



*Supplement of*

**Deep ocean temperatures through time**

**Paul J. Valdes et al.**

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# Scotese Climate Model Simulations Album

The following pages are a brief summary of the climates resulting from the 109 paleogeographies covering the whole of the Phanerozoic era. Access to many more climate variables is available via the website:

[https://www.paleo.bristol.ac.uk/ummodel/scripts/papers/Valdes et al 2021.html](https://www.paleo.bristol.ac.uk/ummodel/scripts/papers/Valdes_et_al_2021.html)

Each pages in the album corresponds to:

Top Left – Topography and Bathymetry on the resolution of the climate model (this and most subsequent plots use the area preserving Mollweide projection).

Top Right – Land ice mask, using a polar stereographic projection extending from 45N/45S to pole.

Subsequent part of page consists of two columns. The left column shows the results from the “smooth” CO<sub>2</sub> simulations and the right shows results from the Foster CO<sub>2</sub>.

The second row shows the time series of ocean volume integrated temperatures (solid line) and 2731m temperatures (dotted line) for the whole duration of the runs.

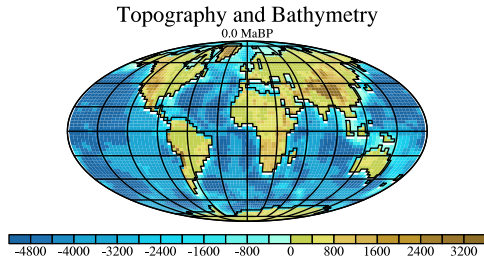
The third row shows the annual mean surface air temperature

The fourth row shows the annual mean precipitation

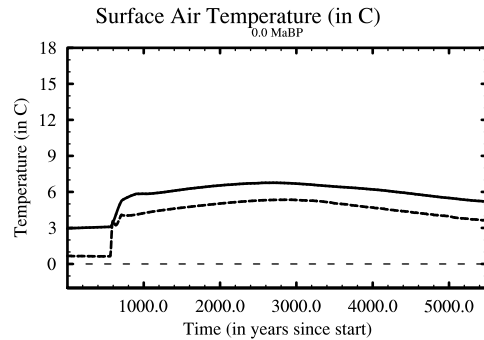
The first row shows the deep ocean temperature at 2731m and the bottom temperature (when depths are greater than 1000m)

The final row shows modelled mixed layer depth as a pair of plots corresponding to DJF/JJA. This allows for a clearer understanding of the regions where sinking is occurring (indicated by high mixed layer depths).

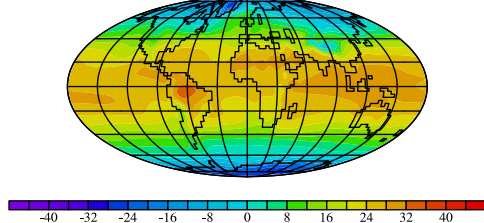
# Present-day (Holocene, 0 Ma)



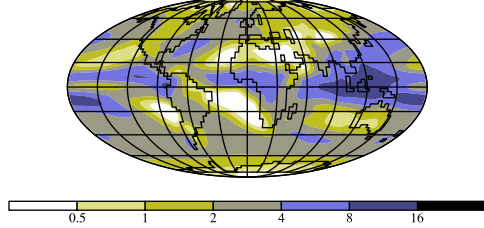
CO<sub>2</sub>= 280 ppmv



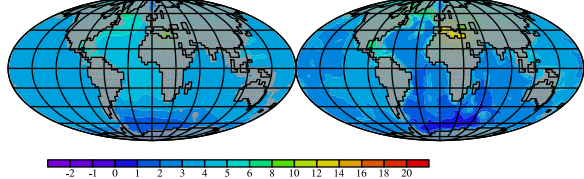
Surface Air Temperature (in C)  
Expt = texya 0.0 MaBP ANN



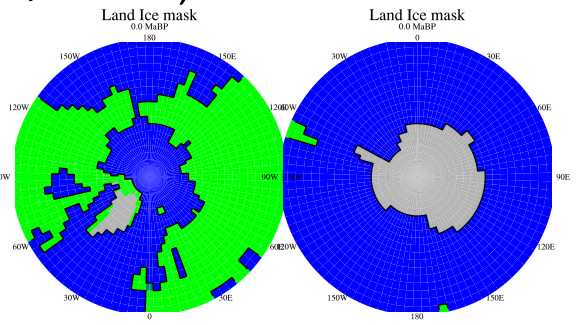
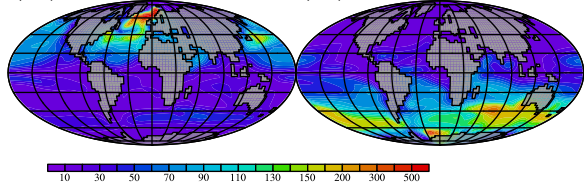
Precipitation (in mm/day)  
Expt = texya 0.0 MaBP ANN



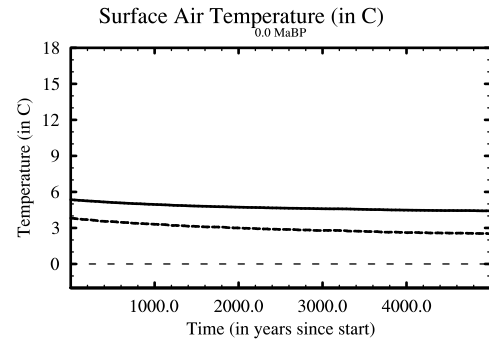
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texya 0.0 MaBP ANN Expt = texya 000.0 MaBP ANN



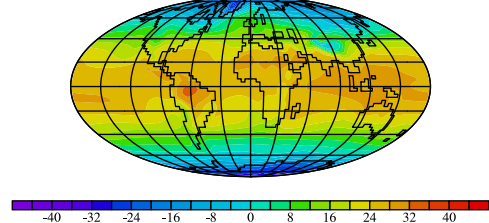
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = texya 0.0 MaBP DJF Expt = texya 0.0 MaBP JJA



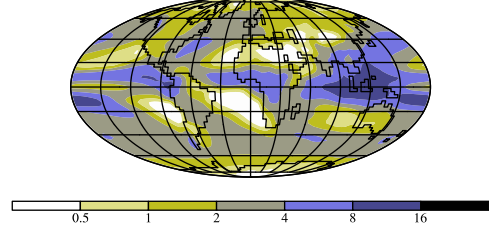
CO<sub>2</sub>= 276 ppmv



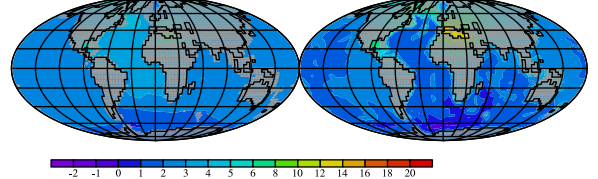
Surface Air Temperature (in C)  
Expt = texpa1 0.0 MaBP ANN



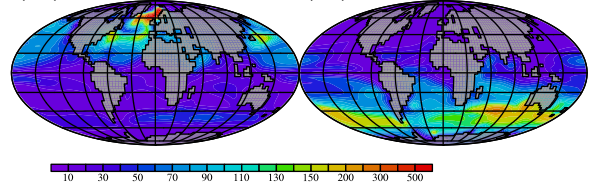
Precipitation (in mm/day)  
Expt = texpa1 0.0 MaBP ANN



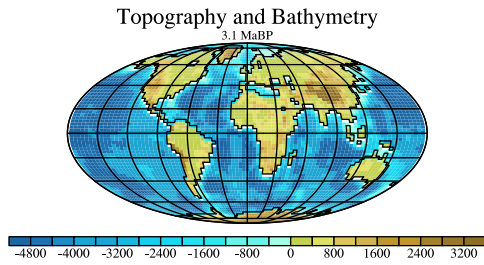
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texpa1 0.0 MaBP ANN Expt = texpa1 000.0 MaBP ANN



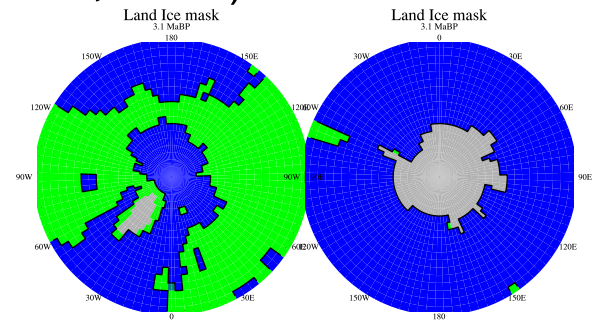
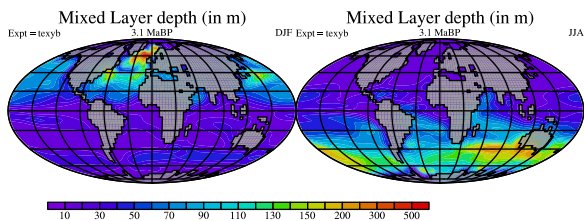
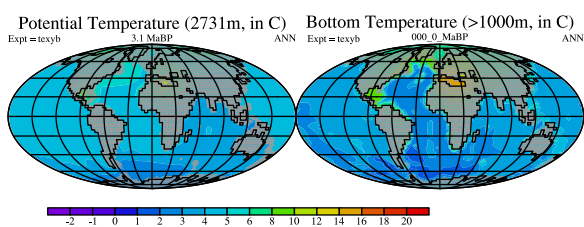
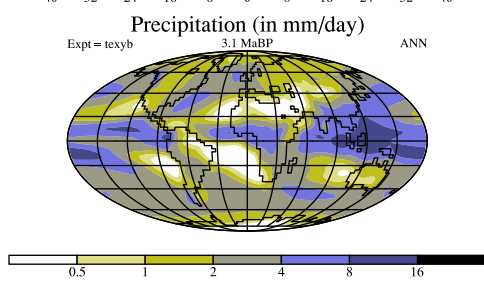
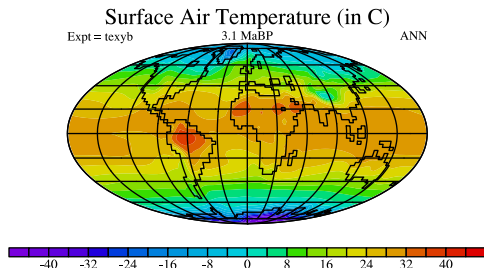
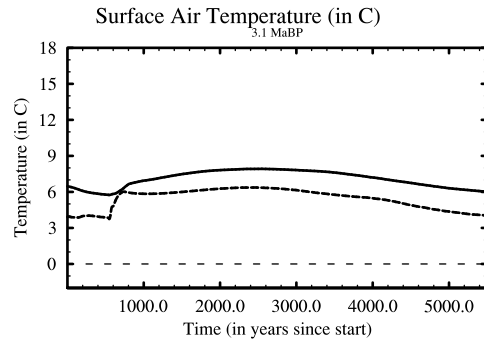
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = texpa1 0.0 MaBP DJF Expt = texpa1 0.0 MaBP JJA



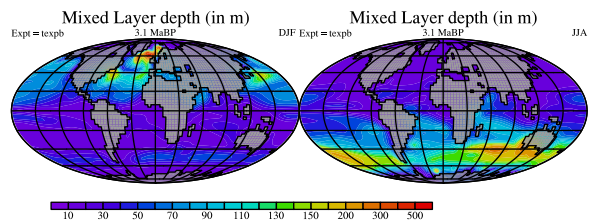
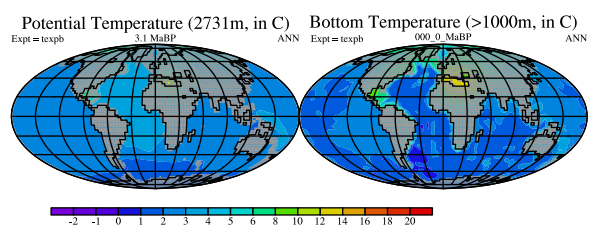
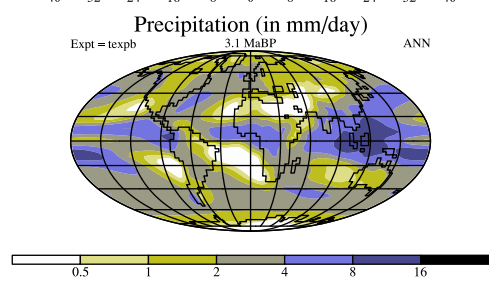
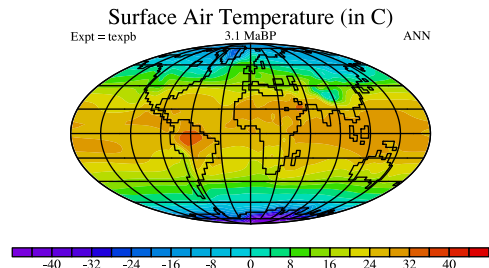
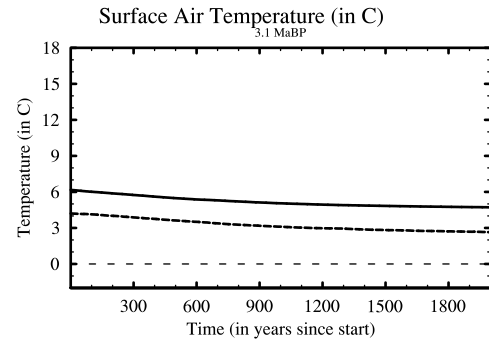
# Late Pliocene (Piacenzian, 3.09)



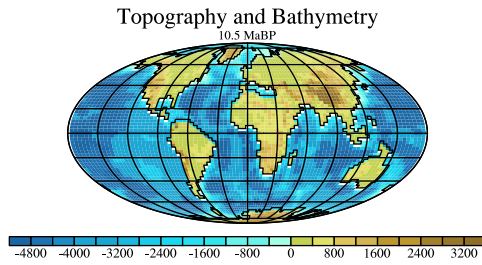
CO<sub>2</sub>= 384 ppmv



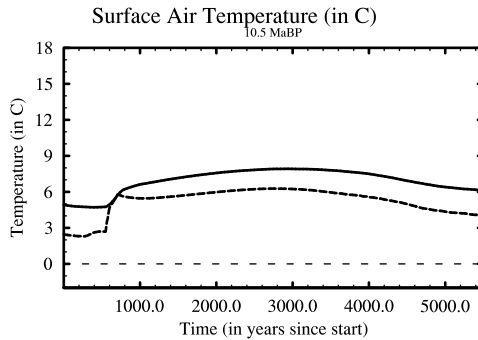
CO<sub>2</sub>= 298 ppmv



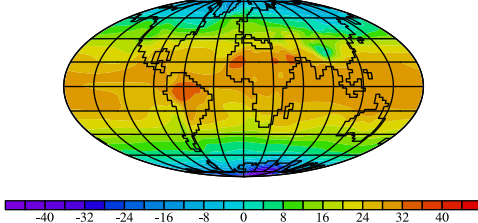
# Middle/Late Miocene (Serravallian&Tortonian, 10.5 Ma)



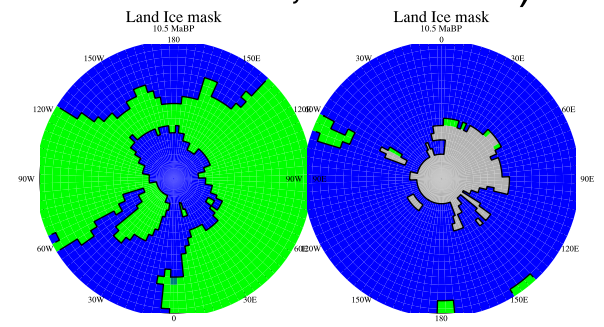
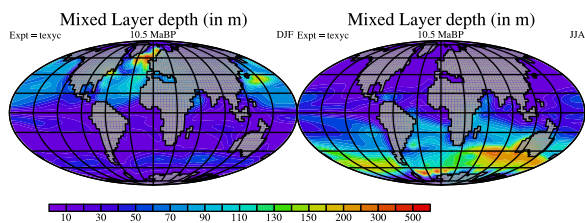
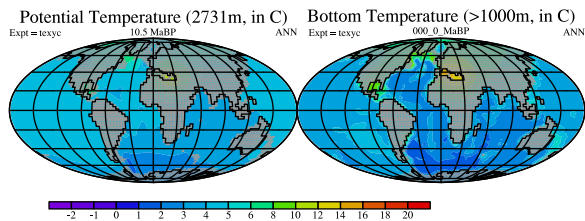
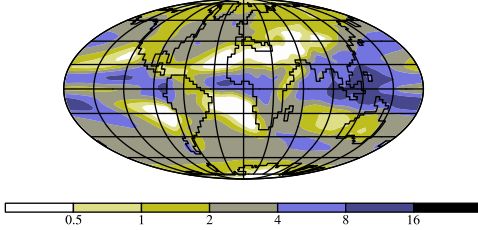
CO<sub>2</sub>= 410 ppmv



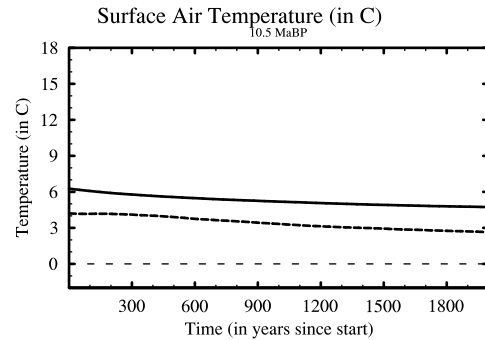
Surface Air Temperature (in C)  
10.5 MaBP



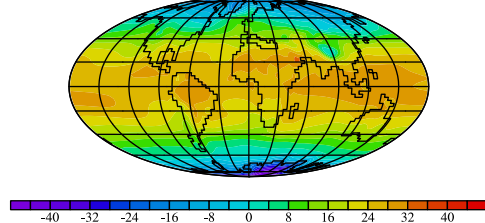
Precipitation (in mm/day)  
10.5 MaBP



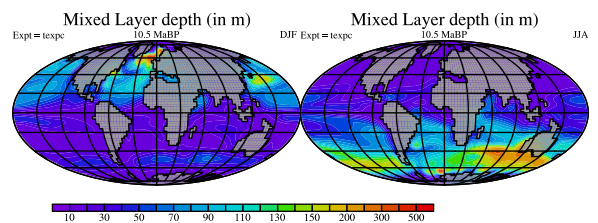
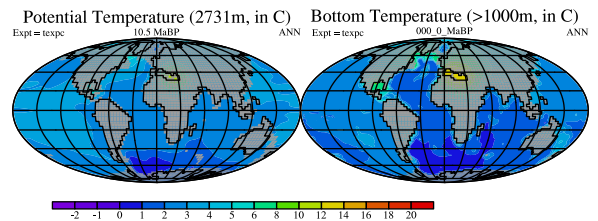
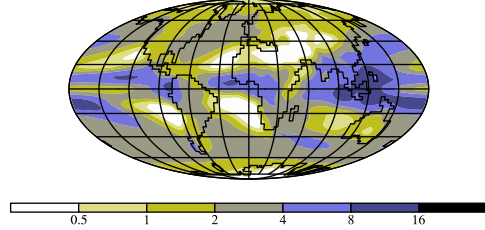
CO<sub>2</sub>= 299 ppmv



Surface Air Temperature (in C)  
10.5 MaBP

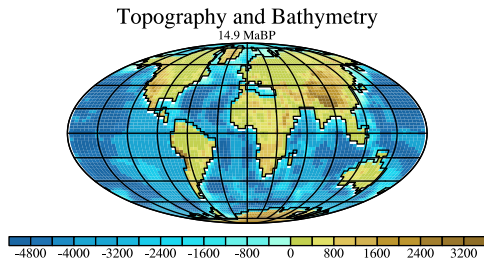


Precipitation (in mm/day)  
10.5 MaBP

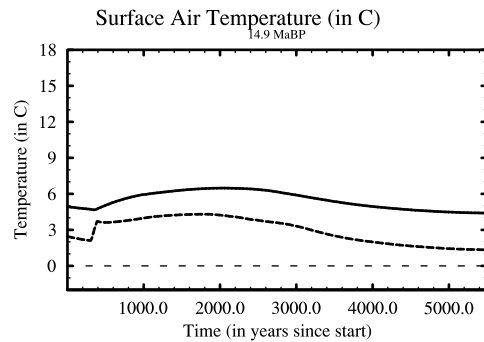




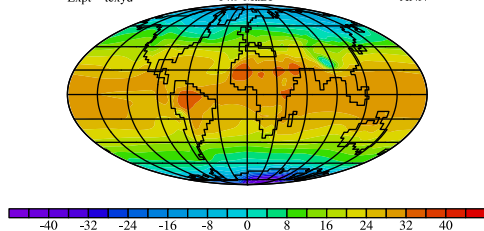
# Middle Miocene (Langhian, 14.9 Ma)



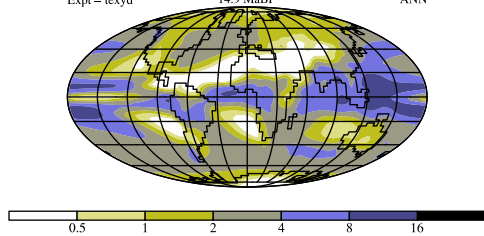
CO<sub>2</sub>= 423 ppmv



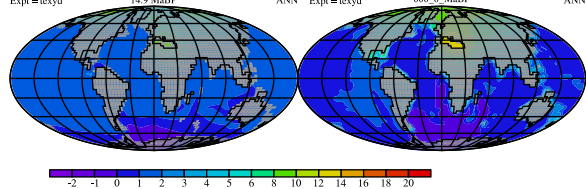
Surface Air Temperature (in C)  
14.9 MaBP



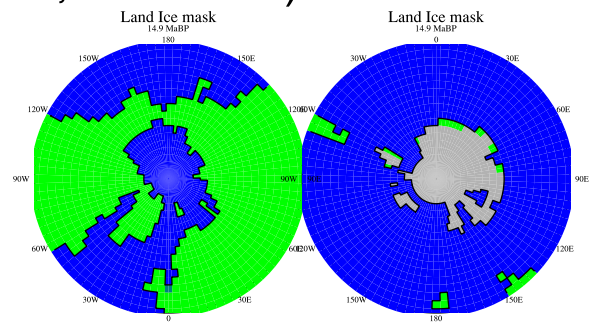
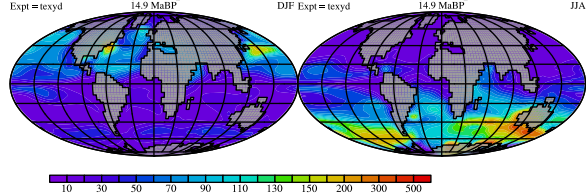
Precipitation (in mm/day)  
14.9 MaBP



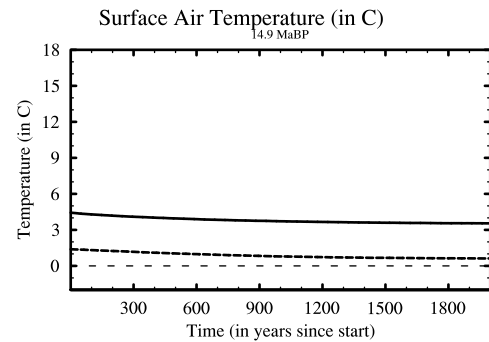
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
14.9 MaBP ANN Expt = texyd 000.0 MaBP ANN



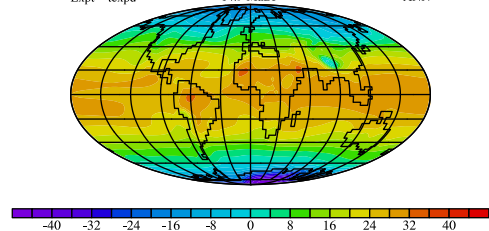
Mixed Layer depth (in m) Mixed Layer depth (in m)  
14.9 MaBP DJF Expt = texyd 14.9 MaBP JJA



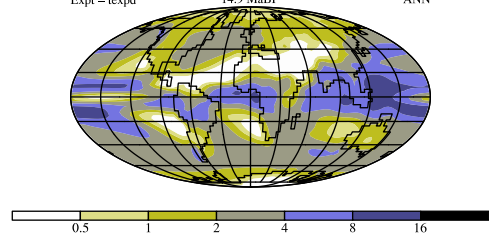
CO<sub>2</sub>= 310 ppmv



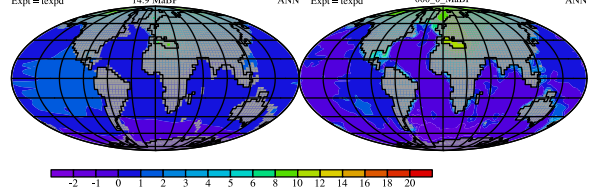
Surface Air Temperature (in C)  
14.9 MaBP



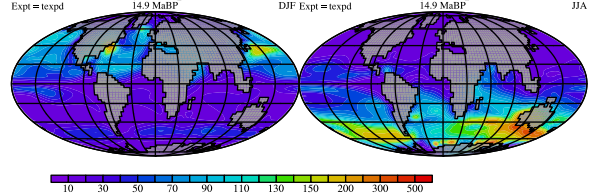
Precipitation (in mm/day)  
14.9 MaBP



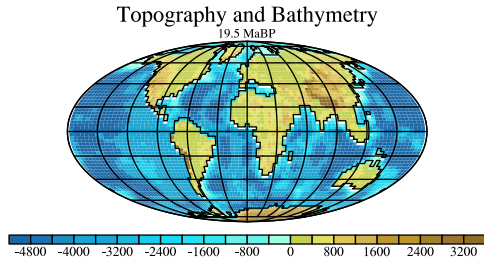
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
14.9 MaBP ANN Expt = texpd 000.0 MaBP ANN



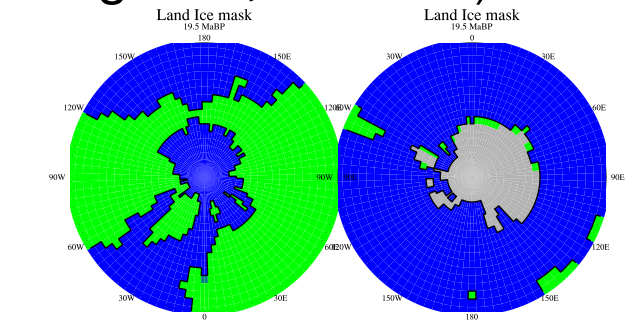
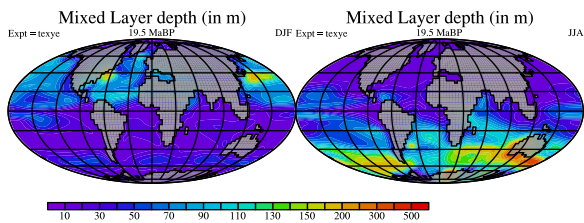
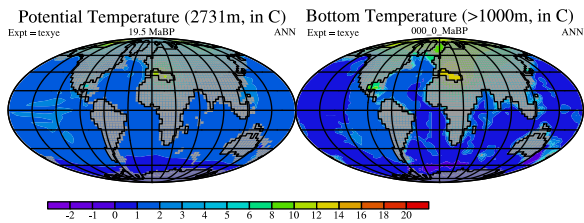
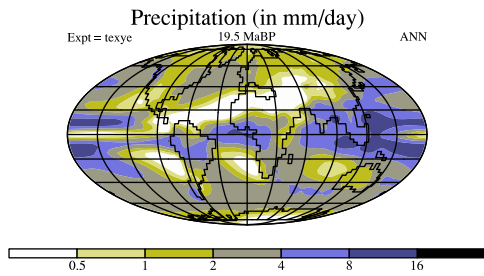
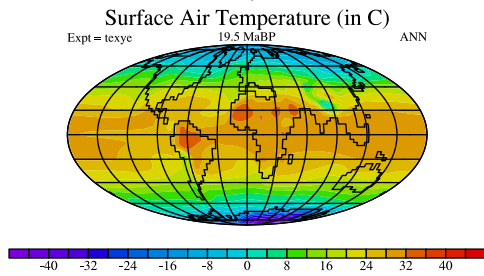
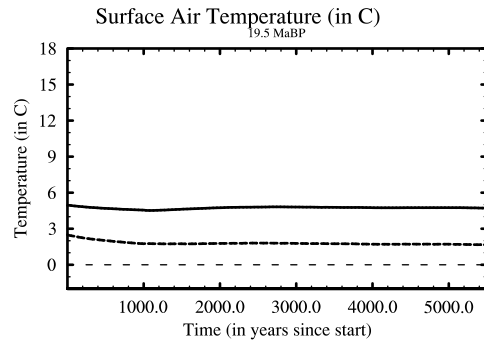
Mixed Layer depth (in m) Mixed Layer depth (in m)  
14.9 MaBP DJF Expt = texpd 14.9 MaBP JJA



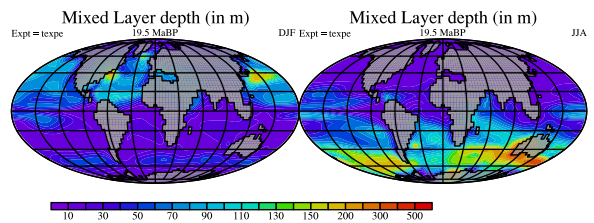
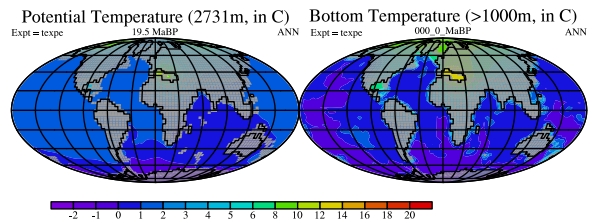
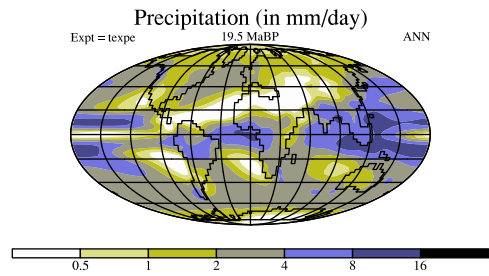
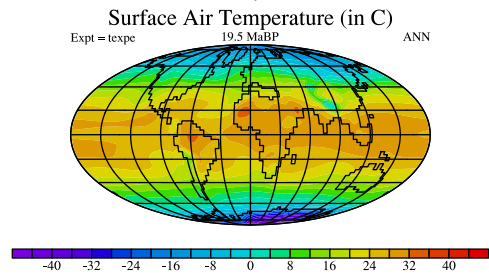
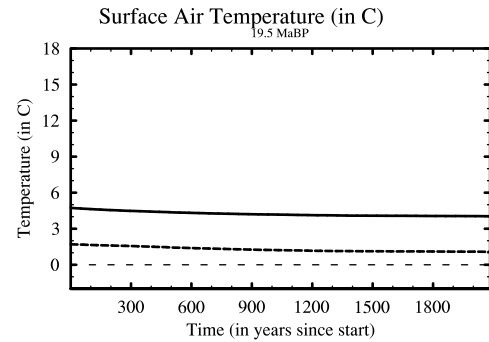
# Early Miocene (Aquitanian&Burdigalian, 19.5 Ma)



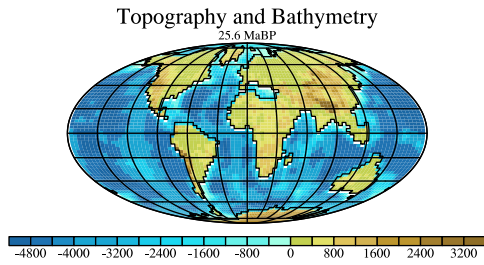
CO<sub>2</sub>= 430 ppmv



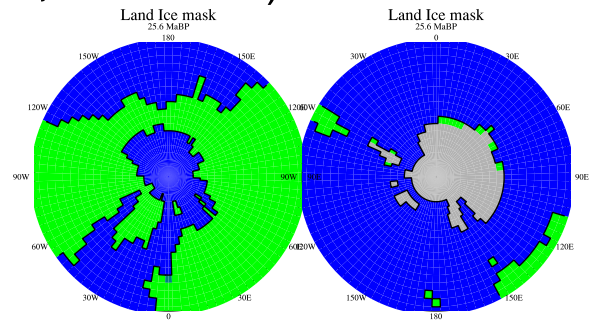
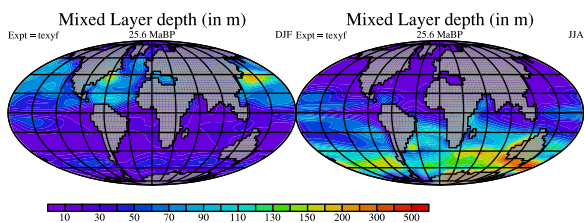
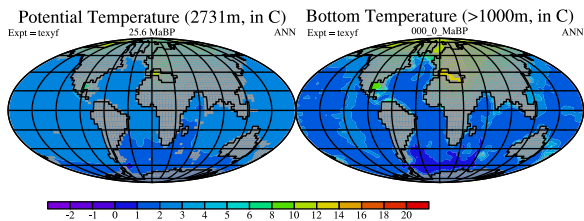
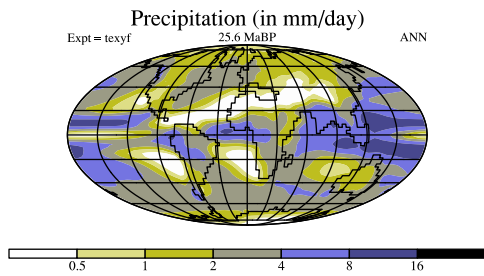
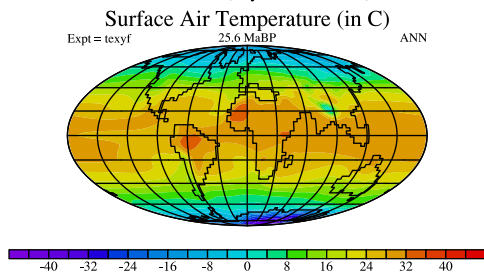
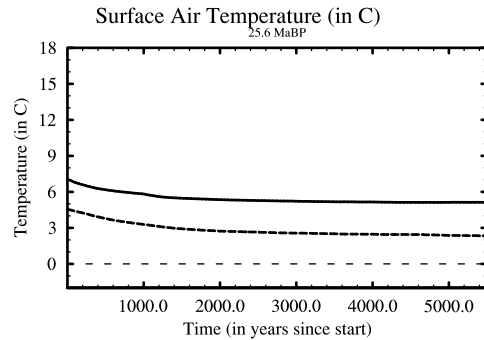
CO<sub>2</sub>= 338 ppmv



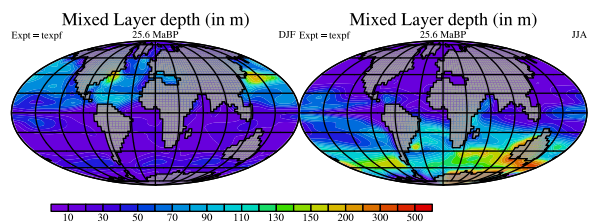
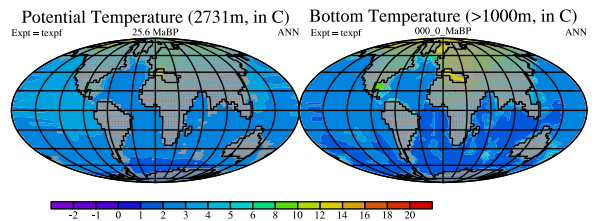
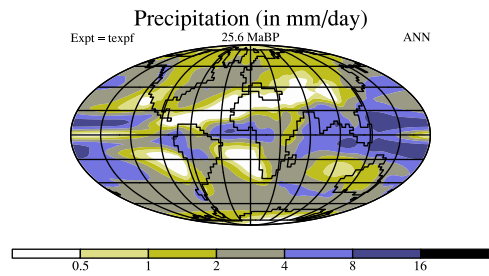
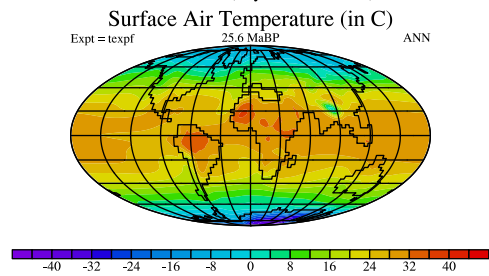
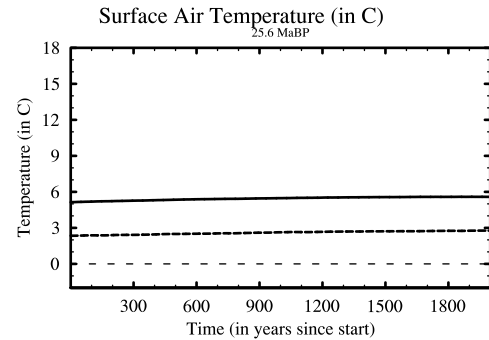
# Late Oligocene (Chattian, 25.6 Ma)



CO<sub>2</sub>= 439 ppmv

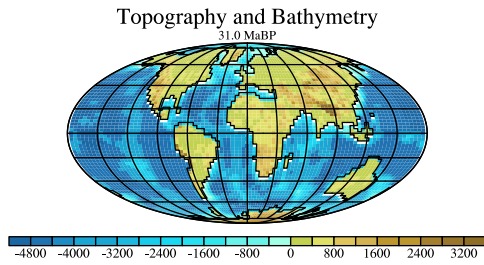


CO<sub>2</sub>= 502 ppmv

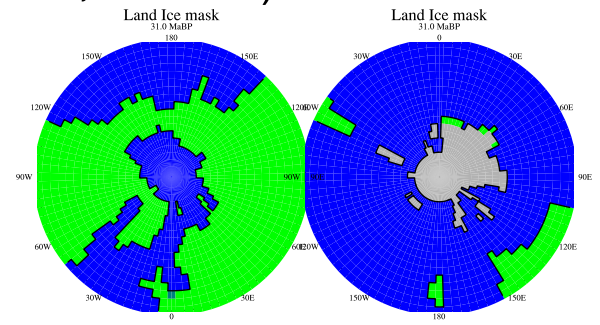
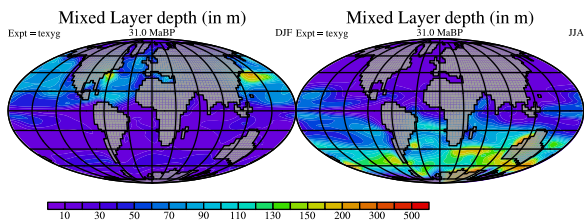
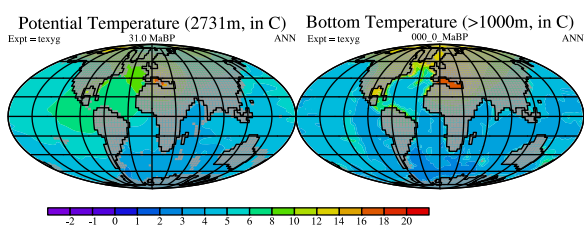
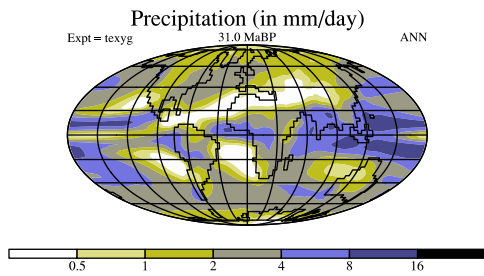
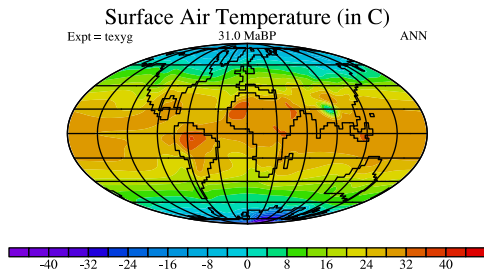
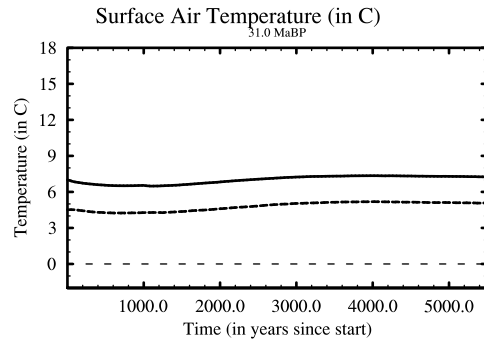




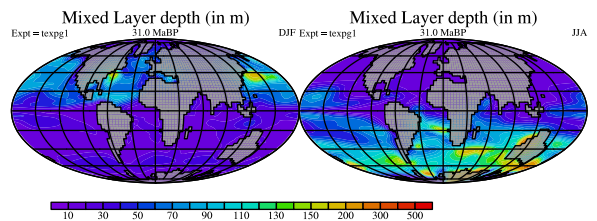
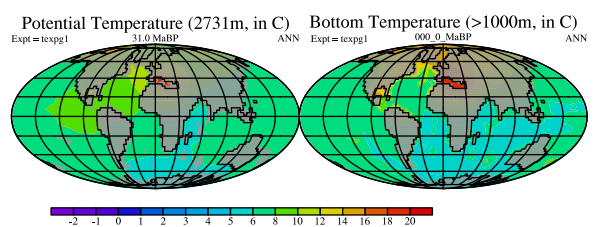
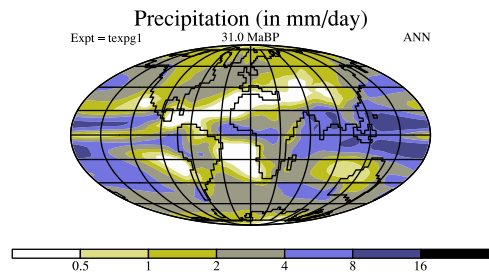
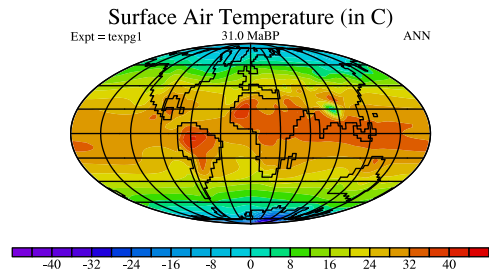
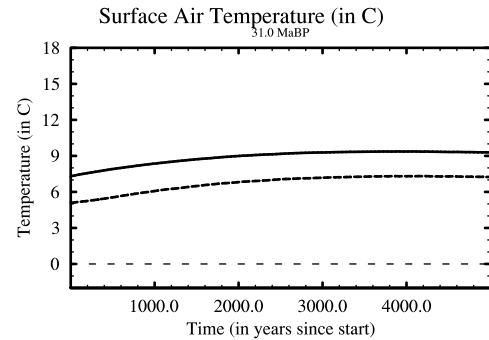
# Early Oligocene (Rupelian, 31 Ma)



CO<sub>2</sub> = 500 ppmv

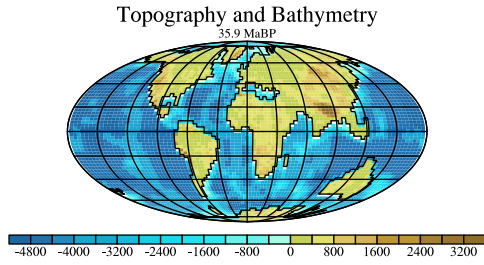


CO<sub>2</sub> = 764 ppmv

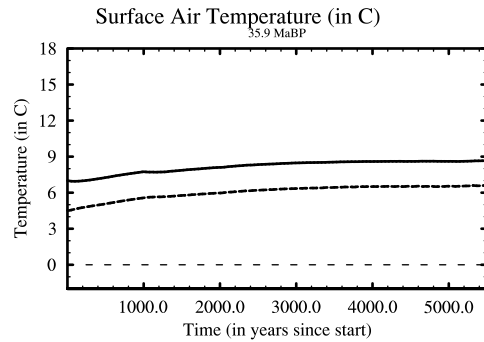




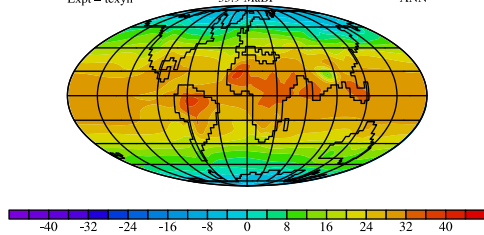
# Late Eocene (Priabonian, 35.9 Ma)



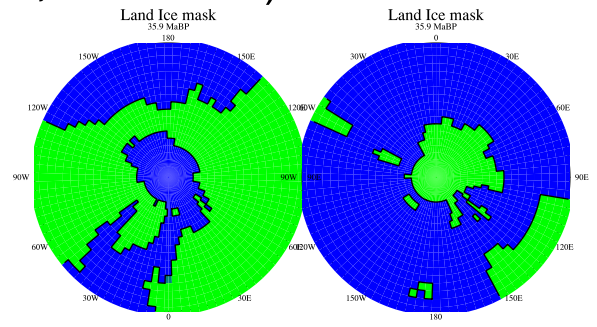
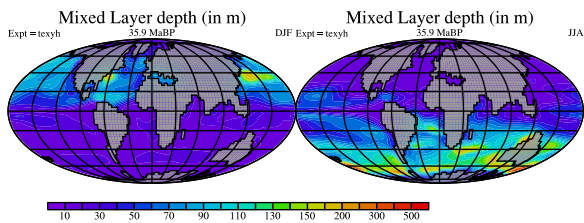
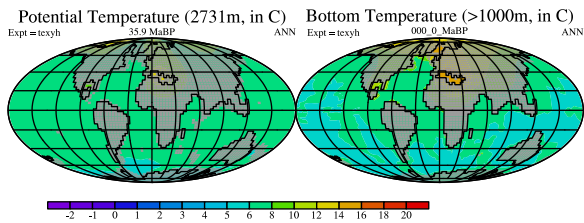
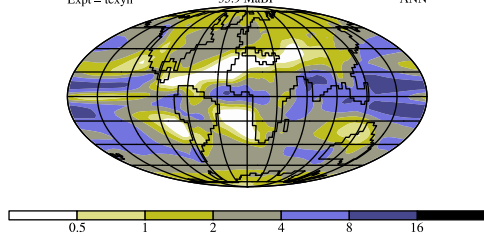
CO<sub>2</sub> = 533 ppmv



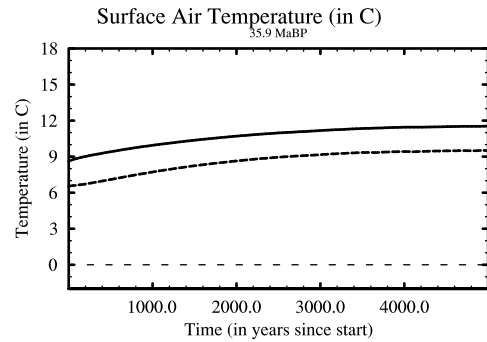
Surface Air Temperature (in C)  
Expt = texyh 35.9 MaBP ANN



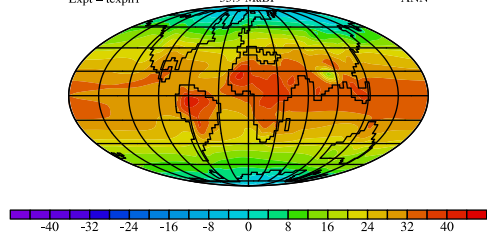
Precipitation (in mm/day)  
Expt = texyh 35.9 MaBP ANN



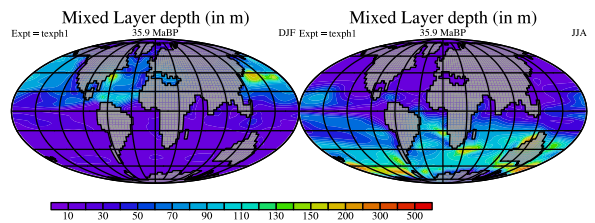
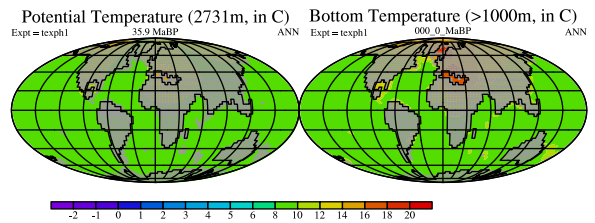
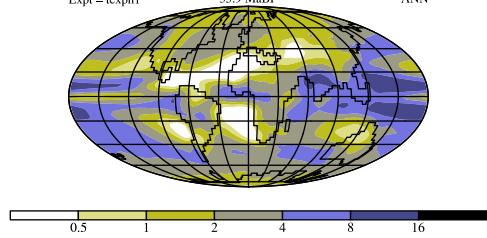
CO<sub>2</sub> = 901 ppmv



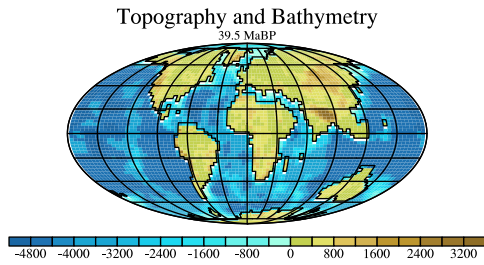
Surface Air Temperature (in C)  
Expt = texph1 35.9 MaBP ANN



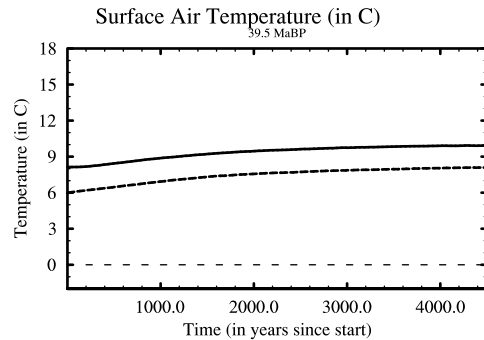
Precipitation (in mm/day)  
Expt = texph1 35.9 MaBP ANN



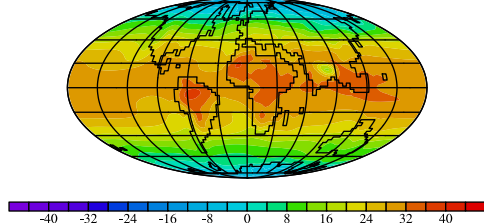
# late Middle Eocene (Bartonian, 39.5 Ma)



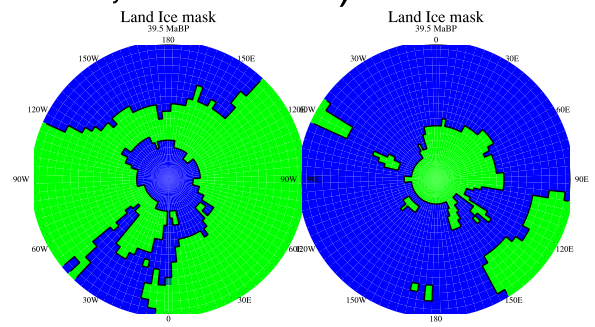
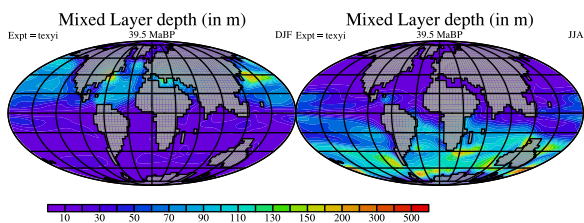
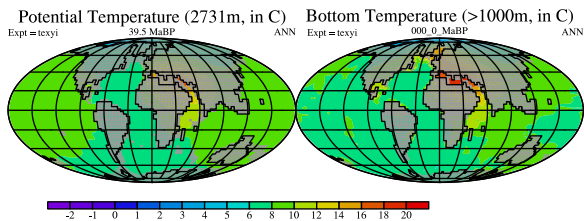
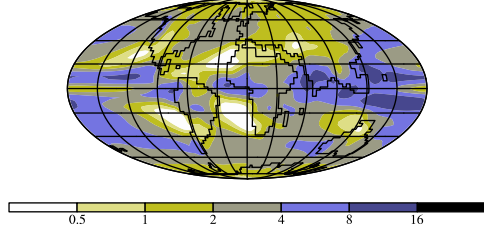
CO<sub>2</sub>= 557 ppmv



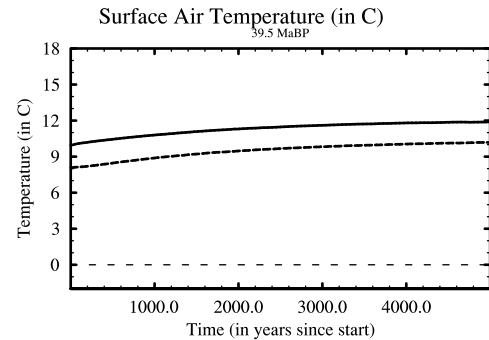
Surface Air Temperature (in C)  
39.5 MaBP



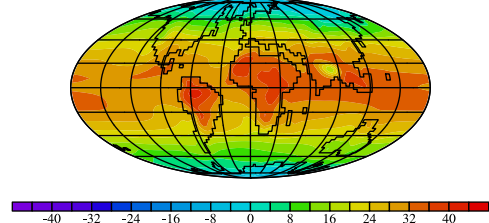
Precipitation (in mm/day)  
39.5 MaBP



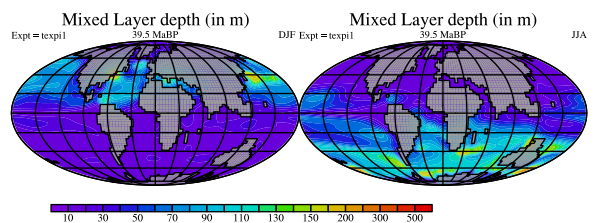
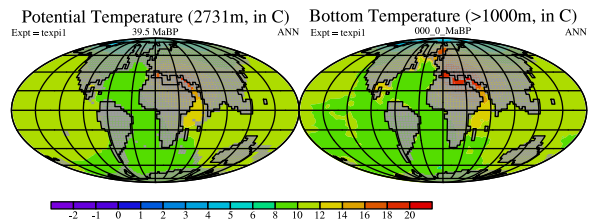
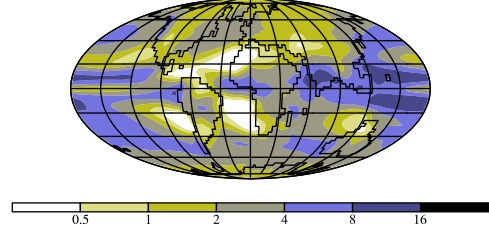
CO<sub>2</sub>= 796 ppmv



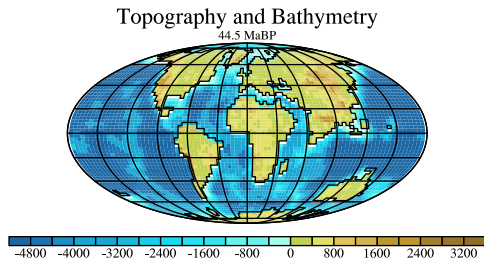
Surface Air Temperature (in C)  
39.5 MaBP



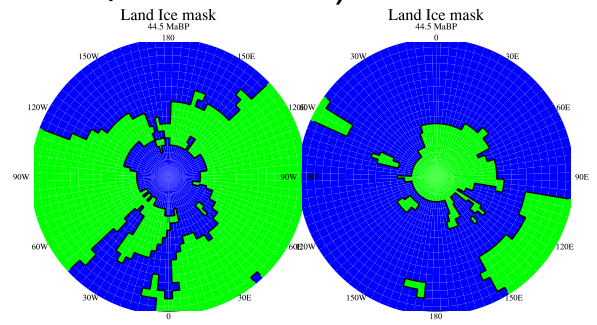
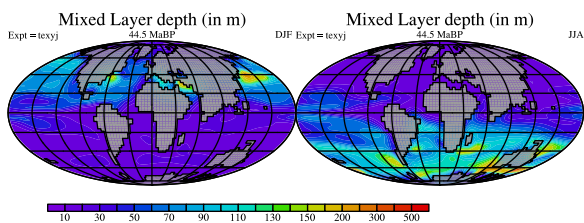
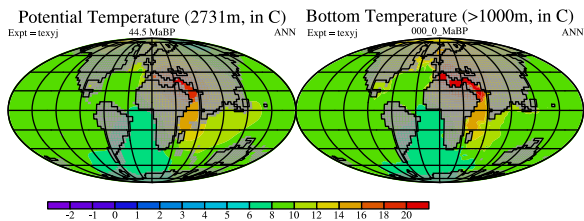
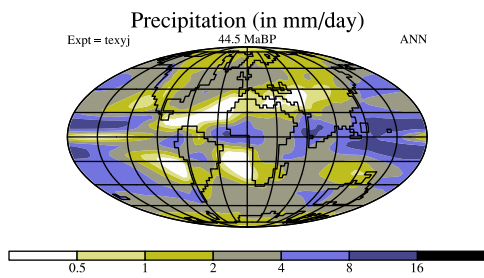
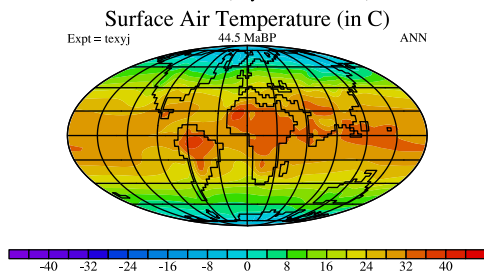
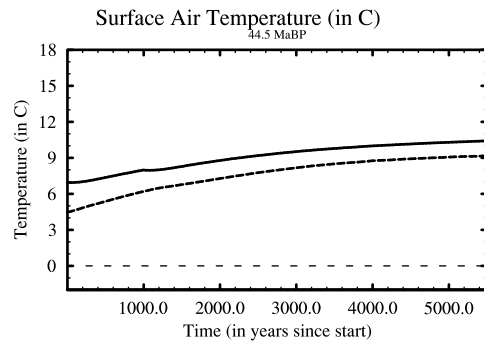
Precipitation (in mm/day)  
39.5 MaBP



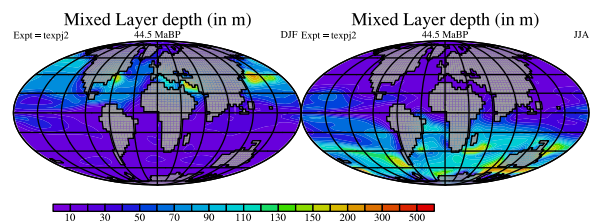
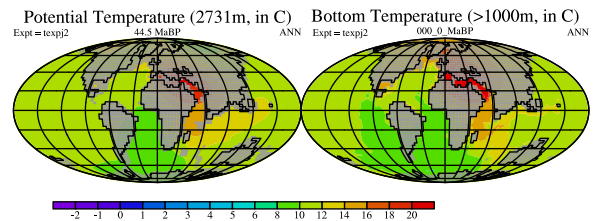
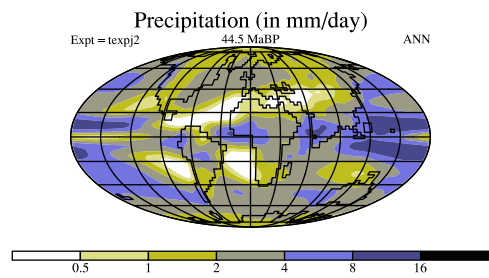
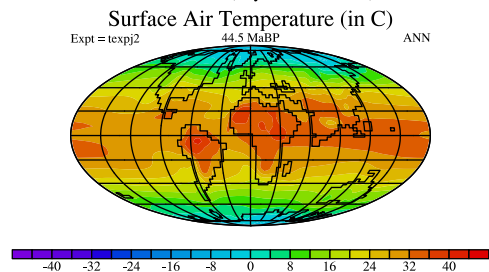
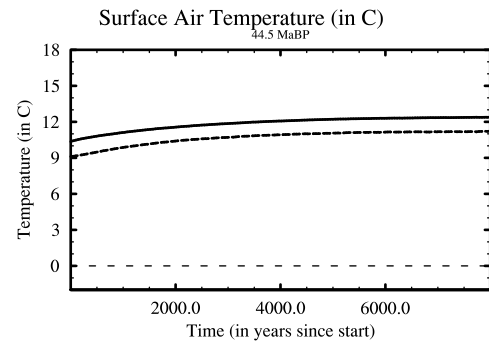
# early Middle Eocene (Lutetian, 44.5 Ma)



CO<sub>2</sub>= 594 ppmv

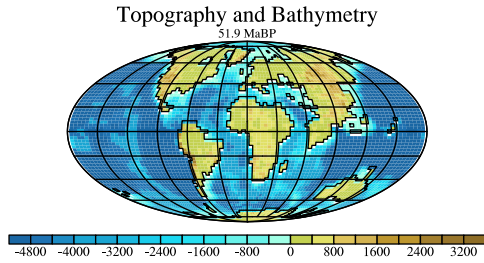


CO<sub>2</sub>= 751 ppmv

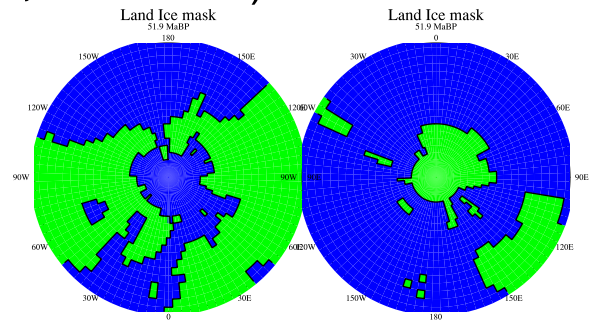
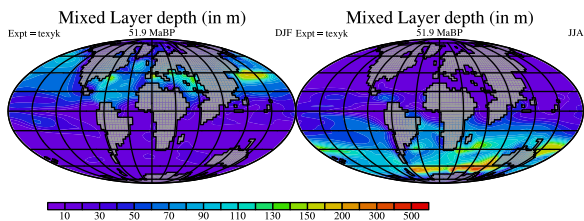
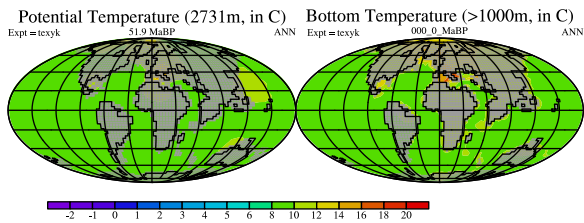
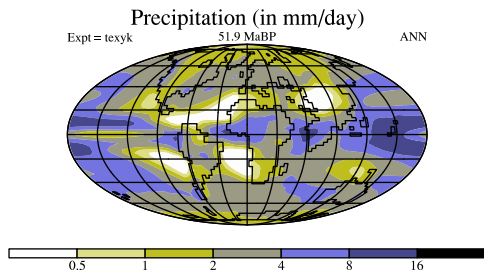
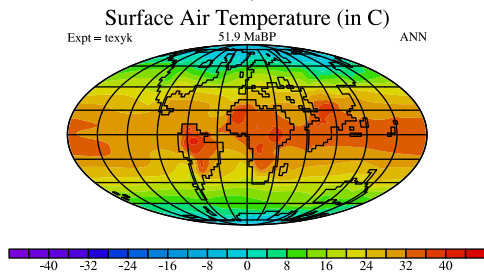
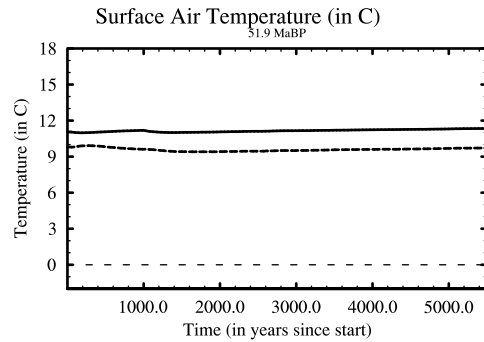




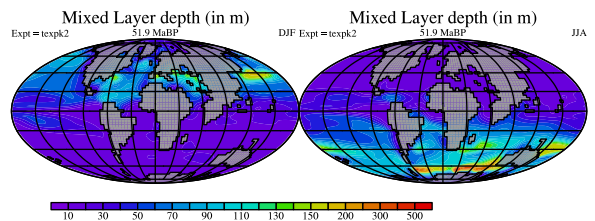
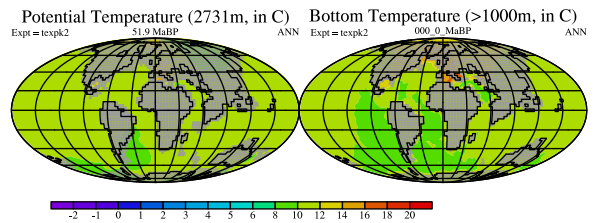
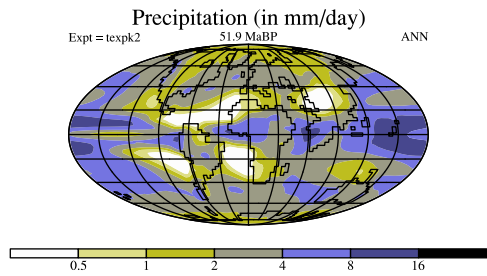
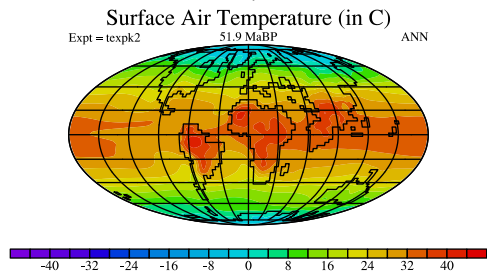
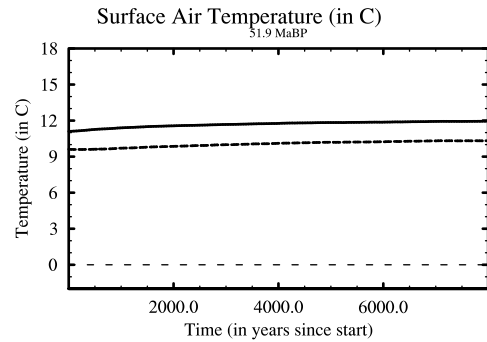
# Early Eocene (Ypresian, 51.9 Ma)

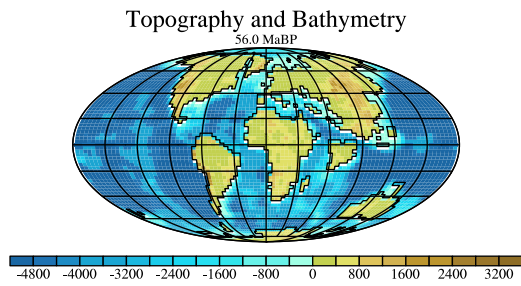


CO<sub>2</sub>= 649 ppmv

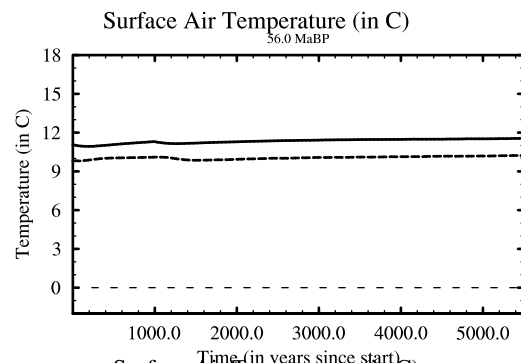


CO<sub>2</sub>= 736 ppmv

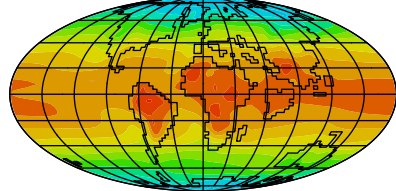




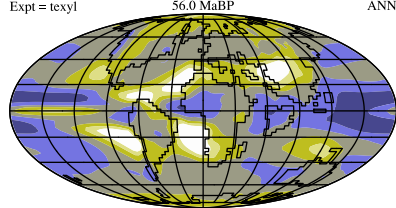
CO<sub>2</sub>= 630 ppmv



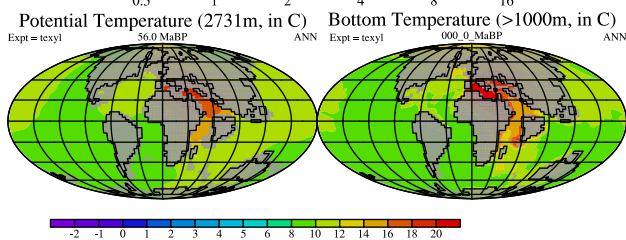
Surface Air Temperature (in C)  
56.0 MaBP



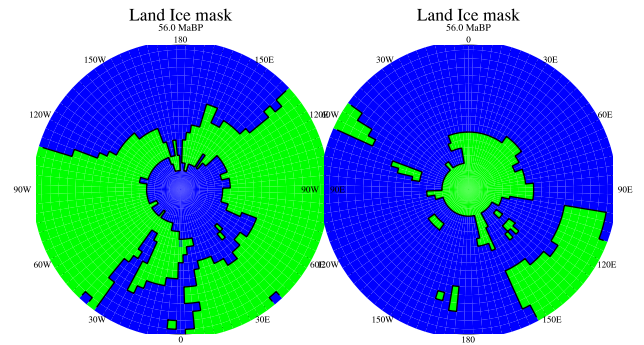
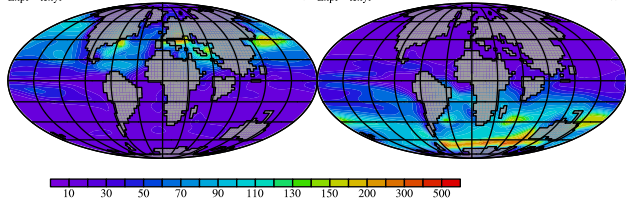
Precipitation (in mm/day)  
56.0 MaBP



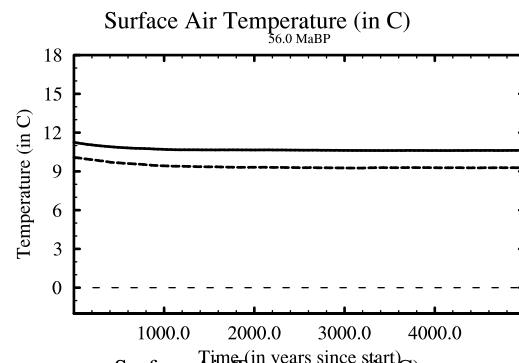
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)



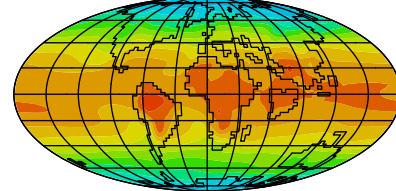
Mixed Layer depth (in m) DJF Expt = texyl 56.0 MaBP JJA



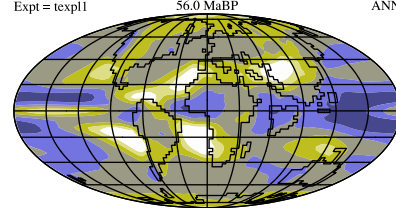
CO<sub>2</sub>= 570 ppmv



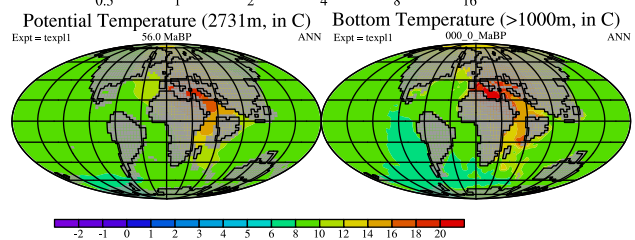
Surface Air Temperature (in C)  
56.0 MaBP



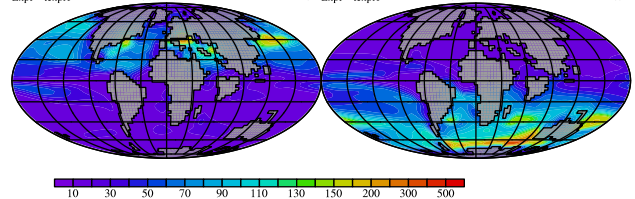
Precipitation (in mm/day)  
56.0 MaBP



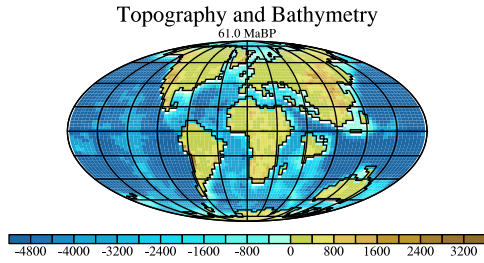
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)



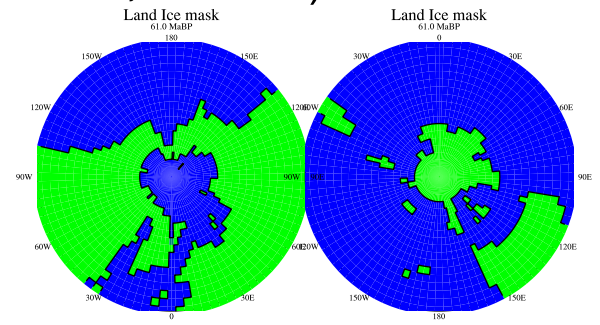
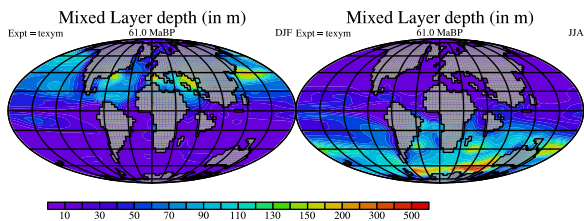
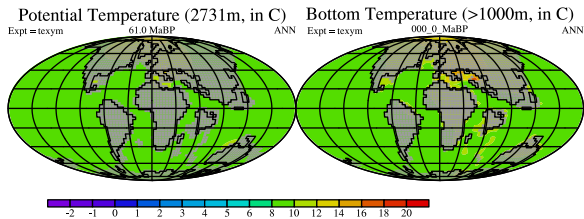
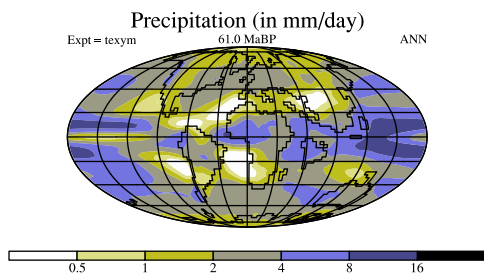
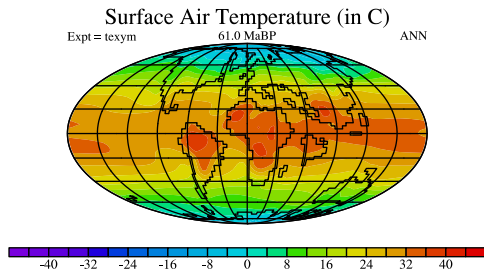
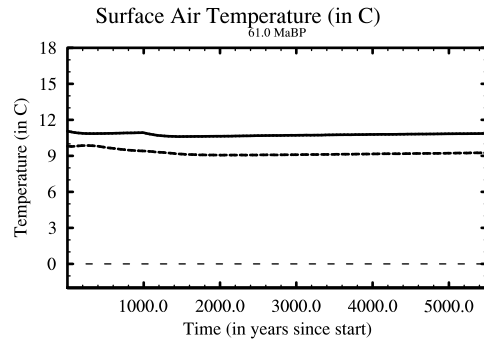
Mixed Layer depth (in m) DJF Expt = texpl1 56.0 MaBP JJA



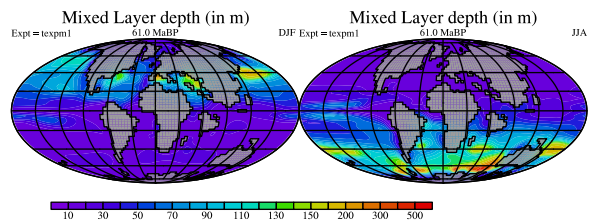
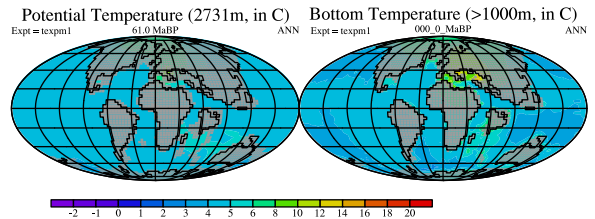
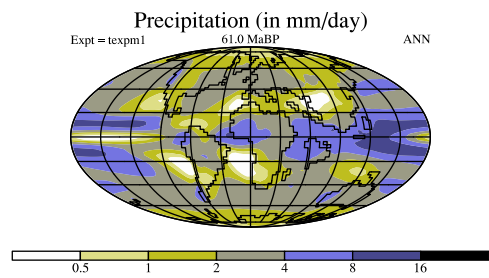
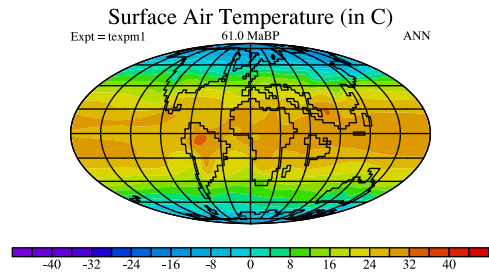
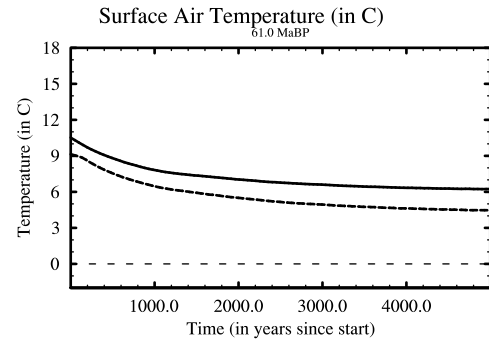
# Paleocene (Danian&Thanetian, 61 Ma)



CO<sub>2</sub>= 604 ppmv

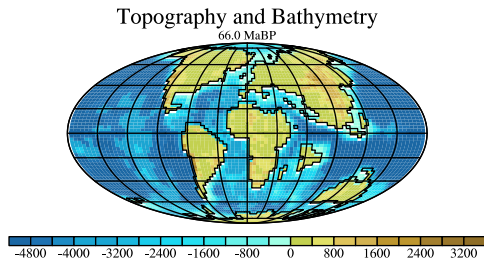


CO<sub>2</sub>= 335 ppmv

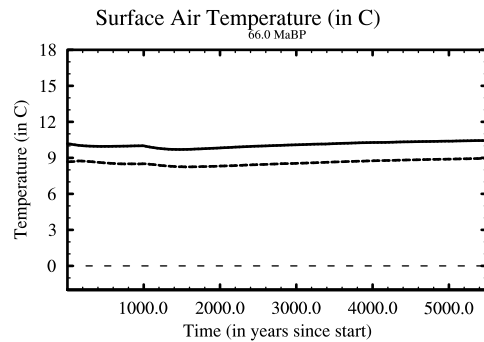




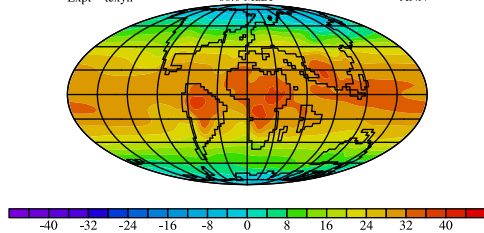
# KT Boundary (latest Maastrichtian, 66 Ma)



