



Supplement of

Early-Holocene warming in Beringia and its mediation by sea-level and vegetation changes

P. J. Bartlein et al.

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Supplement

This supplement contains figures displaying 10-year long-term means or long-term mean differences (anomalies) from the various simulations. Each simulation is described by two pages of figures (A & B): Page A displays net radiation (Wm^{-2}), 2 m air temperature ($^{\circ}\text{C}$), 500 mb heights (gpm) and winds (m s^{-1}), sea-level pressure (hPa) and surface winds (m s^{-1}), total cloud (fraction), precipitation rate (mm d^{-1}), and soil moisture (%). Page B displays surface energy-balance components including net shortwave radiation, net longwave radiation, net radiation, sensible heat flux, latent heat flux, and the heat flux into the substrate (or change in heat storage), all in Wm^{-2} , and 2 m air temperature ($^{\circ}\text{C}$). (Net radiation and 2 m air temperature appear on both figures for convenience.) The sign convention for the energy-balance components is described below.

Figures:

- 1) Present-Day Simulation (with modern continental outlines)
- 2) Present-Day Simulation (with 11 ka continental outlines)
- 3) Present-Day Simulation (with modern continental outlines) minus Present-Day Simulation (with 11 ka continental outlines)
- 4) 11 ka Control Simulation
- 5) 11 ka Control Simulation minus Present-Day Simulation
- 6) 11 ka Control Simulation minus Present-Day Simulation (with 11 ka continental outlines)
- 7) 11 ka Sea-Level Simulation
- 8) 11 ka Sea-Level Simulation minus 11 ka Control Simulation
- 9) 11 ka Vegetation Simulation
- 10) 11 ka Vegetation Simulation minus 11 ka Control Simulation
- 11) 11 ka Lakes Simulation
- 12) 11 ka Lakes Simulation minus 11 ka Control Simulation
- 13) 11 ka All Simulation
- 14) 11 ka All Simulation minus 11 ka Control Simulation
- 15) 11 ka All Simulation minus Present-Day Simulation (with modern continental outlines)
- 16) 6 ka Simulation
- 17) 6 ka Simulation minus Present-Day Simulation (with modern continental outlines)
- 18) 6 ka Simulation minus 11 ka All Simulation

Surface energy-balance components

The surface energy balance is given by

$$K\downarrow - K\uparrow + L\downarrow - L\uparrow - Q_H - Q_E - Q_G = 0 \text{ , or}$$

$$Q_{net} = K\downarrow - K\uparrow + L\downarrow - L\uparrow, \text{ or}$$

$$= K_{net} + L_{net}, \text{ and}$$

$$= Q_H + Q_E + Q_G, \text{ or}$$

$$= Q_H + Q_E + \Delta Q_S$$

where

$K\downarrow$ = incoming shortwave radiation (all terms in Wm^{-2}),

$K\uparrow$ = outgoing shortwave radiation,

K_{net} = $K\downarrow - K\uparrow$, net shortwave radiation, or $(1-\alpha)K\downarrow$ where α is the albedo of the surface,

$L\downarrow$ = incoming longwave radiation,

$L\uparrow$ = outgoing longwave radiation ($\sim T_{sfc}^4$ where T_{sfc} is the temperature of the surface),

L_{net} = $L\downarrow - L\uparrow$, or net longwave radiation,

Q_H = sensible heat flux,

Q_E = latent heat flux ($\sim E$ or $\sim ET$, where E is evaporation and ET is evapotranspiration), and

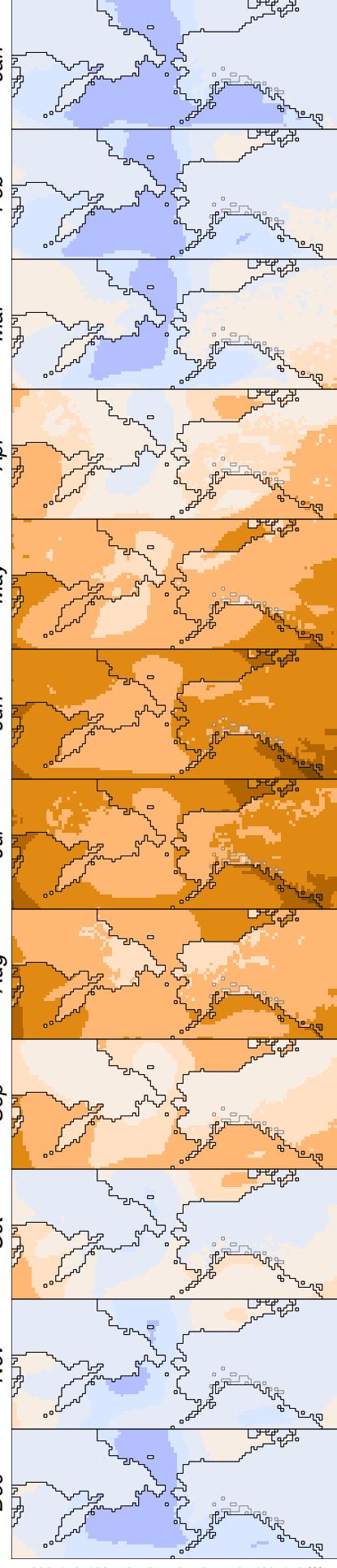
Q_G = ΔQ_S , heat flux into or out of the substrate (land or water) or change in heat storage

Sign conventions for and interpretation of surface energy-balance component

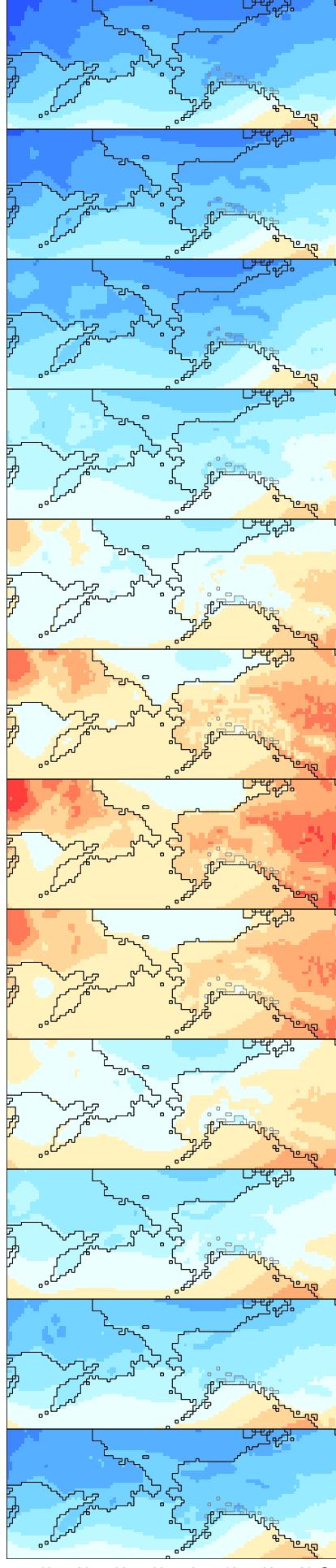
	Long-term mean	Long-term mean difference (anomalies)
Radiative components		
Net shortwave radiation, K_{net}	positive: toward surface (i.e., surface heating) negative: 0.0	positive: increased $K\downarrow$ or decreased albedo (e.g. sea-ice replaced by land) negative: decreased $K\downarrow$ or increased albedo (e.g. land replaced by sea-ice)
Net longwave radiation, L_{net}	positive: toward surface negative: from surface (i.e., surface cooling)	positive: increased $L\downarrow$ or decreased $L\uparrow$ negative: decreased $L\downarrow$ or increased $L\uparrow$
Non-radiative components		
Sensible heat flux, Q_H	positive: heat flow from surface to atmosphere negative: heat flow from atmosphere to surface	positive: increased heating of atmosphere by surface or decreased heating of surface by atmosphere negative: decreased heating of atmosphere by surface or increased heating of surface by atmosphere
Latent heat flux, Q_E	positive: heat flow (via E or ET) from surface to atmosphere negative: heat flow (via condensation) from atmosphere to surface	positive: increased E or ET (or decreased condensation) negative: decreased E or ET (or increased condensation)
Substrate heat flux, $Q_G = \Delta Q_S$	positive: heat flow from surface into substrate (land or water), i.e., into storage negative: heat flow from substrate to surface, i.e., from storage	positive: increased heat flow from surface to substrate (or increased flow into storage) negative: decreased heat flow from surface to substrate (or decreased flow into storage)

Present-Day Simulation

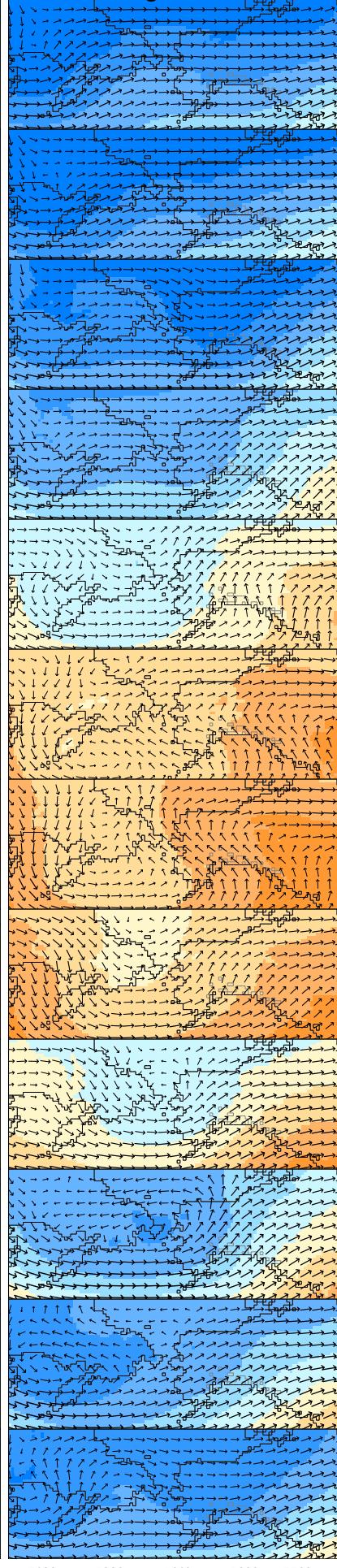
Net Radiation



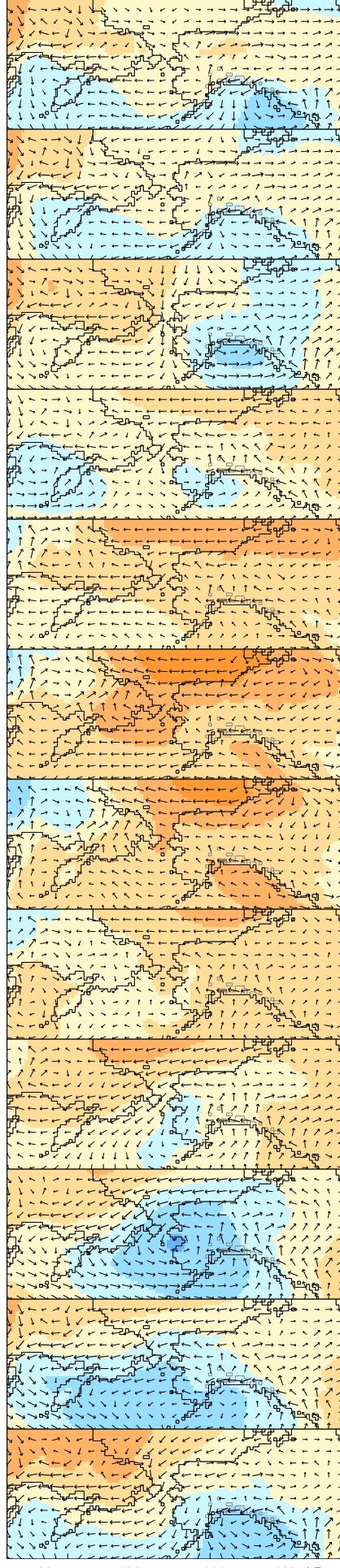
2-m Air Temperature



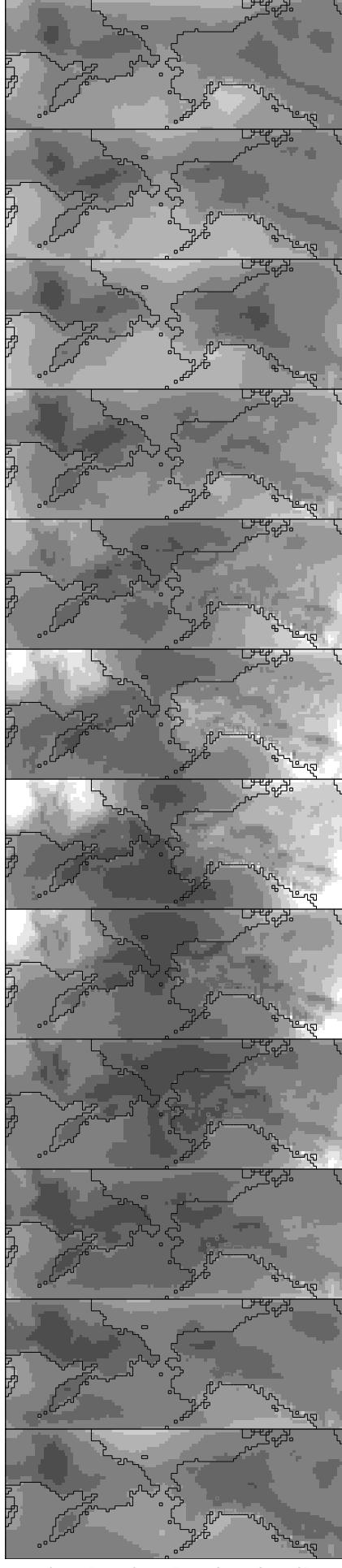
500hPa Heights & Winds



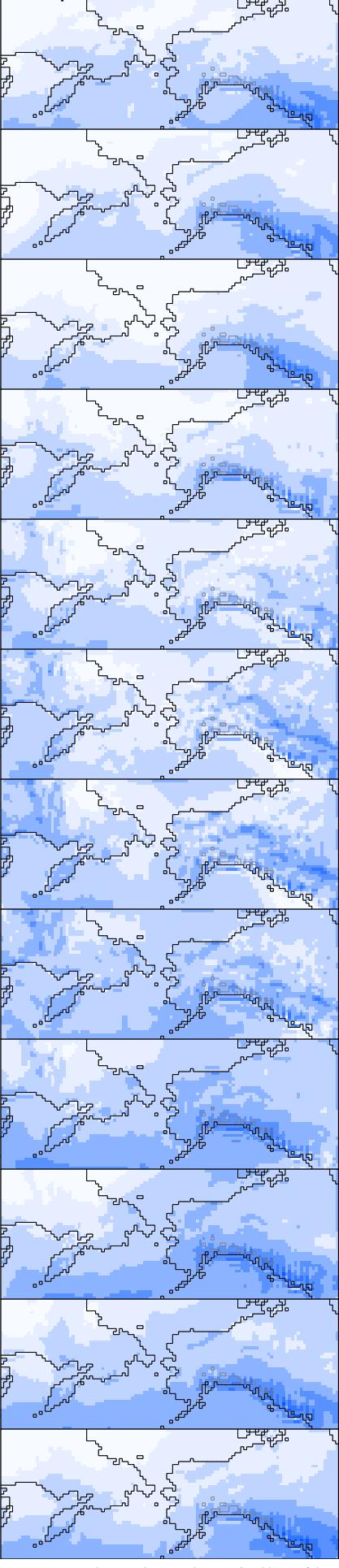
Sea-Level Pressure & Winds



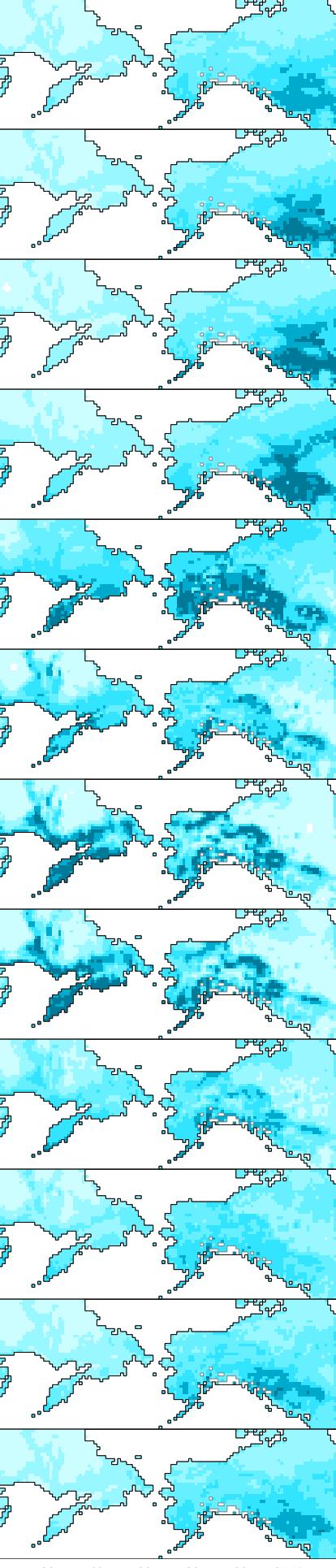
Total Cloud Fraction



Precipitation Rate



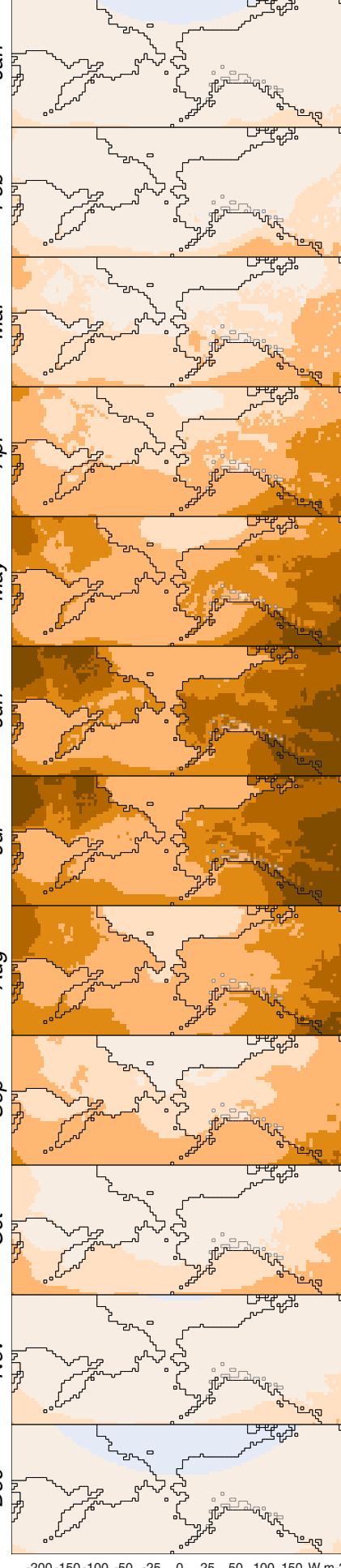
Long-Term Means



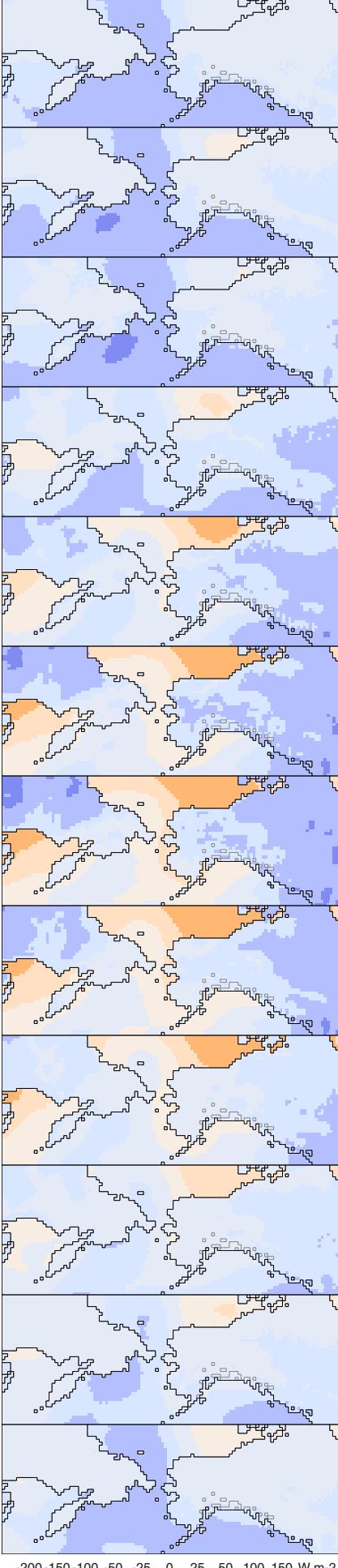
Suppl. Fig. 1A

Present-Day Simulation

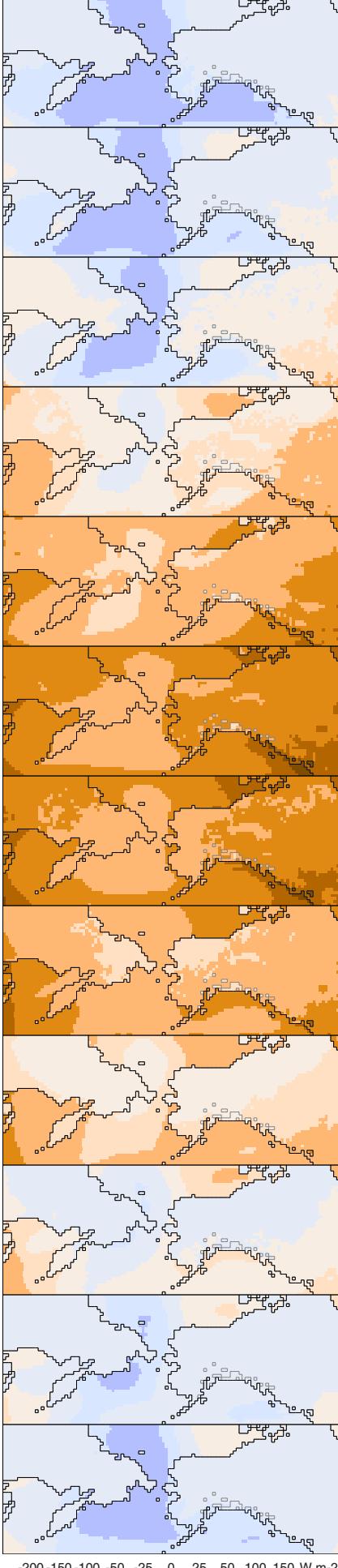
Net Shortwave Radiation



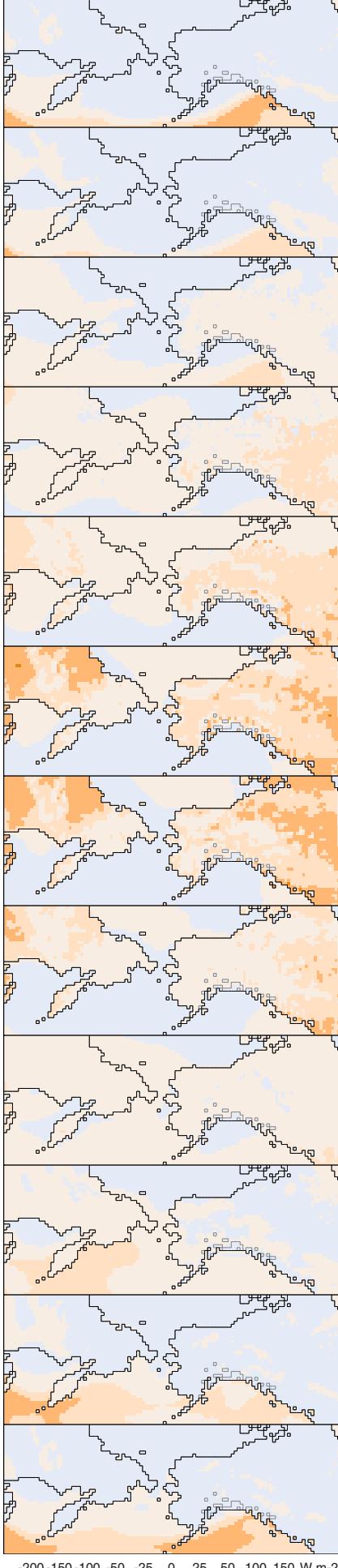
Net Longwave Radiation



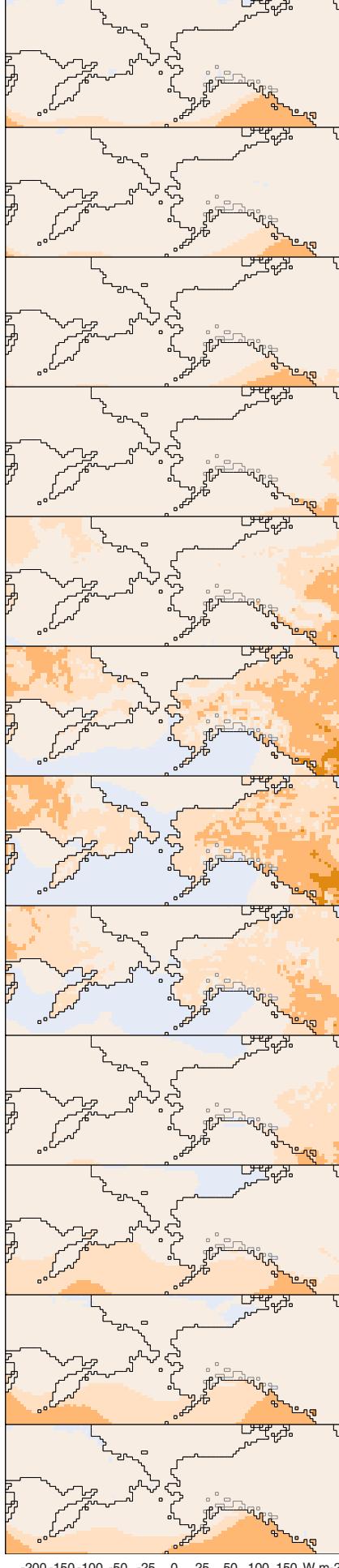
Net Radiation



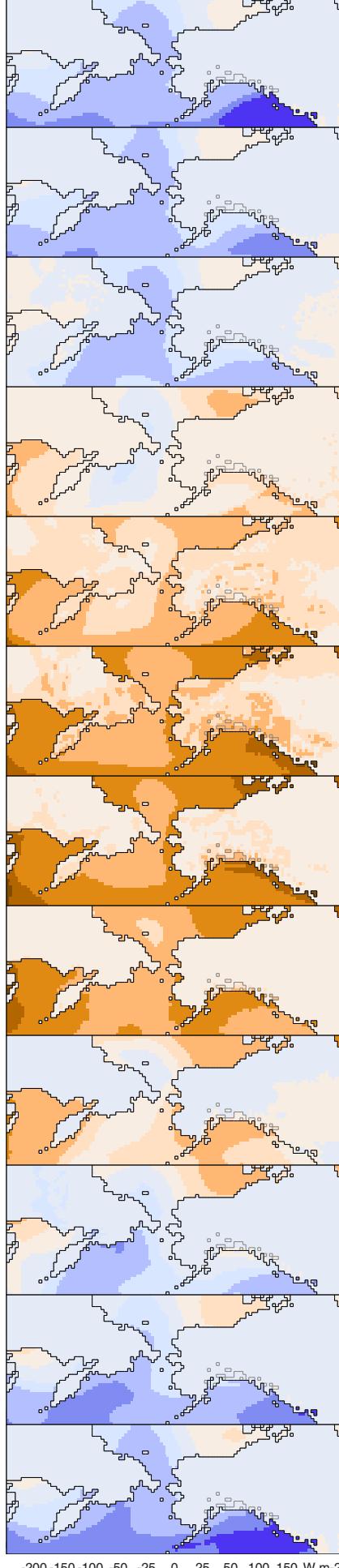
Sensible Heat Flux



Latent Heat Flux

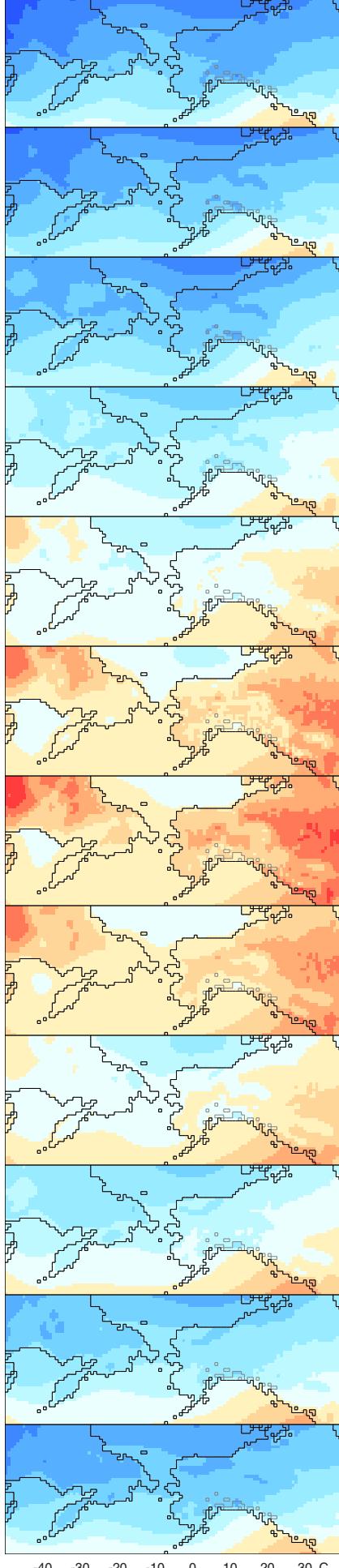


Substrate Heat Flux



Long-Term Means

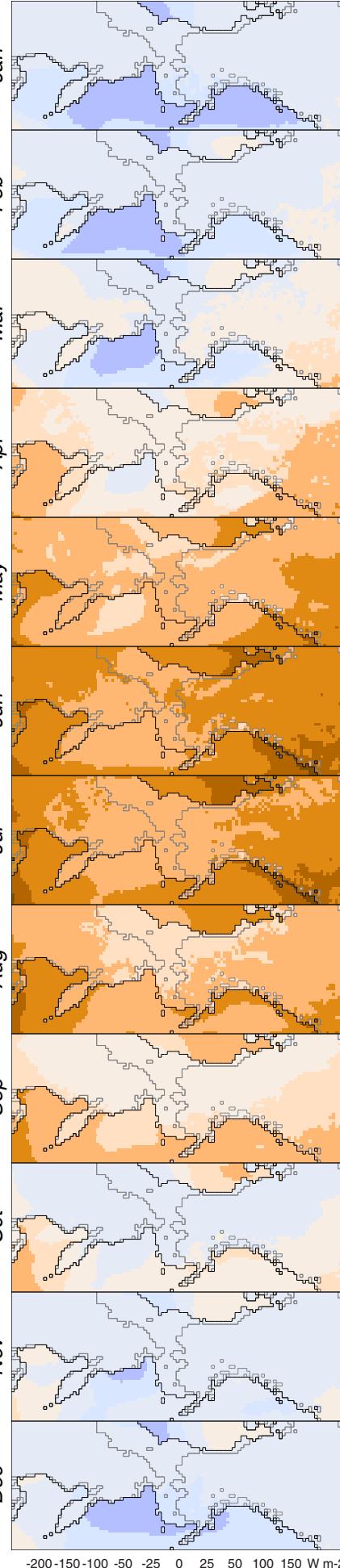
2-m Air Temperature



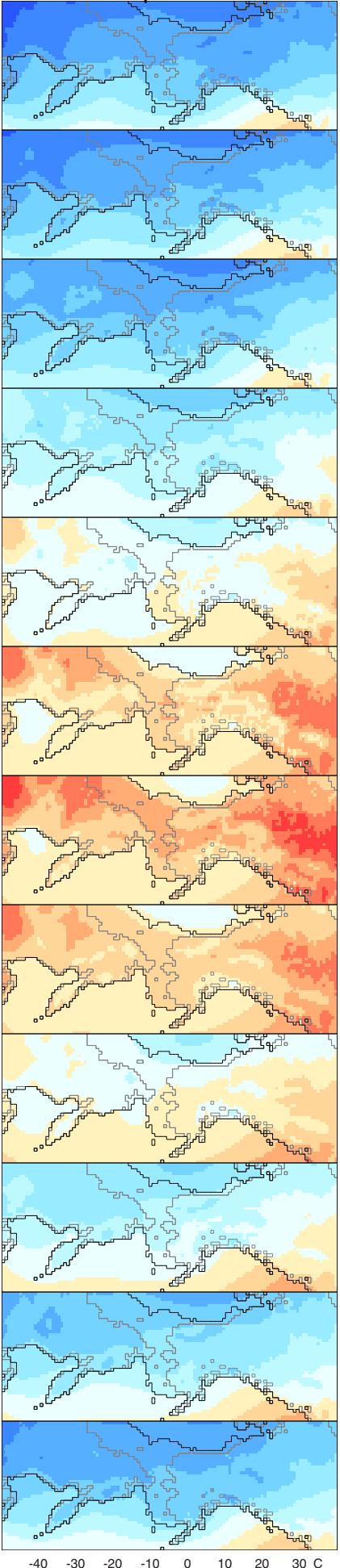
Suppl. Fig. 1B

Present-Day Simulation (with 11 ka Continental Outlines)