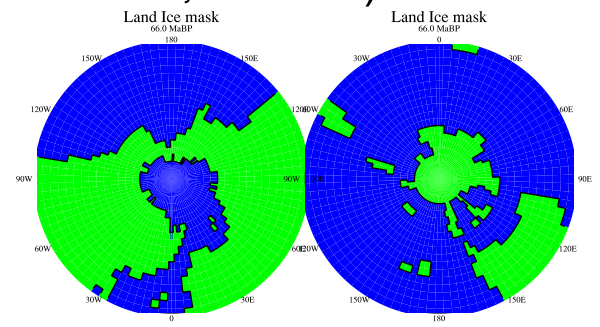
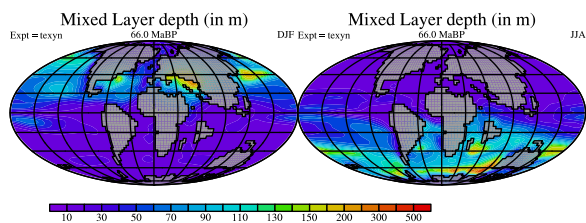
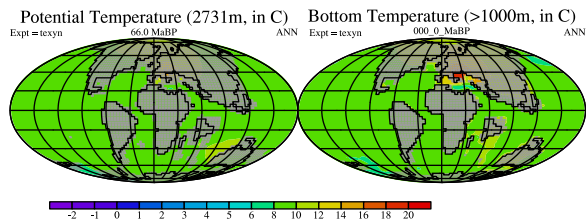
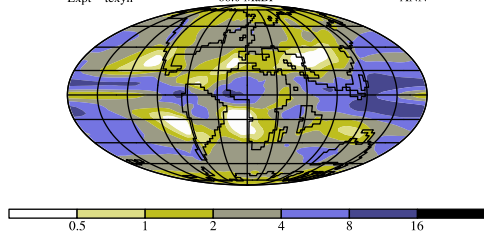
CO<sub>2</sub> = 576 ppmv



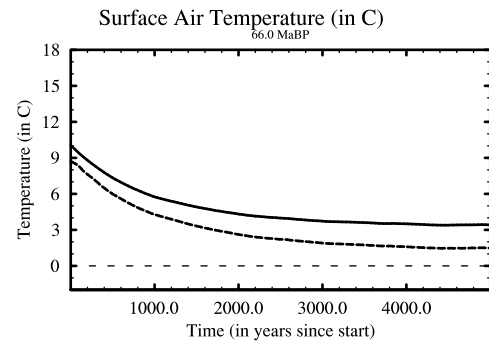
Surface Air Temperature (in C)  
Expt = texyn 66.0 MaBP ANN



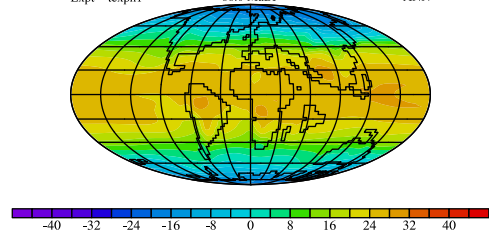
Precipitation (in mm/day)  
Expt = texyn 66.0 MaBP ANN



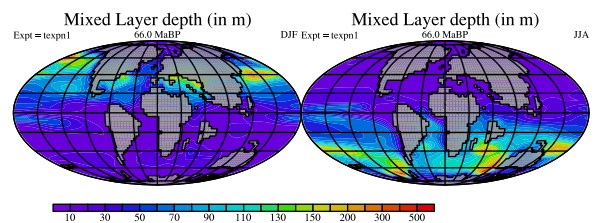
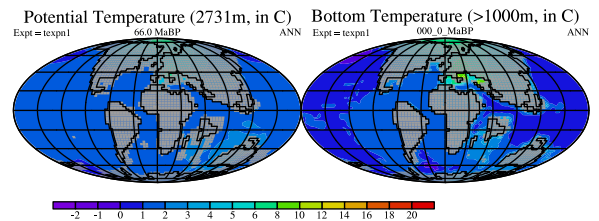
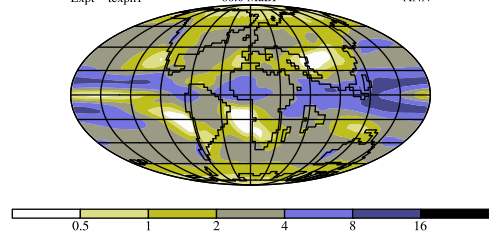
CO<sub>2</sub> = 229 ppmv



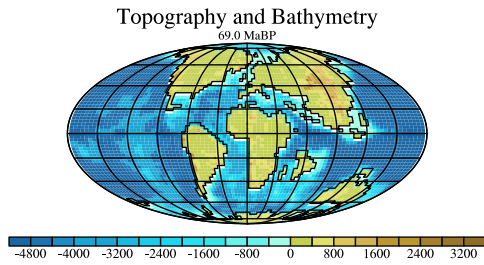
Surface Air Temperature (in C)  
Expt = texpn1 66.0 MaBP ANN



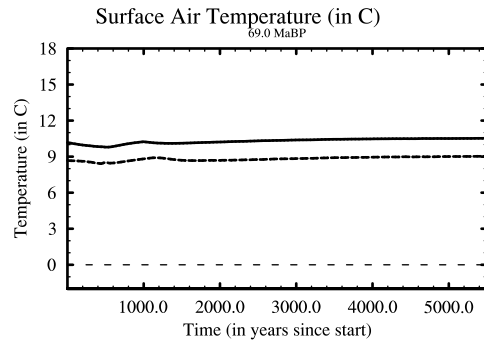
Precipitation (in mm/day)  
Expt = texpn1 66.0 MaBP ANN



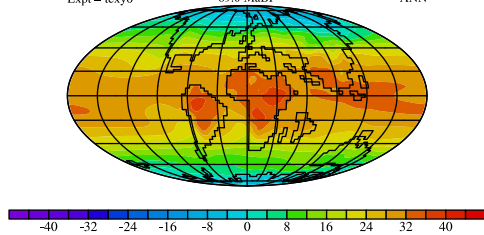
# Late Cretaceous (Maastrichtian, 69 Ma)



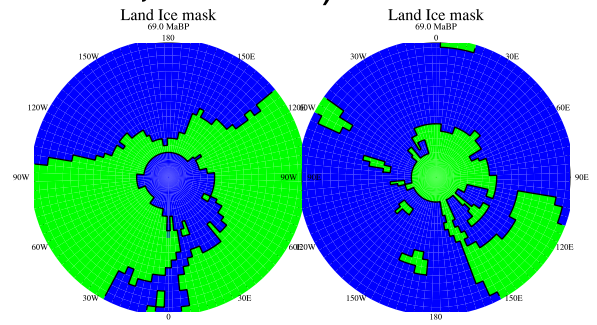
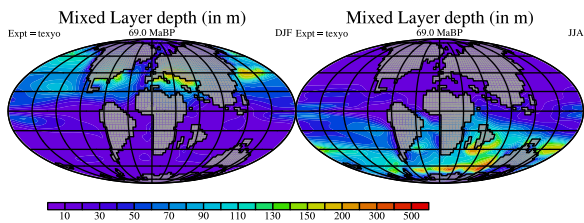
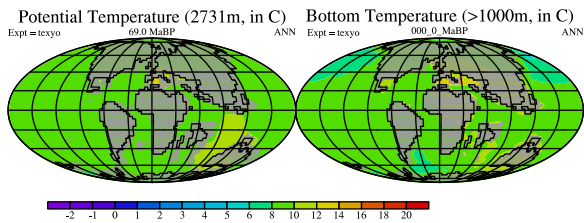
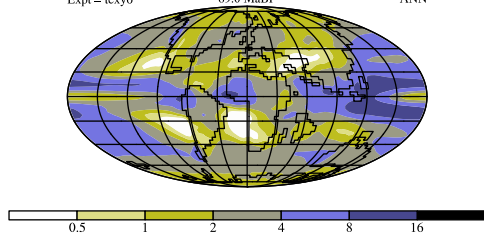
CO<sub>2</sub>= 560 ppmv



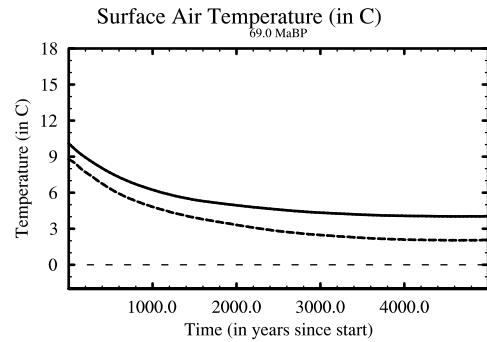
Surface Air Temperature (in C)  
Expt = texyo 69.0 MaBP ANN



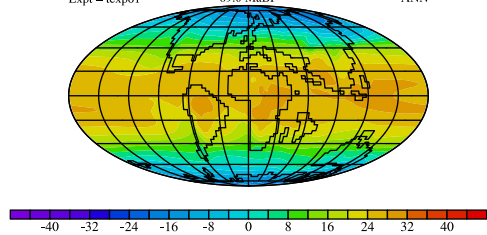
Precipitation (in mm/day)  
Expt = texyo 69.0 MaBP ANN



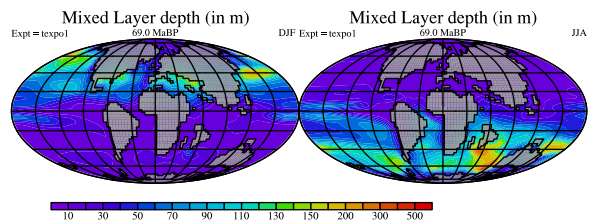
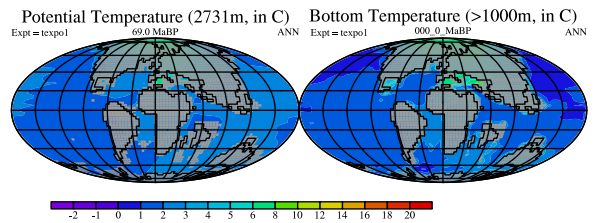
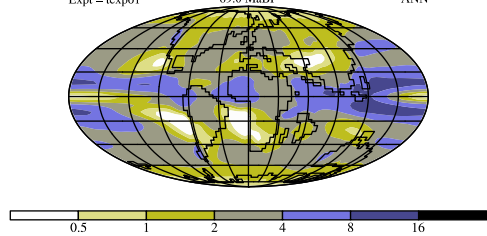
CO<sub>2</sub>= 262 ppmv



Surface Air Temperature (in C)  
Expt = texpo1 69.0 MaBP ANN

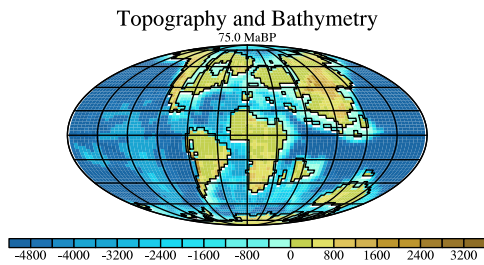


Precipitation (in mm/day)  
Expt = texpo1 69.0 MaBP ANN

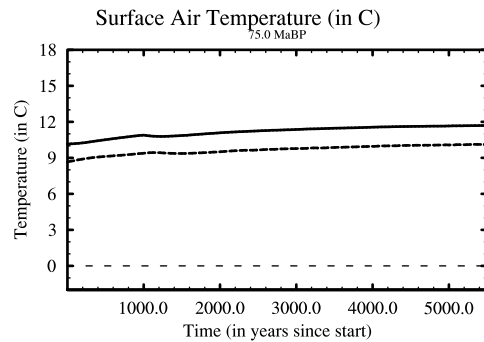




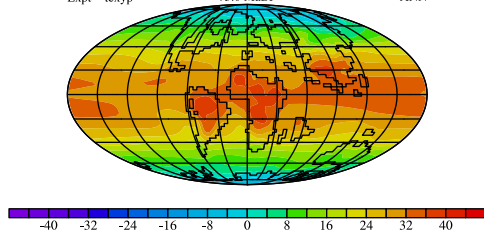
# Late Cretaceous (Late Campanian, 75 Ma)



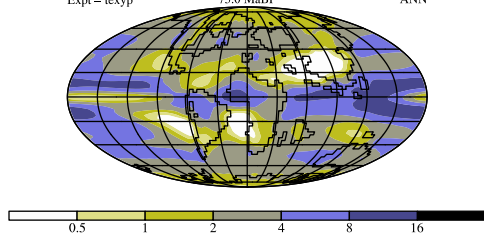
CO<sub>2</sub>= 633 ppmv



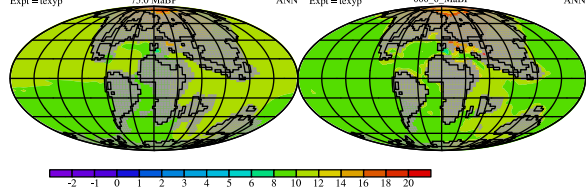
Surface Air Temperature (in C)  
Expt = texyp ANN



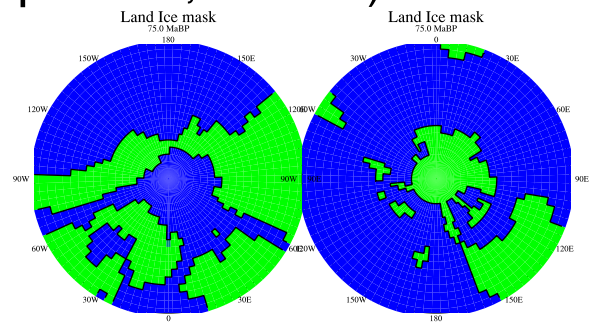
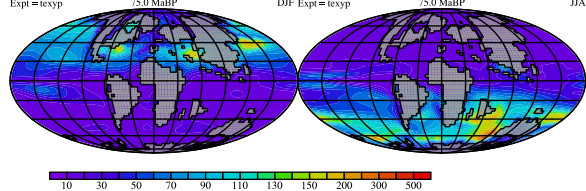
Precipitation (in mm/day)  
Expt = texyp ANN



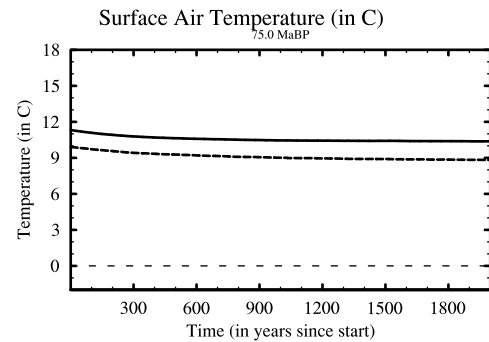
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texyp ANN Expt = texyp ANN



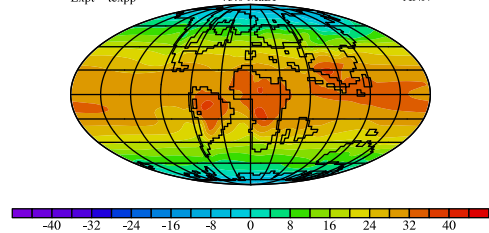
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = texyp DJF Expt = texyp ANN



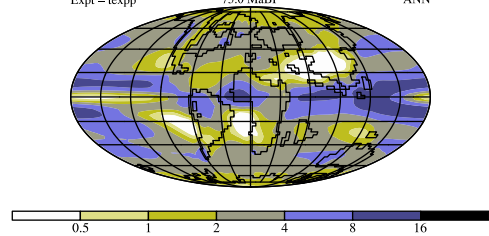
CO<sub>2</sub>= 559 ppmv



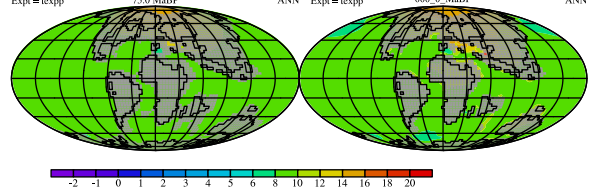
Surface Air Temperature (in C)  
Expt = texpp ANN



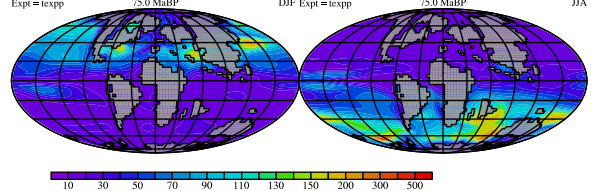
Precipitation (in mm/day)  
Expt = texpp ANN



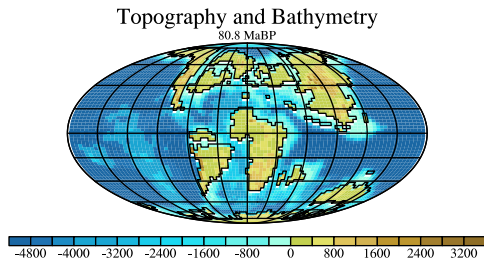
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texpp ANN Expt = texpp ANN



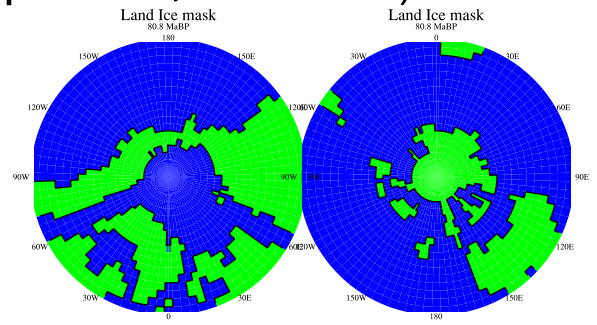
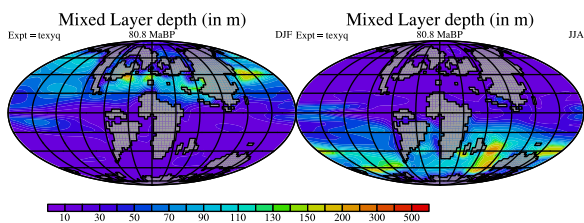
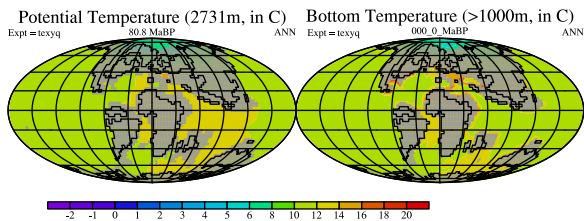
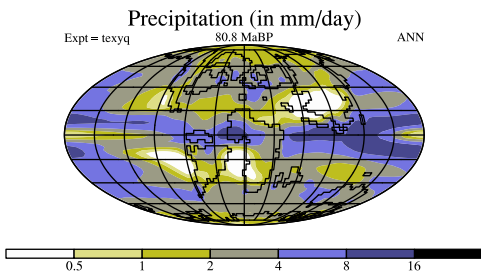
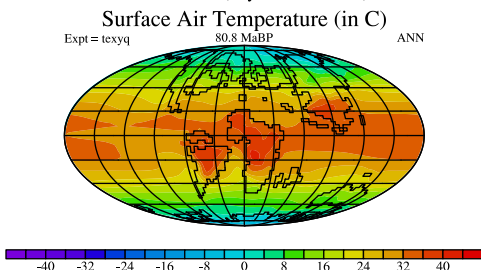
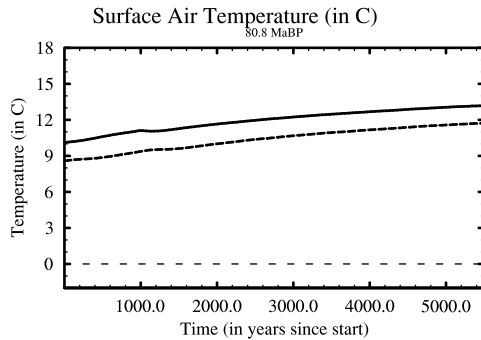
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = texpp DJF Expt = texpp ANN



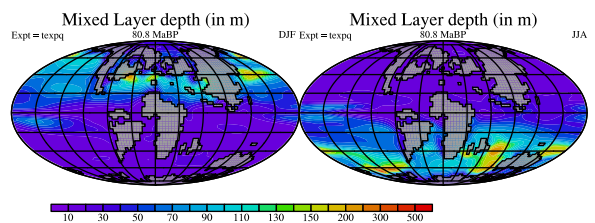
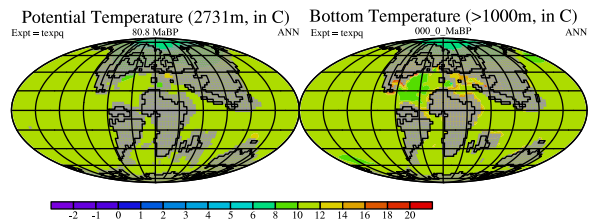
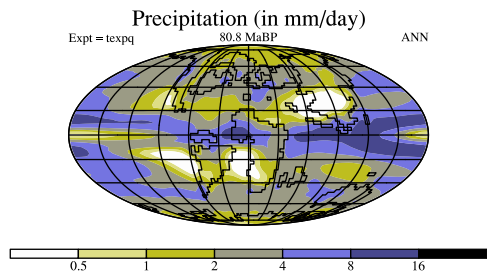
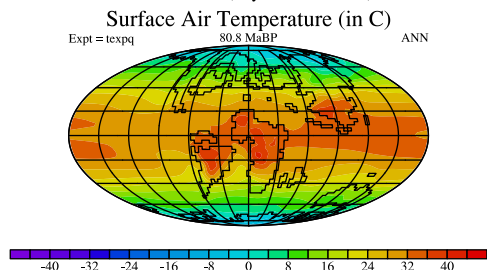
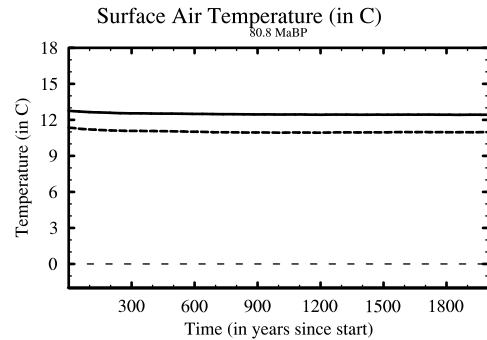
# Late Cretaceous (Early Campanian, 80.8 Ma)



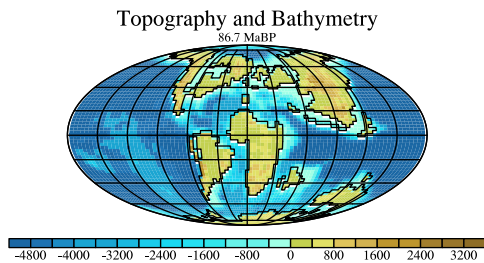
CO<sub>2</sub> = 704 ppmv



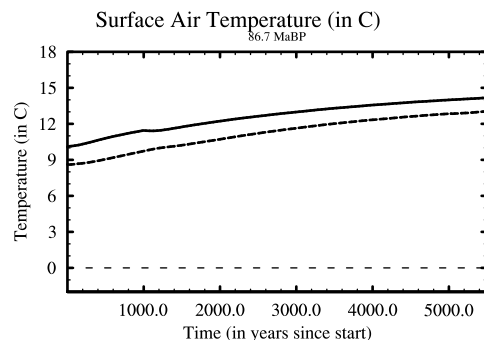
CO<sub>2</sub> = 667 ppmv



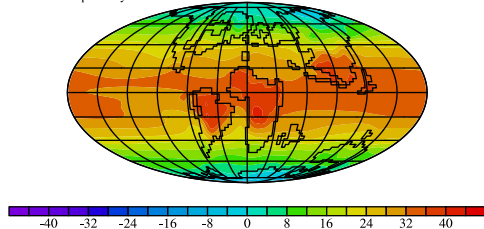
# Late Cretaceous (Santonian&Coniacian, 86.7 Ma)



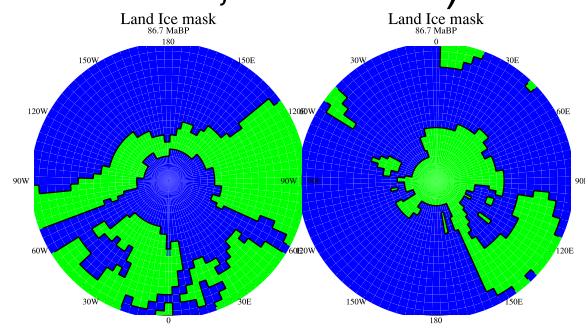
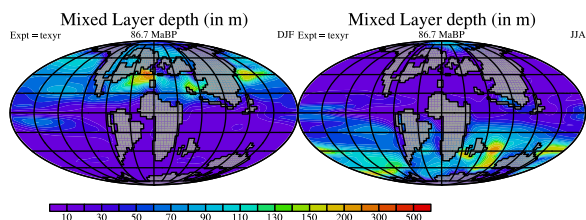
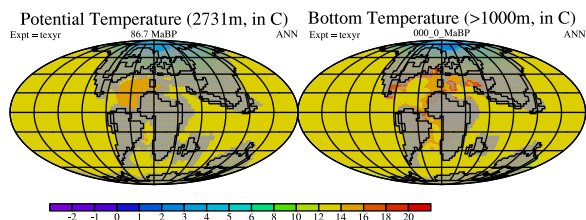
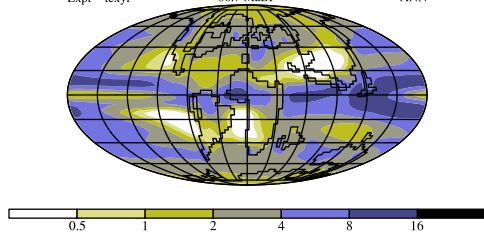
CO<sub>2</sub> = 775 ppmv



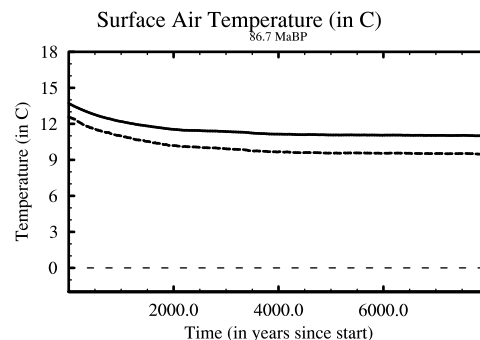
Surface Air Temperature (in C)  
86.7 MaBP



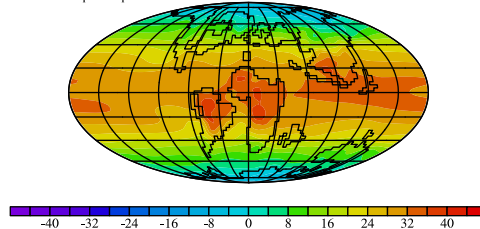
Precipitation (in mm/day)  
86.7 MaBP



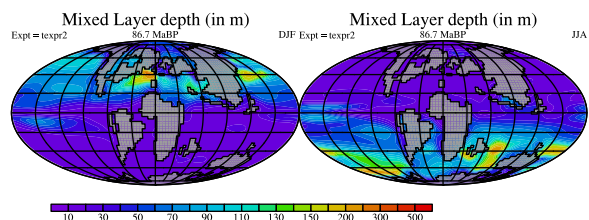
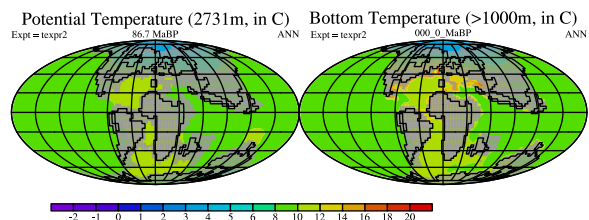
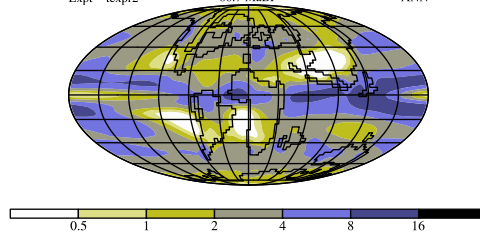
CO<sub>2</sub> = 590 ppmv



Surface Air Temperature (in C)  
86.7 MaBP

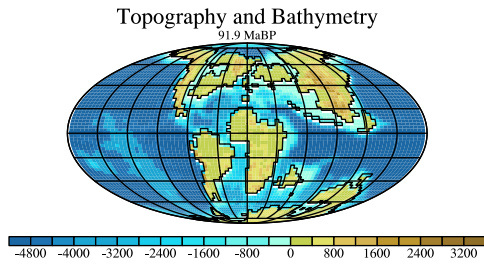


Precipitation (in mm/day)  
86.7 MaBP

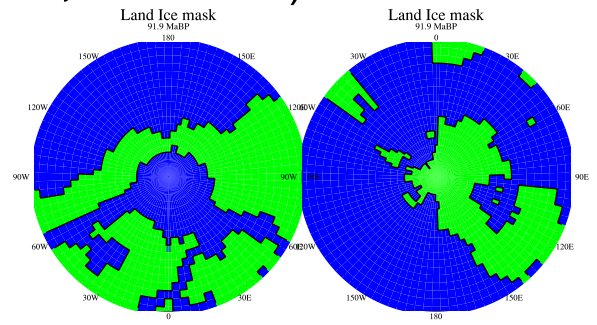
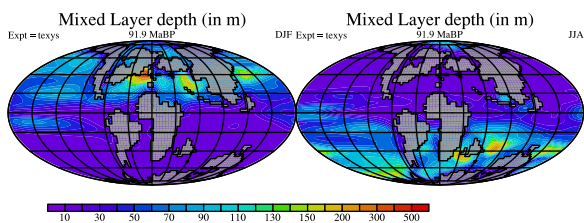
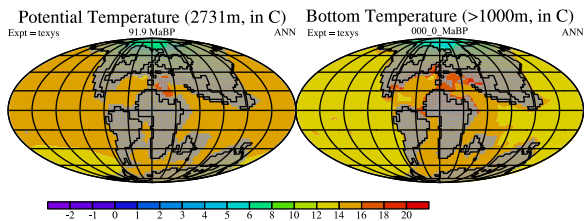
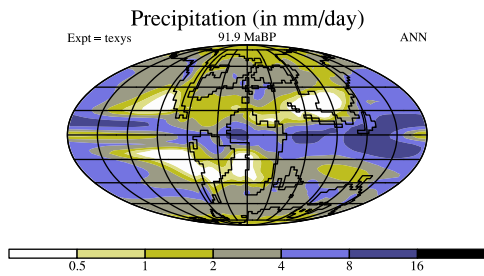
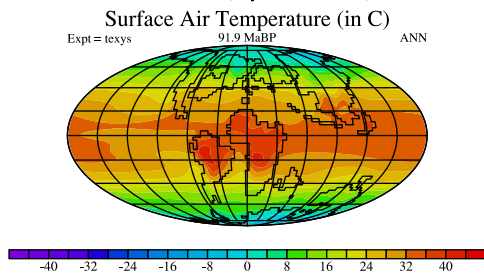
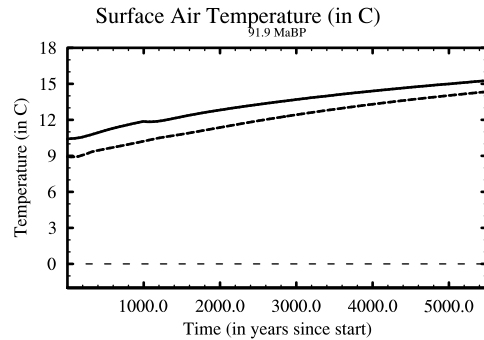




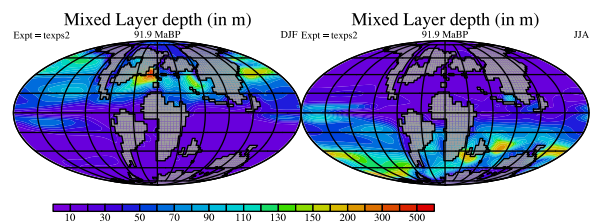
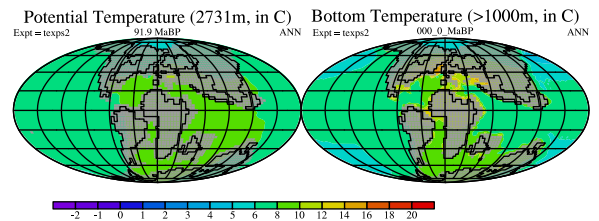
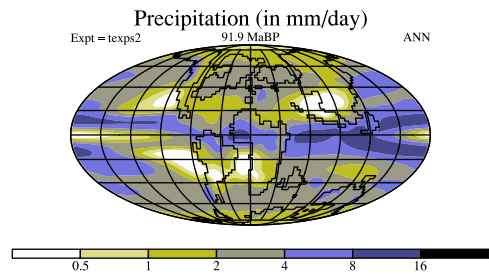
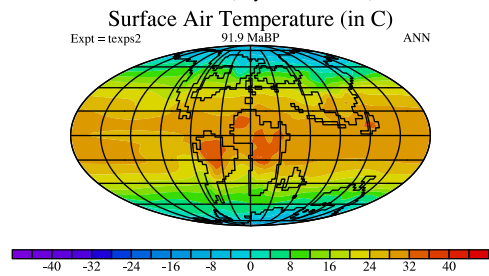
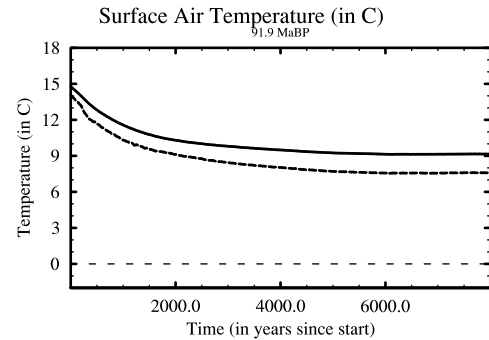
# Mid-Cretaceous (Turonian , 91.9 Ma)



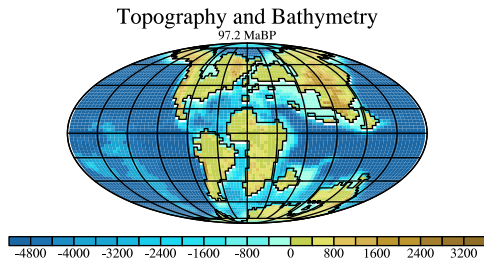
CO<sub>2</sub>= 839 ppmv



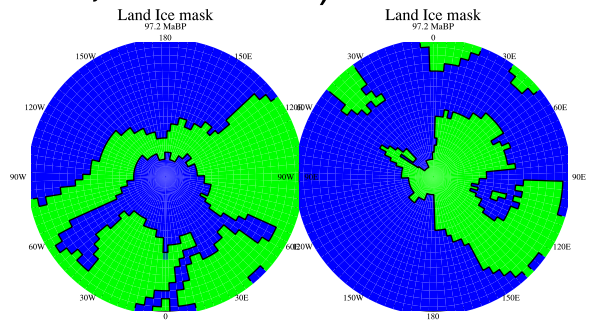
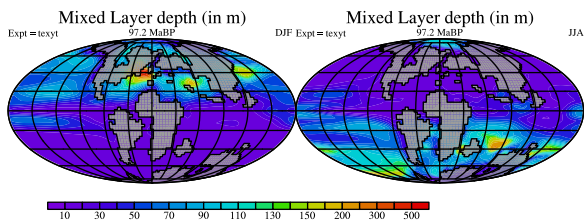
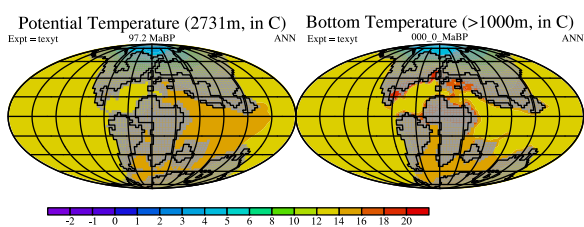
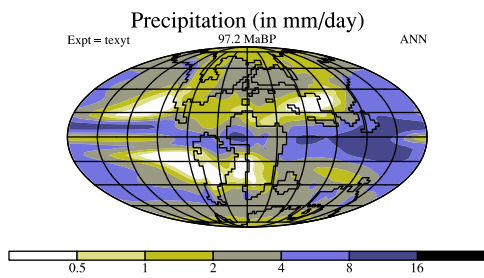
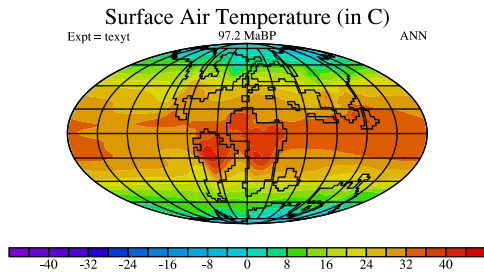
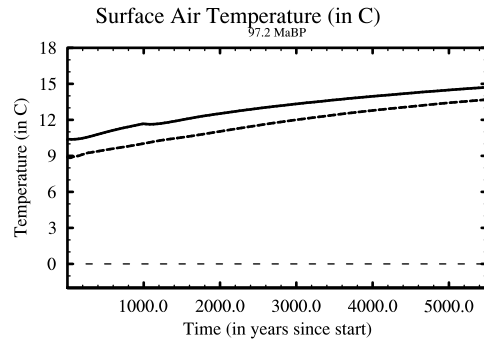
CO<sub>2</sub>= 466 ppmv



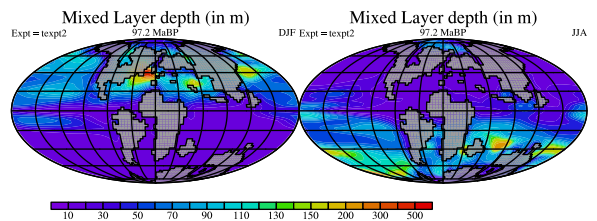
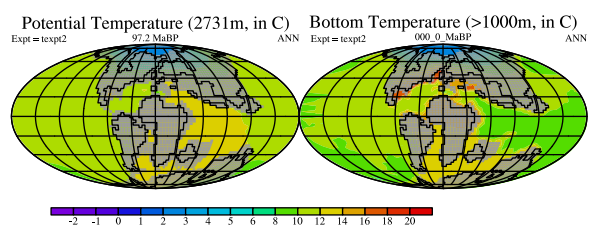
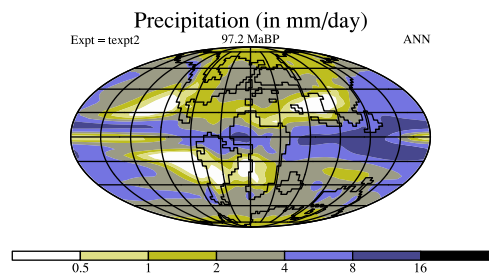
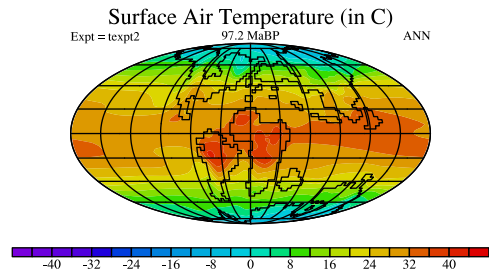
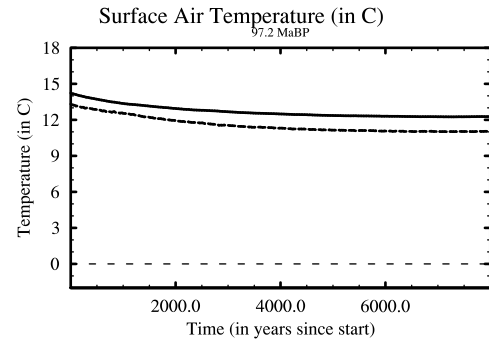
# Mid-Cretaceous (Cenomanian, 97.2 Ma)



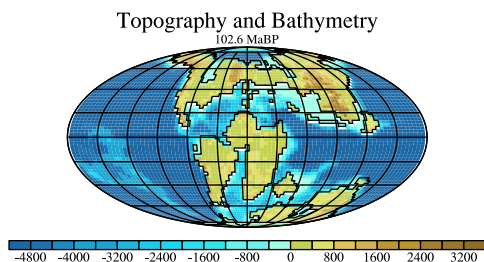
CO<sub>2</sub>= 840 ppmv



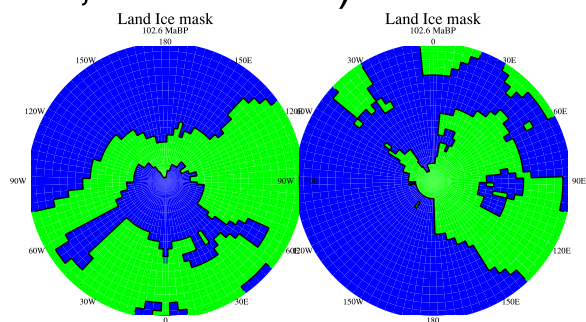
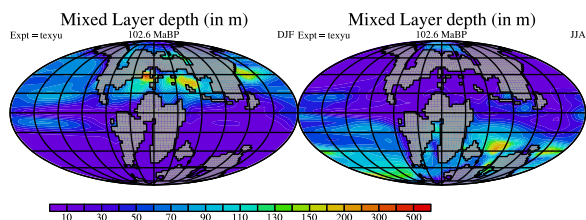
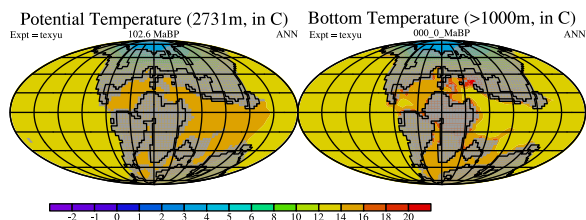
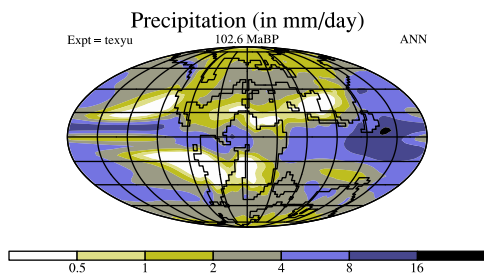
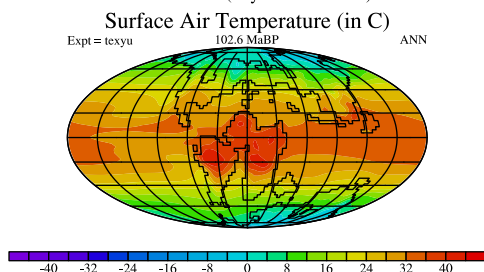
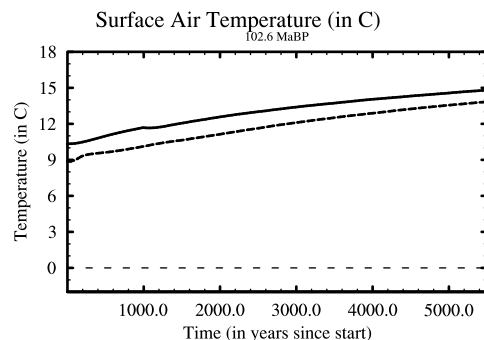
CO<sub>2</sub>= 707 ppmv



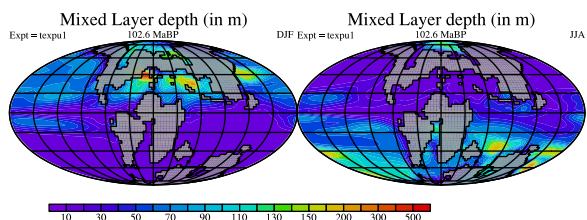
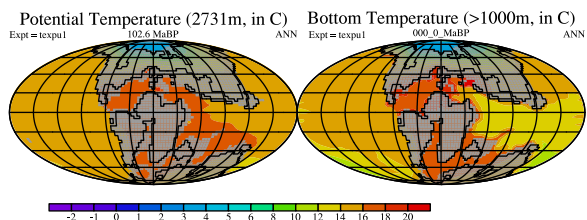
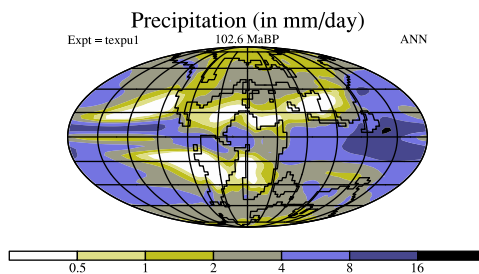
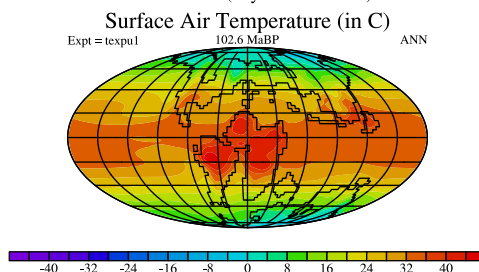
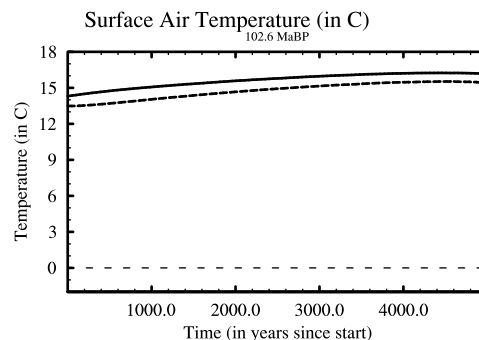
# Early Cretaceous (late Albian, 102.6 Ma)



CO<sub>2</sub>= 840 ppmv

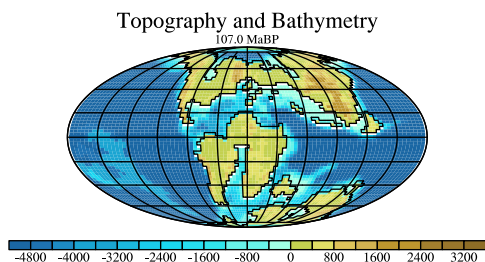


CO<sub>2</sub>= 1008 ppmv

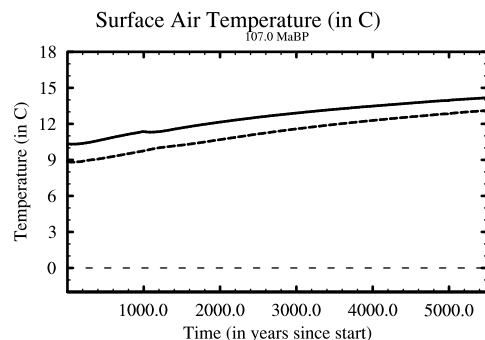




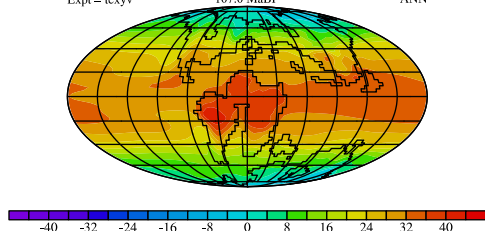
# Early Cretaceous (middle Albian, 107 Ma)



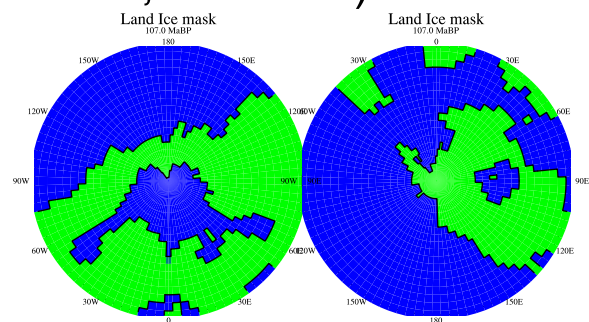
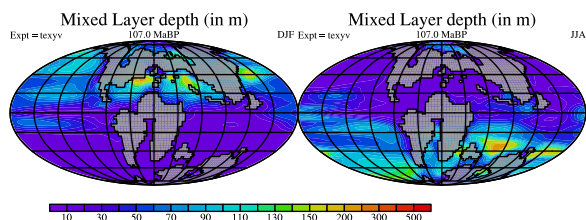
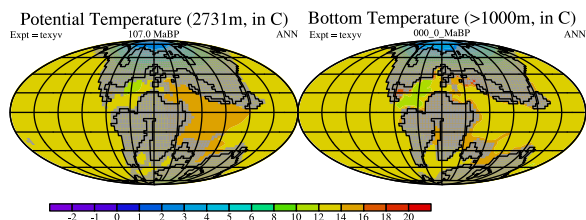
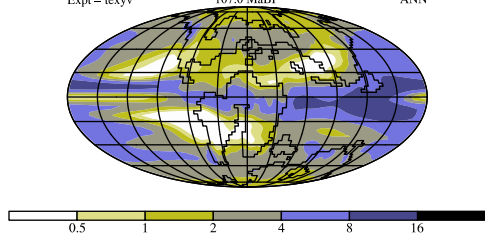
CO<sub>2</sub>= 840 ppmv



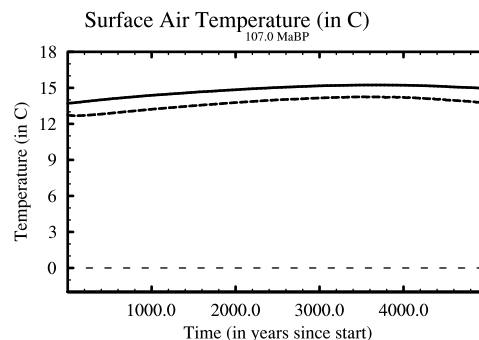
Surface Air Temperature (in C)  
Expt = texyv 107.0 MaBP ANN



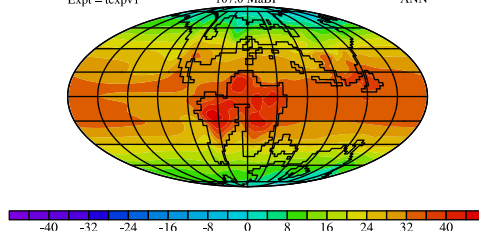
Precipitation (in mm/day)  
Expt = texyv 107.0 MaBP ANN



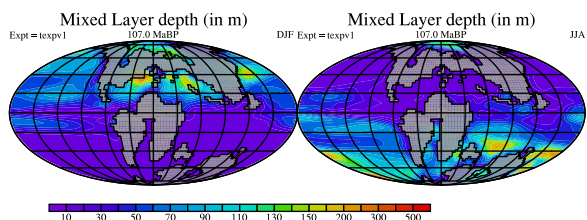
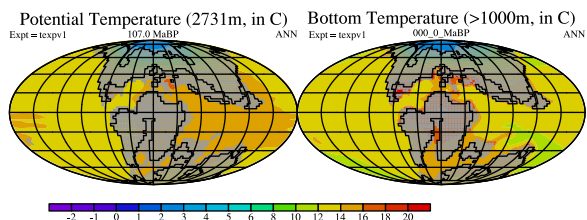
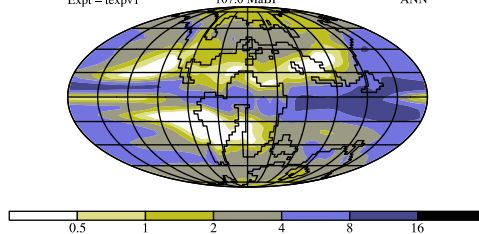
CO<sub>2</sub>= 1028 ppmv



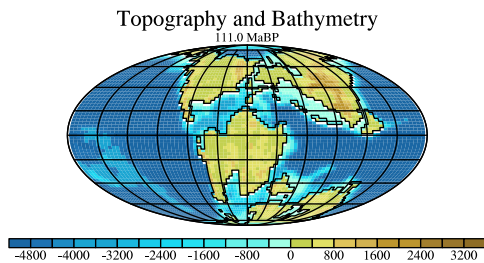
Surface Air Temperature (in C)  
Expt = texpv1 107.0 MaBP ANN



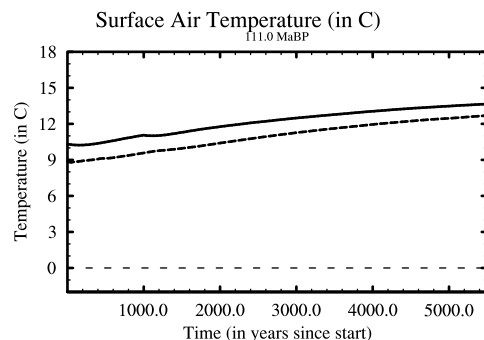
Precipitation (in mm/day)  
Expt = texpv1 107.0 MaBP ANN



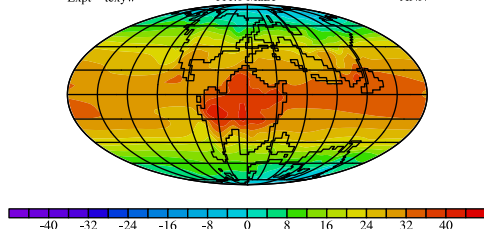
# Early Cretaceous (early Albian, 111 Ma)



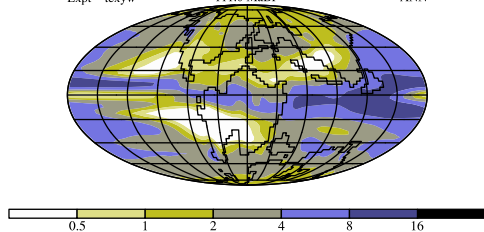
CO<sub>2</sub>= 827 ppmv



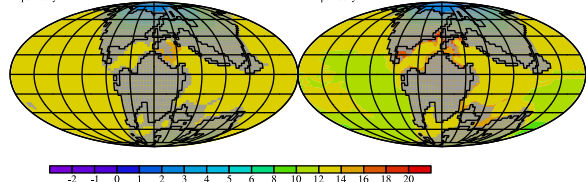
Surface Air Temperature (in C)  
Expt = texyw 111.0 MaBP ANN



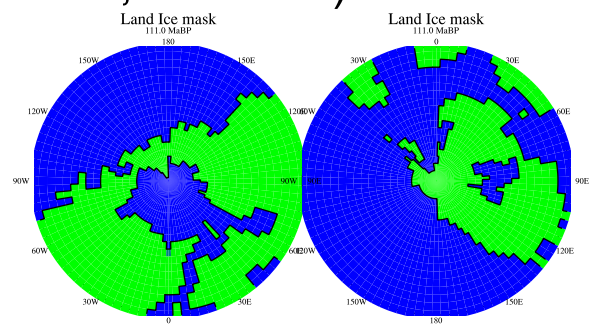
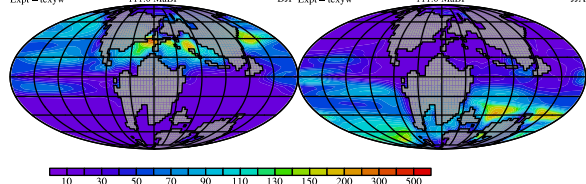
Precipitation (in mm/day)  
Expt = texyw 111.0 MaBP ANN



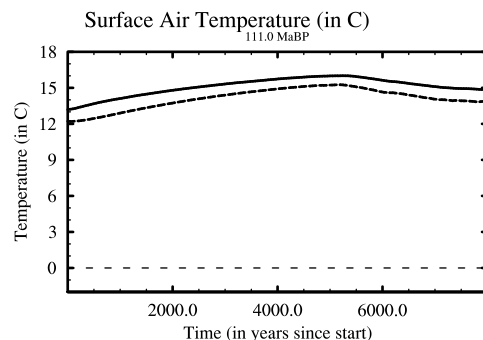
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texyw 111.0 MaBP ANN Expt = texyw 000.0 MaBP ANN



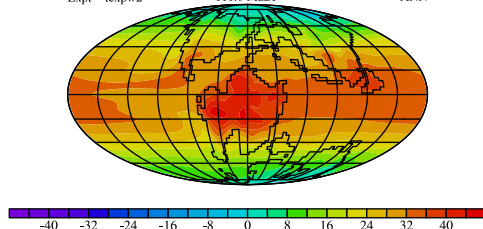
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = texyw 111.0 MaBP DJF Expt = texyw 111.0 MaBP JJA



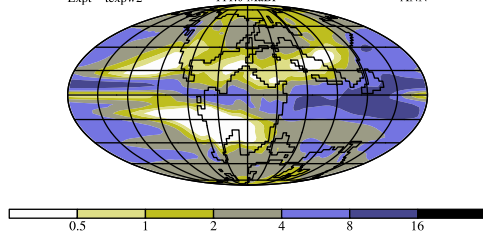
CO<sub>2</sub>= 1148 ppmv



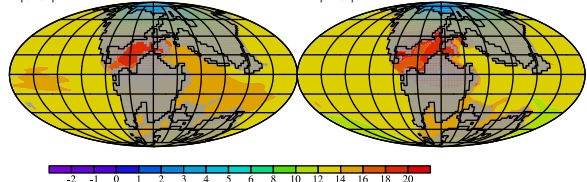
Surface Air Temperature (in C)  
Expt = texpw2 111.0 MaBP ANN



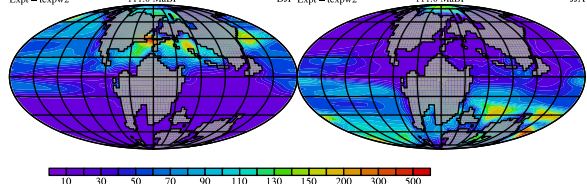
Precipitation (in mm/day)  
Expt = texpw2 111.0 MaBP ANN



Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texpw2 111.0 MaBP ANN Expt = texpw2 000.0 MaBP ANN

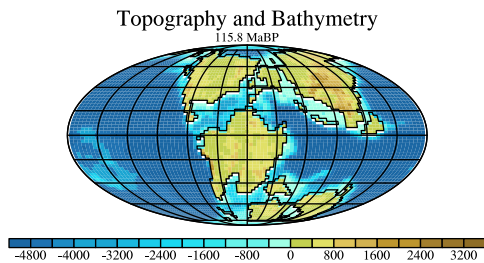


Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = texpw2 111.0 MaBP DJF Expt = texpw2 111.0 MaBP JJA

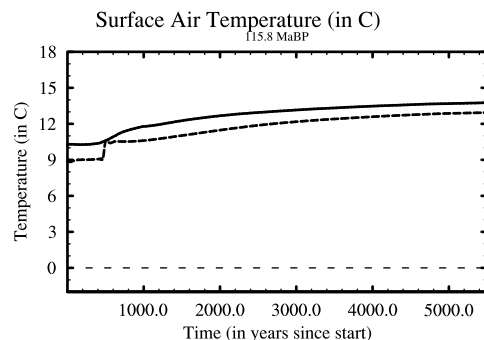




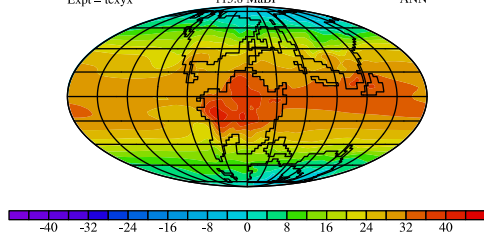
# Early Cretaceous (late Aptian, 115.8 Ma)



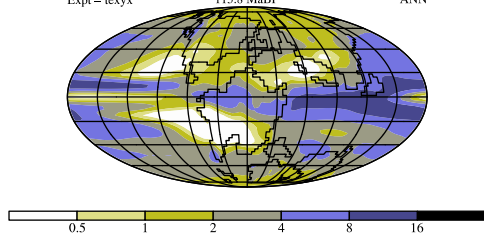
CO<sub>2</sub>= 811 ppmv



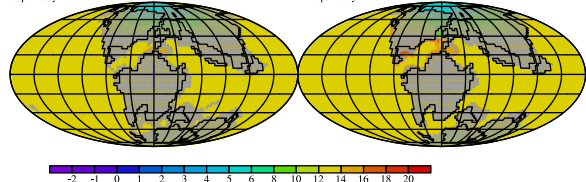
Surface Air Temperature (in C)  
Expt = texyx 115.8 MaBP ANN



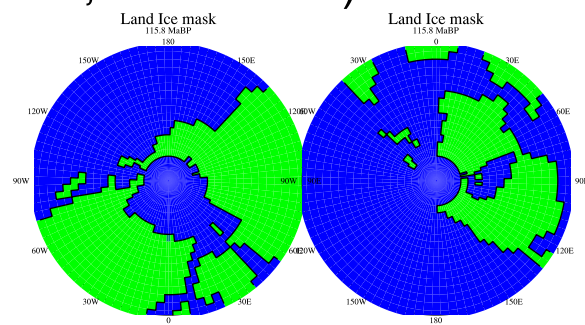
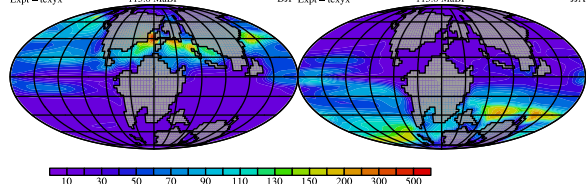
Precipitation (in mm/day)  
Expt = texyx 115.8 MaBP ANN



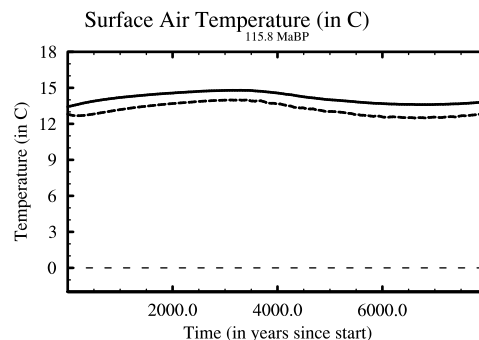
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texyx 115.8 MaBP ANN Expt = texyx 000.0 MaBP ANN



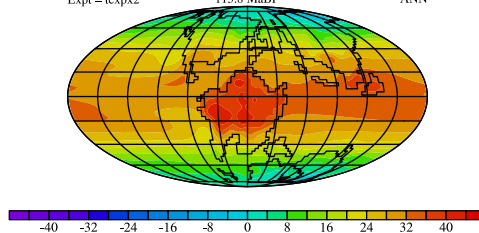
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = texyx 115.8 MaBP DJF Expt = texyx 115.8 MaBP JJA



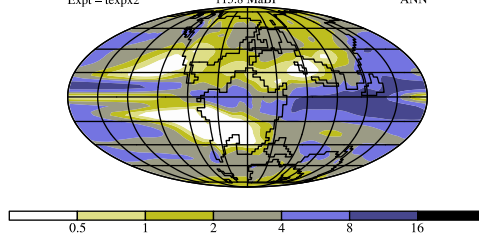
CO<sub>2</sub>= 1103 ppmv



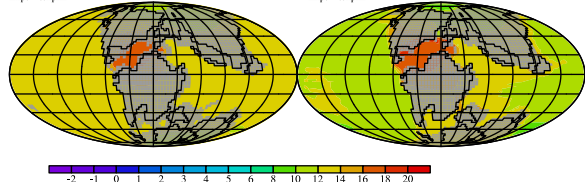
Surface Air Temperature (in C)  
Expt = texpx2 115.8 MaBP ANN



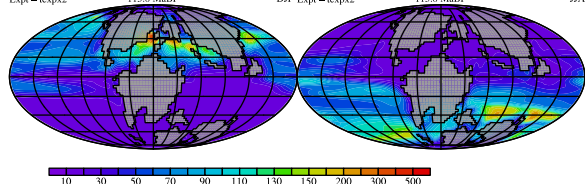
Precipitation (in mm/day)  
Expt = texpx2 115.8 MaBP ANN



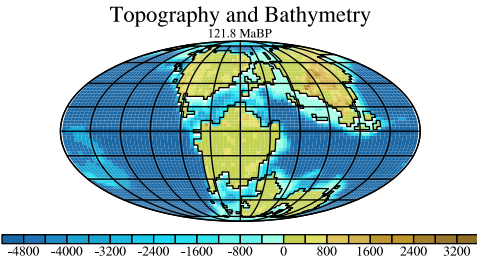
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texpx2 115.8 MaBP ANN Expt = texpx2 000.0 MaBP ANN



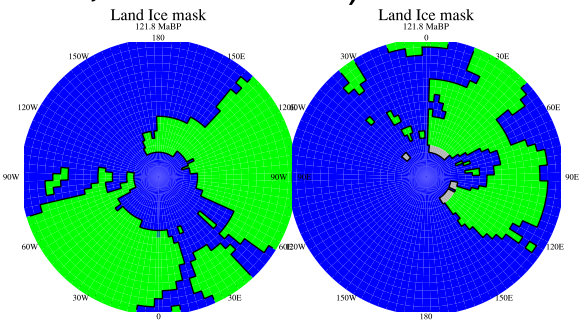
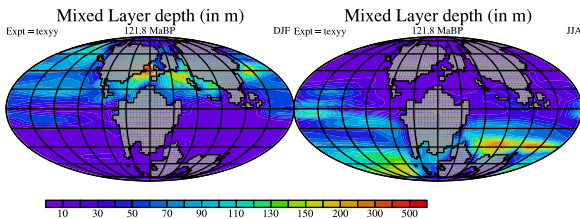
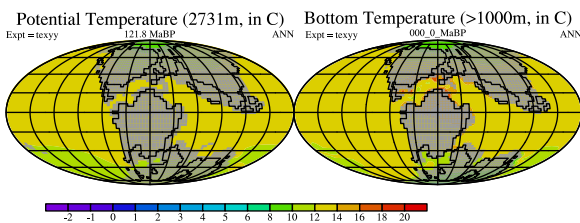
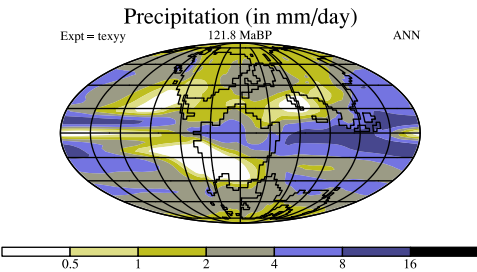
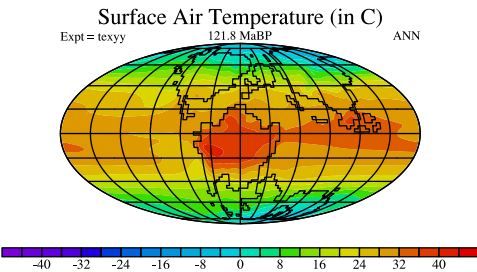
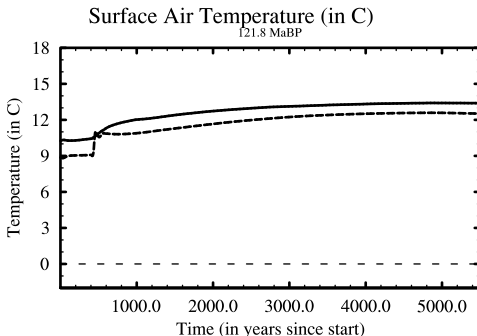
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = texpx2 115.8 MaBP DJF Expt = texpx2 115.8 MaBP JJA



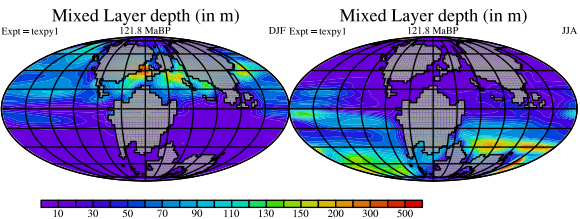
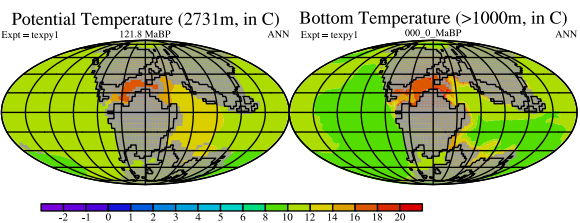
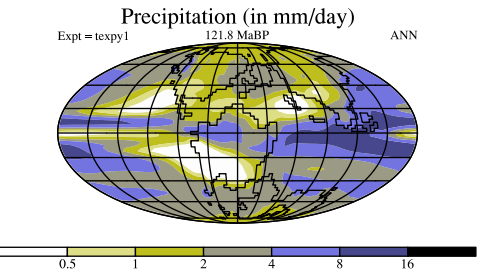
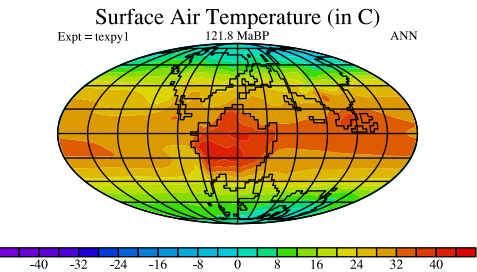
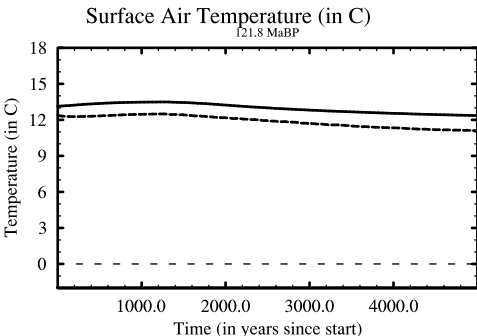
# Early Cretaceous (early Aptian, 121.8 Ma)



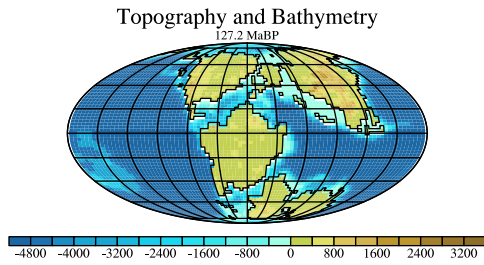
CO<sub>2</sub> = 784 ppmv



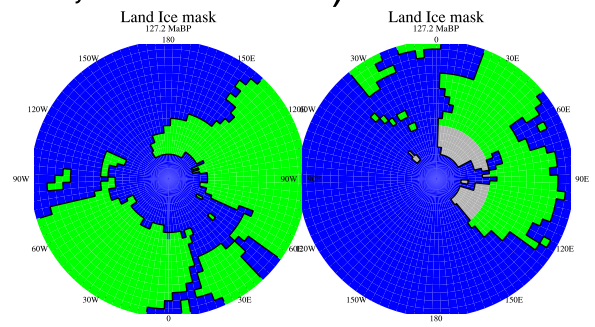
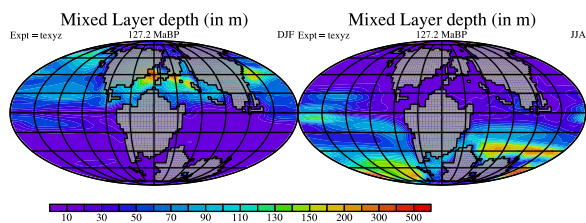
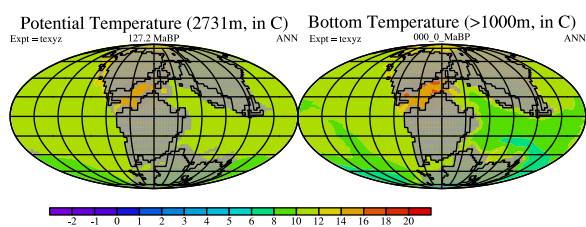
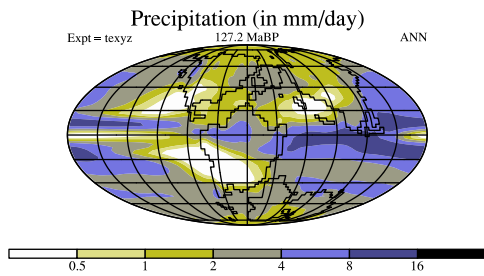
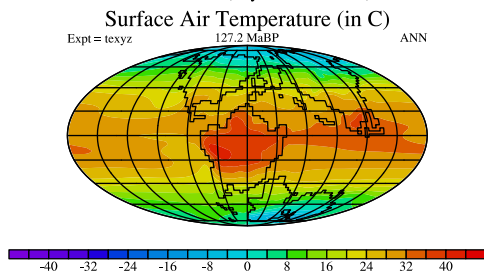
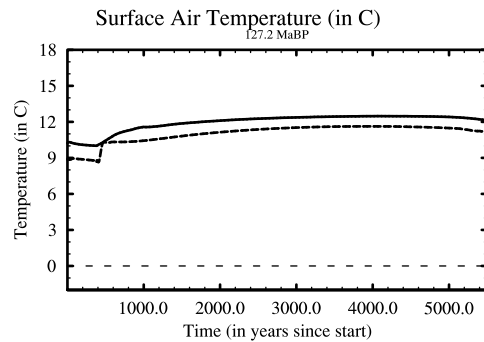
CO<sub>2</sub> = 986 ppmv



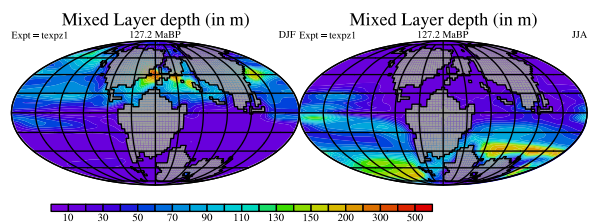
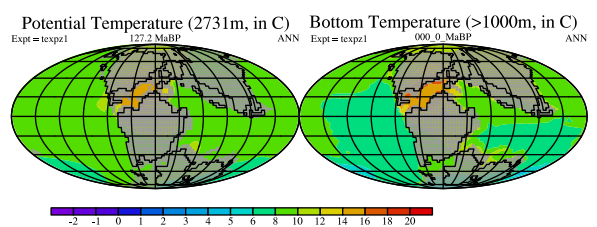
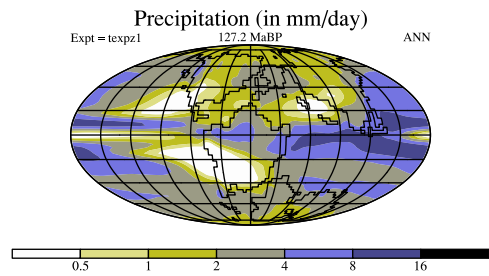
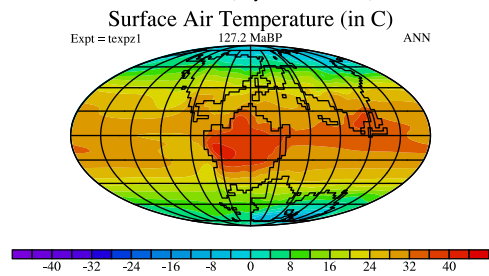
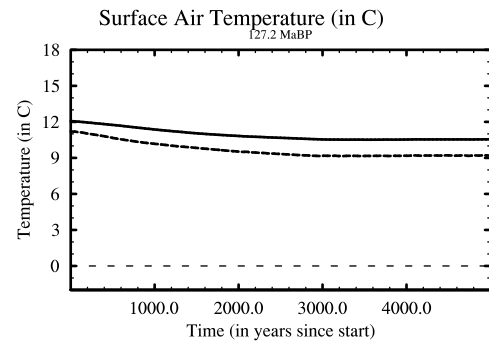
# Early Cretaceous (Barremian, 127.2 Ma)



$\text{CO}_2 = 752 \text{ ppmv}$

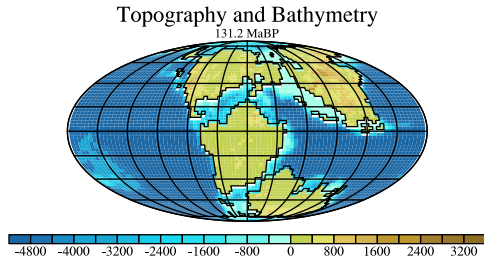


$\text{CO}_2 = 898 \text{ ppmv}$

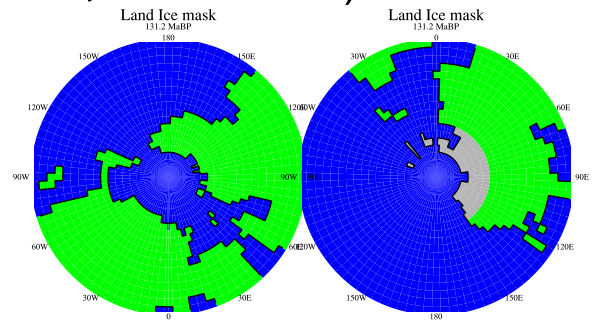
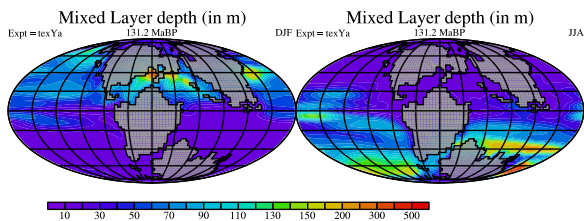
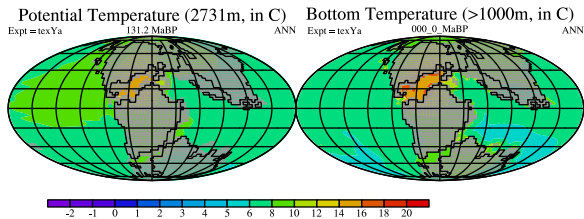
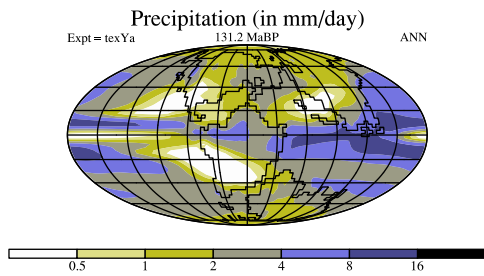
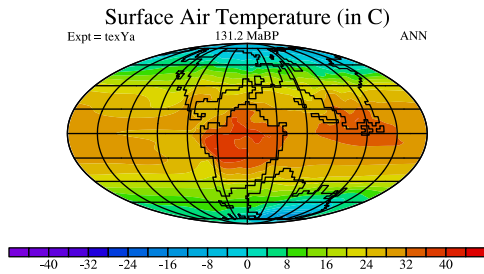
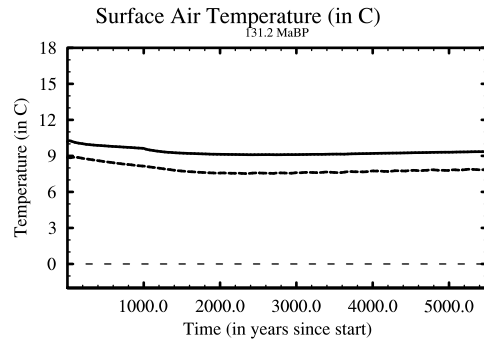




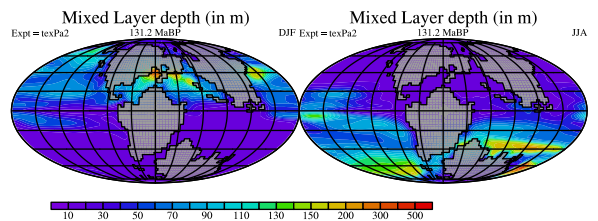
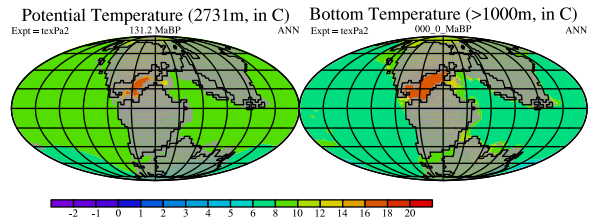
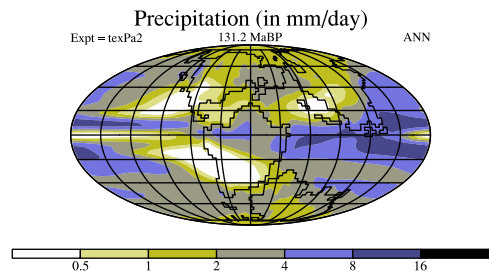
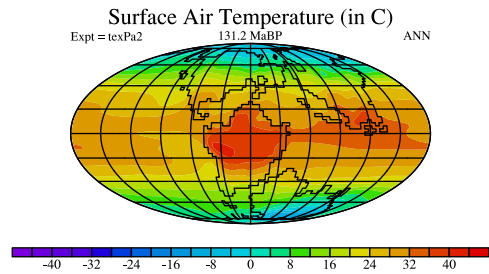
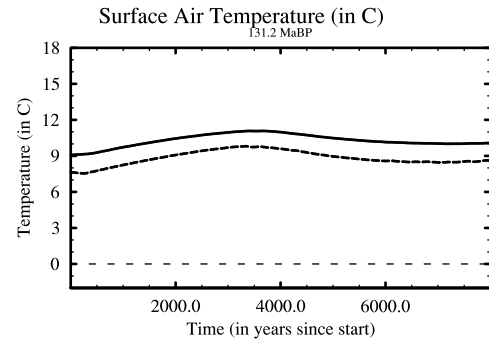
# Early Cretaceous (Hauterivian, 131.2 Ma)



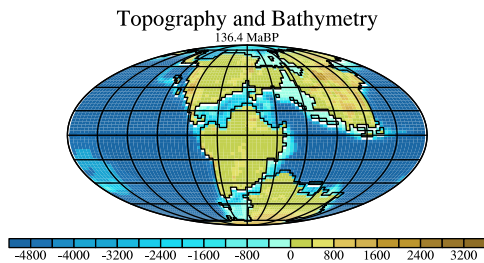
$\text{CO}_2 = 728 \text{ ppmv}$



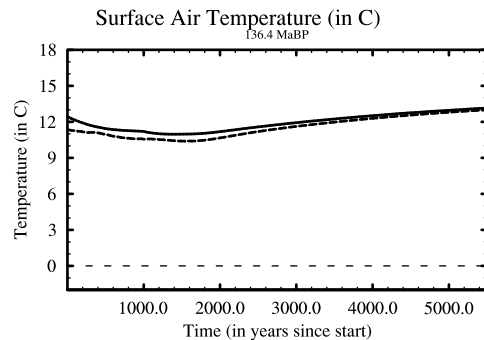
$\text{CO}_2 = 896 \text{ ppmv}$



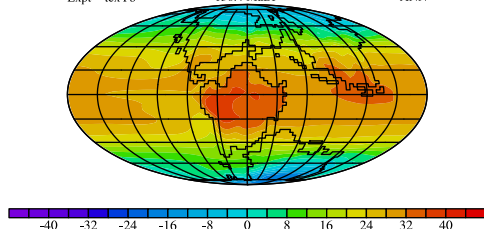
# Early Cretaceous (Valanginian, 136.4 Ma)



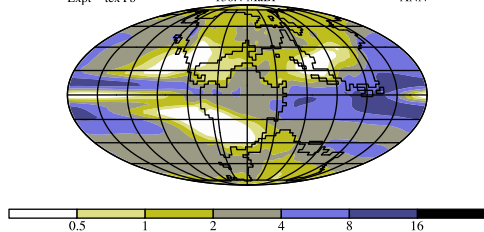
CO<sub>2</sub>= 699 ppmv



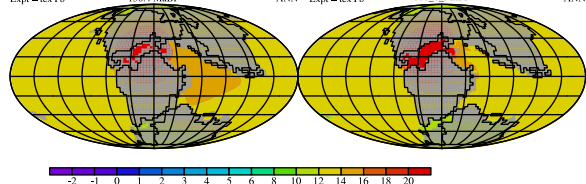
Surface Air Temperature (in C)  
Expt = texYb 136.4 MaBP ANN



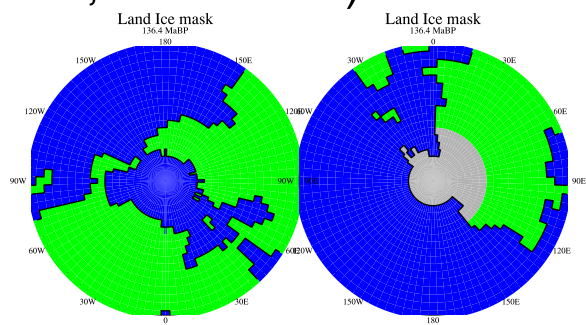
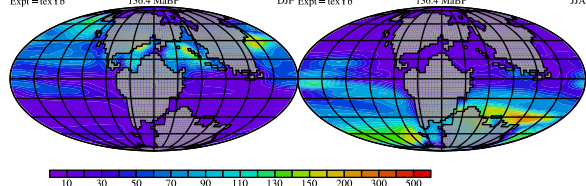
Precipitation (in mm/day)  
Expt = texYb 136.4 MaBP ANN



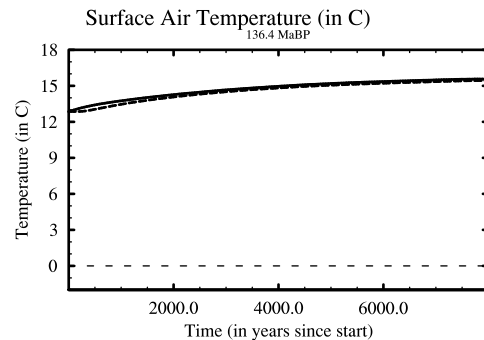
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texYb 136.4 MaBP ANN Expt = texYb 000.0 MaBP ANN



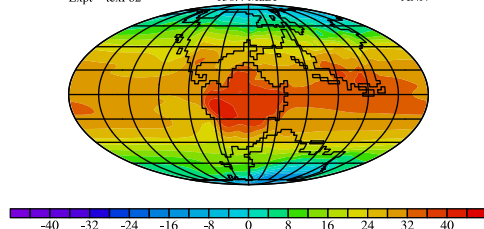
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = texYb 136.4 MaBP DJF Expt = texYb 136.4 MaBP JJA



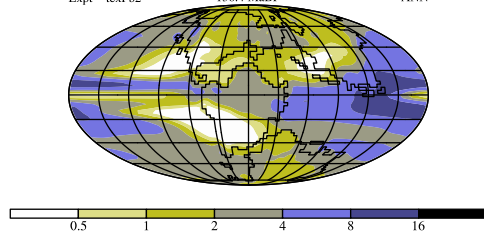
CO<sub>2</sub>= 1020 ppmv



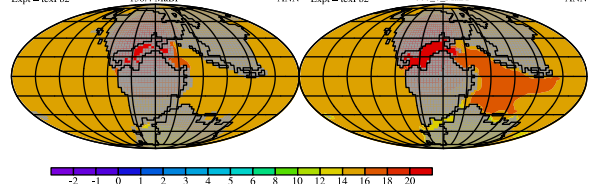
Surface Air Temperature (in C)  
Expt = texPb2 136.4 MaBP ANN



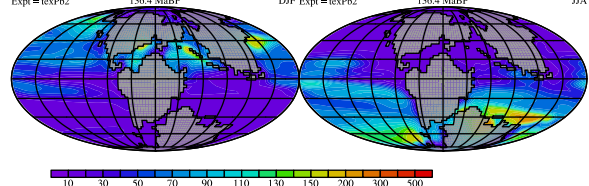
Precipitation (in mm/day)  
Expt = texPb2 136.4 MaBP ANN



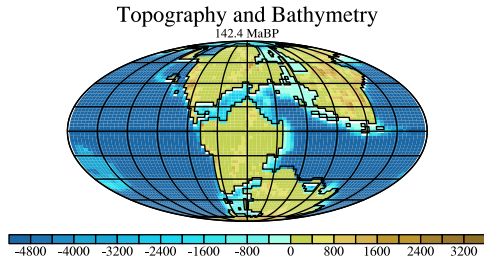
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texPb2 136.4 MaBP ANN Expt = texPb2 000.0 MaBP ANN



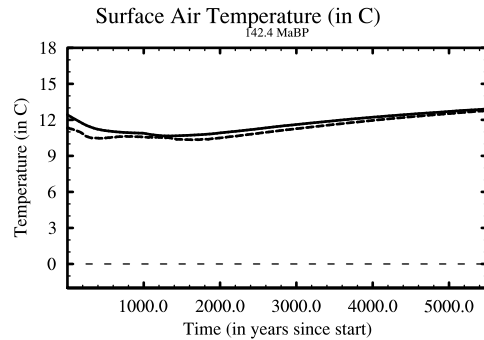
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = texPb2 136.4 MaBP DJF Expt = texPb2 136.4 MaBP JJA



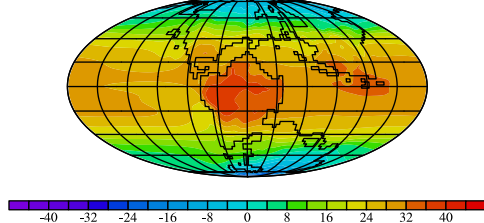
# Early Cretaceous (Berriasian, 142.4 Ma)



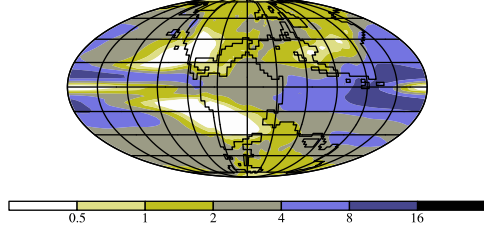
CO<sub>2</sub>= 677 ppmv



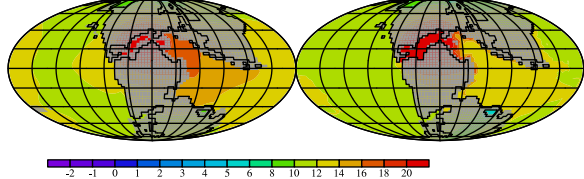
Surface Air Temperature (in C)  
Expt = texYc 142.4 MaBP ANN



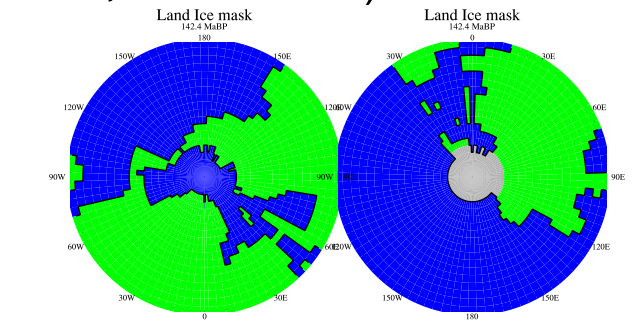
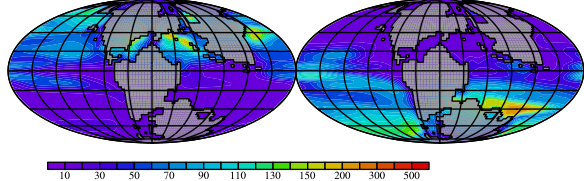
Precipitation (in mm/day)  
Expt = texYc 142.4 MaBP ANN



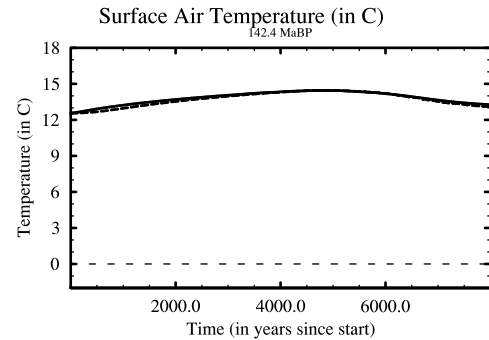
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texYc 142.4 MaBP ANN Expt = texYc 000.0 MaBP ANN



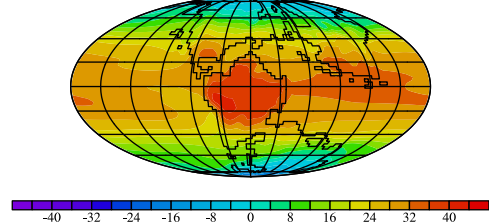
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = texYc 142.4 MaBP DJF Expt = texYc 142.4 MaBP JJA



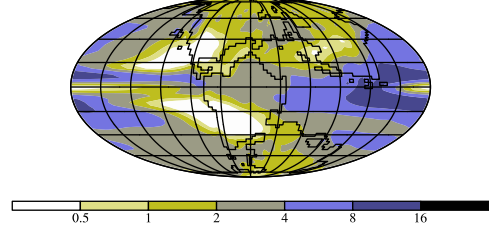
CO<sub>2</sub>= 832 ppmv



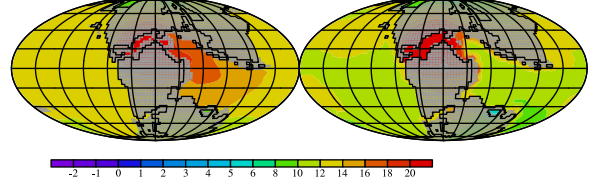
Surface Air Temperature (in C)  
Expt = texPc2 142.4 MaBP ANN



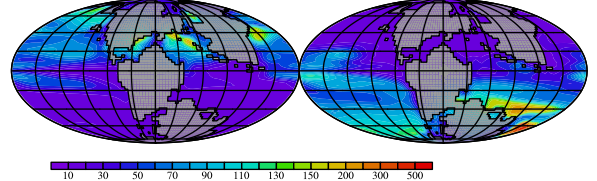
Precipitation (in mm/day)  
Expt = texPc2 142.4 MaBP ANN



Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texPc2 142.4 MaBP ANN Expt = texPc2 000.0 MaBP ANN

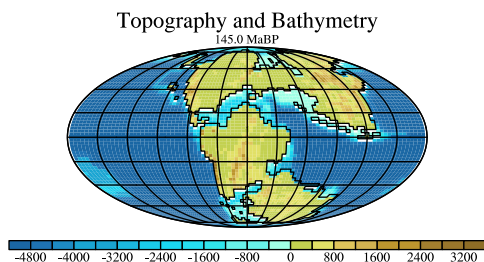


Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = texPc2 142.4 MaBP DJF Expt = texPc2 142.4 MaBP JJA

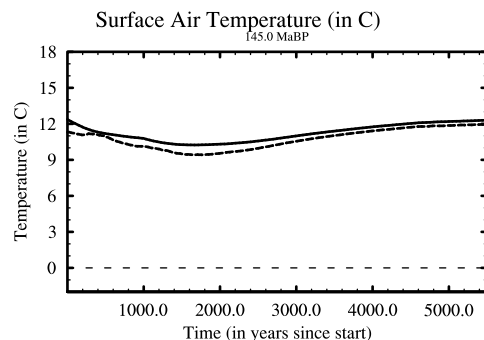




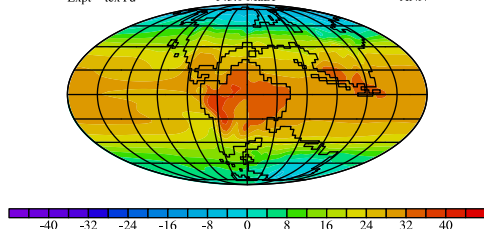
# Jurassic/Cretaceous Boundary (145 Ma)



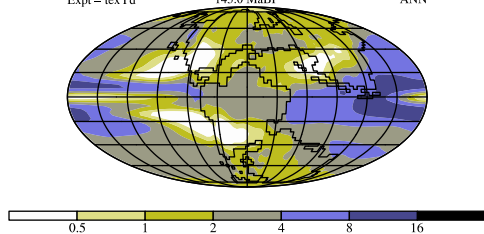
CO<sub>2</sub>= 667 ppmv



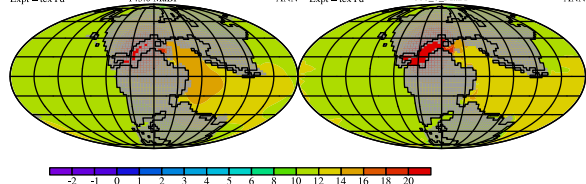
Surface Air Temperature (in C)  
Expt = texYd 145.0 MaBP ANN



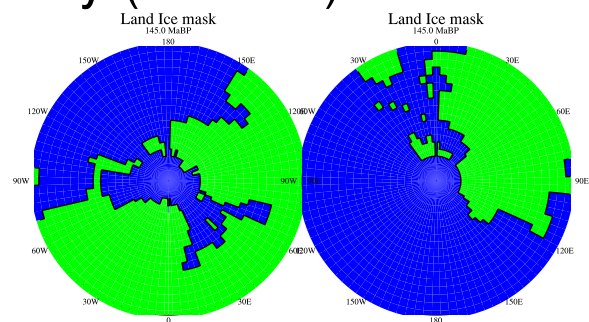
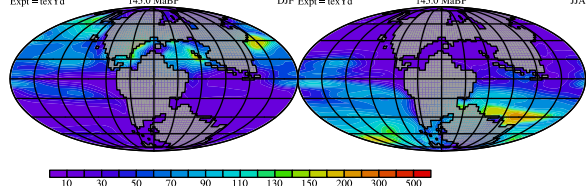
Precipitation (in mm/day)  
Expt = texYd 145.0 MaBP ANN



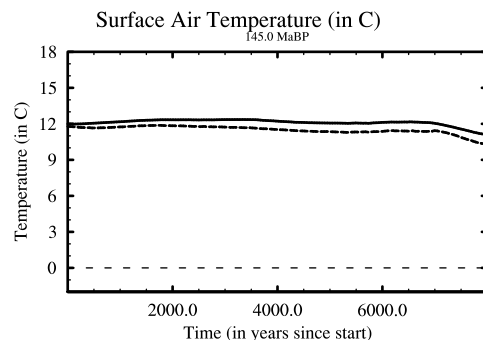
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texYd 145.0 MaBP ANN Expt = texYd 000.0 MaBP ANN



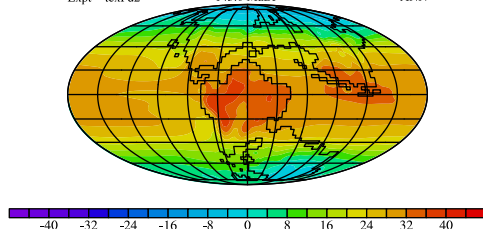
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = texYd 145.0 MaBP DJF Expt = texYd 145.0 MaBP JJA



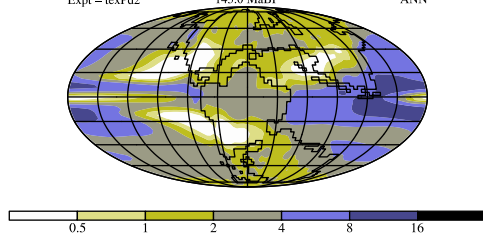
CO<sub>2</sub>= 713 ppmv



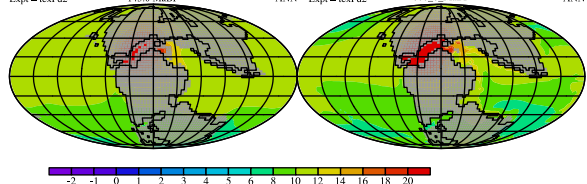
Surface Air Temperature (in C)  
Expt = texPd2 145.0 MaBP ANN



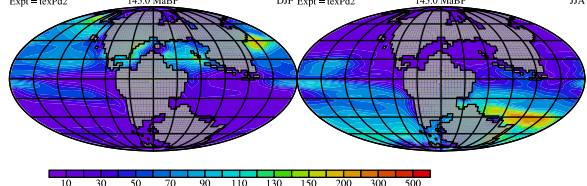
Precipitation (in mm/day)  
Expt = texPd2 145.0 MaBP ANN



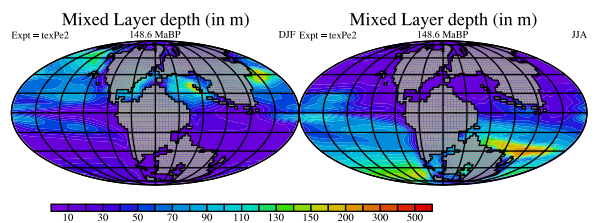
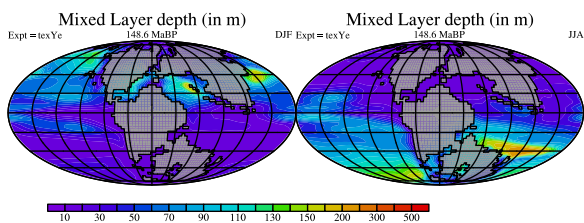
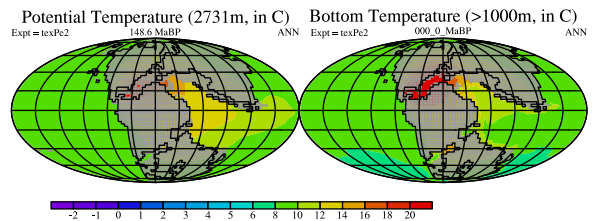
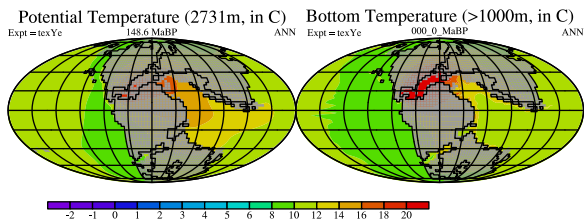
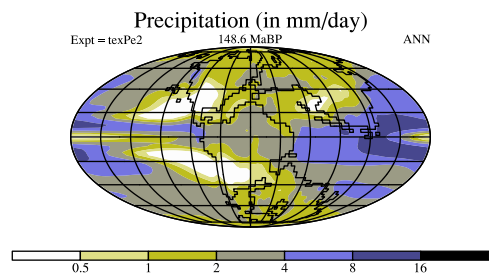
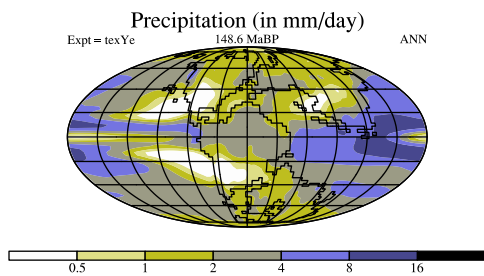
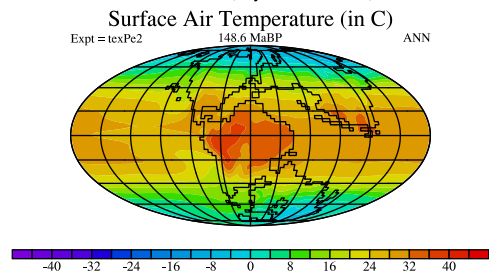
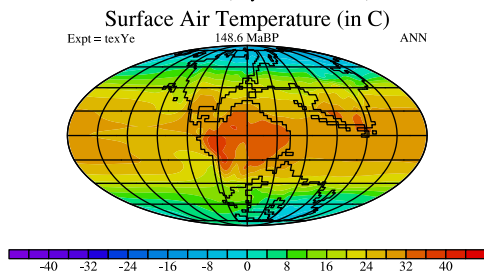
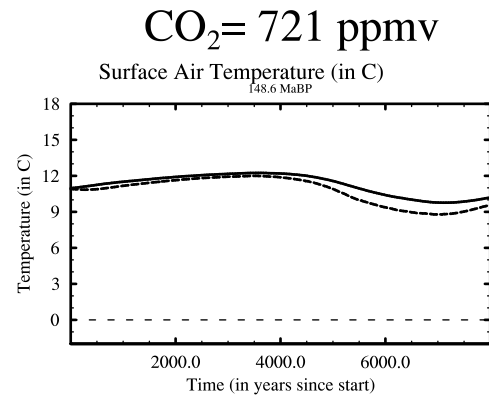
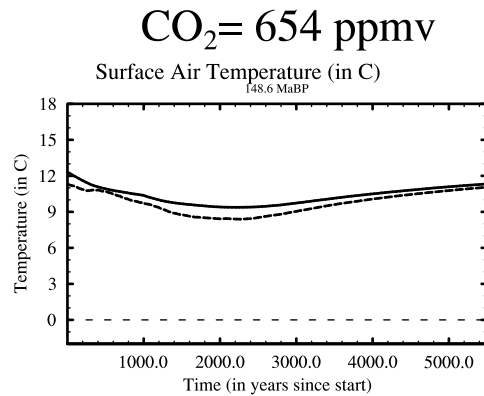
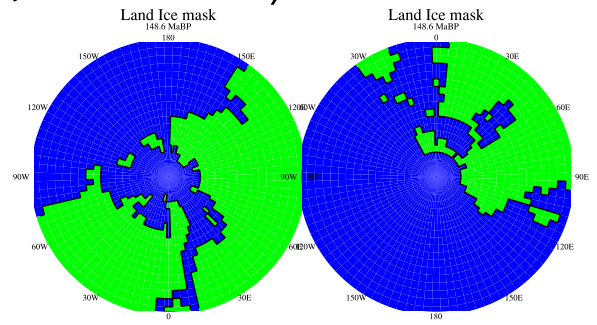
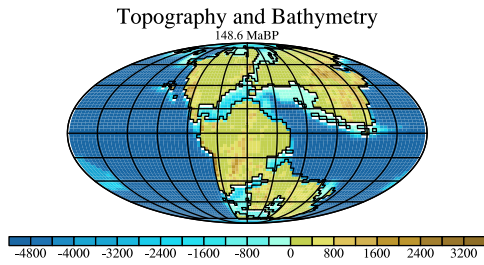
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texPd2 145.0 MaBP ANN Expt = texPd2 000.0 MaBP ANN



Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = texPd2 145.0 MaBP DJF Expt = texPd2 145.0 MaBP JJA

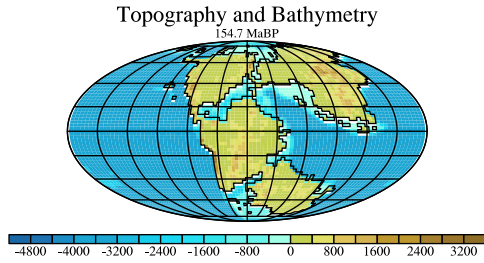


# Late Jurassic (Tithonian, 148.6 Ma)

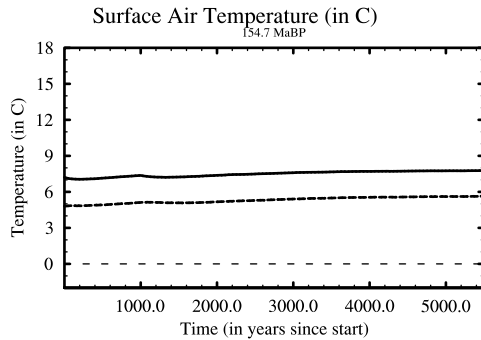




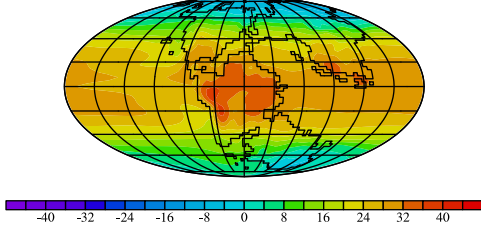
# Late Jurassic (Kimmeridgian, 154.7 Ma)



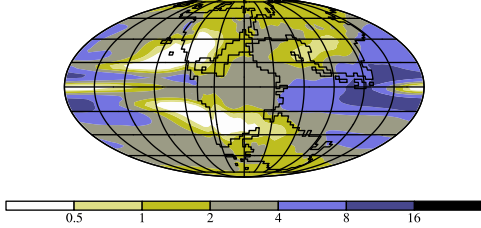
CO<sub>2</sub>= 631 ppmv



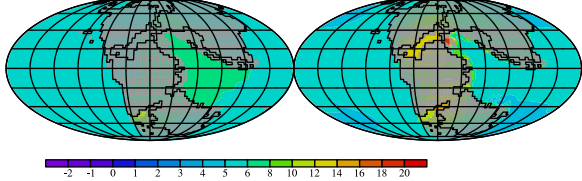
Surface Air Temperature (in C)  
Expt = texYf 154.7 MaBP ANN



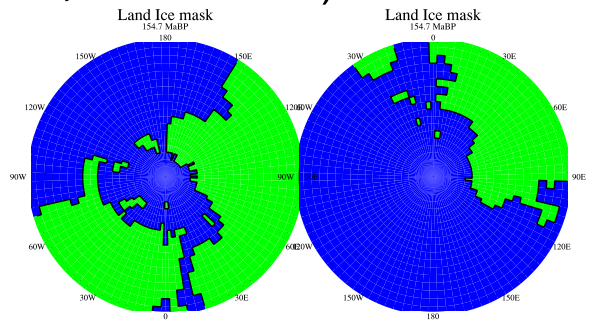
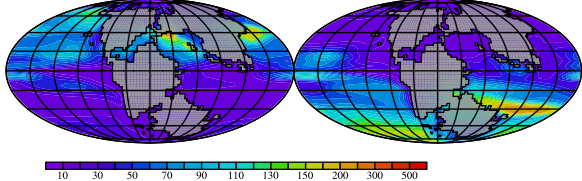
Precipitation (in mm/day)  
Expt = texYf 154.7 MaBP ANN



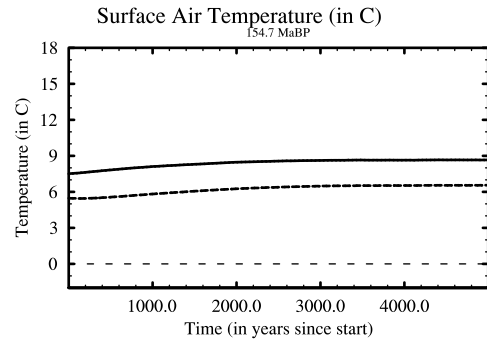
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texYf 154.7 MaBP ANN Expt = texYf 000.0 MaBP ANN



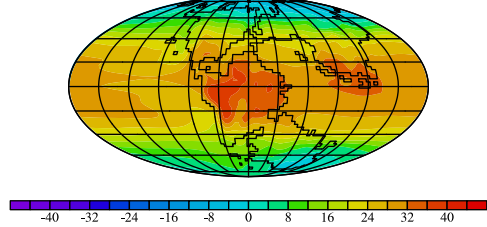
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = texYf 154.7 MaBP DJF Expt = texYf 154.7 MaBP JJA



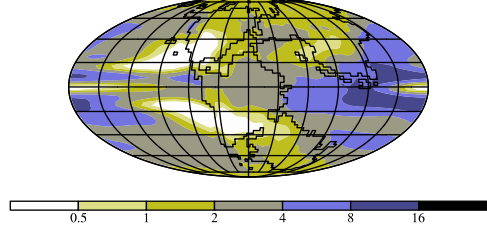
CO<sub>2</sub>= 802 ppmv



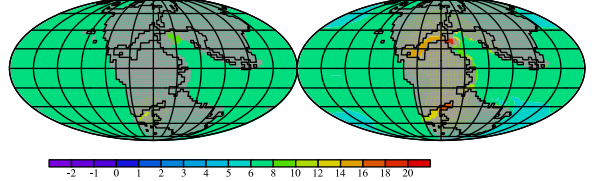
Surface Air Temperature (in C)  
Expt = texPf1 154.7 MaBP ANN



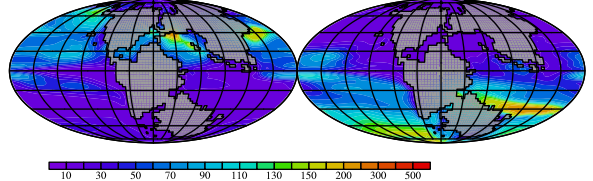
Precipitation (in mm/day)  
Expt = texPf1 154.7 MaBP ANN



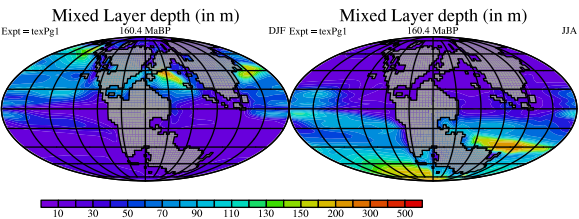
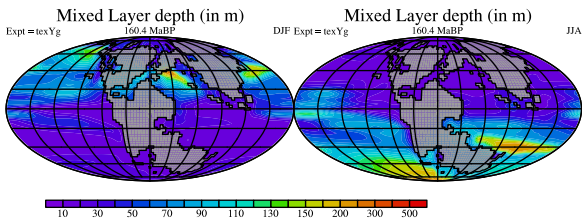
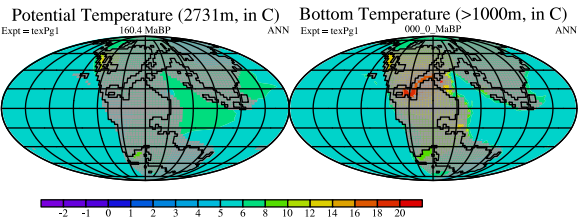
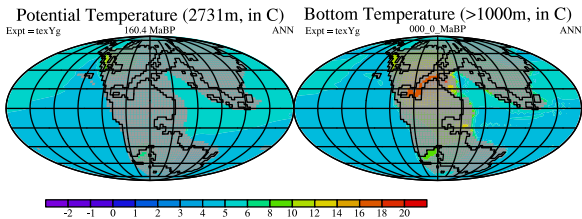
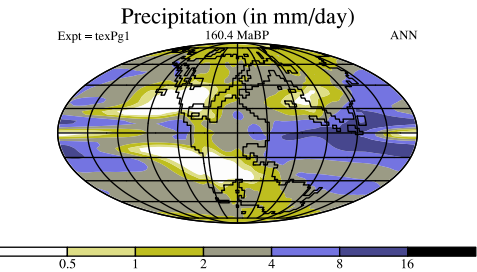
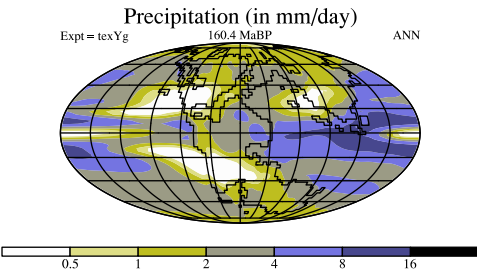
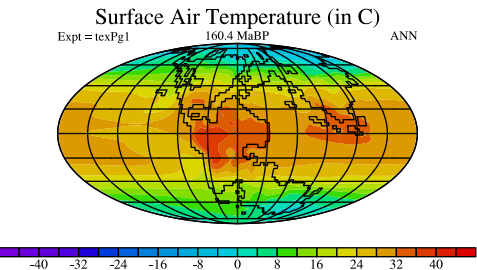
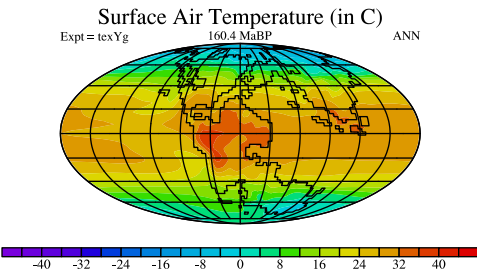
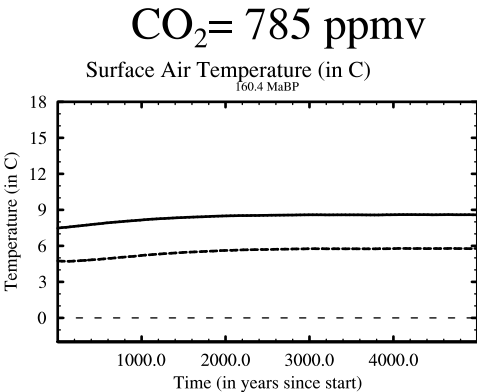
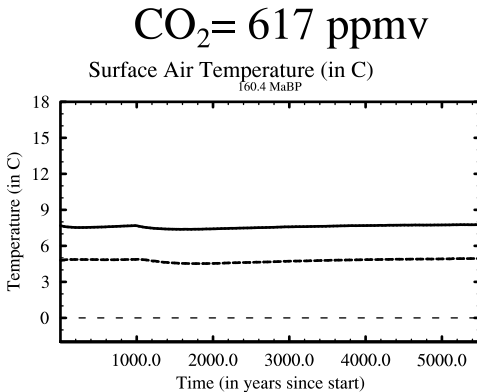
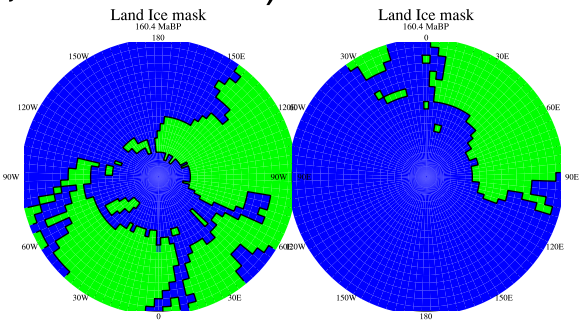
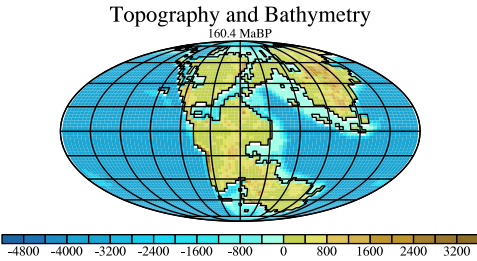
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texPf1 154.7 MaBP ANN Expt = texPf1 000.0 MaBP ANN



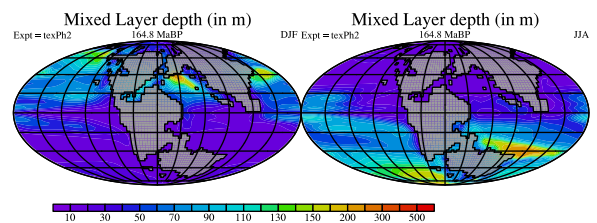
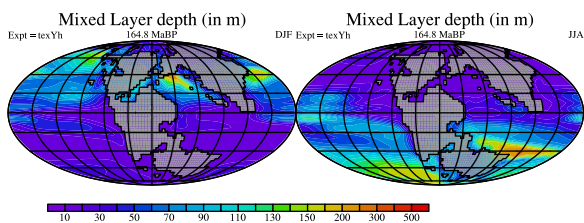
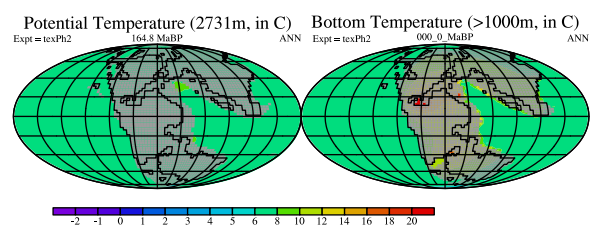
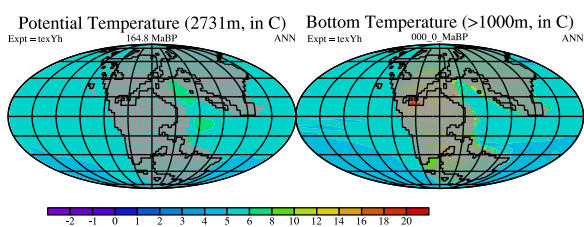
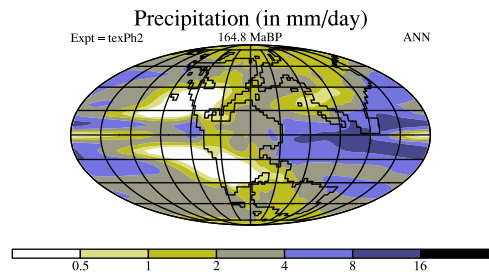
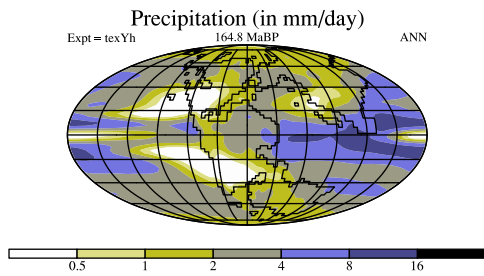
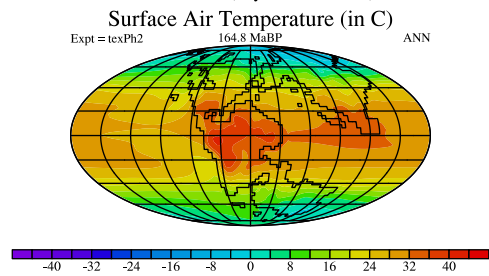
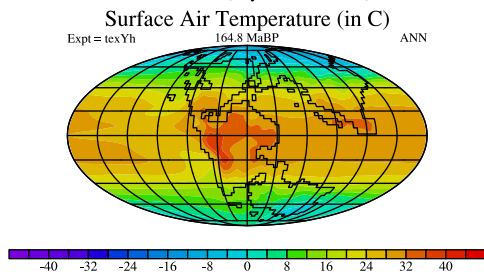
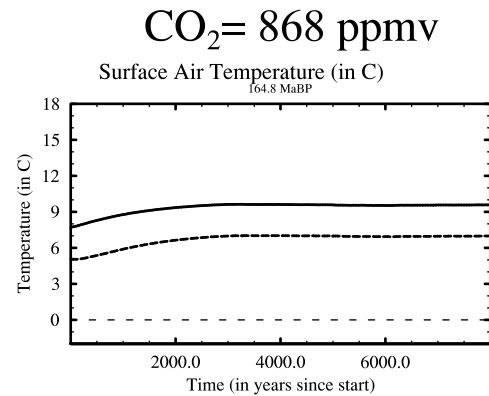
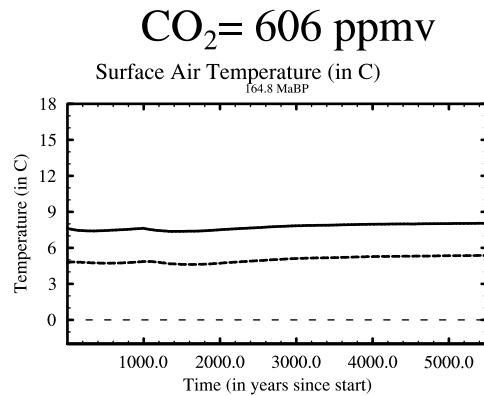
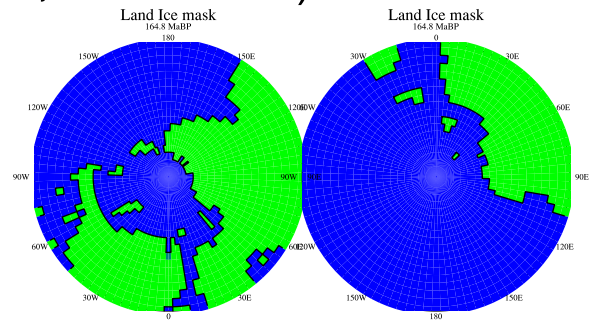
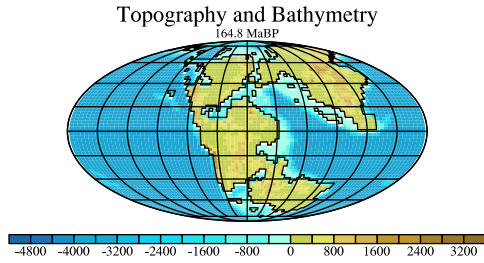
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = texPf1 154.7 MaBP DJF Expt = texPf1 154.7 MaBP JJA



# Late Jurassic (Oxfordian, 160.4 Ma)

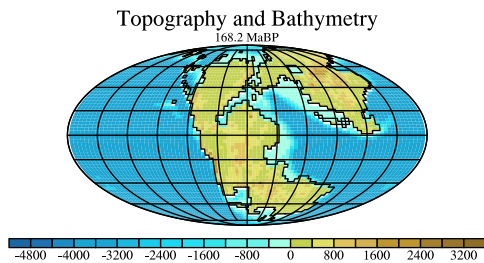


# Middle Jurassic (Callovian, 164.8 Ma)

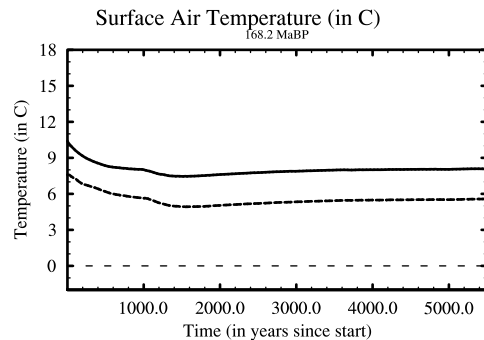




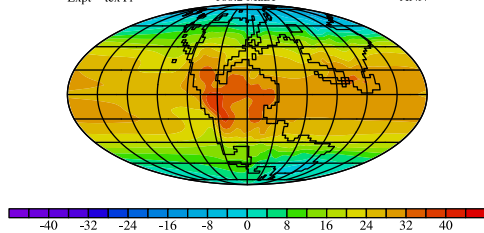
# Middle Jurassic (Bajocian&Bathonian, 168.2)



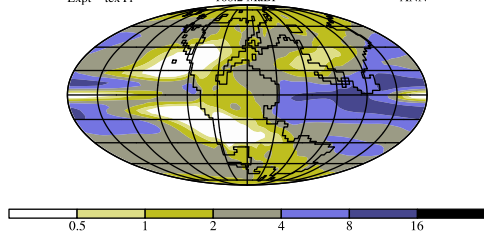
CO<sub>2</sub>= 596 ppmv



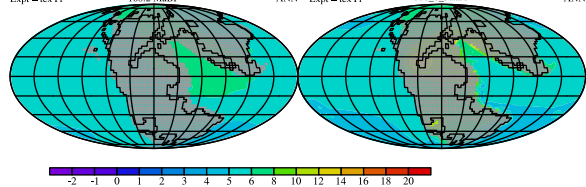
Surface Air Temperature (in C)  
Expt = texYi 168.2 MaBP ANN



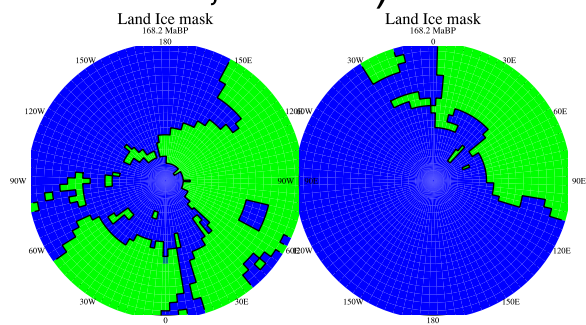
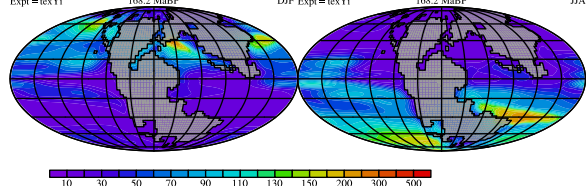
Precipitation (in mm/day)  
Expt = texYi 168.2 MaBP ANN



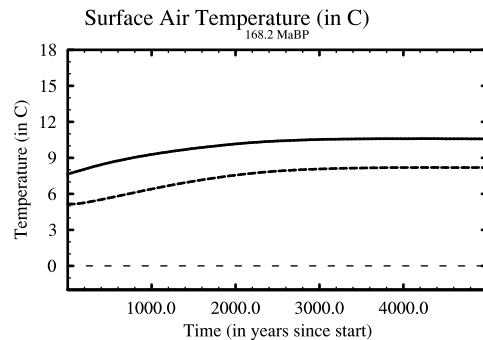
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texYi 168.2 MaBP ANN Expt = texYi 000.0 MaBP ANN



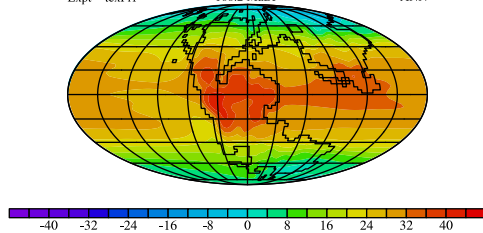
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = texYi 168.2 MaBP DJF Expt = texYi 168.2 MaBP JJA



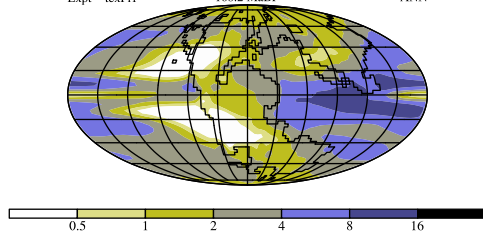
CO<sub>2</sub>= 1019 ppmv



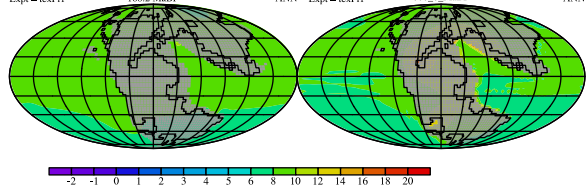
Surface Air Temperature (in C)  
Expt = texP1i 168.2 MaBP ANN



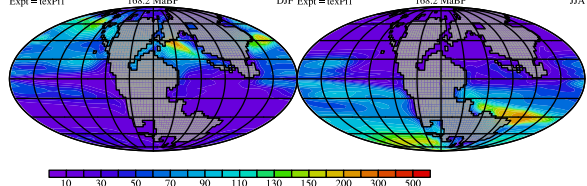
Precipitation (in mm/day)  
Expt = texP1i 168.2 MaBP ANN



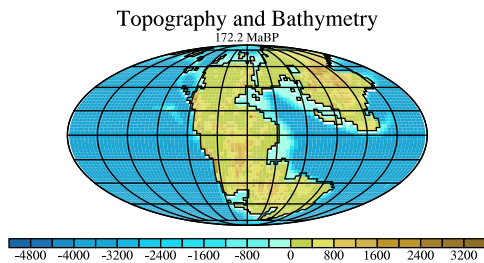
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texP1i 168.2 MaBP ANN Expt = texP1i 000.0 MaBP ANN



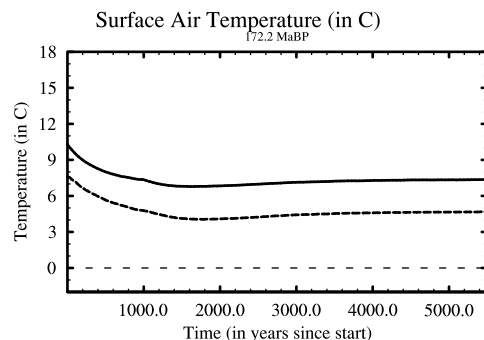
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = texP1i 168.2 MaBP DJF Expt = texP1i 168.2 MaBP JJA



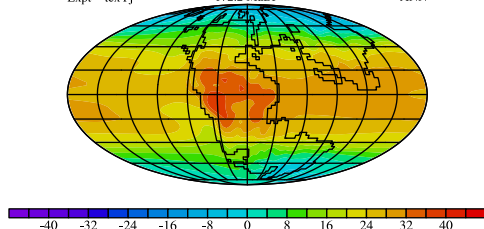
# Middle Jurassic (Aalenian, 172.2 Ma)



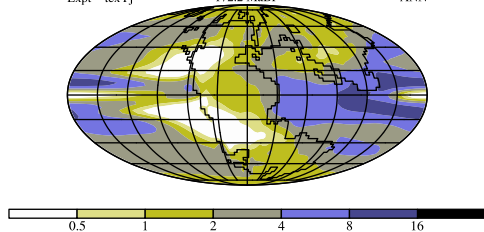
CO<sub>2</sub> = 581 ppmv



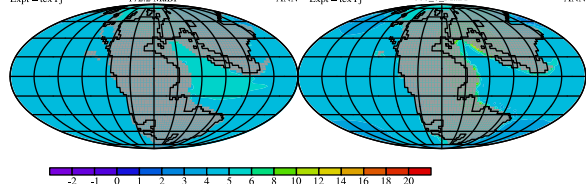
Surface Air Temperature (in C)  
Expt = texYj 172.2 MaBP ANN



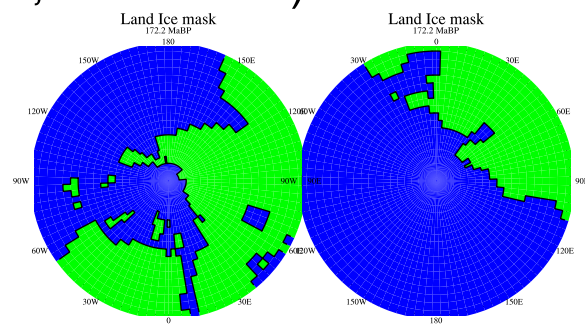
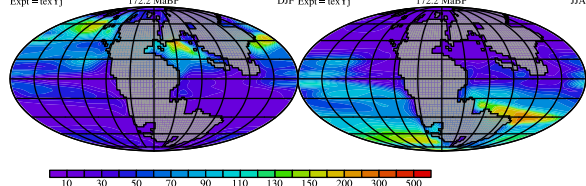
Precipitation (in mm/day)  
Expt = texYj 172.2 MaBP ANN



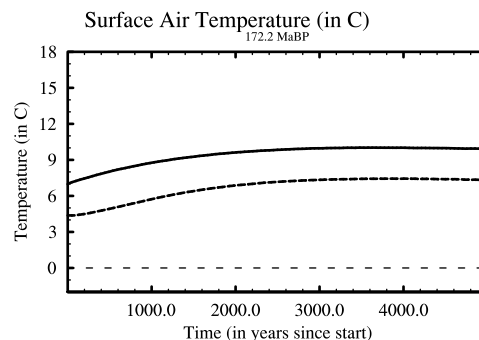
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texYj 172.2 MaBP ANN Expt = texYj 000.0 MaBP ANN



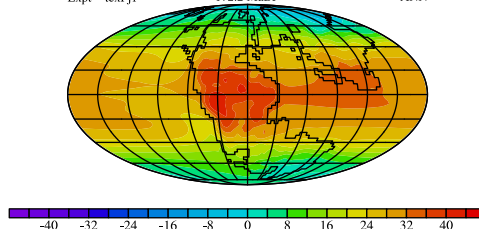
Mixed Layer depth (in m) DIF Expt = texYj 172.2 MaBP ANN JJA



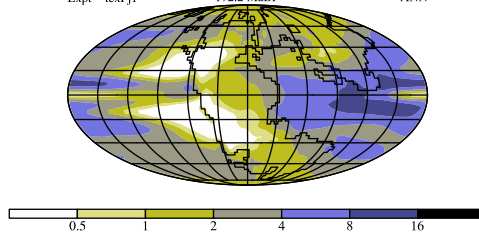
CO<sub>2</sub> = 1046 ppmv



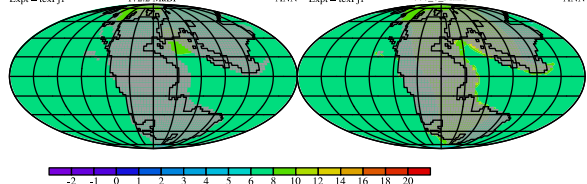
Surface Air Temperature (in C)  
Expt = texPj1 172.2 MaBP ANN



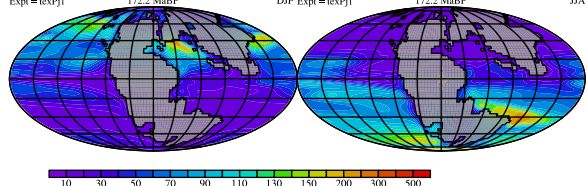
Precipitation (in mm/day)  
Expt = texPj1 172.2 MaBP ANN



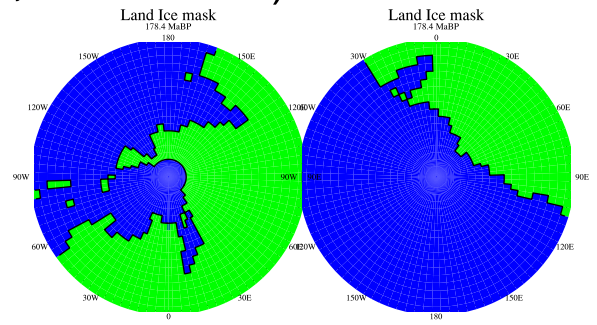
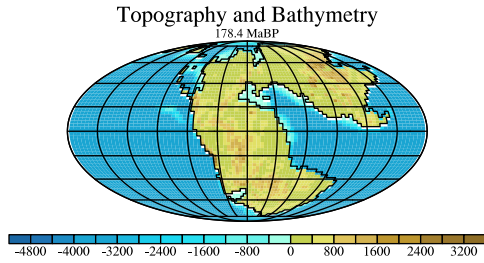
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texPj1 172.2 MaBP ANN Expt = texPj1 000.0 MaBP ANN



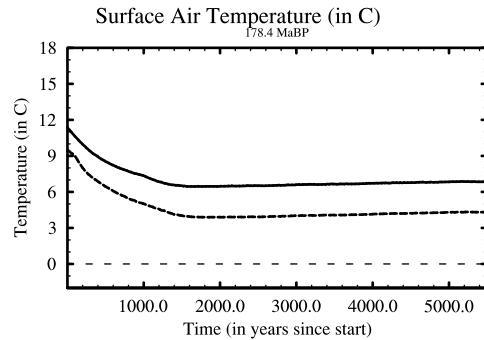
Mixed Layer depth (in m) DIF Expt = texPj1 172.2 MaBP ANN JJA



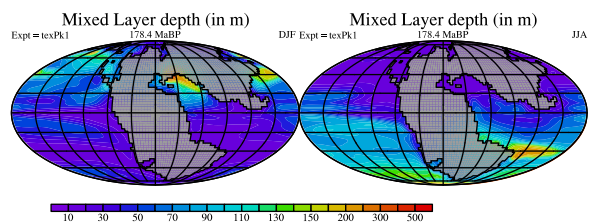
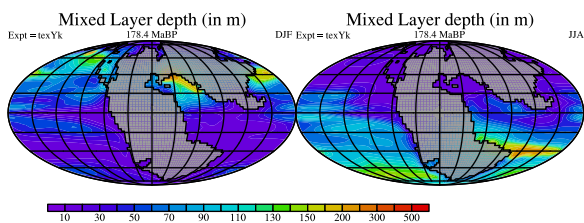
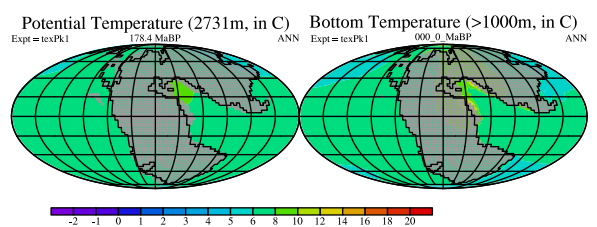
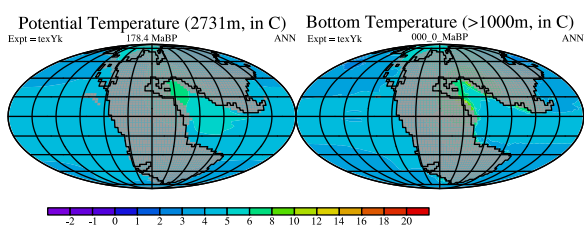
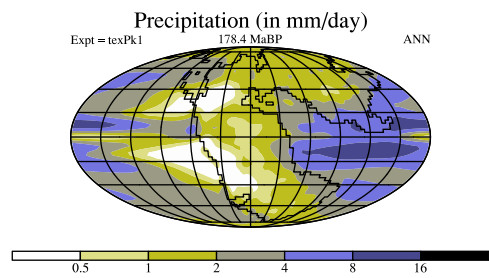
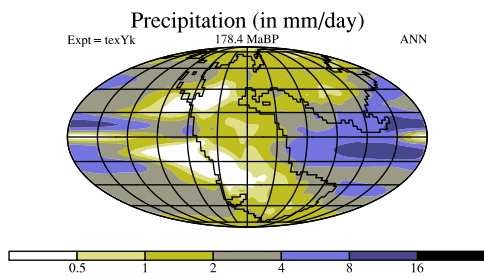
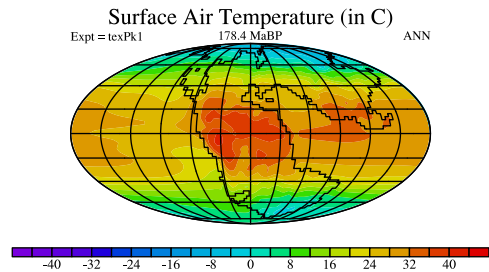
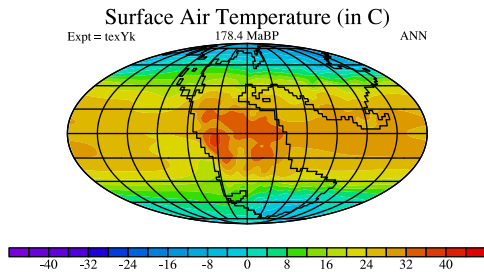
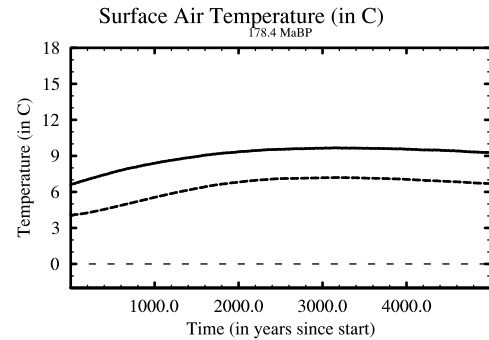
# Early Jurassic (Toarcian, 178.4 Ma)



CO<sub>2</sub>= 560 ppmv

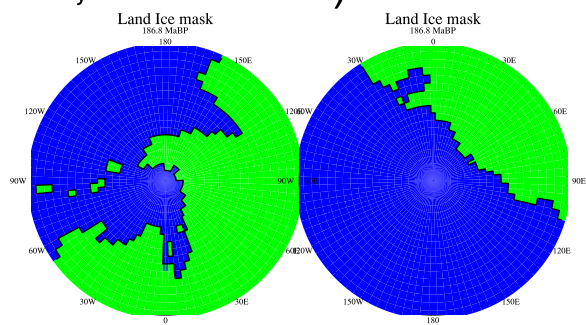
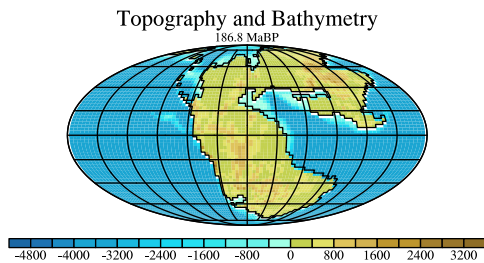


CO<sub>2</sub>= 986 ppmv

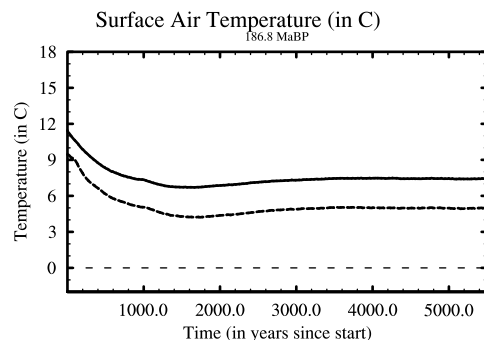




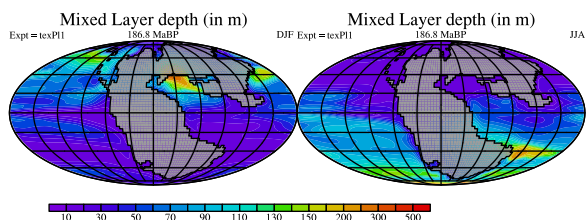
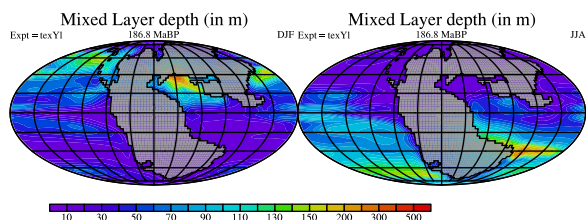
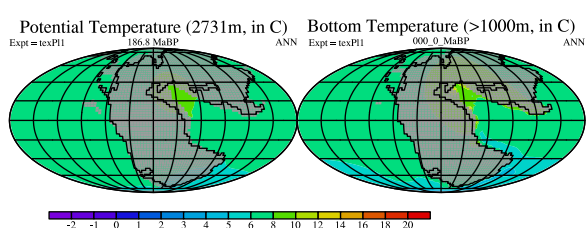
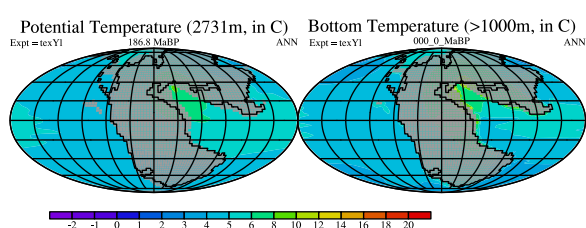
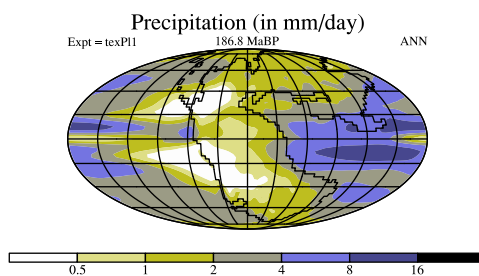
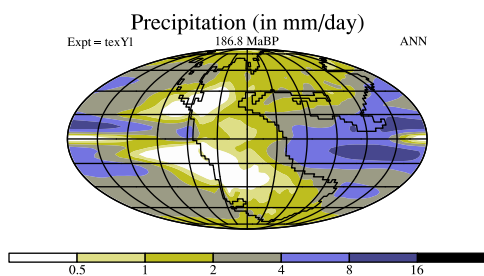
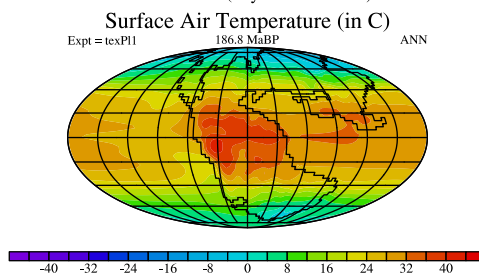
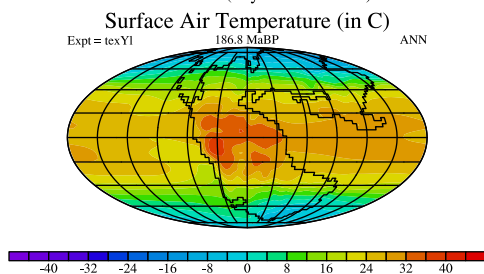
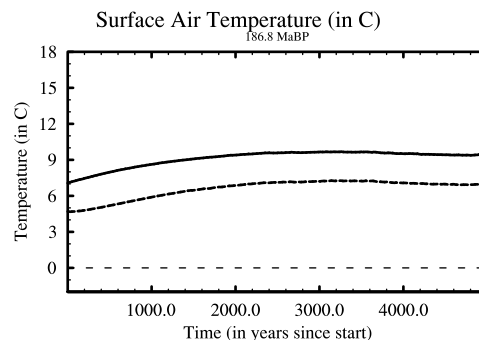
# Early Jurassic (Pliensbachian, 186.8 Ma)



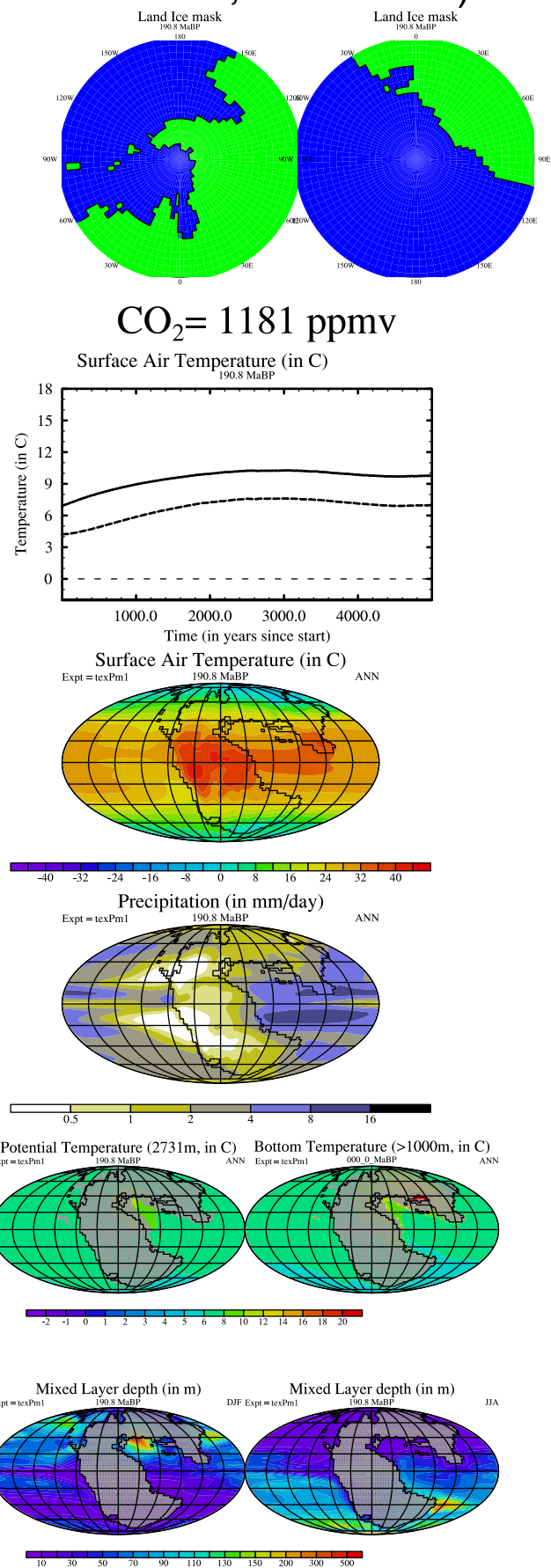
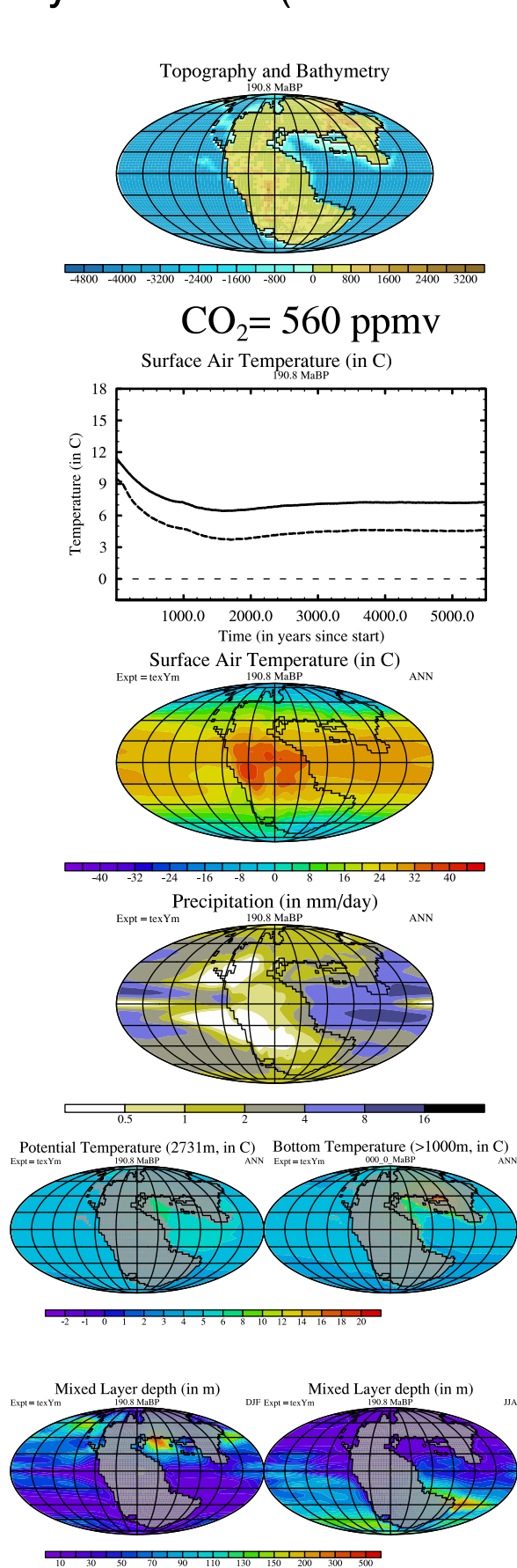
CO<sub>2</sub>= 560 ppmv



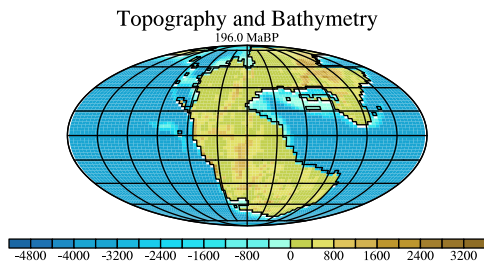
CO<sub>2</sub>= 949 ppmv



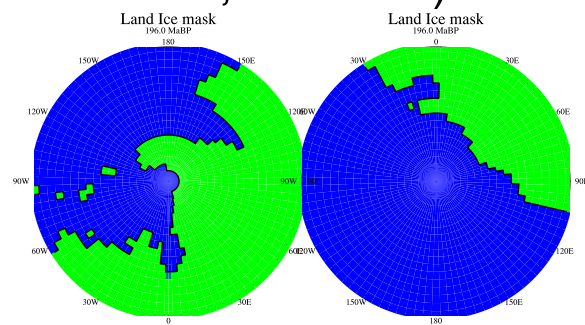
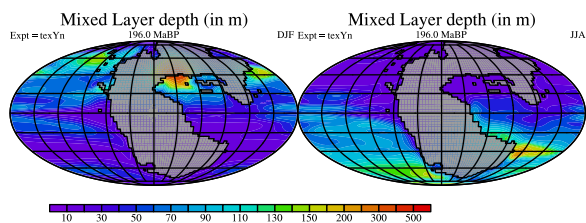
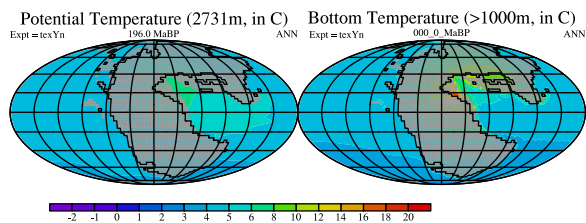
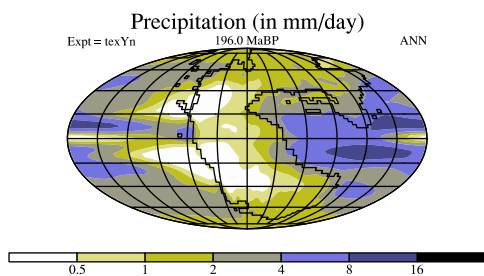
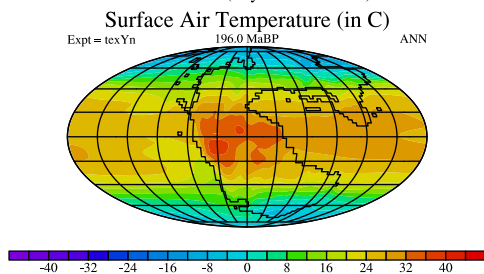
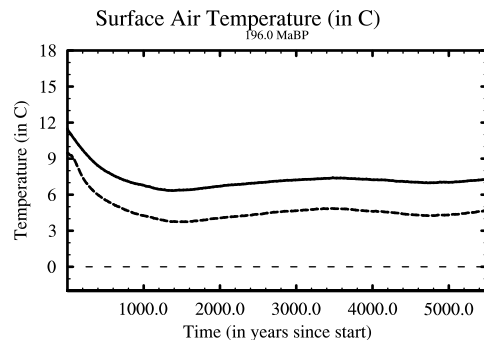
# Early Jurassic (Sinemurian/Pliensbachian, 190.8 Ma)



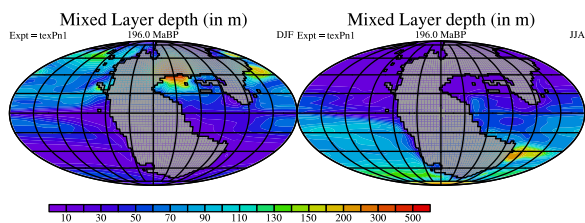
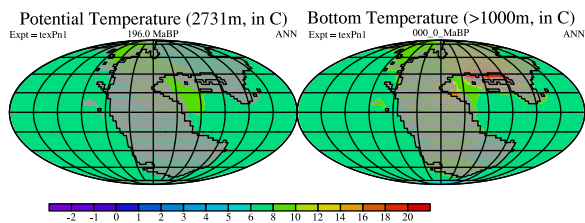
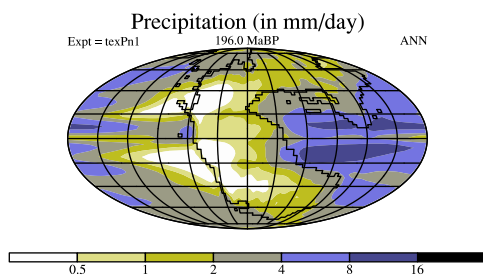
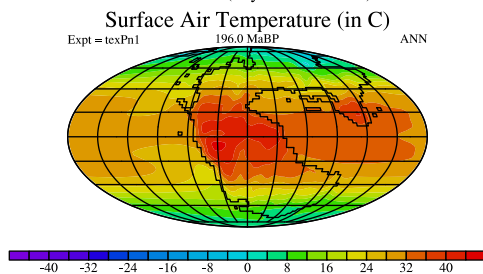
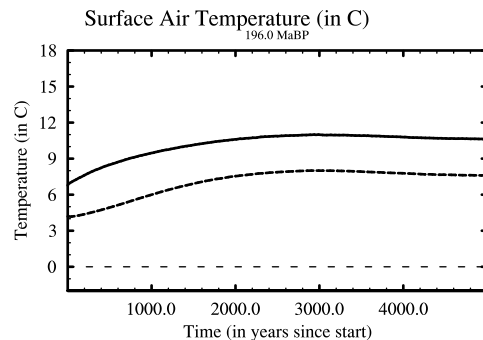
# Early Jurassic (Hettangian&Sinemurian, 196 Ma)



CO<sub>2</sub>= 560 ppmv

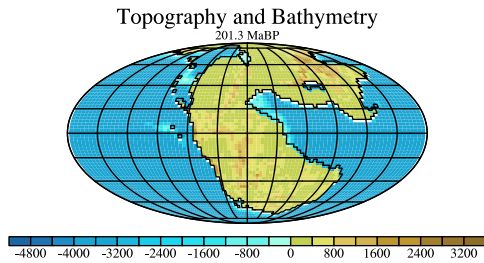


CO<sub>2</sub>= 1784 ppmv

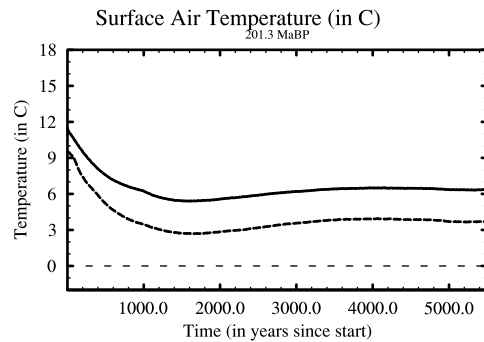




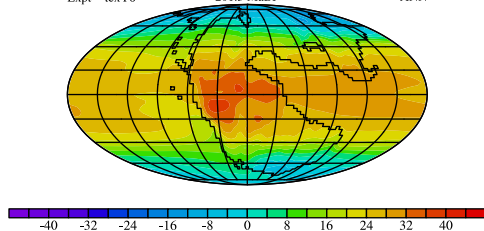
# Late Triassic (Rhaetian/Hettangian, 201.3 Ma)



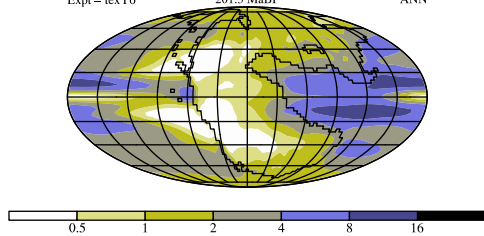
CO<sub>2</sub>= 560 ppmv



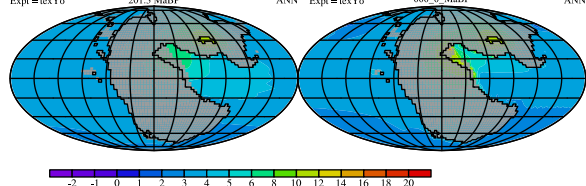
Surface Air Temperature (in C)  
Expt = texYo 201.3 MaBP ANN



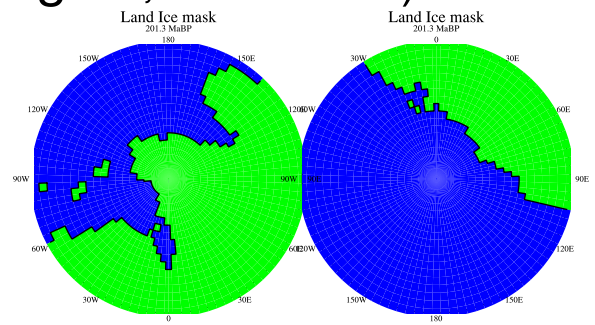
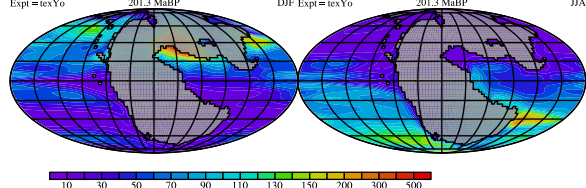
Precipitation (in mm/day)  
Expt = texYo 201.3 MaBP ANN