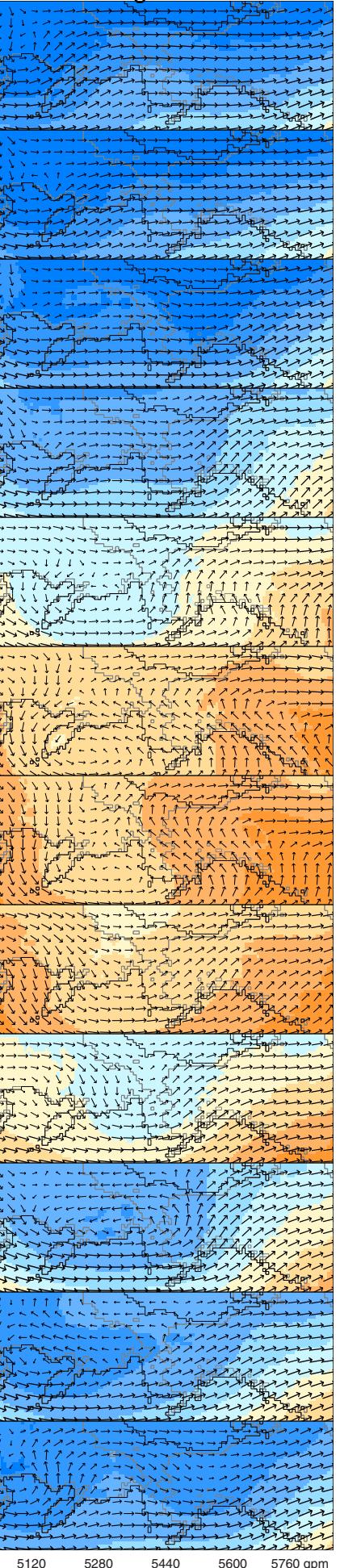
Net Radiation



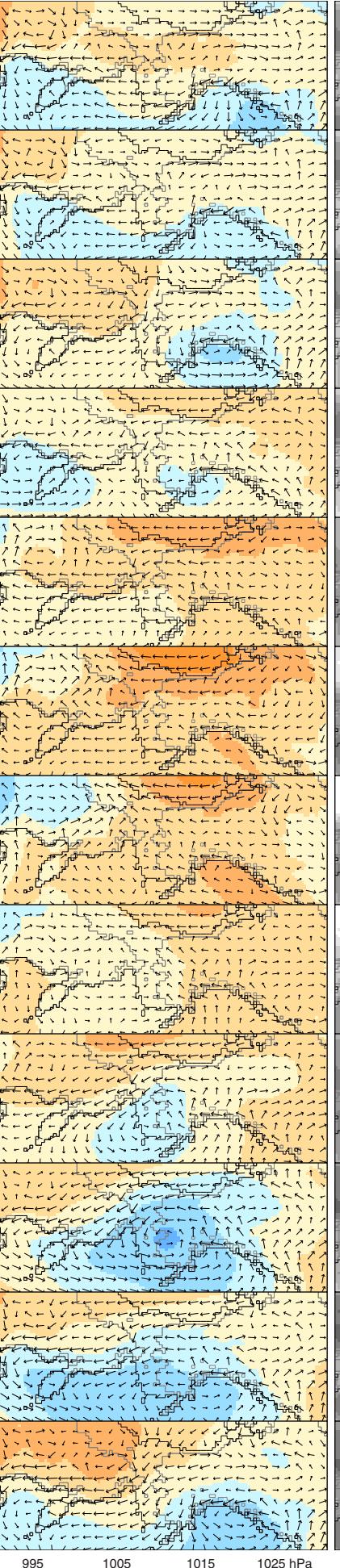
2-m Air Temperature



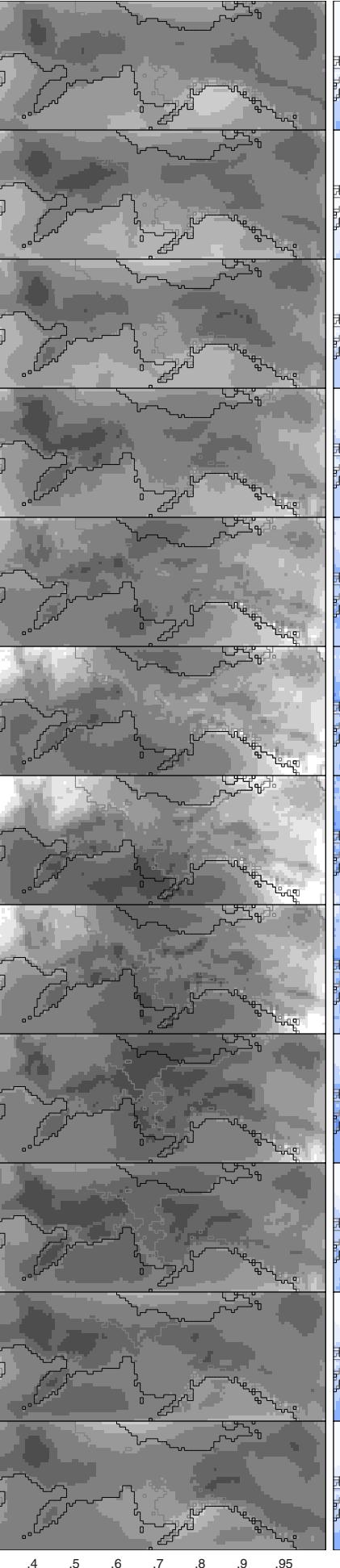
500hPa Heights & Winds



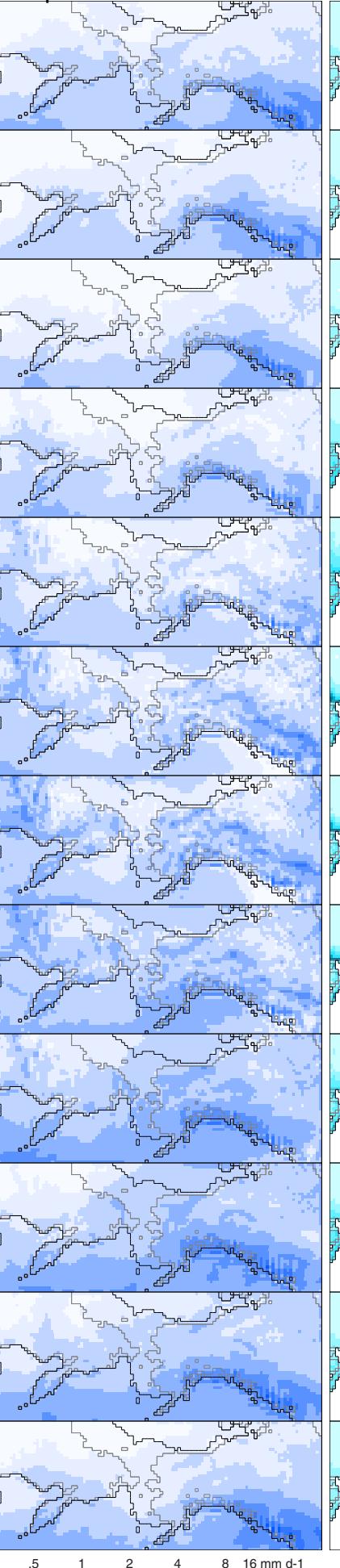
Sea-Level Pressure & Winds



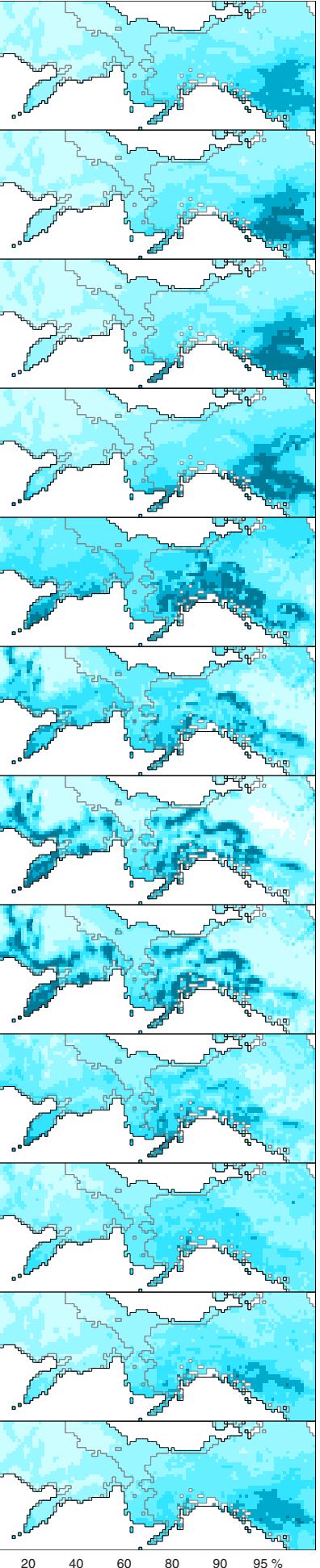
Total Cloud Fraction



Precipitation Rate



Long-Term Means



-200 -150 -100 -50 0 25 50 100 150 W m^-2

-40 -30 -20 -10 0 10 20 30 C

5120 5280 5440 5600 5760 gpm

995 1005 1015 1025 hPa

.4 .5 .6 .7 .8 .9 .95

.5 1 2 4 8 16 mm d^-1

20 40 60 80 90 95 %

Present-Day Simulation (with 11 ka Continental Outlines)

Net Shortwave Radiation

Net Longwave Radiation

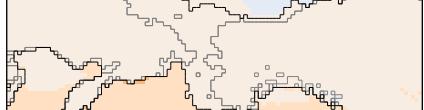
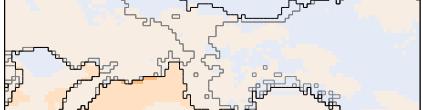
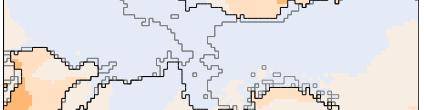
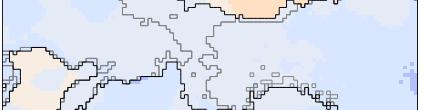
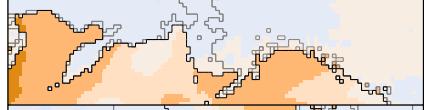
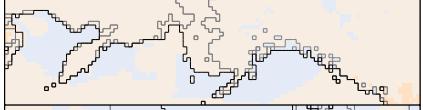
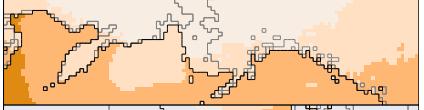
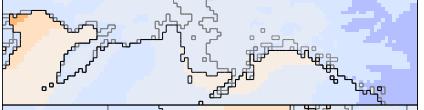
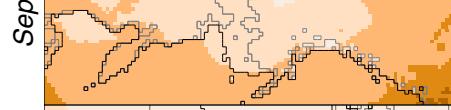
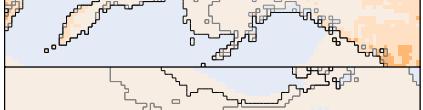
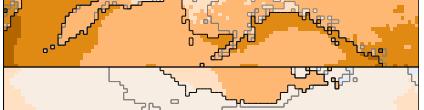
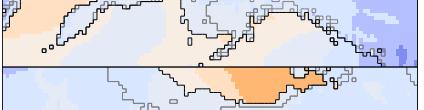
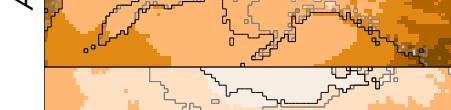
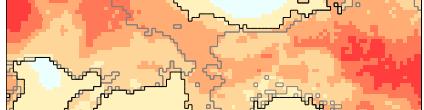
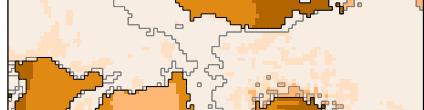
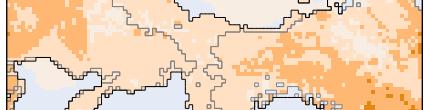
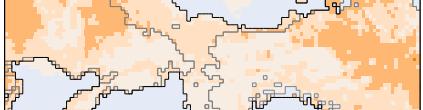
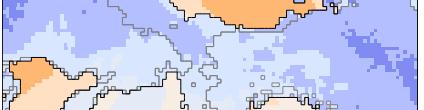
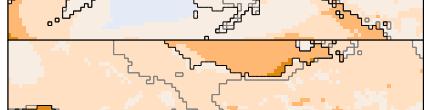
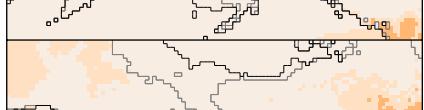
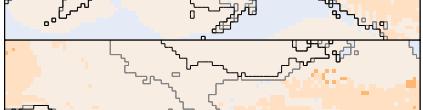
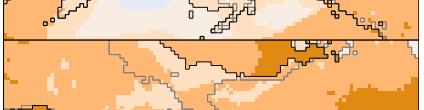
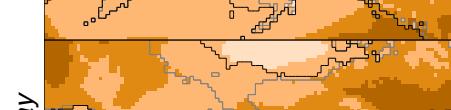
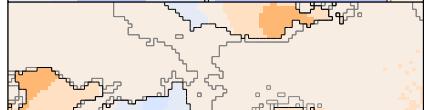
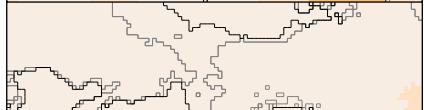
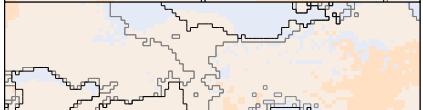
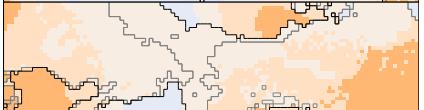
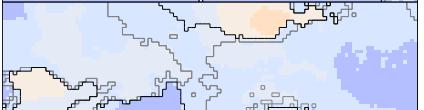
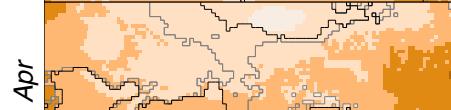
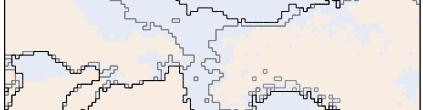
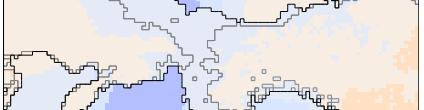
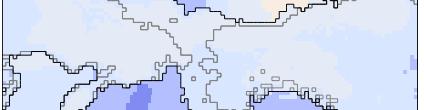
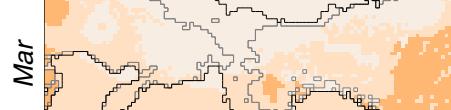
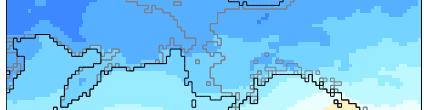
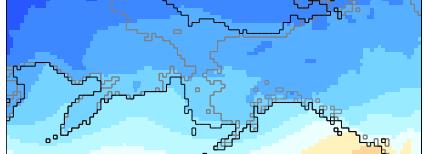
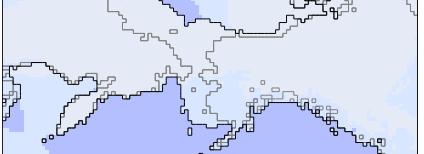
Net Radiation

Sensible Heat Flux

Latent Heat Flux

Substrate Heat Flux

Long-Term Means
2-m Air Temperature



-200 -150 -100 -50 0 25 50 100 150 W m⁻²

-200 -150 -100 -50 0 25 50 100 150 W m⁻²

-200 -150 -100 -50 0 25 50 100 150 W m⁻²

-200 -150 -100 -50 0 25 50 100 150 W m⁻²

-200 -150 -100 -50 0 25 50 100 150 W m⁻²

-200 -150 -100 -50 0 25 50 100 150 W m⁻²

-40 -30 -20 -10 0 10 20 30 C

Suppl. Fig. 2B

Present-Day Simulation - Present-Day Simulation (with 11 ka Continental Outlines)

Long-Term Mean Differences

Net Radiation

2-m Air Temperature

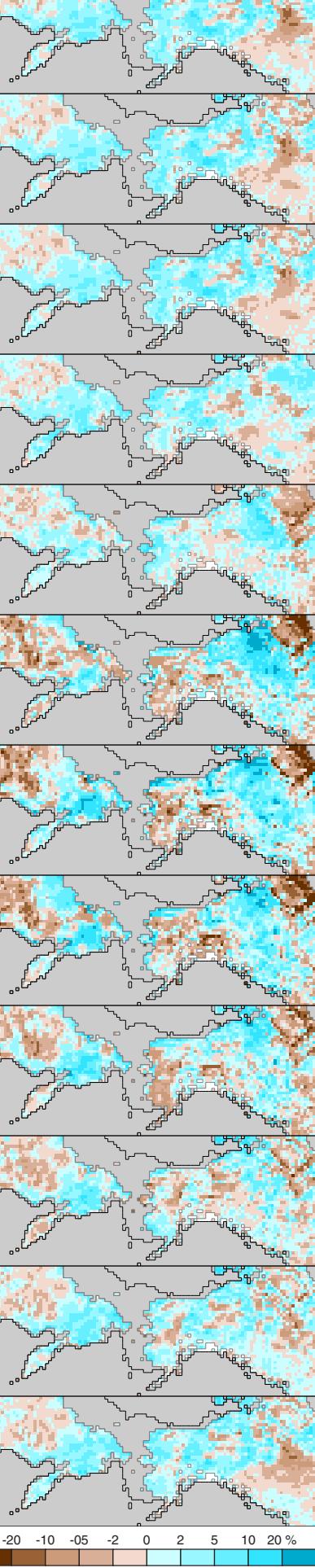
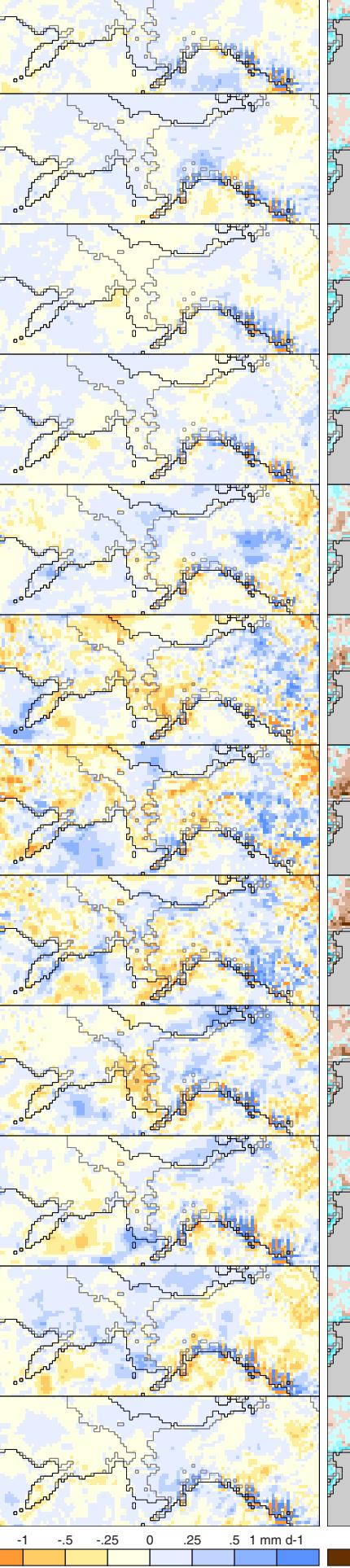
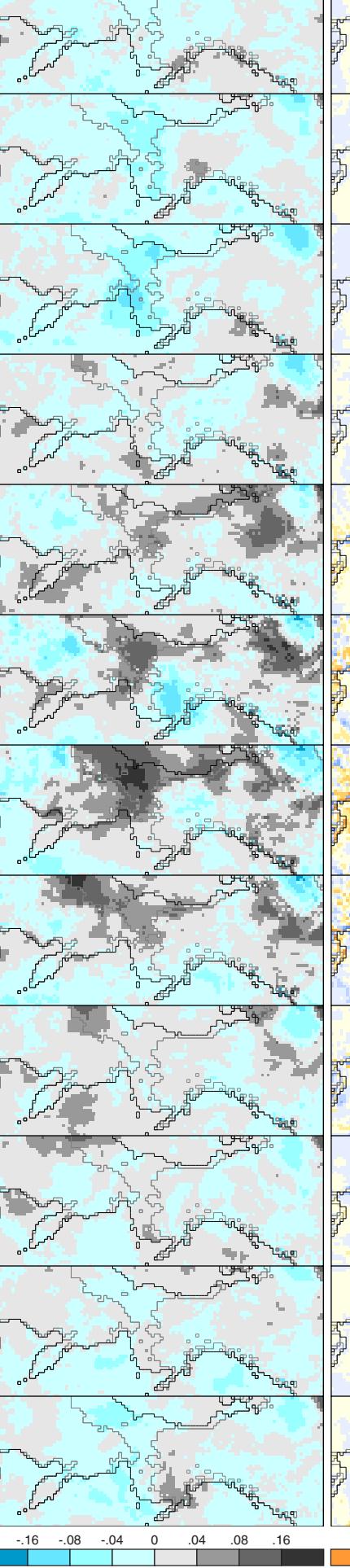
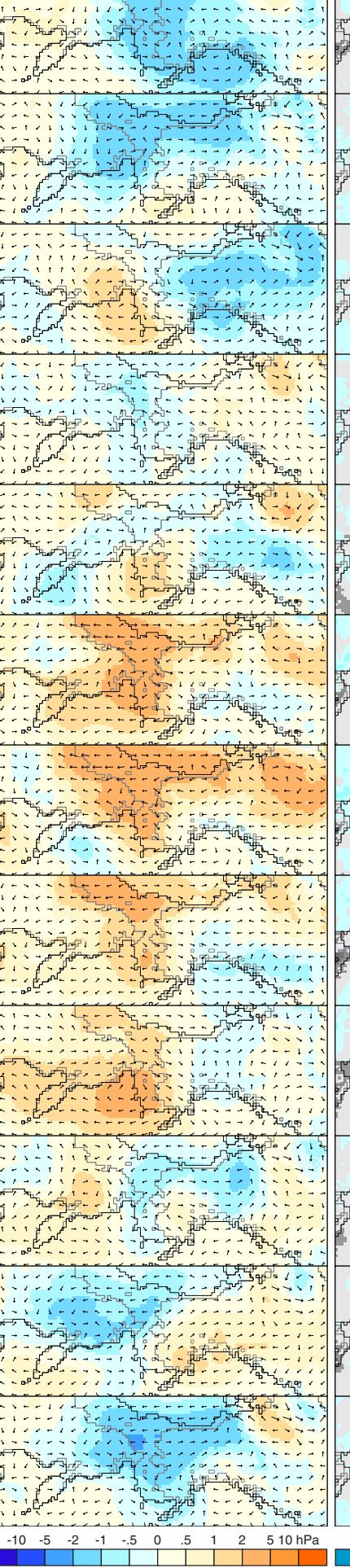
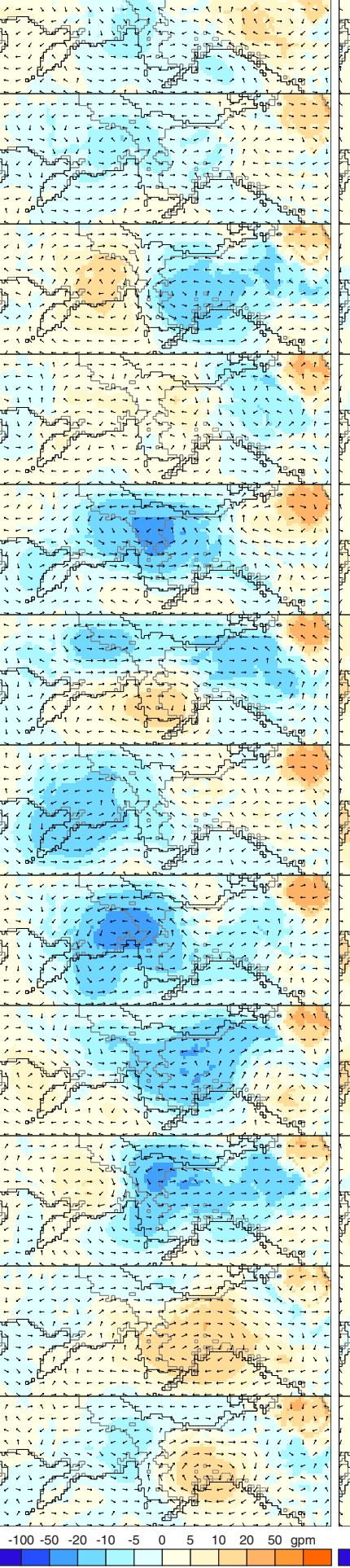
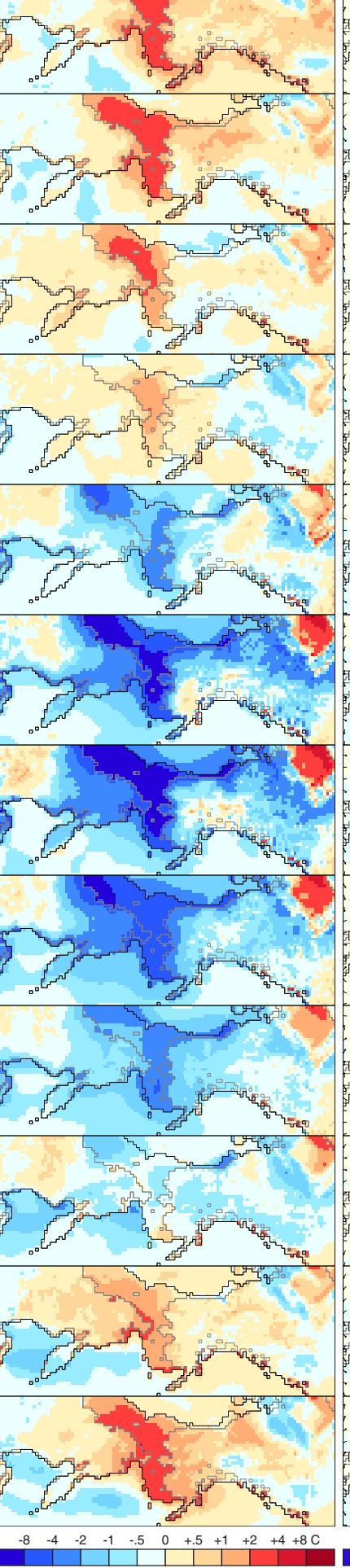
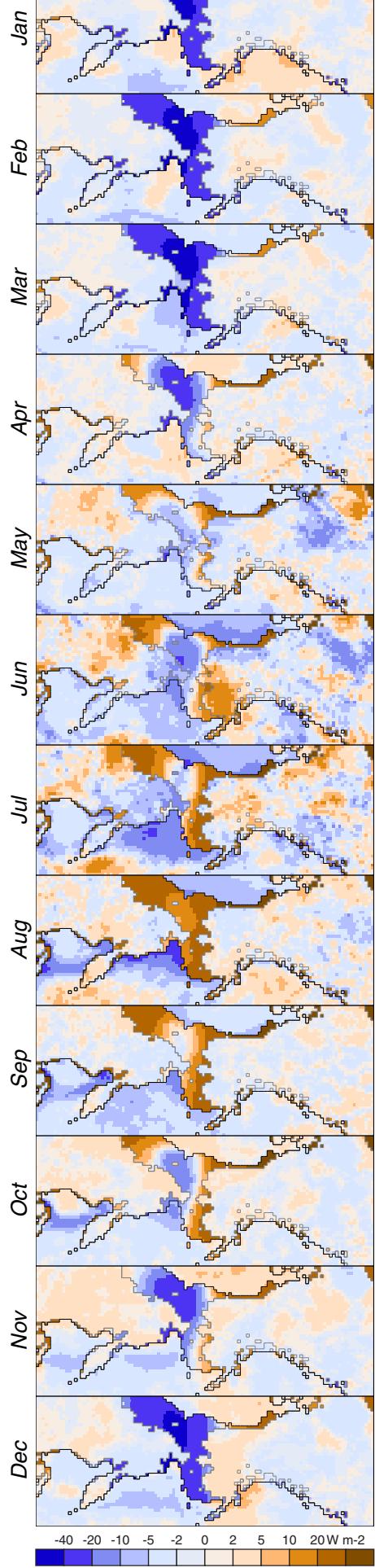
500hPa Heights & Winds

Sea-Level Pressure & Winds

Total Cloud Fraction

Precipitation Rate

Soil Moisture



1 2 4
8 16 32 m/sec

-16 -8 -.08 -.04 0 .04 .08 .16

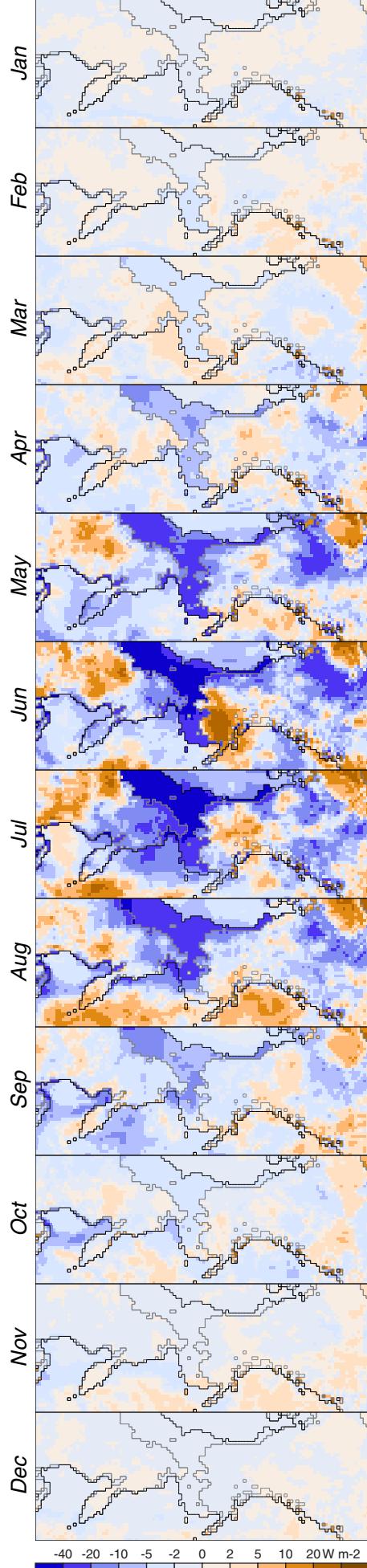
-1 -.5 -.25 0 .25 .5 1 mm d⁻¹

-20 -10 -5 0 2 5 10 20 %

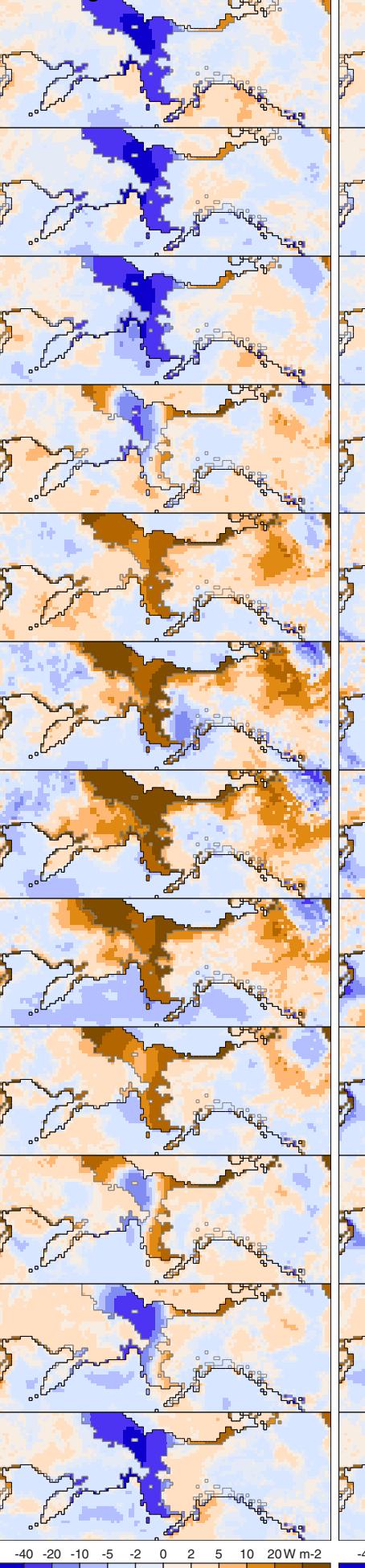
Suppl. Fig. 3A

Present-Day Simulation - Present-Day Simulation (with 11 ka Continental Outlines)