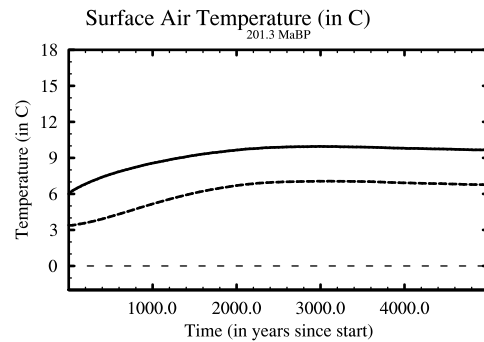
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texYo 201.3 MaBP ANN Expt = texYo 000.0 MaBP ANN



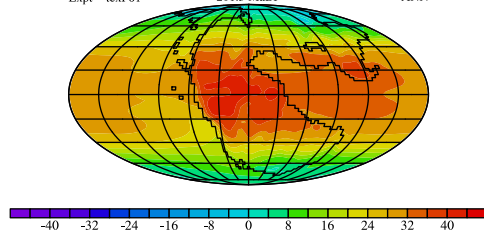
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = texYo 201.3 MaBP DJF Expt = texYo 201.3 MaBP JJA



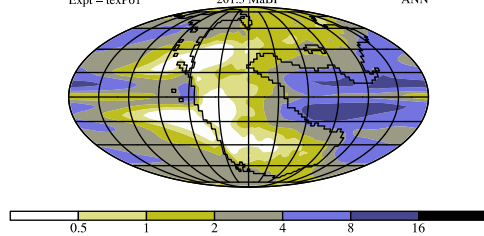
CO<sub>2</sub>= 1729 ppmv



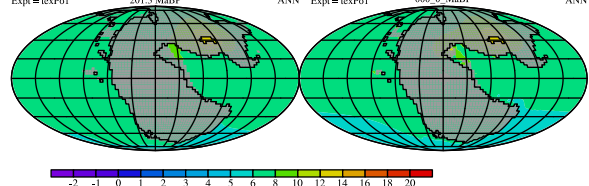
Surface Air Temperature (in C)  
Expt = texPo1 201.3 MaBP ANN



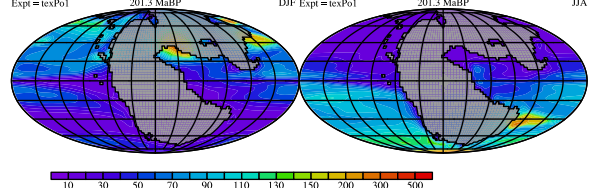
Precipitation (in mm/day)  
Expt = texPo1 201.3 MaBP ANN



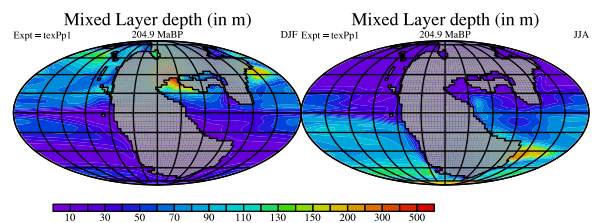
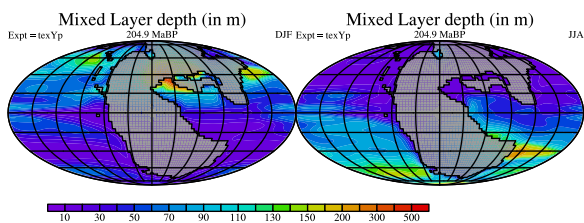
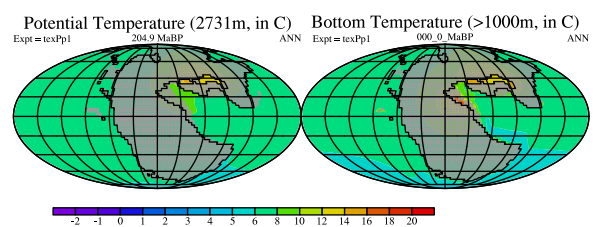
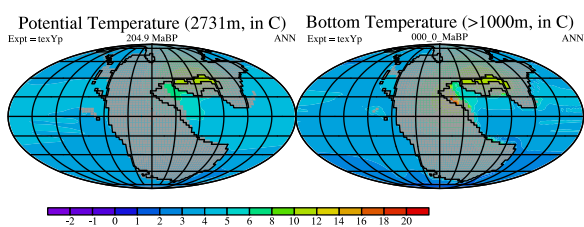
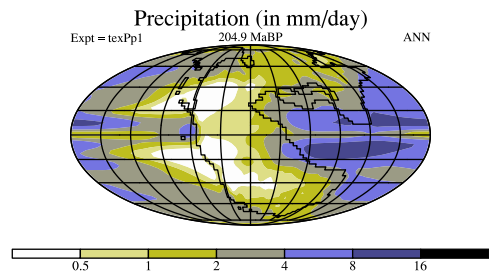
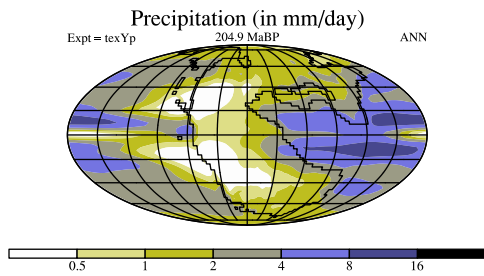
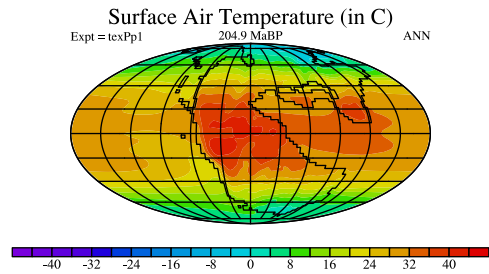
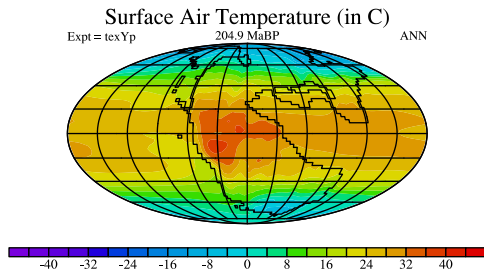
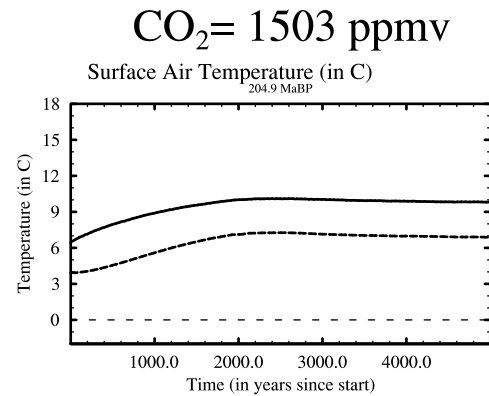
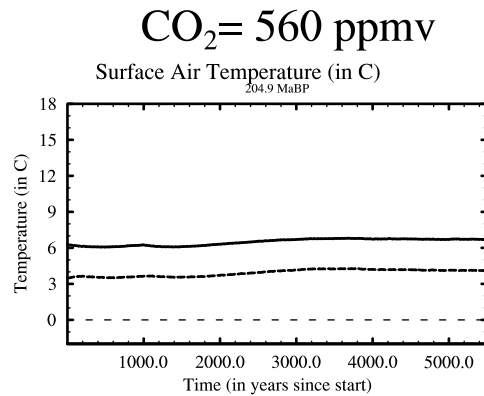
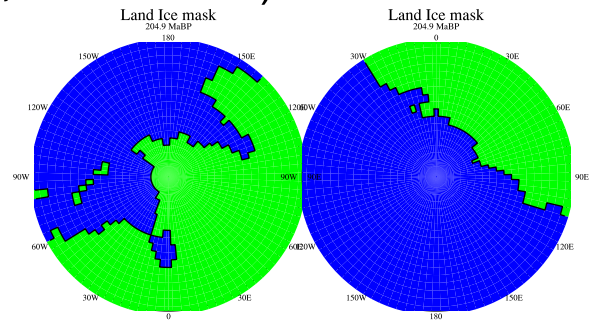
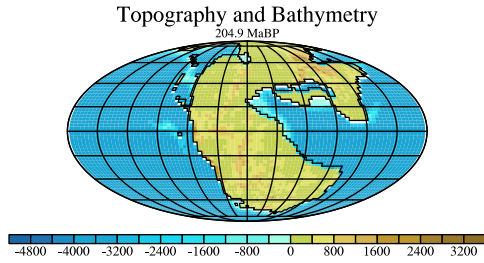
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texPo1 201.3 MaBP ANN Expt = texPo1 000.0 MaBP ANN



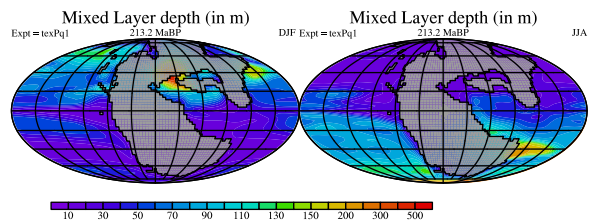
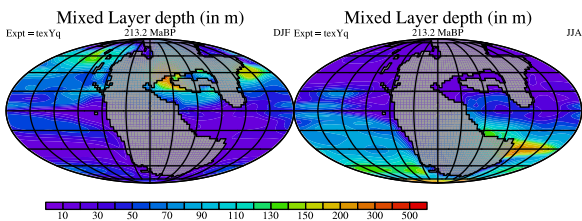
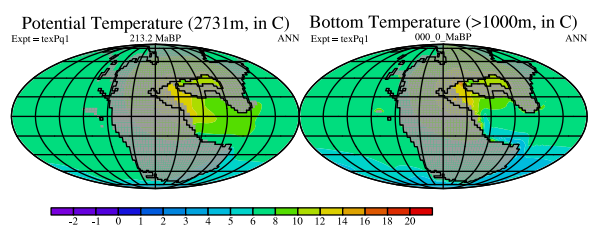
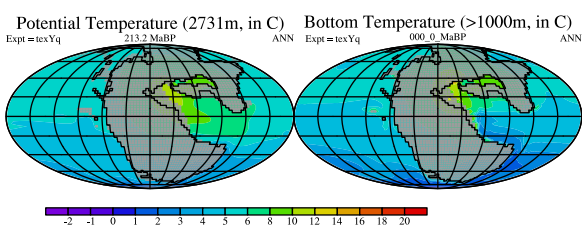
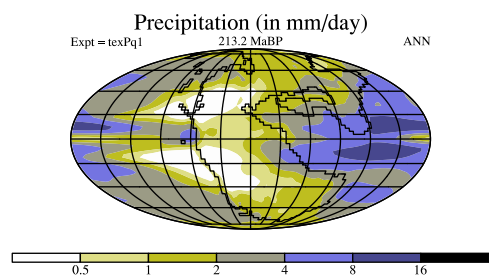
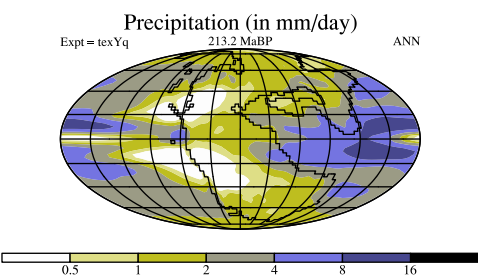
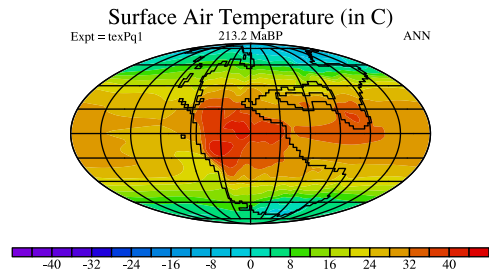
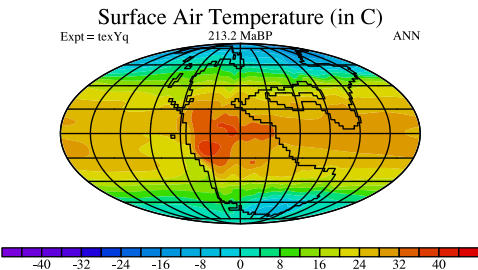
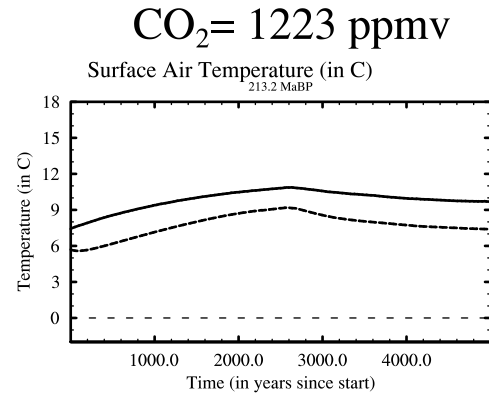
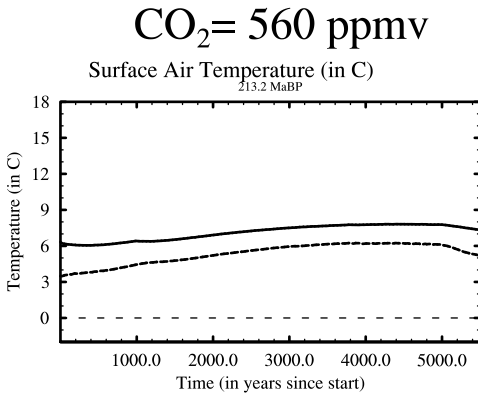
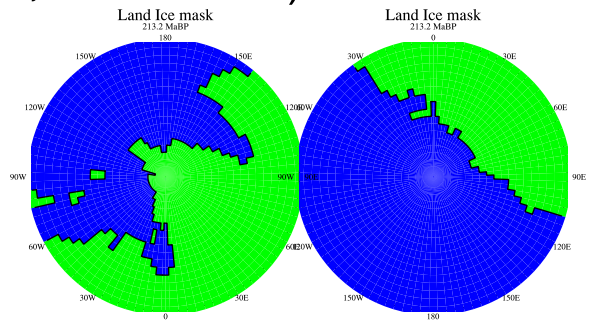
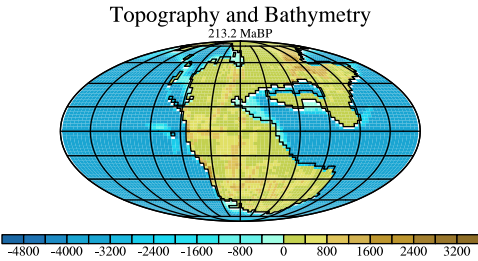
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = texPo1 201.3 MaBP DJF Expt = texPo1 201.3 MaBP JJA



# Late Triassic (Rhaetian, 204.9 Ma)

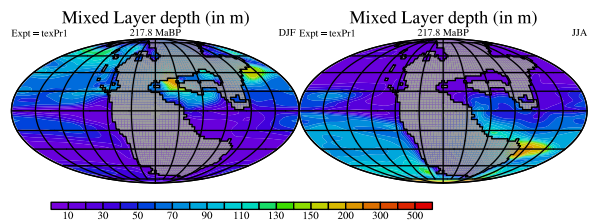
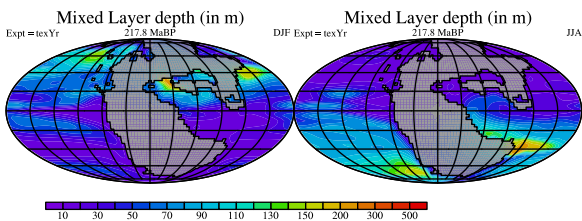
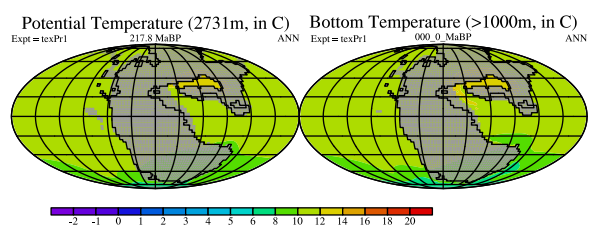
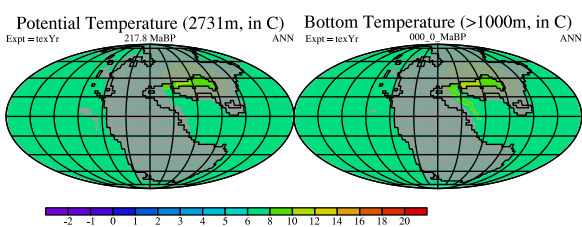
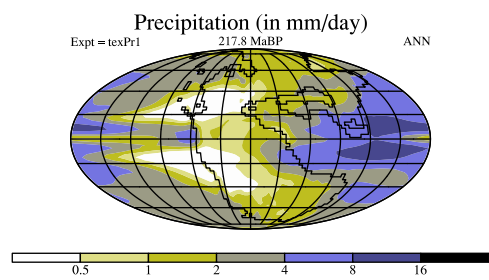
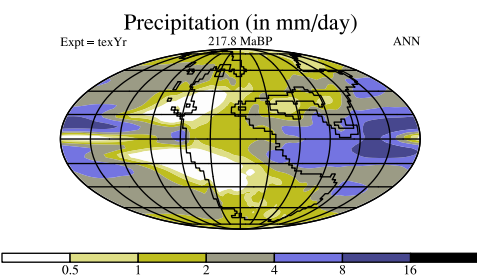
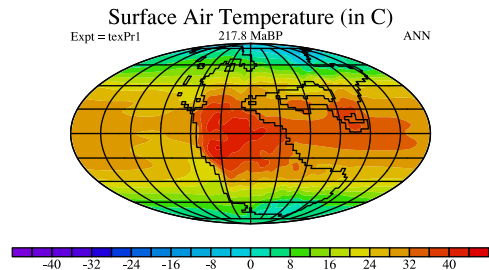
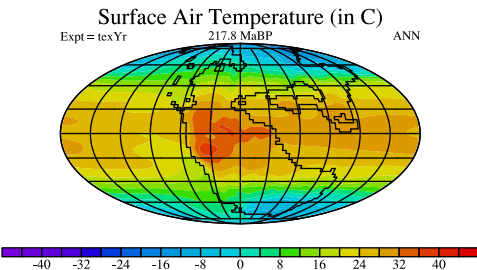
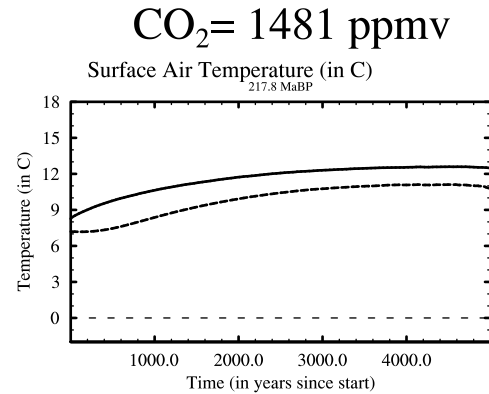
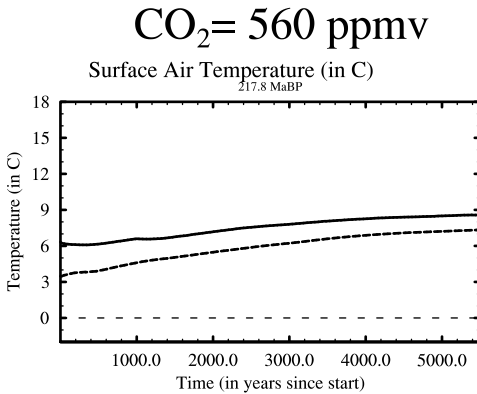
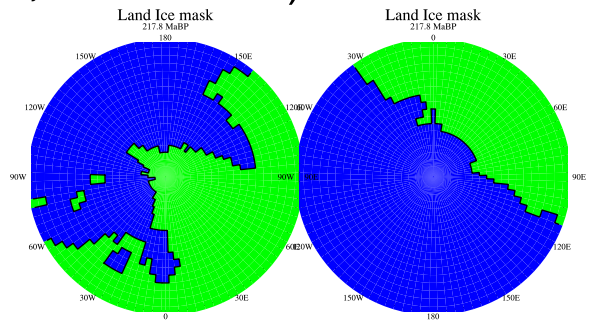
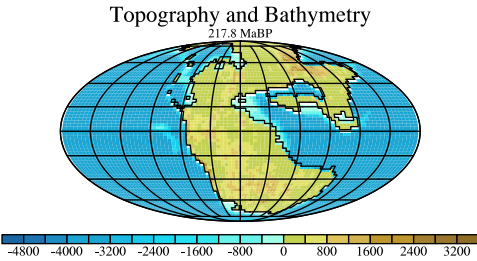


# Late Triassic (late Norian, 213.2 Ma)

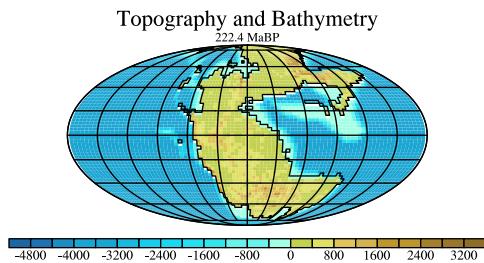




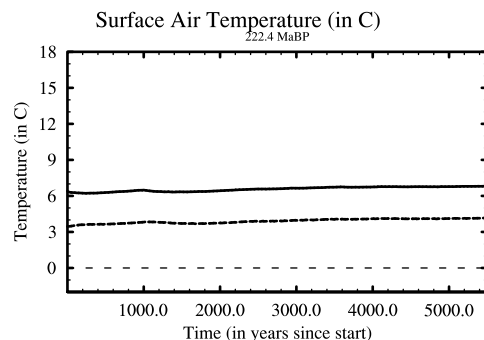
# Late Triassic (mid Norian, 217.8 Ma)



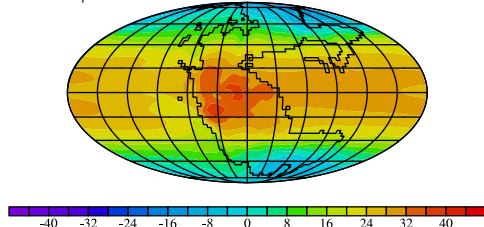
# Late Triassic (early Norian, 222.4 Ma)



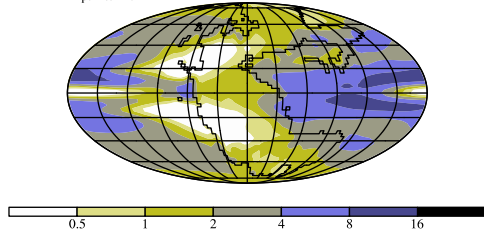
CO<sub>2</sub>= 557 ppmv



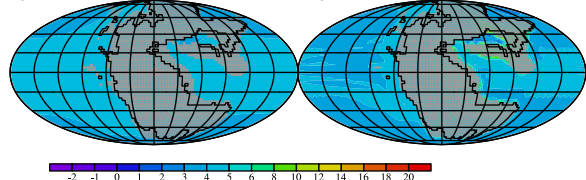
Surface Air Temperature (in C)  
Expt = texYs 222.4 MaBP ANN



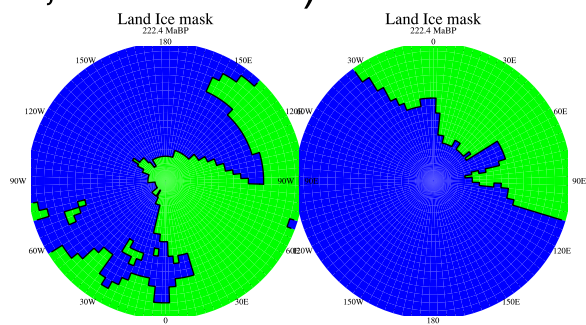
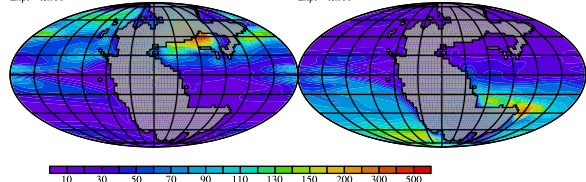
Precipitation (in mm/day)  
Expt = texYs 222.4 MaBP ANN



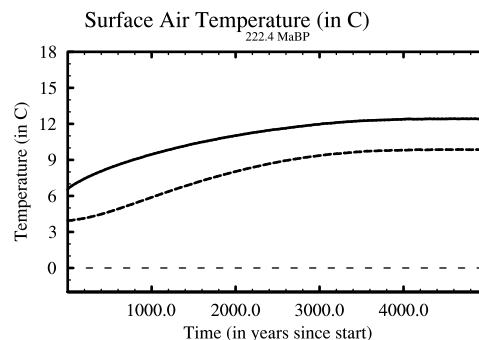
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texYs 222.4 MaBP ANN Expt = texYs 000.0 MaBP ANN



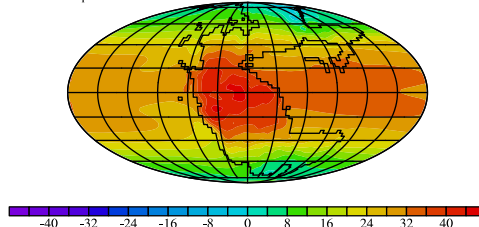
Mixed Layer depth (in m)  
Expt = texYs 222.4 MaBP DJF Expt = texYs 222.4 MaBP JJA



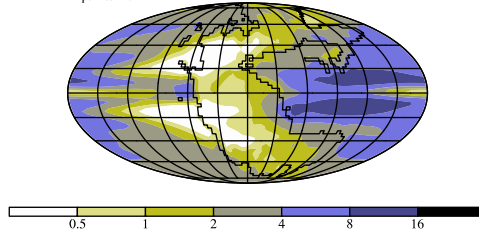
CO<sub>2</sub>= 1810 ppmv



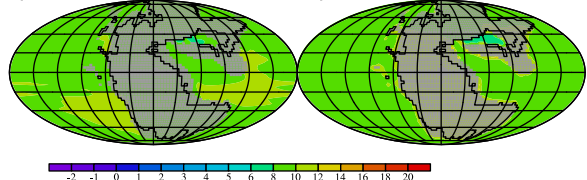
Surface Air Temperature (in C)  
Expt = texPsI 222.4 MaBP ANN



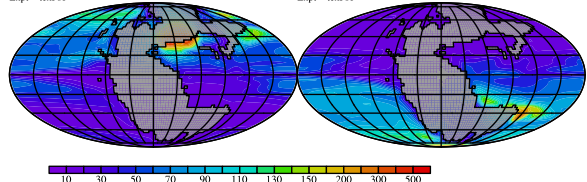
Precipitation (in mm/day)  
Expt = texPsI 222.4 MaBP ANN



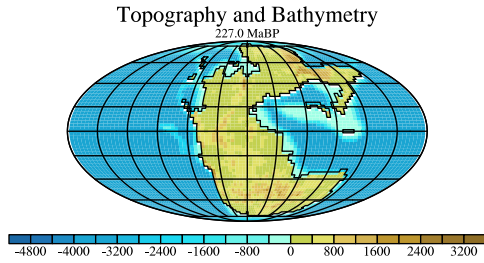
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texPsI 222.4 MaBP ANN Expt = texPsI 000.0 MaBP ANN



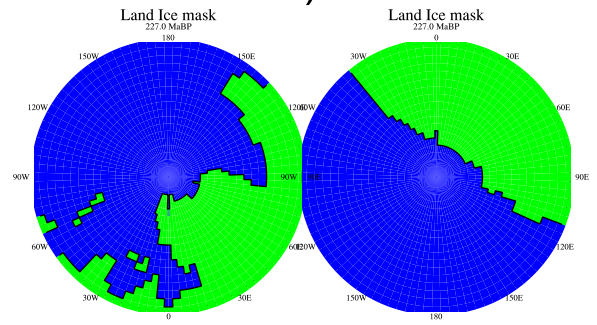
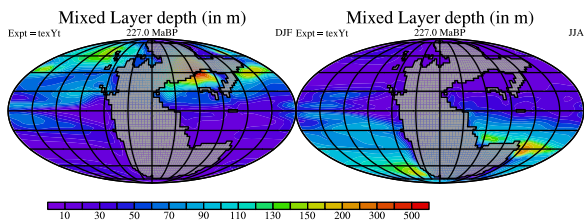
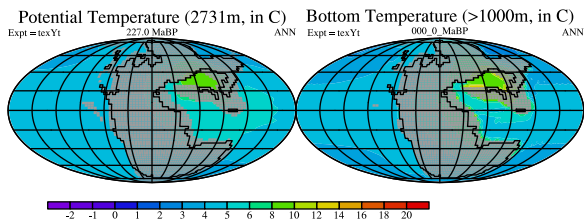
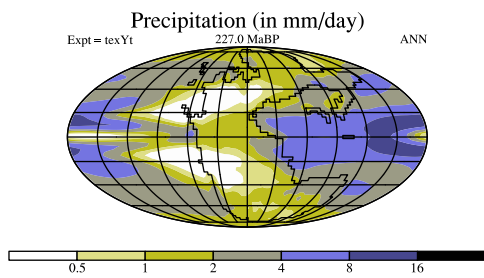
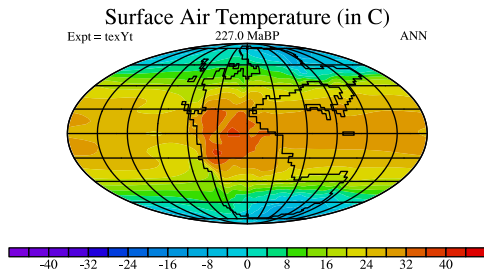
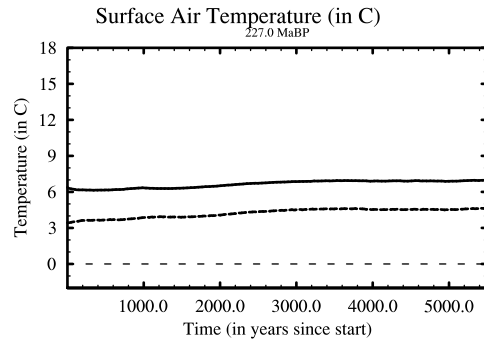
Mixed Layer depth (in m)  
Expt = texPsI 222.4 MaBP DJF Expt = texPsI 222.4 MaBP JJA



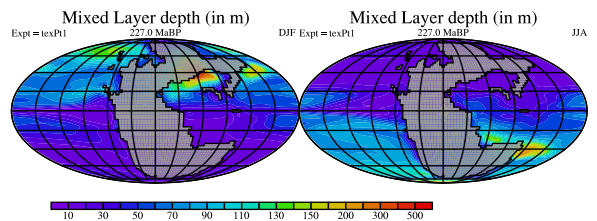
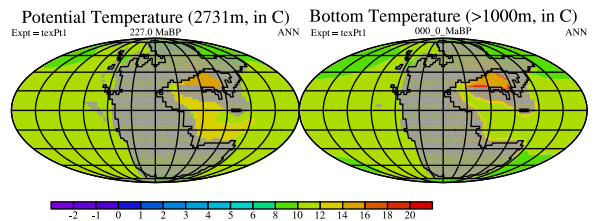
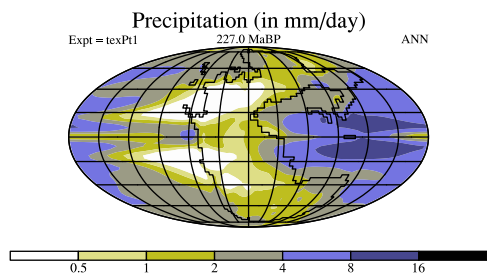
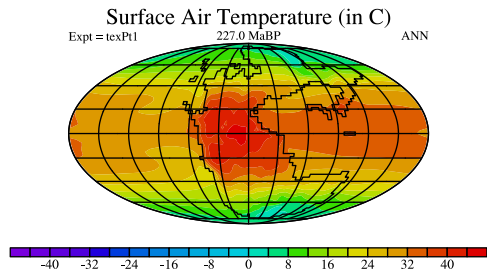
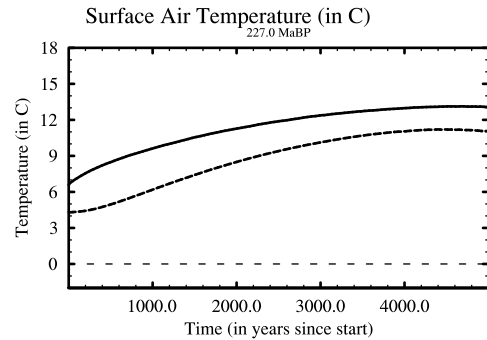
# Late Triassic (Carnian/Norian 227 Ma)



CO<sub>2</sub>= 553 ppmv

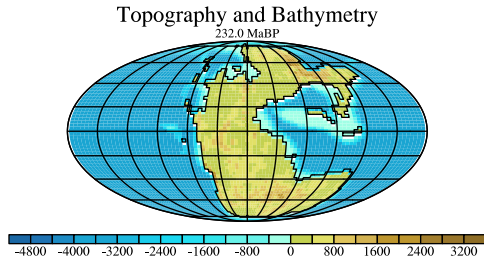


CO<sub>2</sub>= 2059 ppmv

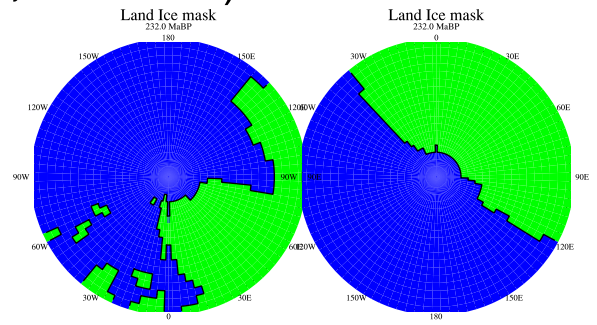
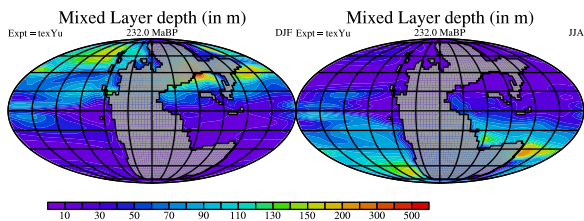
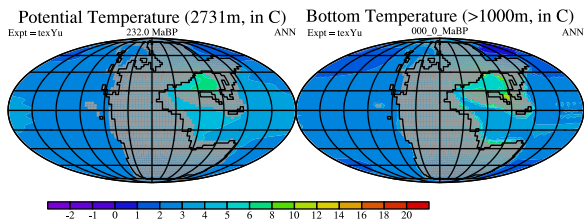
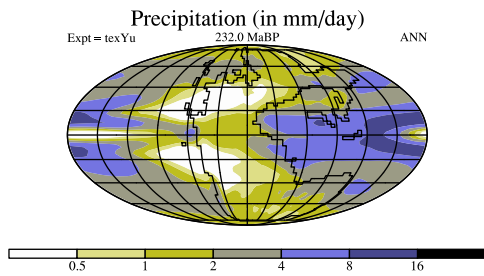
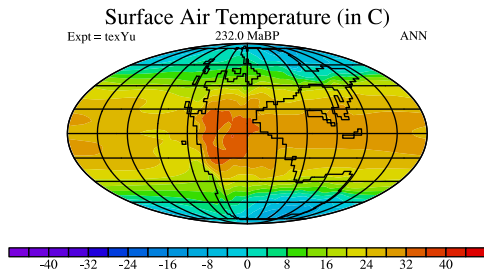
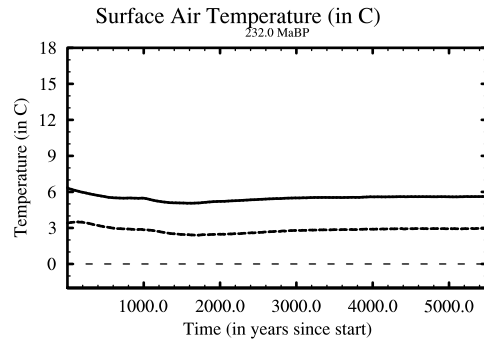




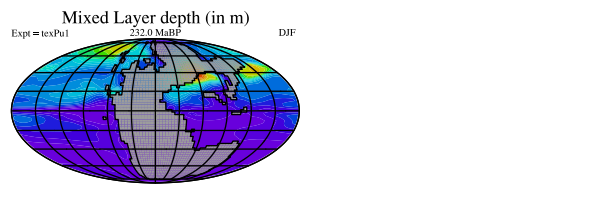
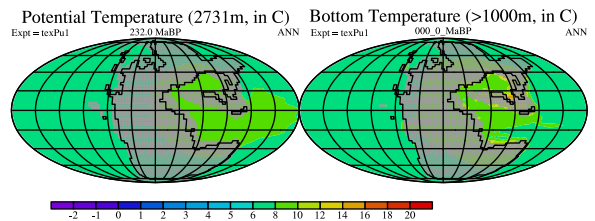
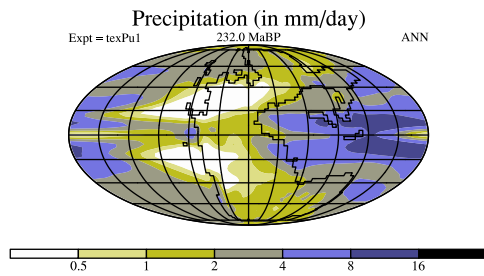
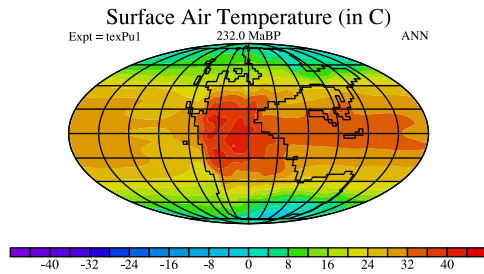
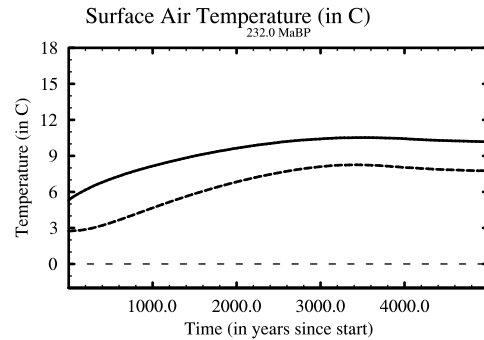
# Late Triassic (Carnian, 232 Ma)



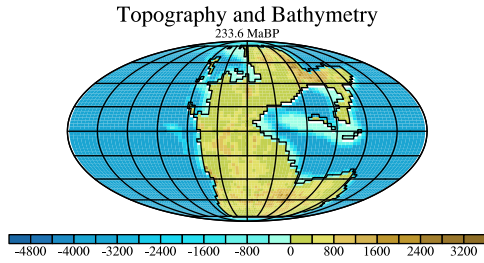
CO<sub>2</sub>= 549 ppmv



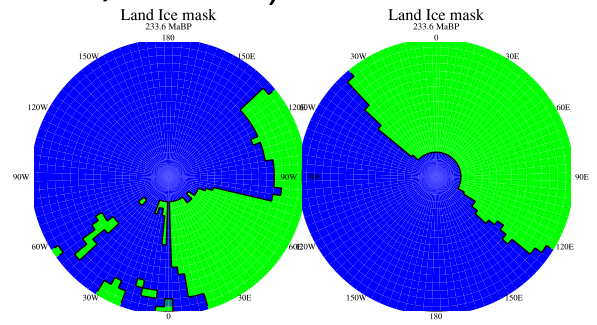
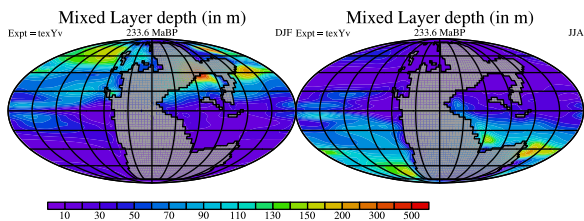
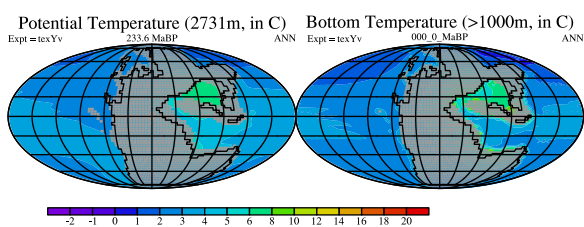
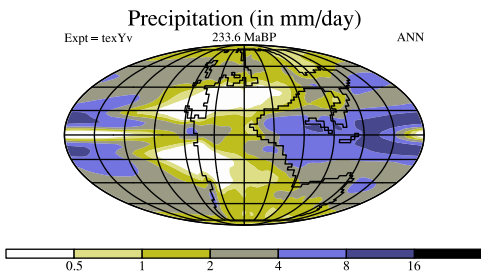
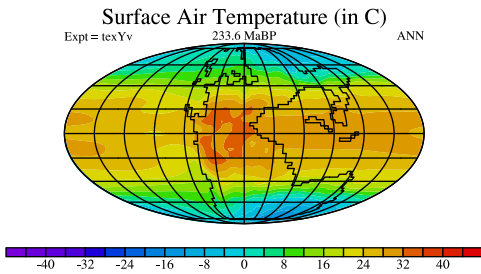
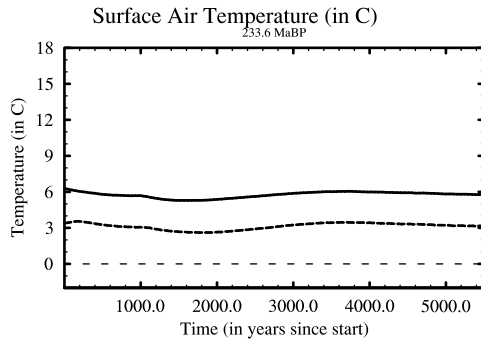
CO<sub>2</sub>= 1614 ppmv



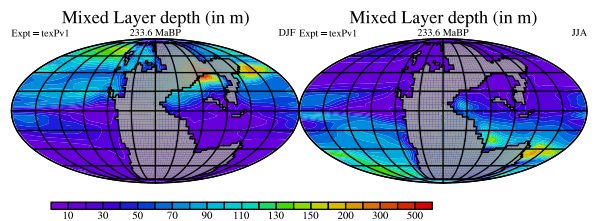
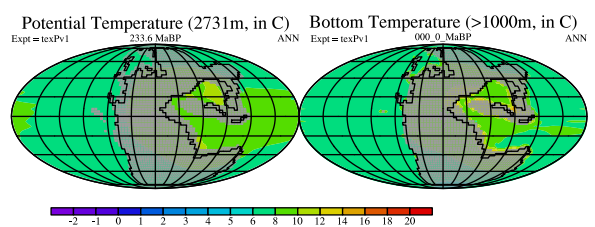
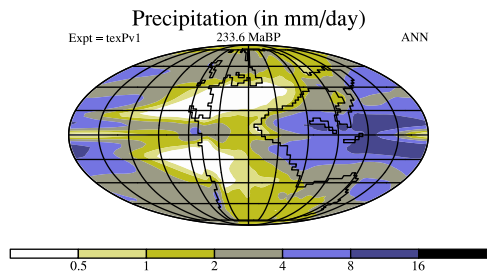
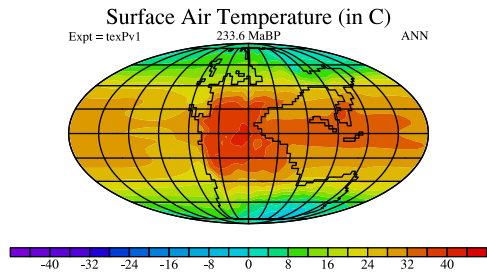
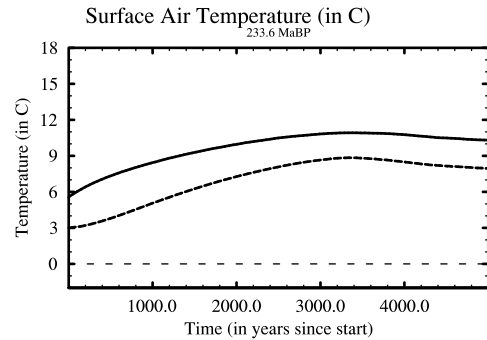
# Late Triassic (early Carnian, 233.6)



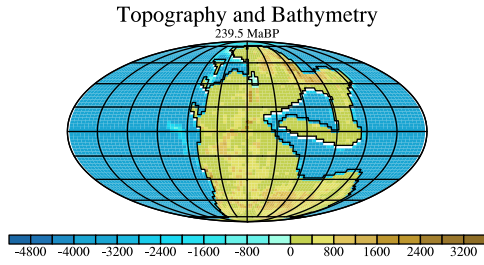
CO<sub>2</sub>= 548 ppmv



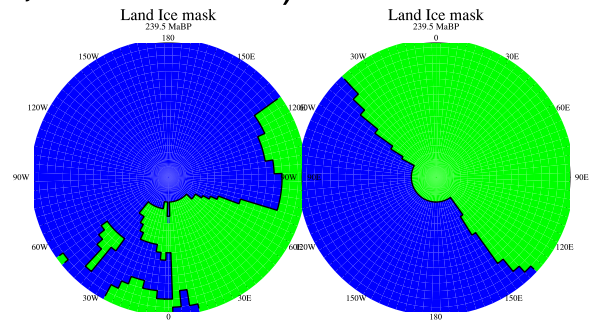
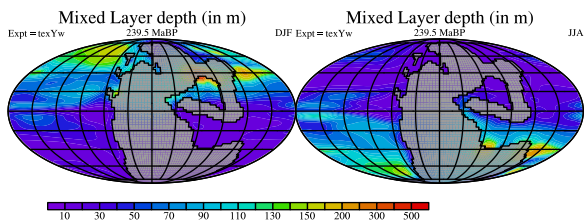
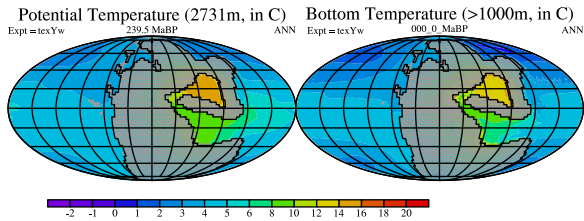
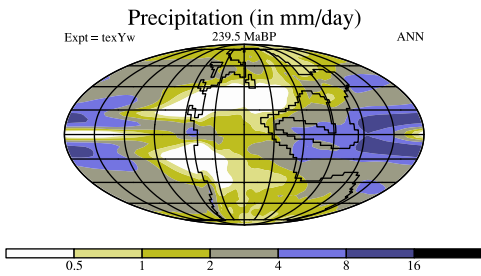
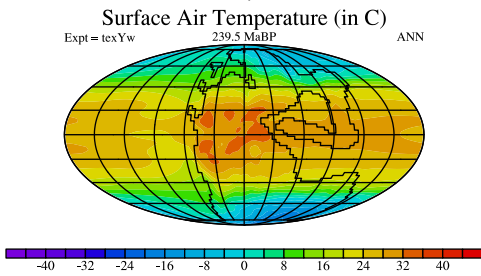
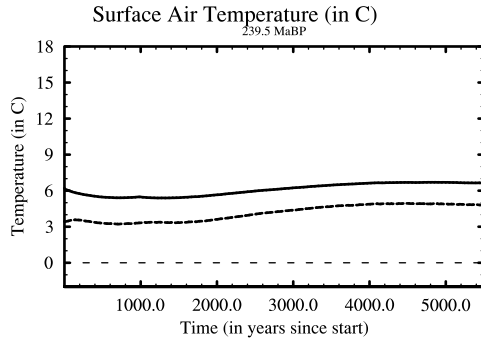
CO<sub>2</sub>= 1492 ppmv



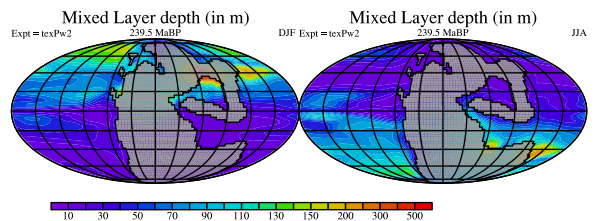
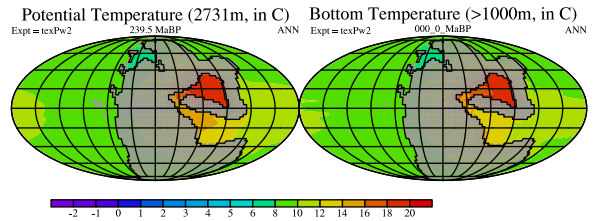
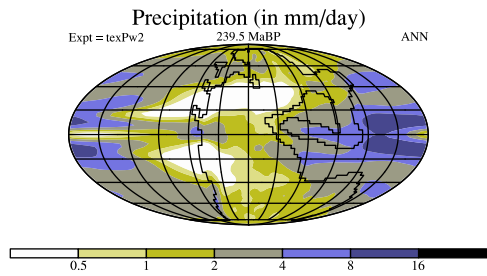
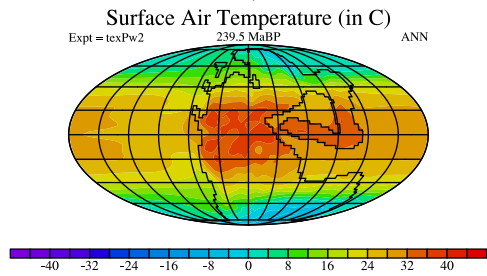
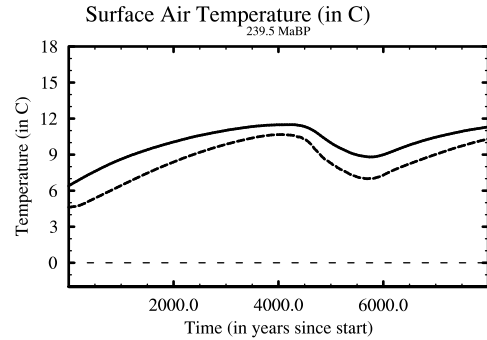
# Middle Triassic (Ladinian, 239.5 Ma)



CO<sub>2</sub>= 543 ppmv

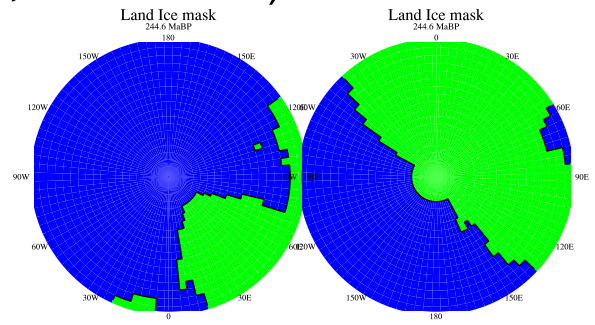
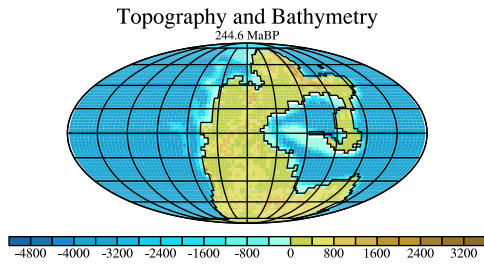


CO<sub>2</sub>= 1034 ppmv

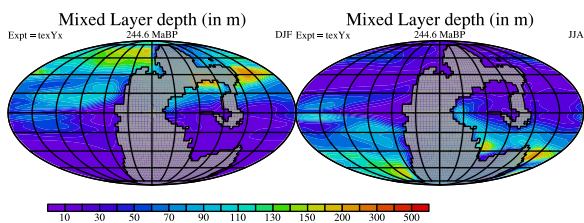
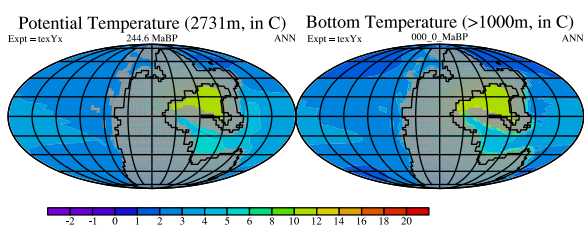
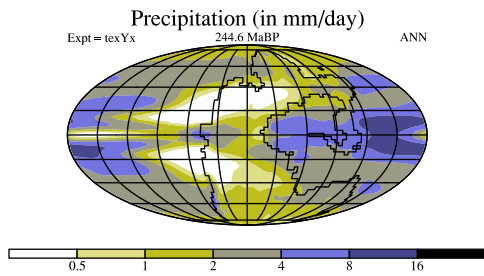
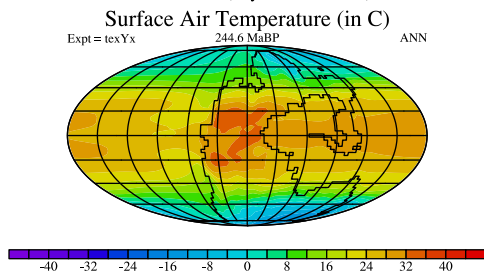
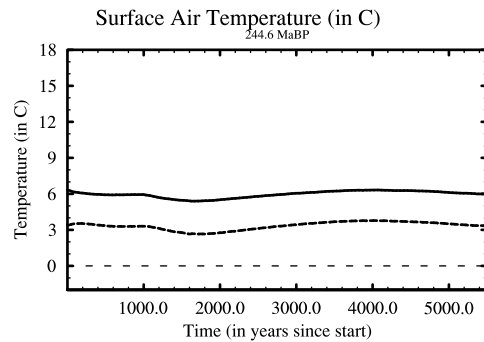




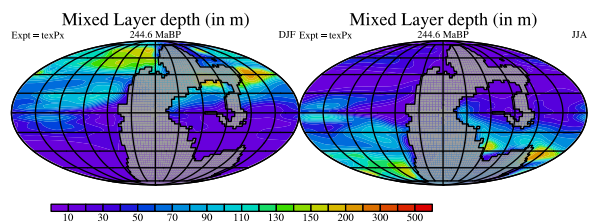
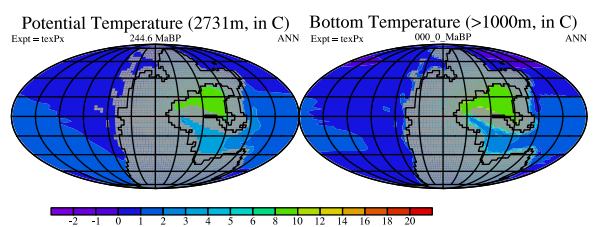
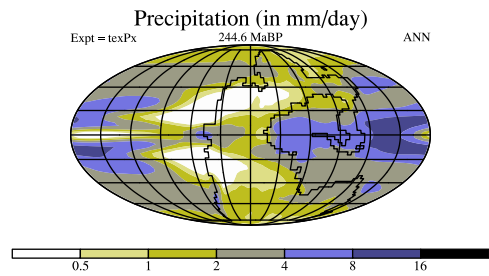
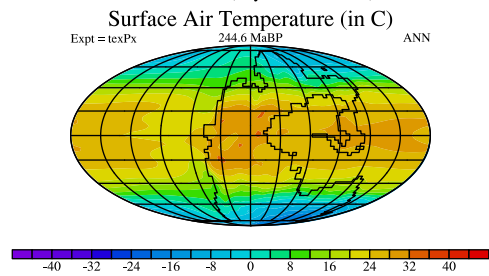
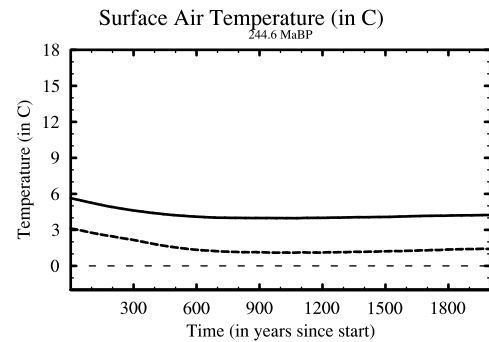
# Middle Triassic (Anisian, 244.6 Ma)



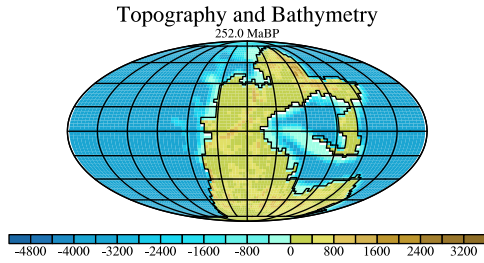
CO<sub>2</sub>= 540 ppmv



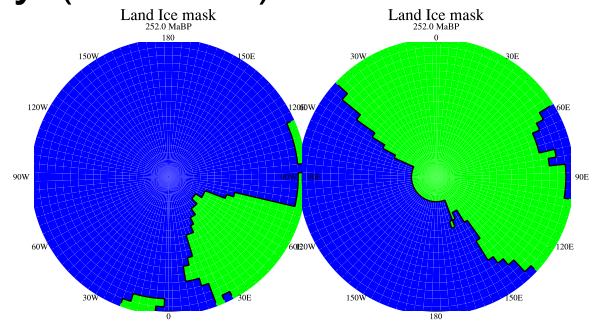
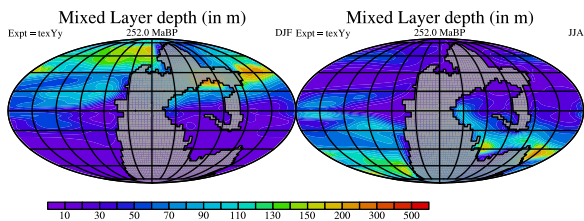
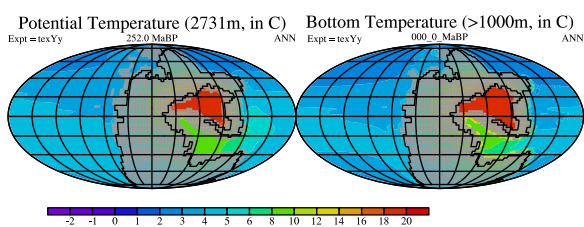
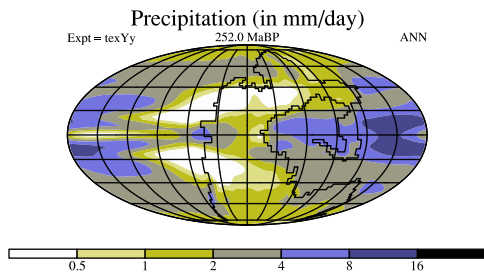
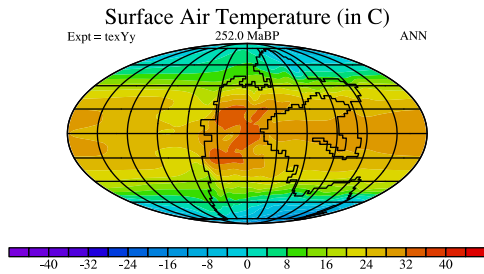
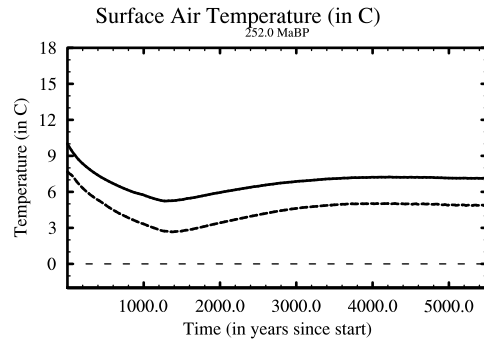
CO<sub>2</sub>= 419 ppmv



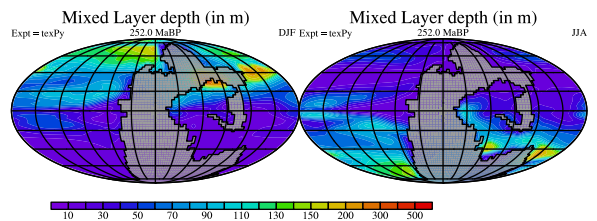
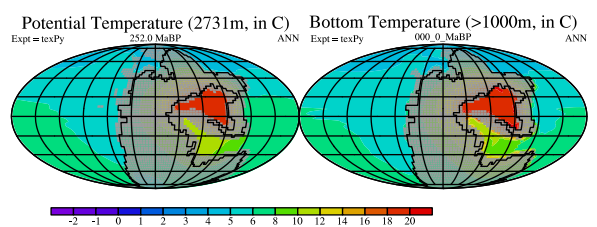
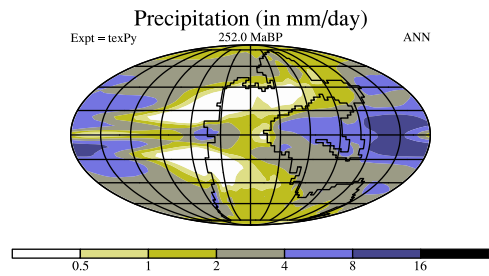
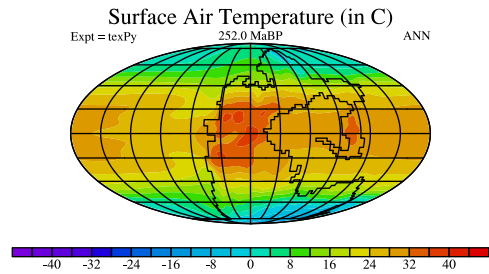
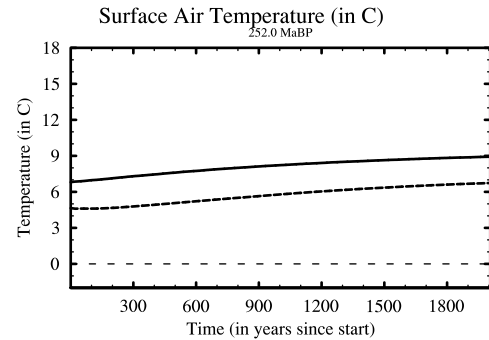
# Permo-Triassic Boundary (252 Ma)



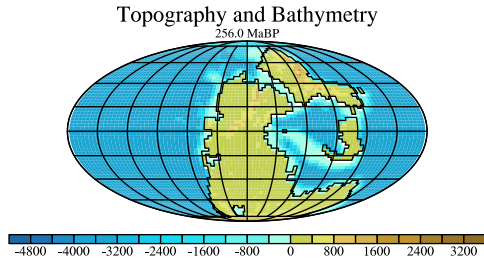
CO<sub>2</sub> = 534 ppmv



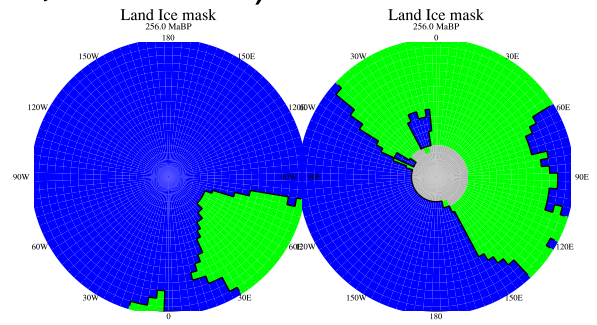
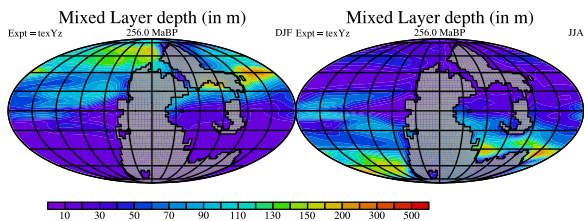
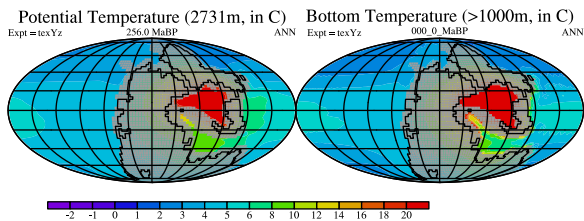
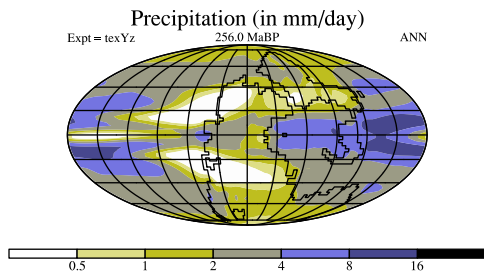
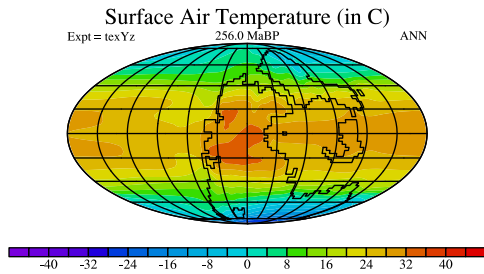
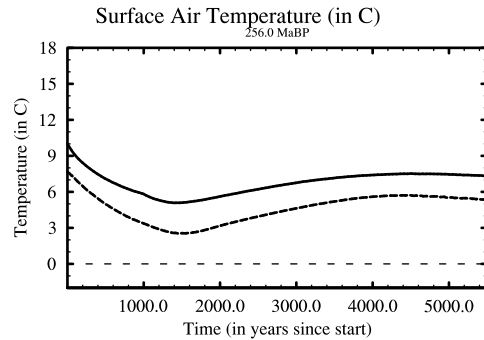
CO<sub>2</sub> = 879 ppmv



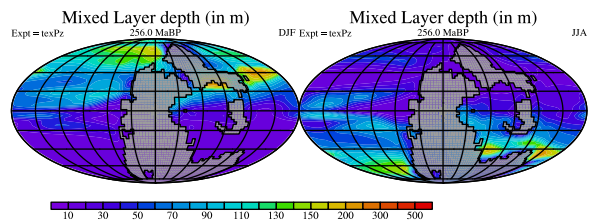
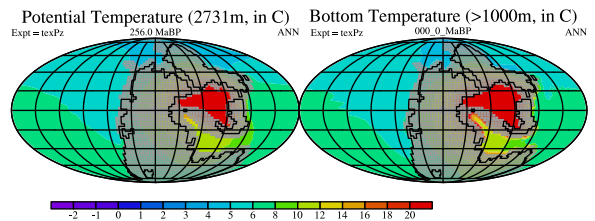
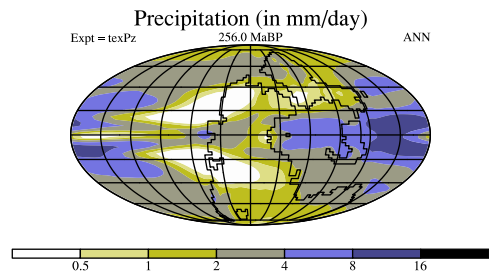
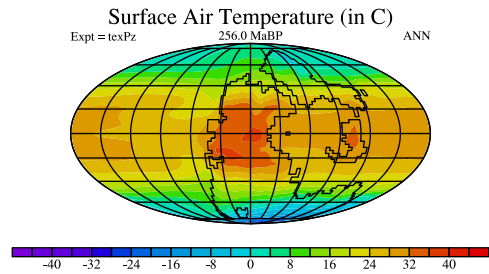
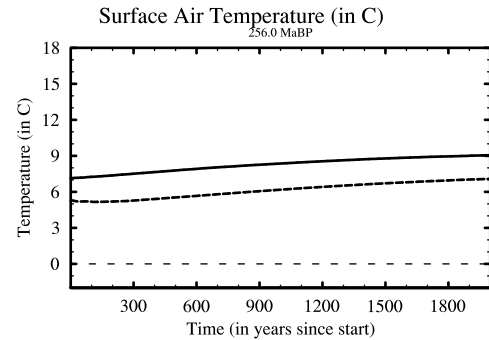
# Late Permian (Lopingian, 256 Ma)



CO<sub>2</sub>= 531 ppmv

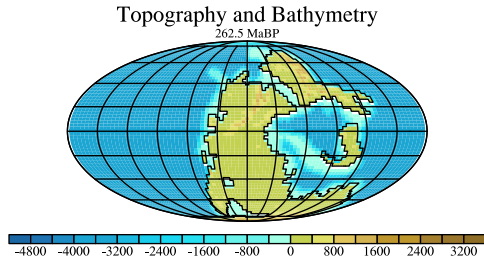


CO<sub>2</sub>= 811 ppmv

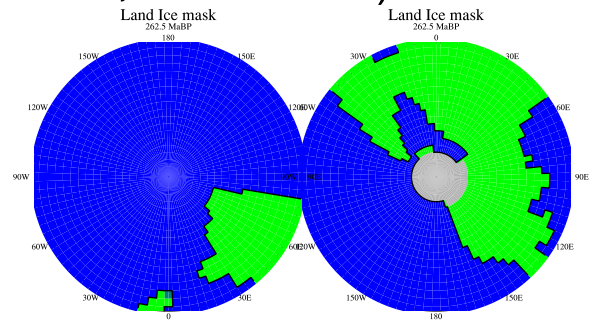
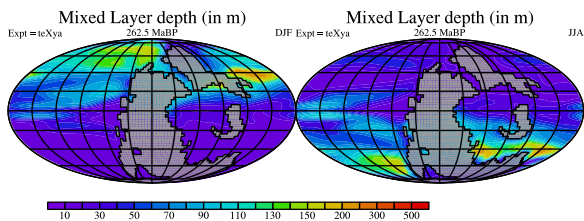
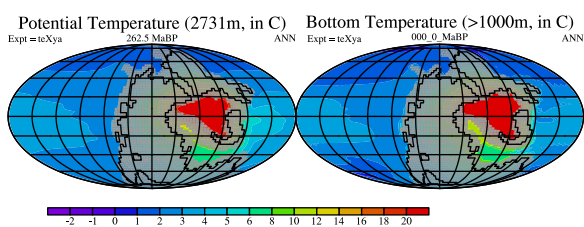
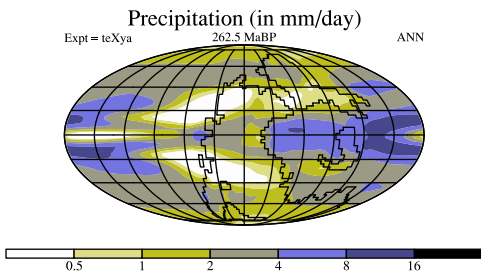
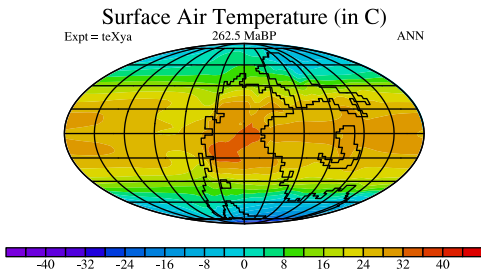
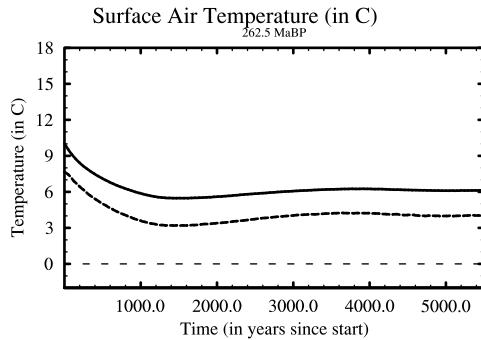




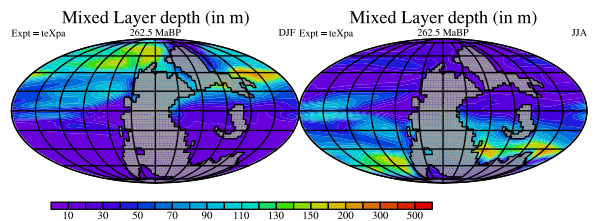
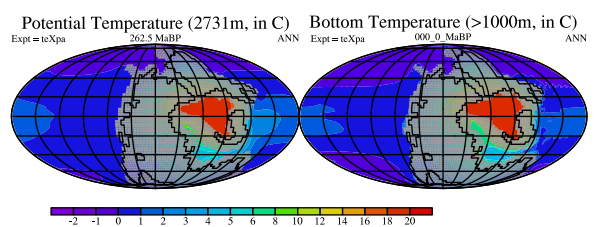
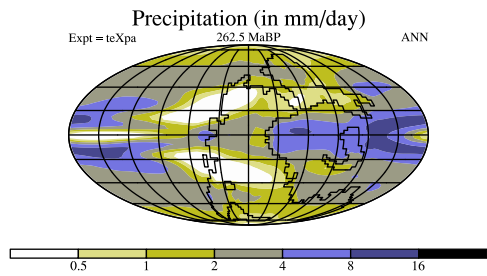
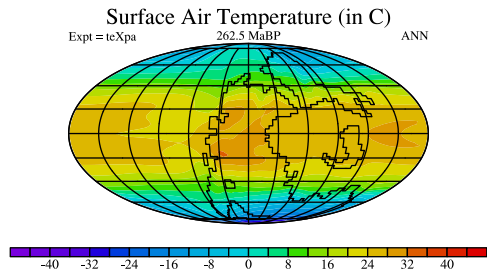
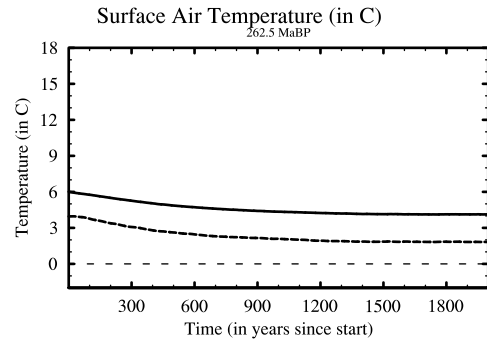
# late Middle Permian (Capitanian, 262.5 Ma)



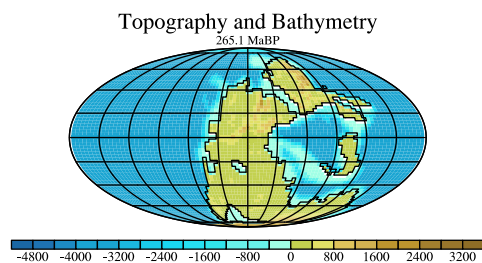
CO<sub>2</sub>= 526 ppmv



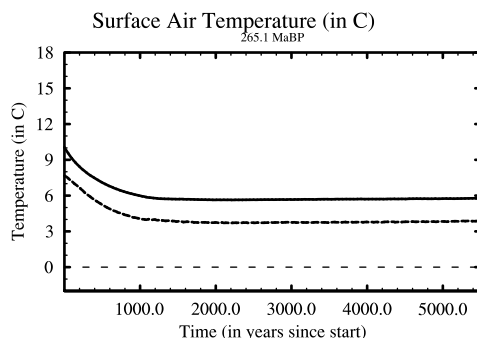
CO<sub>2</sub>= 352 ppmv



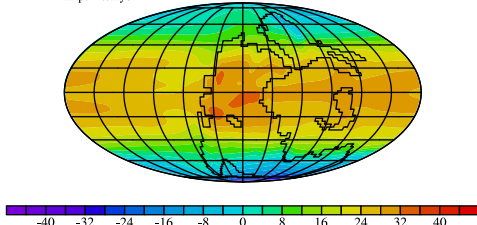
# Middle Permian (Wordian/Capitanian Boundary 265.1 Ma)



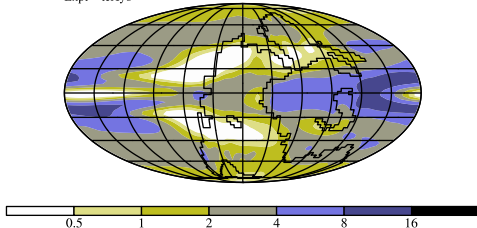
CO<sub>2</sub>= 524 ppmv



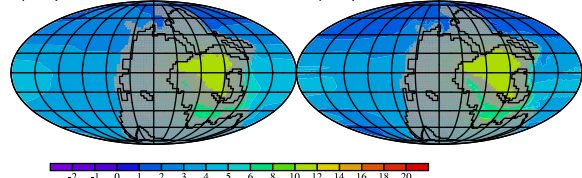
Surface Air Temperature (in C)  
Expt = teXyb ANN



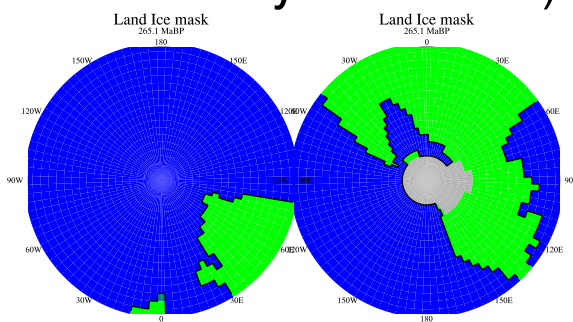
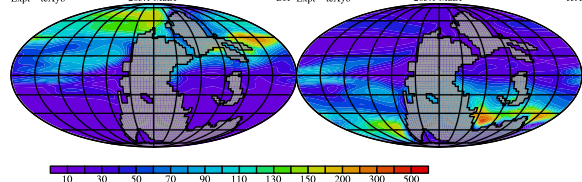
Precipitation (in mm/day)  
Expt = teXyb ANN



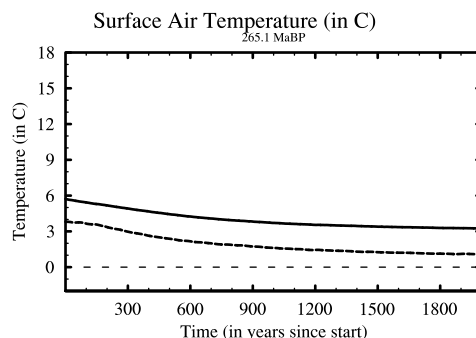
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = teXyb ANN Expt = teXyb ANN



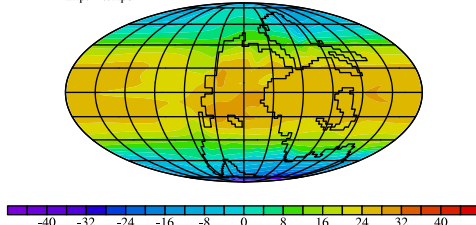
Mixed Layer depth (in m) DIF Expt = teXyb ANN



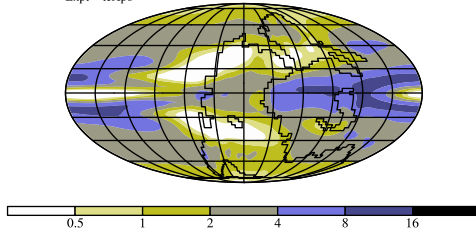
CO<sub>2</sub>= 321 ppmv



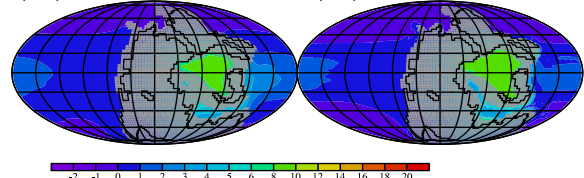
Surface Air Temperature (in C)  
Expt = teXpb ANN



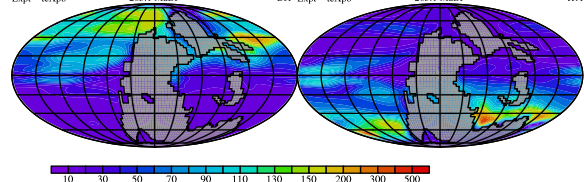
Precipitation (in mm/day)  
Expt = teXpb ANN



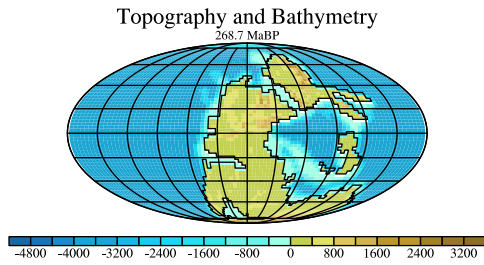
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = teXpb ANN Expt = teXpb ANN



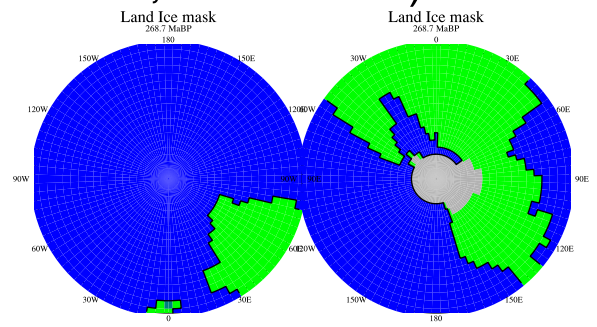
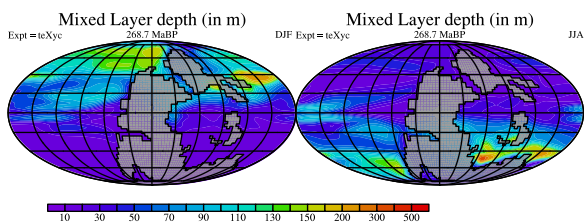
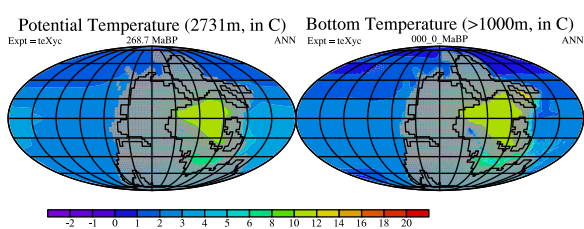
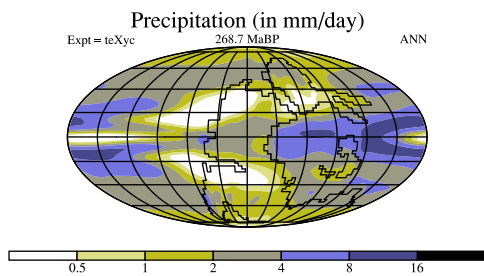
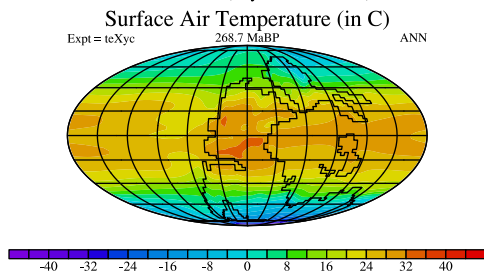
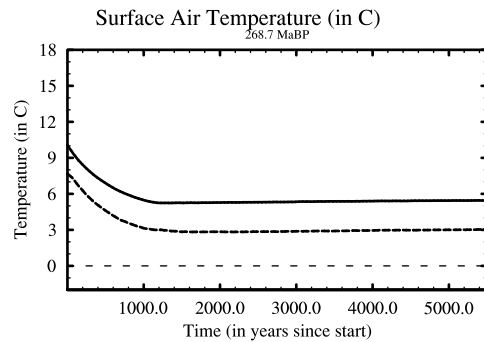
Mixed Layer depth (in m) DIF Expt = teXpb ANN



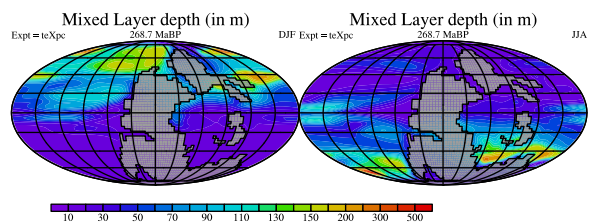
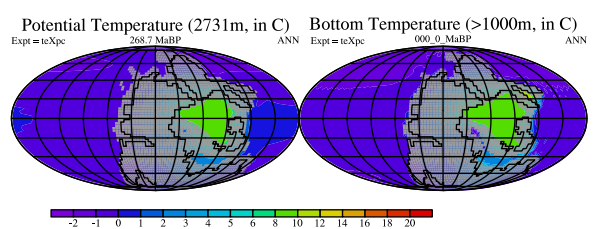
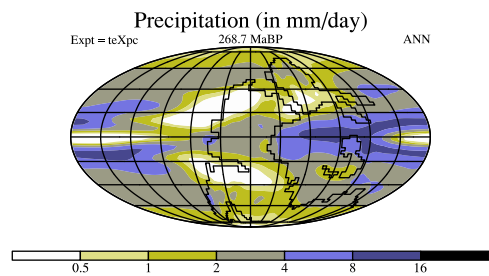
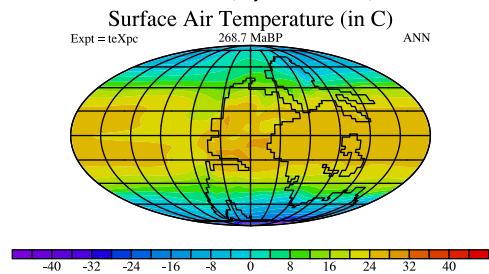
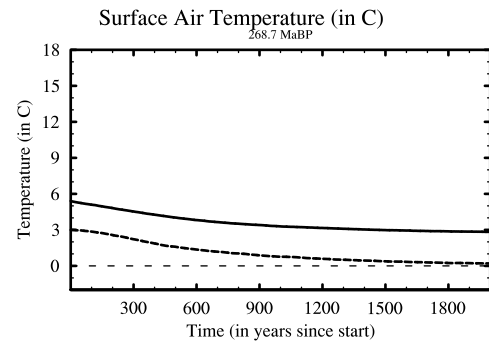
# Middle Permian (Roadian&Wordian, 268.7 Ma)



CO<sub>2</sub>= 521 ppmv

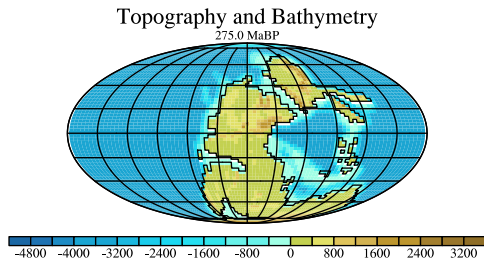


CO<sub>2</sub>= 311 ppmv

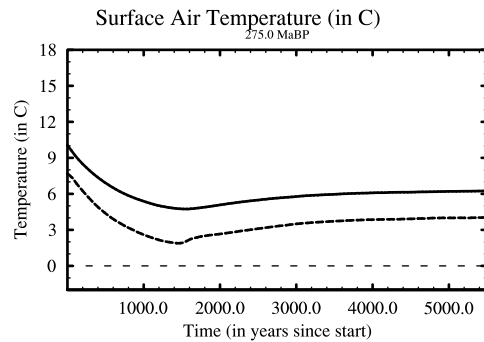




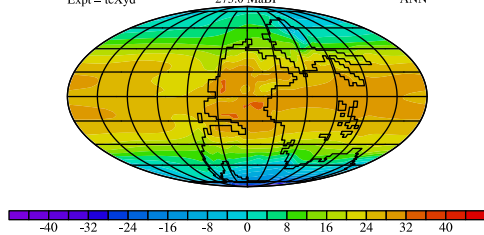
# Early Permian (late Kungurian, 275 Ma)



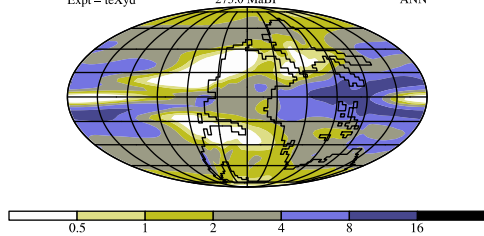
CO<sub>2</sub>= 517 ppmv



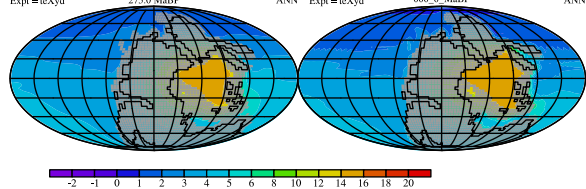
Surface Air Temperature (in C)  
Expt = teXyd 275.0 MaBP ANN



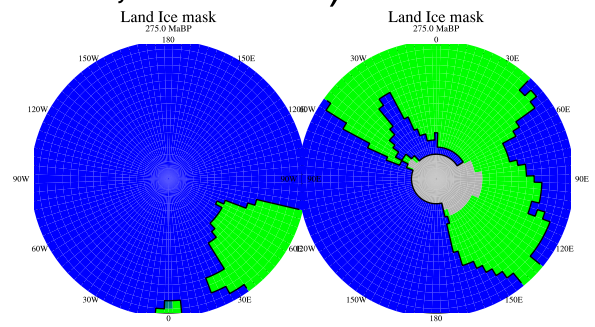
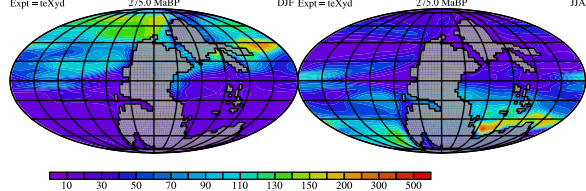
Precipitation (in mm/day)  
Expt = teXyd 275.0 MaBP ANN



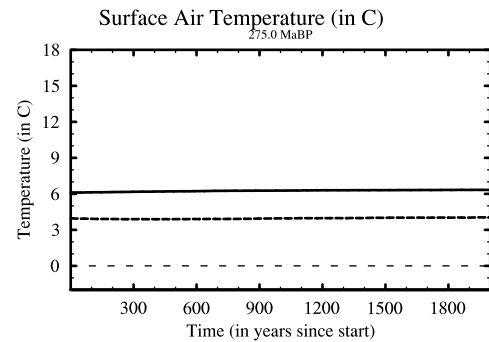
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = teXyd 275.0 MaBP ANN Expt = teXyd 000.0 MaBP ANN



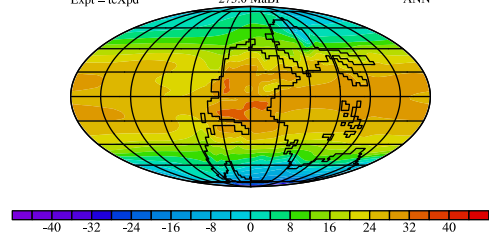
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = teXyd 275.0 MaBP DJF Expt = teXyd 275.0 MaBP JJA



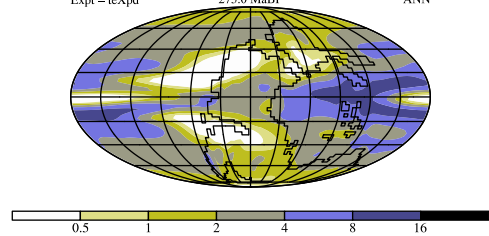
CO<sub>2</sub>= 556 ppmv



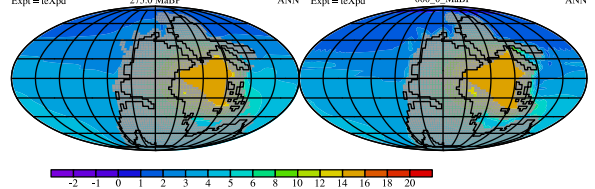
Surface Air Temperature (in C)  
Expt = teXpd 275.0 MaBP ANN



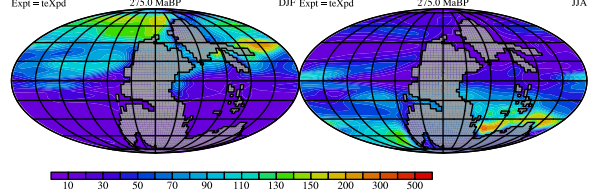
Precipitation (in mm/day)  
Expt = teXpd 275.0 MaBP ANN



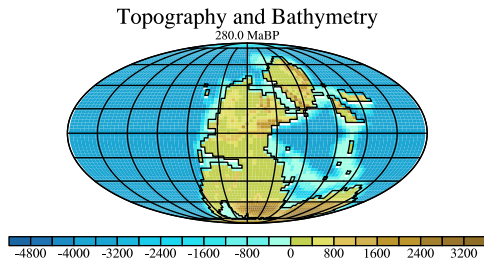
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = teXpd 275.0 MaBP ANN Expt = teXpd 000.0 MaBP ANN



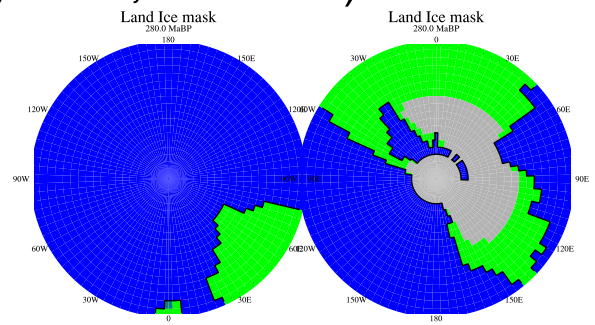
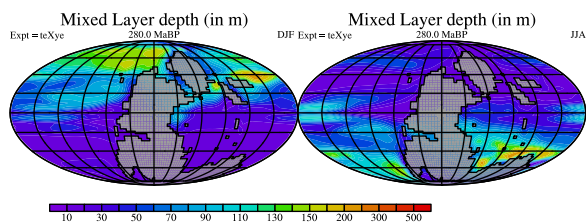
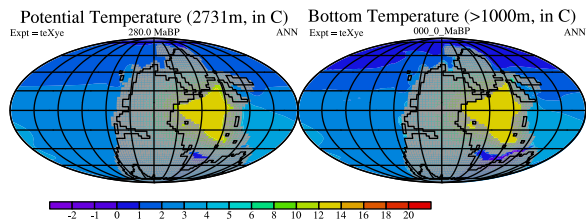
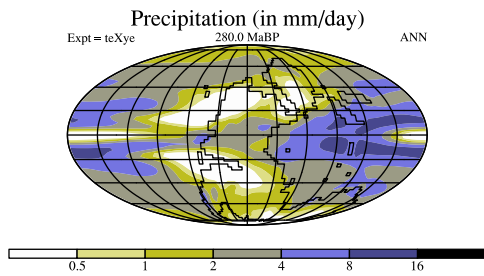
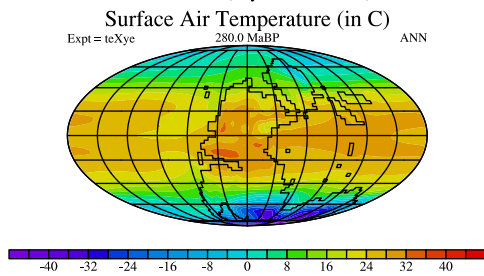
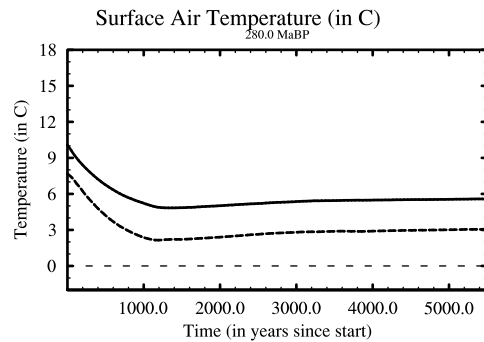
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = teXpd 275.0 MaBP DJF Expt = teXpd 275.0 MaBP JJA



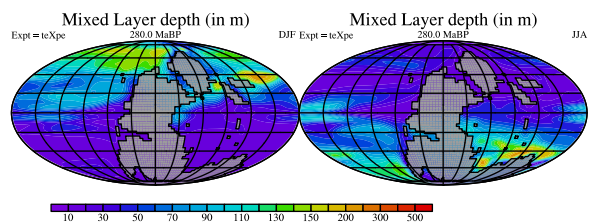
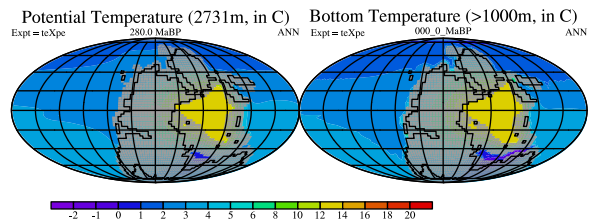
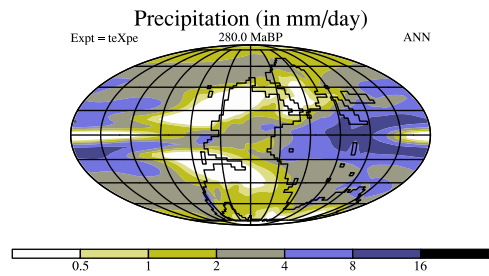
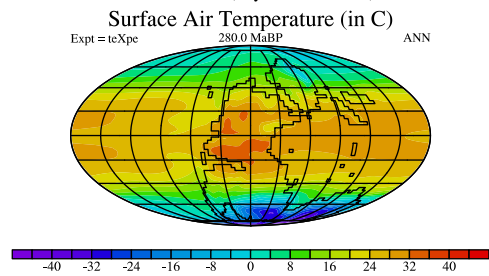
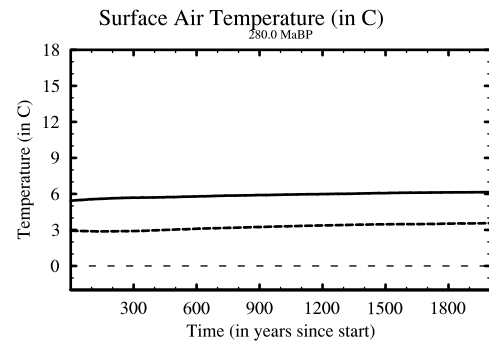
# Early Permian (early Kungurian, 280 Ma)



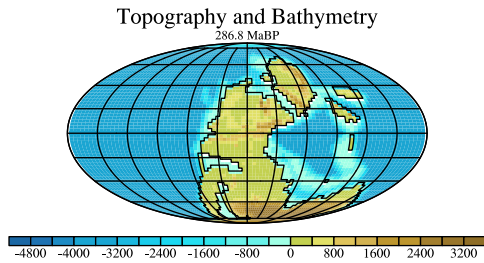
CO<sub>2</sub>= 513 ppmv



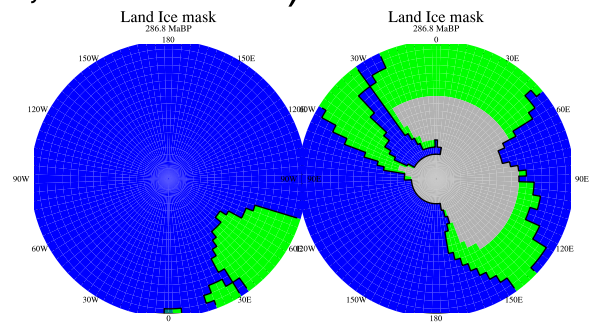
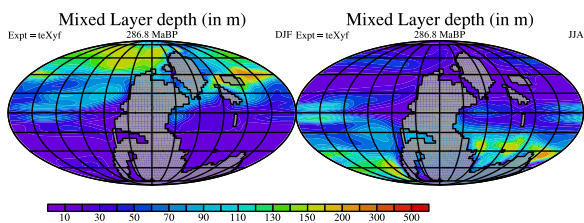
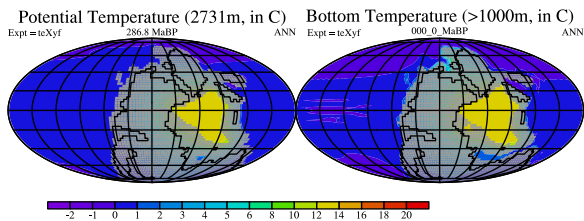
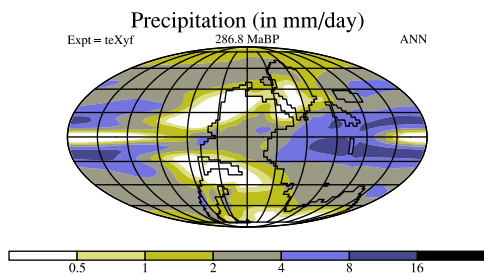
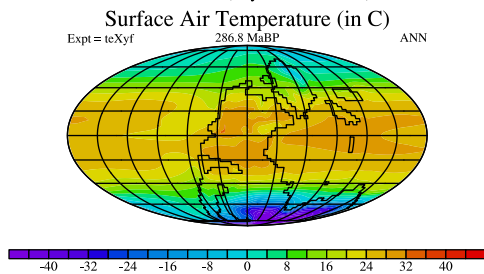
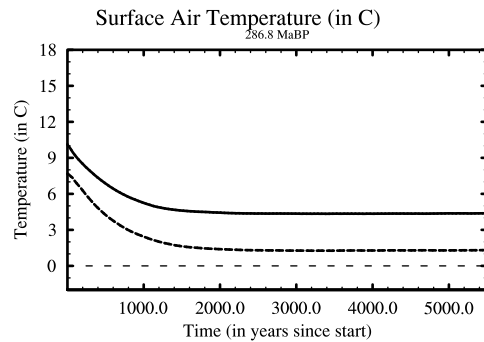
CO<sub>2</sub>= 690 ppmv



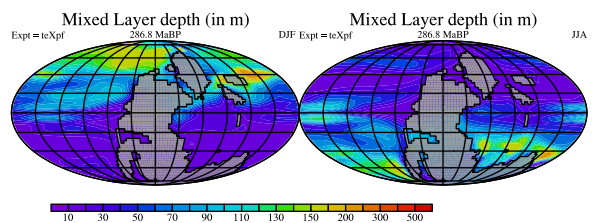
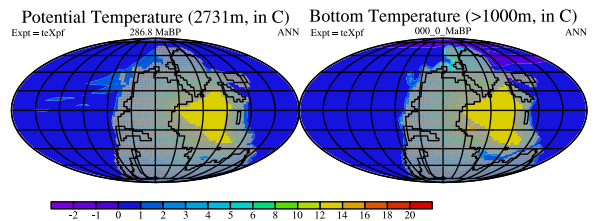
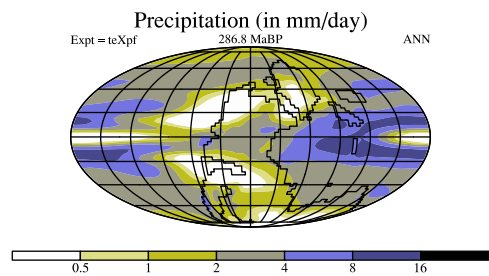
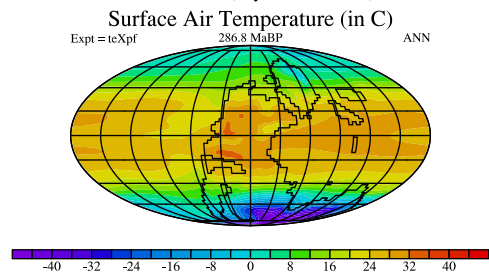
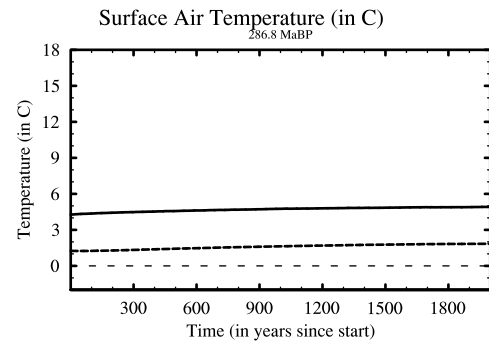
# Early Permian (Artinskian, 286.8 Ma)



CO<sub>2</sub>= 508 ppmv

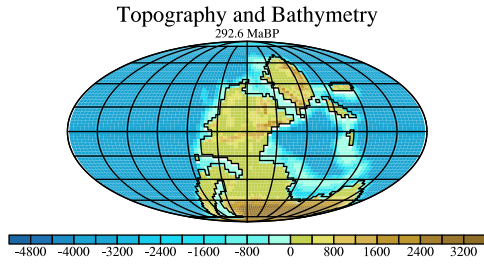


CO<sub>2</sub>= 626 ppmv

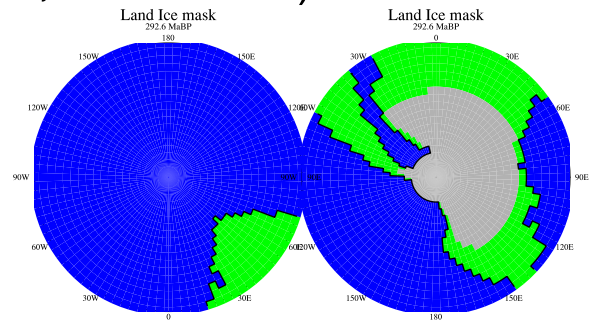
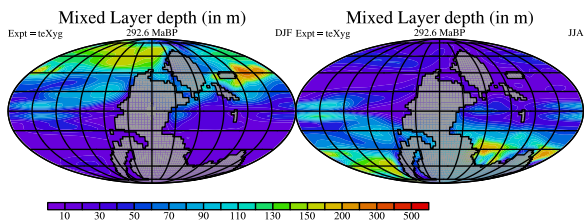
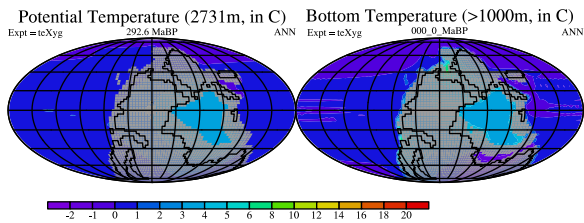
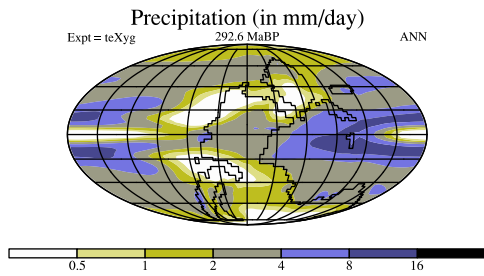
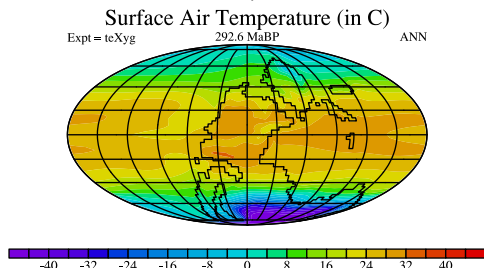
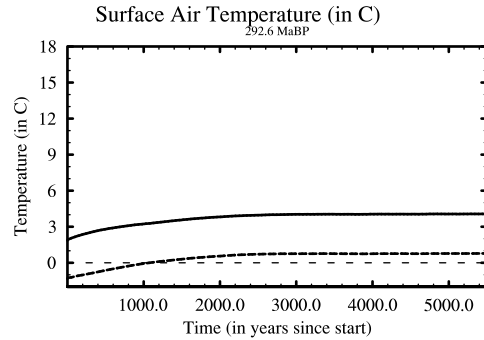




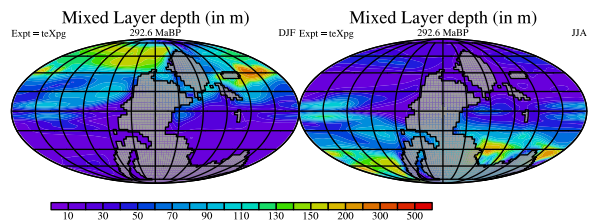
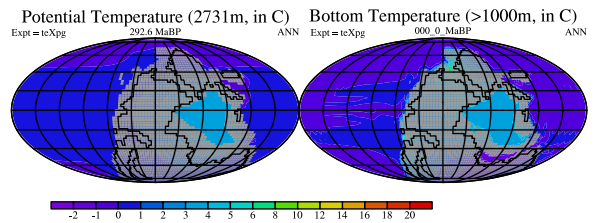
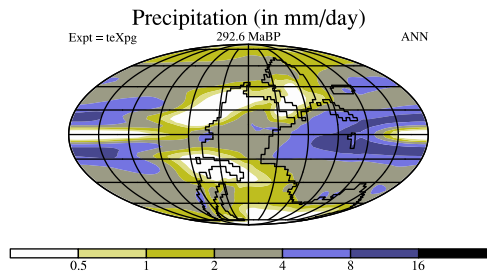
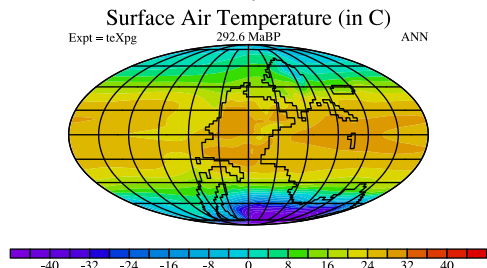
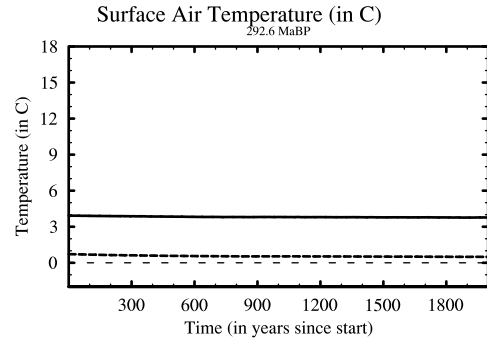
# Early Permian (Sakmarian, 292.6 Ma)



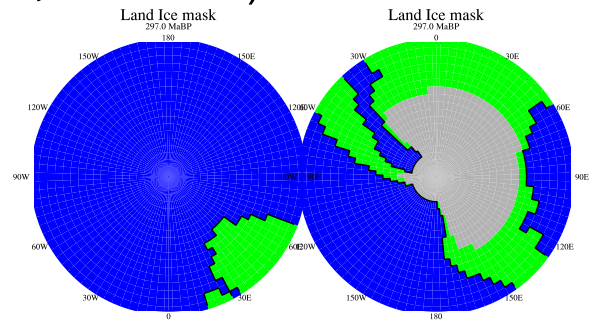
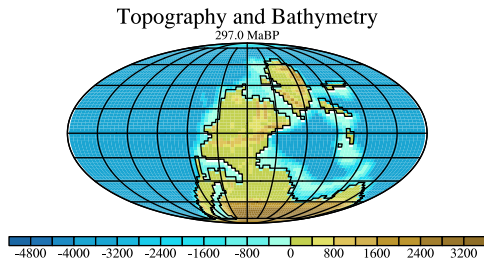
CO<sub>2</sub> = 503 ppmv



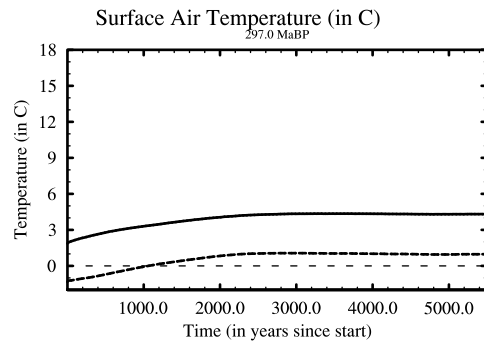
CO<sub>2</sub> = 495 ppmv



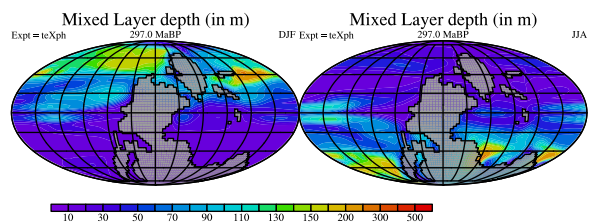
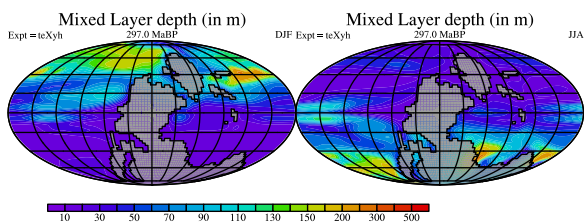
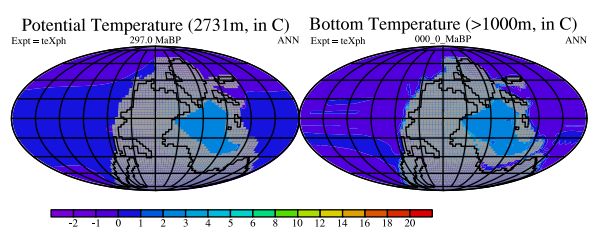
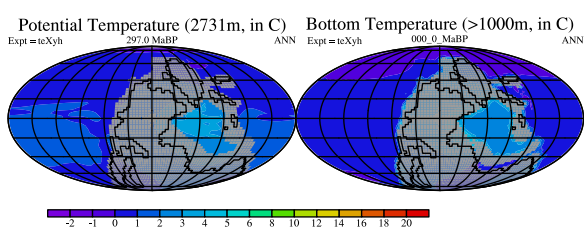
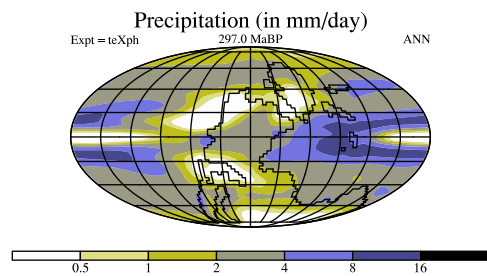
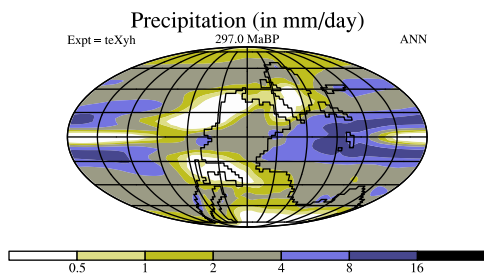
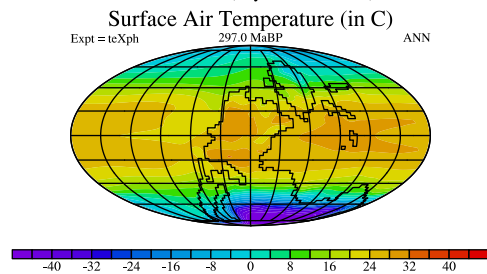
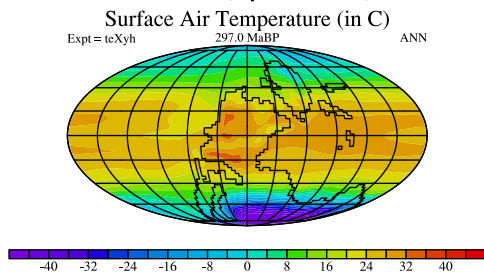
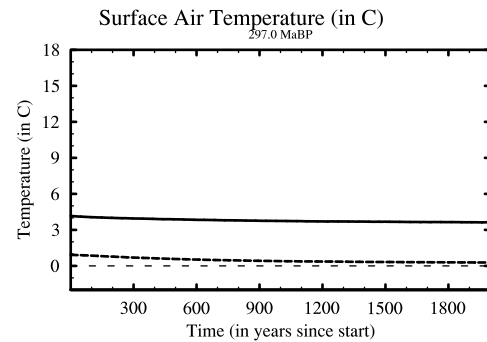
# Early Permian (Asselian, 297 Ma)



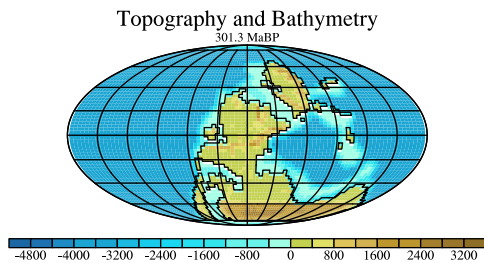
CO<sub>2</sub>= 500 ppmv



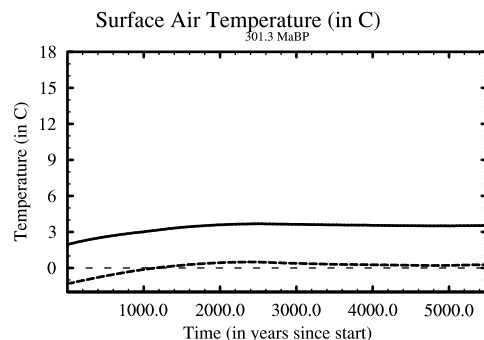
CO<sub>2</sub>= 445 ppmv



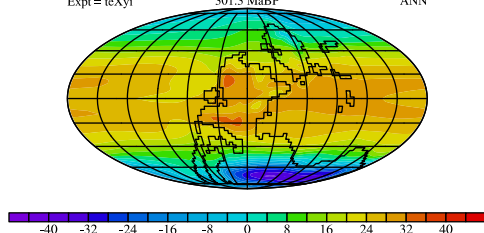
# Late Pennsylvanian (Gzhelian, 301.3 Ma)



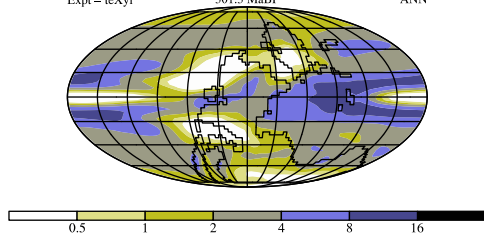
CO<sub>2</sub>= 510 ppmv



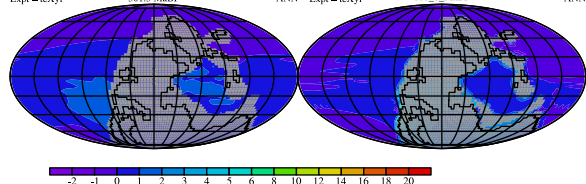
Surface Air Temperature (in C)  
Expt = teXyi 301.3 MaBP ANN



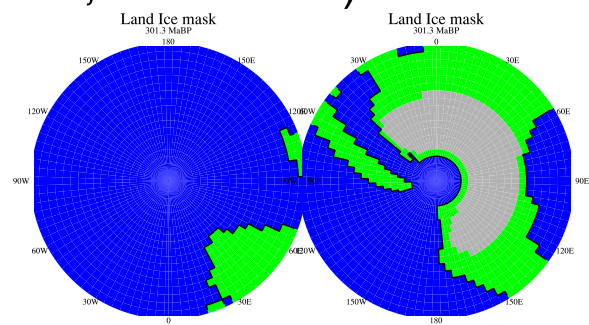
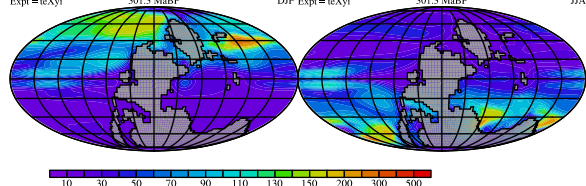
Precipitation (in mm/day)  
Expt = teXyi 301.3 MaBP ANN



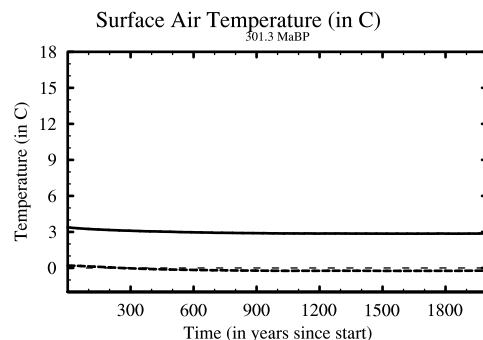
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = teXyi 301.3 MaBP ANN Expt = teXyi 000.0 MaBP ANN



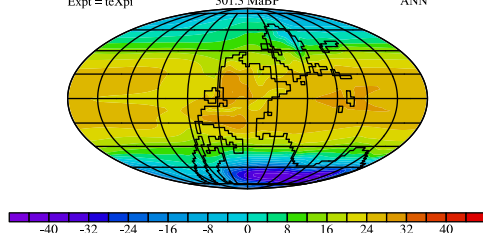
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = teXyi 301.3 MaBP DJF Expt = teXyi 301.3 MaBP JJA



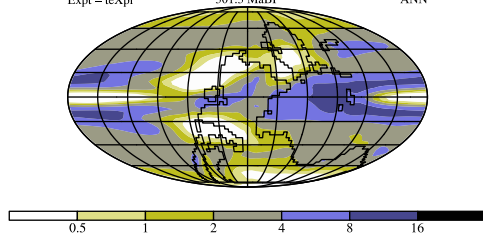
CO<sub>2</sub>= 393 ppmv



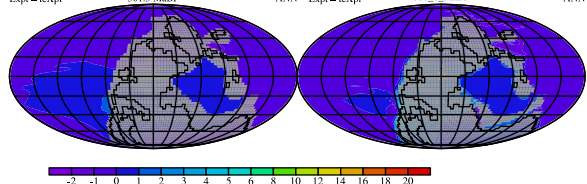
Surface Air Temperature (in C)  
Expt = teXpi 301.3 MaBP ANN



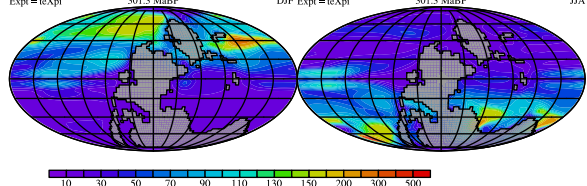
Precipitation (in mm/day)  
Expt = teXpi 301.3 MaBP ANN



Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = teXpi 301.3 MaBP ANN Expt = teXpi 000.0 MaBP ANN

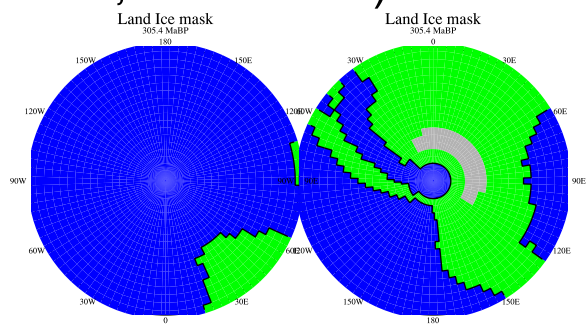
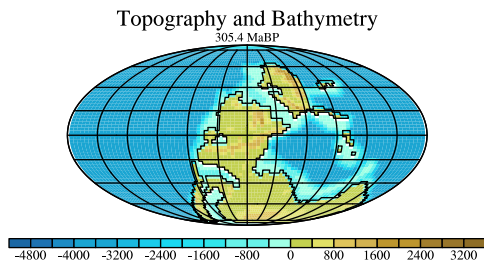


Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = teXpi 301.3 MaBP DJF Expt = teXpi 301.3 MaBP JJA

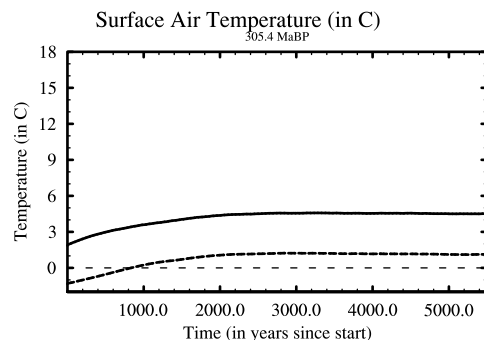




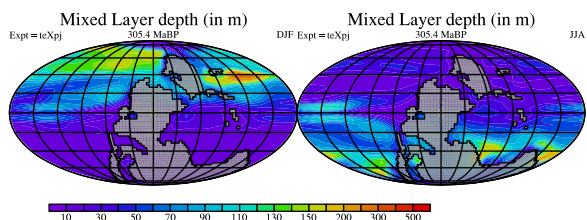
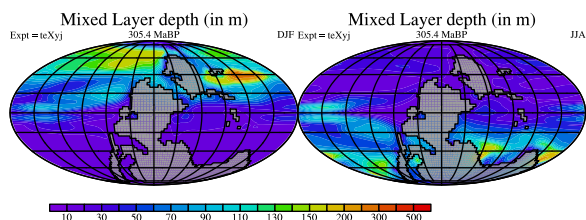
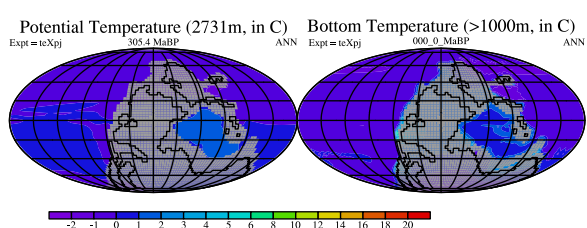
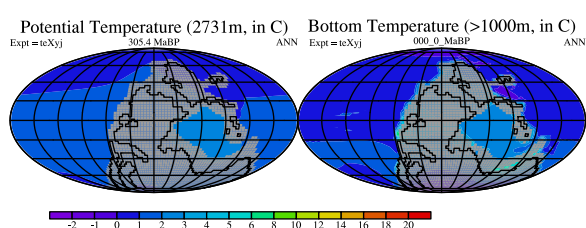
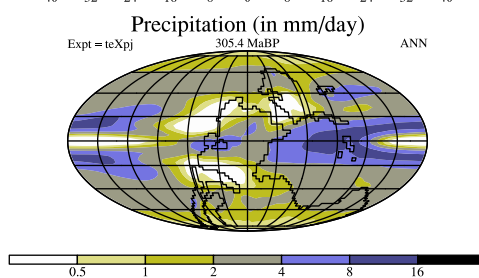
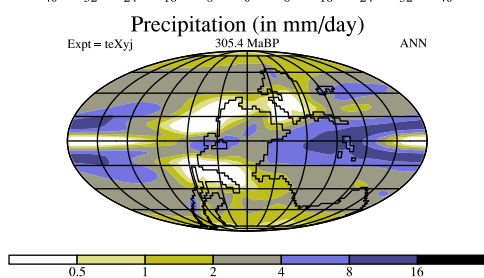
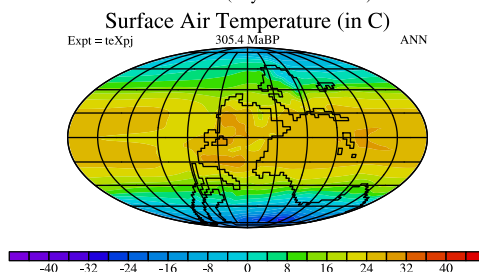
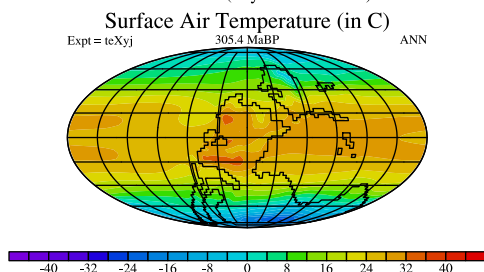
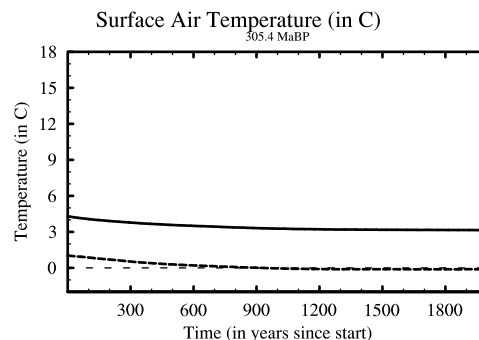
# Late Pennsylvanian (Kasimovian, 305.4 Ma)



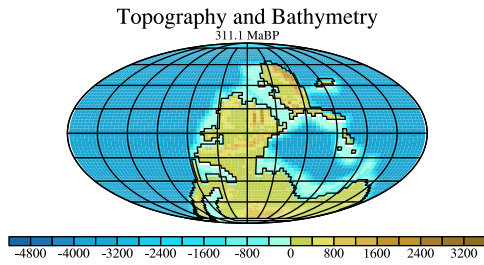
CO<sub>2</sub>= 520 ppmv



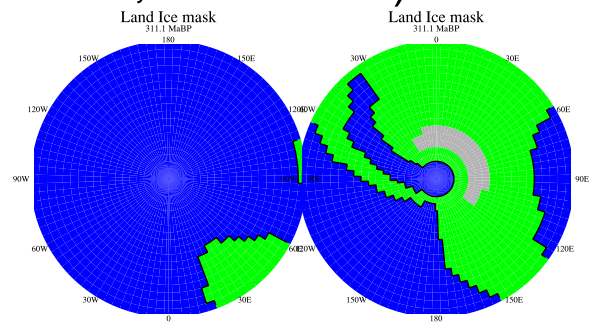
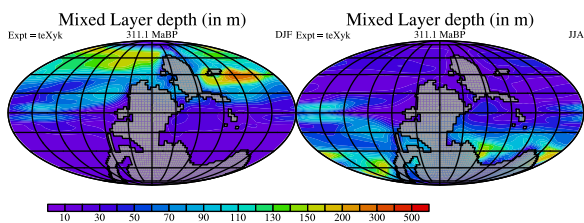
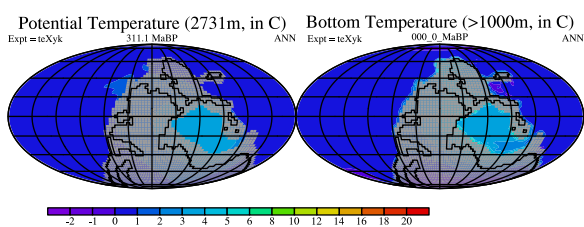
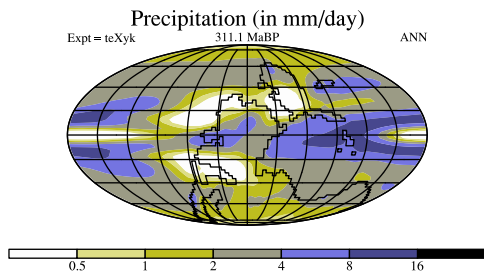
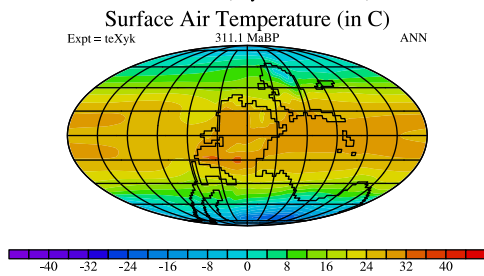
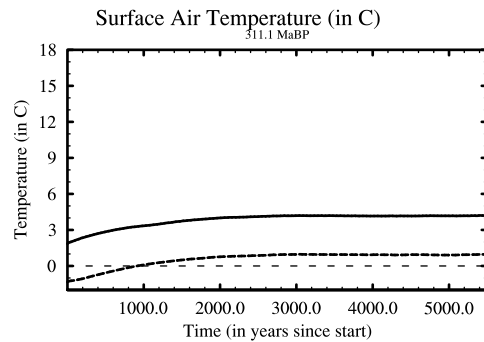
CO<sub>2</sub>= 358 ppmv



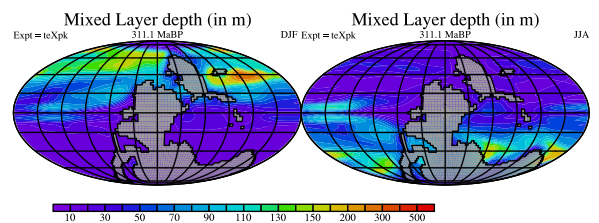
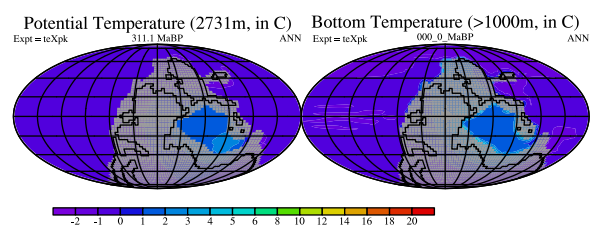
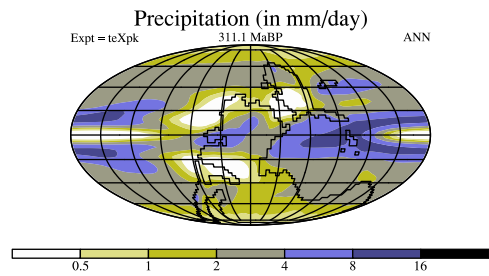
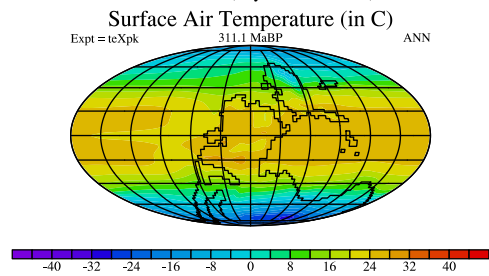
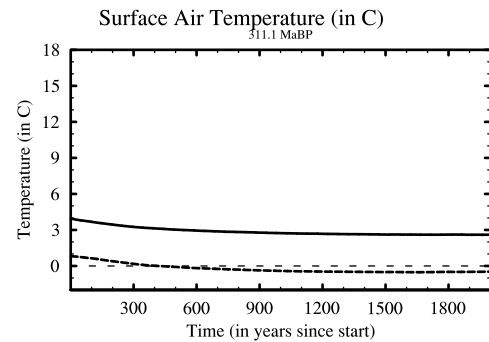
# Middle Pennsylvanian (Moscovian, 311.1 Ma)



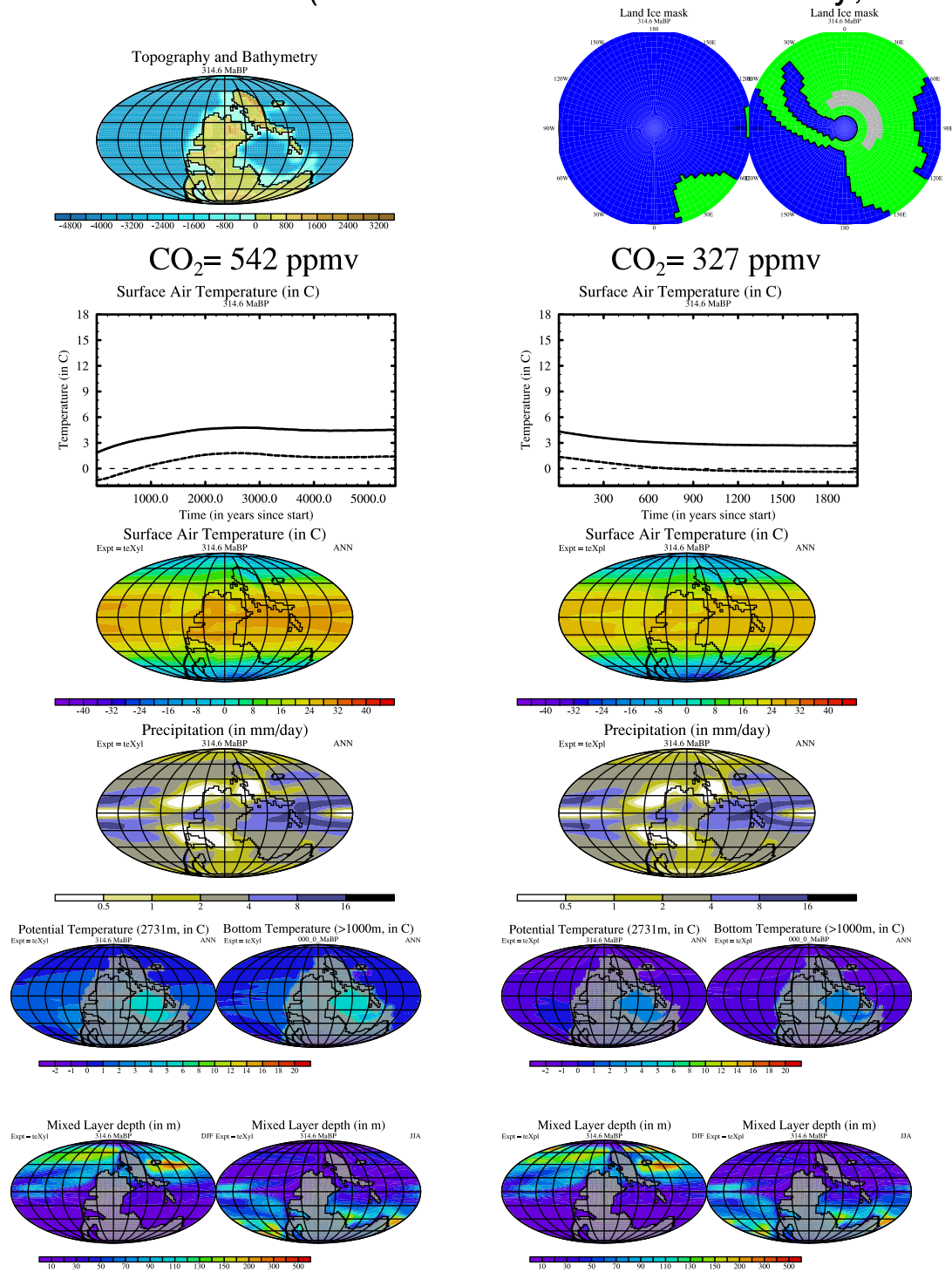
CO<sub>2</sub>= 534 ppmv



CO<sub>2</sub>= 338 ppmv

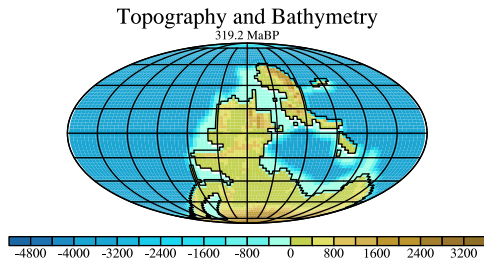


# Early/Middle Carboniferous (Baskirian/Moscovian boundary, 314.6 Ma)

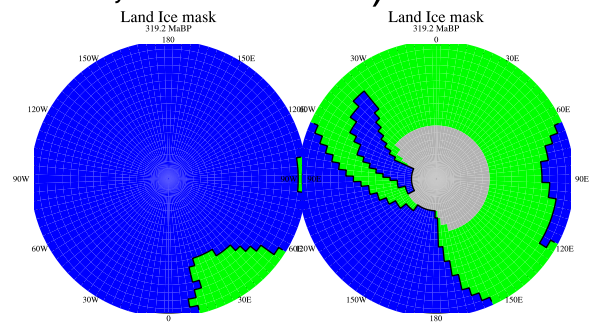
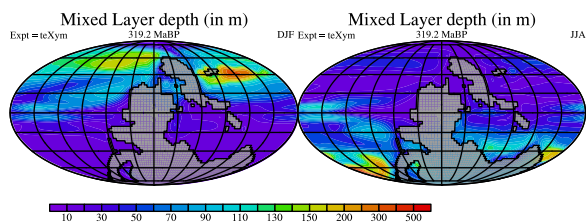
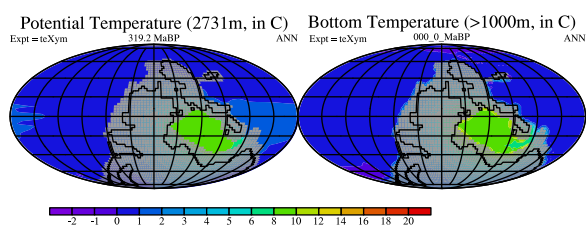
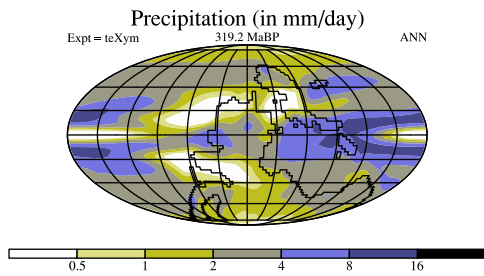
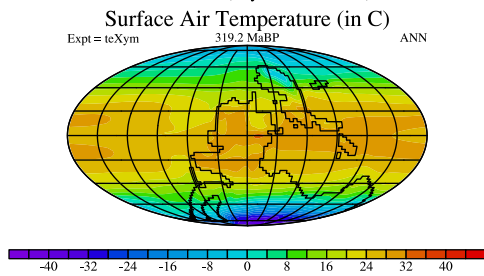
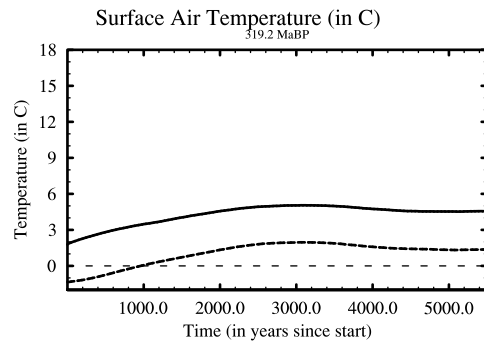




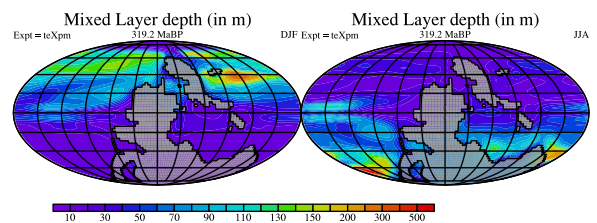
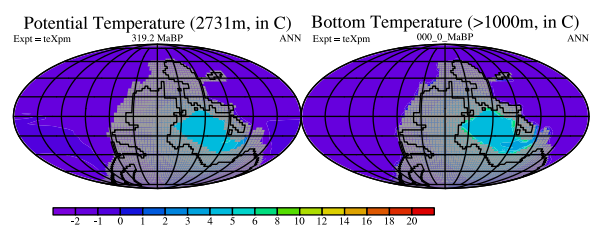
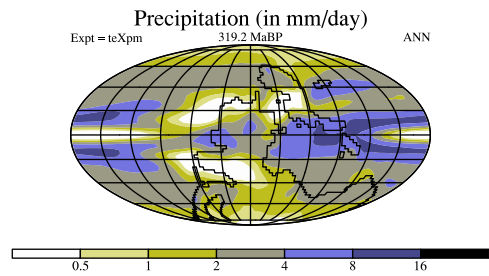
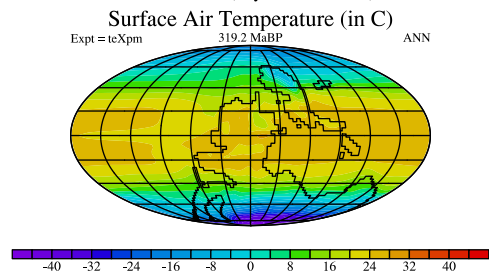
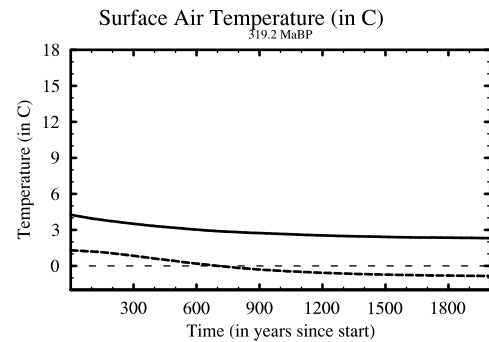
# Early Pennsylvanian (Bashkirian, 319.2 Ma)



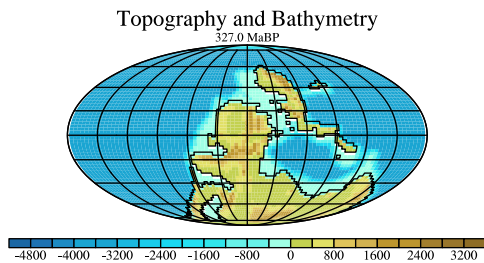
CO<sub>2</sub>= 553 ppmv



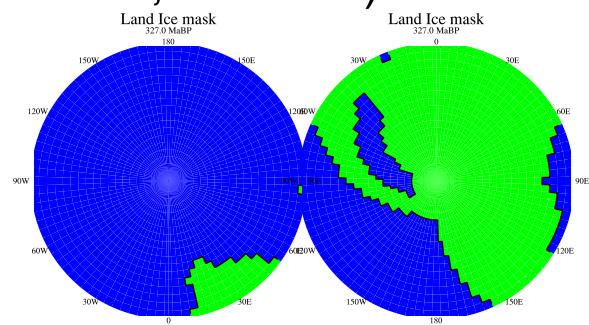
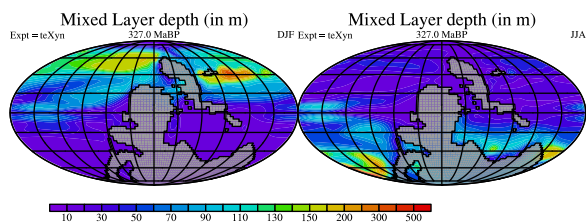
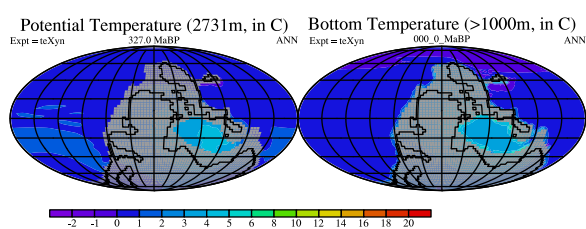
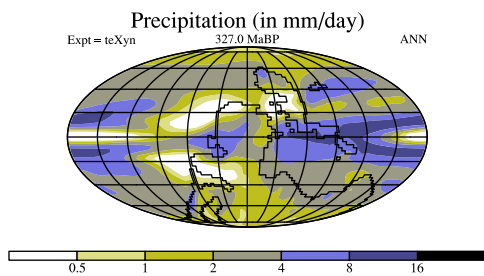
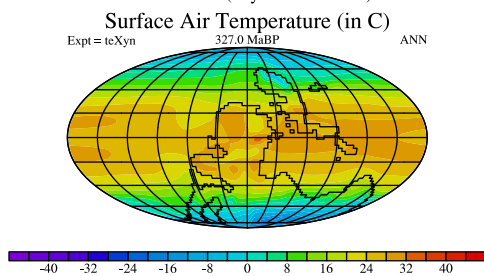
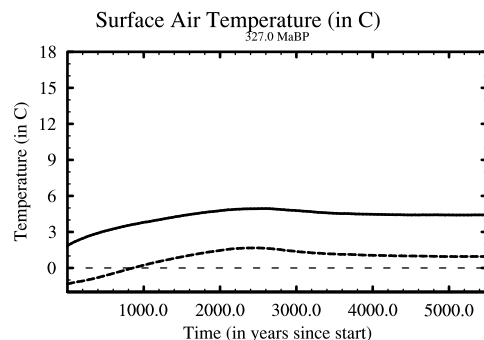
CO<sub>2</sub>= 328 ppmv



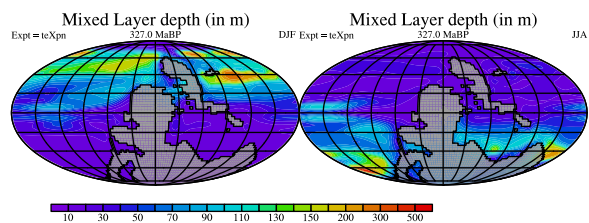
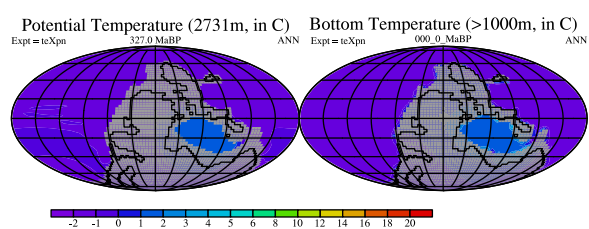
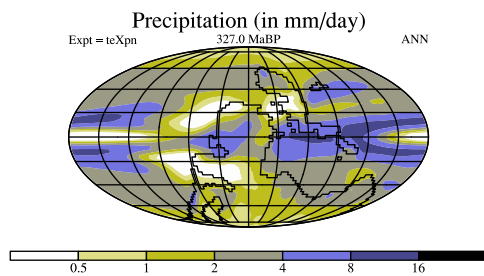
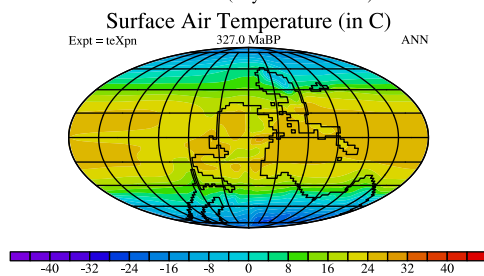
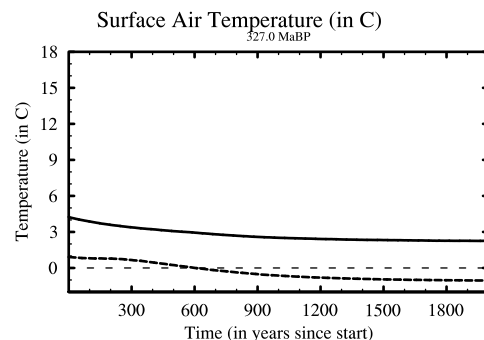
# Late Mississippian (Serpukhovian, 327 Ma)



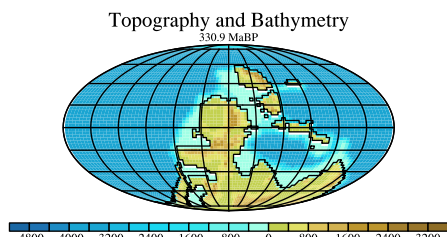
CO<sub>2</sub>= 571 ppmv



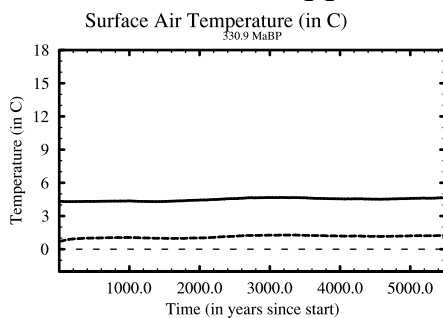
CO<sub>2</sub>= 317 ppmv



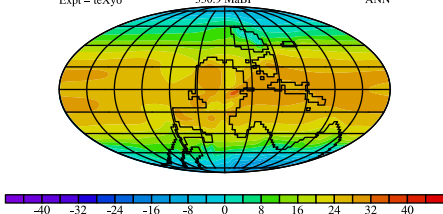
# Late Mississippian (Visean/Serpukhovian boundary, 330.9 Ma)



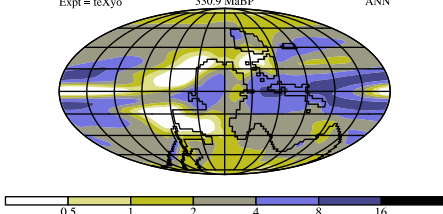
CO<sub>2</sub> = 581 ppmv



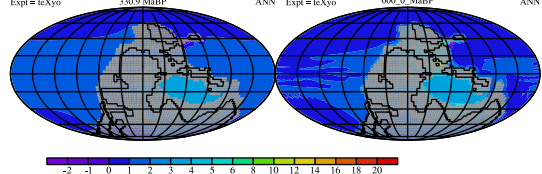
Surface Air Temperature (in C)  
Expt = tcXyo ANN



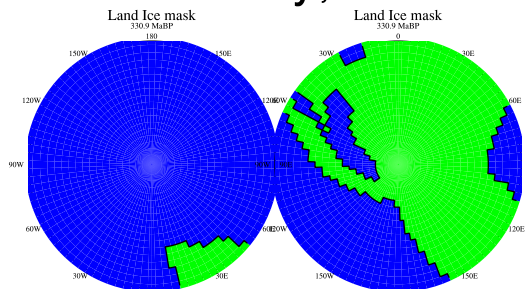
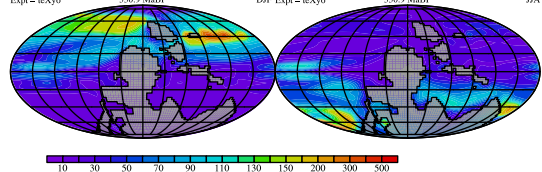
Precipitation (in mm/day)  
Expt = tcXyo ANN



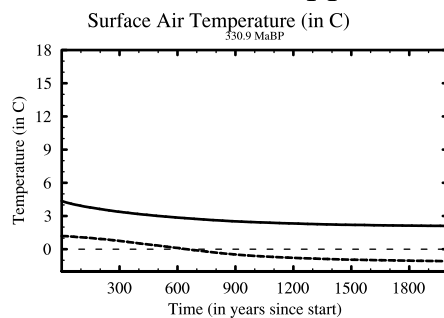
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = tcXyo ANN Expt = tcXyo ANN



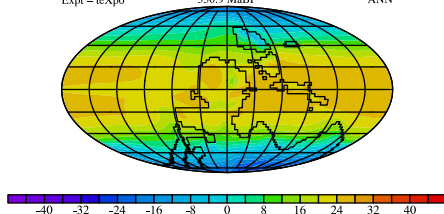
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = tcXyo ANN Expt = tcXyo ANN



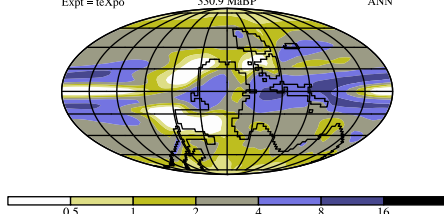
CO<sub>2</sub> = 296 ppmv



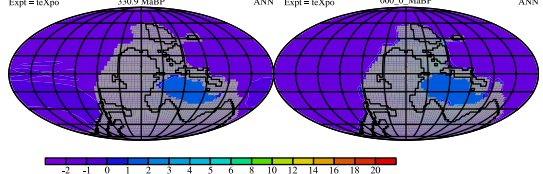
Surface Air Temperature (in C)  
Expt = tcXpo ANN



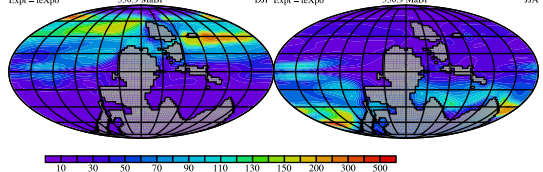
Precipitation (in mm/day)  
Expt = tcXpo ANN



Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = tcXpo ANN Expt = tcXpo ANN

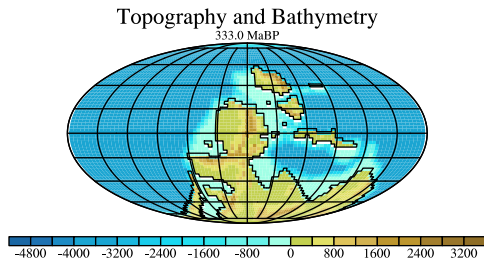


Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = tcXpo ANN Expt = tcXpo ANN

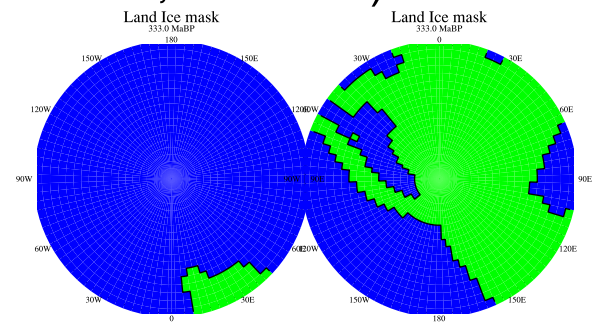
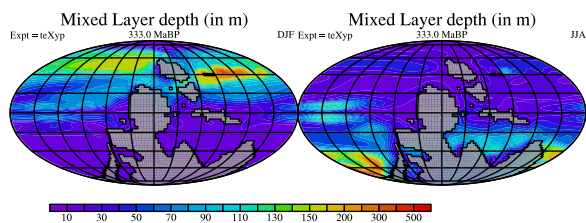
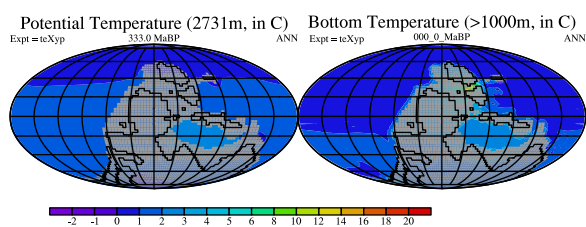
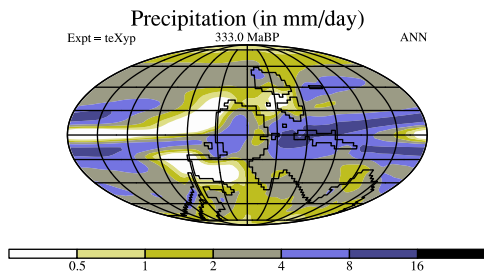
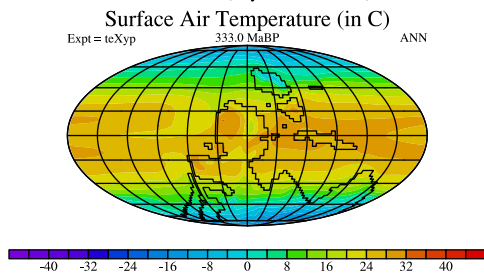
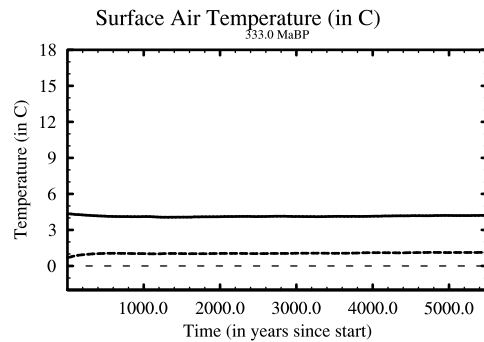




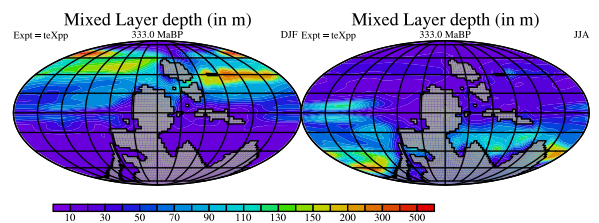
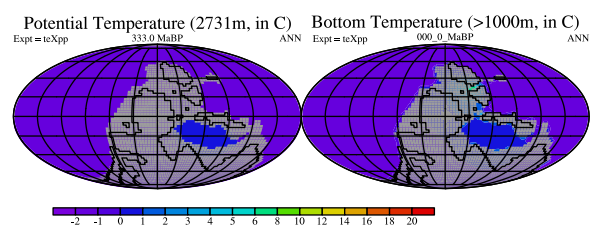
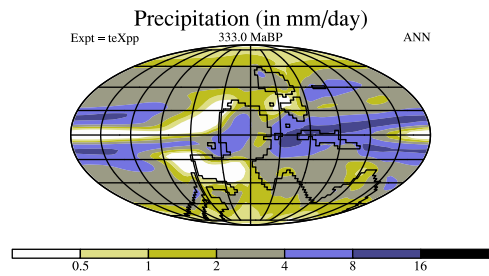
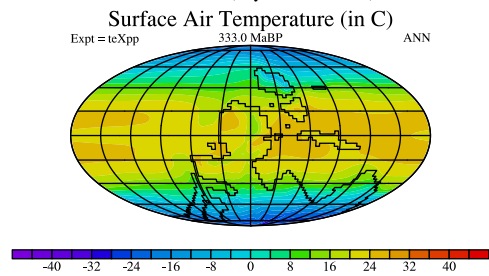
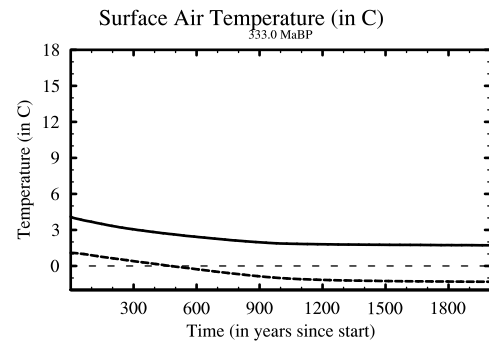
# Middle Mississippian (late Visean, 333 Ma)