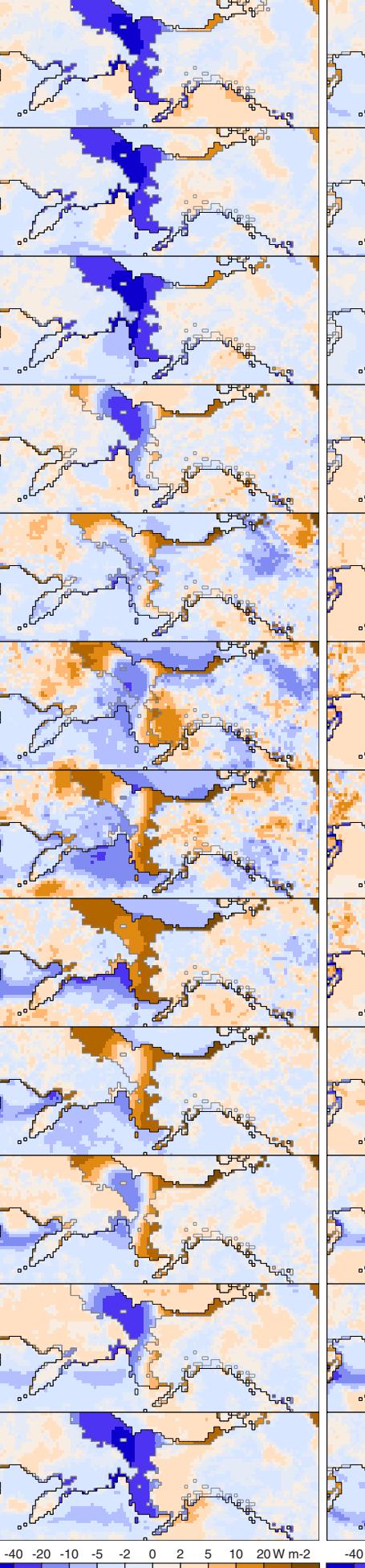
Net Shortwave Radiation



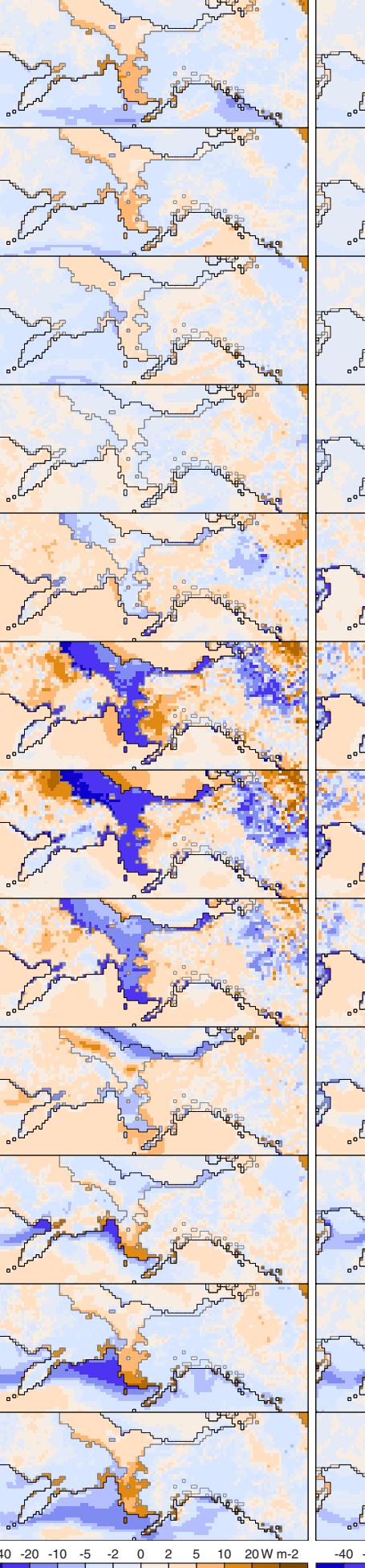
Net Longwave Radiation



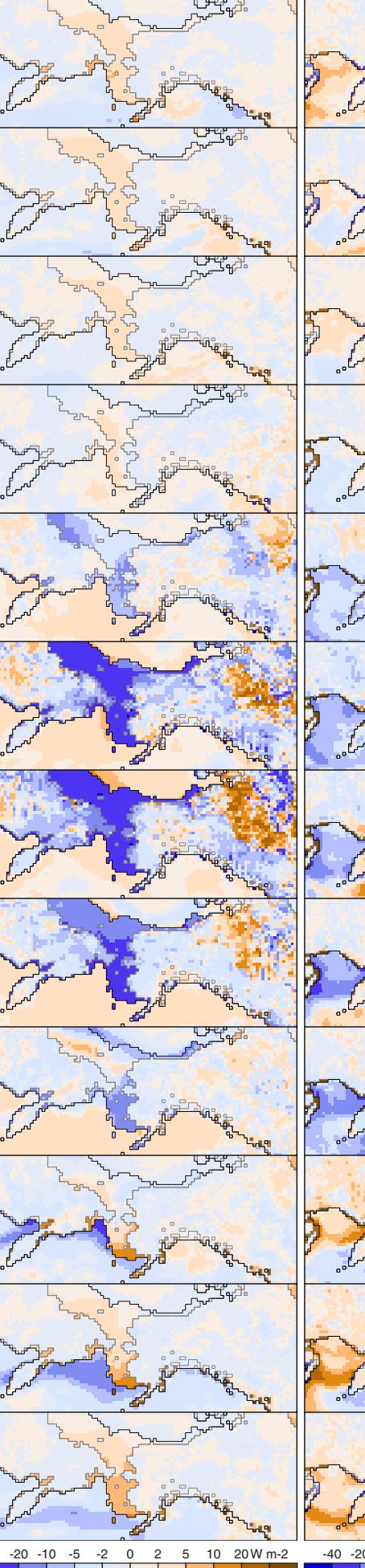
Net Radiation



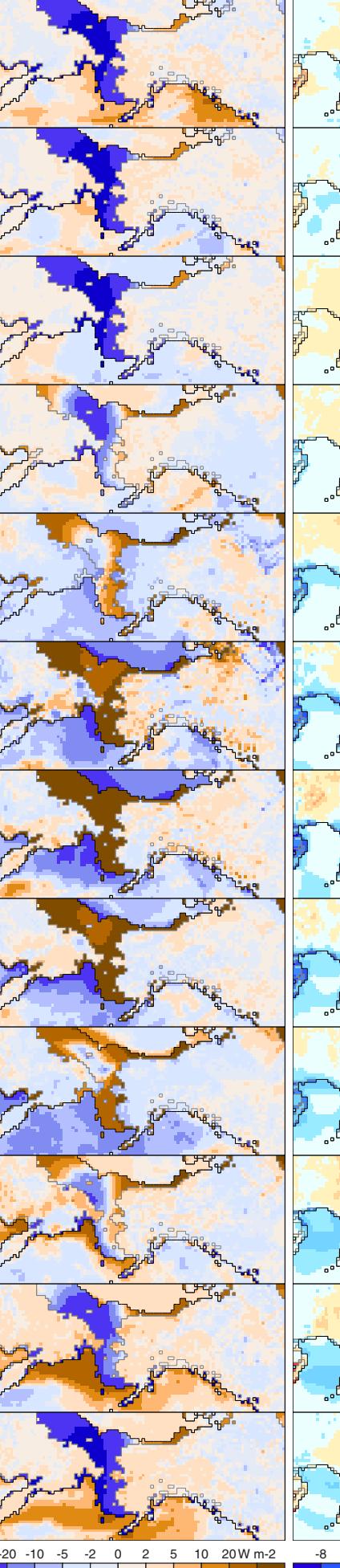
Sensible Heat Flux



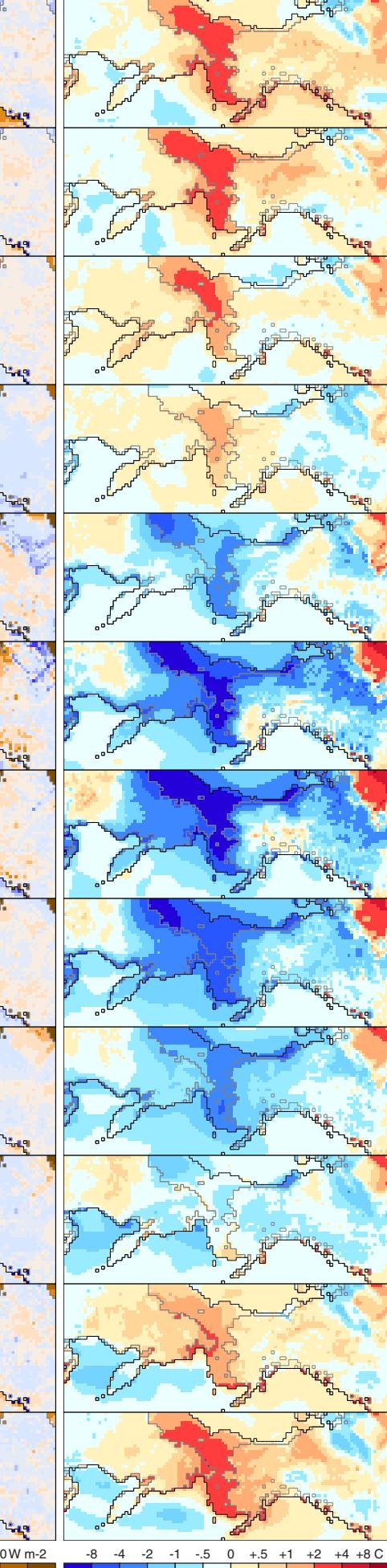
Latent Heat Flux



Substrate Heat Flux

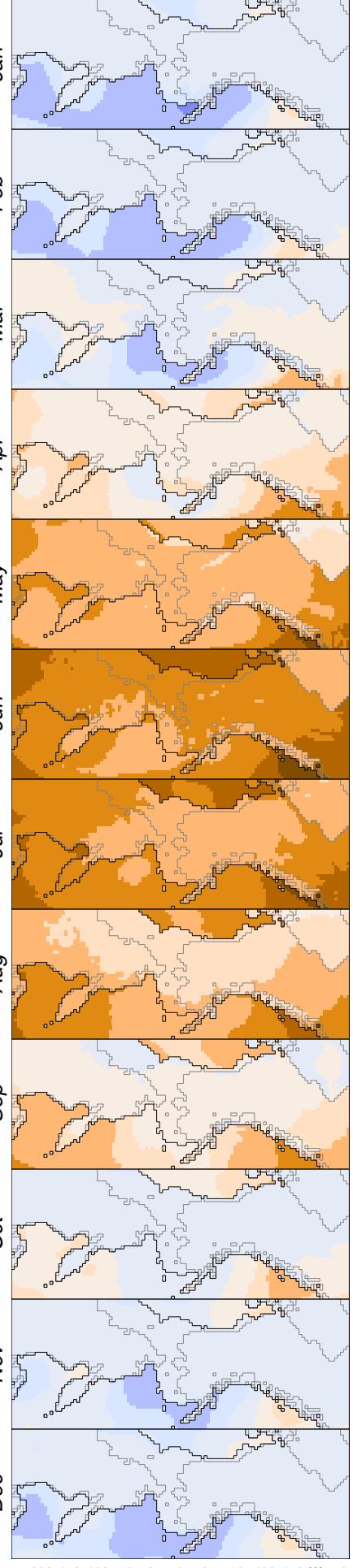


Long-Term Mean Differences
2-m Air Temperature

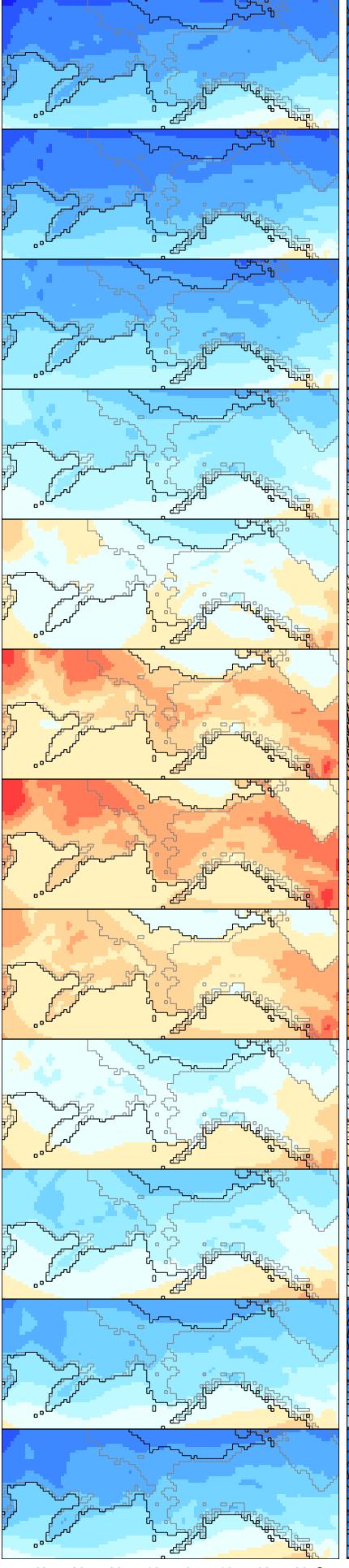


11 ka Control Simulation

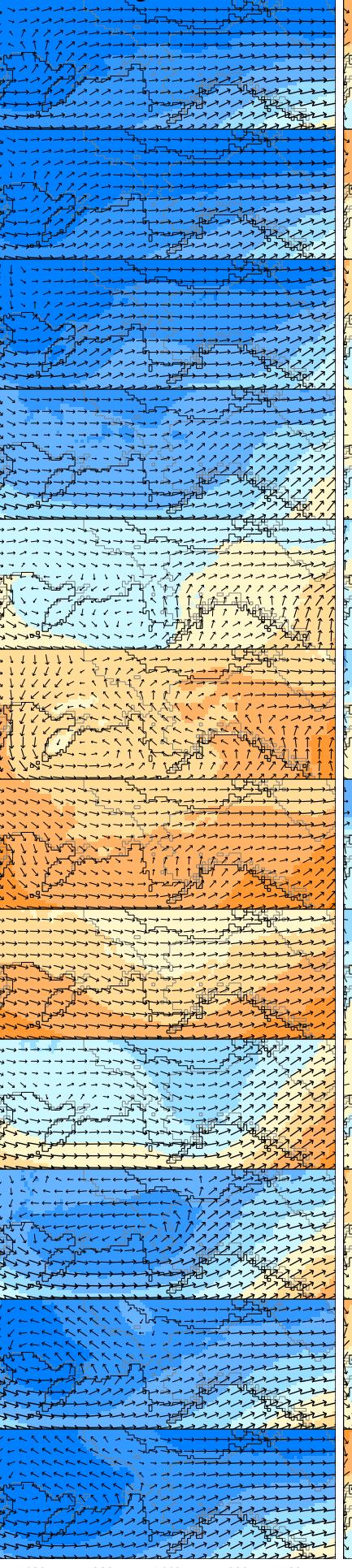
Net Radiation



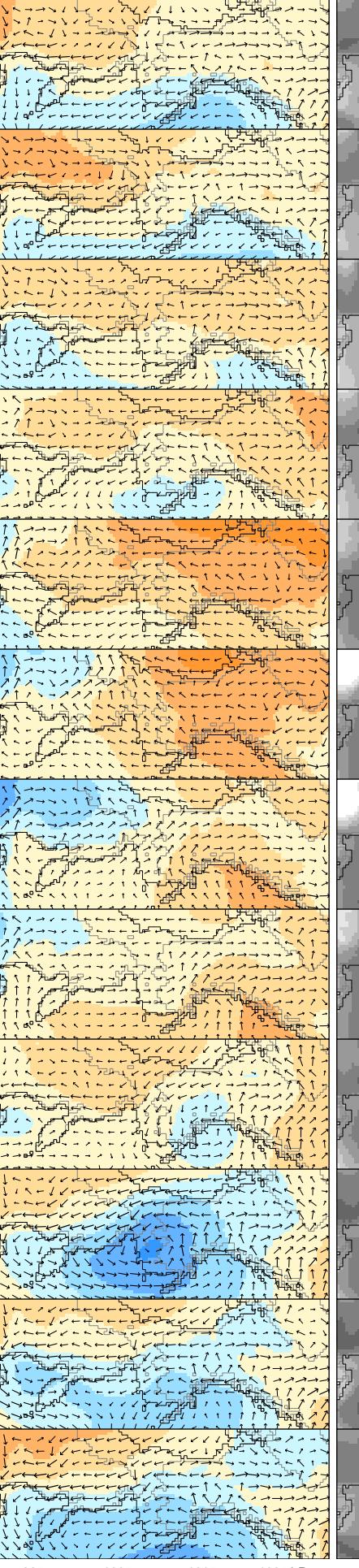
2-m Air Temperature



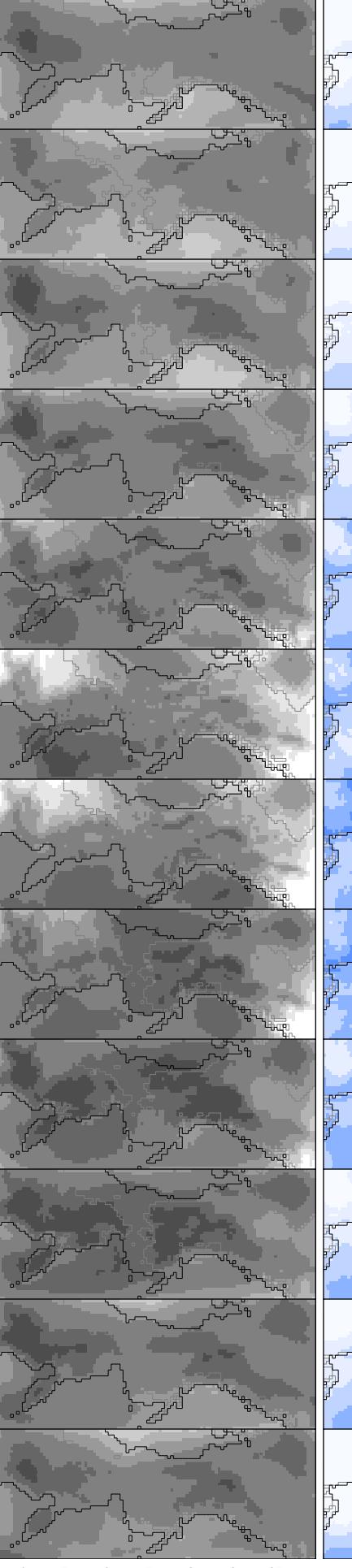
500hPa Heights & Winds



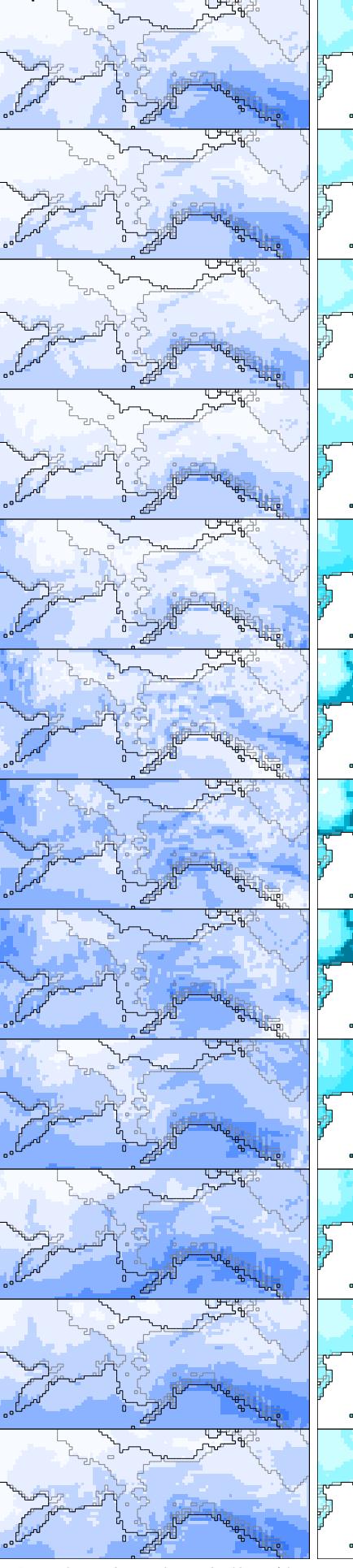
Sea-Level Pressure & Winds



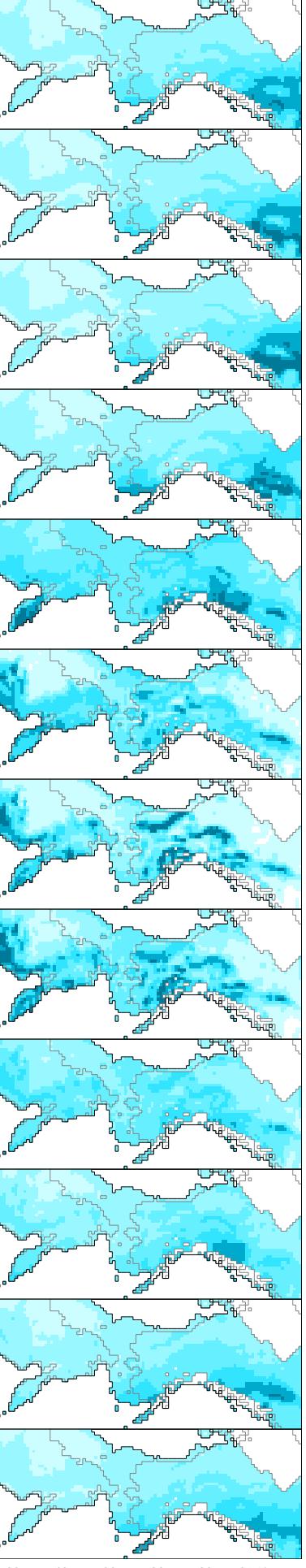
Total Cloud Fraction



Precipitation Rate



Long-Term Means



Suppl. Fig. 4A

11 ka Control Simulation

Net Shortwave Radiation



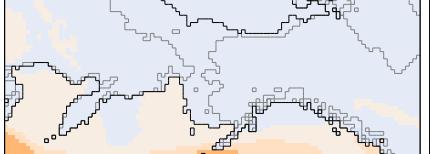
Net Longwave Radiation



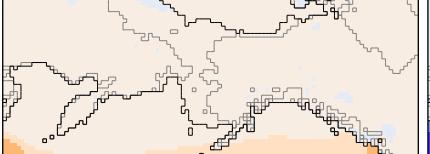
Net Radiation



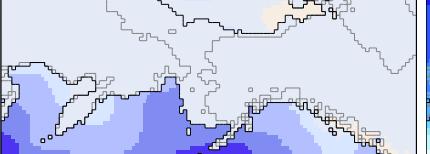
Sensible Heat Flux



Latent Heat Flux

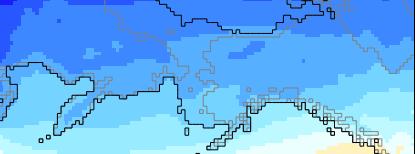


Substrate Heat Flux



Long-Term Means

2-m Air Temperature



Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

-200 -150 -100 -50 0 25 50 100 150 W m⁻²

-200 -150 -100 -50 0 25 50 100 150 W m⁻²

-200 -150 -100 -50 0 25 50 100 150 W m⁻²

-200 -150 -100 -50 0 25 50 100 150 W m⁻²

-200 -150 -100 -50 0 25 50 100 150 W m⁻²

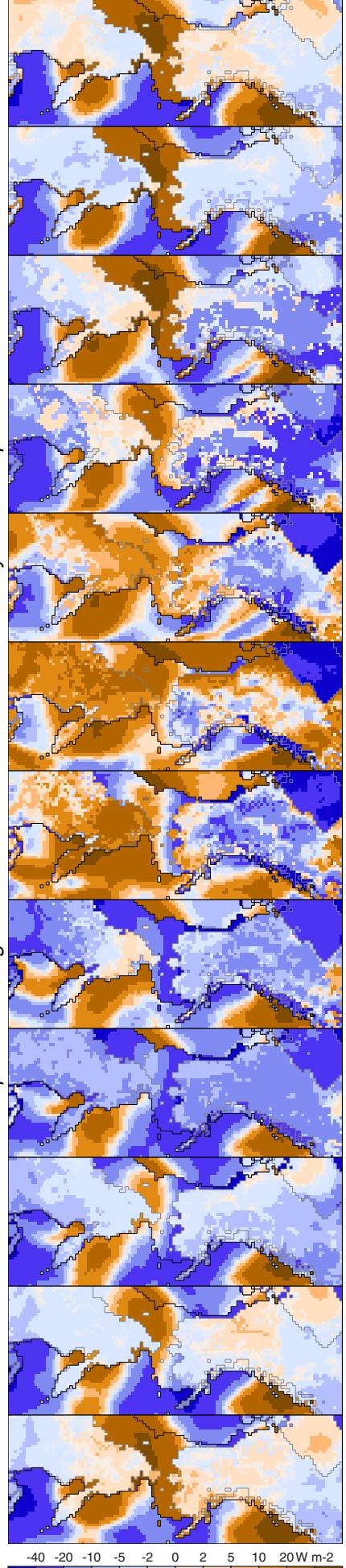
-200 -150 -100 -50 0 25 50 100 150 W m⁻²

-40 -30 -20 -10 0 10 20 30 C

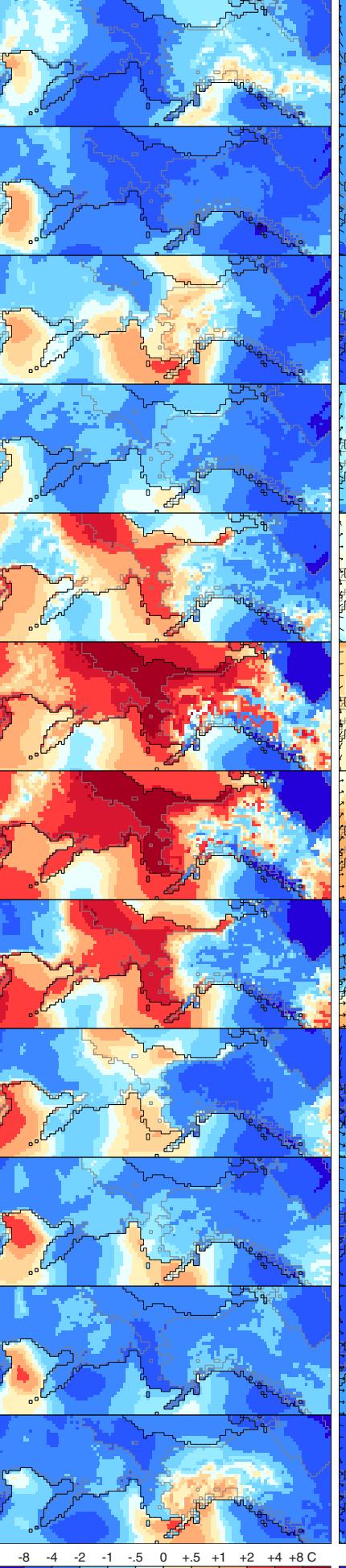
Suppl. Fig. 4B

11 ka Control Simulation - Present-Day Simulation

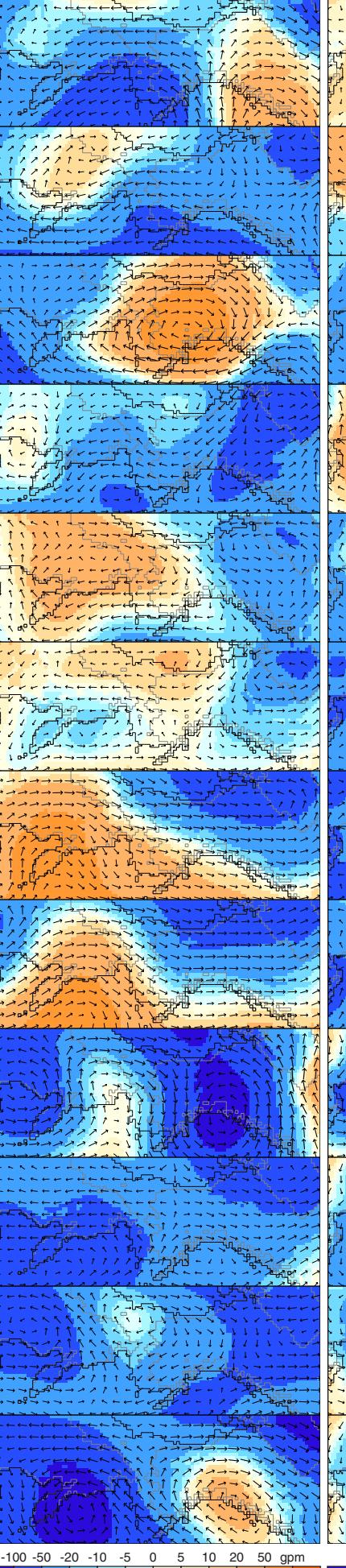
Net Radiation



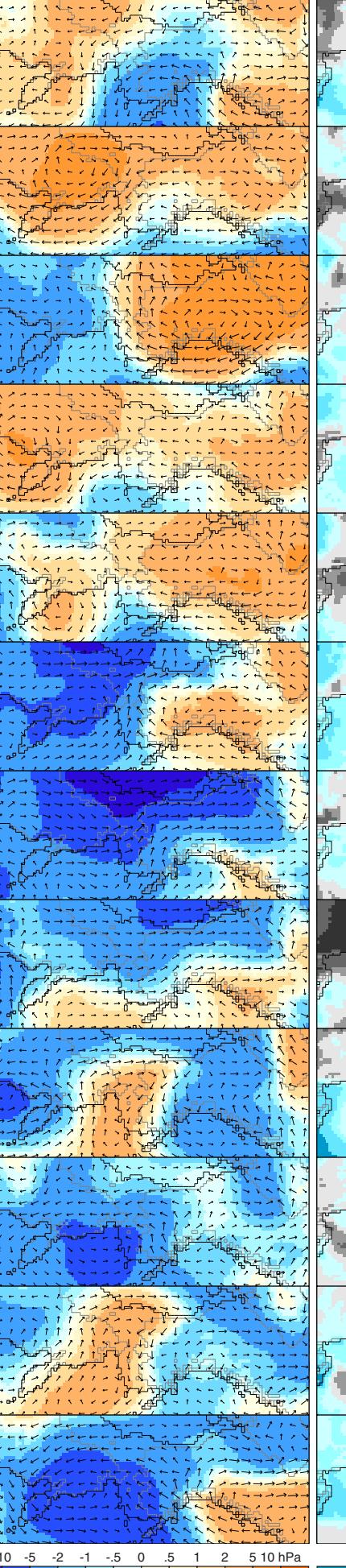
2-m Air Temperature



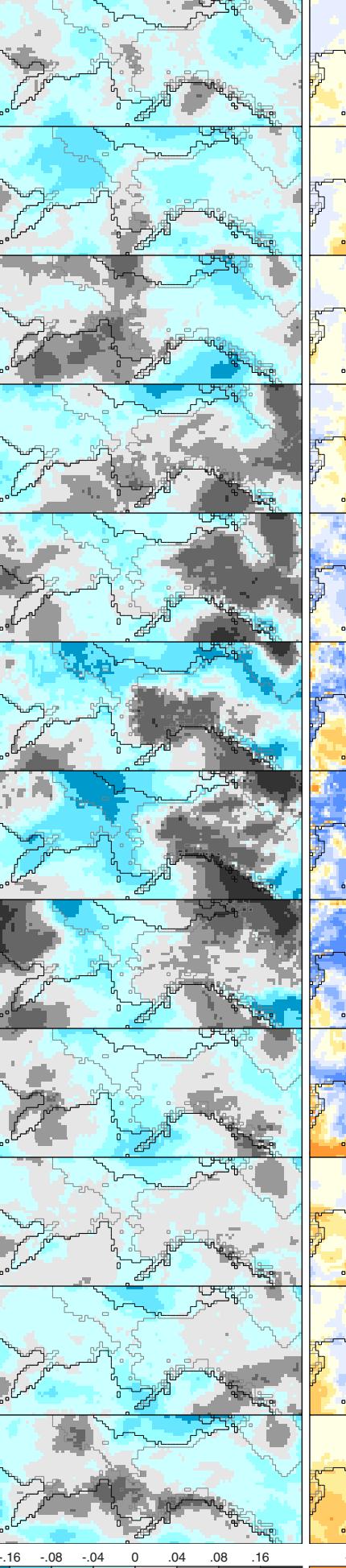
500hPa Heights & Winds



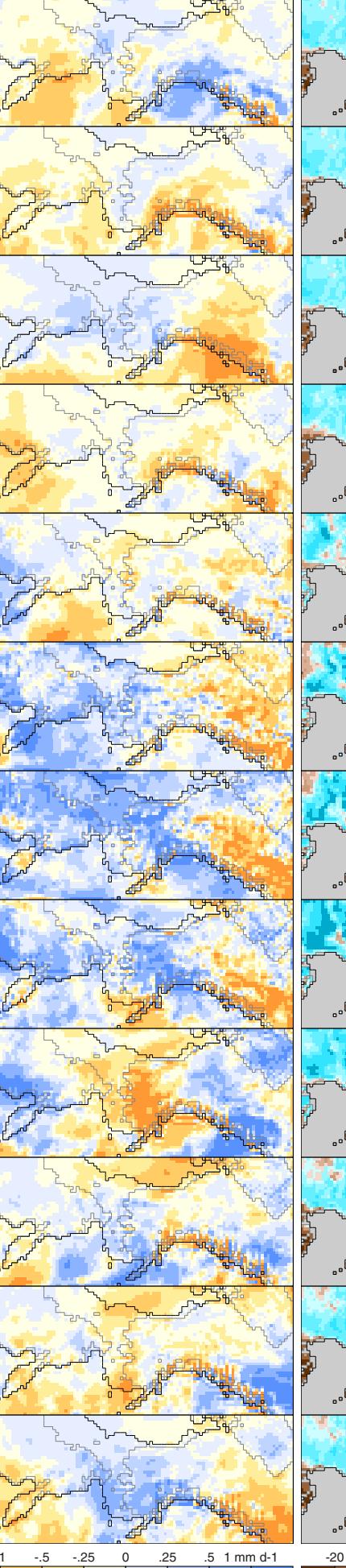
Sea-Level Pressure & Winds



Total Cloud Fraction

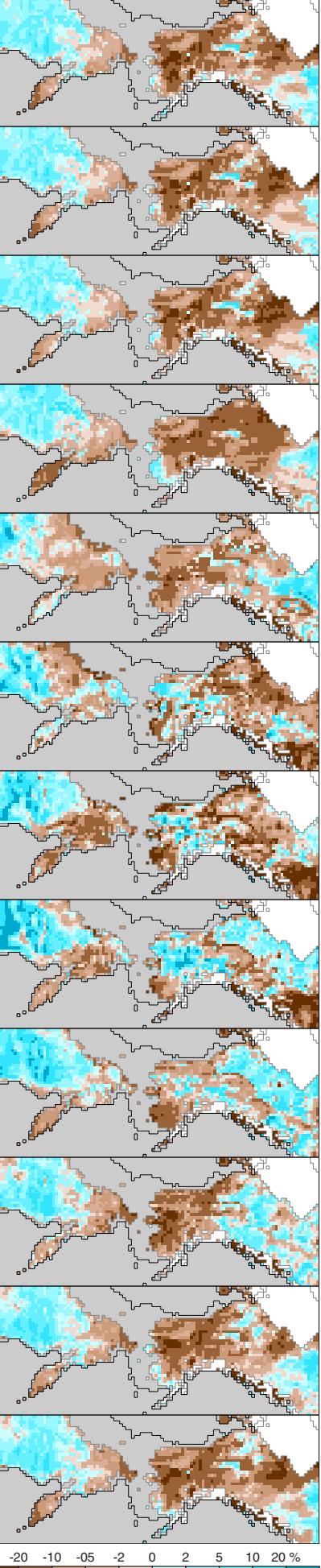


Precipitation Rate



Long-Term Mean Differences

Soil Moisture



-40 -20 -10 -5 0 2 5 10 W m⁻²

-8 -4 -2 -1 0 +.5 +1 +2 +4 +8 C

-100 -50 -20 -10 0 5 10 50 gpm

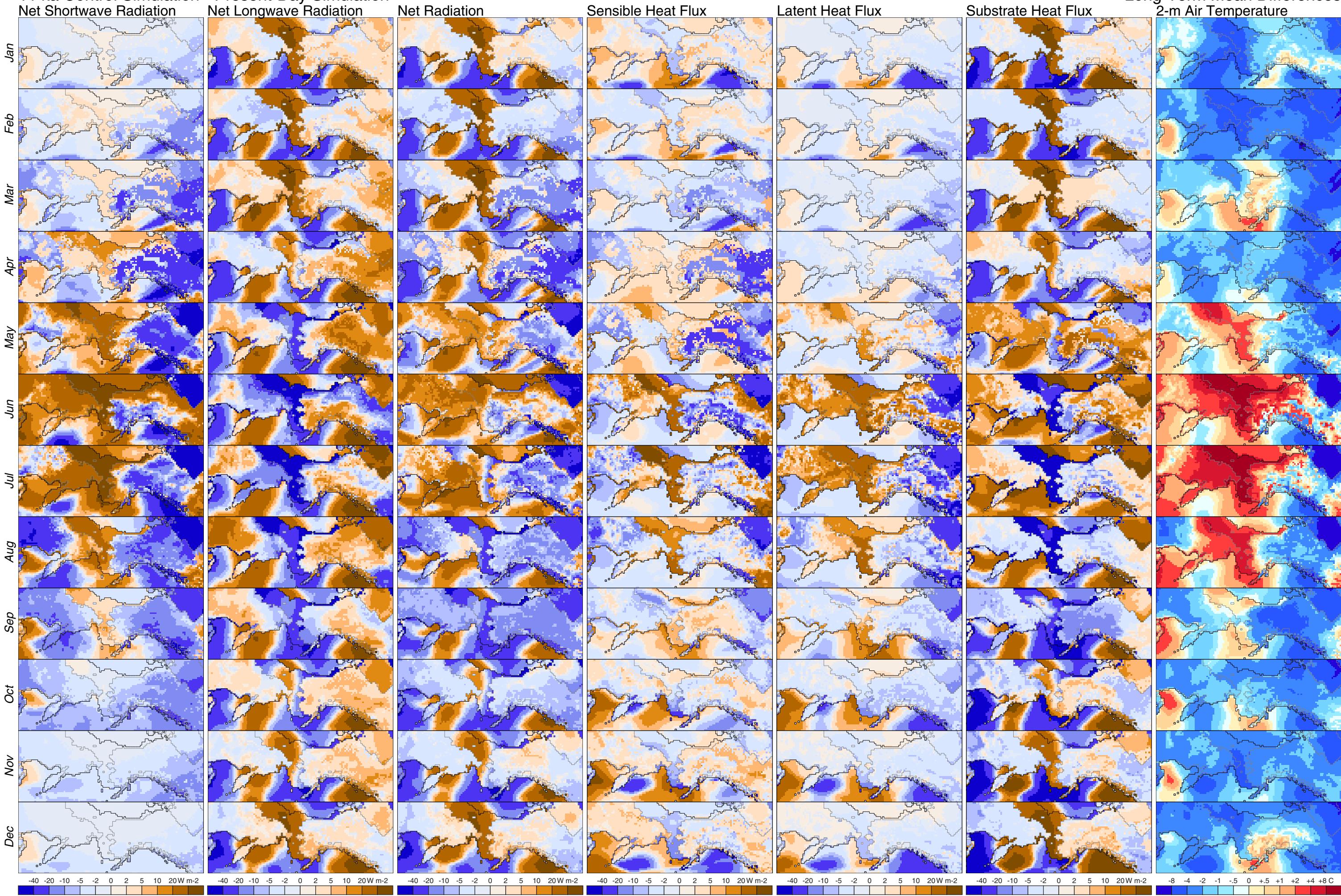
-10 -5 -2 -1 0 .5 1 2 5 10 hPa

-16 -.08 -.04 0 .04 .08 .16

-1 -.5 -.25 0 .25 .5 1 mm d⁻¹

-20 -10 -5 0 2 5 10 20 %

11 ka Control Simulation - Present-Day Simulation



Long-Term Mean Differences

2-m Air Temperature

11 ka Control Simulation - Present-Day Simulation (with 11 ka Continental Outlines)