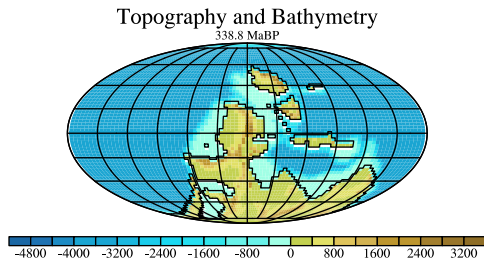
CO<sub>2</sub>= 586 ppmv



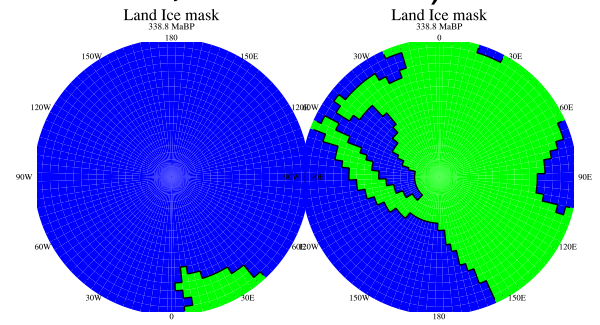
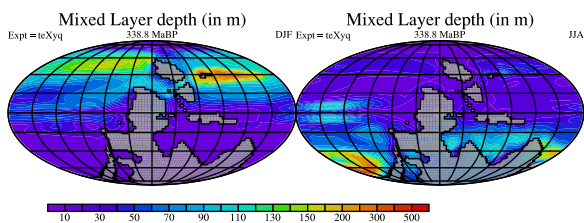
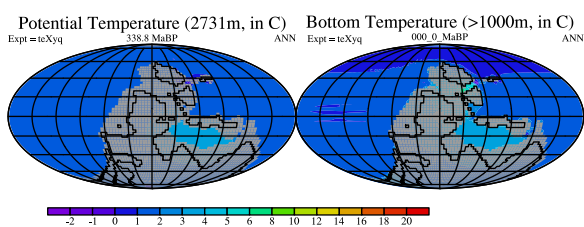
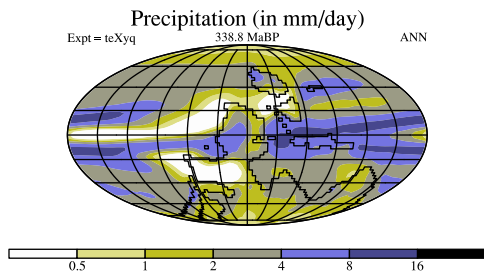
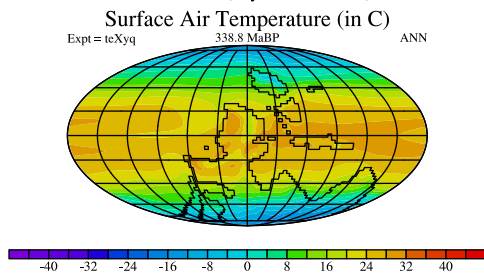
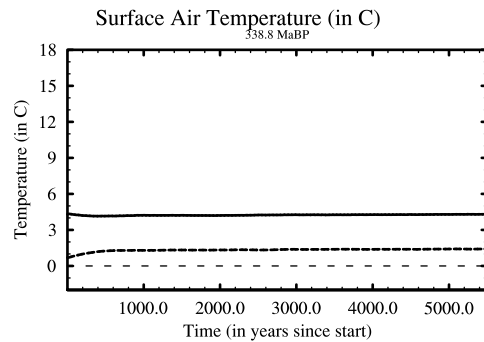
CO<sub>2</sub>= 263 ppmv



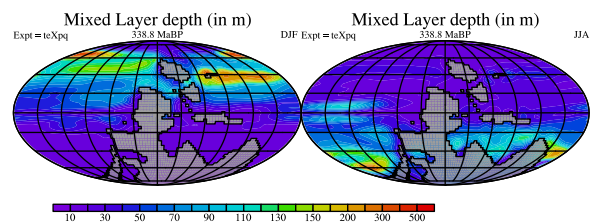
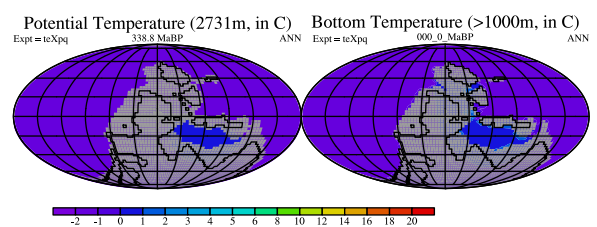
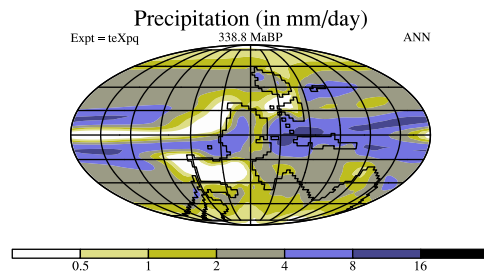
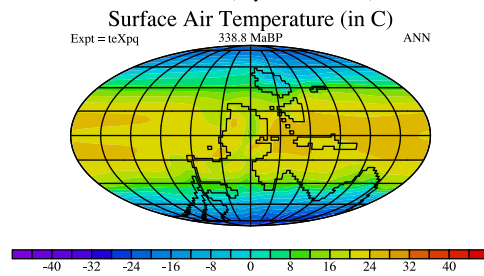
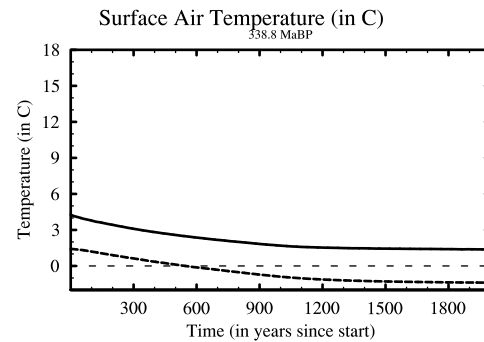
# Middle Mississippian (middle Visean, 338.8 Ma)



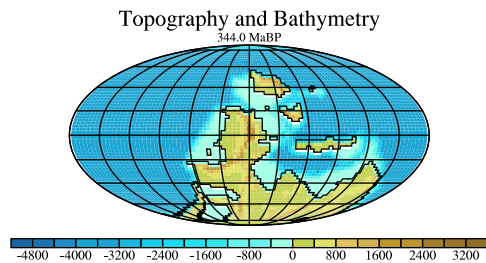
CO<sub>2</sub>= 600 ppmv



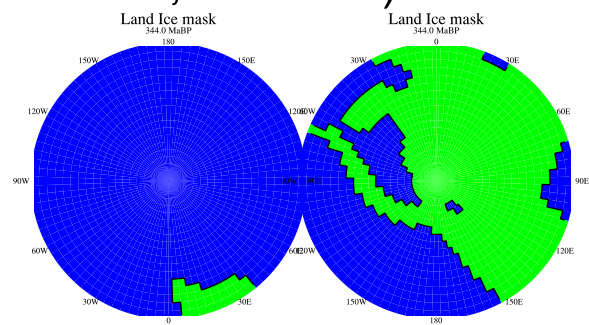
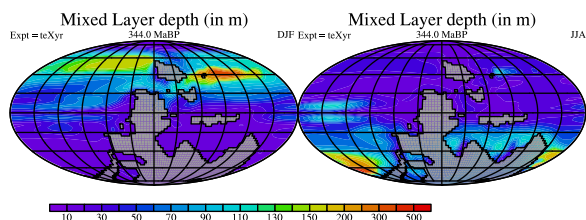
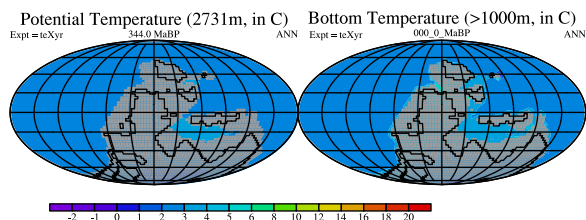
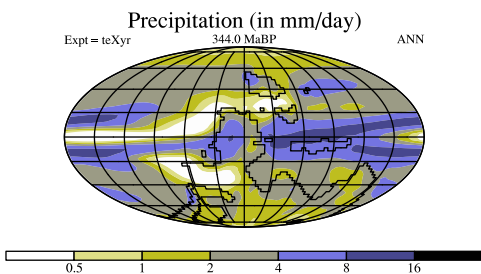
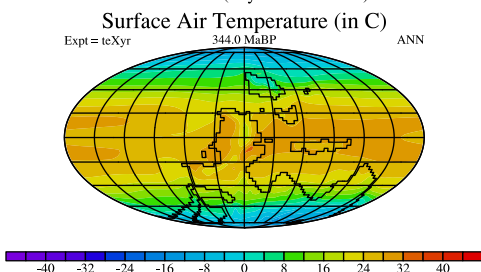
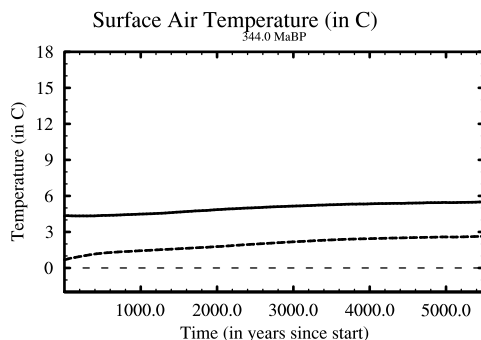
CO<sub>2</sub>= 233 ppmv



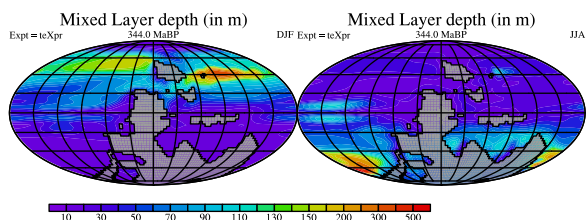
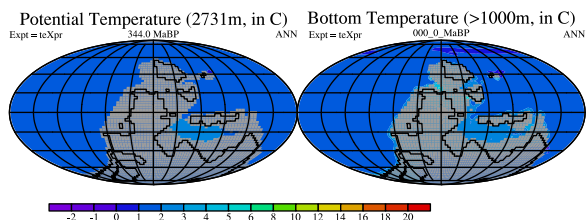
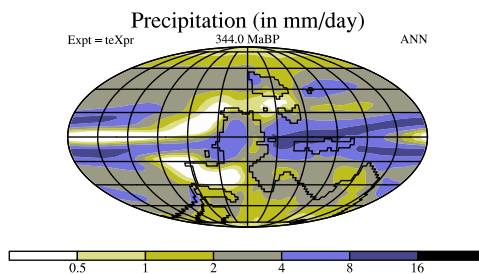
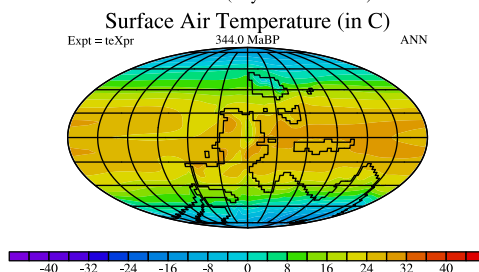
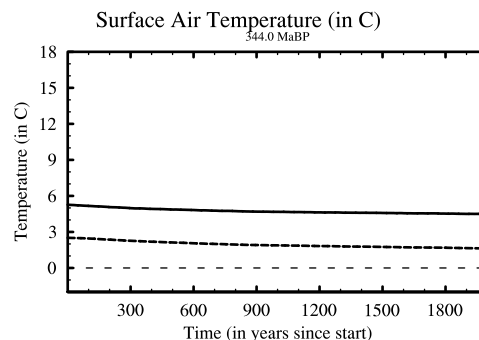
# Middle Mississippian (early Visean, 344 Ma)



CO<sub>2</sub>= 653 ppmv

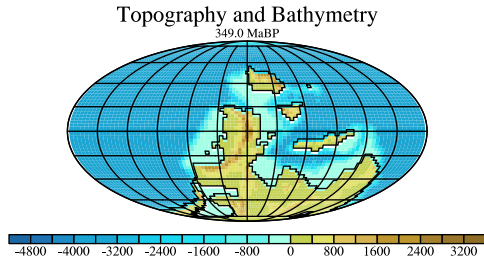


CO<sub>2</sub>= 565 ppmv

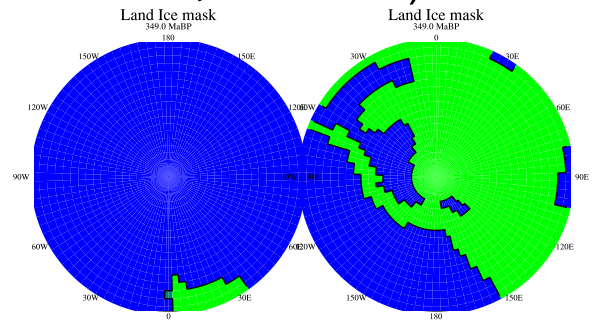
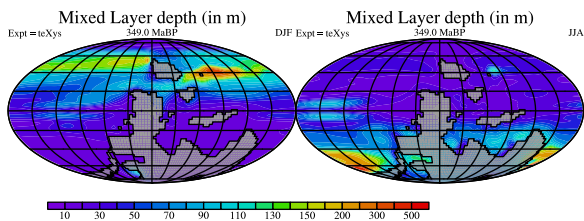
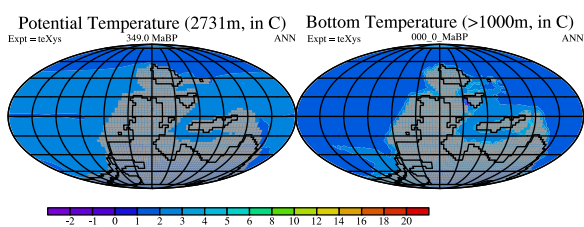
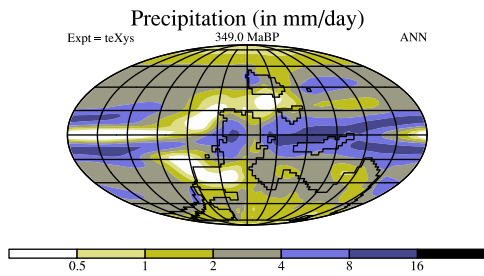
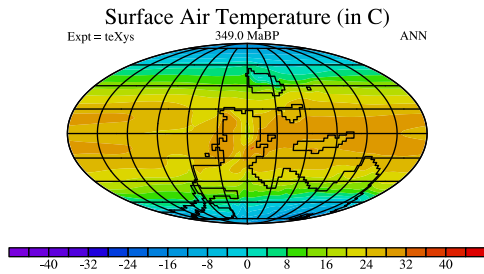
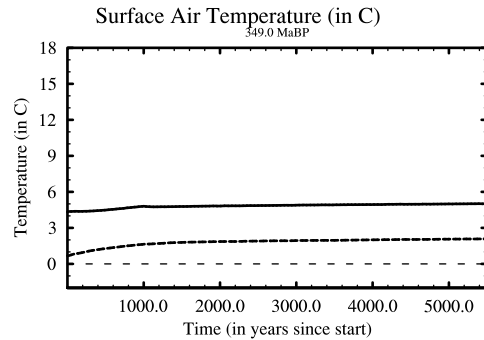




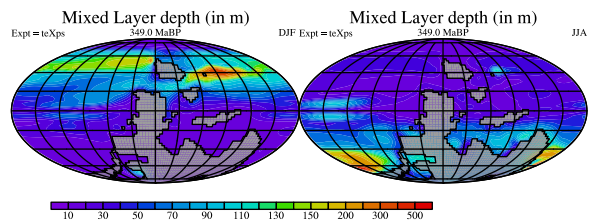
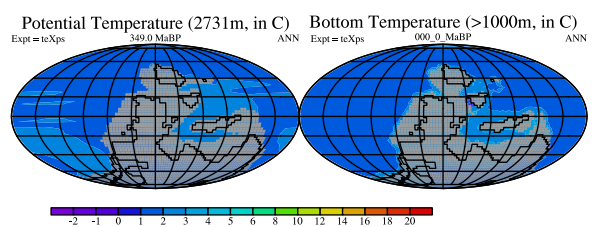
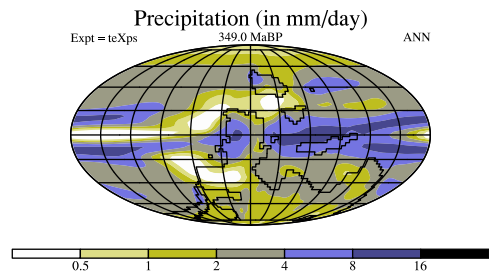
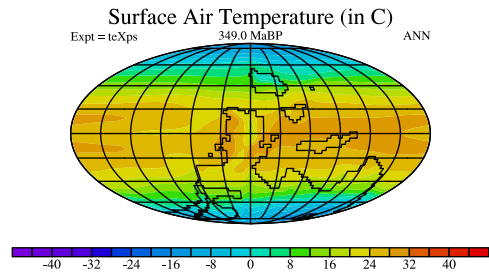
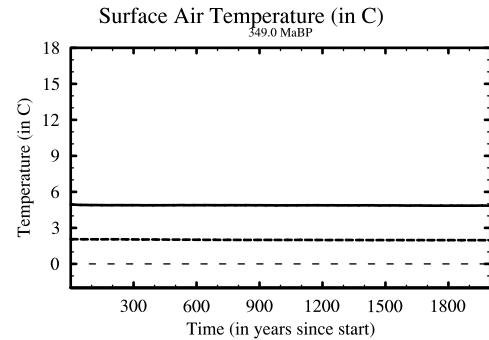
# Early Mississippian (late Tournaisian, 349 Ma)



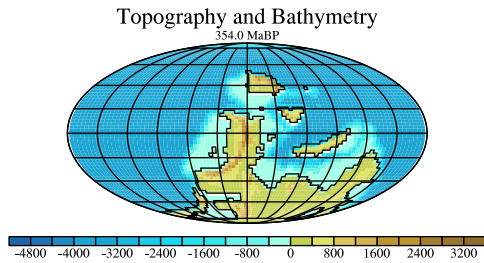
CO<sub>2</sub> = 705 ppmv



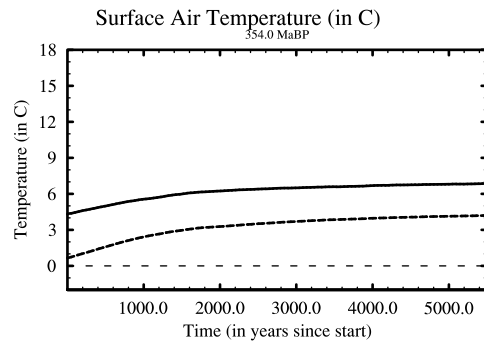
CO<sub>2</sub> = 645 ppmv



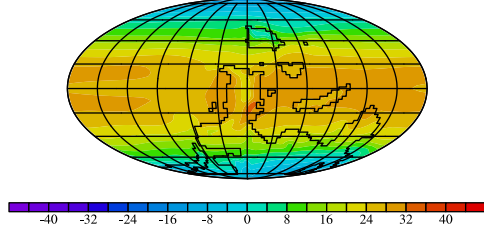
# Early Mississippian (early Tournaisian, 354 Ma)



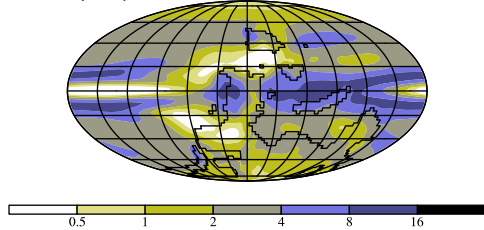
CO<sub>2</sub> = 758 ppmv



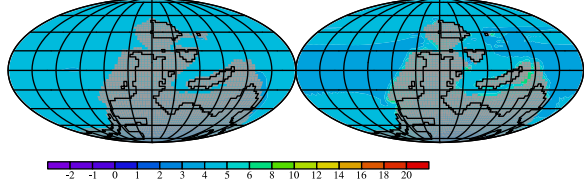
Surface Air Temperature (in C)  
354.0 MaBP



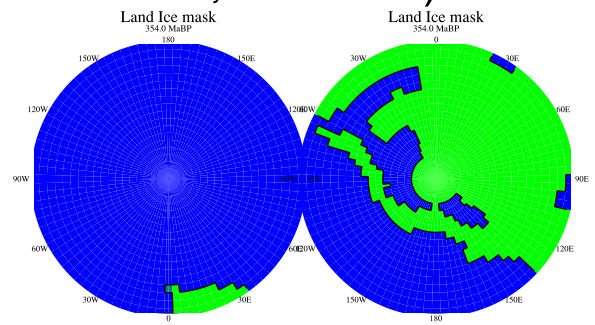
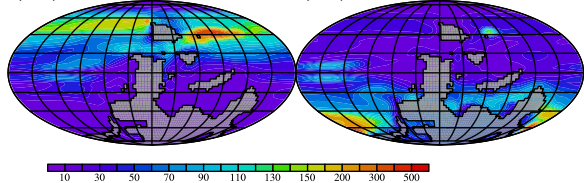
Precipitation (in mm/day)  
354.0 MaBP



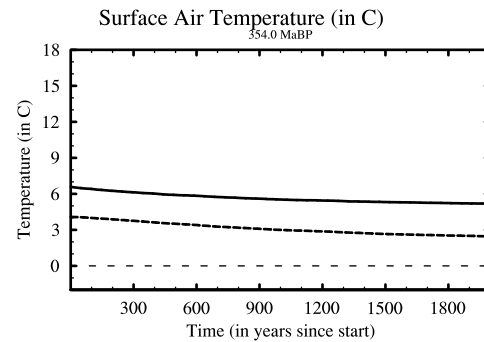
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
354.0 MaBP ANN Expt = teXyt 000.0 MaBP ANN



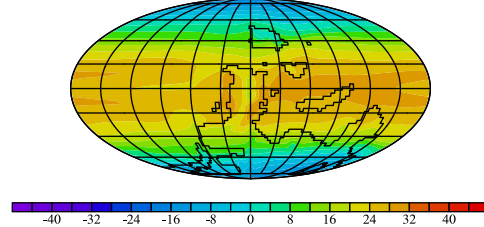
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = teXyt 354.0 MaBP DJF Expt = teXyt 354.0 MaBP JJA



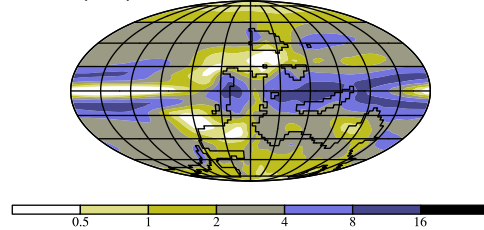
CO<sub>2</sub> = 589 ppmv



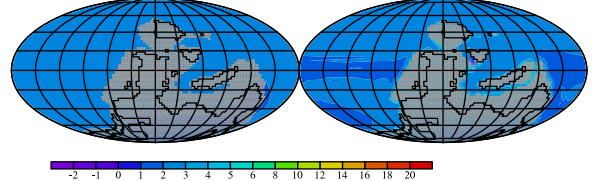
Surface Air Temperature (in C)  
354.0 MaBP



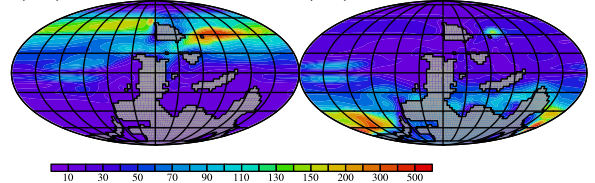
Precipitation (in mm/day)  
354.0 MaBP



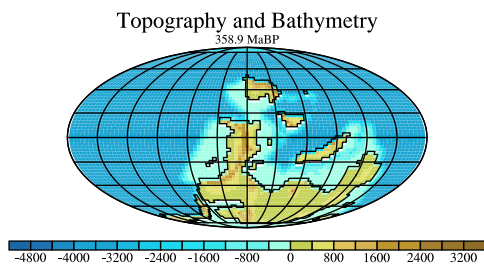
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
354.0 MaBP ANN Expt = teXpt 000.0 MaBP ANN



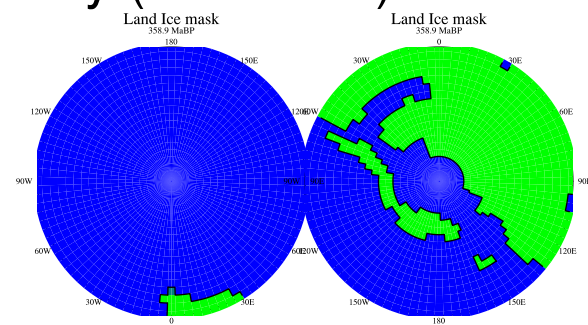
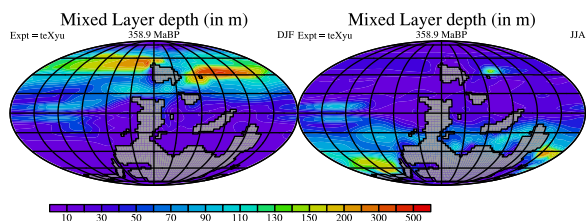
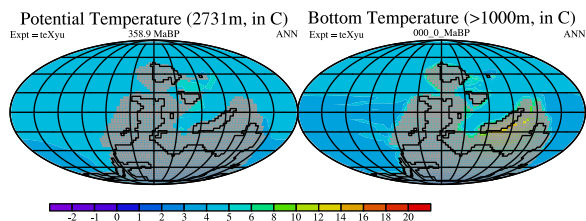
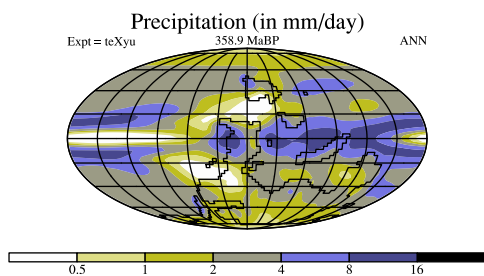
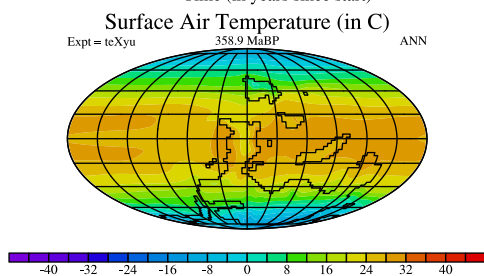
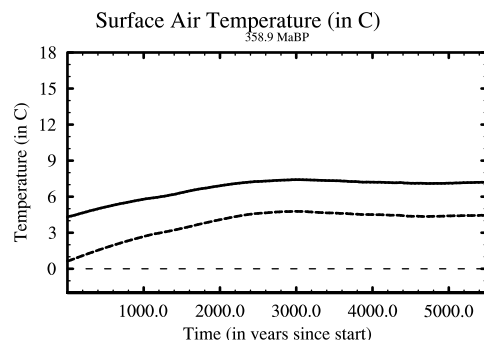
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = teXpt 354.0 MaBP DJF Expt = teXpt 354.0 MaBP JJA



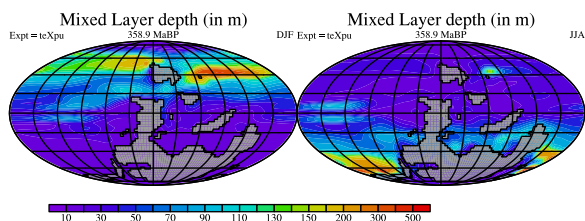
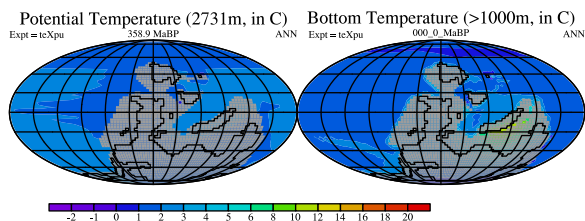
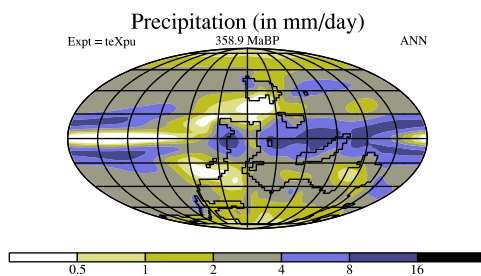
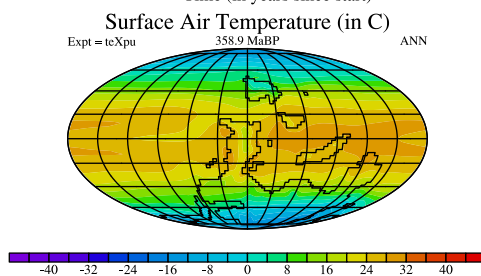
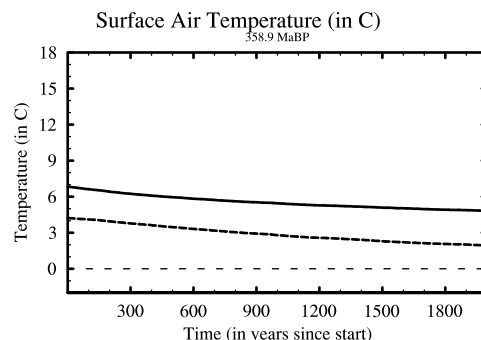
# Devono-Carboniferous Boundary (358.9 Ma)



CO<sub>2</sub> = 809 ppmv

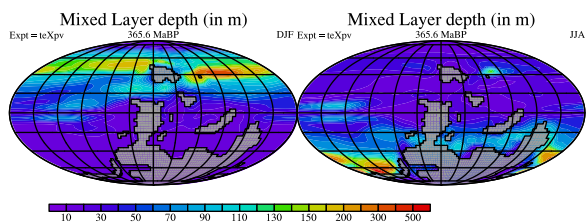
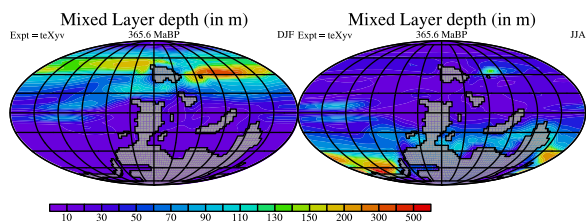
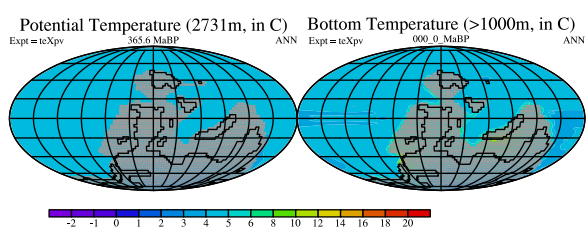
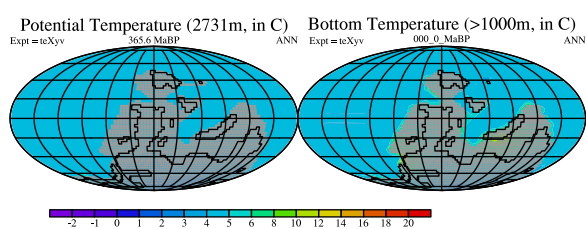
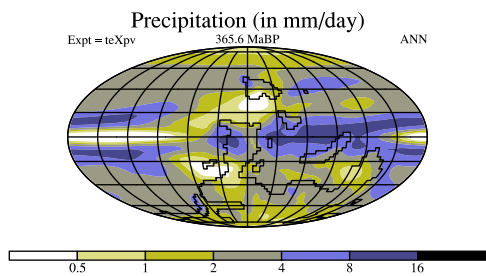
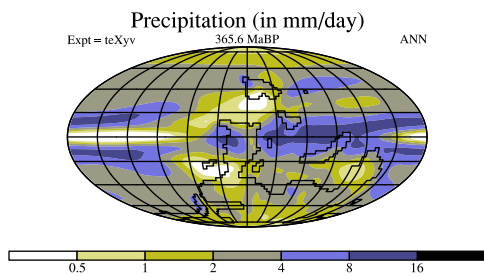
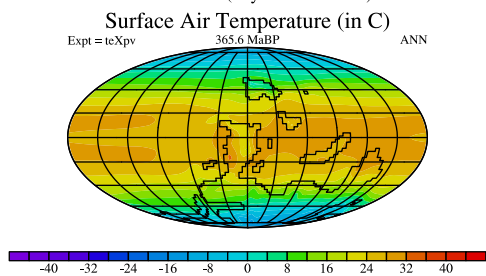
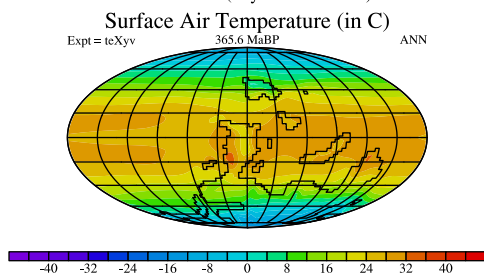
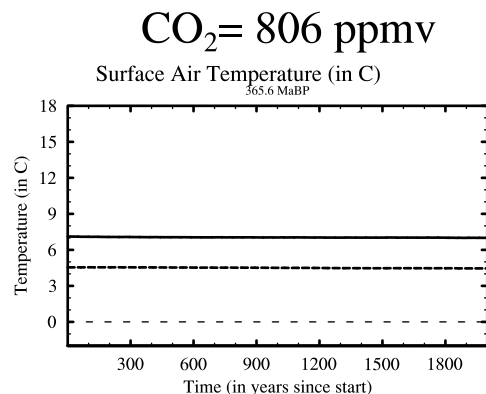
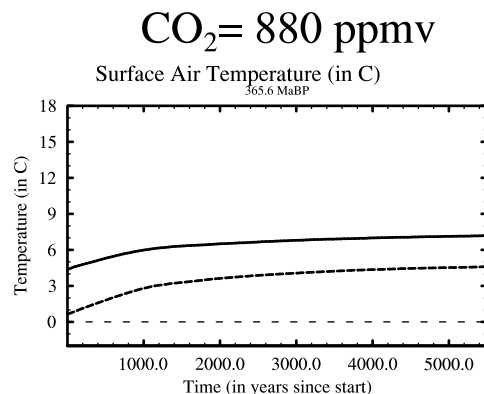
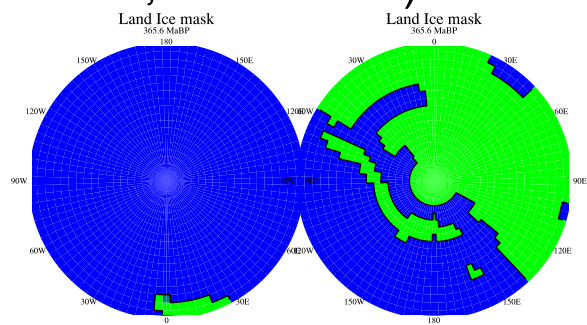
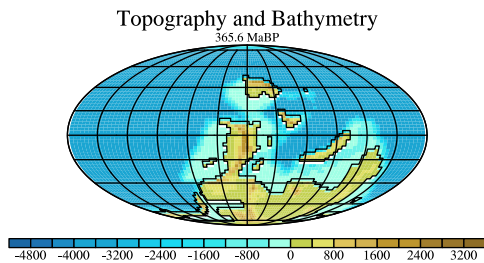


CO<sub>2</sub> = 587 ppmv

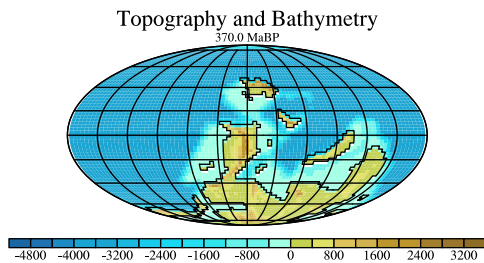




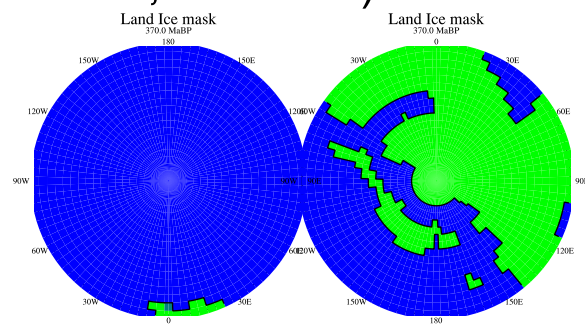
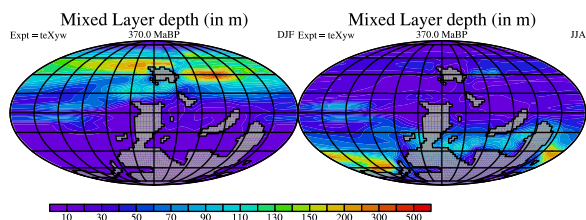
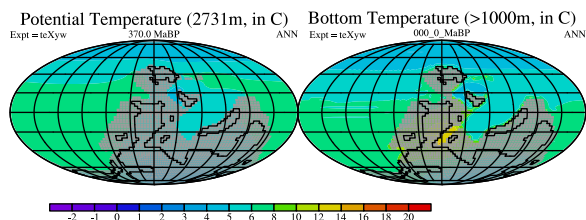
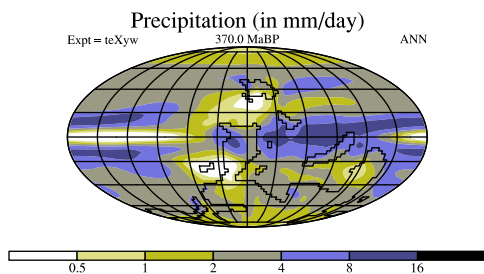
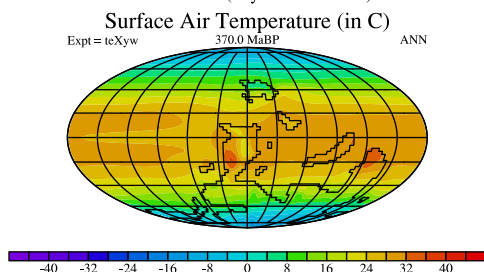
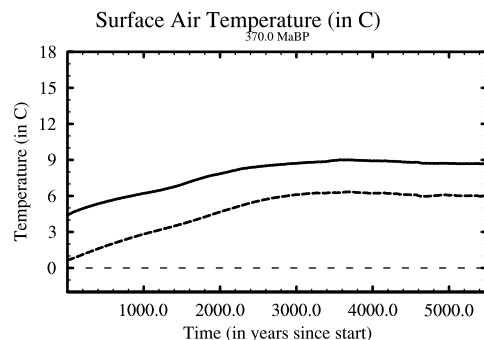
# Late Devonian (middle Famennian, 365.6 Ma)



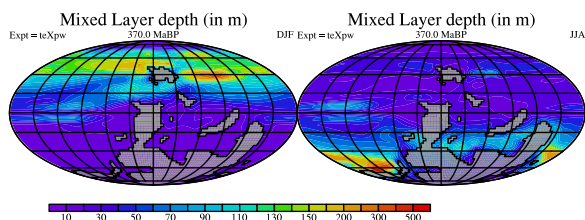
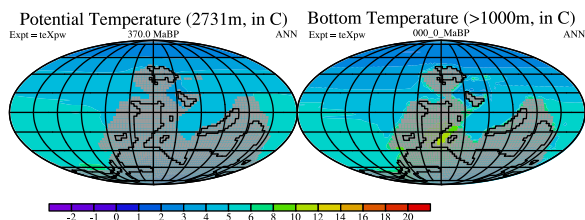
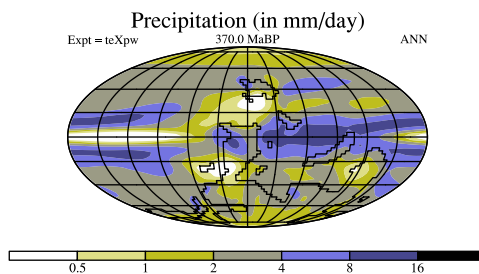
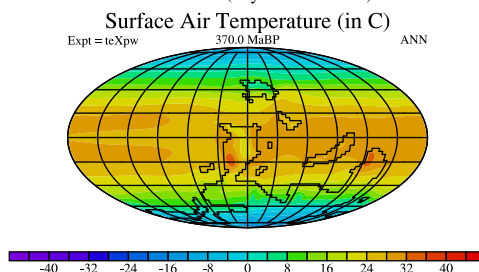
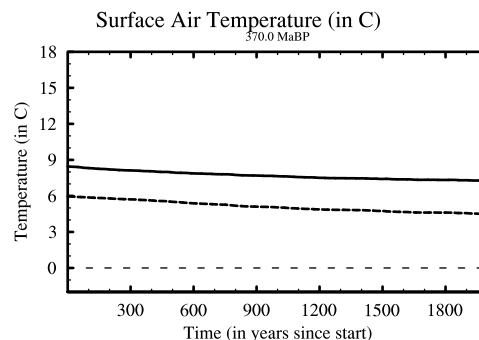
# Late Devonian (early Famennian, 370 Ma)



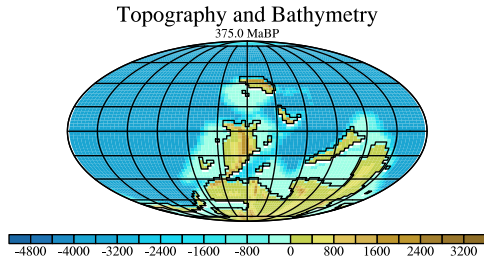
CO<sub>2</sub>= 926 ppmv



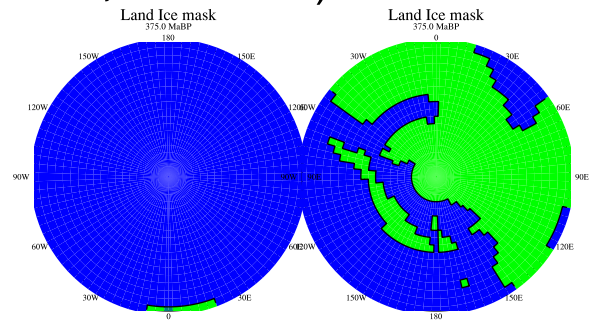
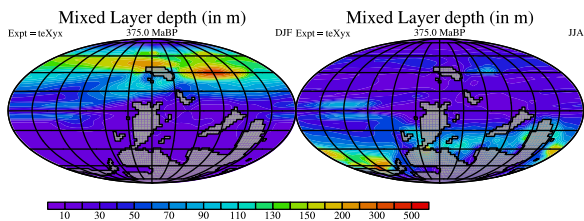
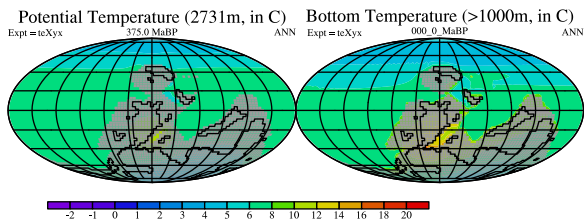
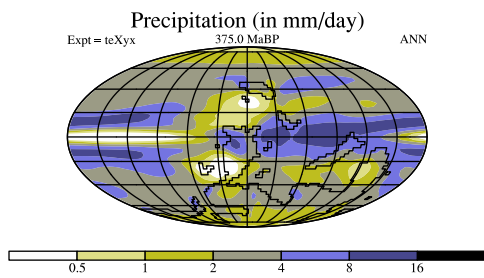
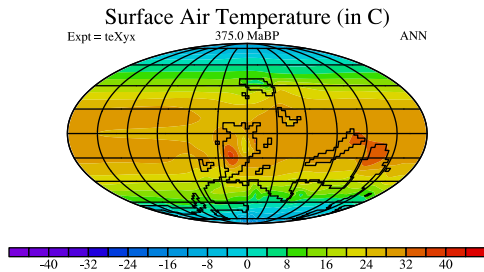
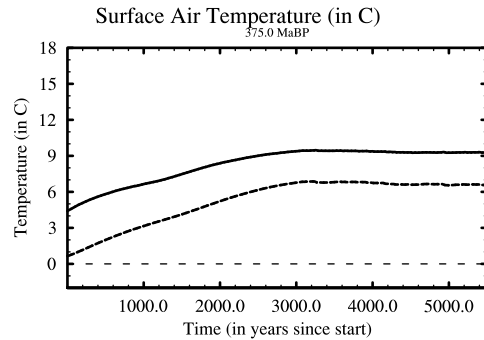
CO<sub>2</sub>= 811 ppmv



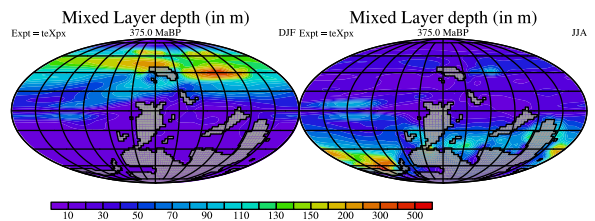
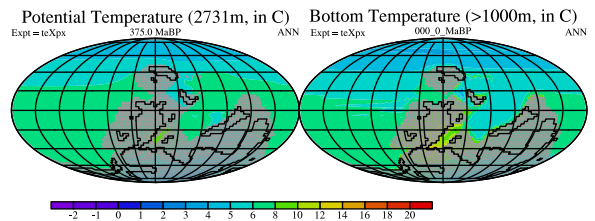
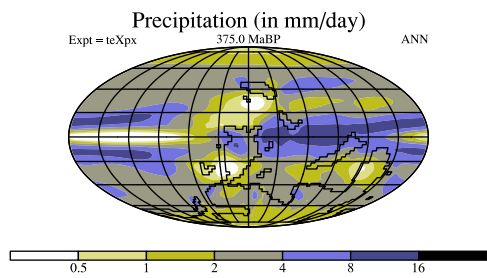
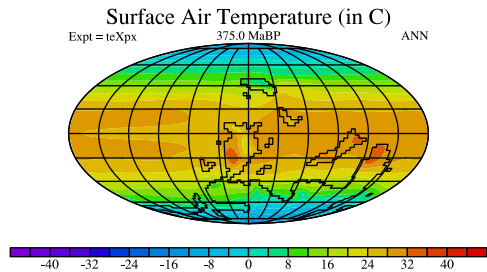
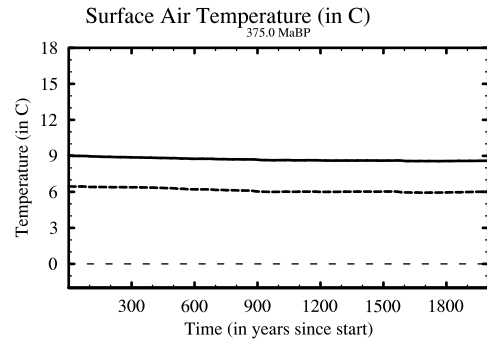
# Late Devonian (late Frasnian, 375 Ma)



CO<sub>2</sub>= 979 ppmv

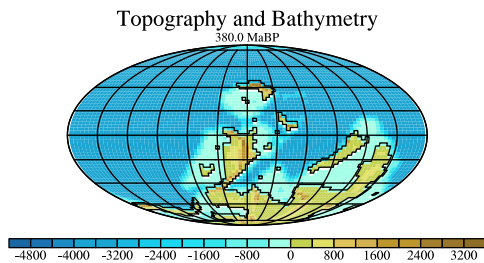


CO<sub>2</sub>= 1052 ppmv

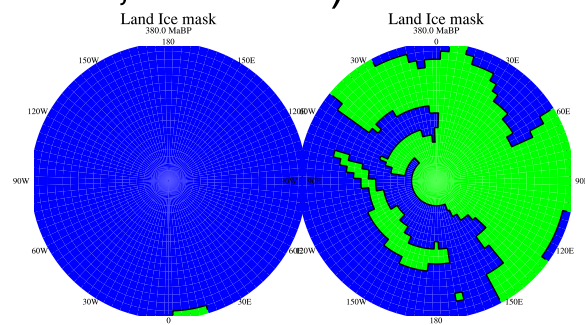
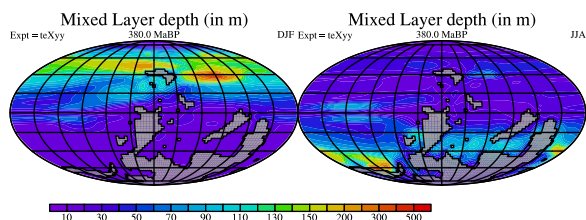
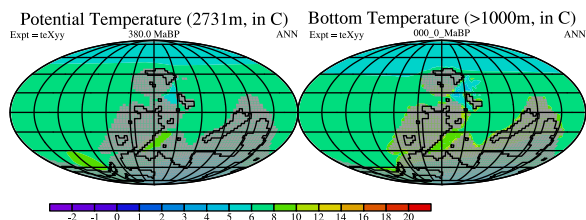
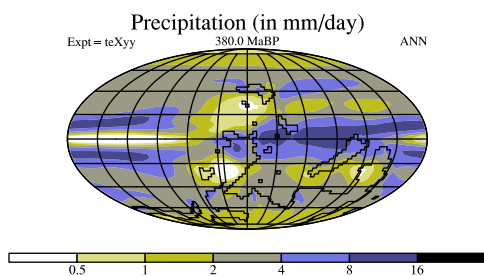
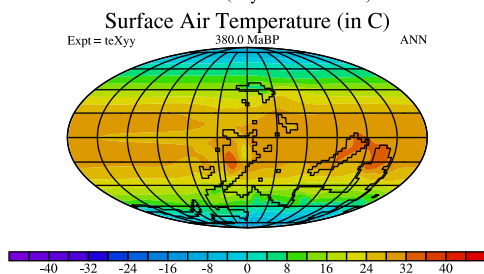
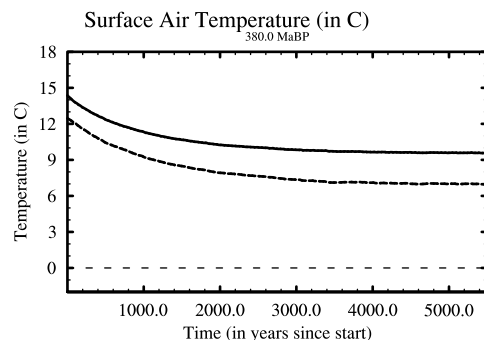




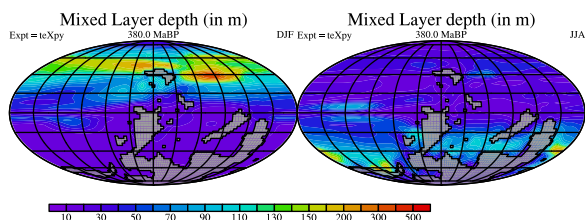
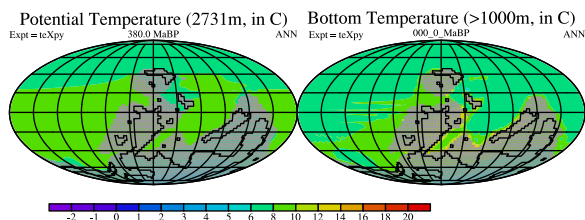
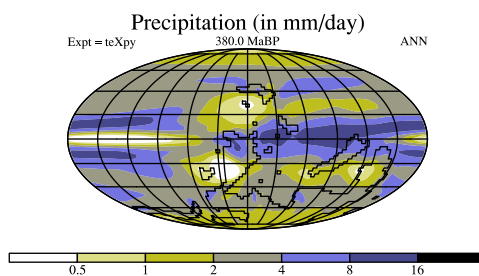
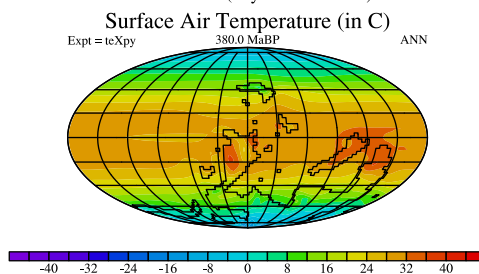
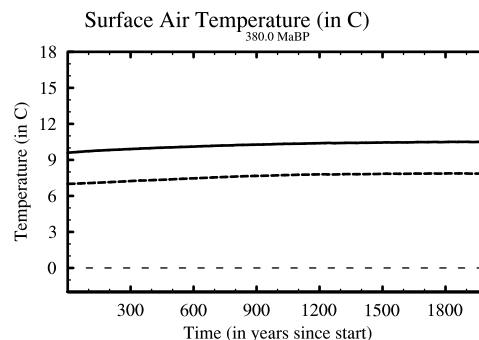
# Late Devonian (early Frasnian, 380 Ma)



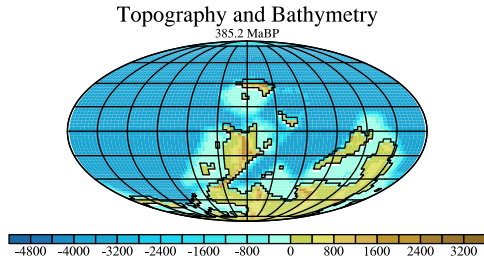
CO<sub>2</sub> = 1029 ppmv



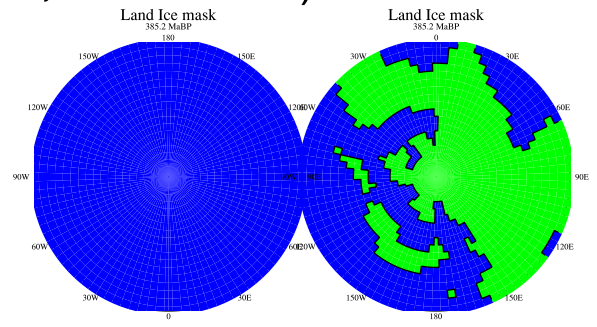
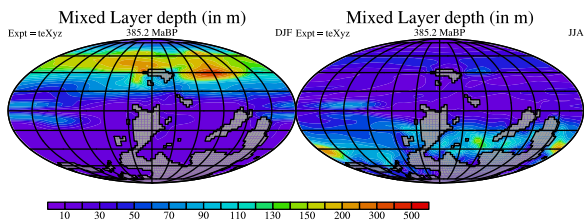
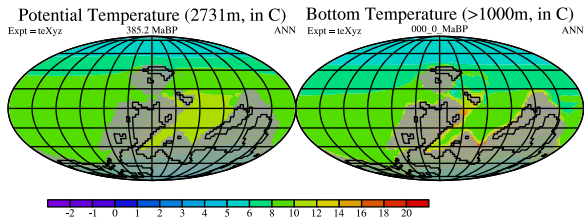
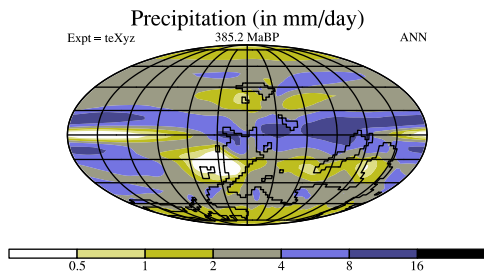
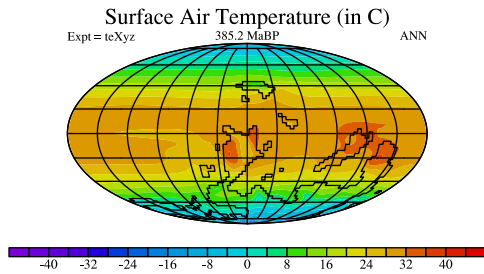
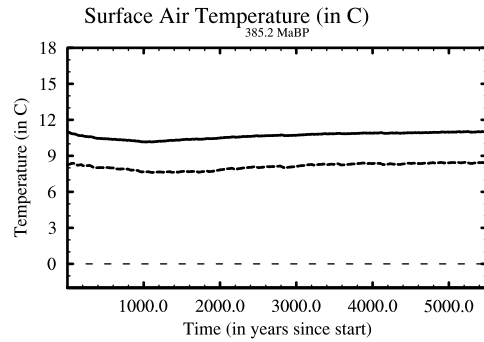
CO<sub>2</sub> = 1269 ppmv



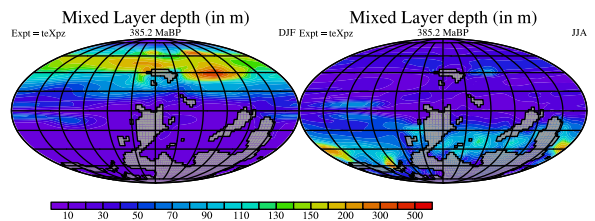
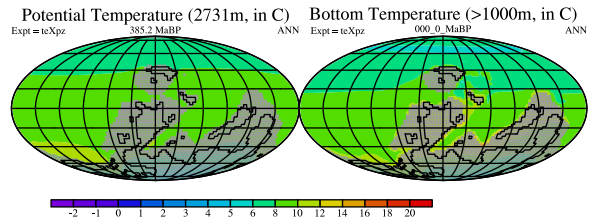
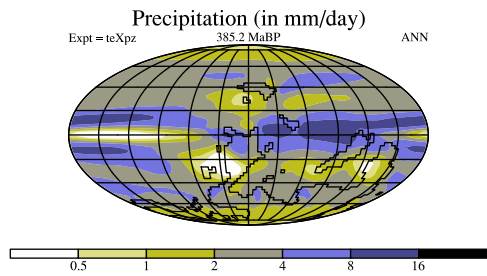
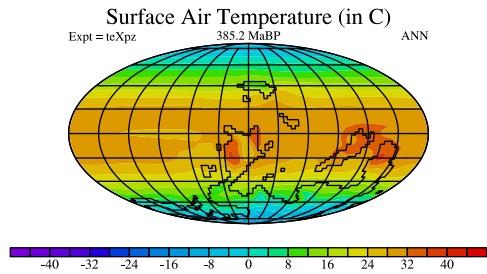
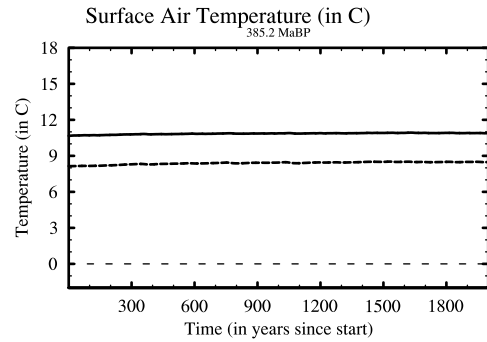
# Middle Devonian (Givetian, 385.2 Ma)



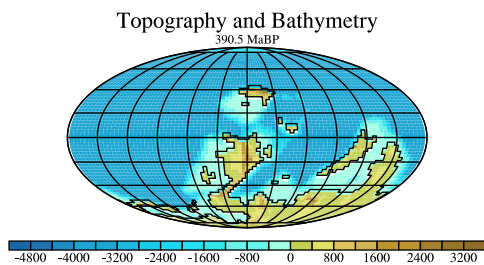
$\text{CO}_2 = 1079 \text{ ppmv}$



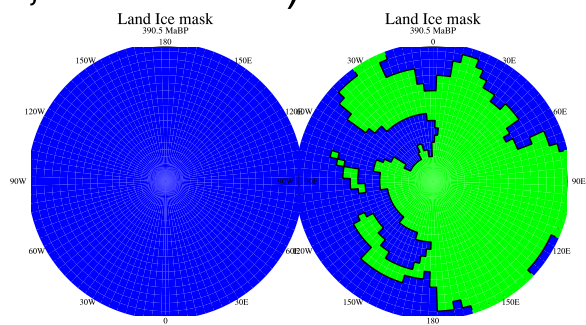
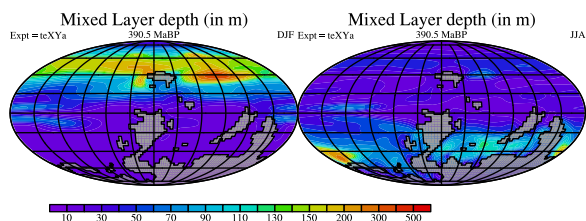
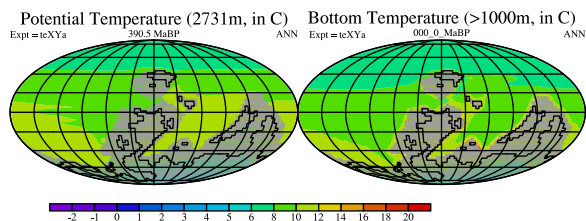
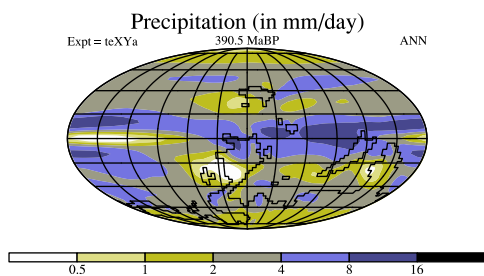
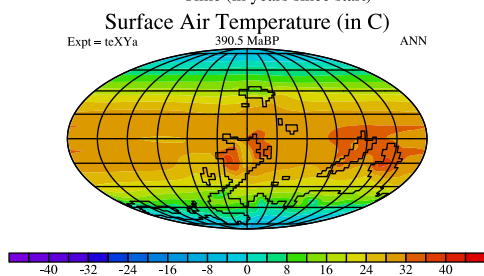
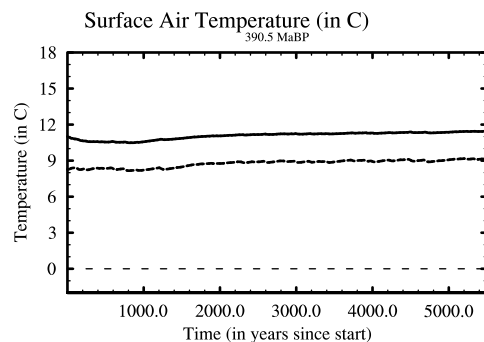
$\text{CO}_2 = 1377 \text{ ppmv}$



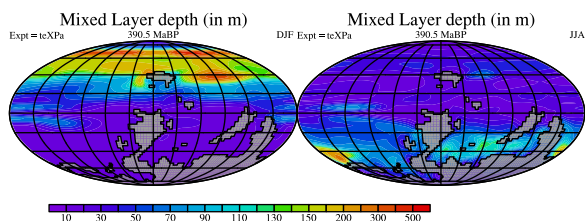
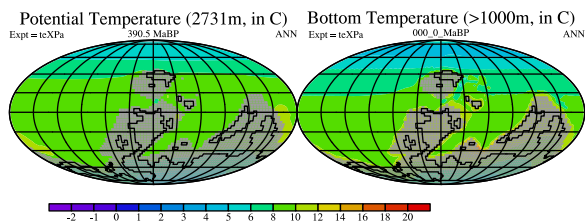
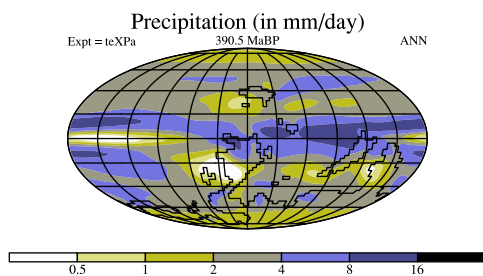
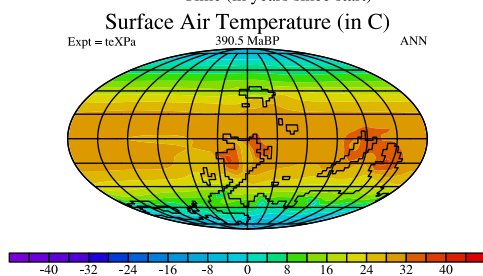
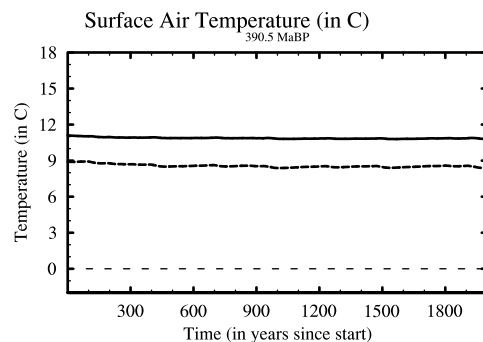
# Middle Devonian (Eifelian, 390.5 Ma)



$\text{CO}_2 = 1131 \text{ ppmv}$

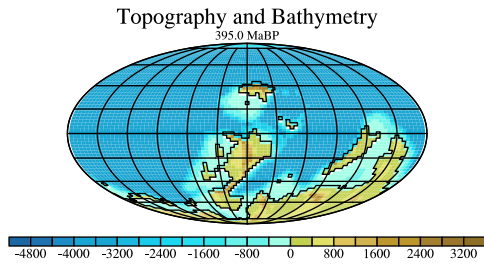


$\text{CO}_2 = 1093 \text{ ppmv}$

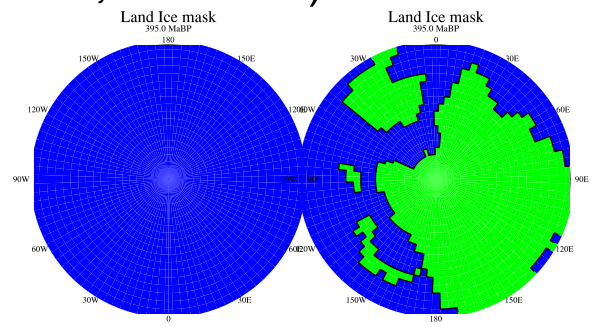
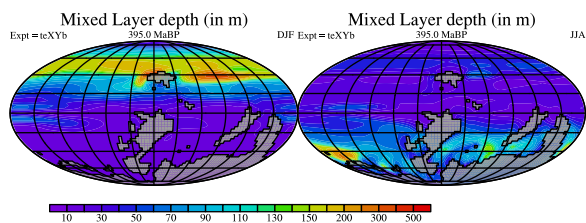
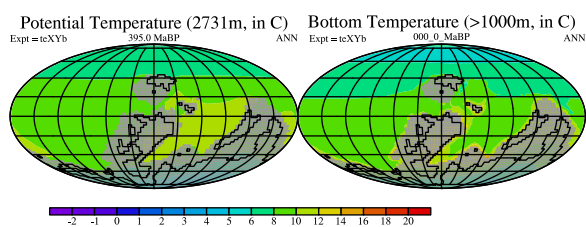
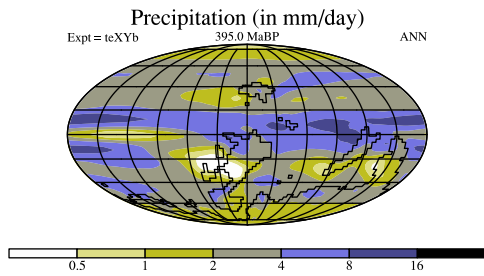
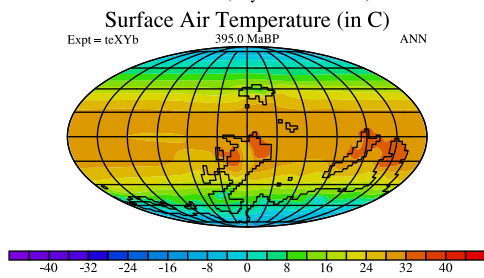
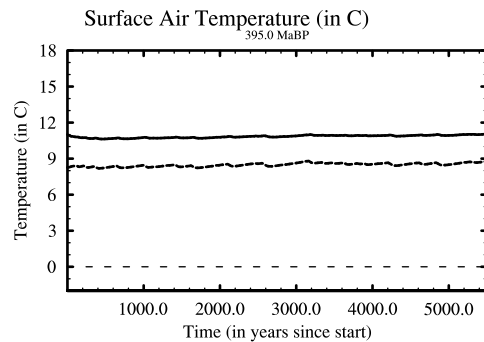




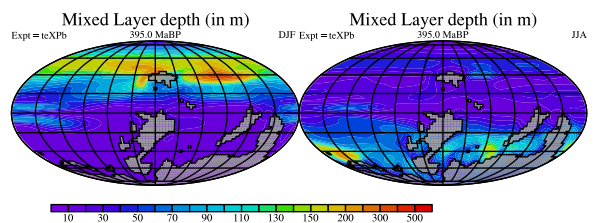
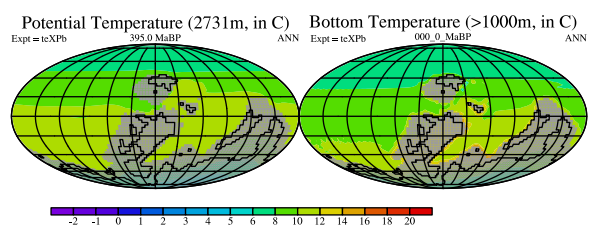
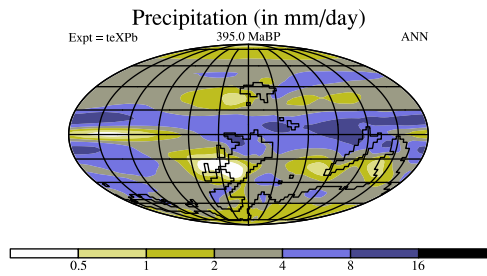
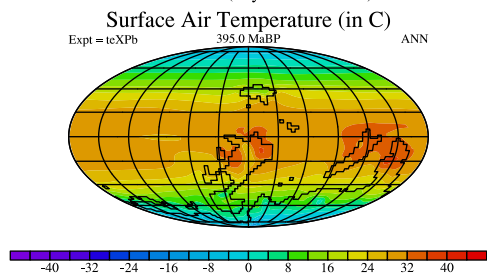
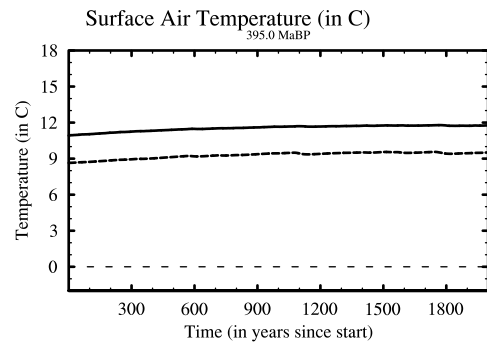
# Early Devonian (late Emsian, 395 Ma)



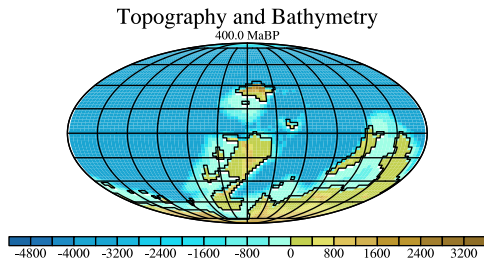
$\text{CO}_2 = 1174 \text{ ppmv}$



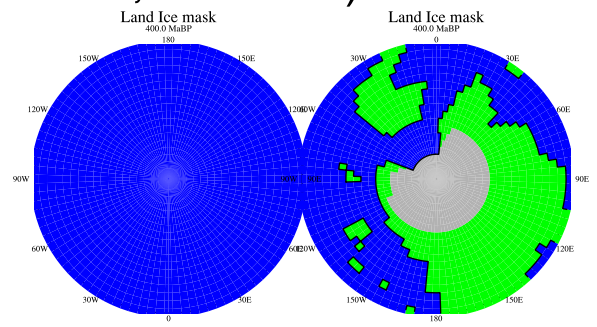
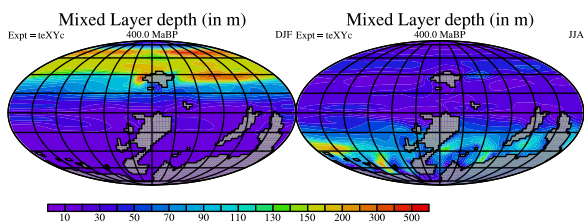
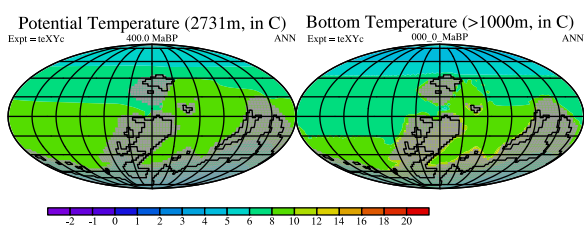
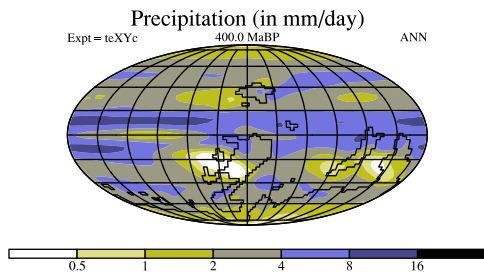
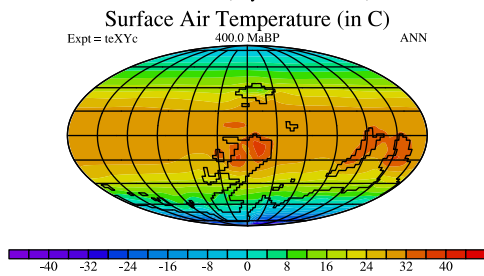
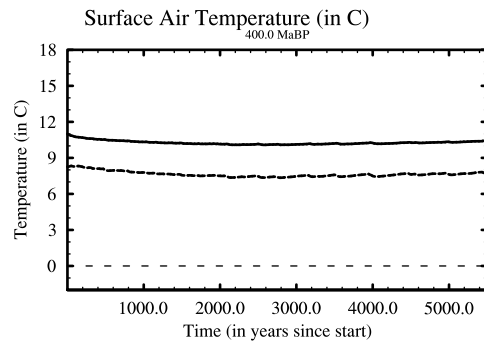
$\text{CO}_2 = 1297 \text{ ppmv}$



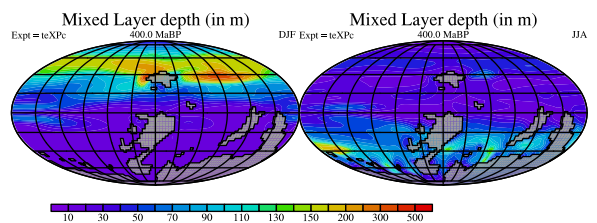
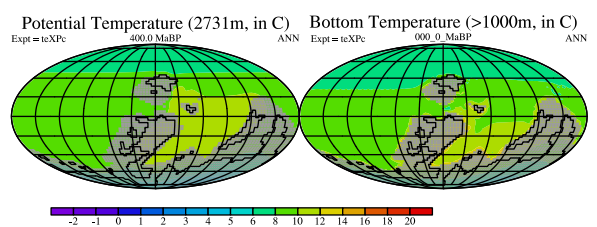
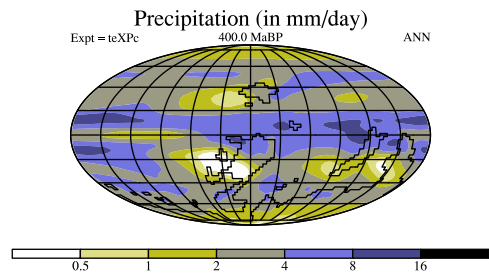
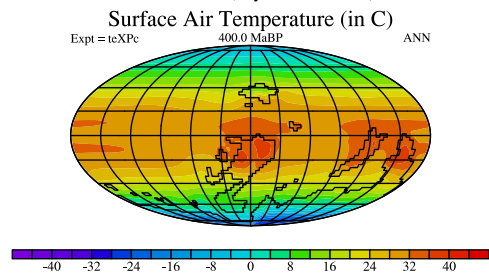
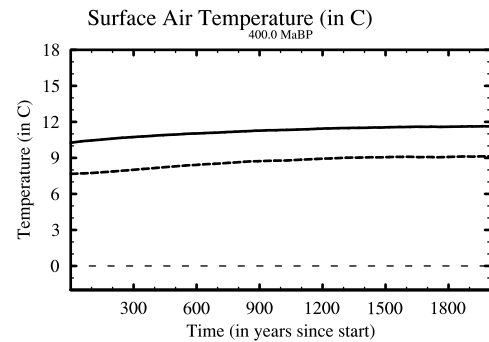
# Early Devonian (middle Emsian, 400 Ma)



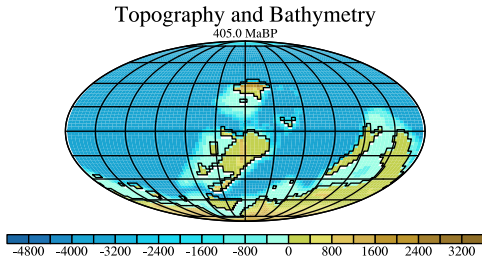
$\text{CO}_2 = 1223 \text{ ppmv}$



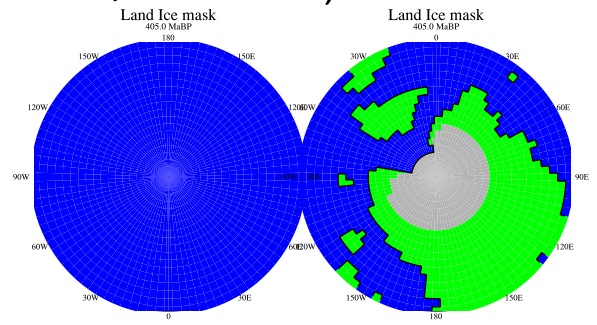
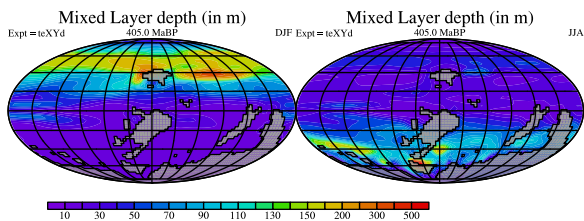
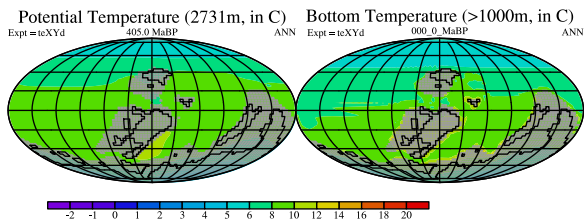
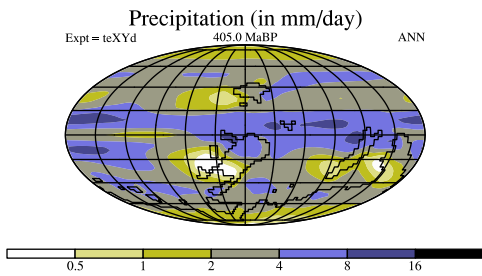
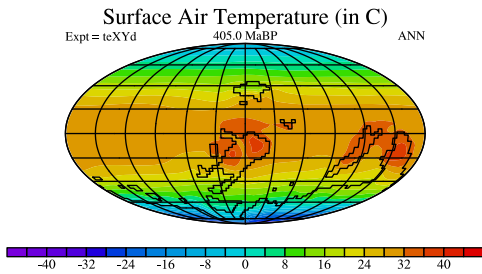
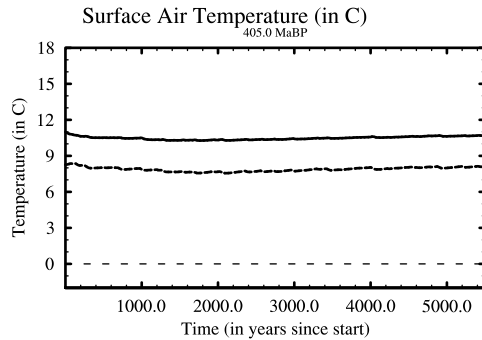
$\text{CO}_2 = 1731 \text{ ppmv}$



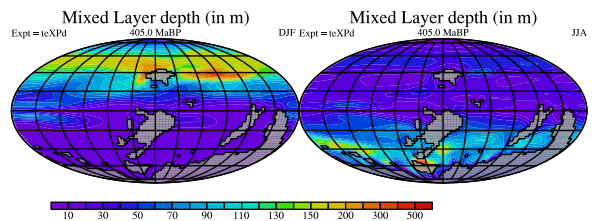
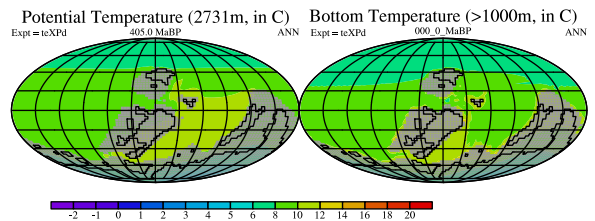
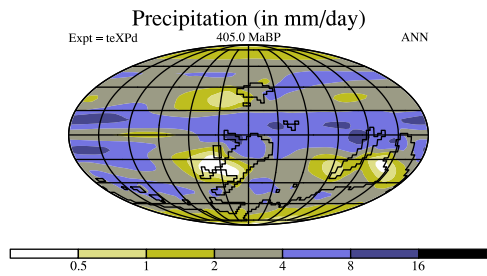
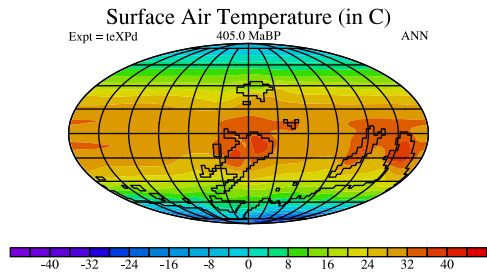
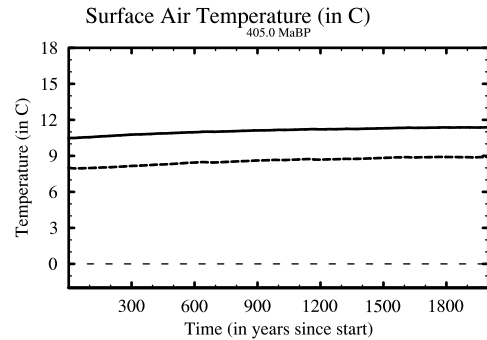
# Early Devonian (early Emsian, 405 Ma)