Long-Term Mean Differences

Net Radiation

2-m Air Temperature

500hPa Heights & Winds

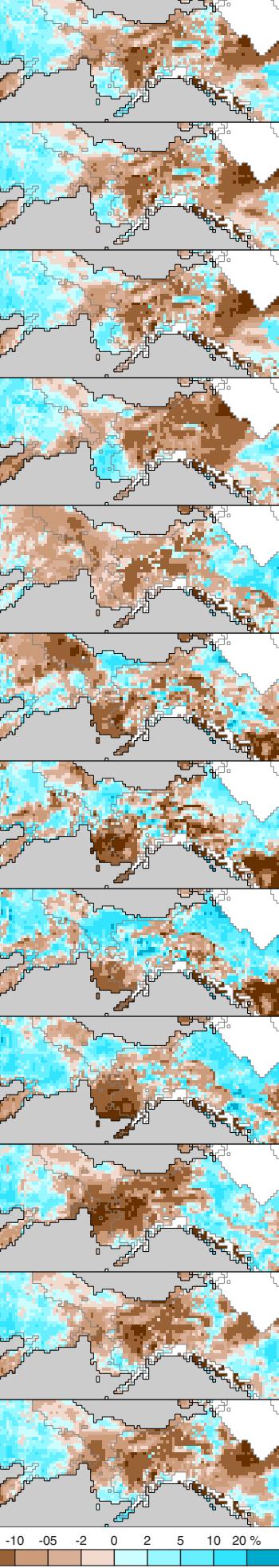
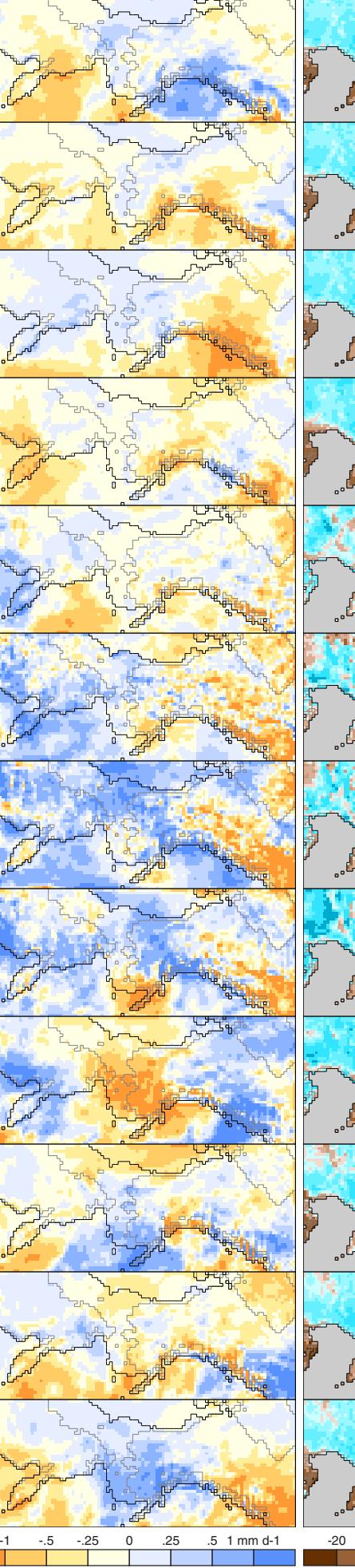
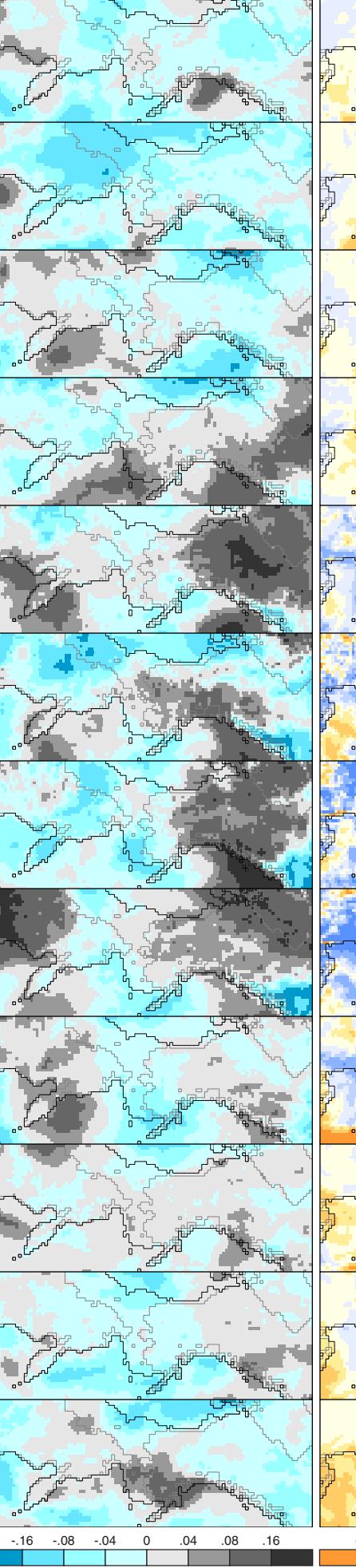
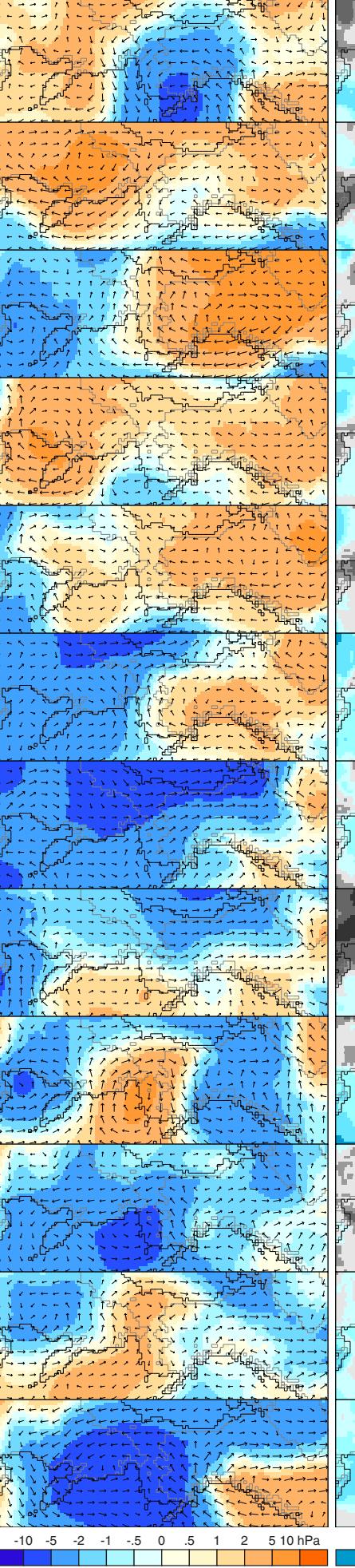
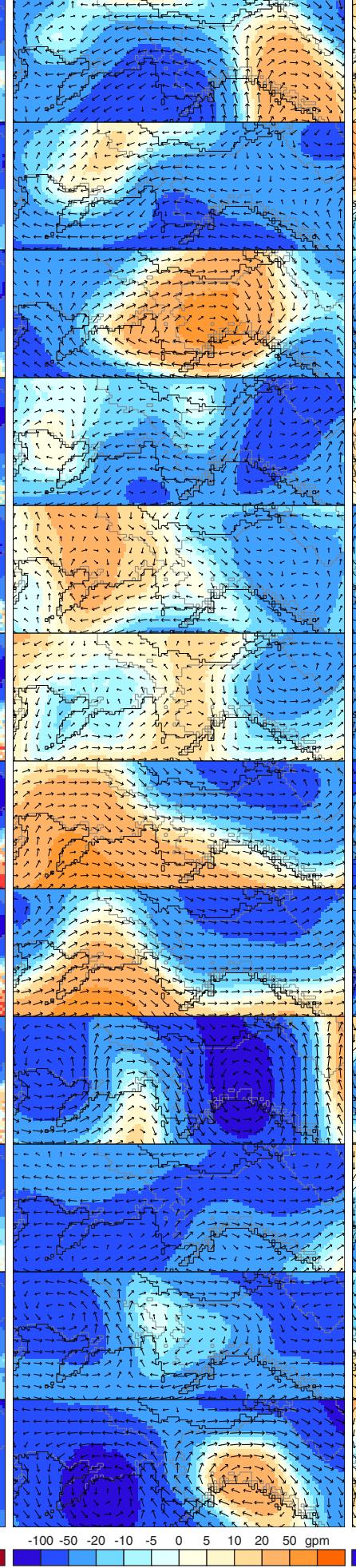
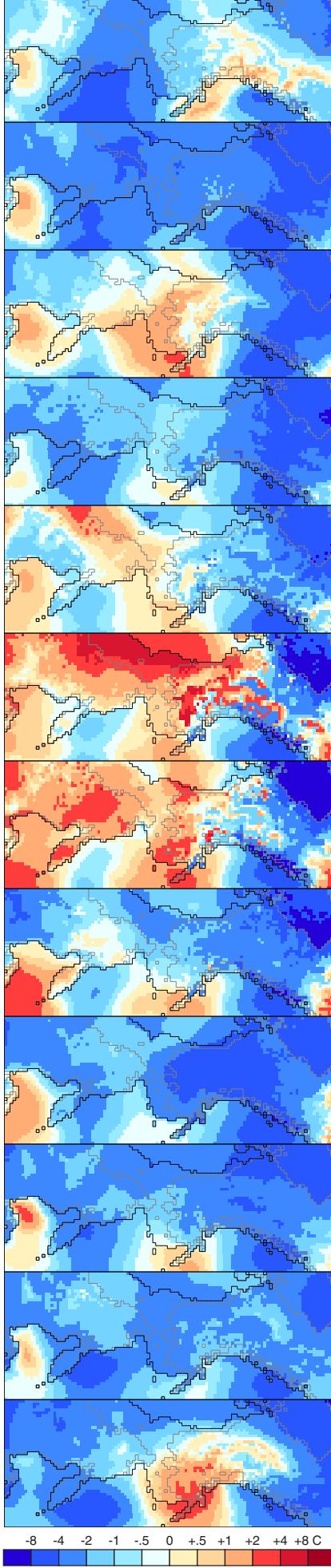
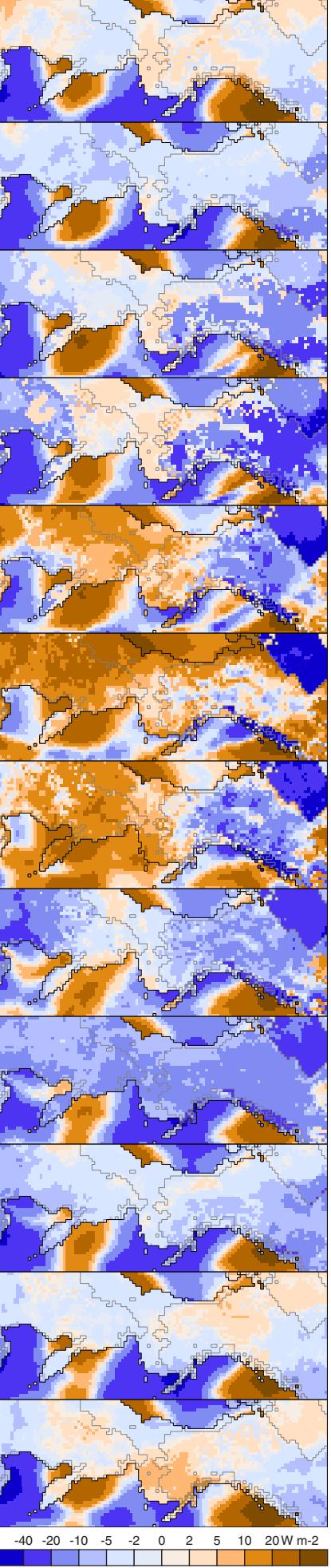
Sea-Level Pressure & Winds

Total Cloud Fraction

Precipitation Rate

Soil Moisture

Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec



11 ka Control Simulation - Present-Day Simulation (with 11 ka Continental Outlines)

Long-Term Mean Differences

Net Shortwave Radiation

Net Longwave Radiation

Net Radiation

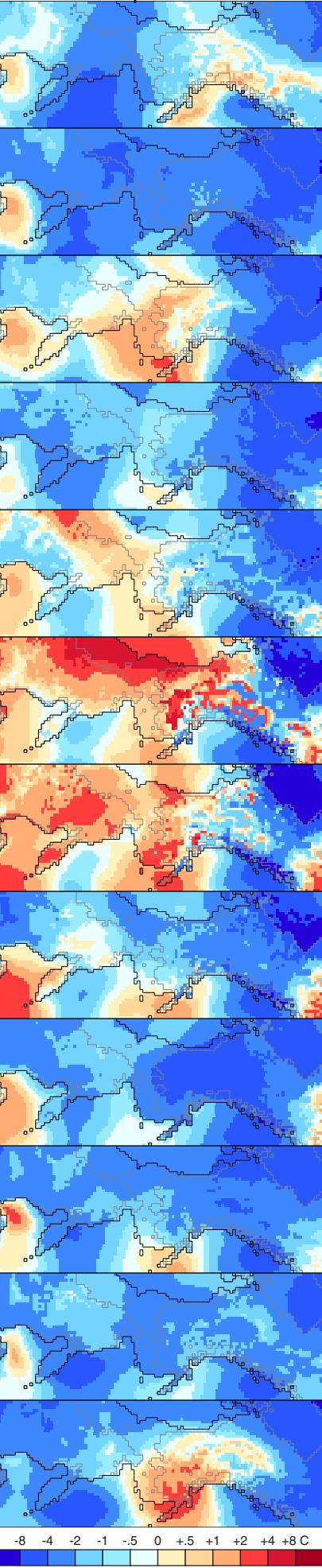
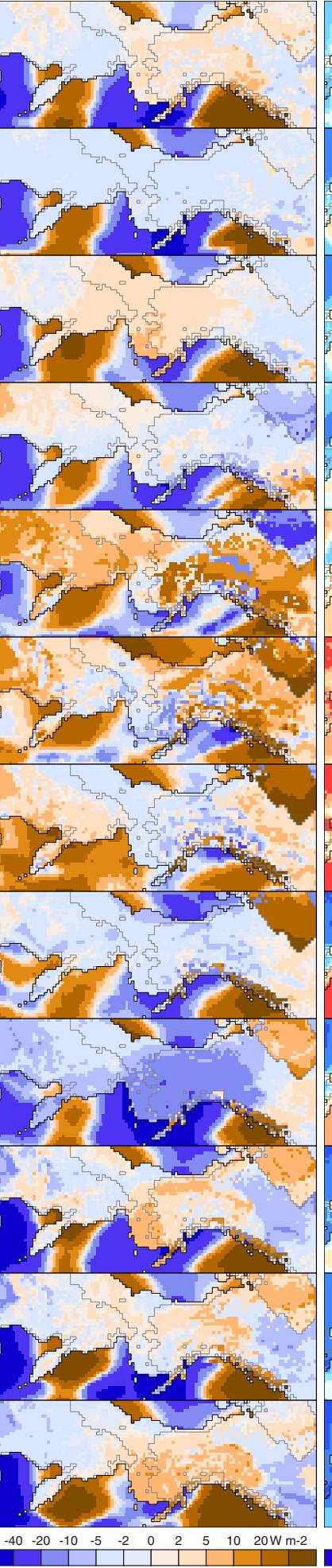
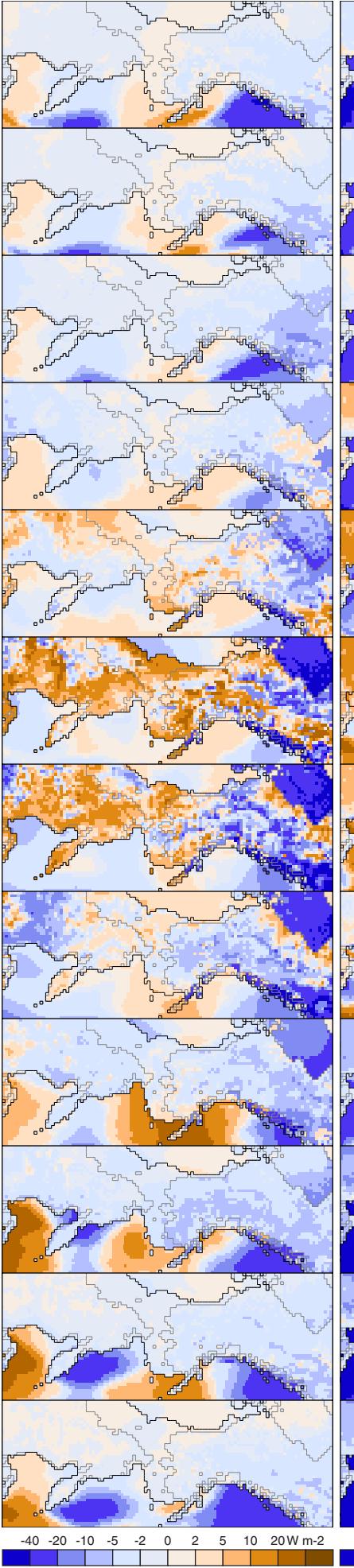
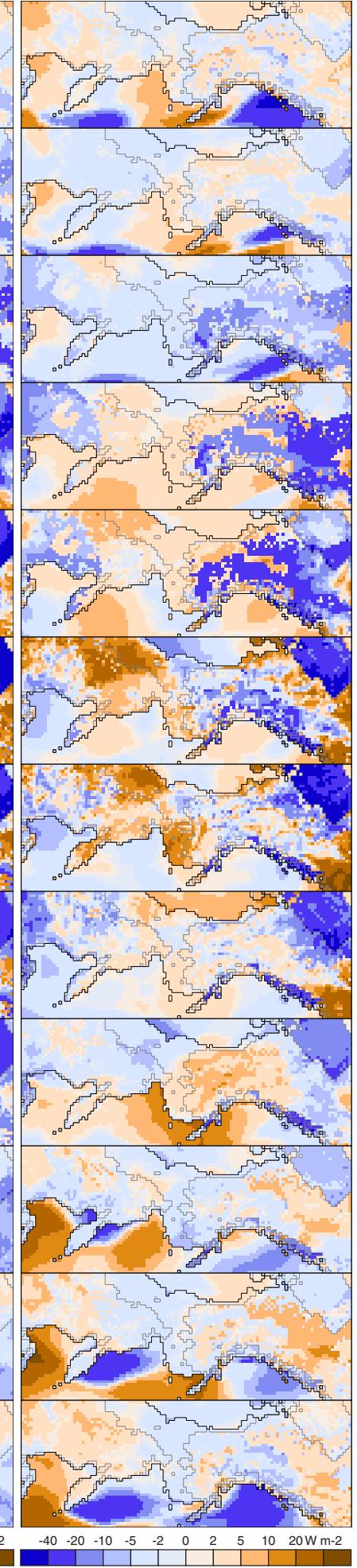
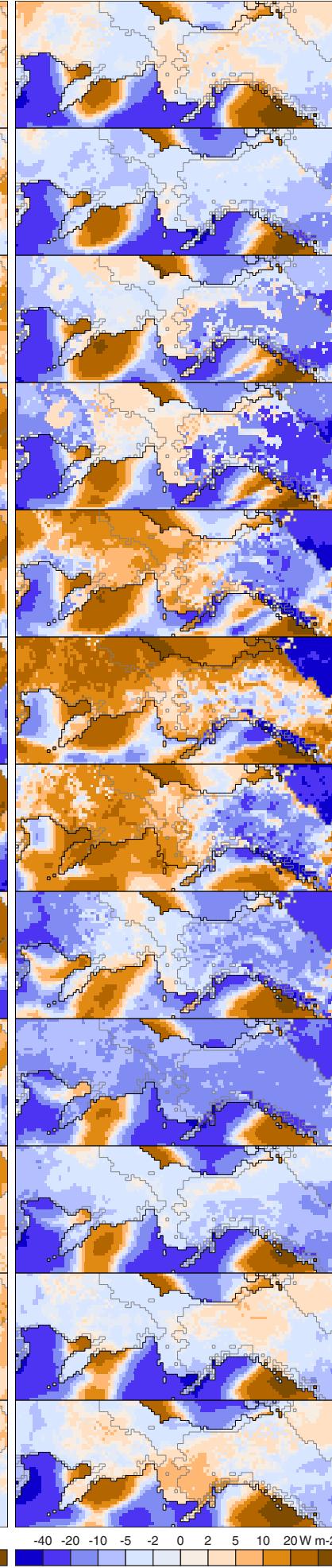
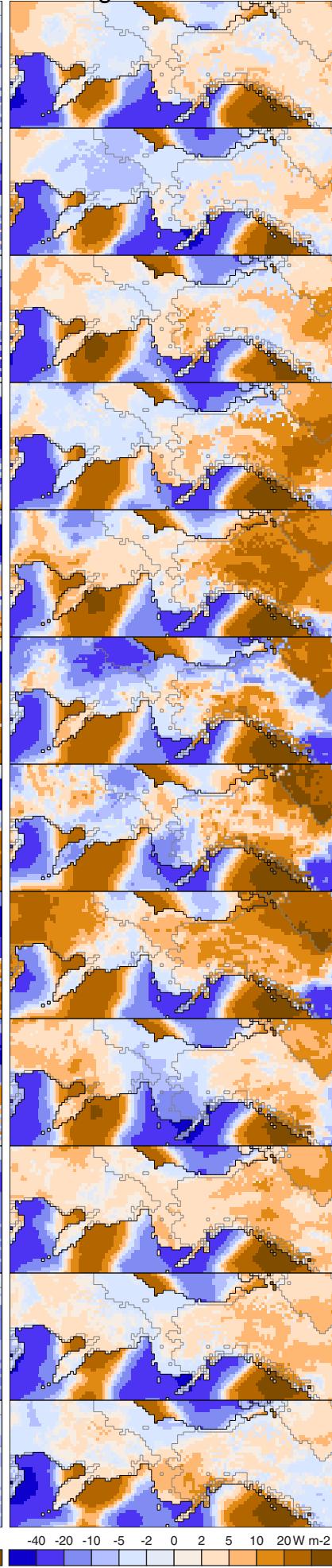
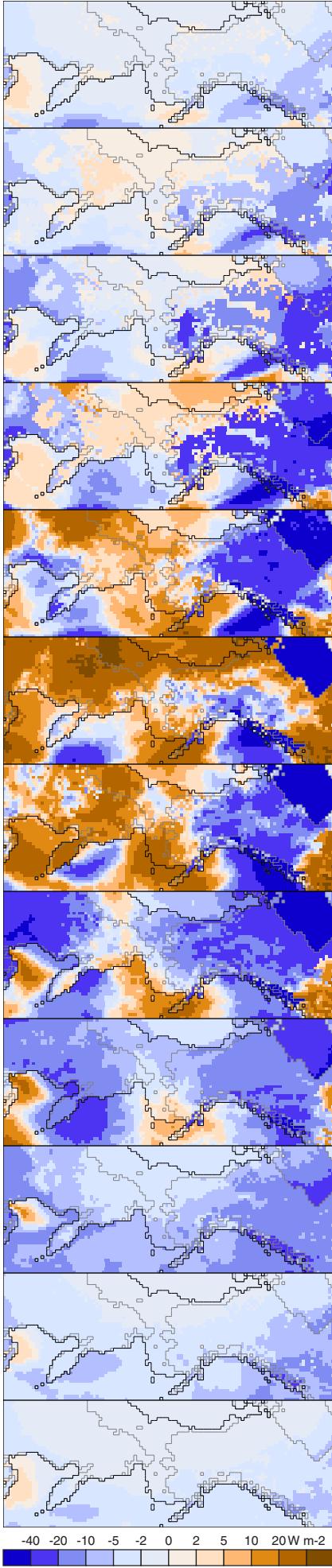
Sensible Heat Flux