$\text{CO}_2 = 1271 \text{ ppmv}$

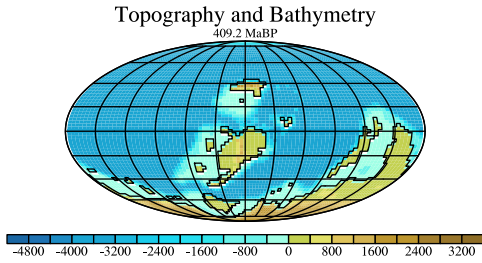


$\text{CO}_2 = 1689 \text{ ppmv}$

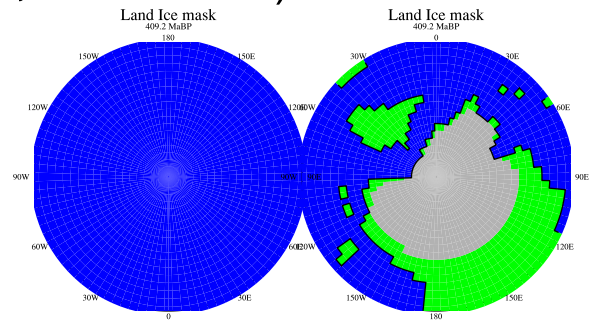
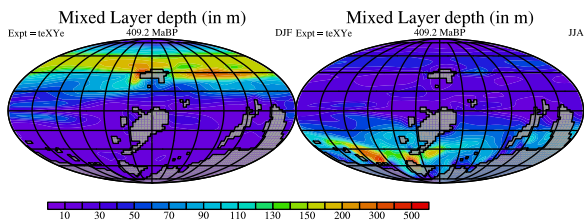
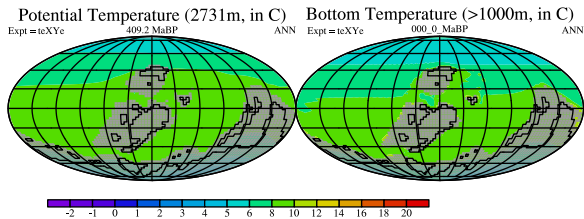
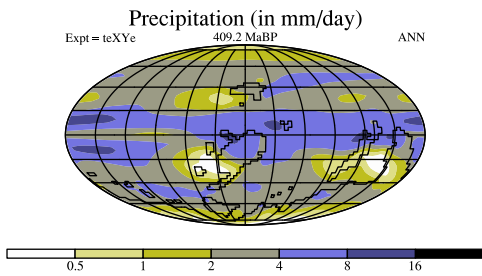
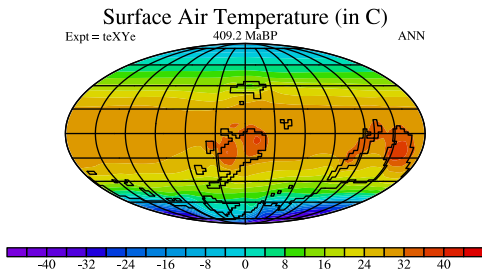
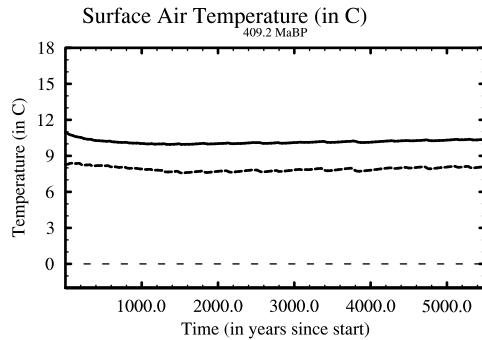




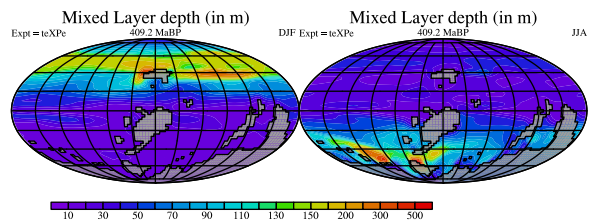
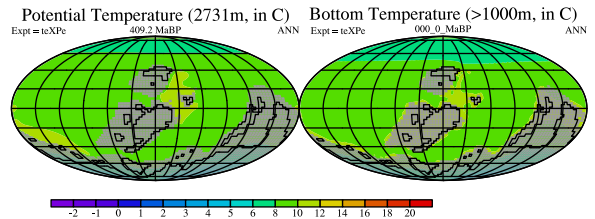
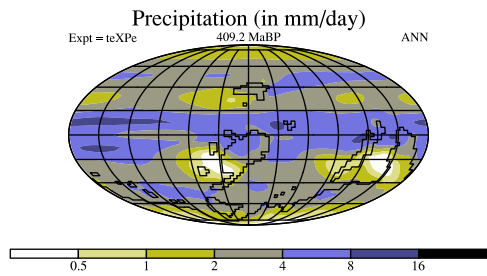
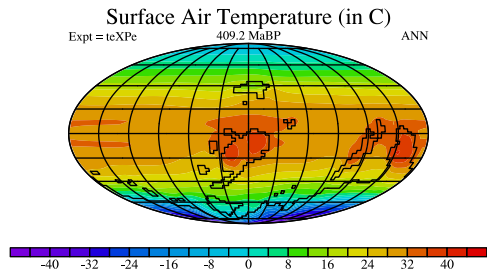
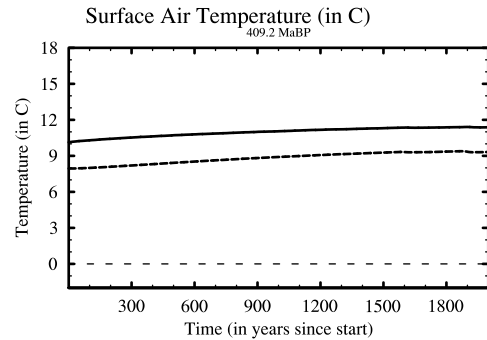
# Early Devonian (Pragian, 409.2 Ma)



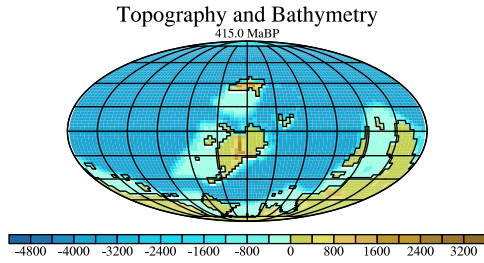
$\text{CO}_2 = 1319 \text{ ppmv}$



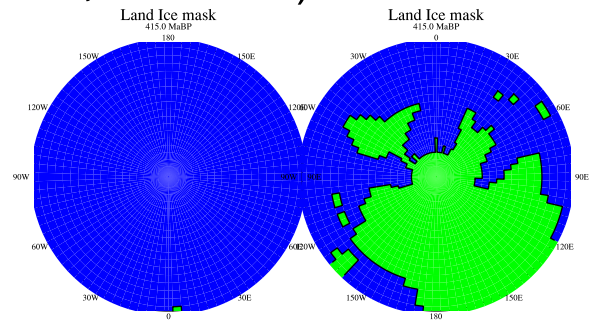
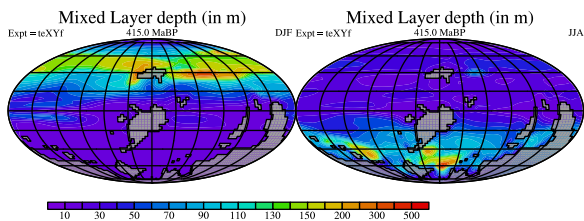
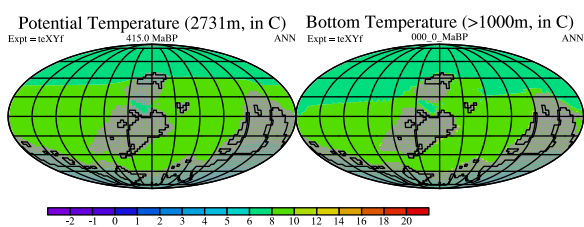
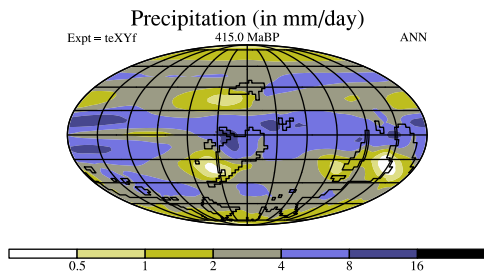
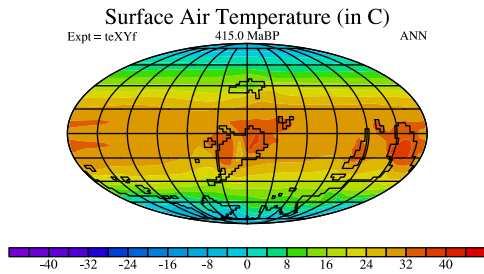
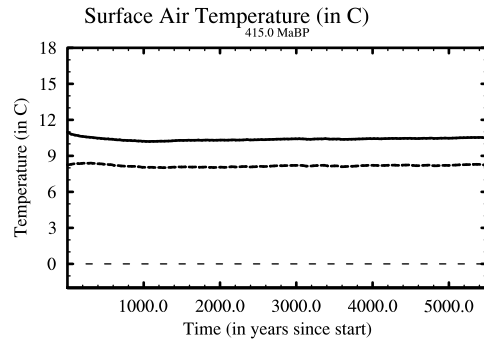
$\text{CO}_2 = 2102 \text{ ppmv}$



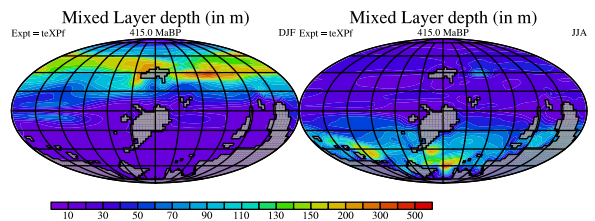
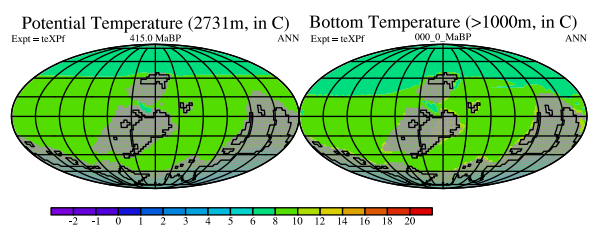
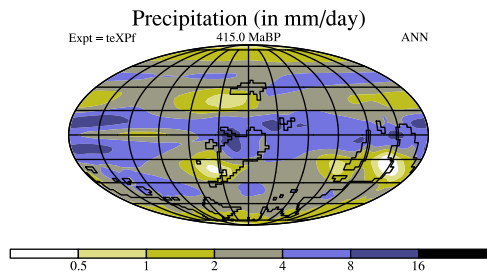
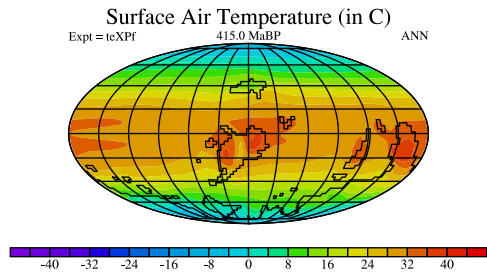
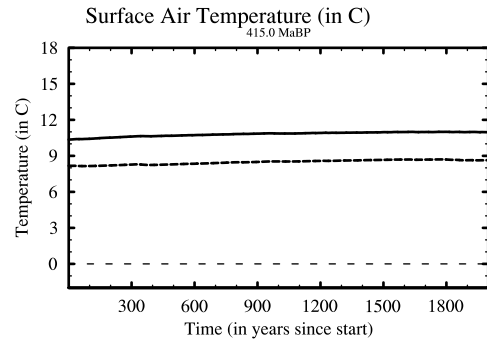
# Early Devonian (Lochkovian, 415 Ma)



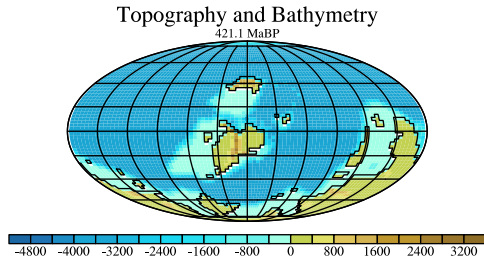
CO<sub>2</sub> = 1368 ppmv



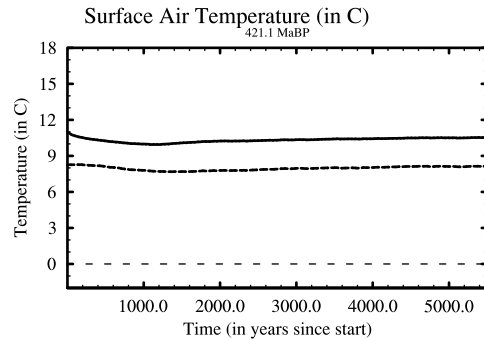
CO<sub>2</sub> = 1579 ppmv



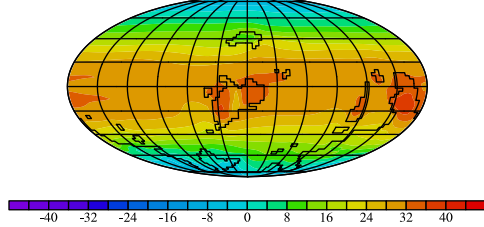
# Late Silurian (Pridoli, 421.1 Ma)



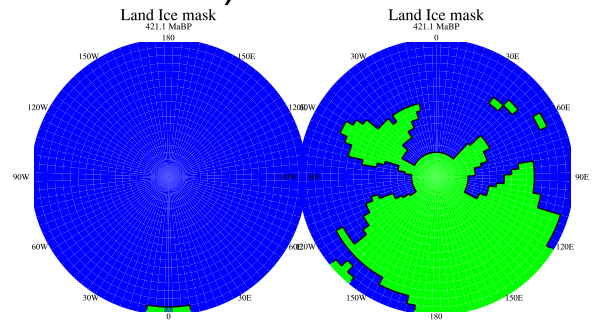
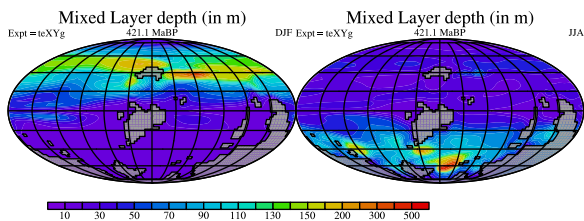
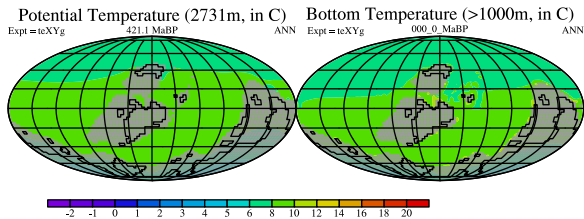
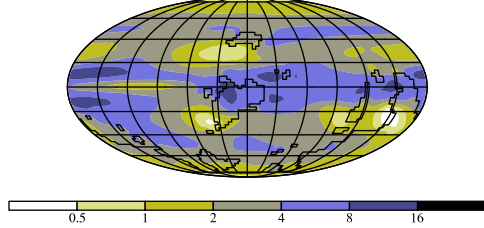
CO<sub>2</sub> = 1427 ppmv



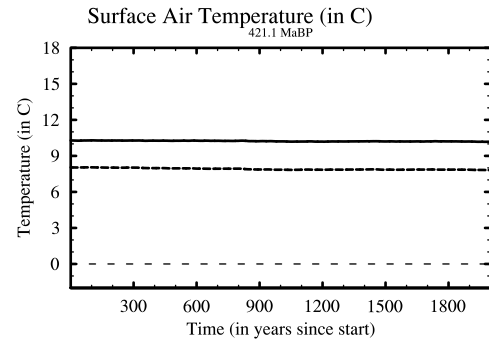
Surface Air Temperature (in C)  
Expt = teXYg 421.1 MaBP ANN



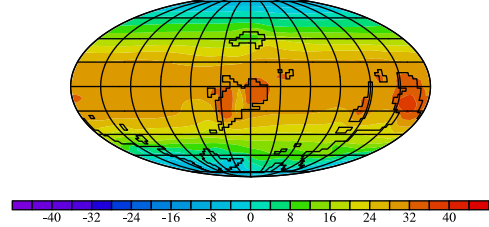
Precipitation (in mm/day)  
Expt = teXYg 421.1 MaBP ANN



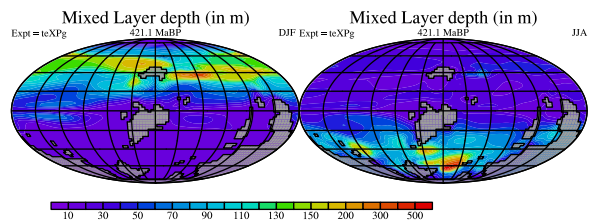
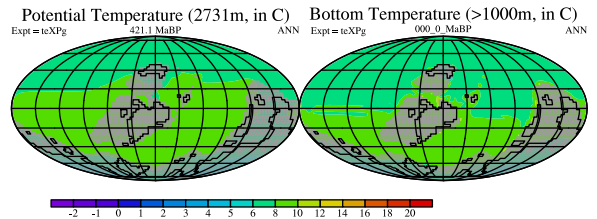
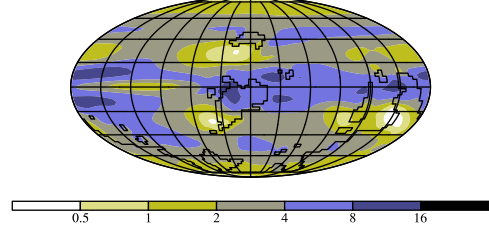
CO<sub>2</sub> = 1457 ppmv



Surface Air Temperature (in C)  
Expt = teXPg 421.1 MaBP ANN

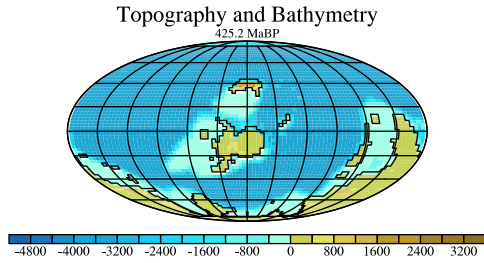


Precipitation (in mm/day)  
Expt = teXPg 421.1 MaBP ANN

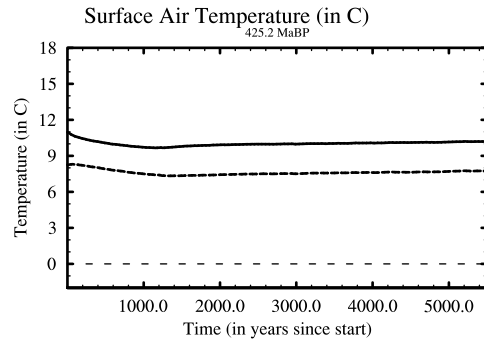




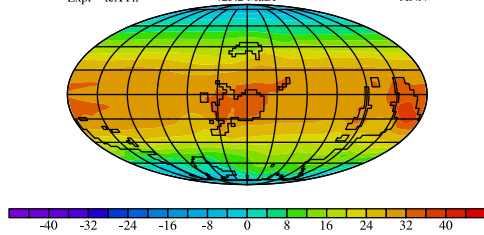
# Late Silurian (Ludlow, 425.2 Ma)



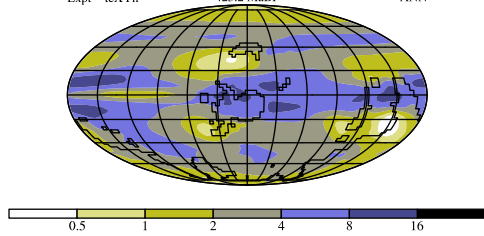
CO<sub>2</sub> = 1466 ppmv



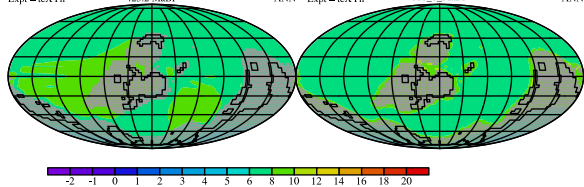
Surface Air Temperature (in C)  
Expt = teXYh 425.2 MaBP ANN



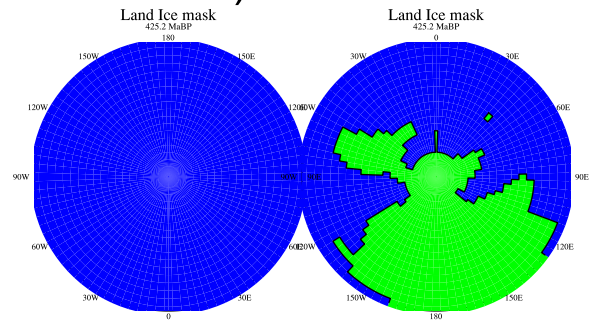
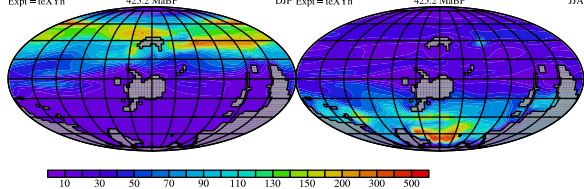
Precipitation (in mm/day)  
Expt = teXYh 425.2 MaBP ANN



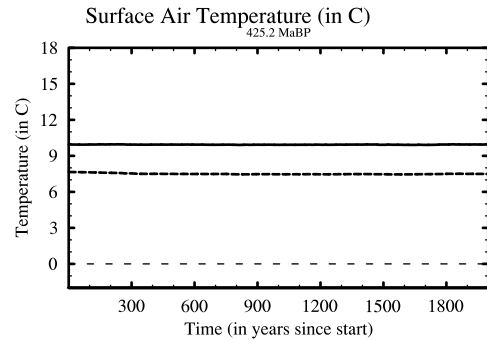
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = teXYh 425.2 MaBP ANN Expt = teXYh 000.0 MaBP ANN



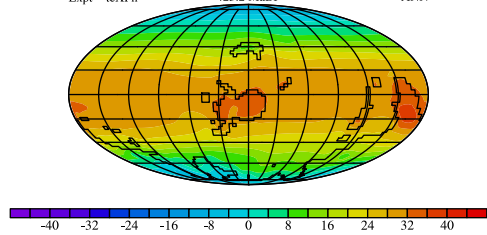
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = teXYh 425.2 MaBP DJF Expt = teXYh 425.2 MaBP JJA



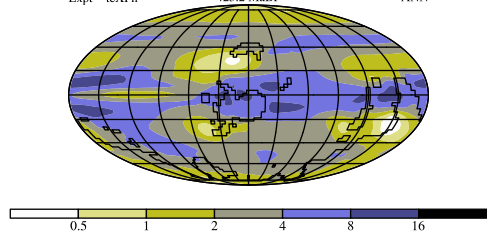
CO<sub>2</sub> = 1490 ppmv



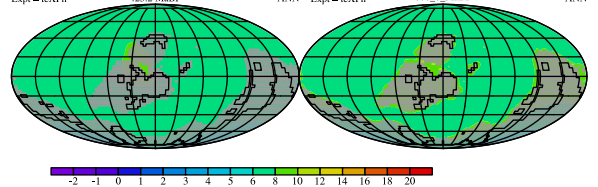
Surface Air Temperature (in C)  
Expt = teXPh 425.2 MaBP ANN



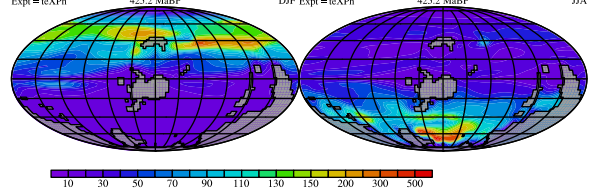
Precipitation (in mm/day)  
Expt = teXPh 425.2 MaBP ANN



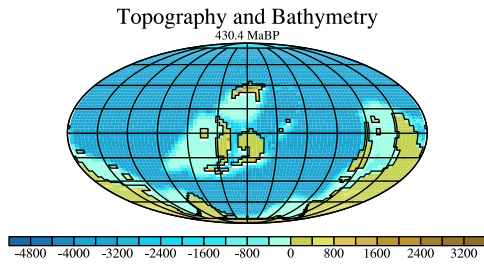
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = teXPh 425.2 MaBP ANN Expt = teXPh 000.0 MaBP ANN



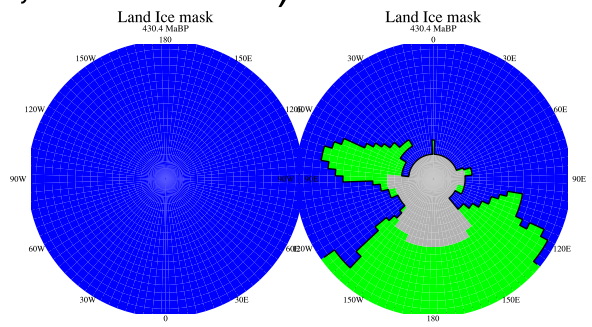
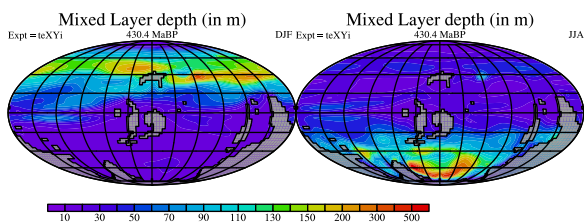
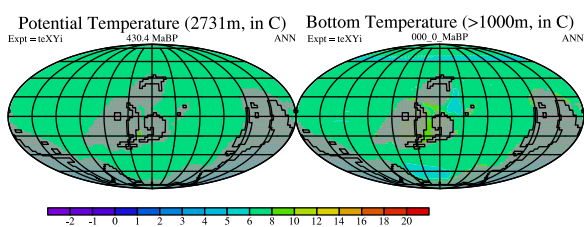
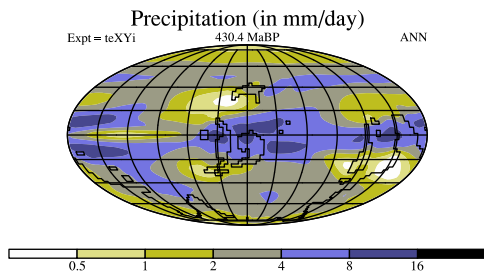
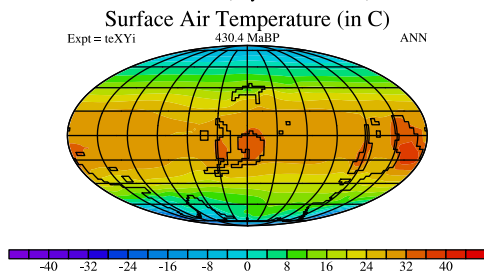
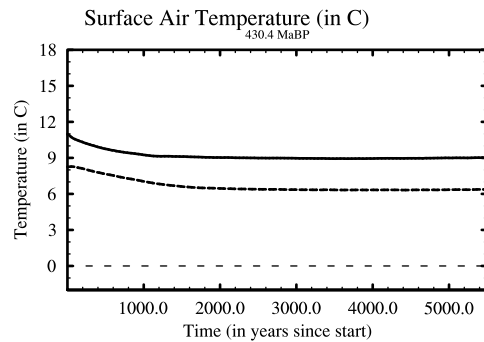
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = teXPh 425.2 MaBP DJF Expt = teXPh 425.2 MaBP JJA



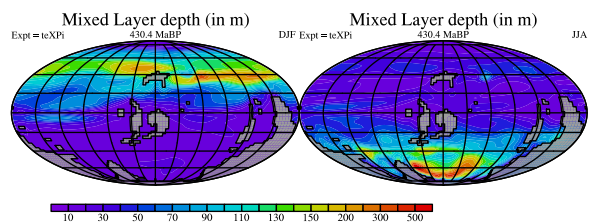
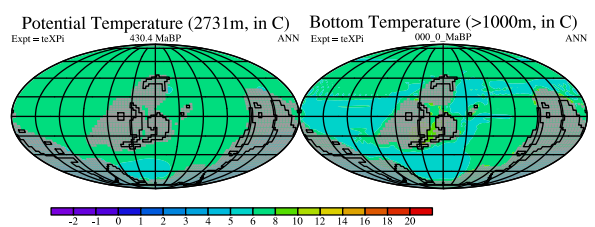
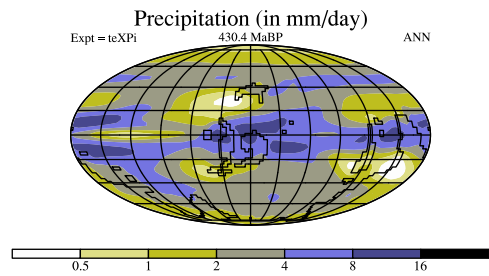
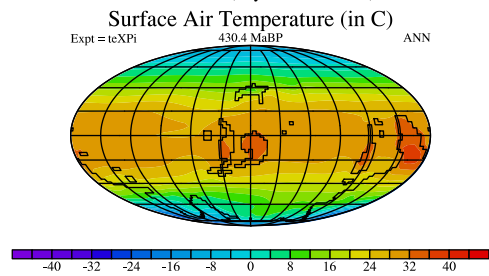
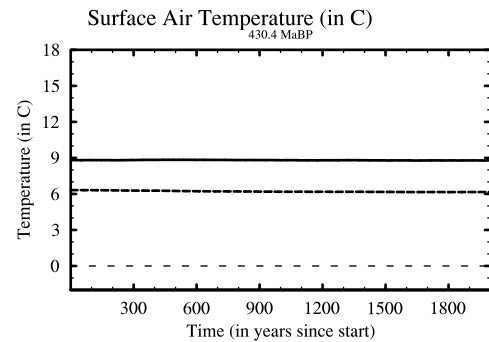
# Middle Silurian (Wenlock, 430.4 Ma)



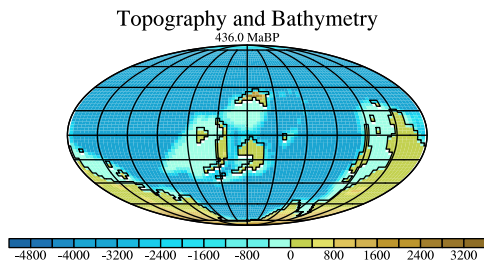
CO<sub>2</sub> = 1517 ppmv



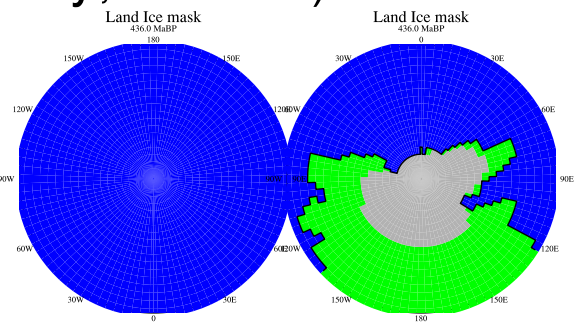
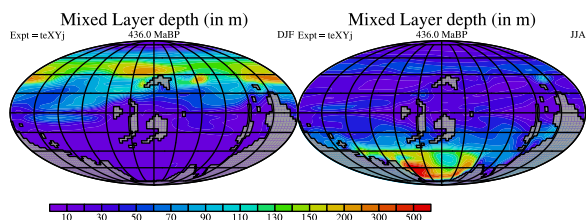
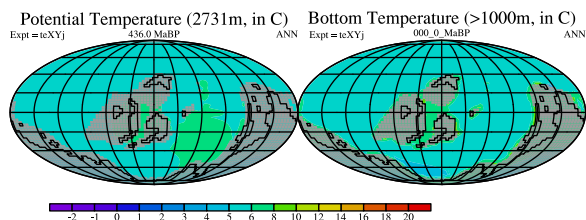
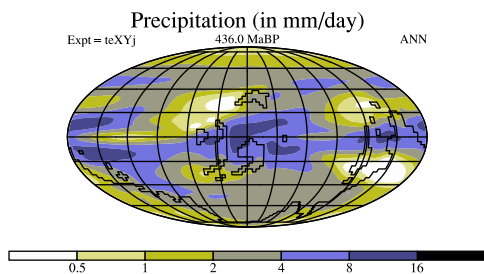
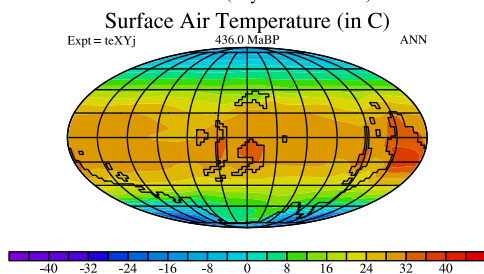
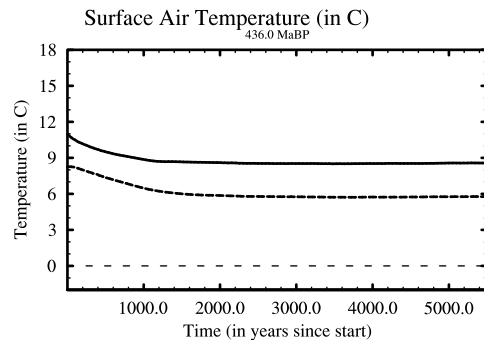
CO<sub>2</sub> = 1531 ppmv



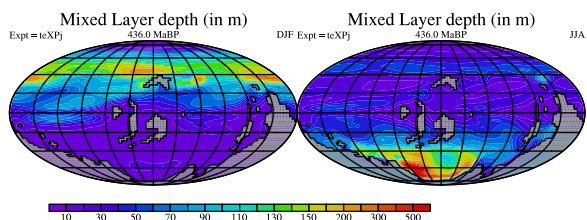
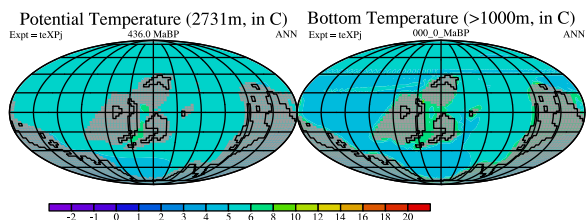
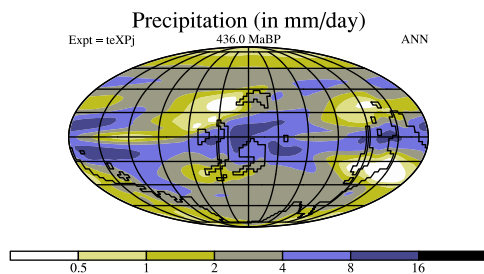
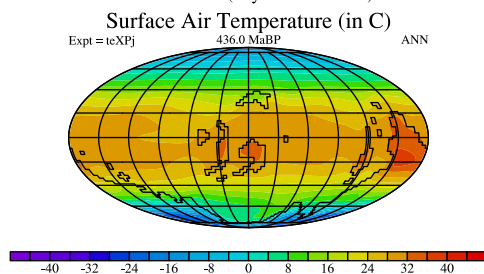
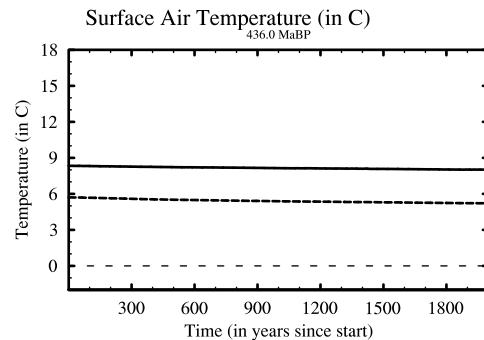
# Early Silurian (late Llandovery, 436 Ma)



$\text{CO}_2 = 1571 \text{ ppmv}$

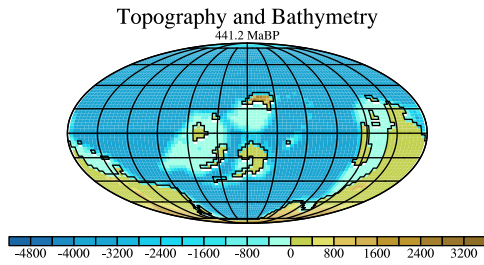


$\text{CO}_2 = 1576 \text{ ppmv}$

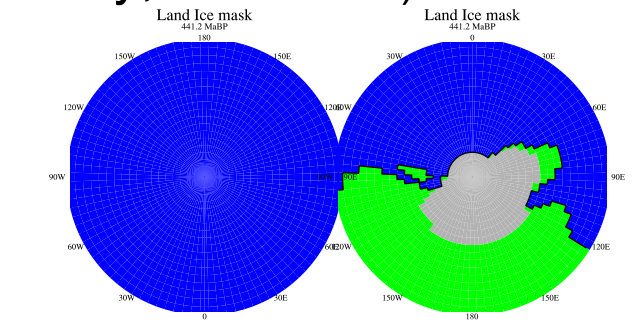
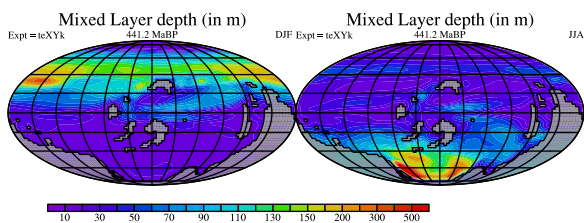
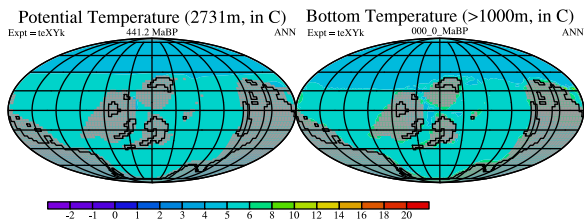
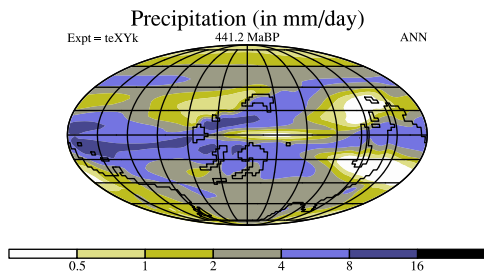
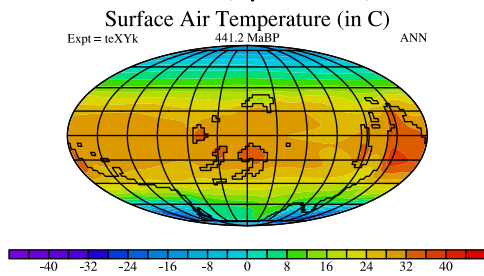
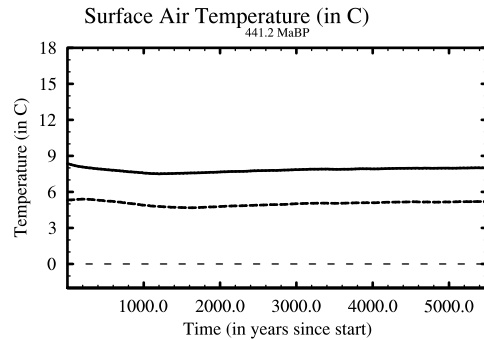




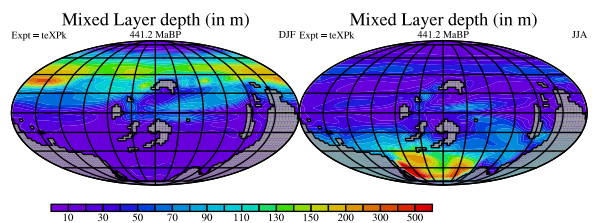
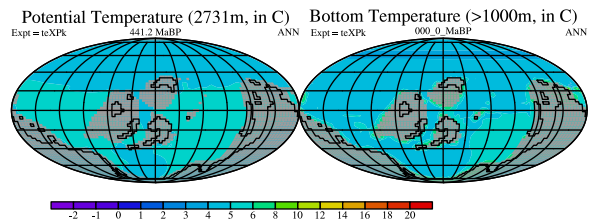
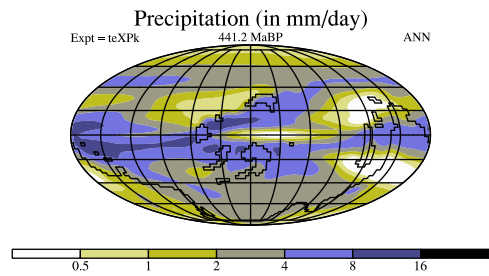
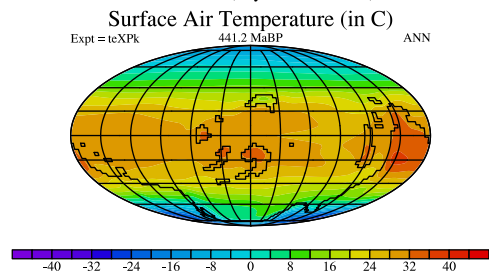
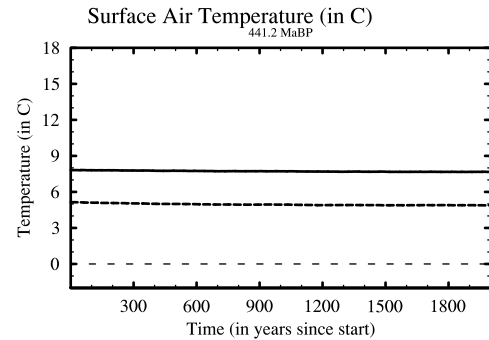
# Early Silurian (early Llandovery, 441.2 Ma)



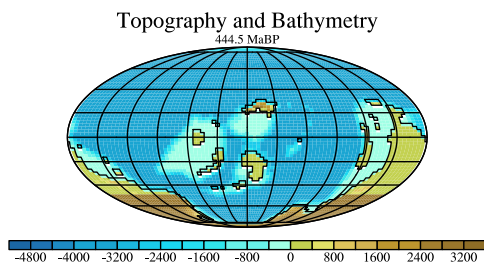
$\text{CO}_2 = 1614 \text{ ppmv}$



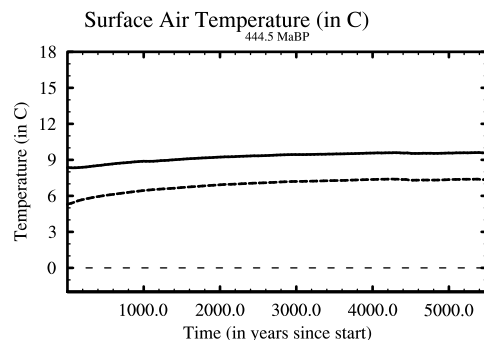
$\text{CO}_2 = 1643 \text{ ppmv}$



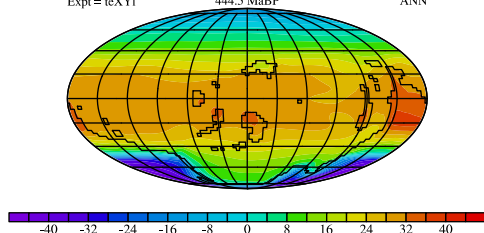
# Late Ordovician (Hirnantian, 444.5 Ma)



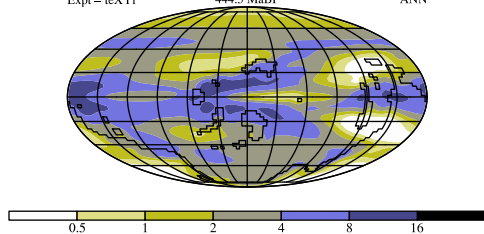
$\text{CO}_2 = 1636 \text{ ppmv}$



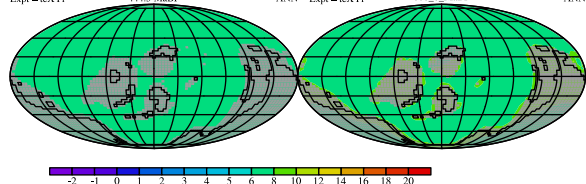
Surface Air Temperature (in C)  
Expt = teXYI 444.5 MaBP ANN



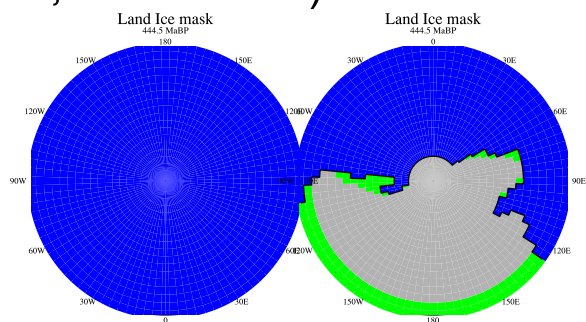
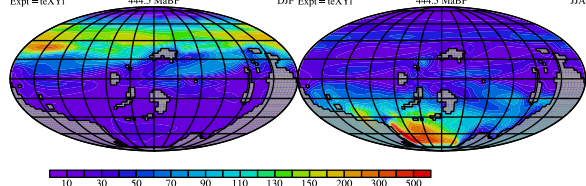
Precipitation (in mm/day)  
Expt = teXYI 444.5 MaBP ANN



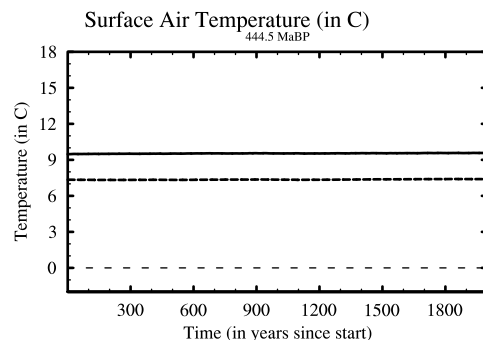
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = teXYI 444.5 MaBP ANN Expt = teXYI 000.0 MaBP ANN



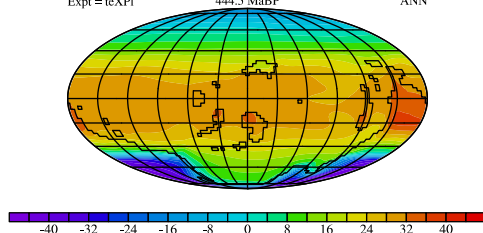
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = teXYI 444.5 MaBP DJF Expt = teXYI 444.5 MaBP JJA



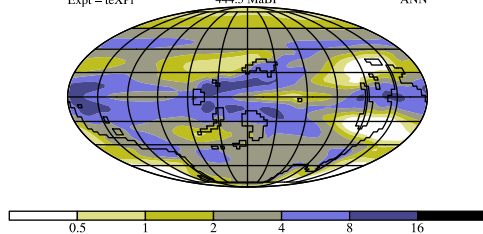
$\text{CO}_2 = 1708 \text{ ppmv}$



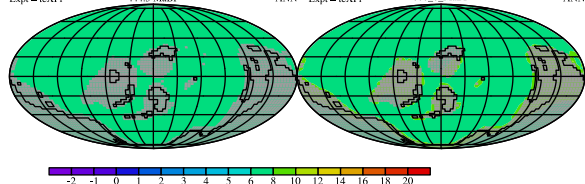
Surface Air Temperature (in C)  
Expt = teXPI 444.5 MaBP ANN



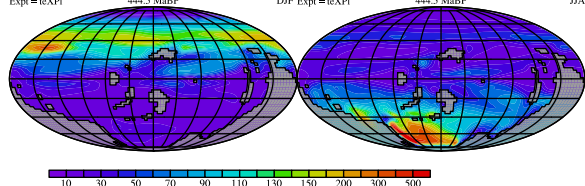
Precipitation (in mm/day)  
Expt = teXPI 444.5 MaBP ANN



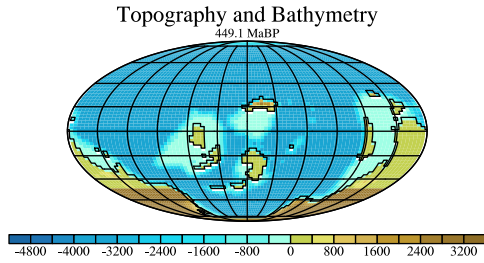
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = teXPI 444.5 MaBP ANN Expt = teXPI 000.0 MaBP ANN



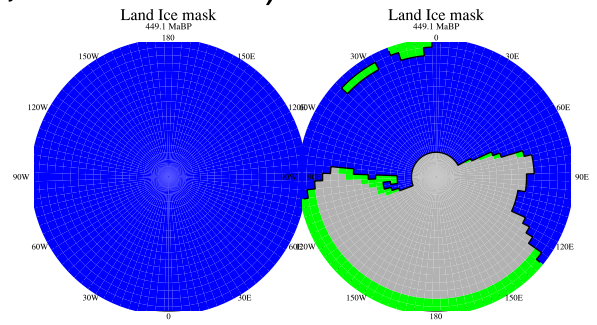
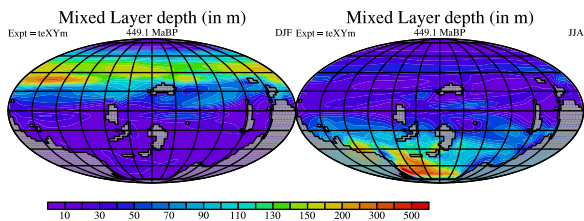
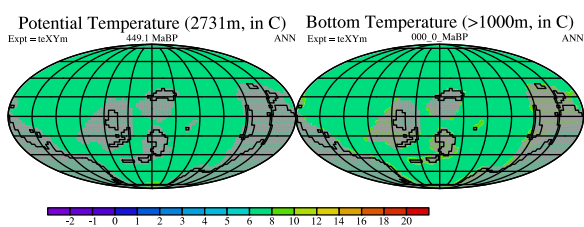
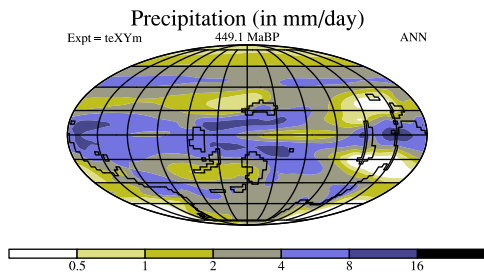
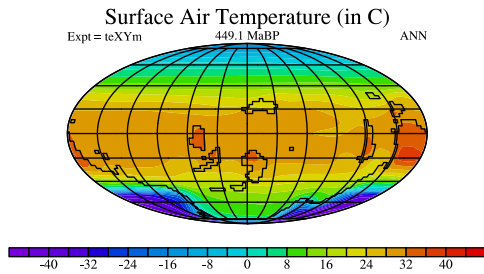
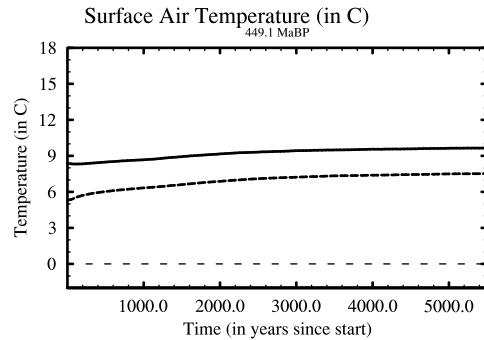
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = teXPI 444.5 MaBP DJF Expt = teXPI 444.5 MaBP JJA



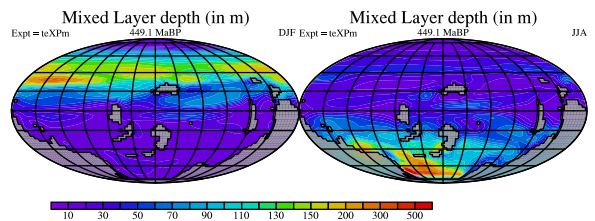
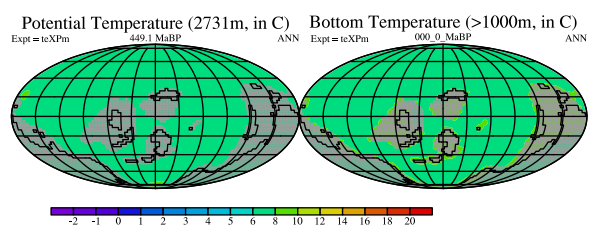
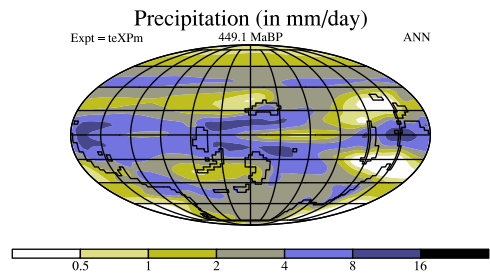
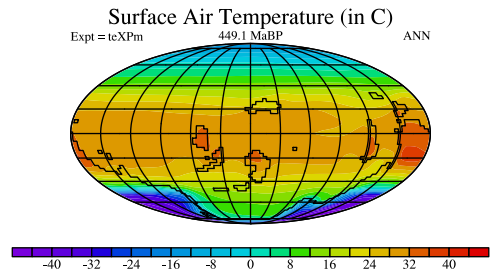
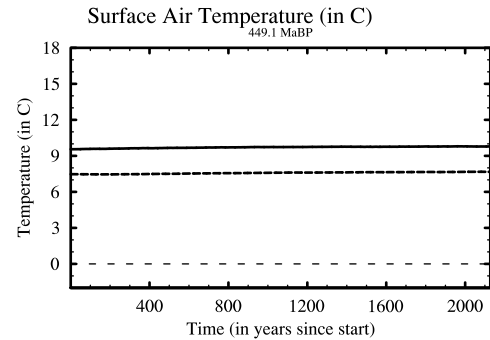
# Late Ordovician (Katian, 449.1 Ma)



CO<sub>2</sub> = 1666 ppmv

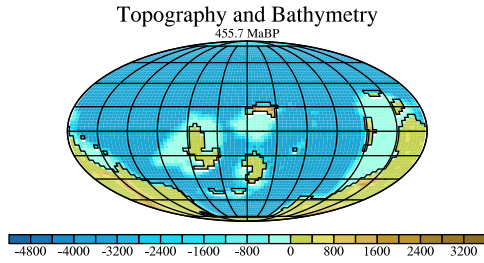


CO<sub>2</sub> = 1799 ppmv

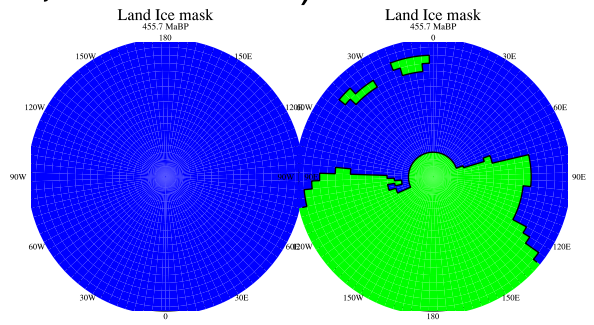
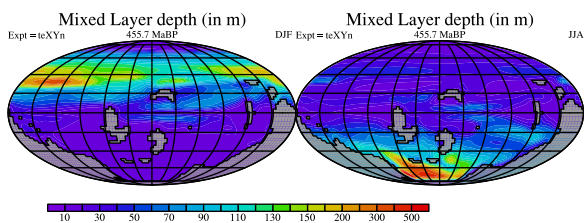
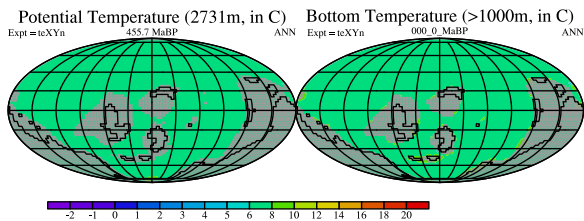
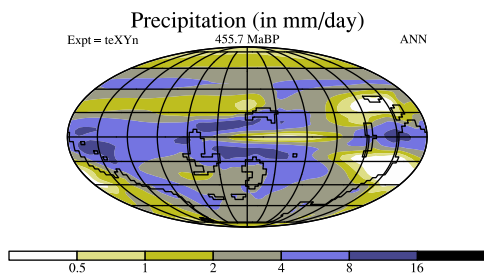
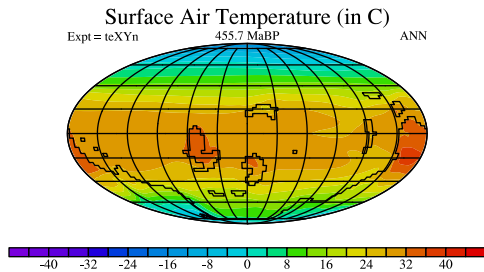
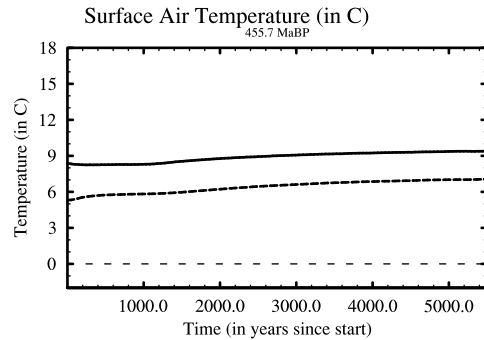




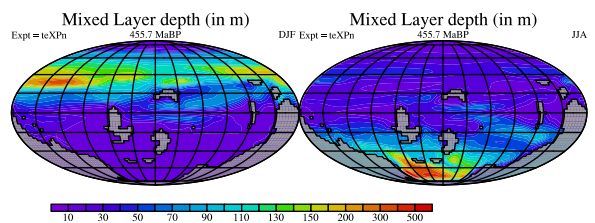
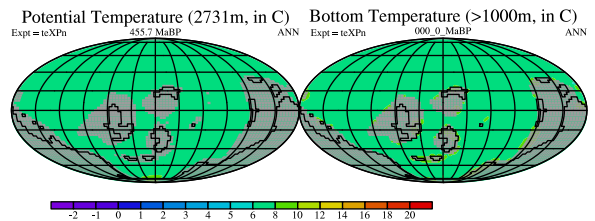
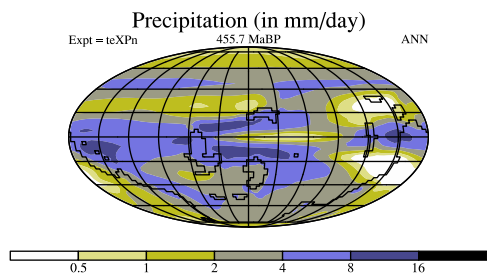
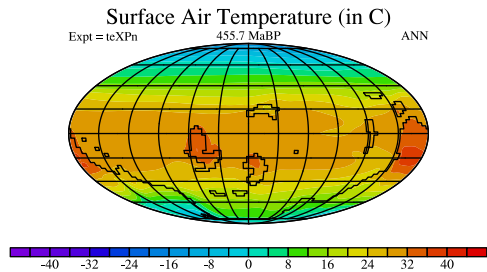
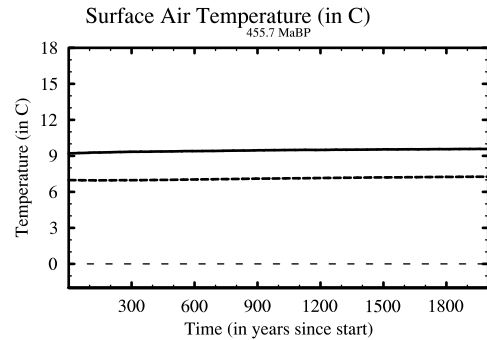
# Late Ordovician (Sandbian, 455.7 Ma)



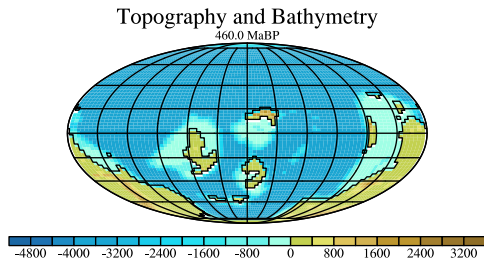
CO<sub>2</sub> = 1710 ppmv



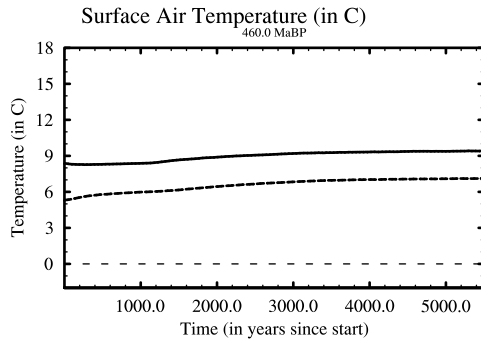
CO<sub>2</sub> = 1929 ppmv



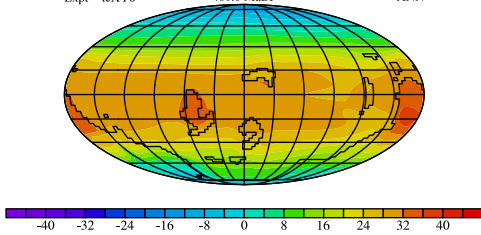
# Middle Ordovician (late Darwillian, 460 Ma)



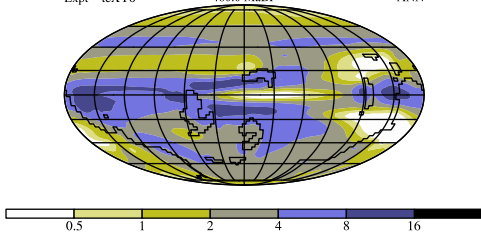
$\text{CO}_2 = 1738 \text{ ppmv}$



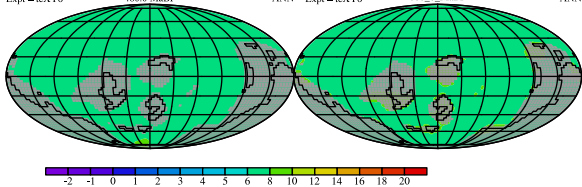
Surface Air Temperature (in C)  
Expt = teXYo 460.0 MaBP ANN



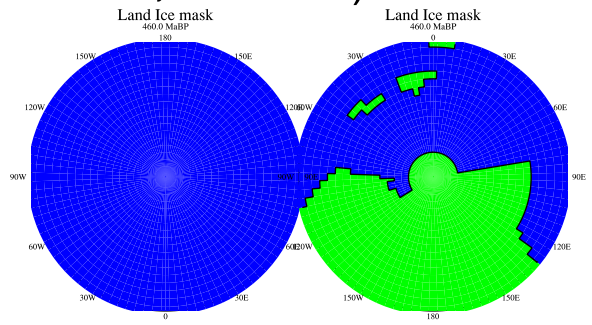
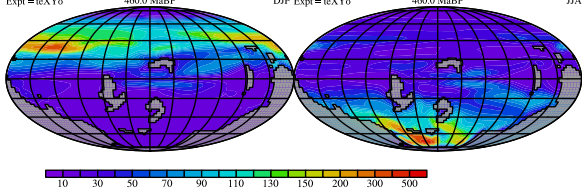
Precipitation (in mm/day)  
Expt = teXYo 460.0 MaBP ANN



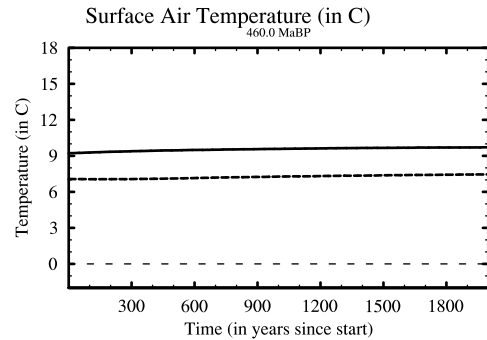
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = teXYo 460.0 MaBP ANN Expt = teXYo 000.0 MaBP ANN



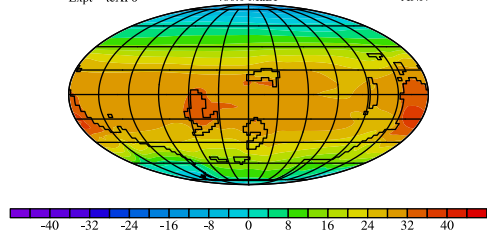
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = teXYo 460.0 MaBP DJF Expt = teXYo 460.0 MaBP JJA



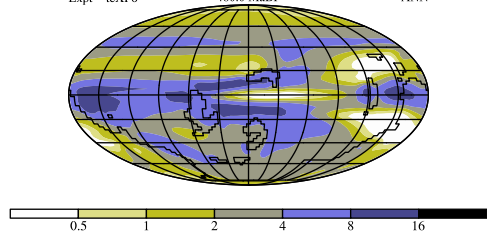
$\text{CO}_2 = 2013 \text{ ppmv}$



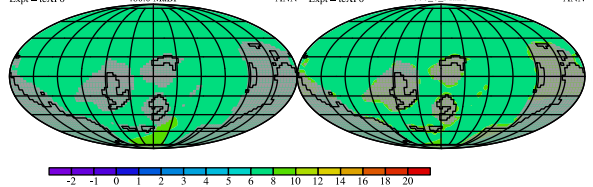
Surface Air Temperature (in C)  
Expt = teXPo 460.0 MaBP ANN



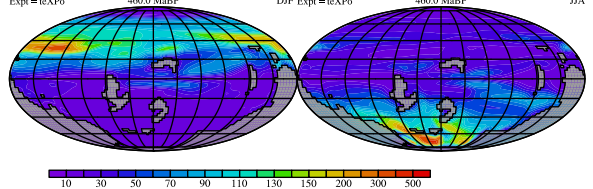
Precipitation (in mm/day)  
Expt = teXPo 460.0 MaBP ANN



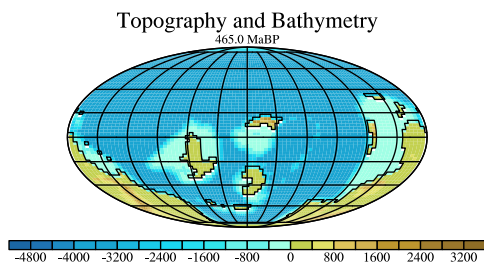
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = teXPo 460.0 MaBP ANN Expt = teXPo 000.0 MaBP ANN



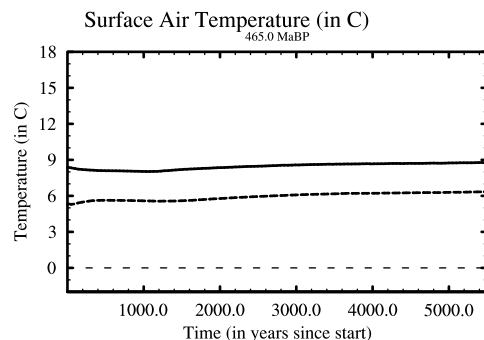
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = teXPo 460.0 MaBP DJF Expt = teXPo 460.0 MaBP JJA



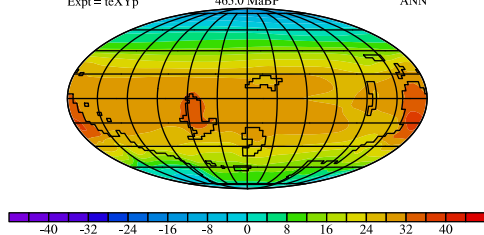
# Middle Ordovician (early Darwillian, 465 Ma)



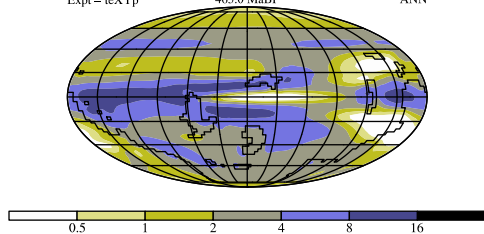
$\text{CO}_2 = 1770 \text{ ppmv}$



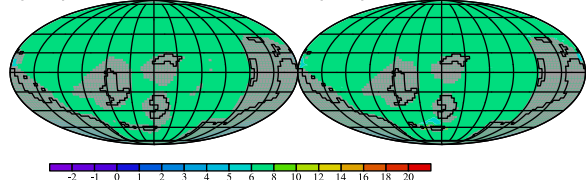
Surface Air Temperature (in C)  
Expt = teXYp 465.0 MaBP ANN



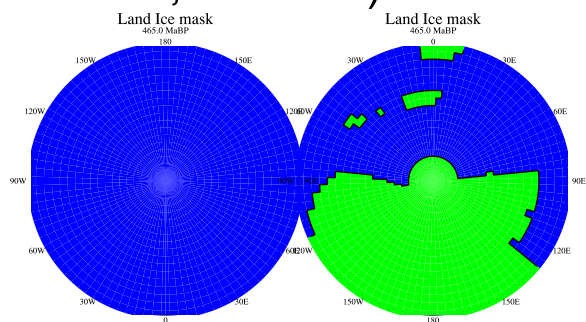
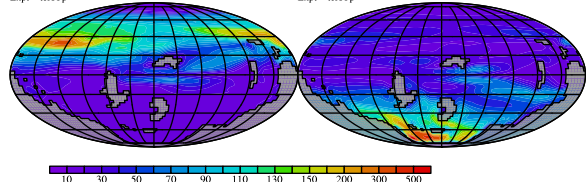
Precipitation (in mm/day)  
Expt = teXYp 465.0 MaBP ANN



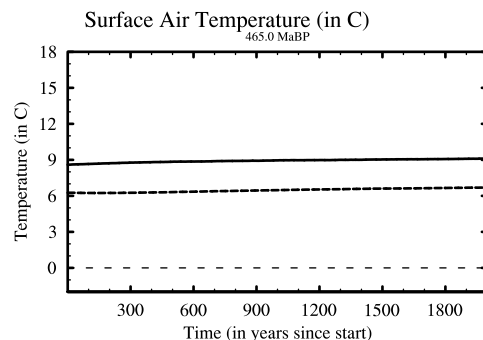
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = teXYp 465.0 MaBP ANN Expt = teXYp 000.0 MaBP ANN



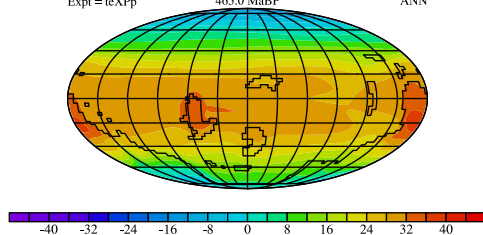
Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = teXYp 465.0 MaBP DJF Expt = teXYp 465.0 MaBP JJA



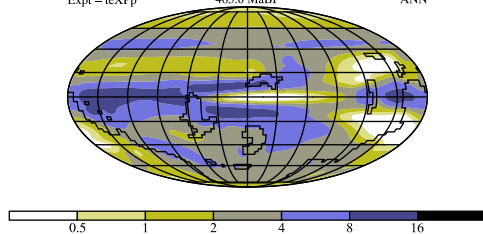
$\text{CO}_2 = 2111 \text{ ppmv}$



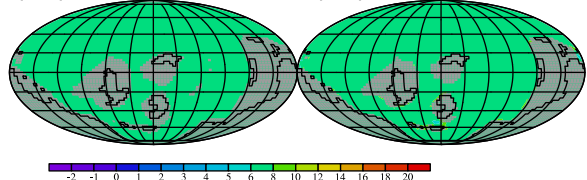
Surface Air Temperature (in C)  
Expt = teXPp 465.0 MaBP ANN



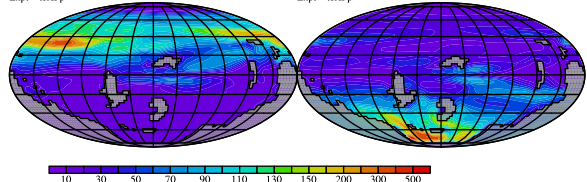
Precipitation (in mm/day)  
Expt = teXPp 465.0 MaBP ANN



Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = teXPp 465.0 MaBP ANN Expt = teXPp 000.0 MaBP ANN

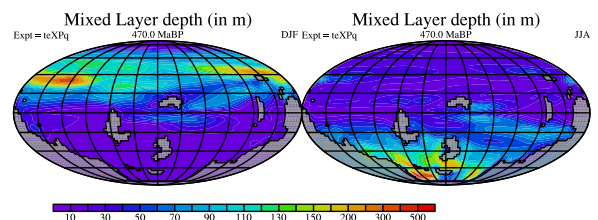
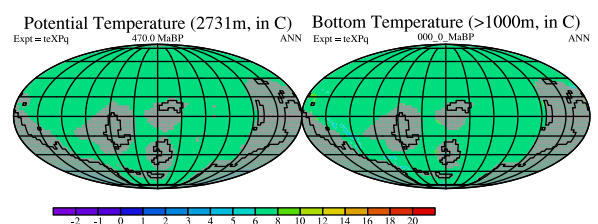
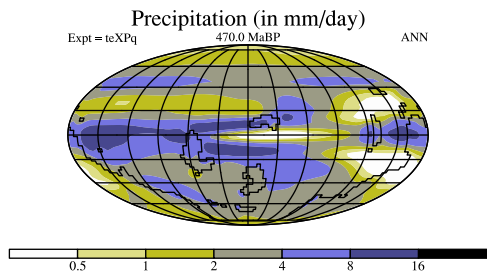
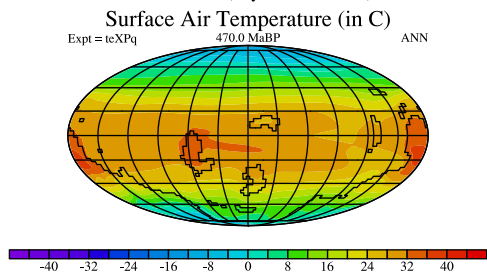
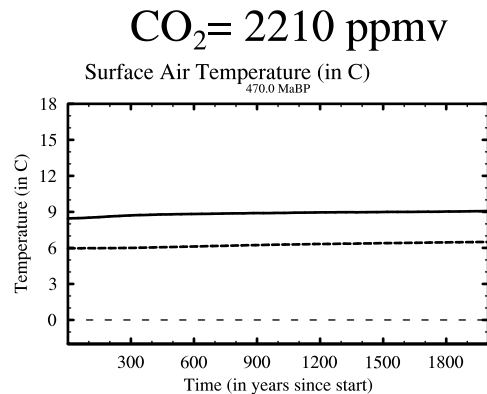
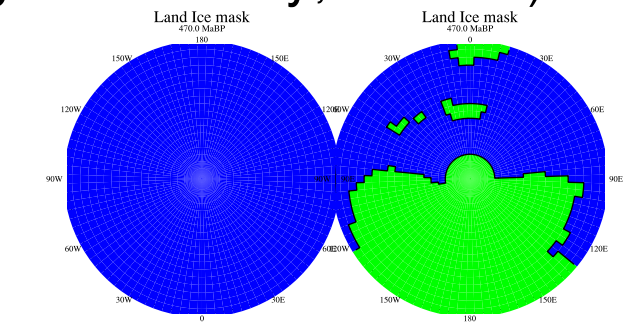
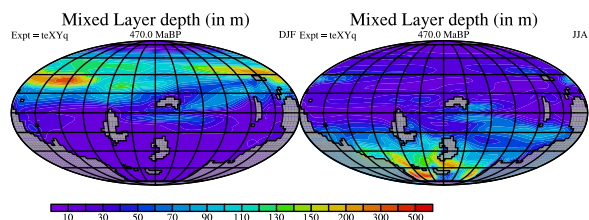
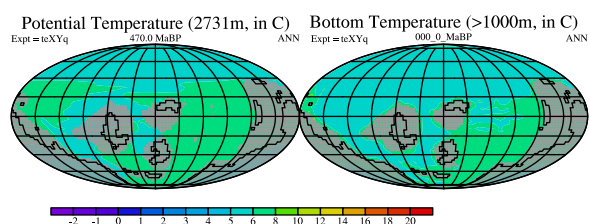
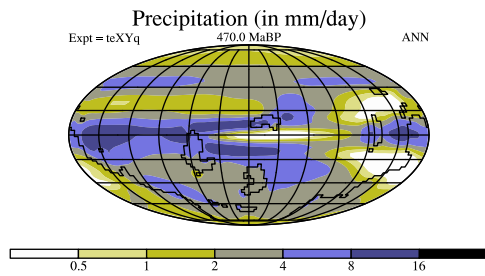
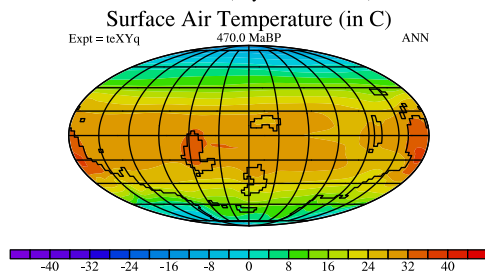
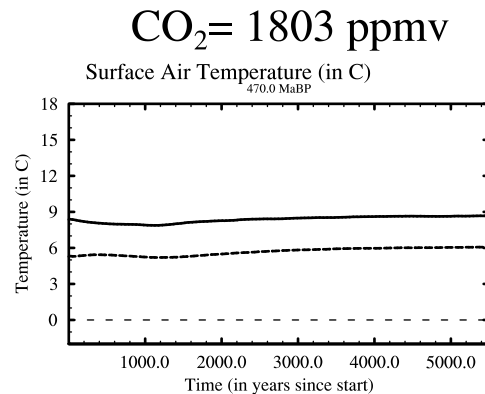
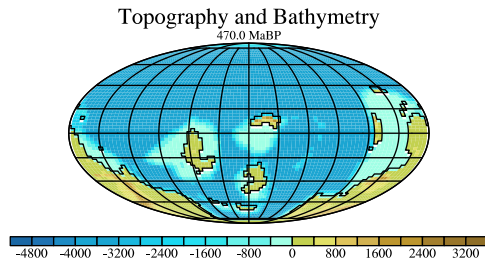


Mixed Layer depth (in m) Mixed Layer depth (in m)  
Expt = teXPp 465.0 MaBP DJF Expt = teXPp 465.0 MaBP JJA

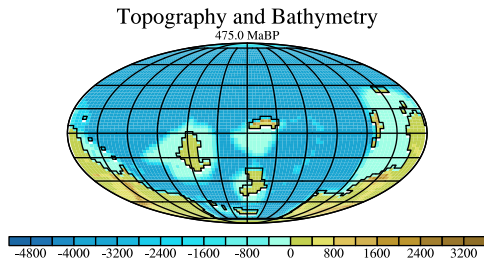




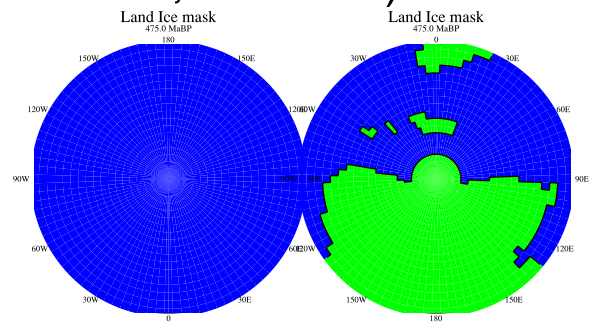
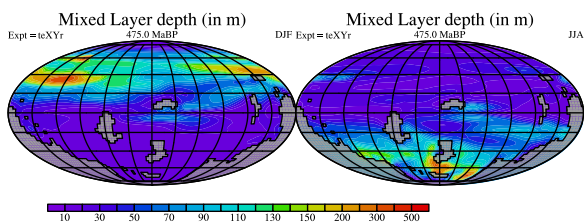
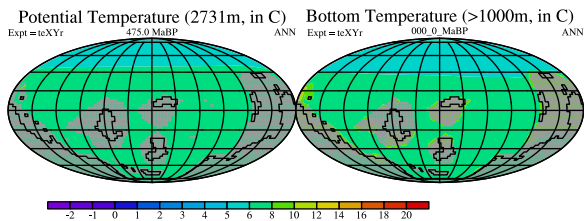
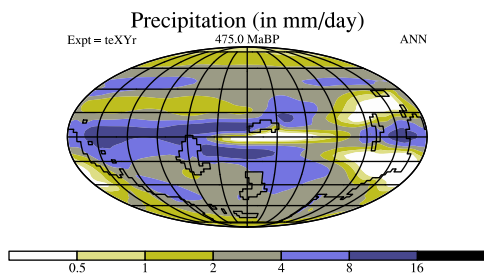
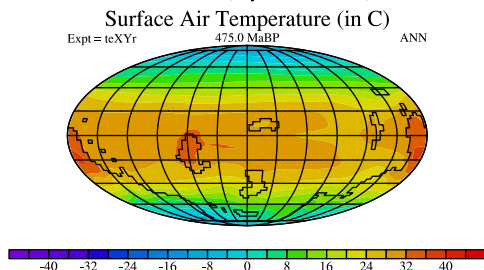
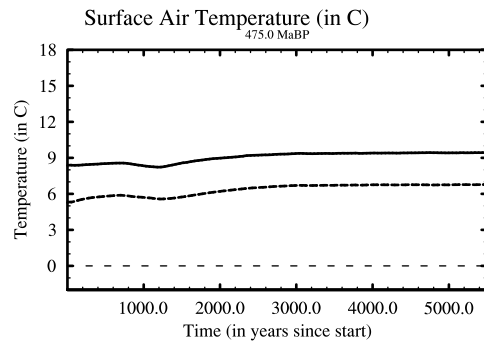
# Early Ordovician (Floian/Dapingian boundary, 470 Ma)