Latent Heat Flux

Substrate Heat Flux

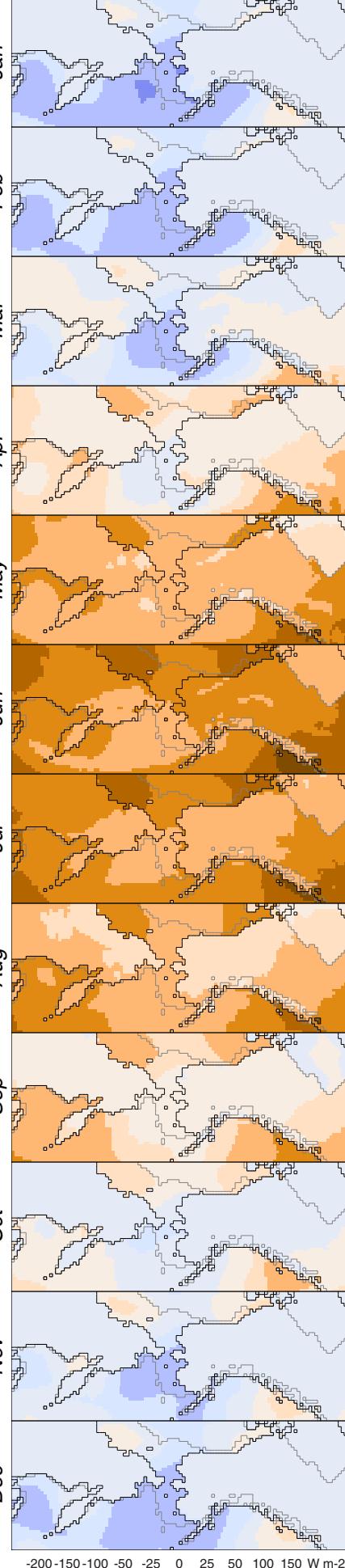
2-m Air Temperature

Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

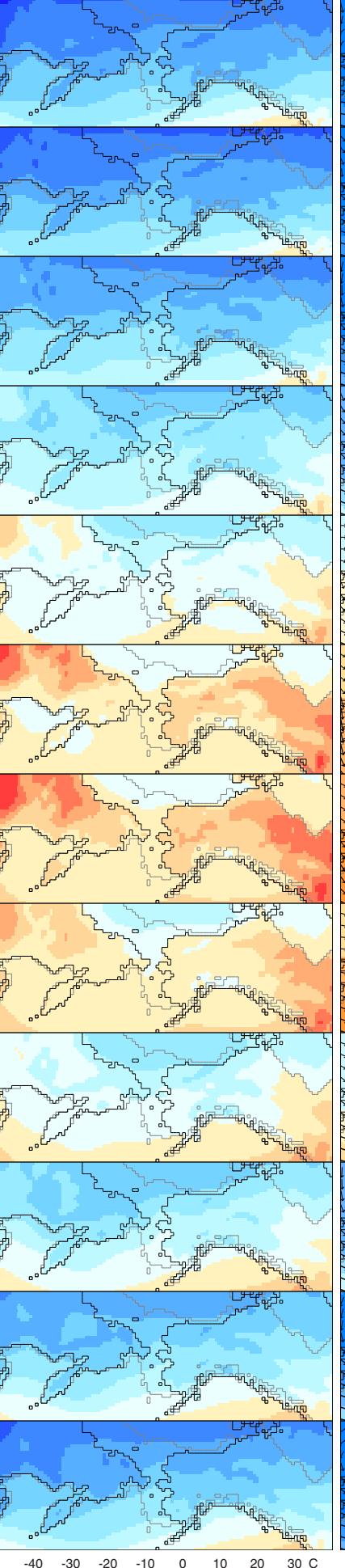


11 ka Sea-Level Simulation

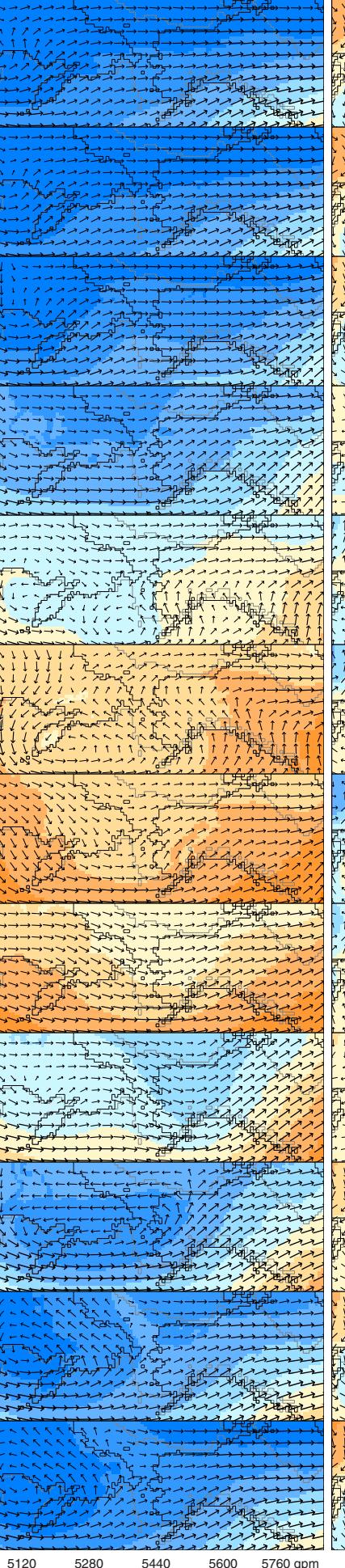
Net Radiation



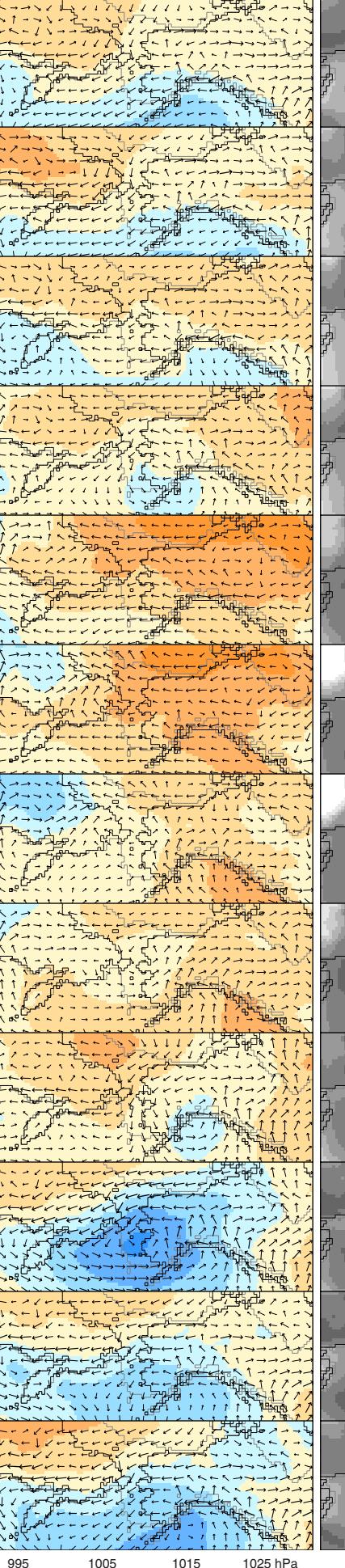
2-m Air Temperature



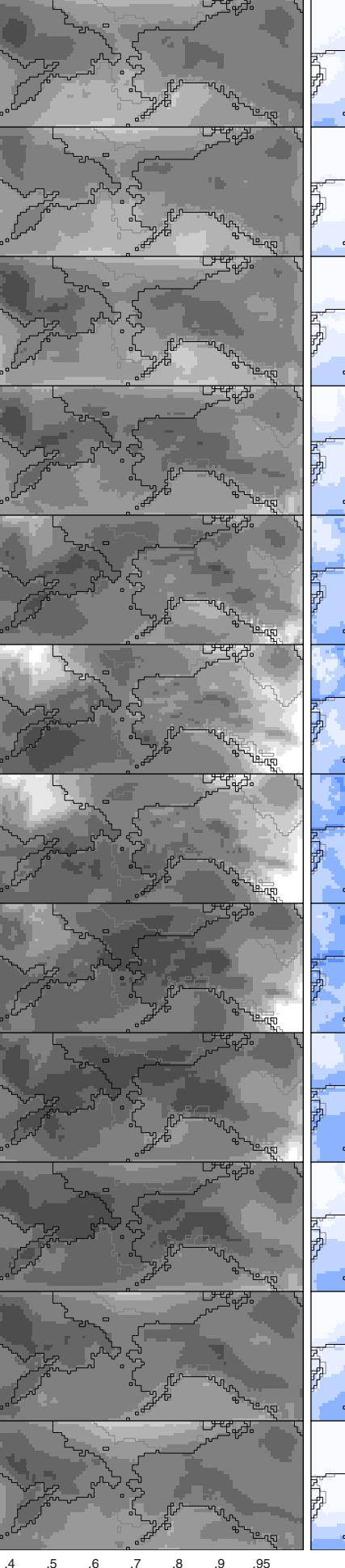
500hPa Heights & Winds



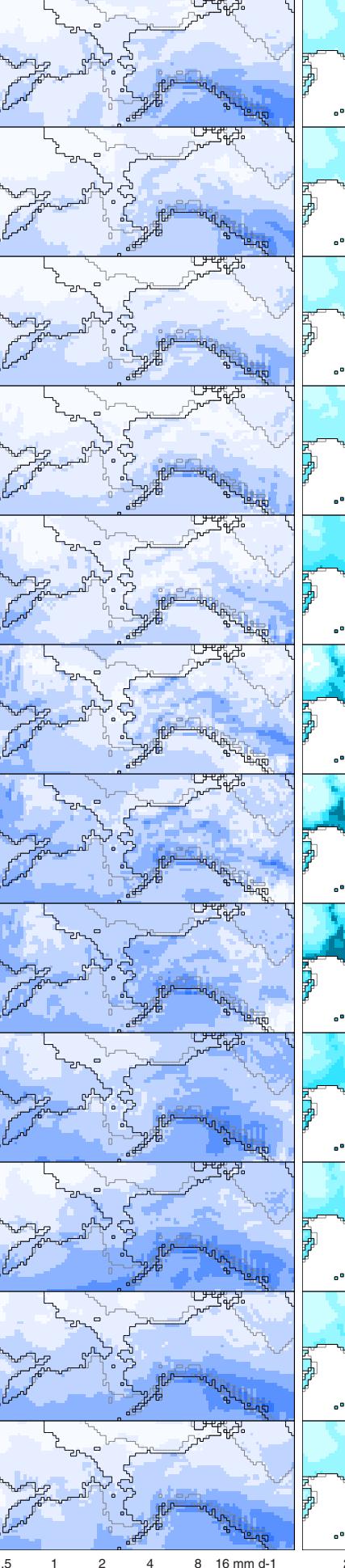
Sea-Level Pressure & Winds



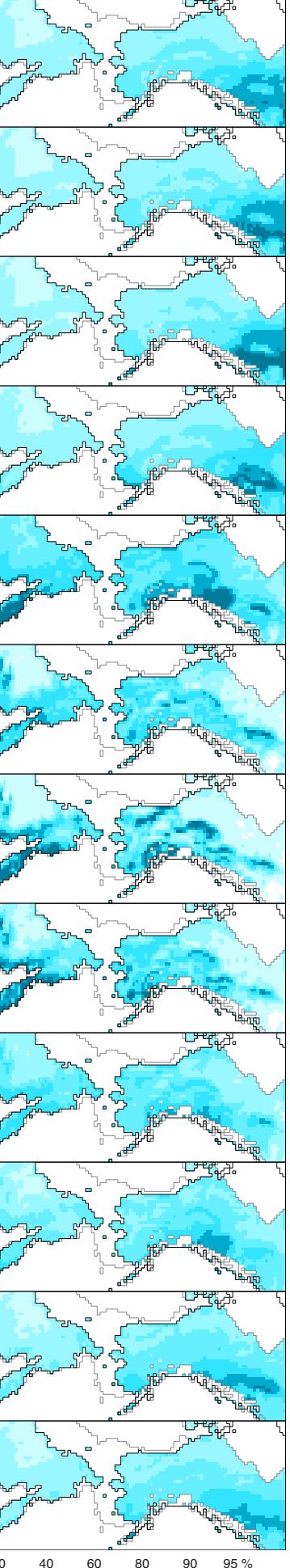
Total Cloud Fraction



Precipitation Rate



Long-Term Means



Suppl. Fig. 7A

11 ka Sea-Level Simulation

Net Shortwave Radiation

Net Longwave Radiation

Net Radiation

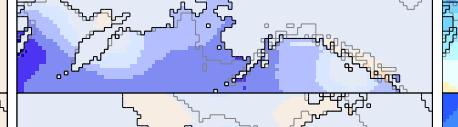
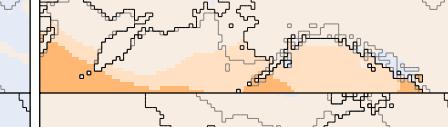
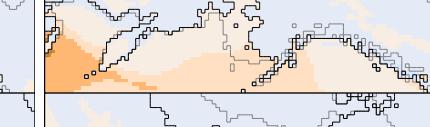
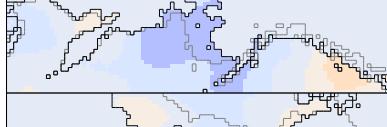
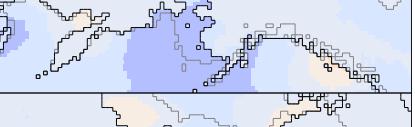
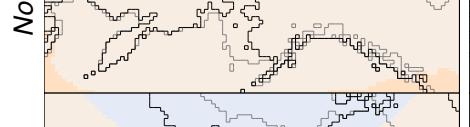
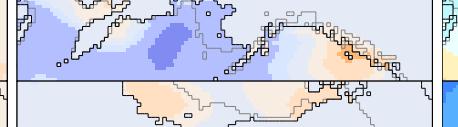
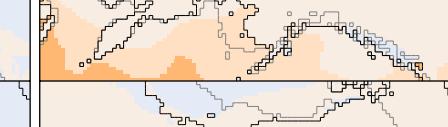
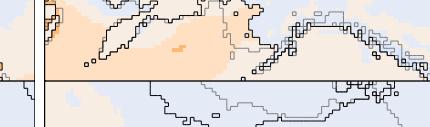
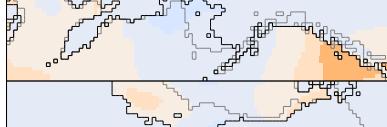
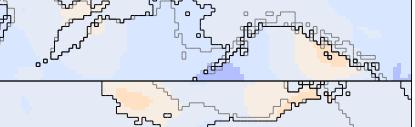
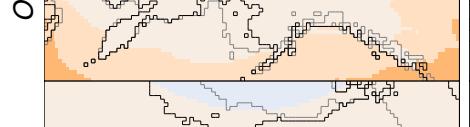
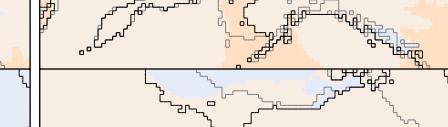
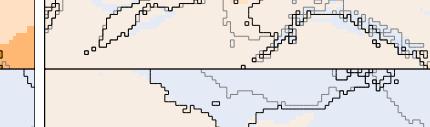
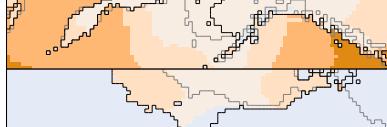
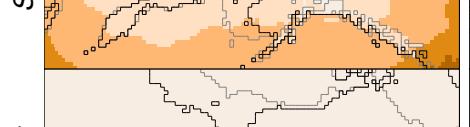
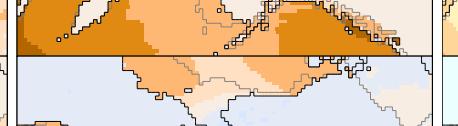
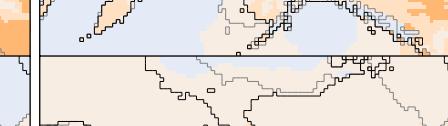
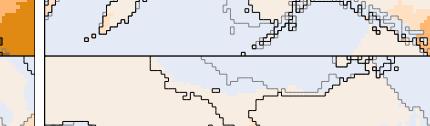
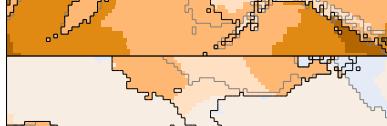
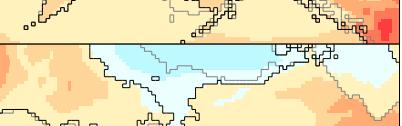
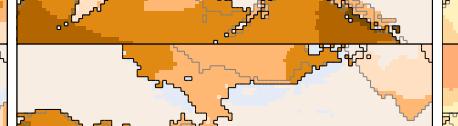
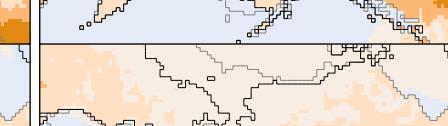
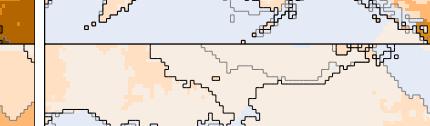
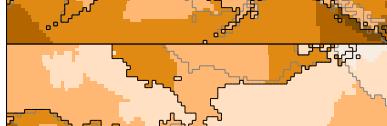
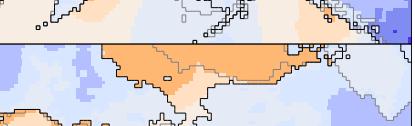
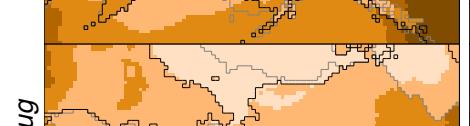
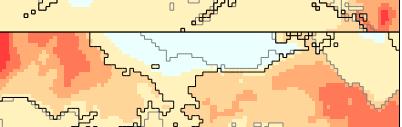
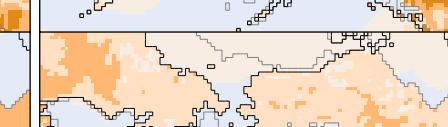
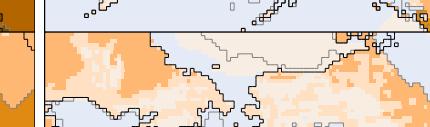
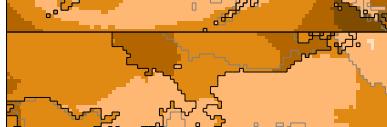
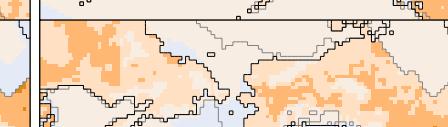
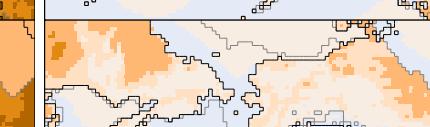
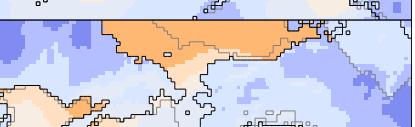
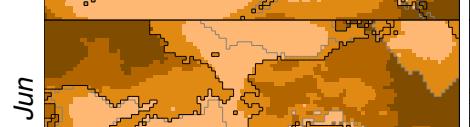
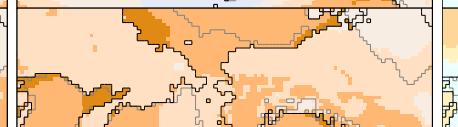
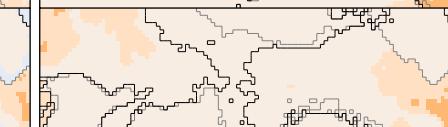
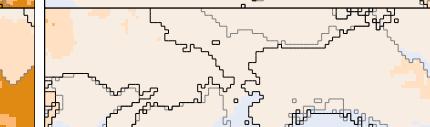
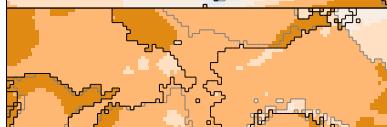
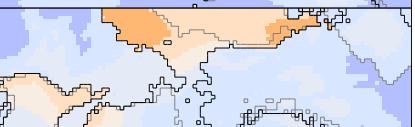
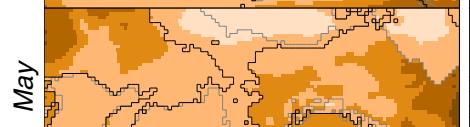
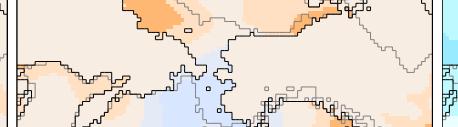
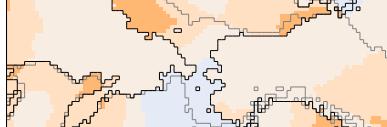
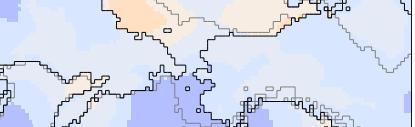
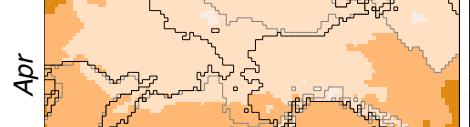
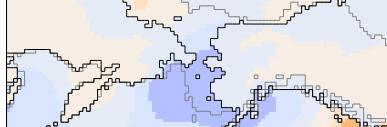
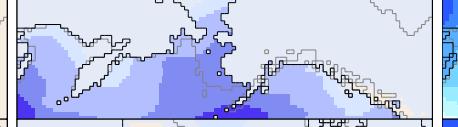
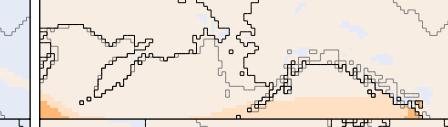
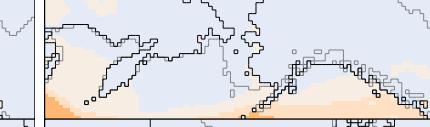
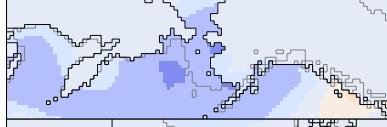
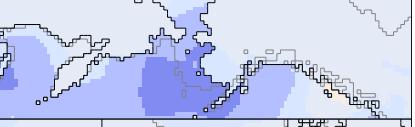
Sensible Heat Flux

Latent Heat Flux

Substrate Heat Flux

Long-Term Means

2-m Air Temperature



-200 -150 -100 -50 0 25 50 100 150 W m⁻²

-200 -150 -100 -50 0 25 50 100 150 W m⁻²

-200 -150 -100 -50 0 25 50 100 150 W m⁻²

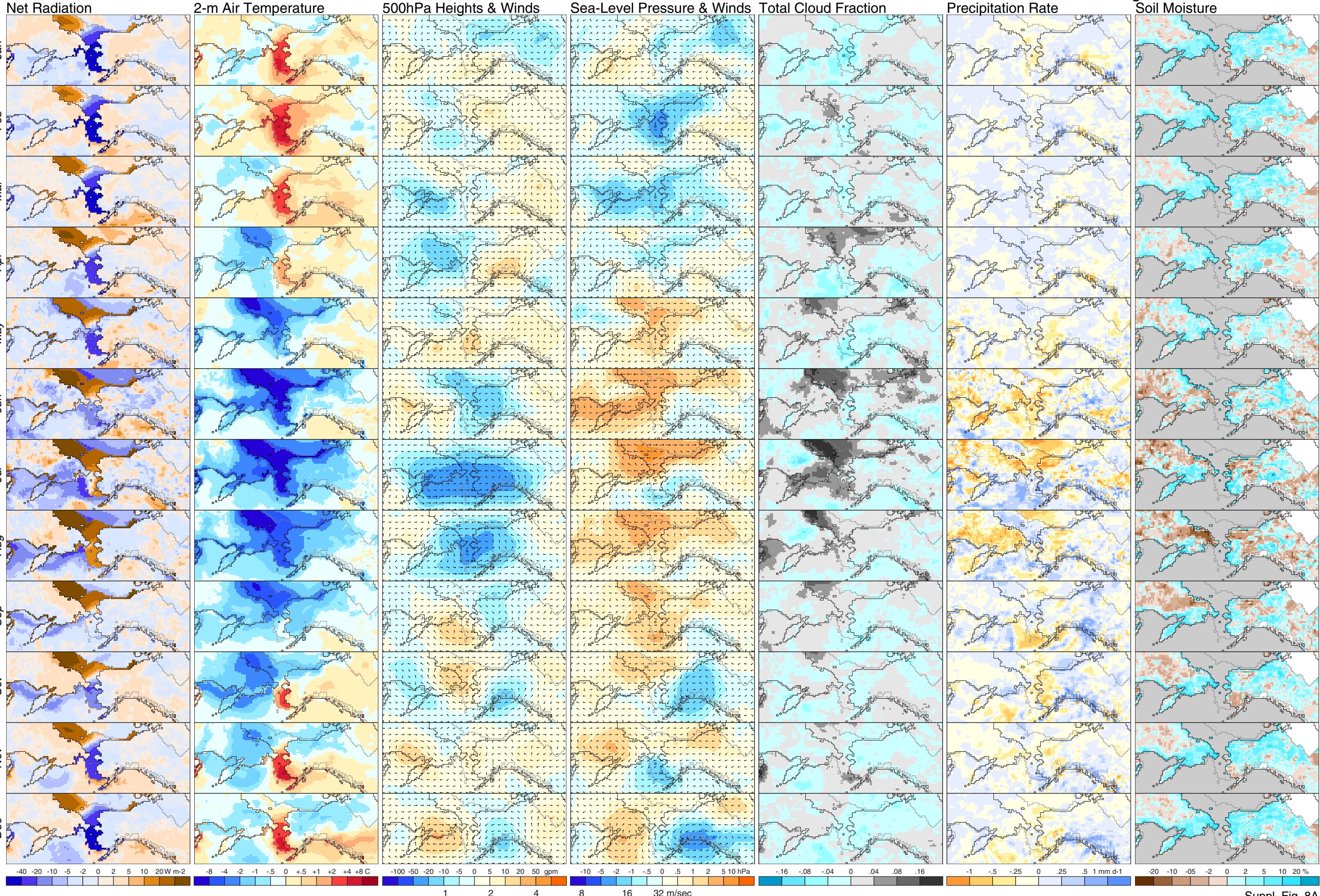
-200 -150 -100 -50 0 25 50 100 150 W m⁻²

-200 -150 -100 -50 0 25 50 100 150 W m⁻²

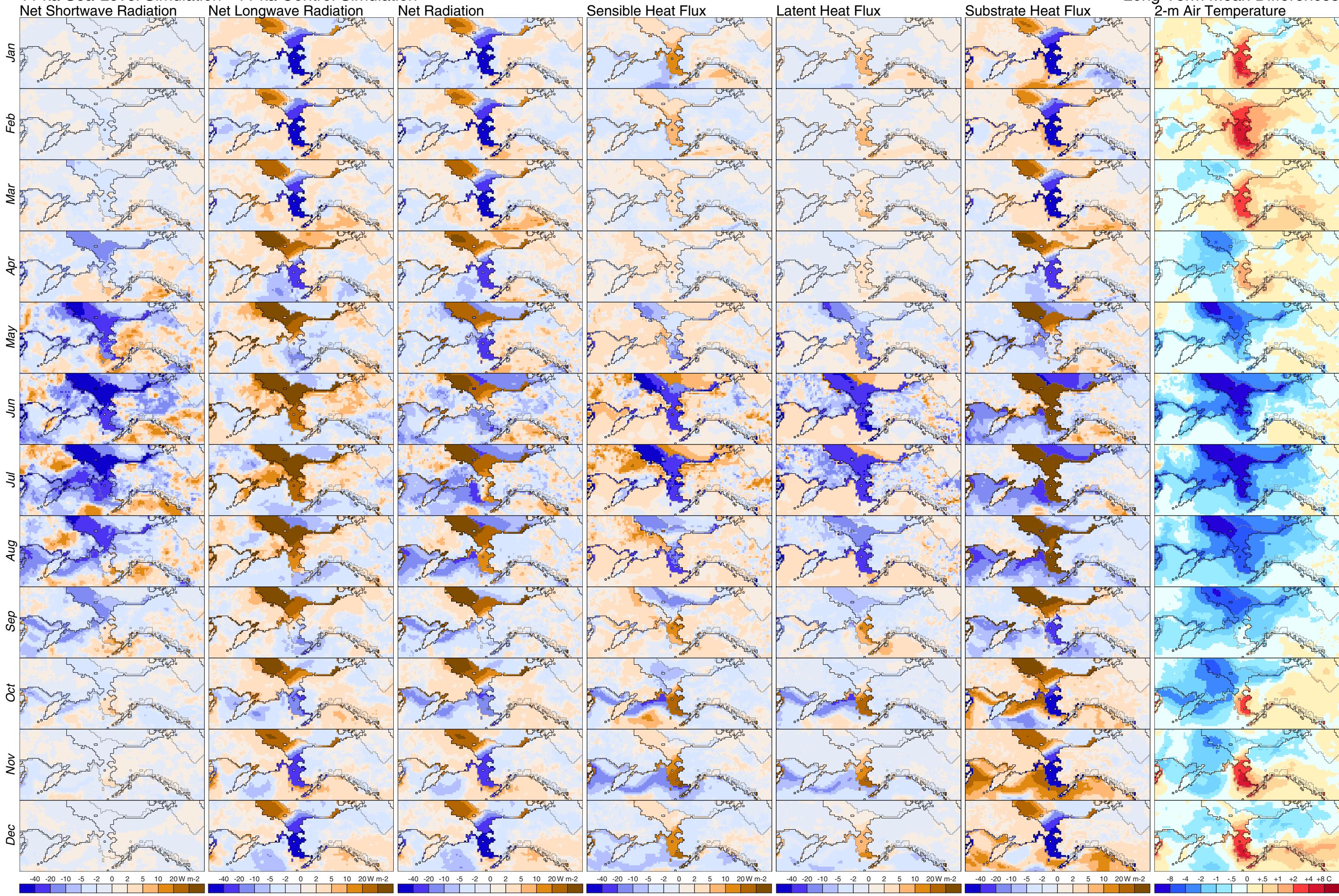
-200 -150 -100 -50 0 25 50 100 150 W m⁻²

-40 -30 -20 -10 0 10 20 30 C

11 ka Sea-Level Simulation - 11 ka Control Simulation

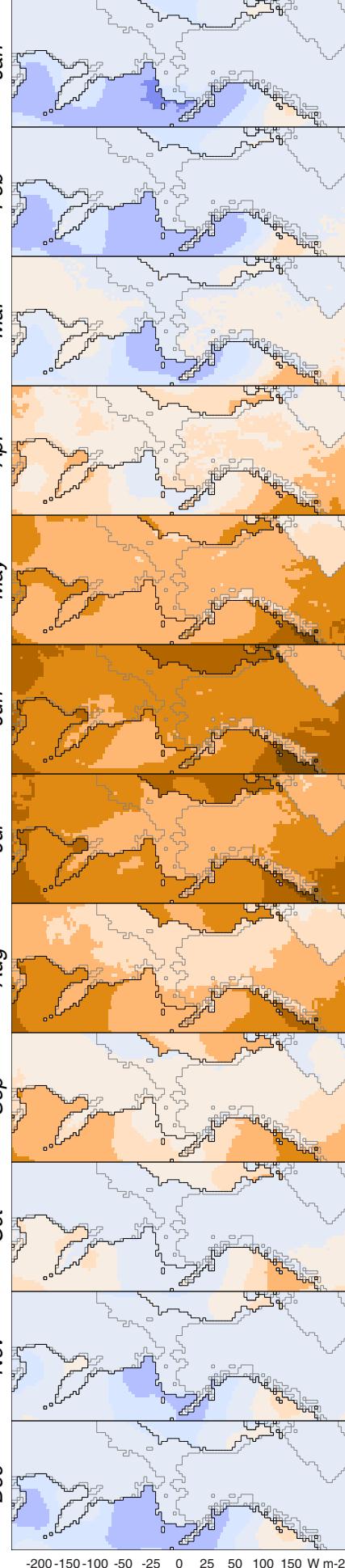


11 ka Sea-Level Simulation - 11 ka Control Simulation

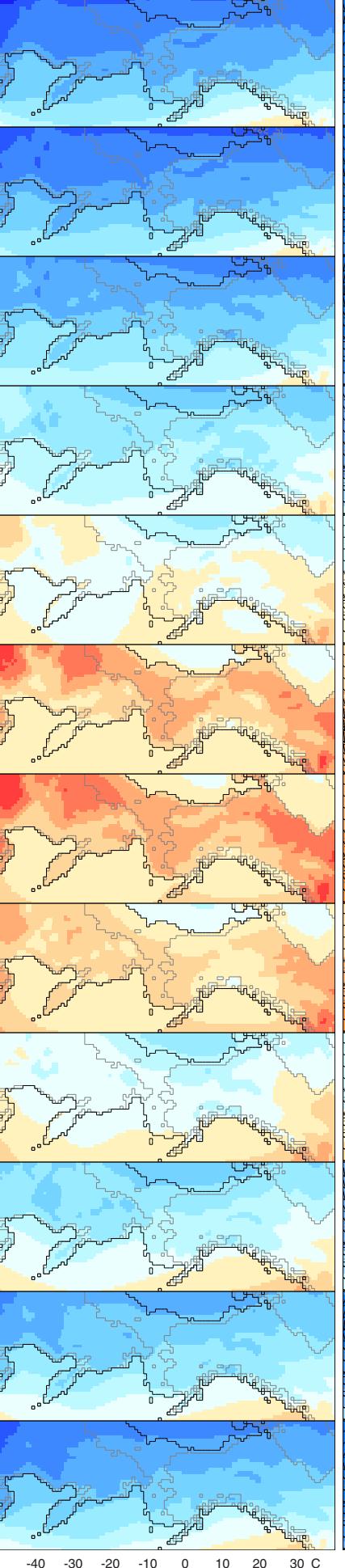


11 ka Vegetation Simulation

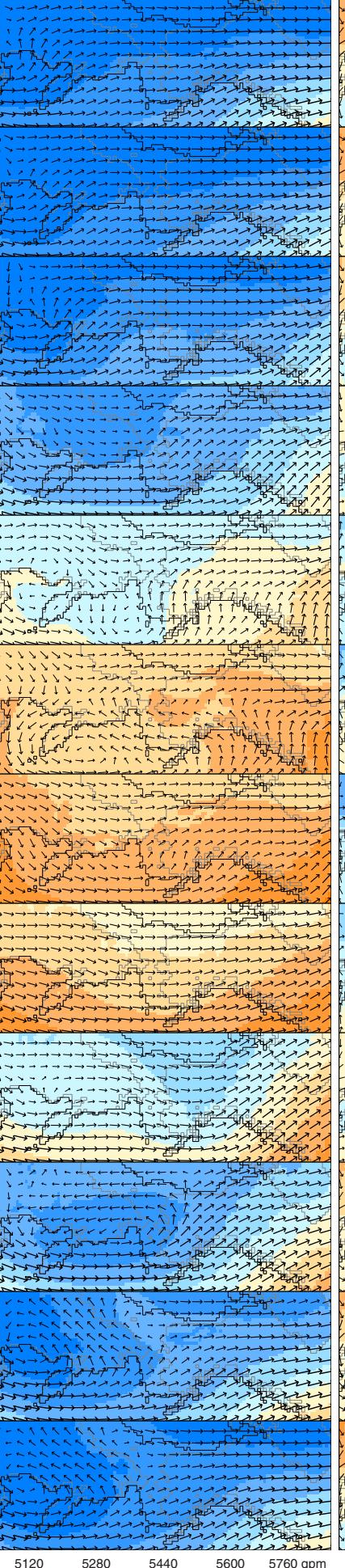
Net Radiation



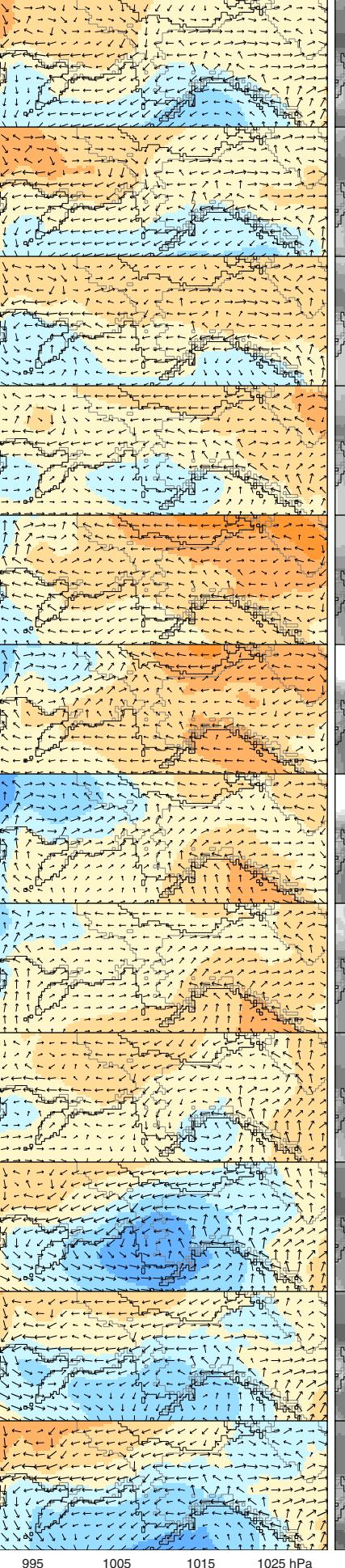
2-m Air Temperature



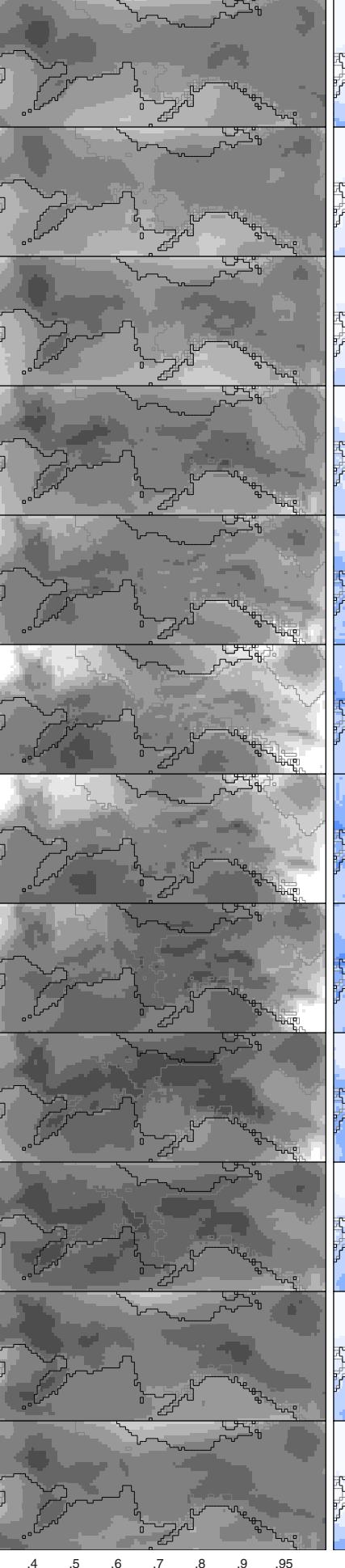
500hPa Heights & Winds



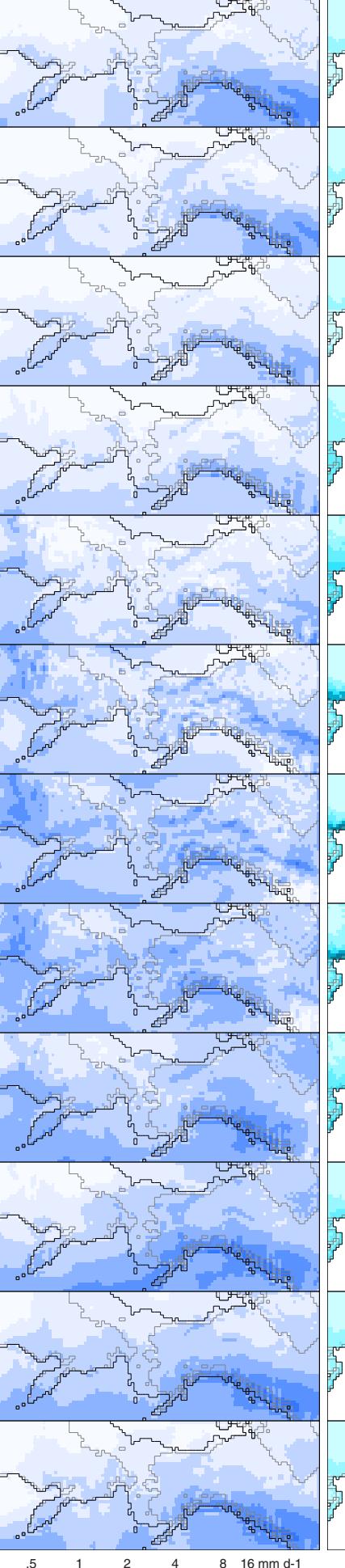
Sea-Level Pressure & Winds



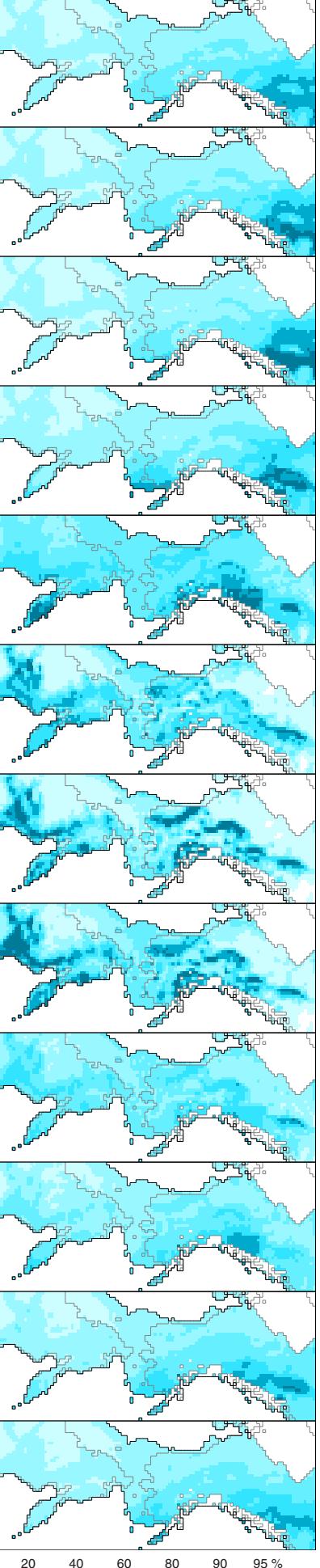
Total Cloud Fraction



Precipitation Rate



Long-Term Means



Suppl. Fig. 9A

11 ka Vegetation Simulation

Net Shortwave Radiation

Net Longwave Radiation

Net Radiation

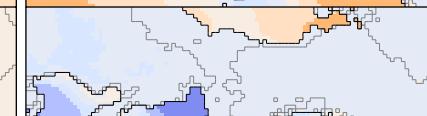
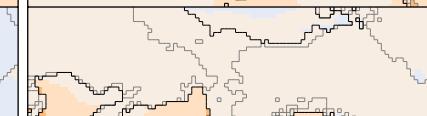
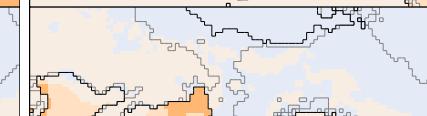
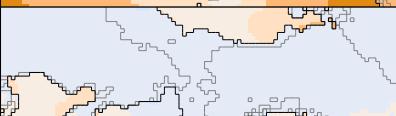
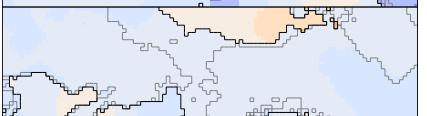
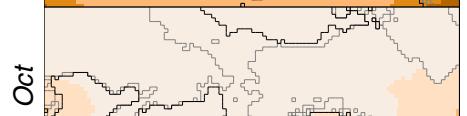
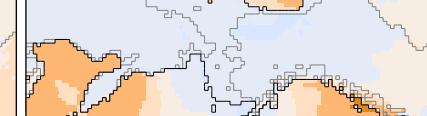
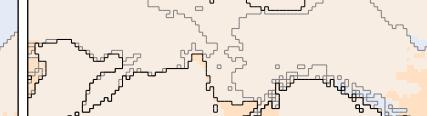
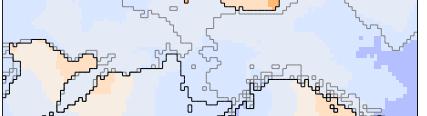
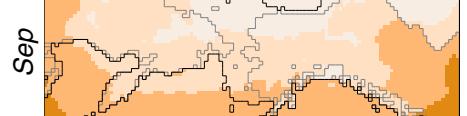
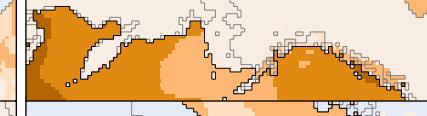
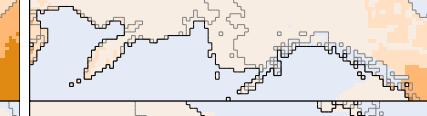
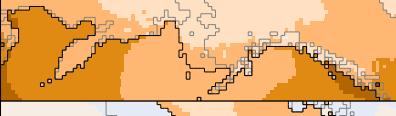
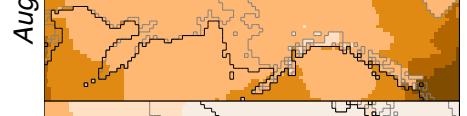
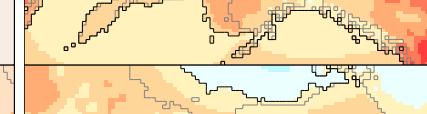
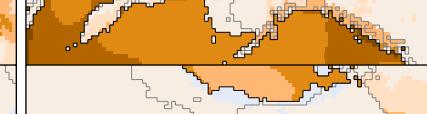
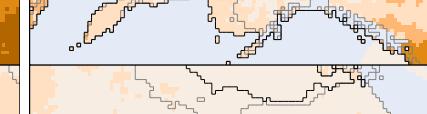
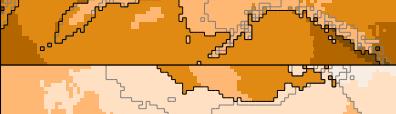
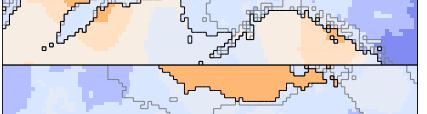
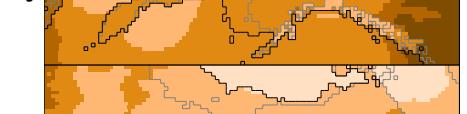
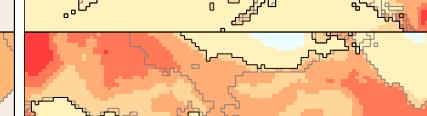
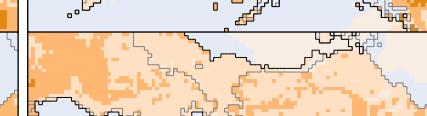
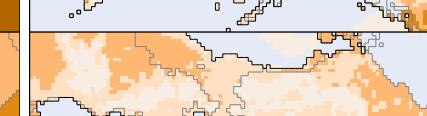
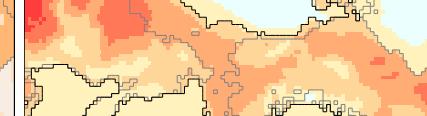
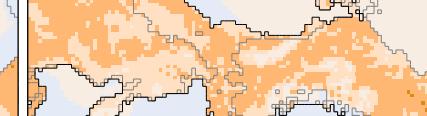
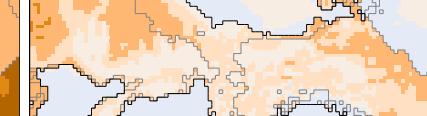
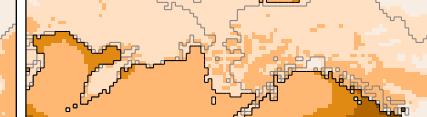
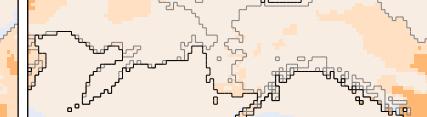
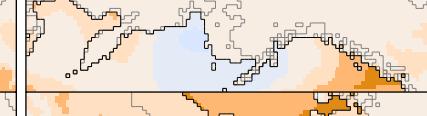
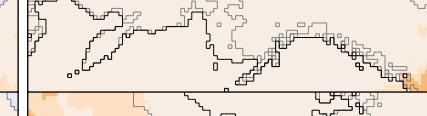
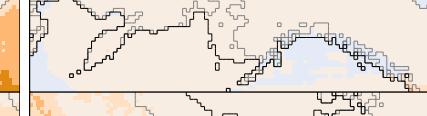
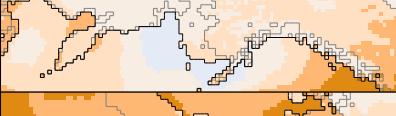
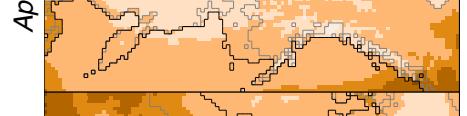
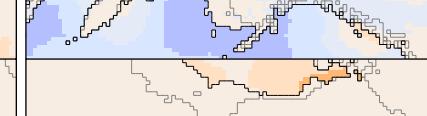
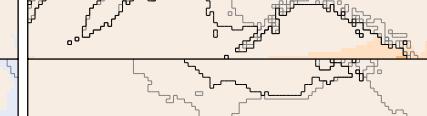
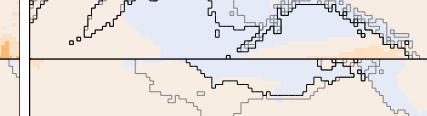
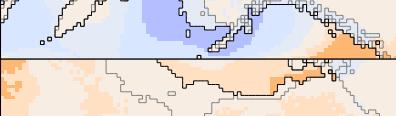
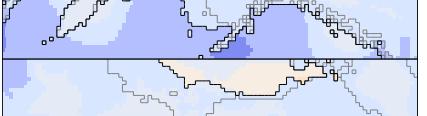
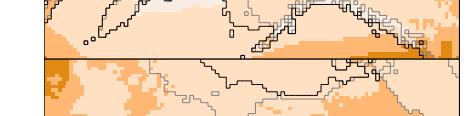
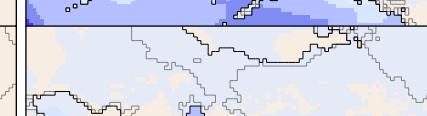
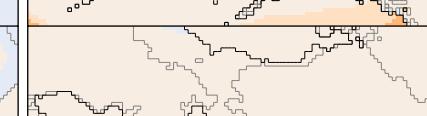
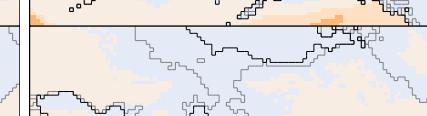
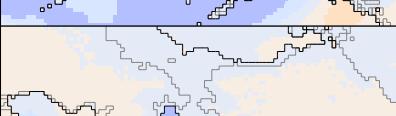
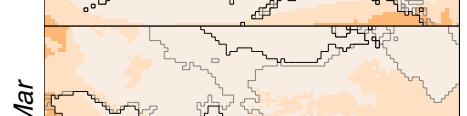
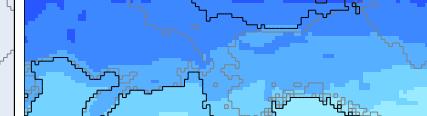
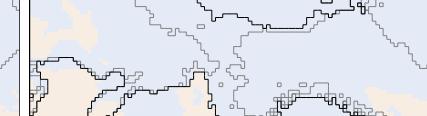
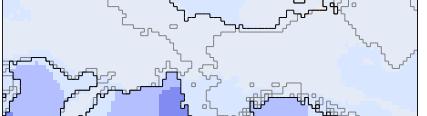
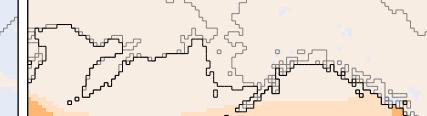
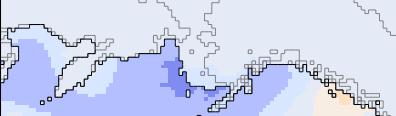
Sensible Heat Flux

Latent Heat Flux

Substrate Heat Flux

Long-Term Means

2-m Air Temperature



-200 -150 -100 -50 0 25 50 100 150 W m⁻²

-200 -150 -100 -50 0 25 50 100 150 W m⁻²

-200 -150 -100 -50 0 25 50 100 150 W m⁻²

-200 -150 -100 -50 0 25 50 100 150 W m⁻²

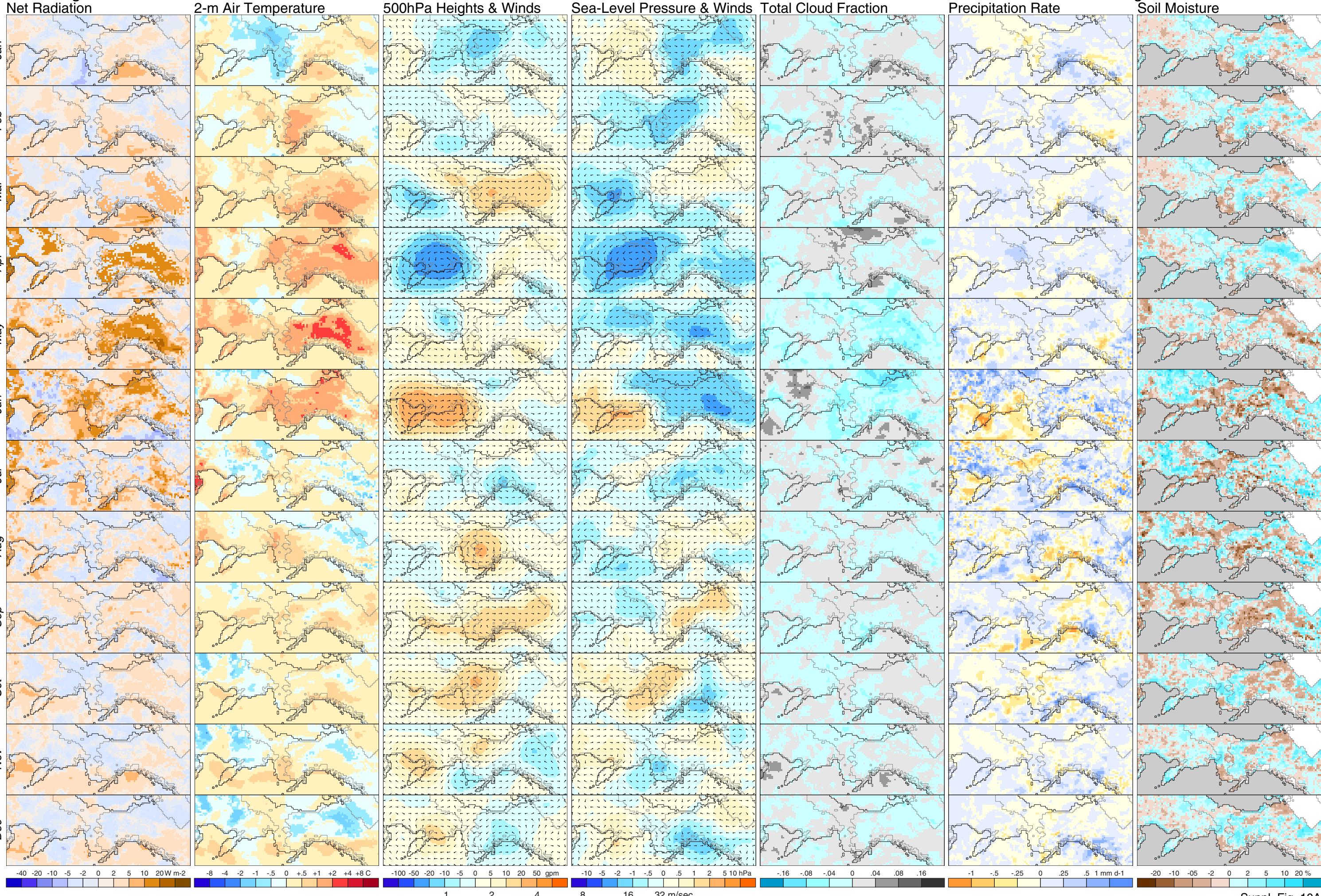
-200 -150 -100 -50 0 25 50 100 150 W m⁻²

-200 -150 -100 -50 0 25 50 100 150 W m⁻²

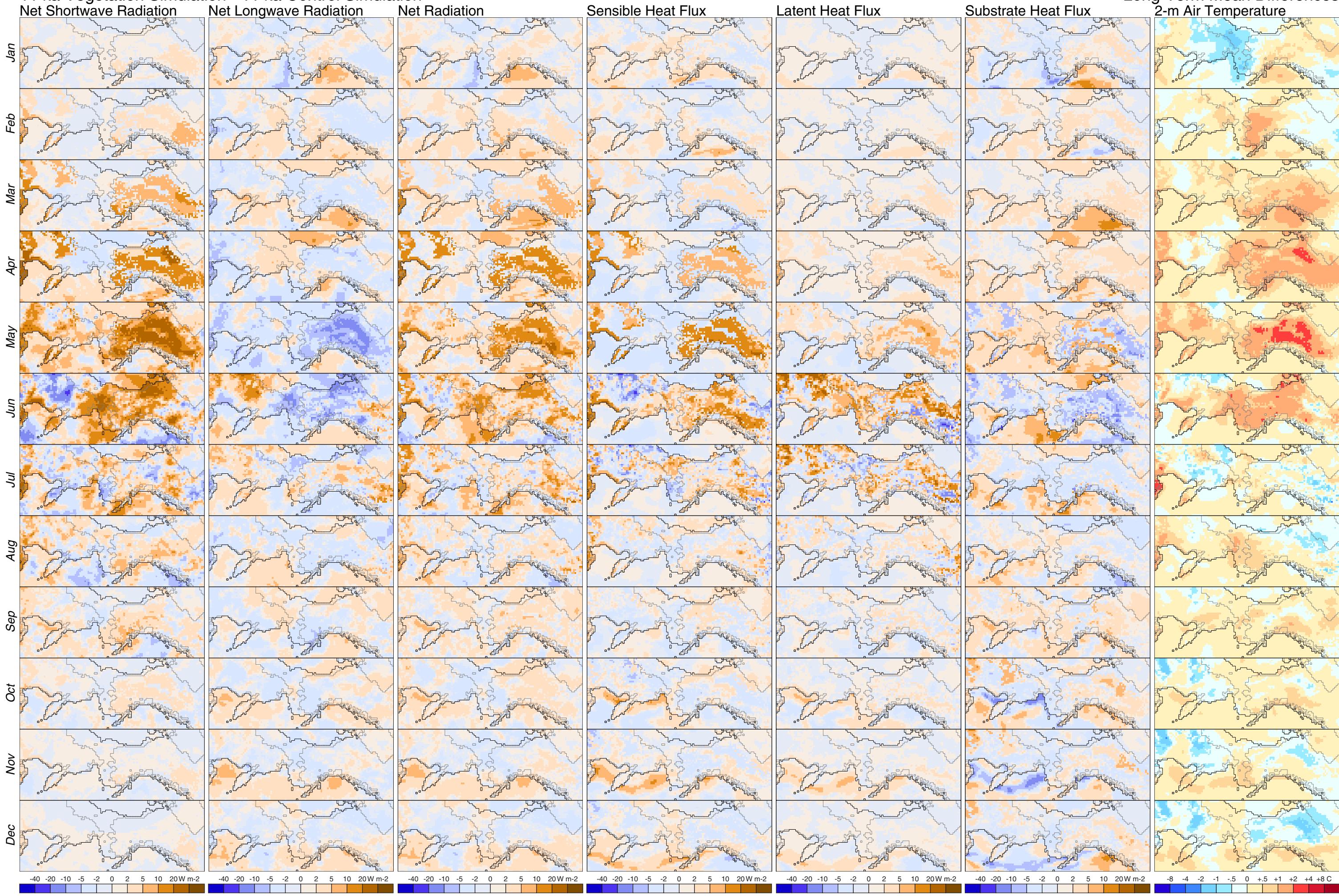
-40 -30 -20 -10 0 10 20 30 C

11 ka Vegetation Simulation - 11 ka Control Simulation

Long-Term Mean Differences



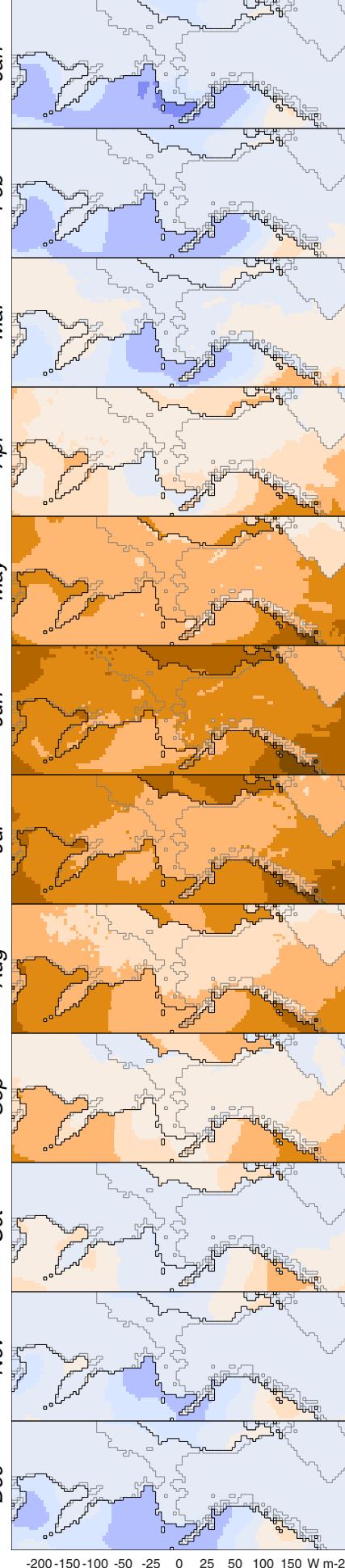
11 ka Vegetation Simulation - 11 ka Control Simulation



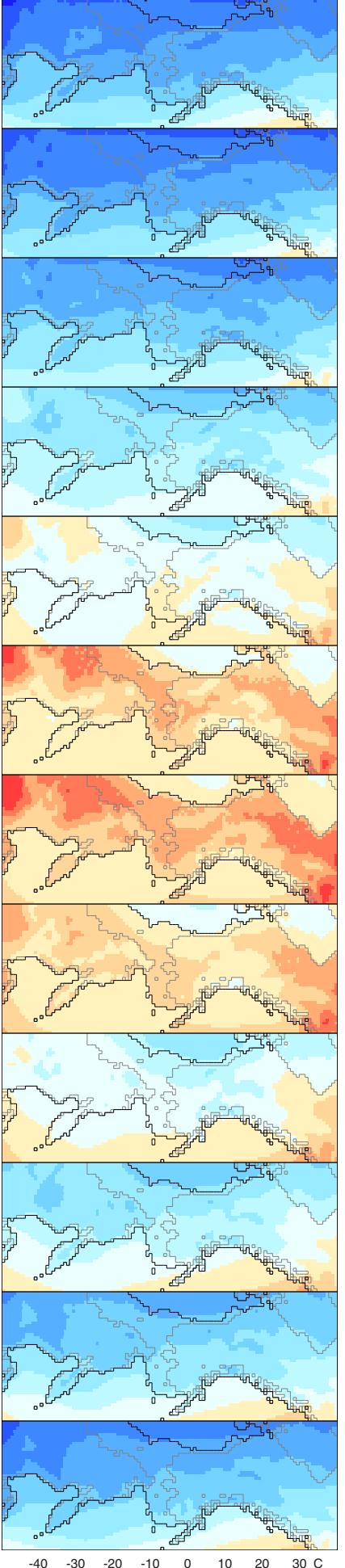
Long-Term Mean Differences
2-m Air Temperature

11 ka Lakes Simulation

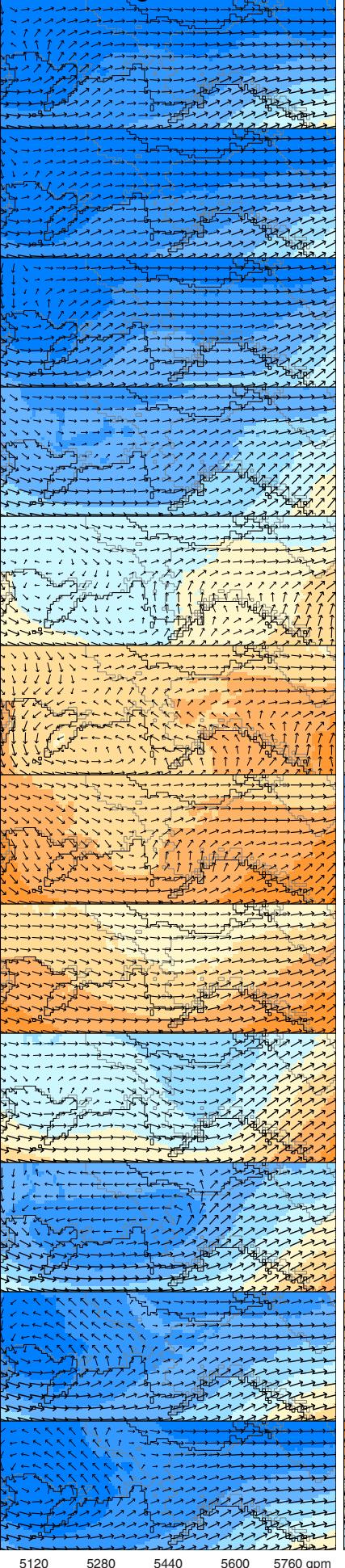
Net Radiation



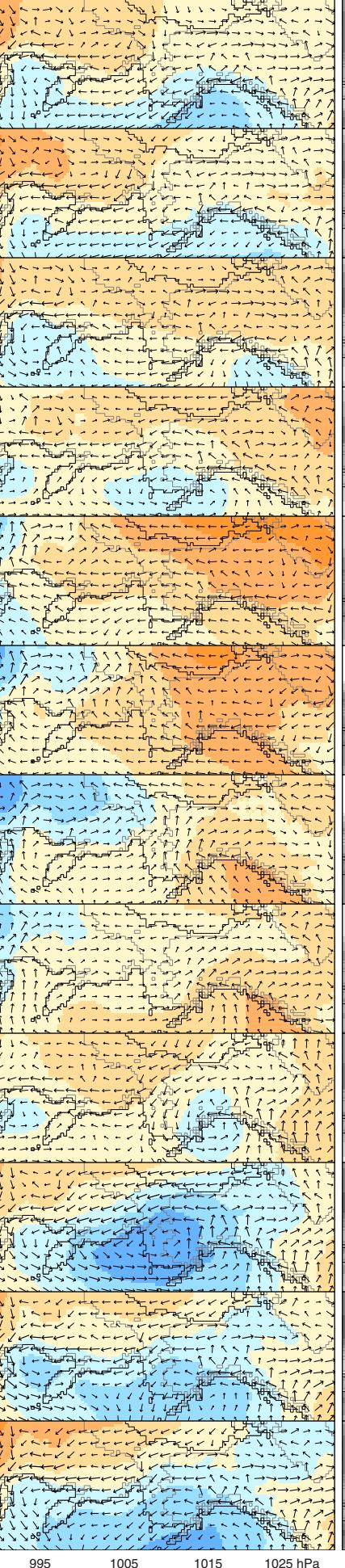
2-m Air Temperature



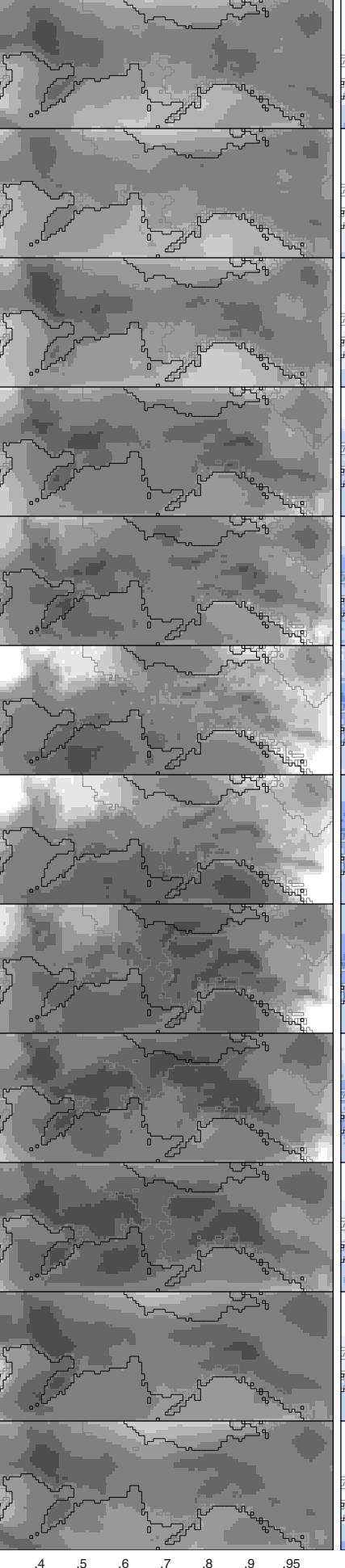
500hPa Heights & Winds



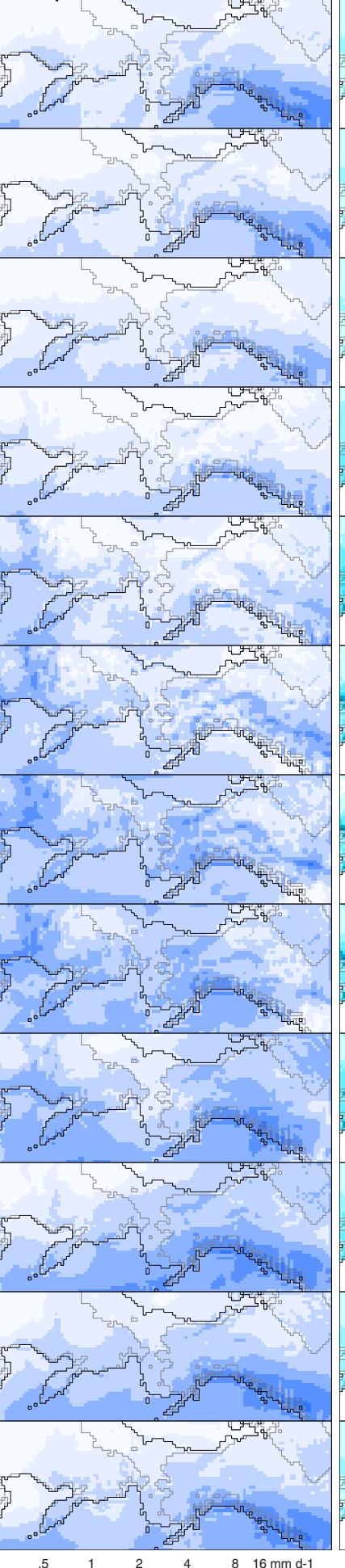
Sea-Level Pressure & Winds



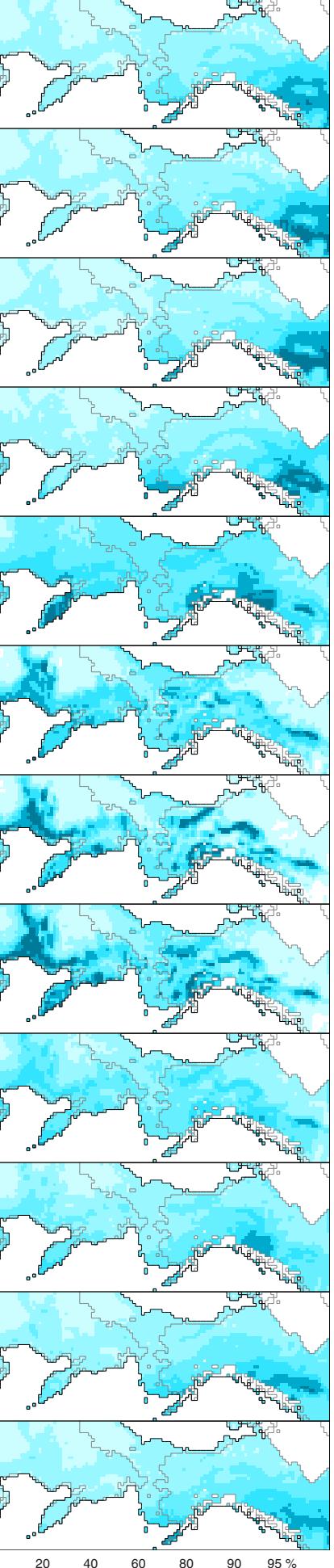
Total Cloud Fraction



Precipitation Rate

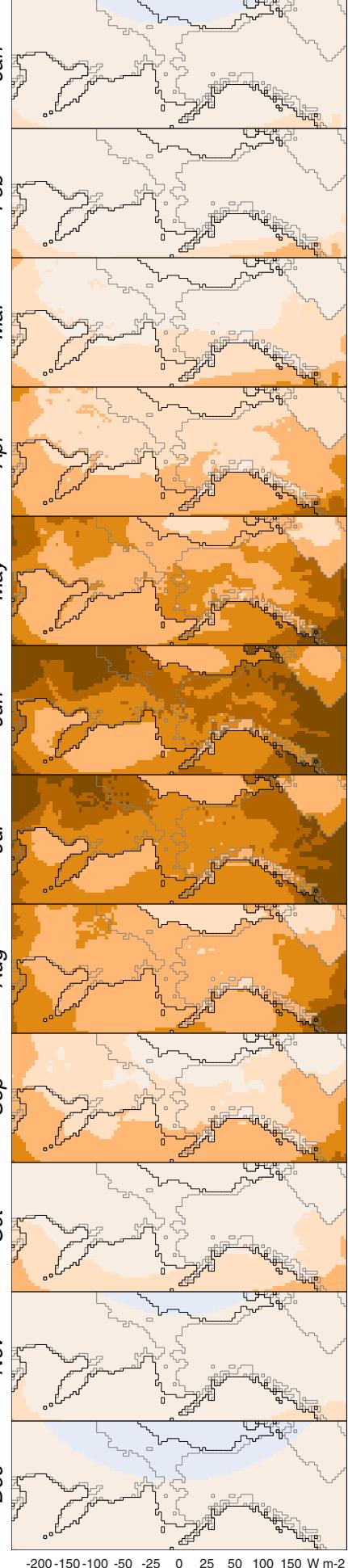


Long-Term Means

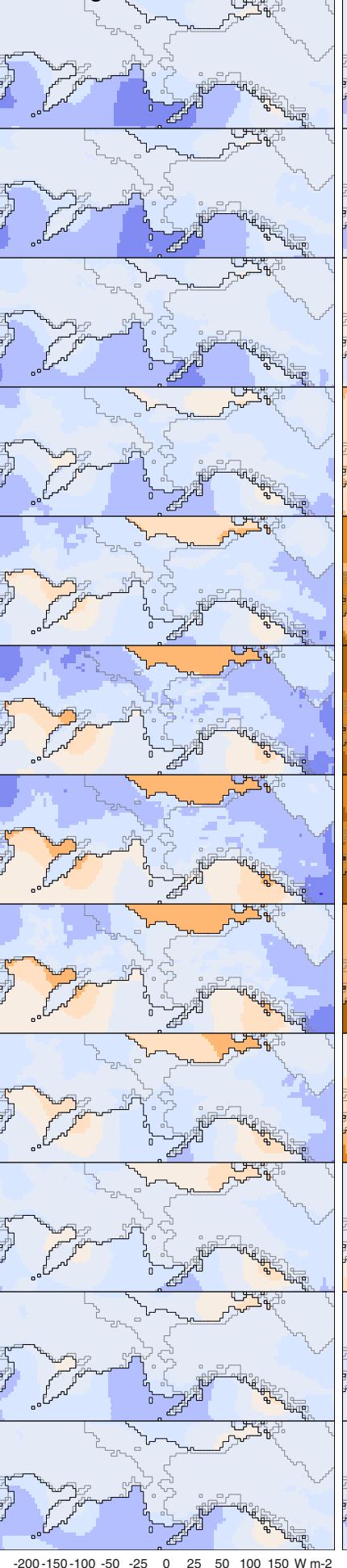


11 ka Lakes Simulation

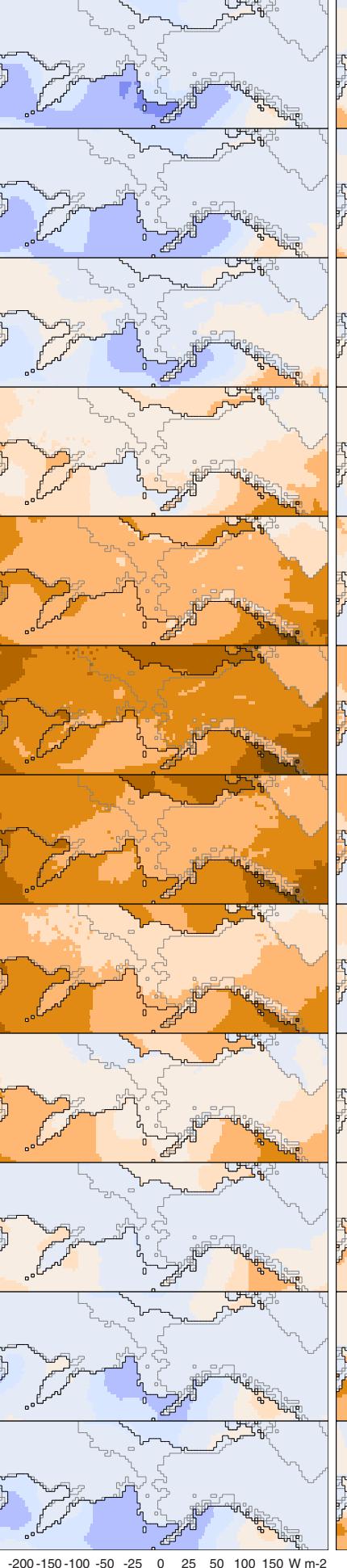
Net Shortwave Radiation



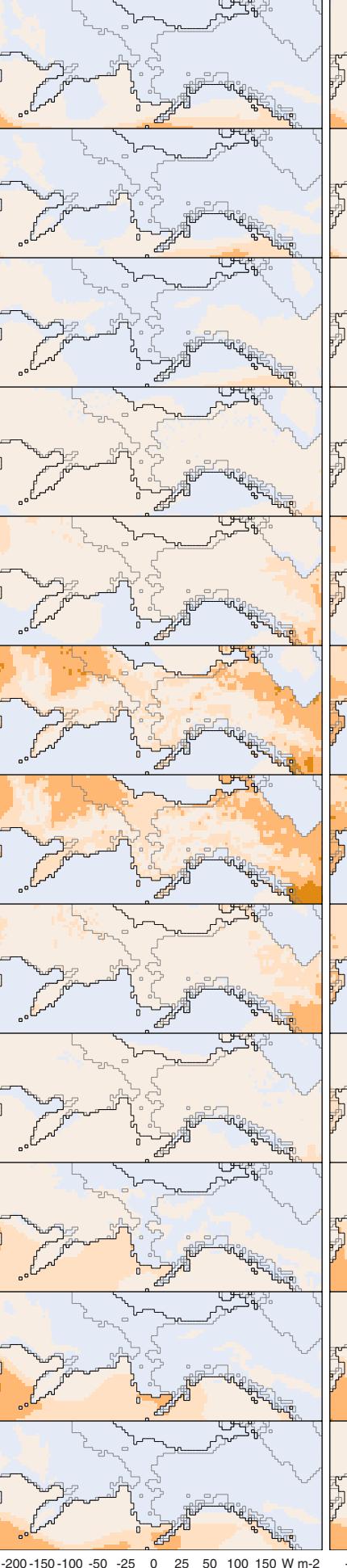
Net Longwave Radiation



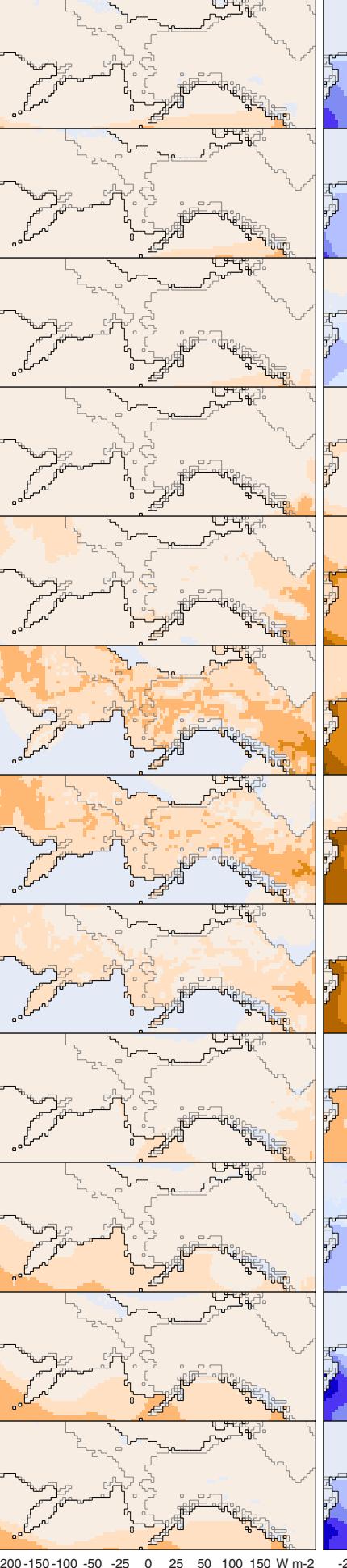
Net Radiation



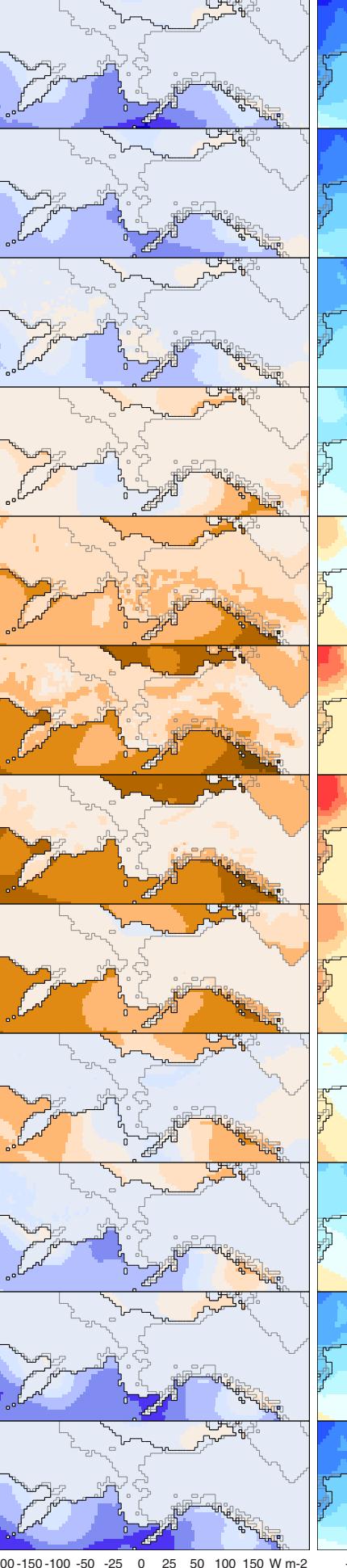
Sensible Heat Flux



Latent Heat Flux

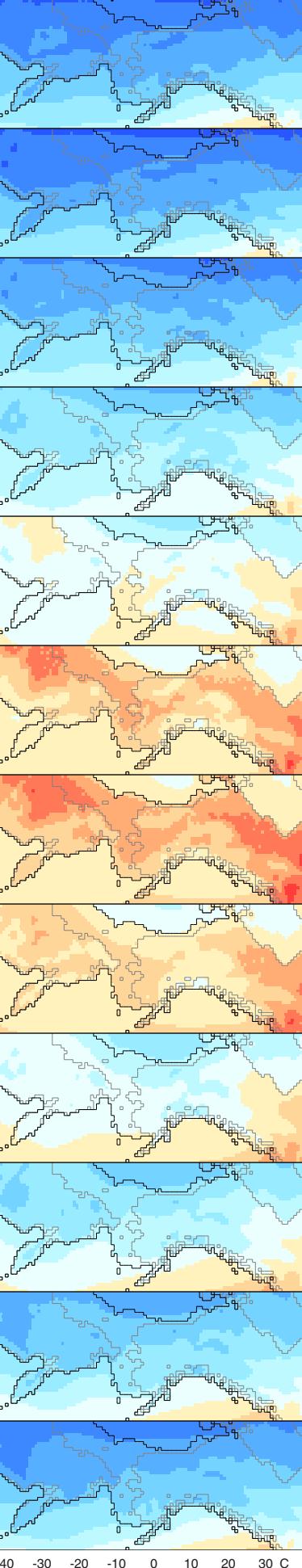


Substrate Heat Flux



Long-Term Means

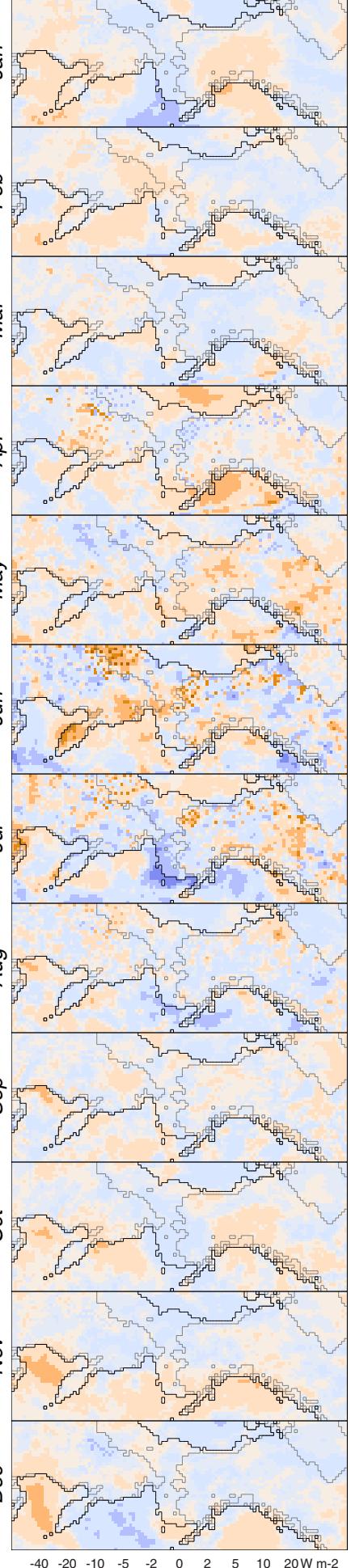
2-m Air Temperature



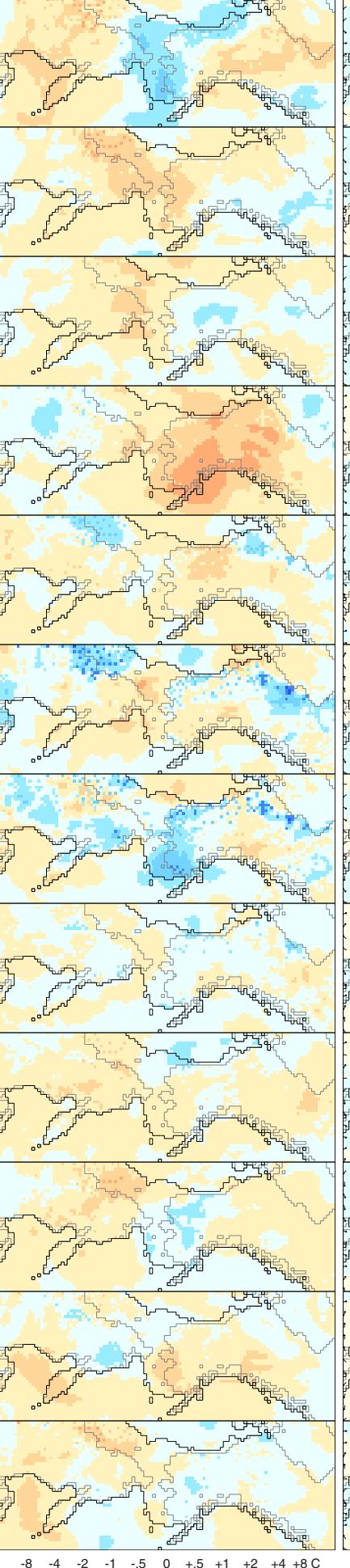
Suppl. Fig. 11B

11 ka Lakes Simulation - 11 ka Control Simulation

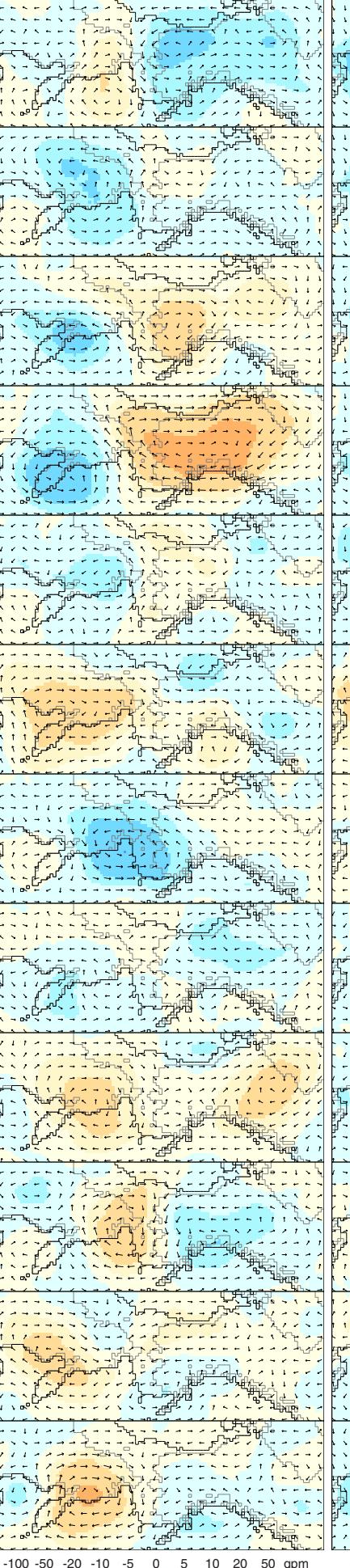
Net Radiation



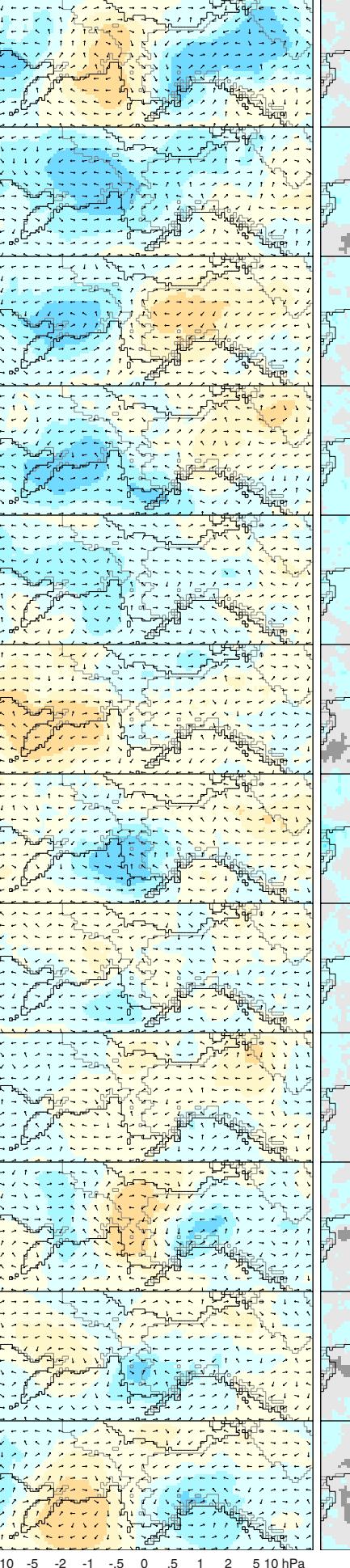
2-m Air Temperature



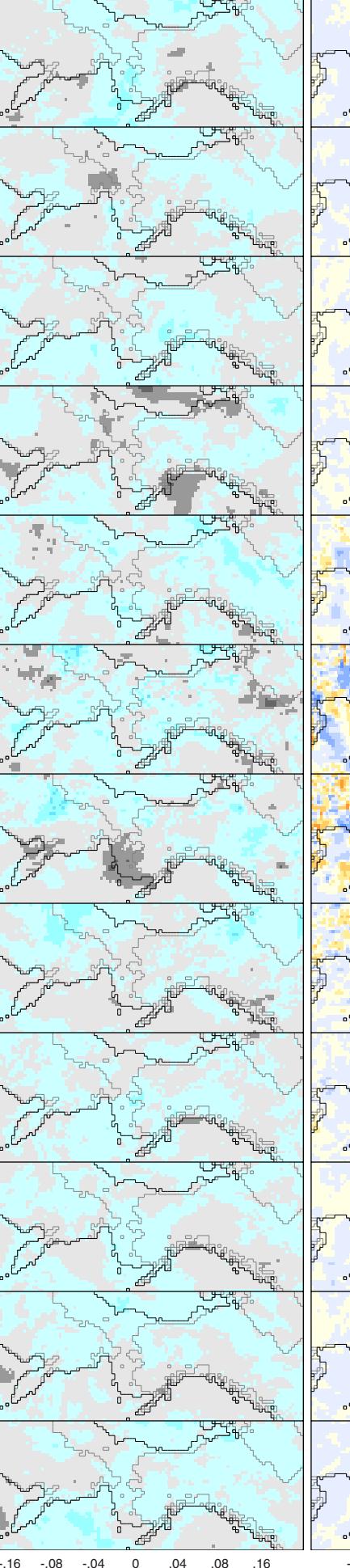
500hPa Heights & Winds



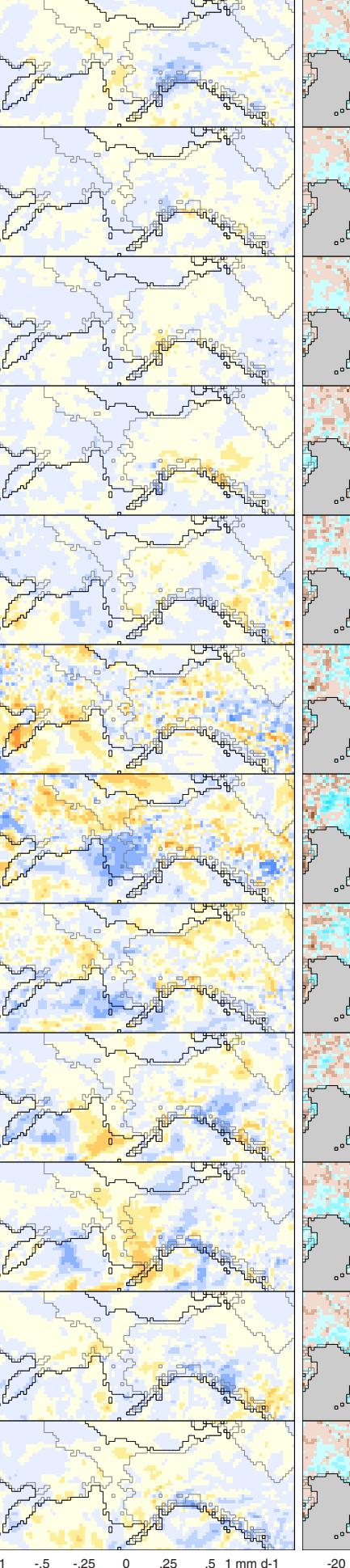
Sea-Level Pressure & Winds



Total Cloud Fraction

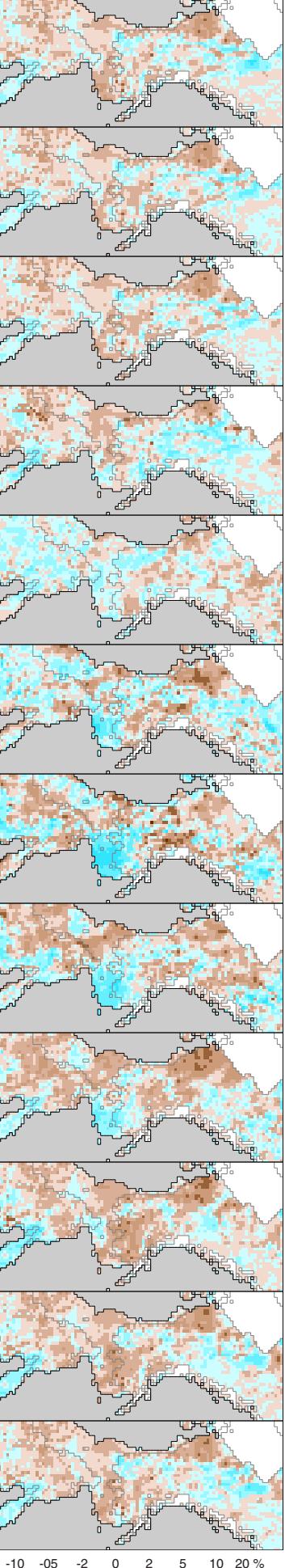


Precipitation Rate



Long-Term Mean Differences

Soil Moisture



Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

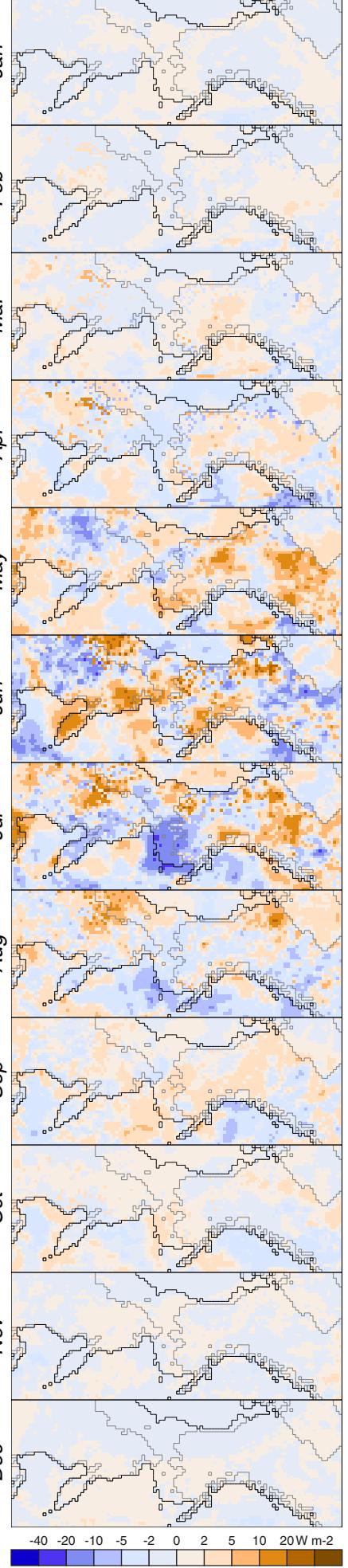
-40 -20 -10 -5 0 2 5 10 20 W m⁻²
-8 -4 -2 -1 0 +.5 +1 +2 +4 +8 C
-100 -50 -20 -5 0 5 10 gpm
-10 -5 -2 -1 -.5 0 .5 1 2 5 10 hPa
-16 -.8 -.4 0 .4 .8 1.6 mm d⁻¹
-20 -10 -5 0 2 5 10 20 %

1 2 4
8 16 32 m/sec

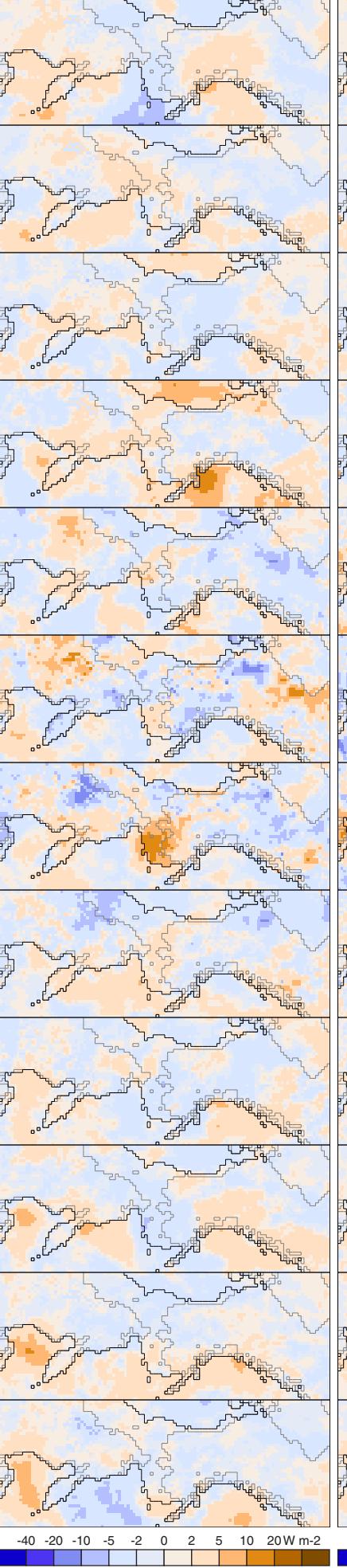
Suppl. Fig. 12A

11 ka Lakes Simulation - 11 ka Control Simulation

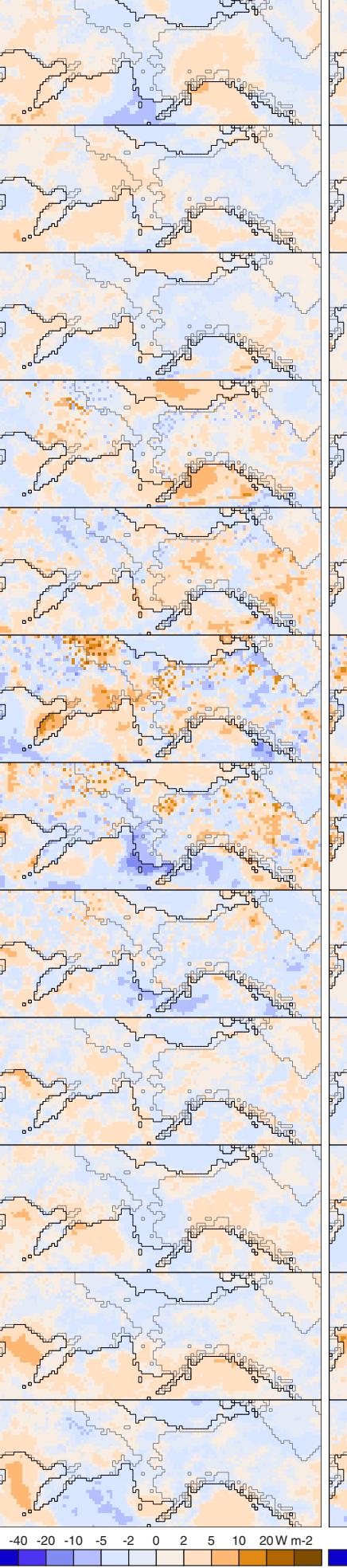
Net Shortwave Radiation



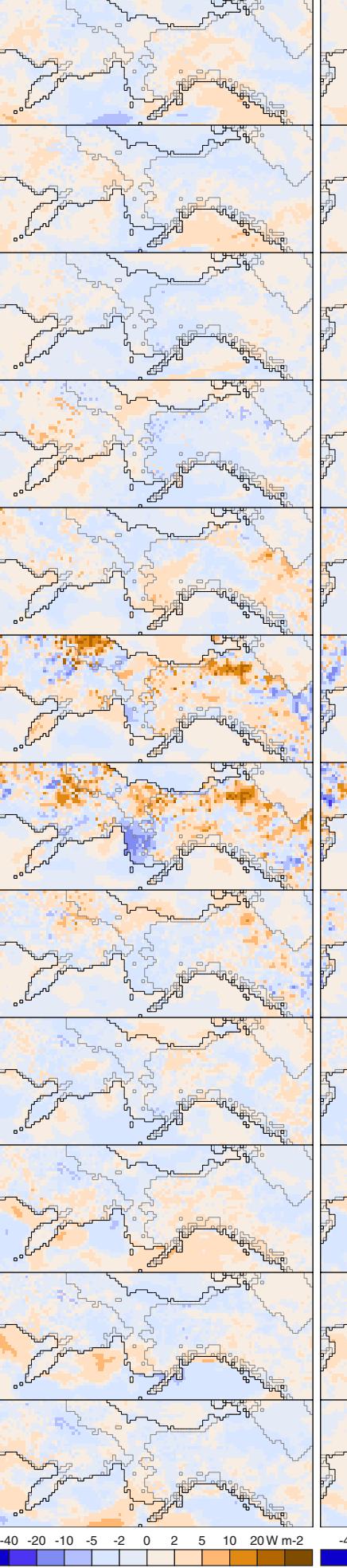
Net Longwave Radiation



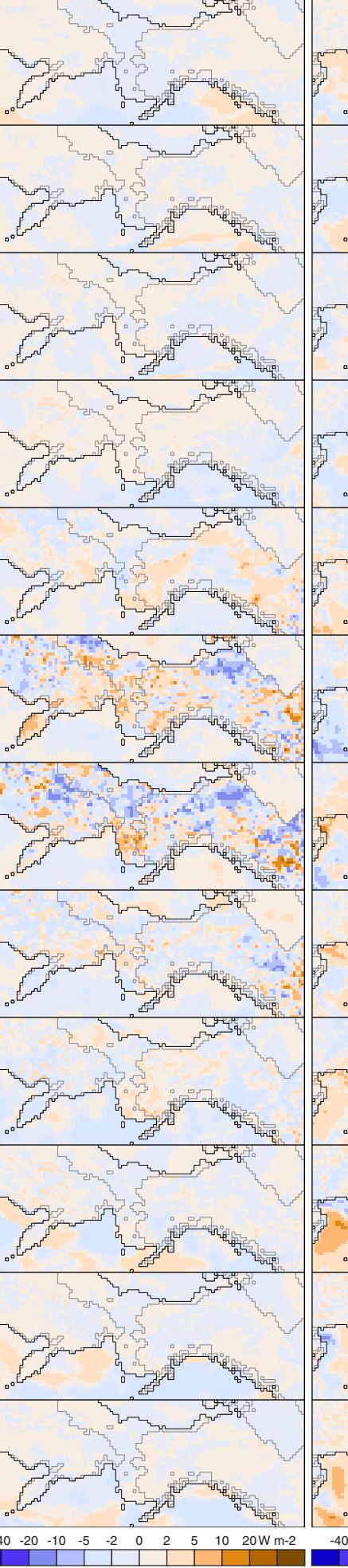
Net Radiation



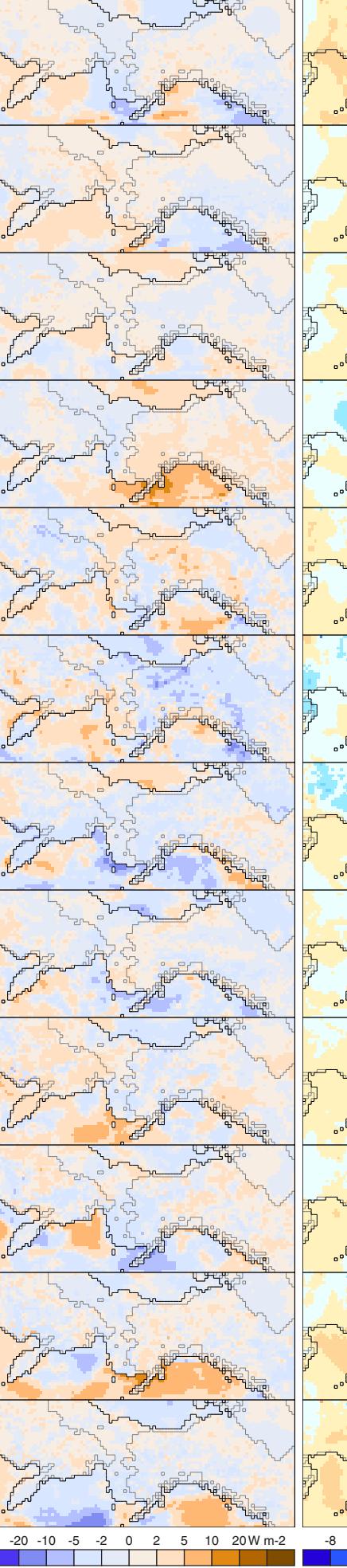
Sensible Heat Flux



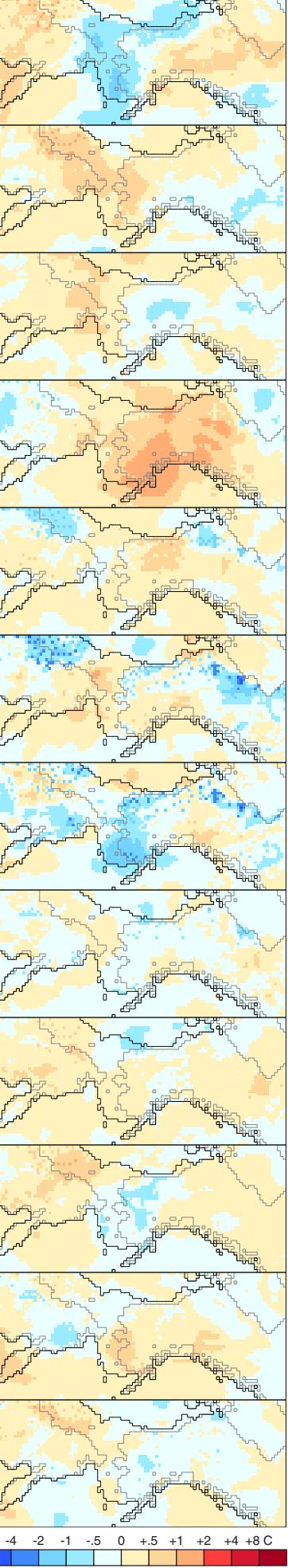
Latent Heat Flux



Substrate Heat Flux

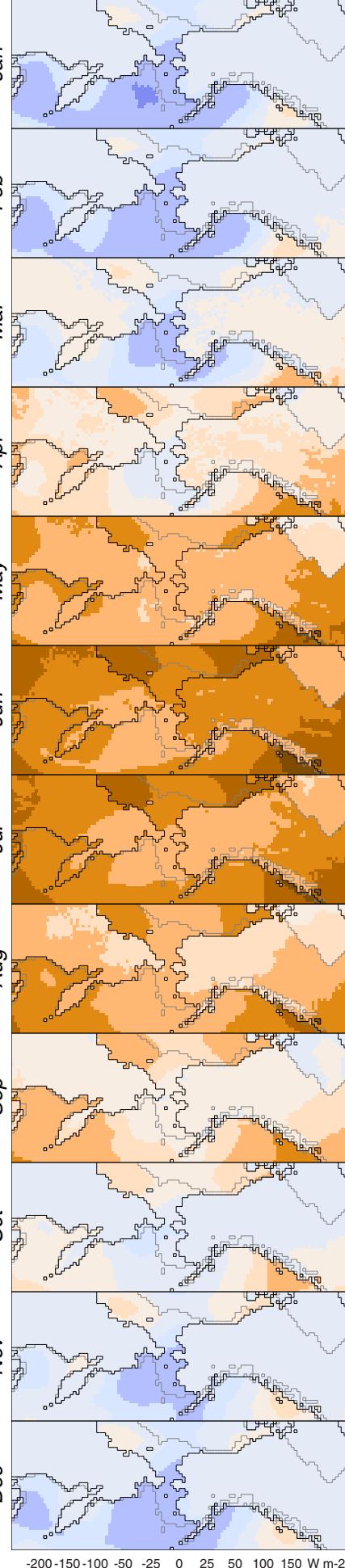


Long-Term Mean Differences
2-m Air Temperature

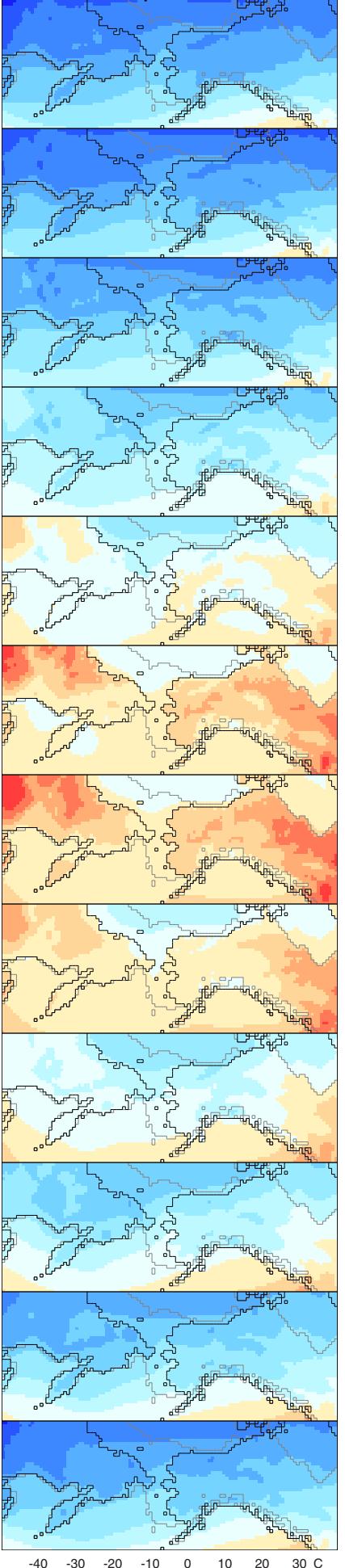


11 ka All Simulation

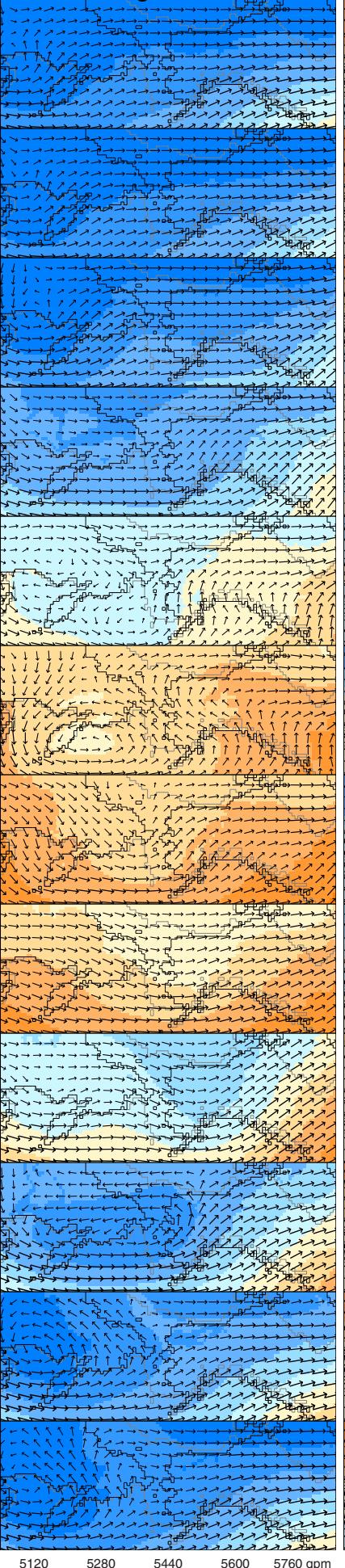
Net Radiation



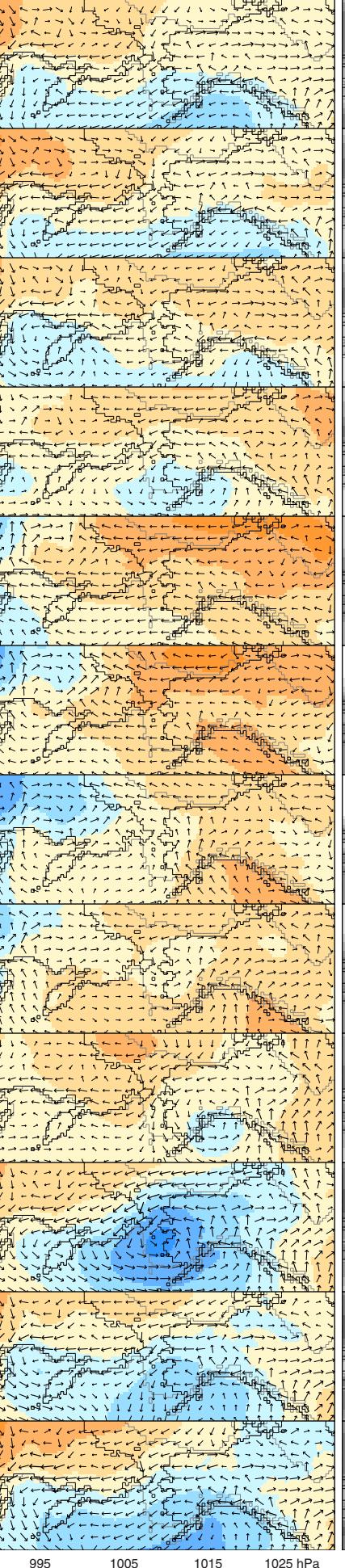
2-m Air Temperature



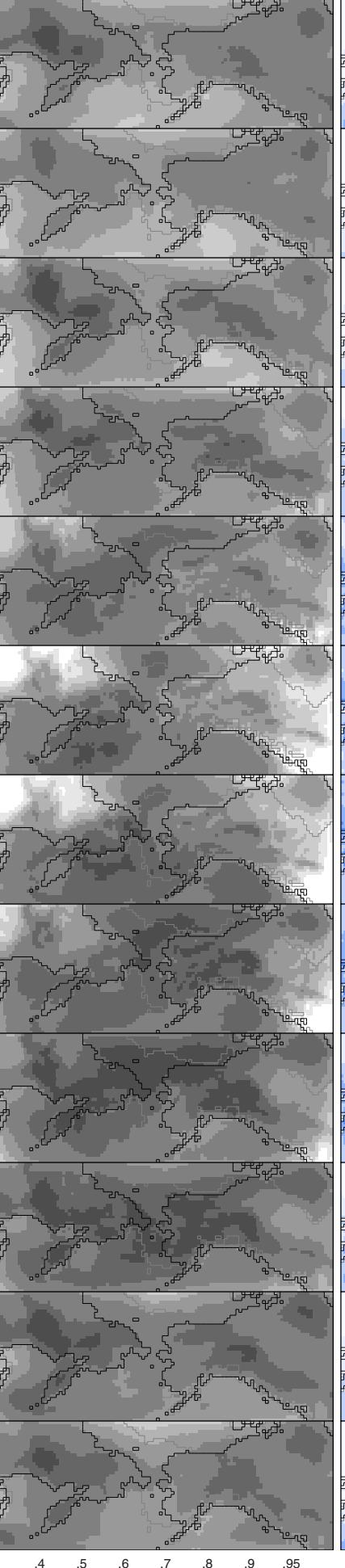
500hPa Heights & Winds



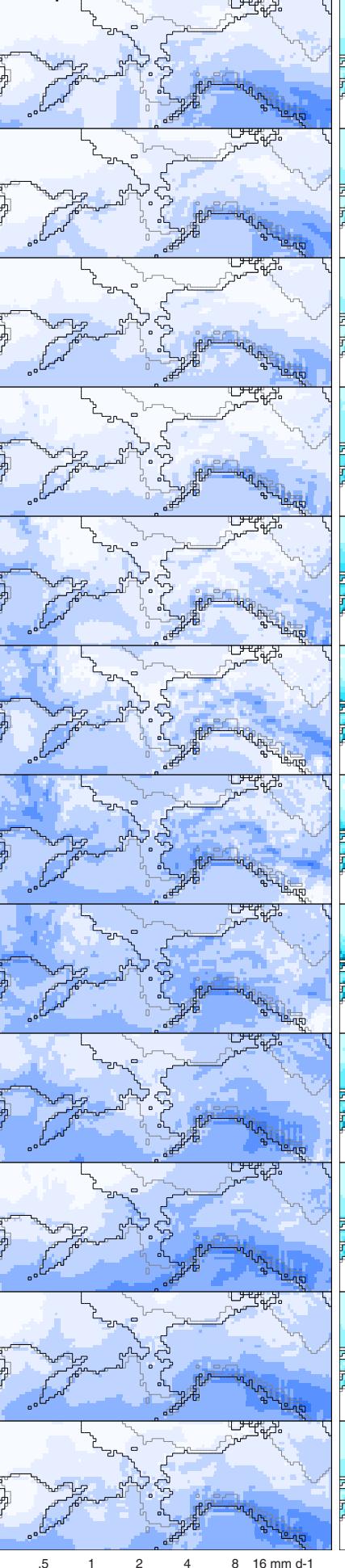
Sea-Level Pressure & Winds



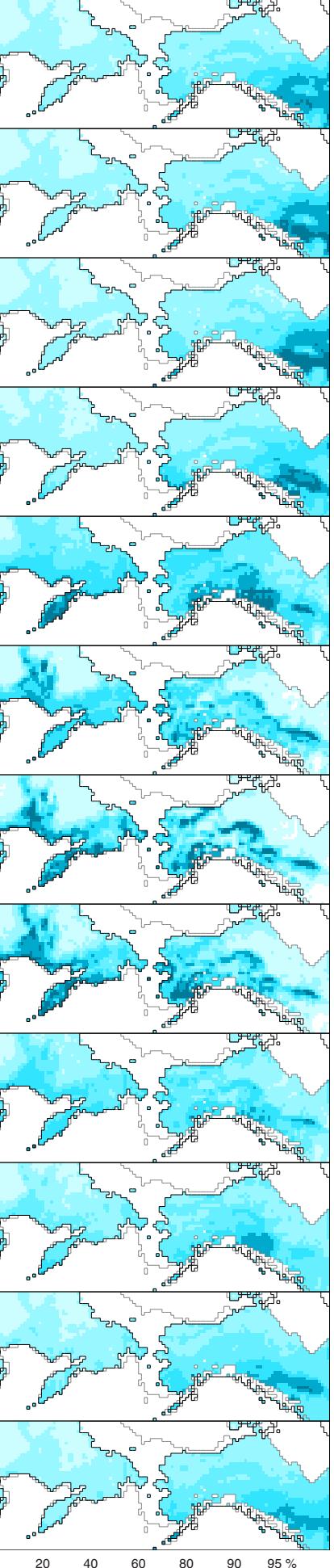
Total Cloud Fraction



Precipitation Rate

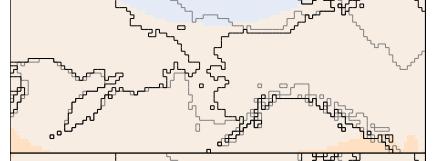


Long-Term Means

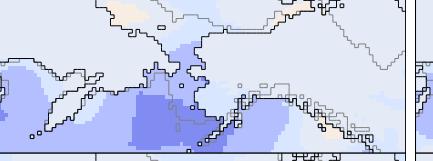


11 ka All Simulation

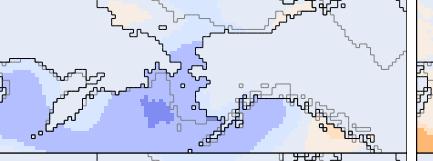
Net Shortwave Radiation



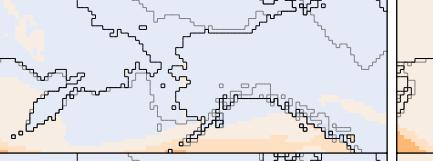
Net Longwave Radiation



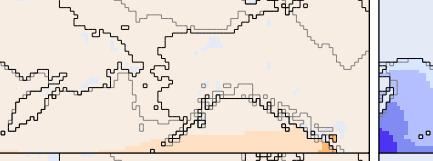
Net Radiation



Sensible Heat Flux



Latent Heat Flux



Substrate Heat Flux



Long-Term Means

2-m Air Temperature



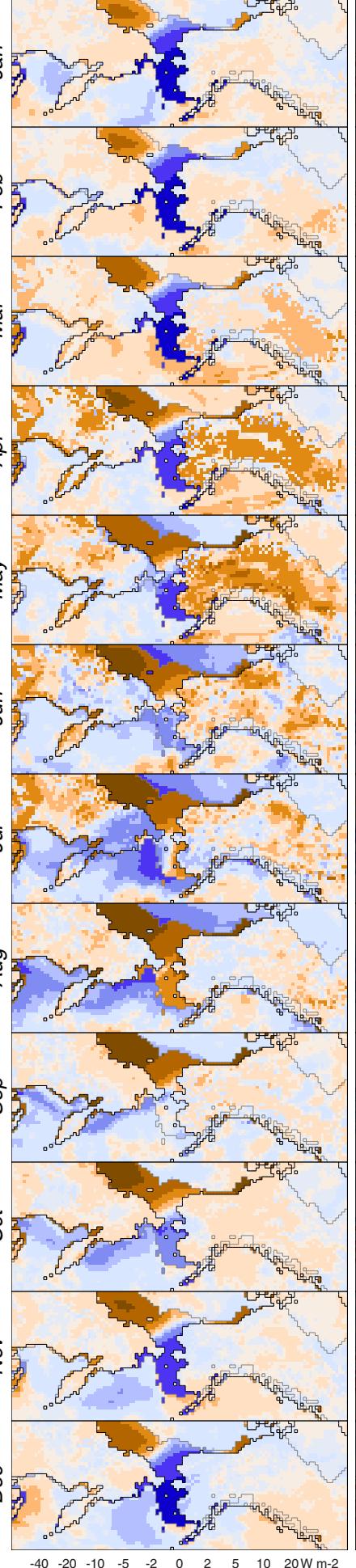
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

-200 -150 -100 -50 0 25 50 100 150 W m⁻²

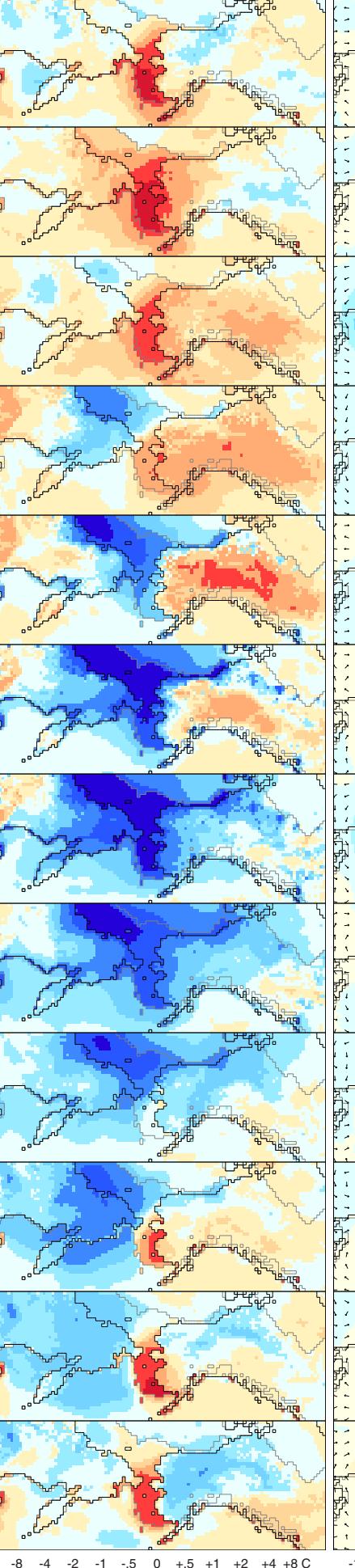
Suppl. Fig. 13B

11 ka All Simulation - 11 ka Control Simulation

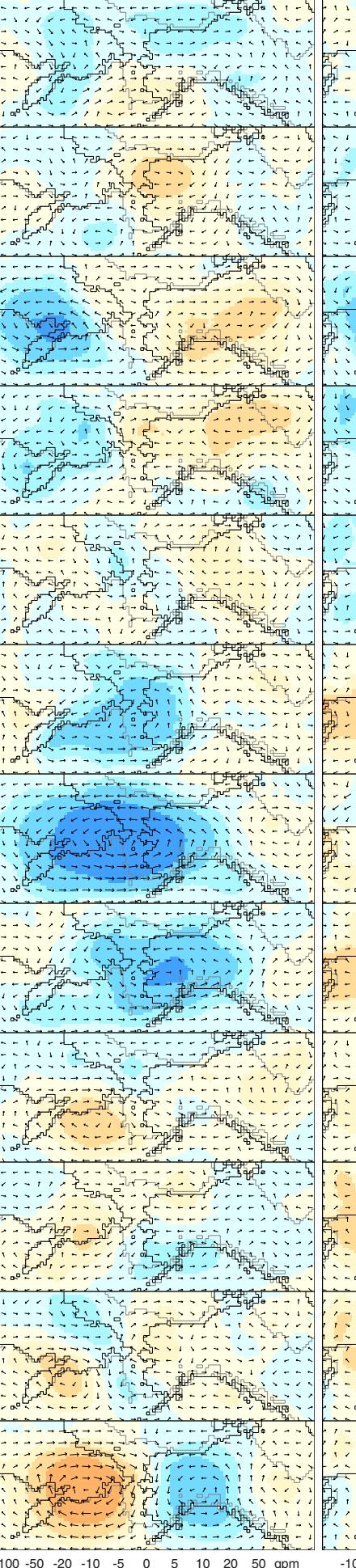
Net Radiation



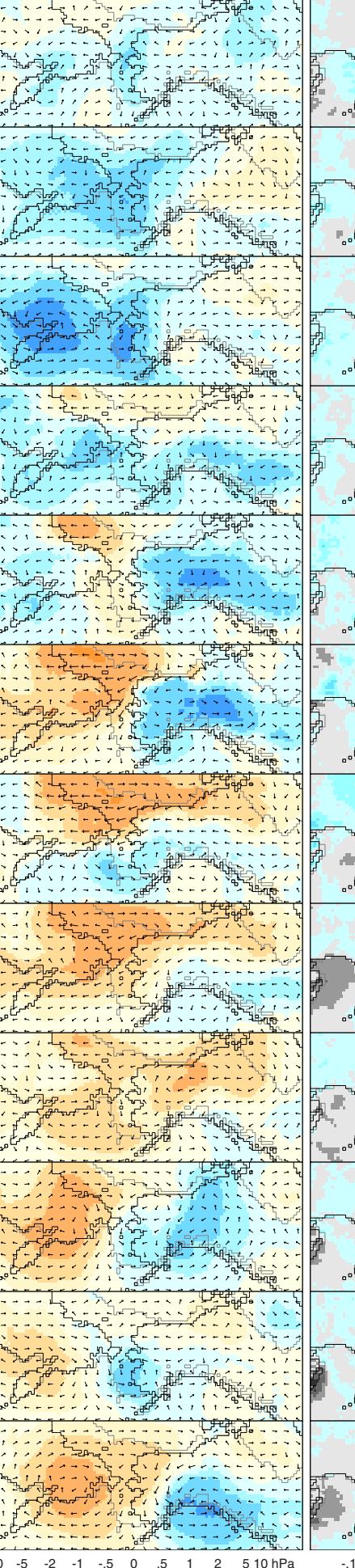
2-m Air Temperature



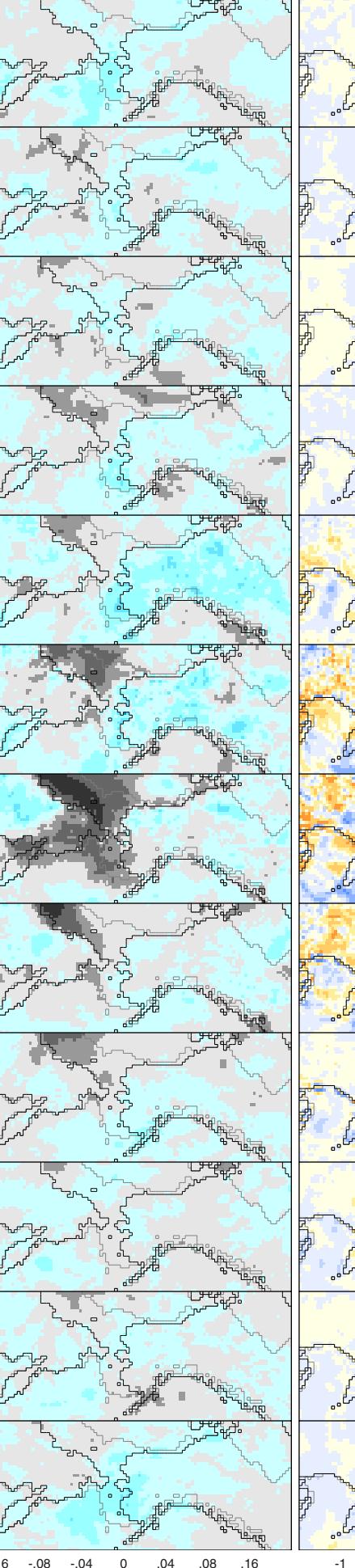
500hPa Heights & Winds



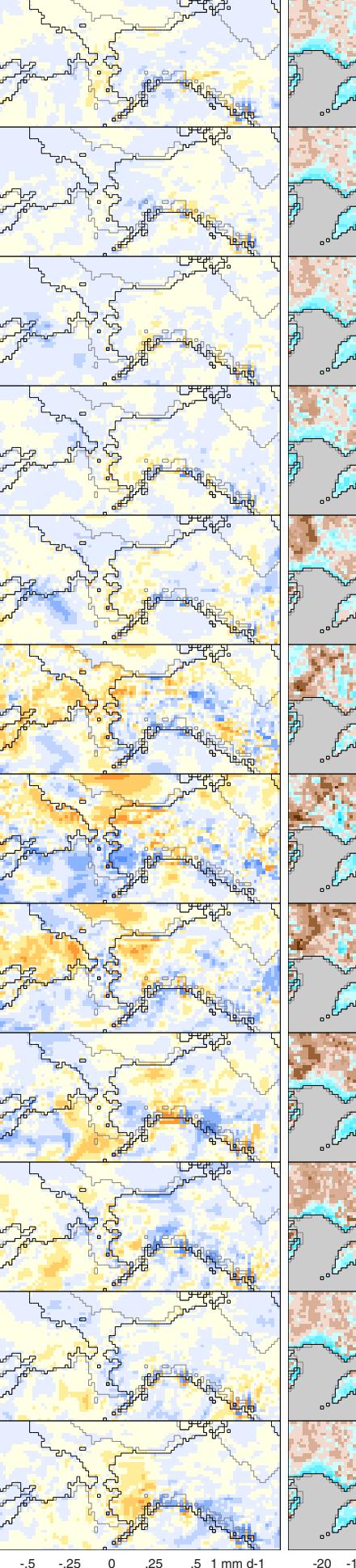
Sea-Level Pressure & Winds



Total Cloud Fraction

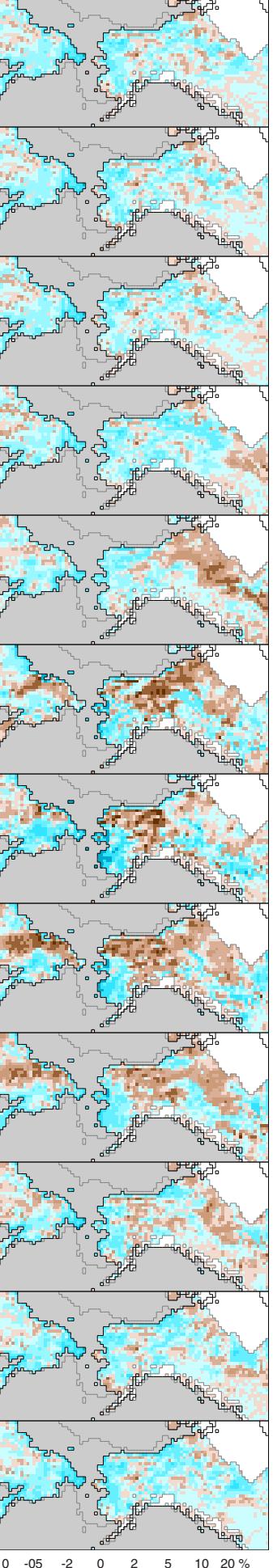


Precipitation Rate



Long-Term Mean Differences

Soil Moisture



11 ka All Simulation - 11 ka Control Simulation

Net Shortwave Radiation

Net Longwave Radiation

Net Radiation

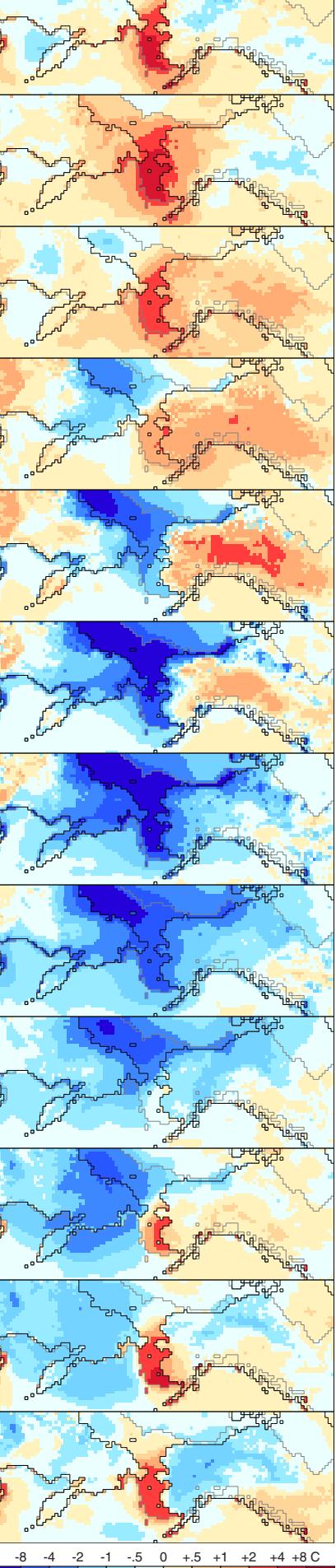
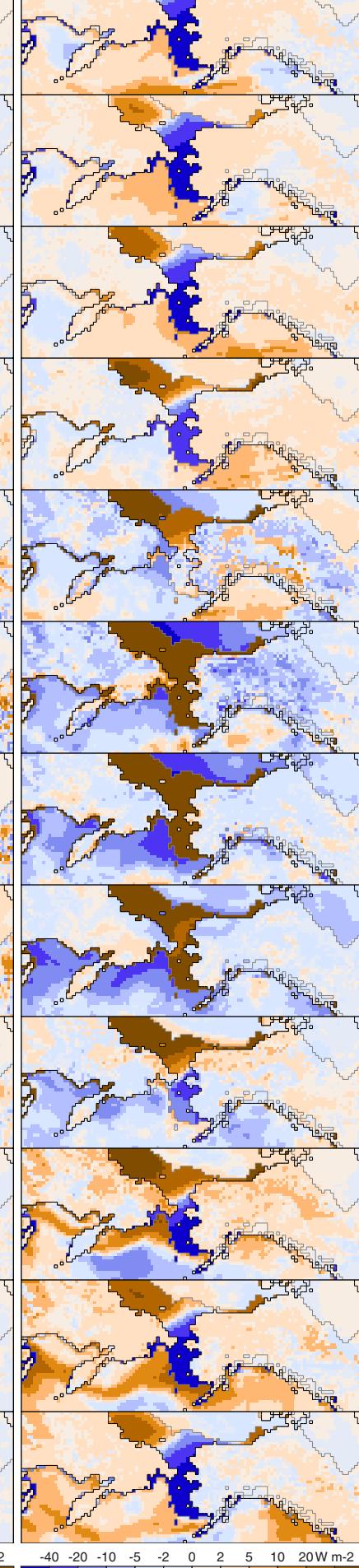
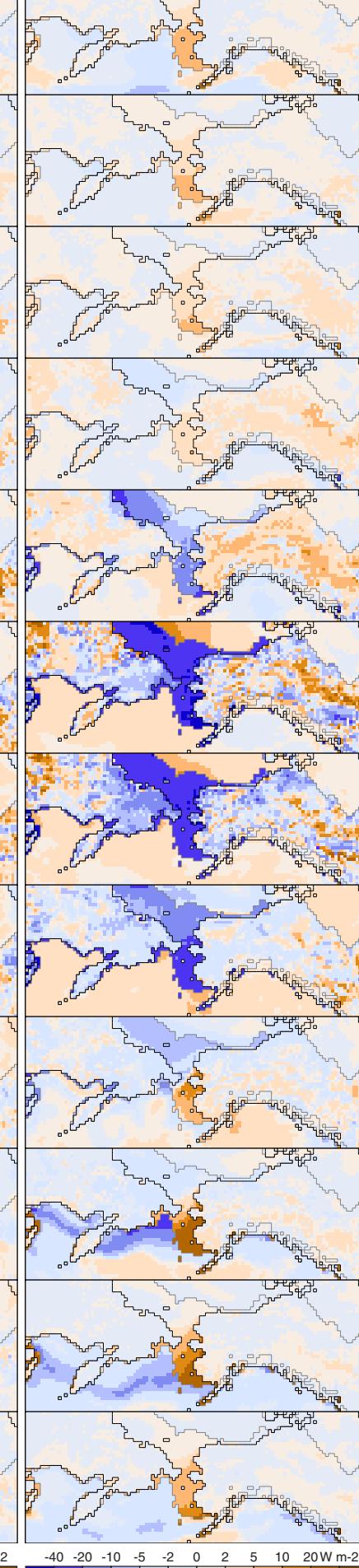
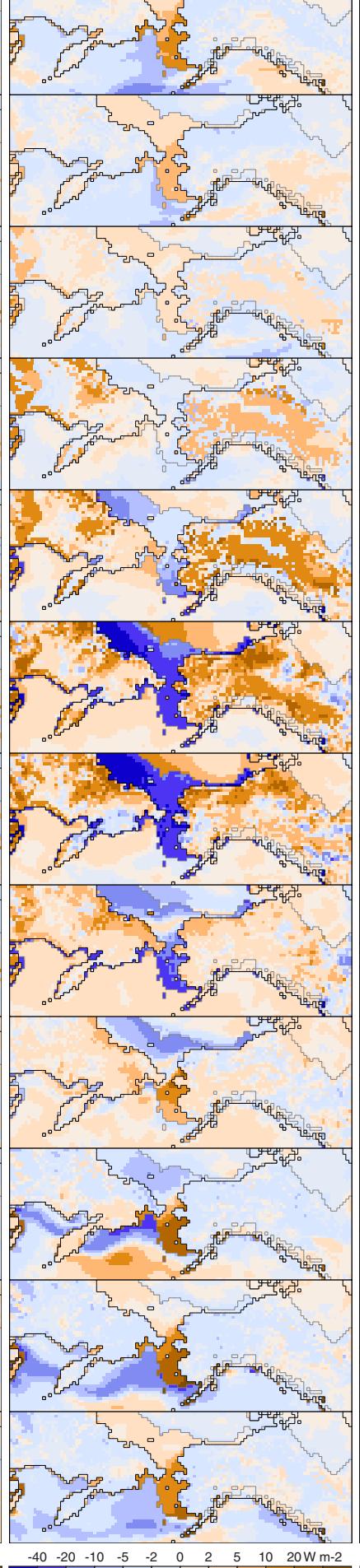
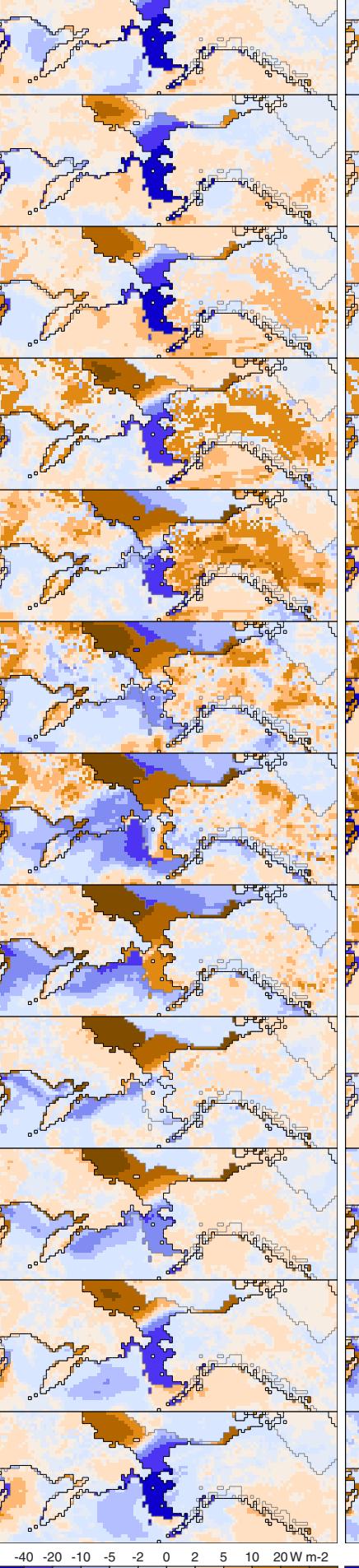
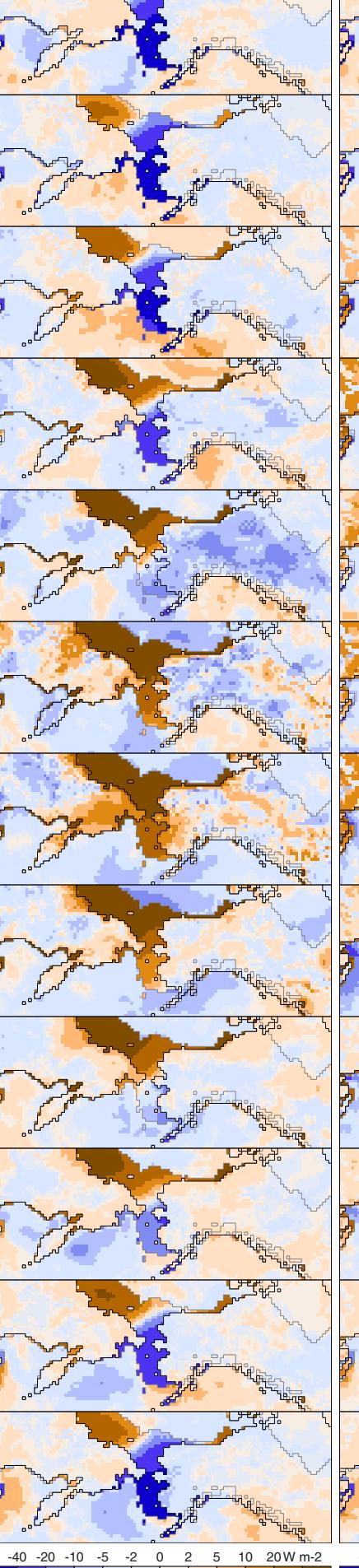
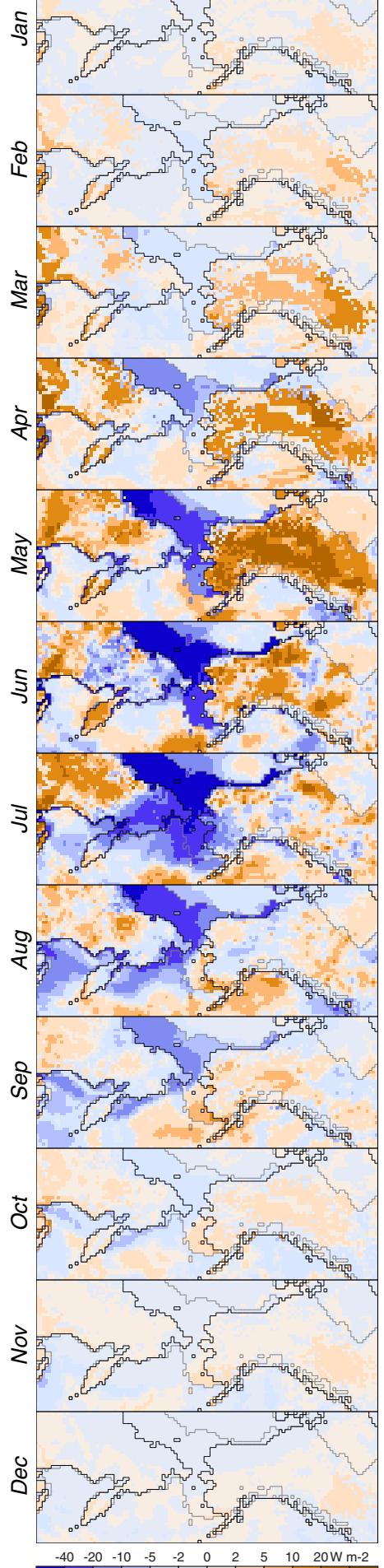
Sensible Heat Flux

Latent Heat Flux

Substrate Heat Flux

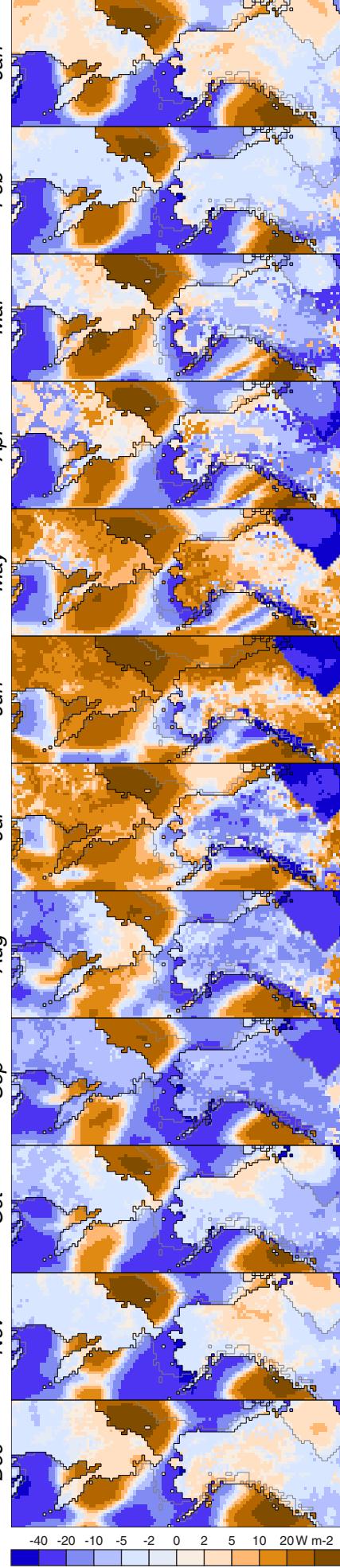
Long-Term Mean Differences

2-m Air Temperature

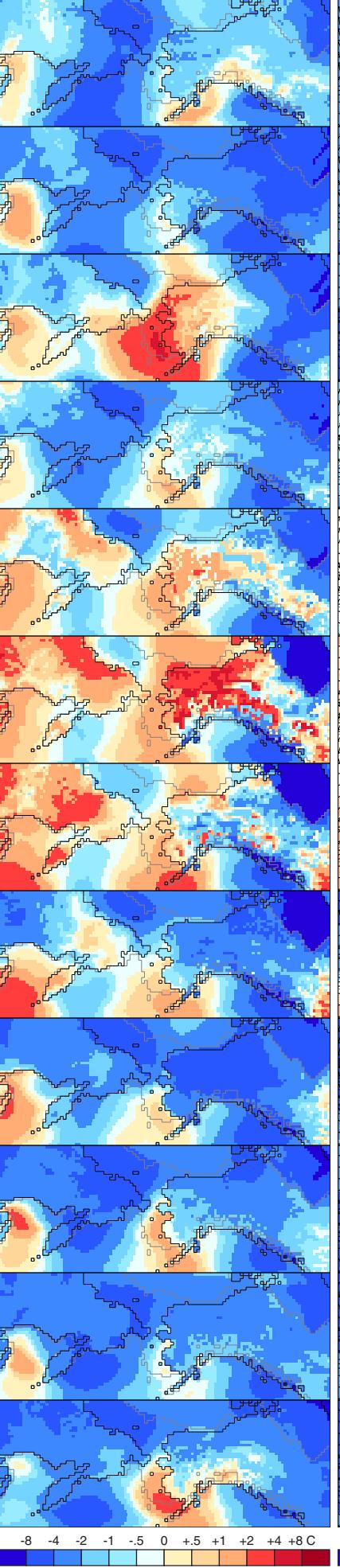


11 ka All Simulation - Present-Day Simulation

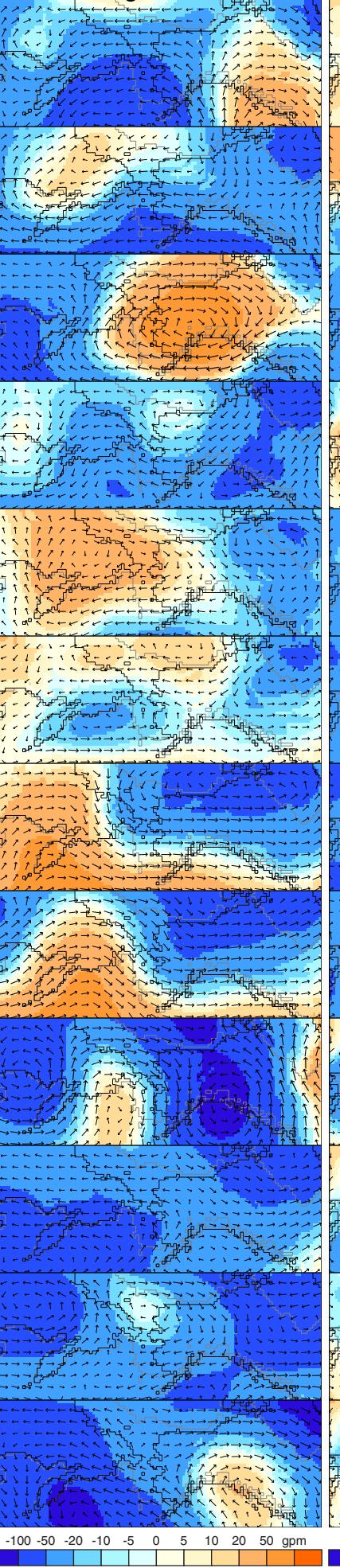
Net Radiation



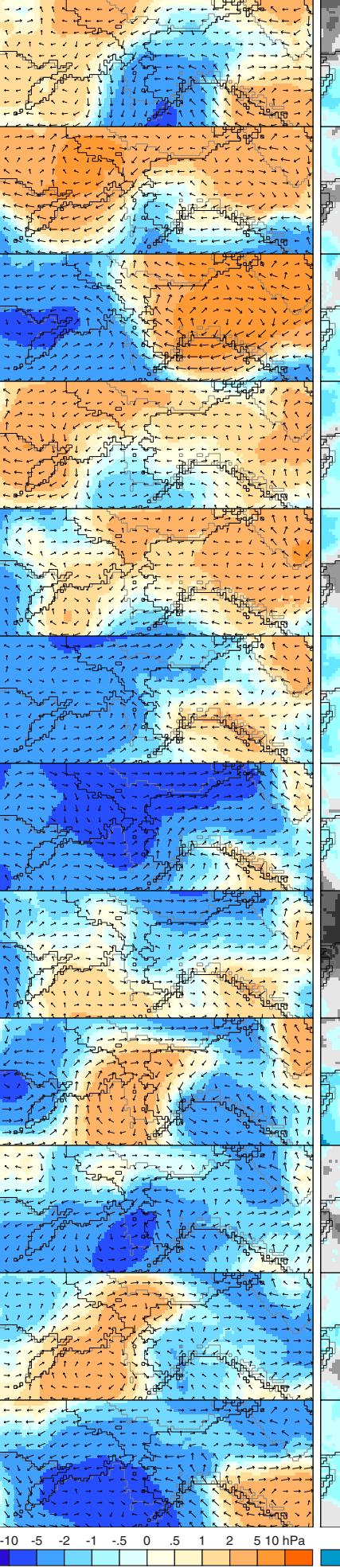
2-m Air Temperature



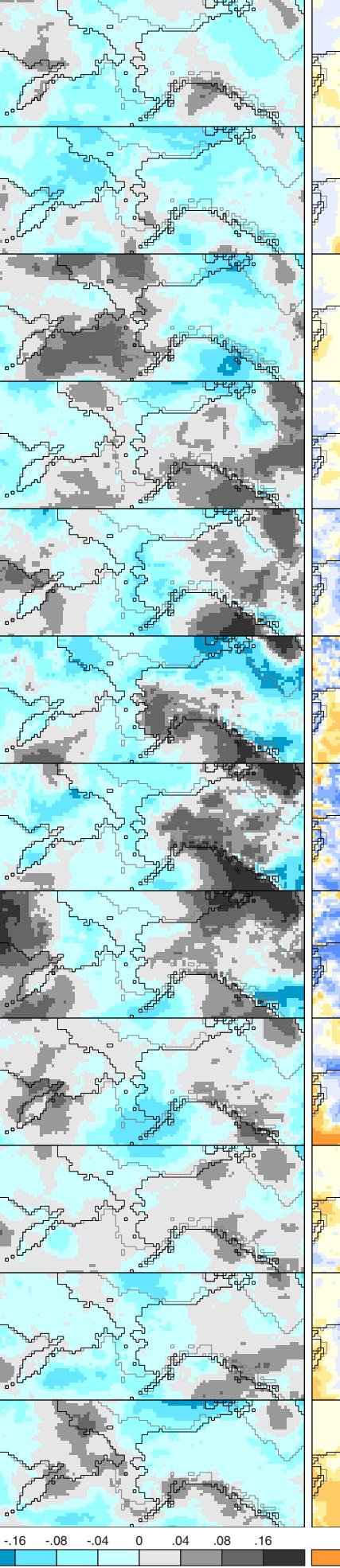
500hPa Heights & Winds



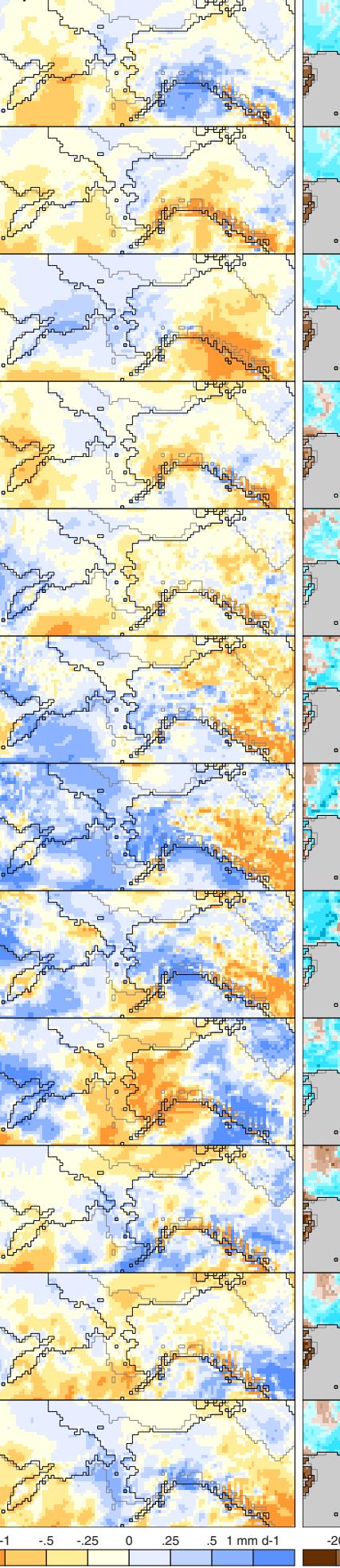
Sea-Level Pressure & Winds



Total Cloud Fraction

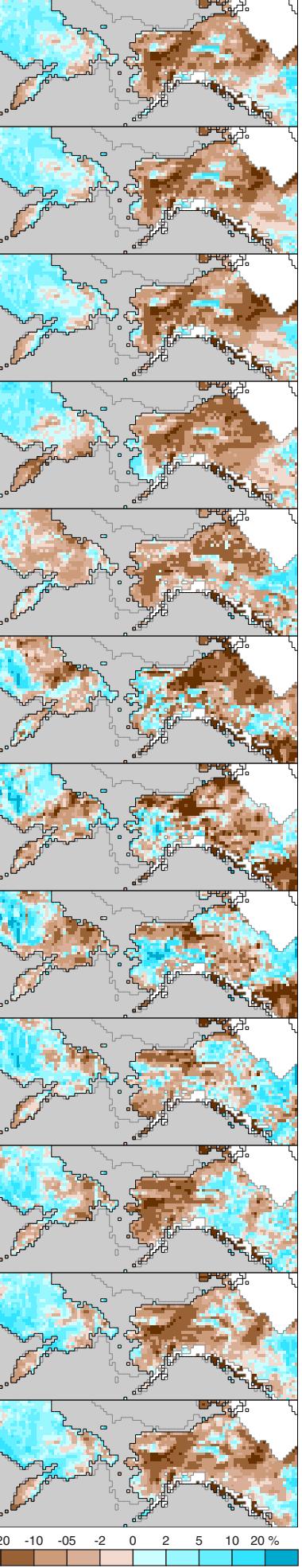


Precipitation Rate



Long-Term Mean Differences

Soil Moisture



11 ka All Simulation - Present-Day