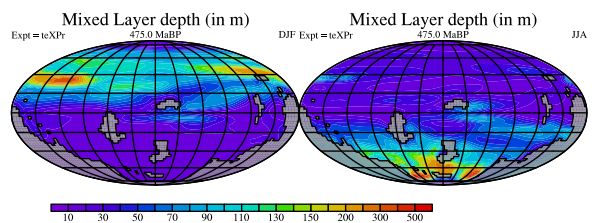
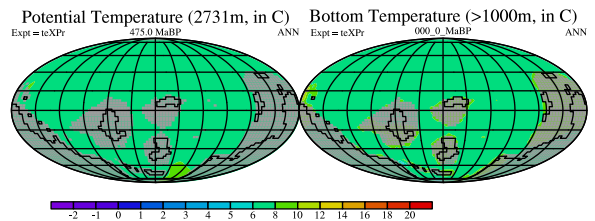
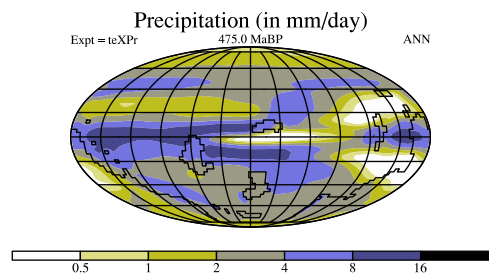
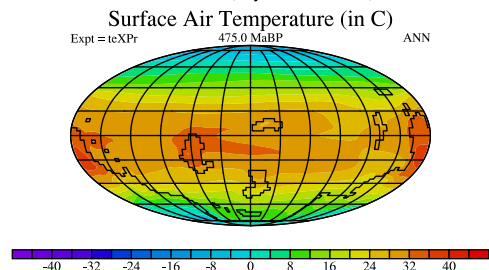
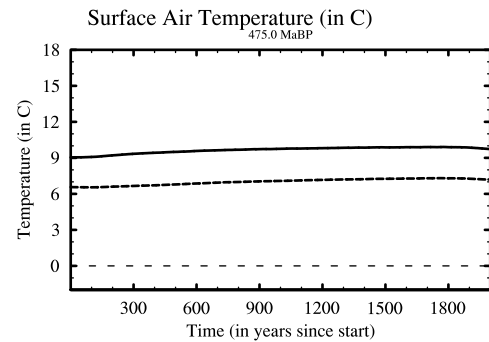
# Early Ordovician (late Early Floian, 475 Ma)



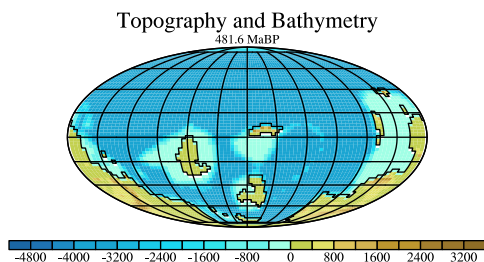
$\text{CO}_2 = 1836 \text{ ppmv}$



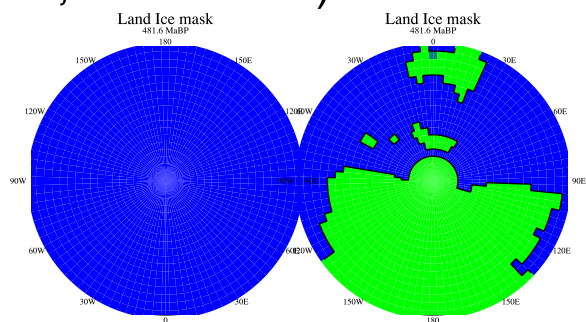
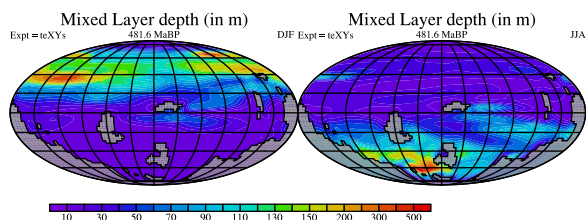
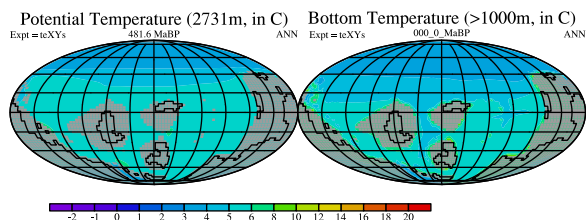
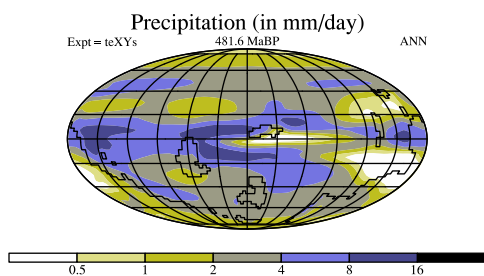
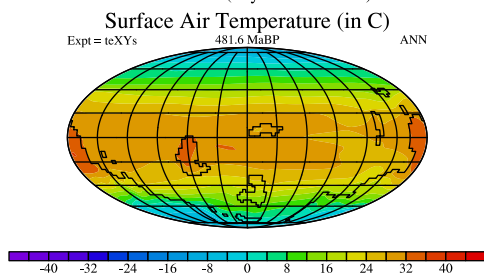
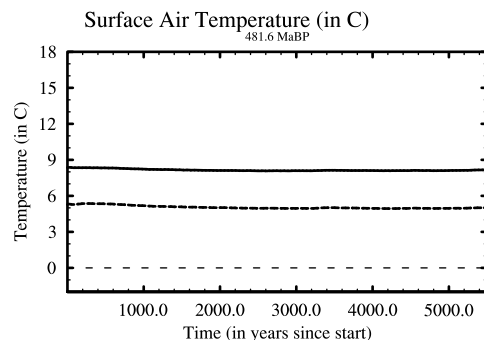
$\text{CO}_2 = 2308 \text{ ppmv}$



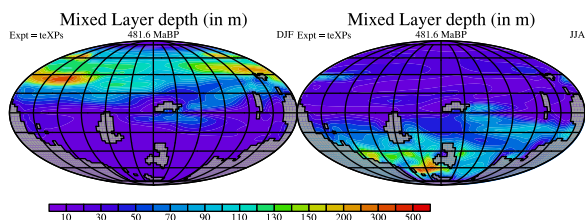
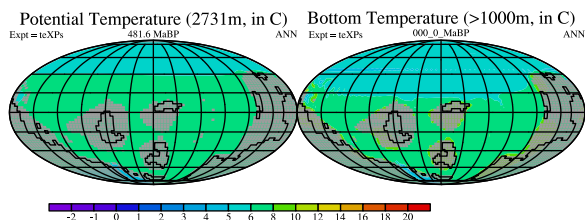
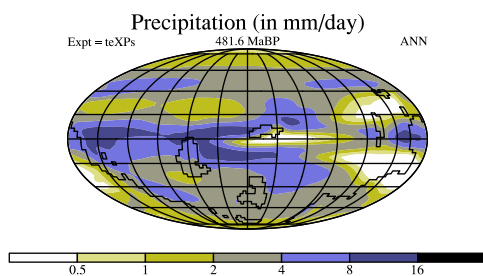
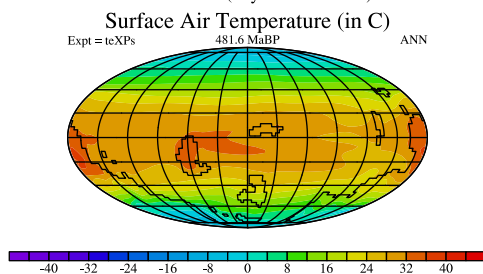
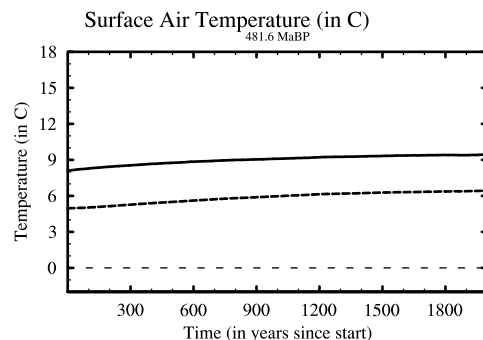
# Early Ordovician (Tremadoc, 481.6 Ma)



$\text{CO}_2 = 1879 \text{ ppmv}$

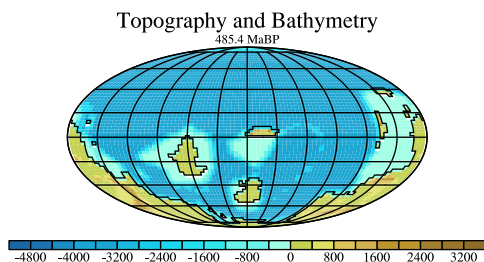


$\text{CO}_2 = 2438 \text{ ppmv}$

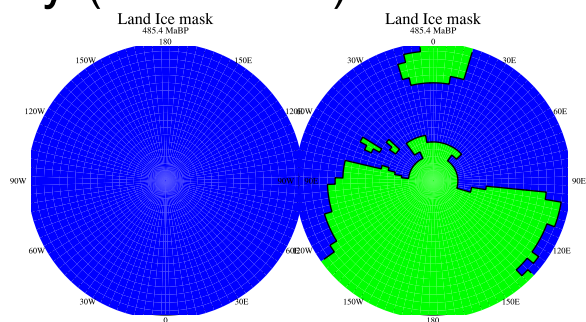
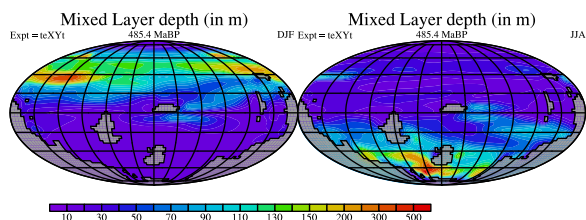
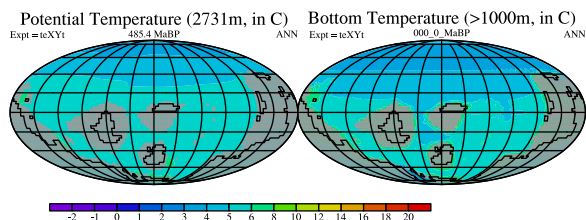
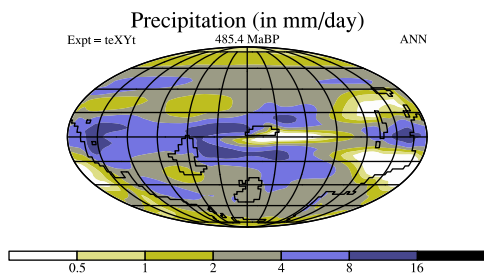
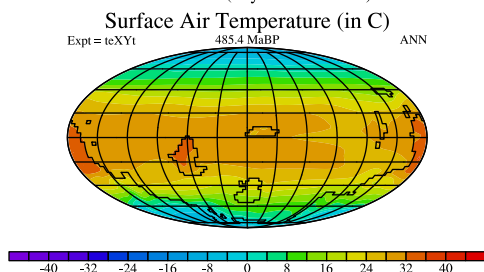
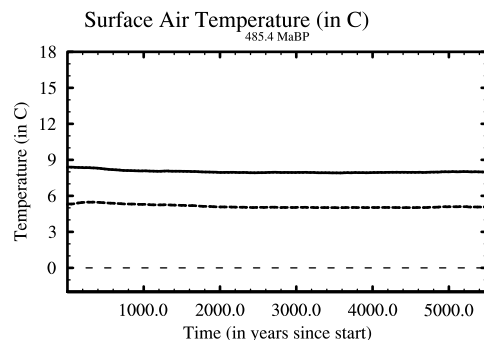




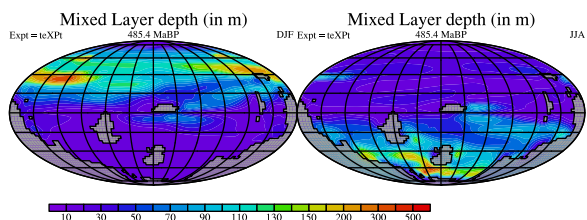
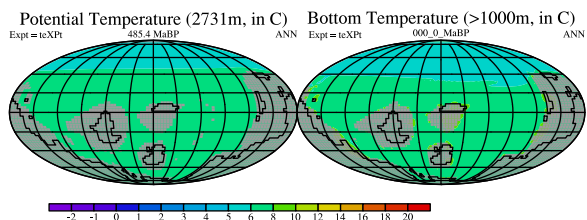
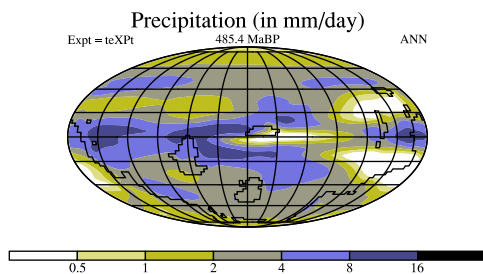
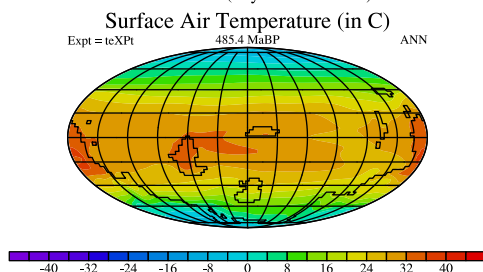
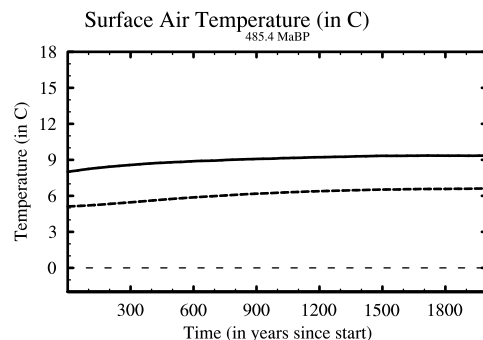
# Cambro-Ordovician Boundary (485.4 Ma)



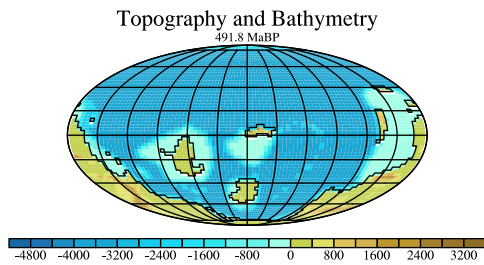
CO<sub>2</sub> = 1904 ppmv



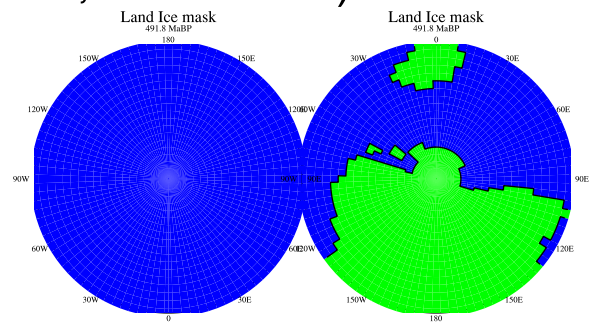
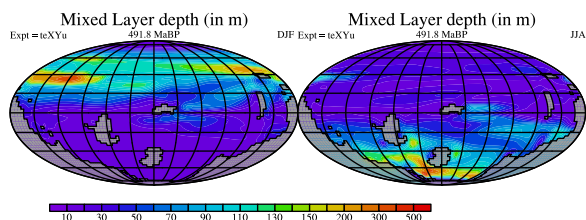
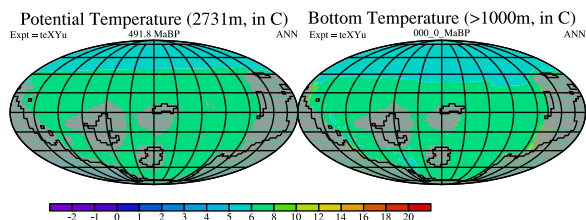
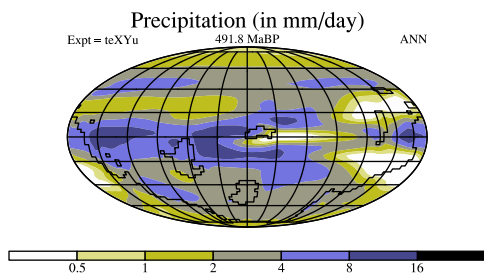
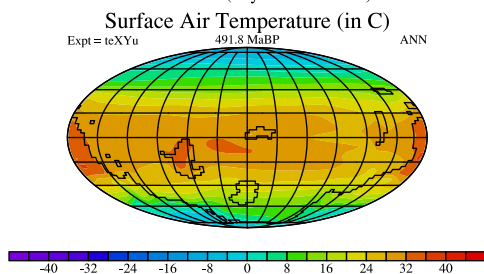
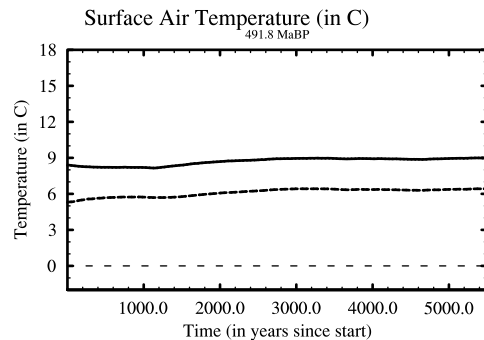
CO<sub>2</sub> = 2513 ppmv



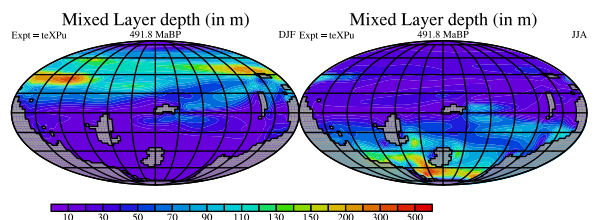
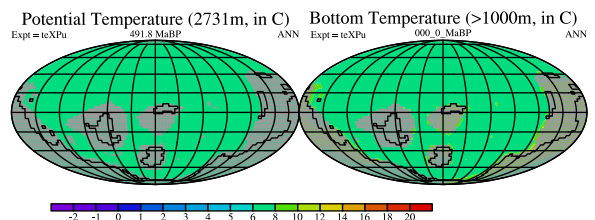
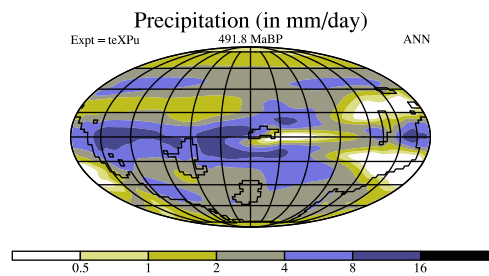
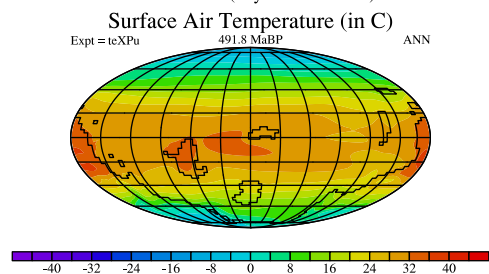
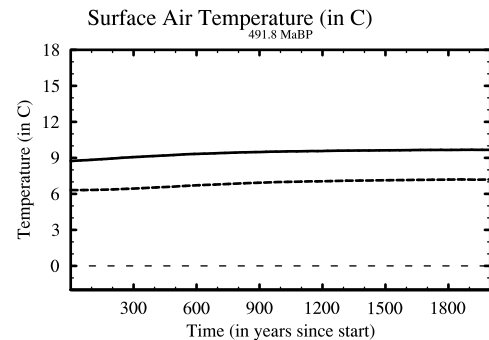
# Late Cambrian (Jiangshanian, 491.8 Ma)



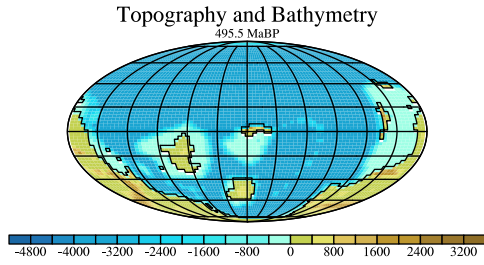
CO<sub>2</sub> = 1946 ppmv



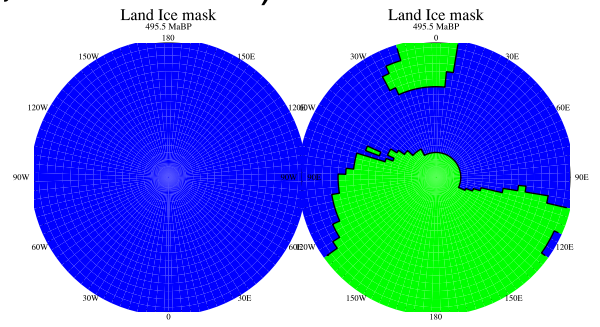
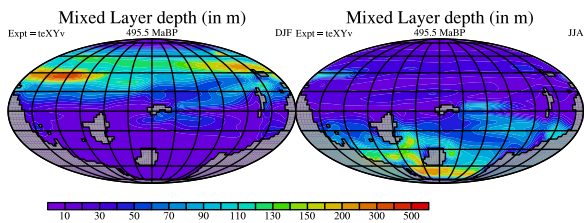
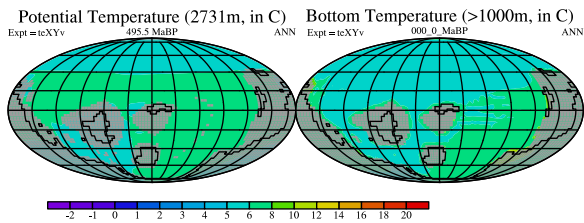
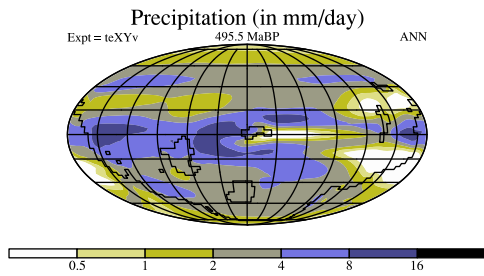
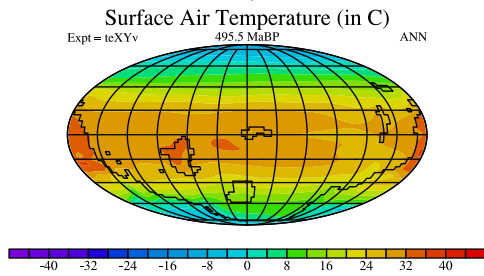
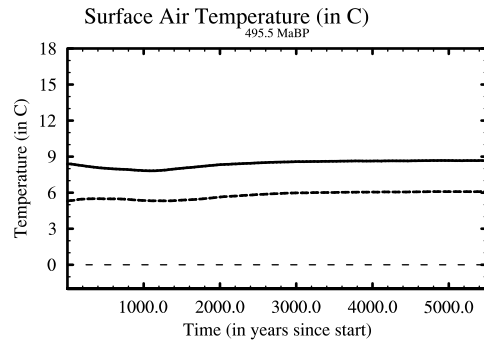
CO<sub>2</sub> = 2639 ppmv



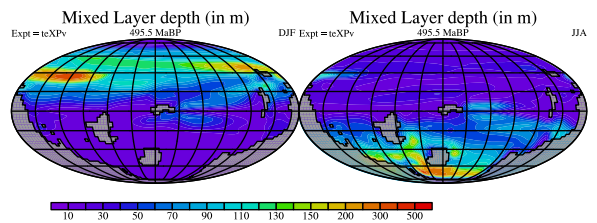
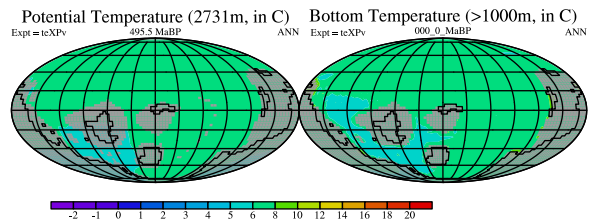
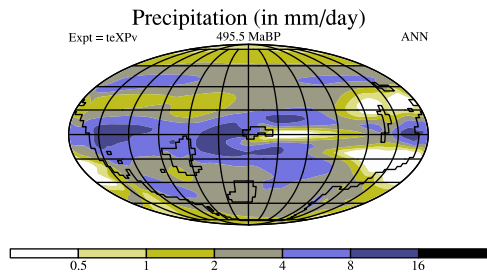
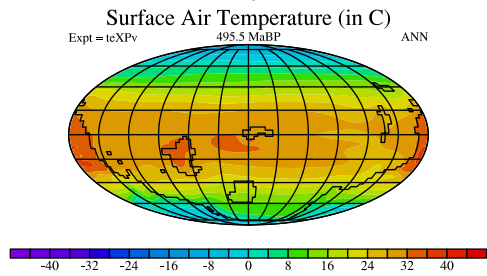
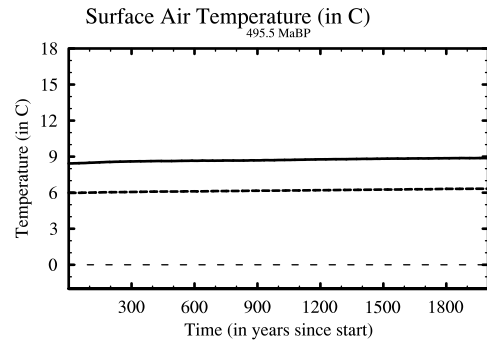
# Late Cambrian (Pabian, 495.5 Ma)



CO<sub>2</sub> = 1970 ppmv

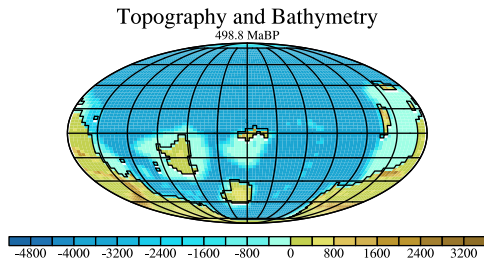


CO<sub>2</sub> = 2711 ppmv

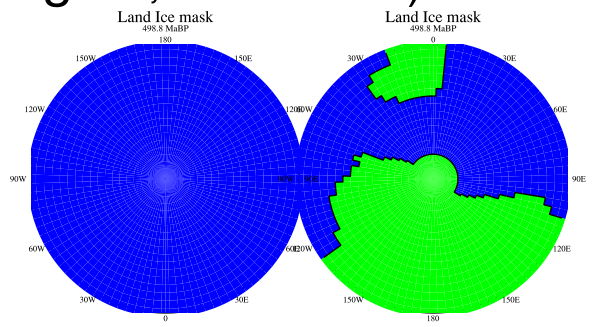
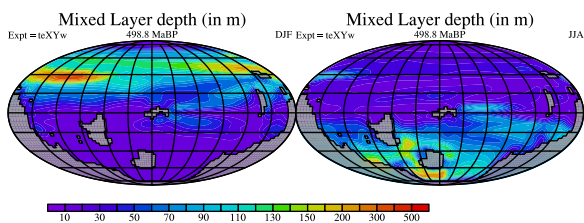
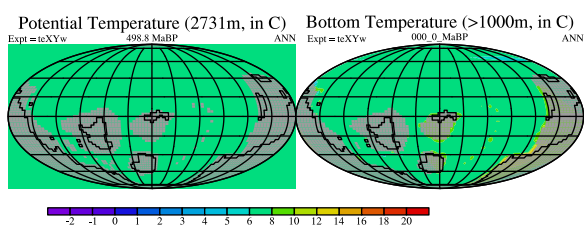
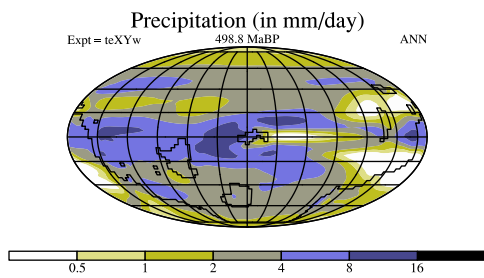
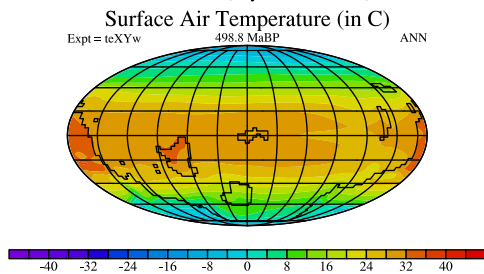
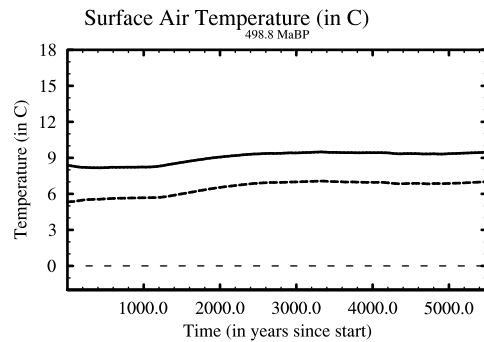




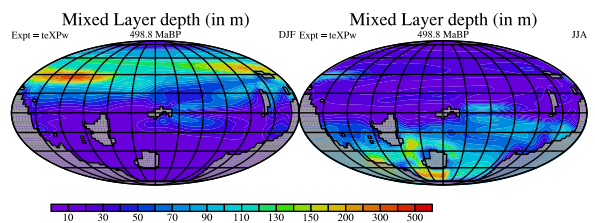
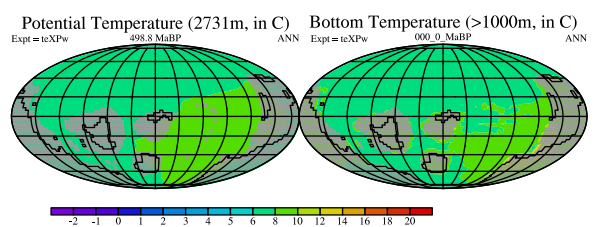
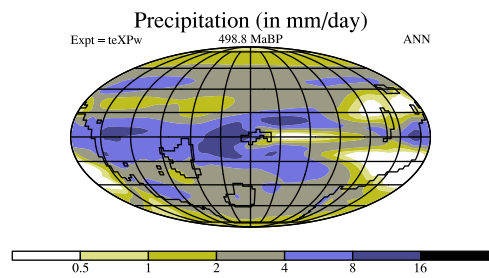
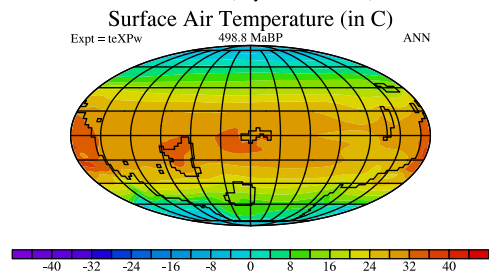
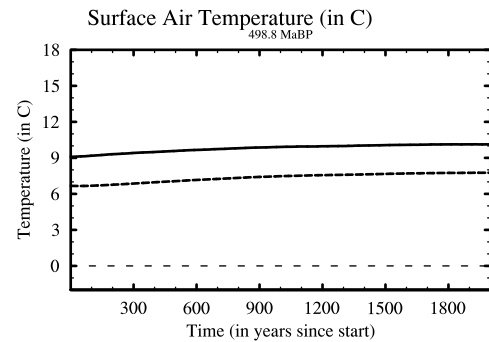
# late Middle Cambrian (Guzhangian, 498.8 Ma)



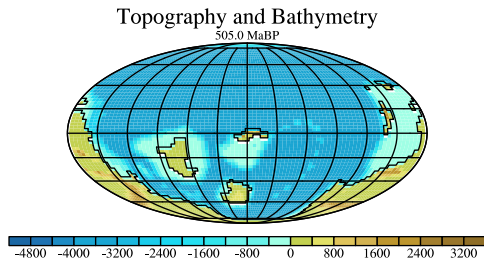
CO<sub>2</sub> = 1992 ppmv



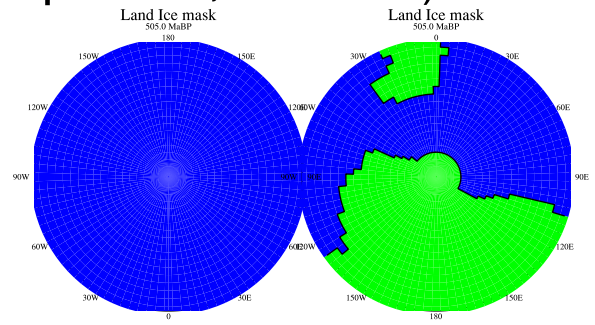
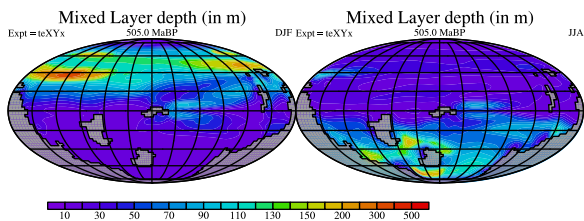
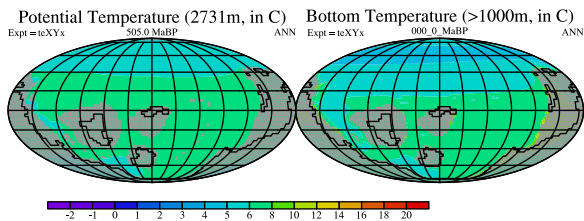
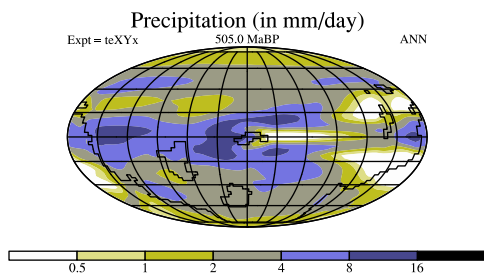
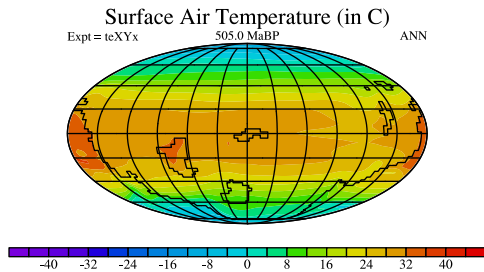
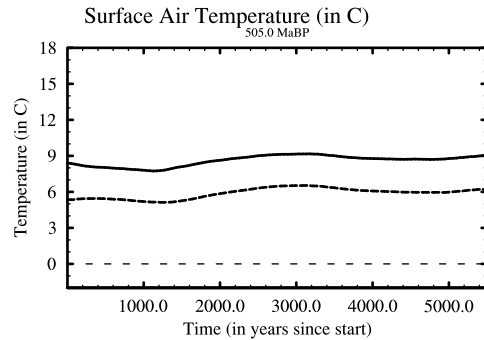
CO<sub>2</sub> = 2776 ppmv



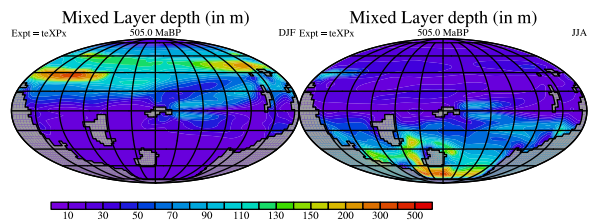
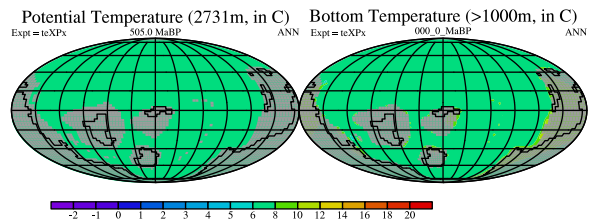
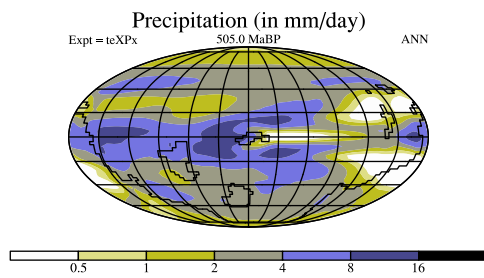
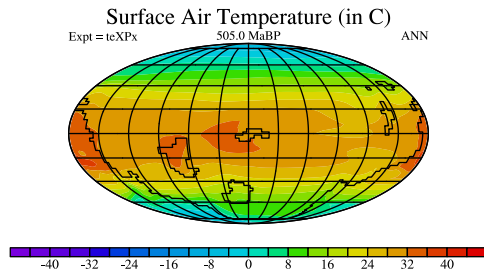
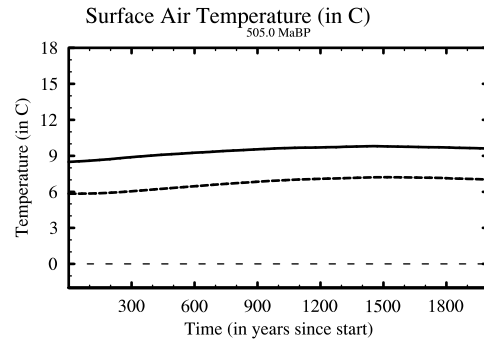
# late Middle Cambrian (early Epoch 3, 505 Ma)



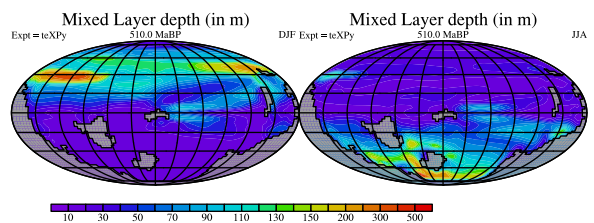
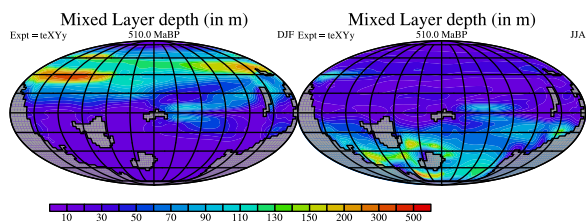
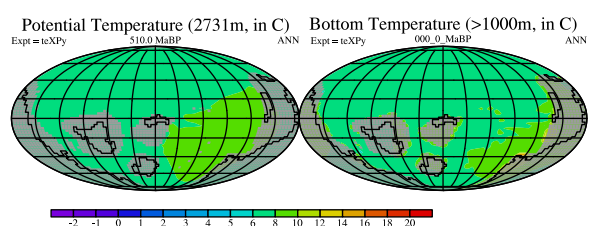
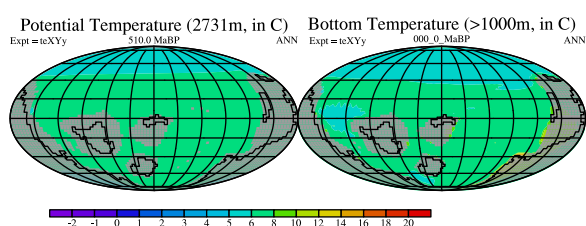
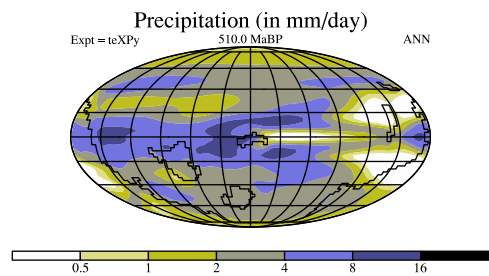
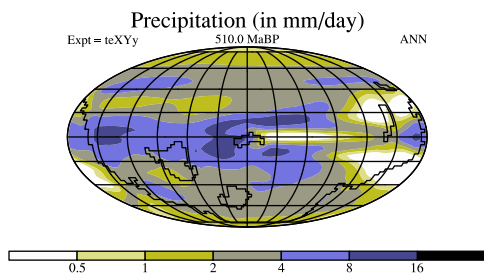
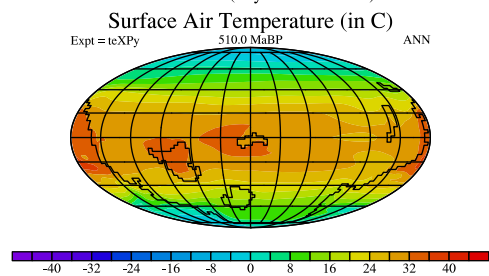
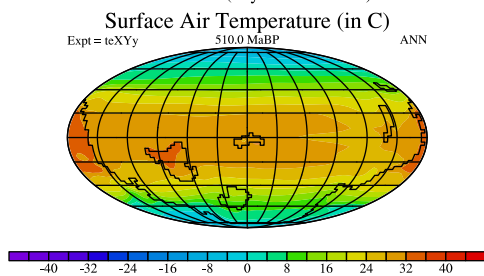
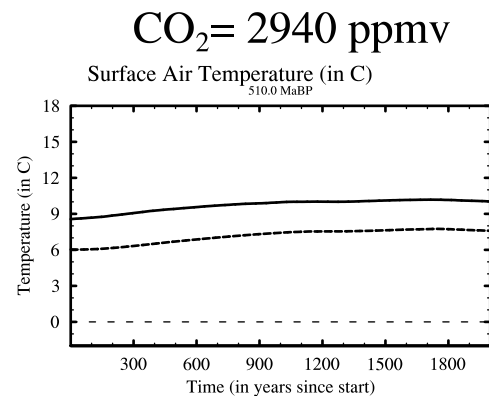
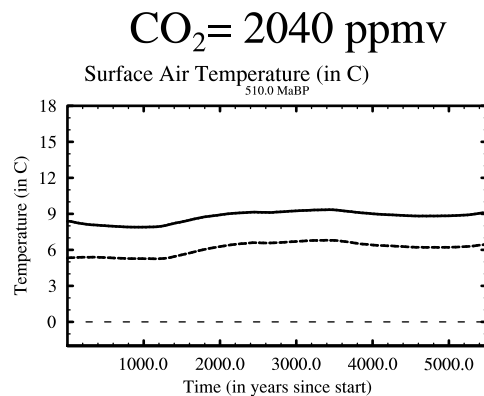
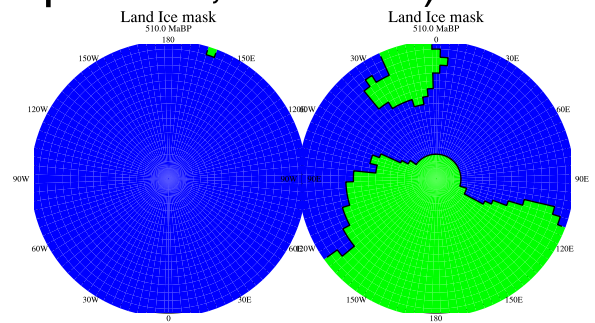
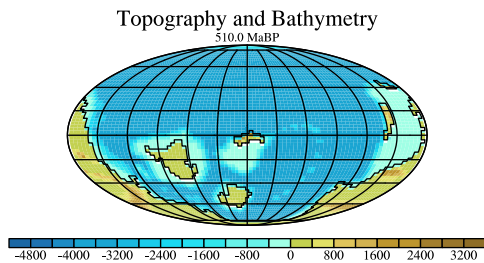
CO<sub>2</sub> = 2020 ppmv



CO<sub>2</sub> = 2870 ppmv

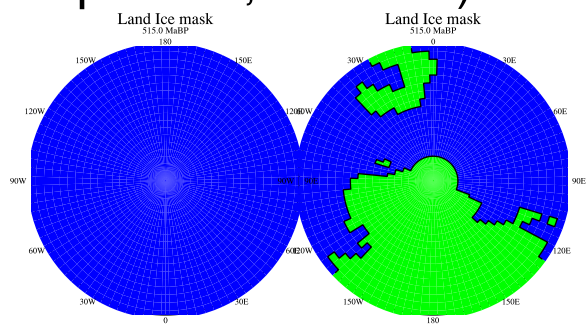
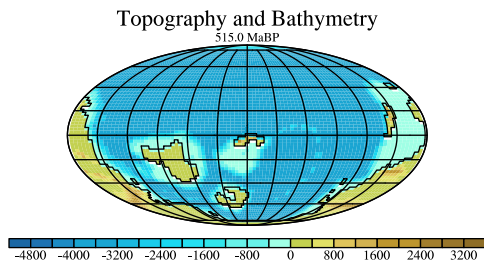


# early Middle Cambrian (late Epoch 2, 510 Ma)

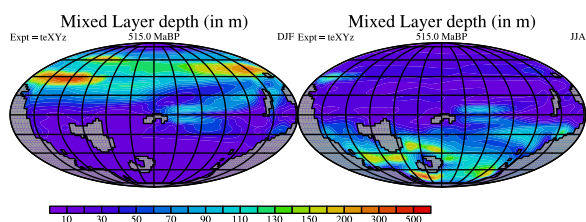
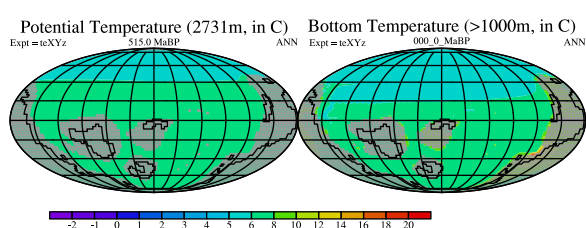
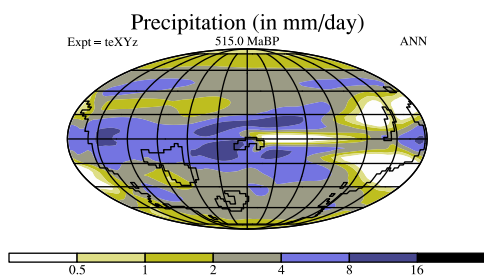
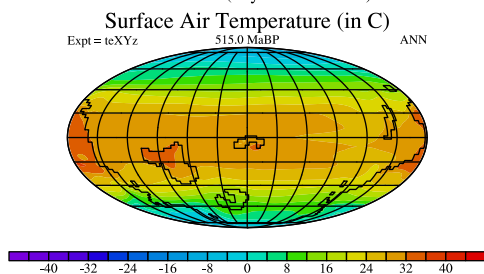
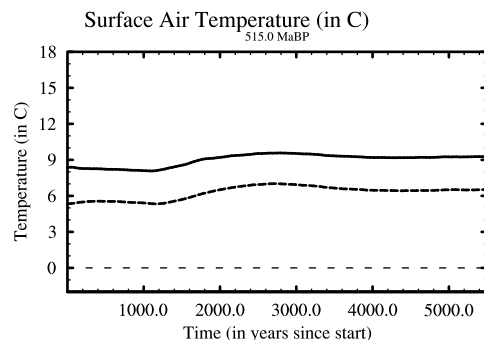




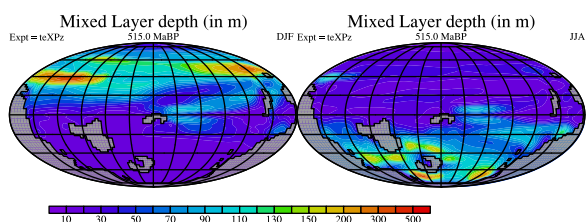
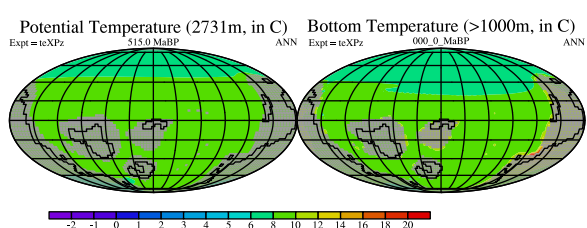
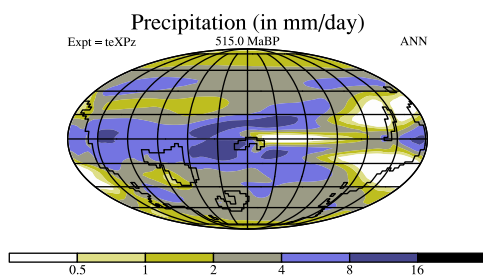
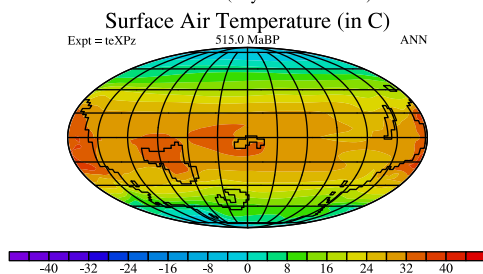
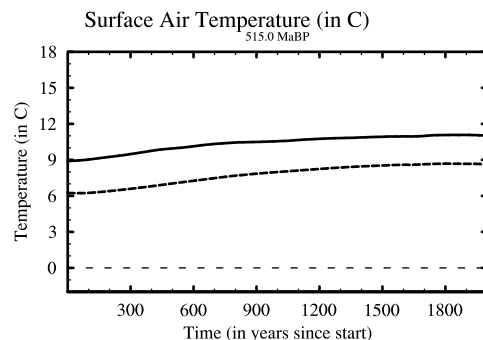
# early Middle Cambrian (middle Epoch 2, 515 Ma)



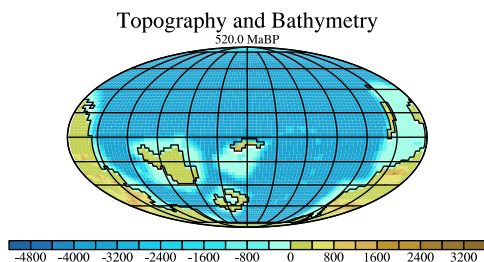
$\text{CO}_2 = 2060 \text{ ppmv}$



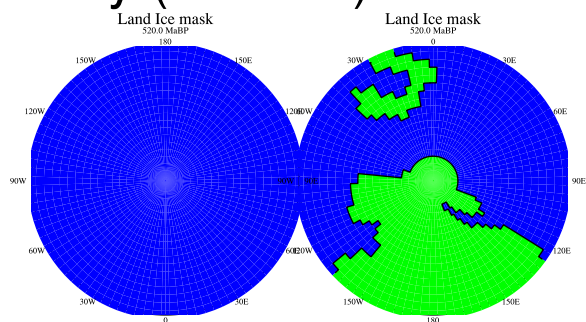
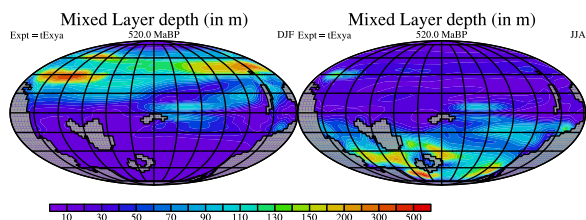
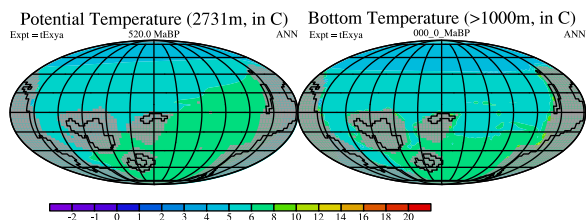
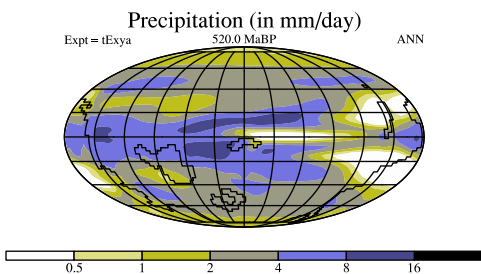
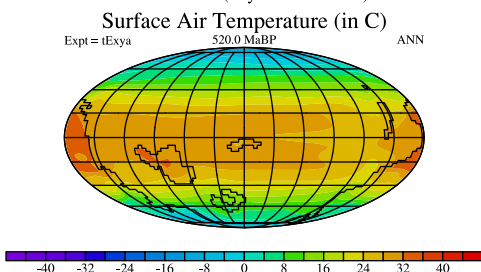
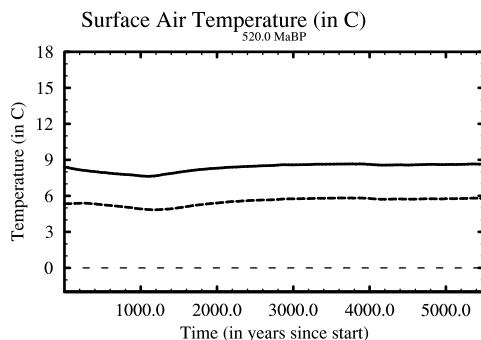
$\text{CO}_2 = 3010 \text{ ppmv}$



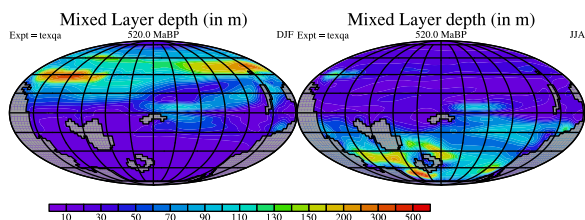
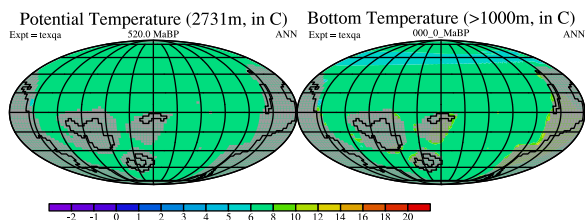
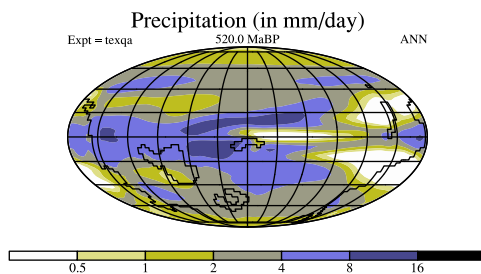
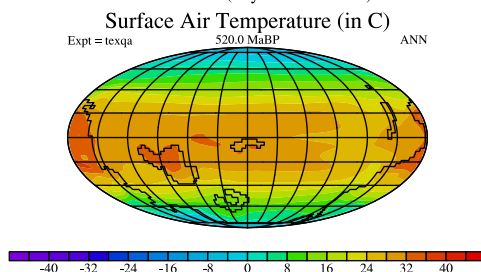
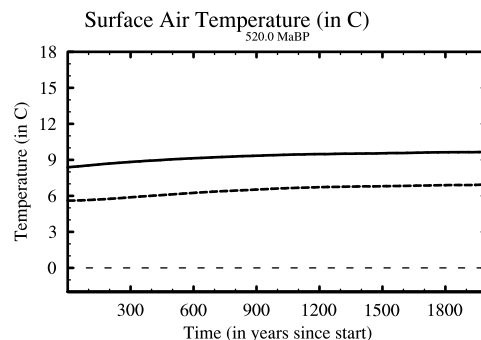
# Early/Middle Cambrian boundary (520 Ma)



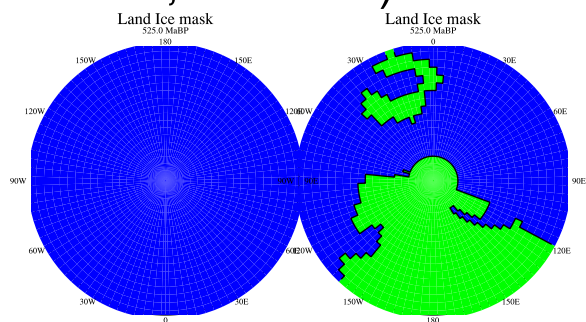
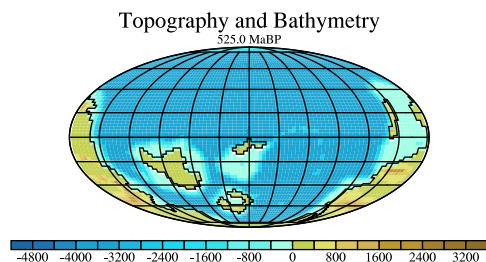
CO<sub>2</sub> = 2080 ppmv



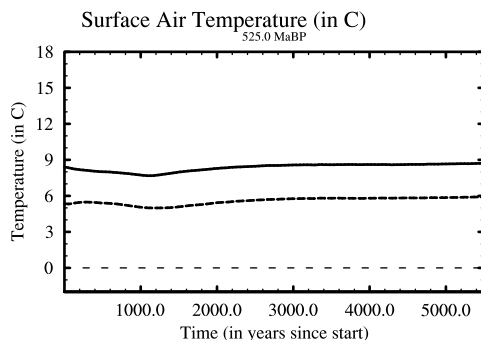
CO<sub>2</sub> = 3080 ppmv



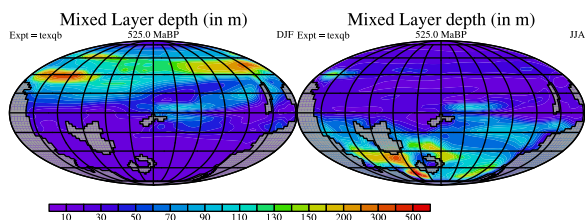
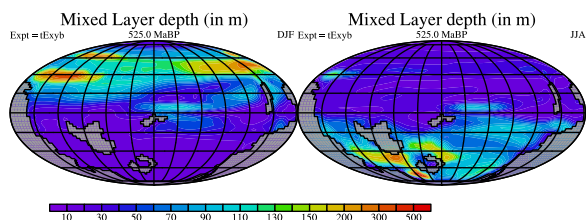
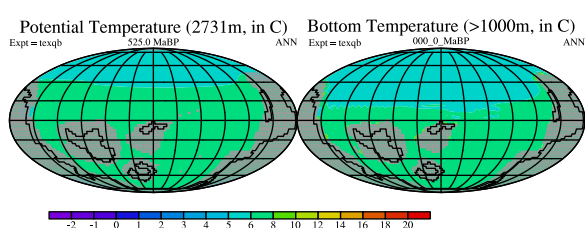
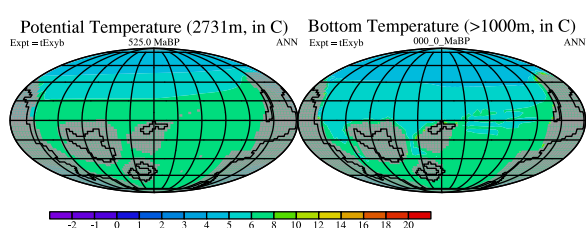
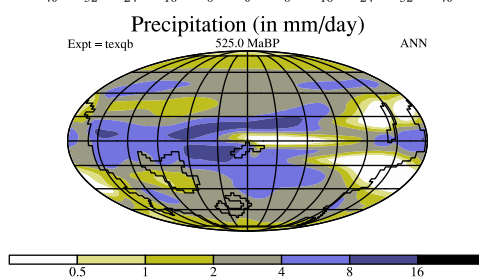
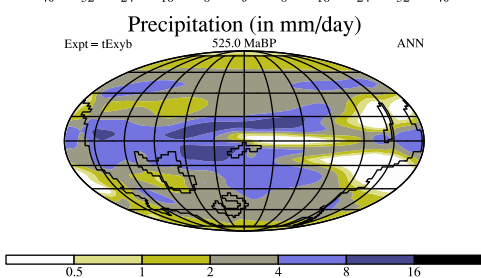
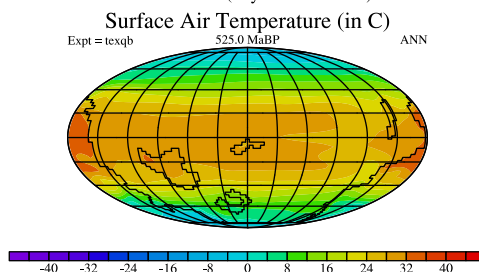
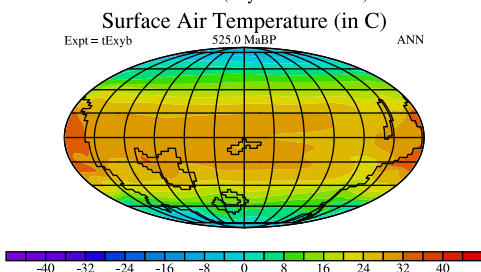
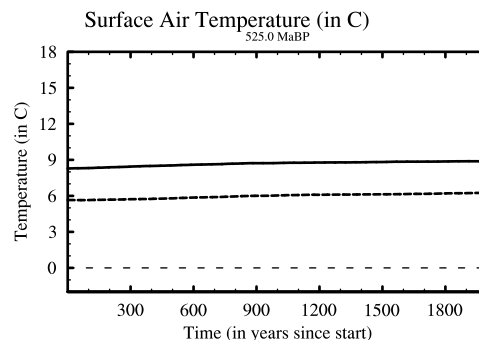
# Early Cambrian (late Terreneuvian, 525 Ma)



$\text{CO}_2 = 2100 \text{ ppmv}$

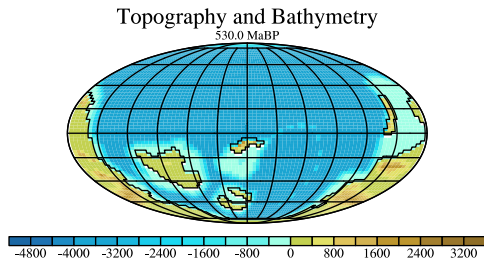


$\text{CO}_2 = 3150 \text{ ppmv}$

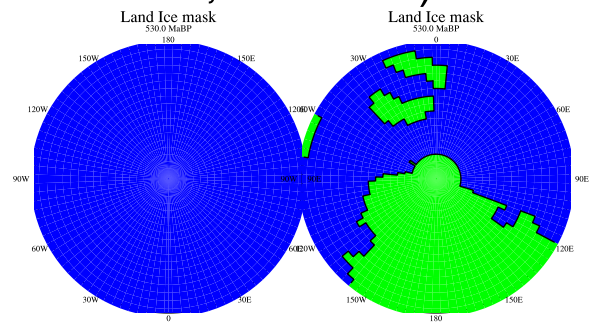
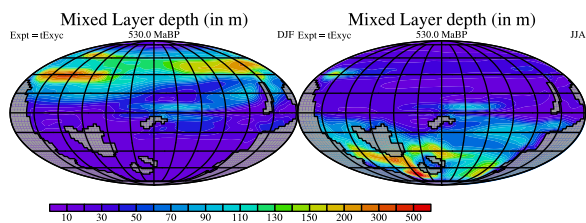
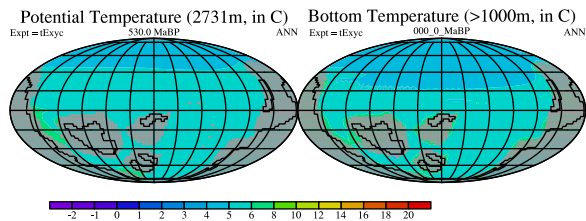
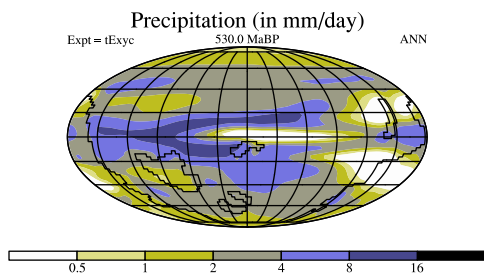
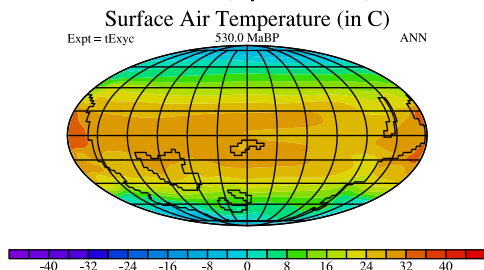
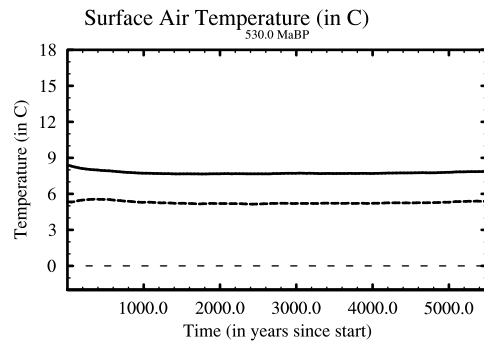




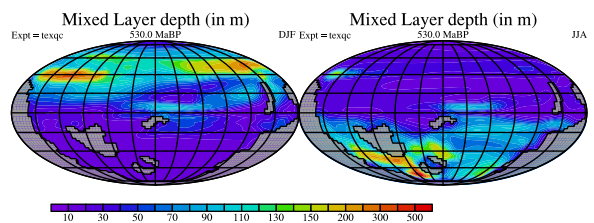
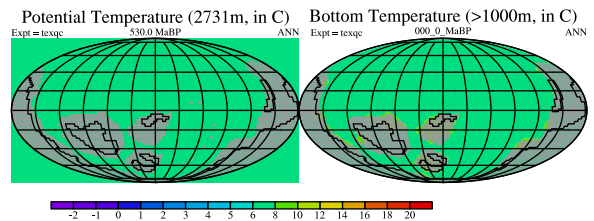
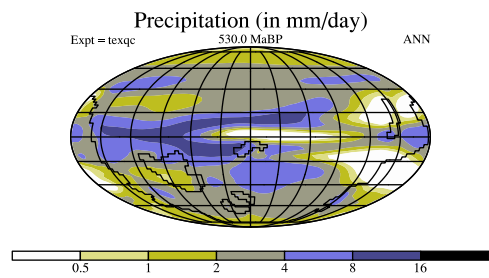
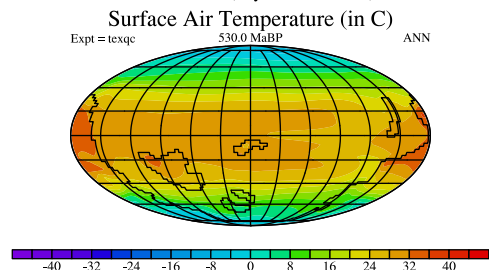
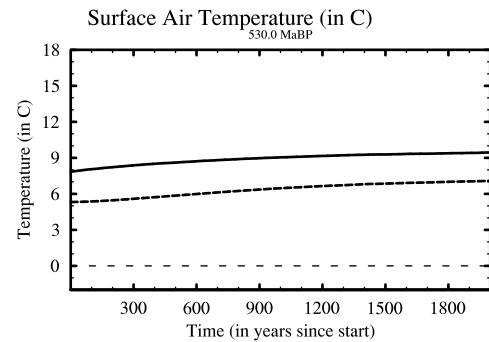
# Early Cambrian (middle Terreneuvian, 530 Ma)



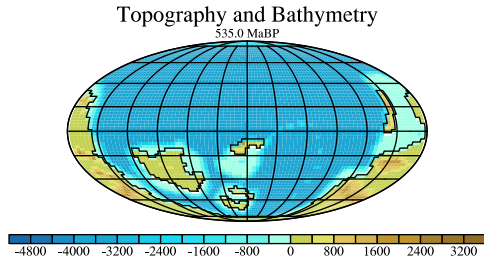
$\text{CO}_2 = 2120 \text{ ppmv}$



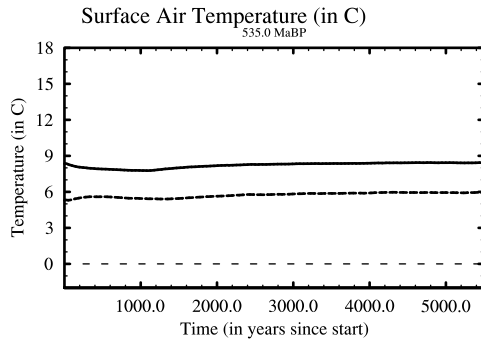
$\text{CO}_2 = 3220 \text{ ppmv}$



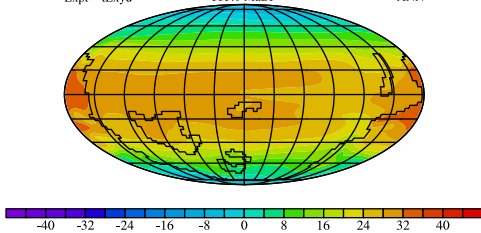
# Early Cambrian (early Terreneuvian, 535 Ma)



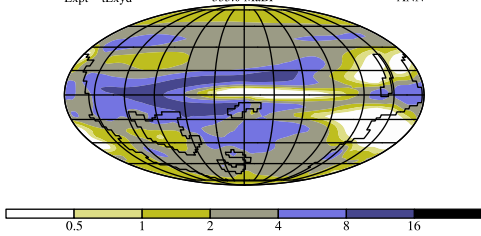
$\text{CO}_2 = 2140 \text{ ppmv}$



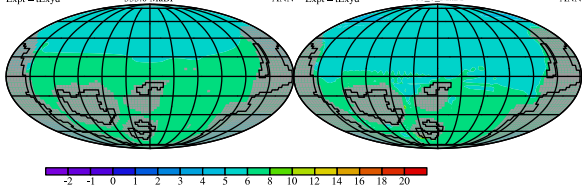
Surface Air Temperature (in C)  
Expt = tExyd 535.0 MaBP ANN



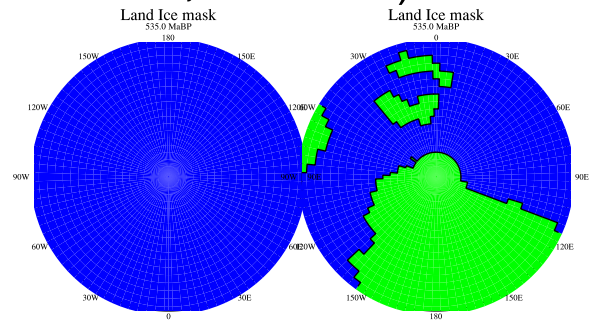
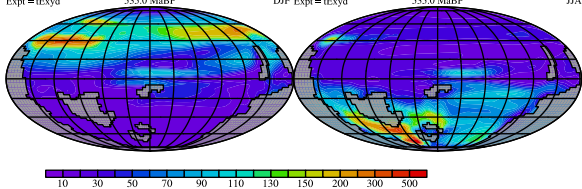
Precipitation (in mm/day)  
Expt = tExyd 535.0 MaBP ANN



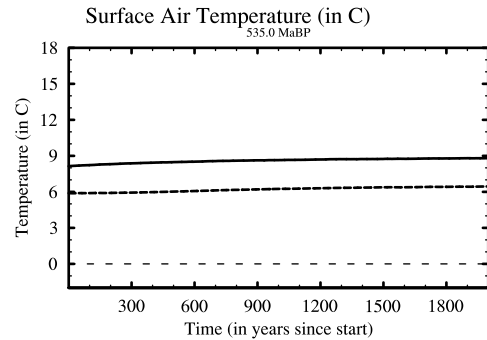
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = tExyd 535.0 MaBP ANN Expt = tExyd 000.0 MaBP ANN



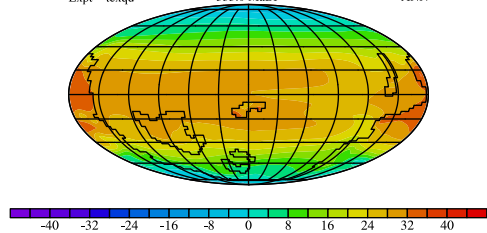
Mixed Layer depth (in m) DJF Expt = tExyd 535.0 MaBP JJA



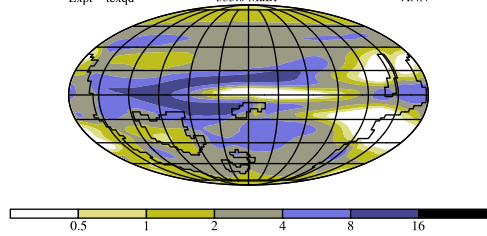
$\text{CO}_2 = 3290 \text{ ppmv}$



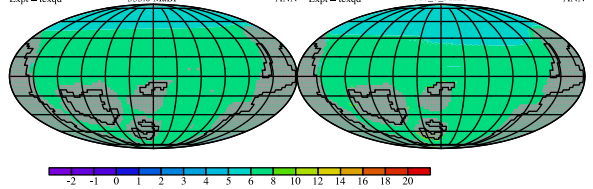
Surface Air Temperature (in C)  
Expt = texqd 535.0 MaBP ANN



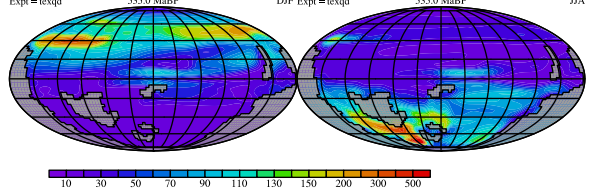
Precipitation (in mm/day)  
Expt = texqd 535.0 MaBP ANN



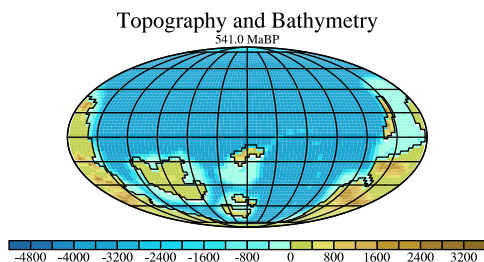
Potential Temperature (2731m, in C) Bottom Temperature (>1000m, in C)  
Expt = texqd 535.0 MaBP ANN Expt = texqd 000.0 MaBP ANN



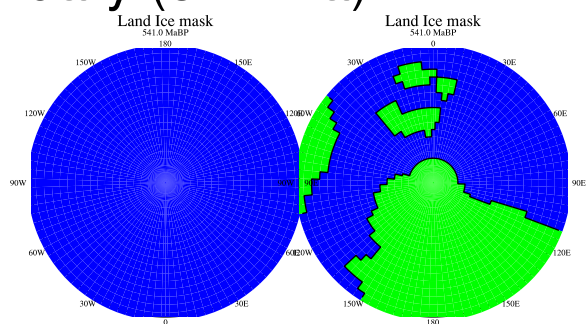
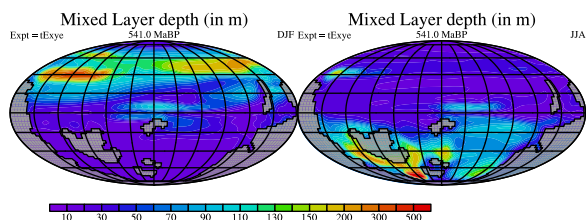
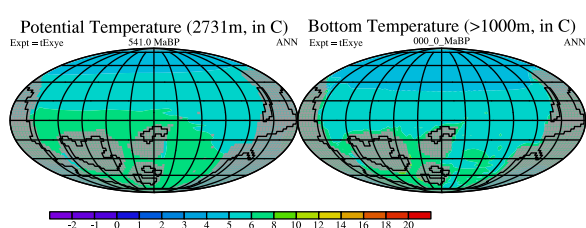
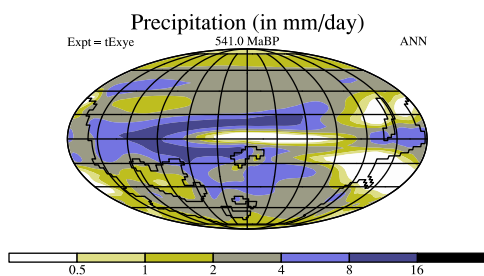
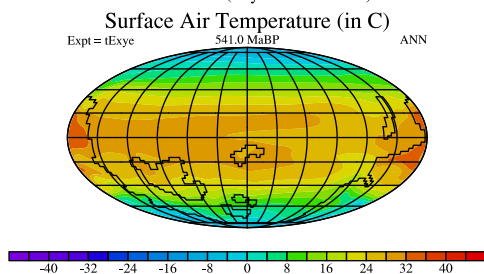
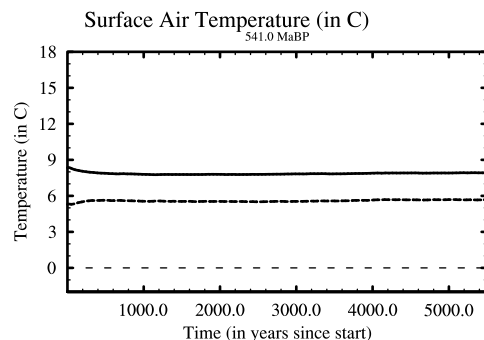
Mixed Layer depth (in m) DJF Expt = texqd 535.0 MaBP JJA



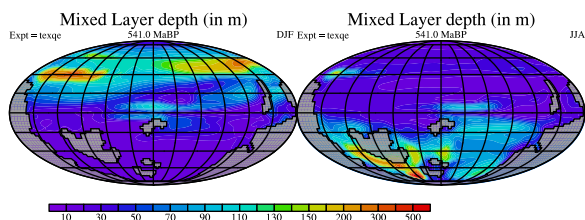
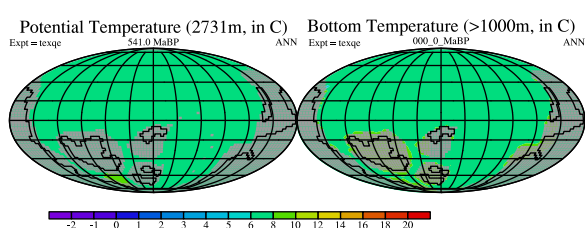
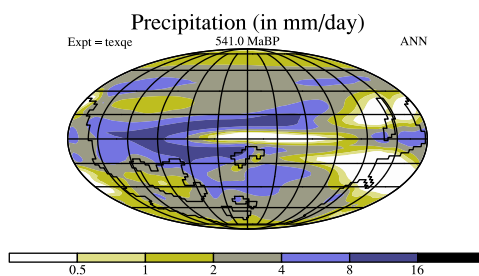
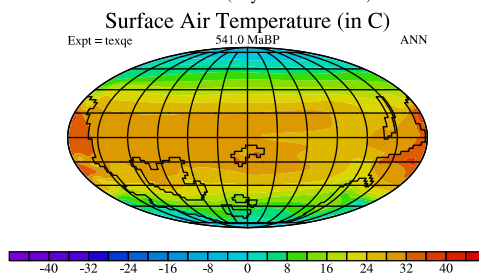
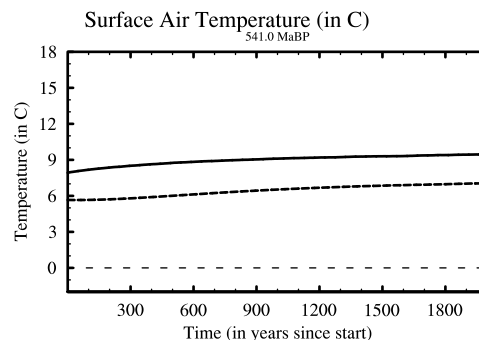
# Cambrian/Precambrian boundary (541 Ma)



$\text{CO}_2 = 2164 \text{ ppmv}$



$\text{CO}_2 = 3374 \text{ ppmv}$





# Ocean Heat Transport

The following pages shows the latitudinal heat transport for the Foster CO<sub>2</sub> simulations. The first page shows the present day heat transport. Subsequent pages show all 108 other simulations as a change, relative to the present day transport. The date of the simulations is shown in the middle of the title.

The green line shows the total heat transport, the blue line shows the atmospheric transport, and the black line shows the ocean transport.

Access to many more climate variables is available via the website:

[https://www.paleo.bristol.ac.uk/ummodel/scripts/papers/Valdes et al 2021.html](https://www.paleo.bristol.ac.uk/ummodel/scripts/papers/Valdes_et_al_2021.html)

# Latitudinal Heat Transport

(Zonal mean)

000\_0\_MaBP

Expt = texpa1

ANN

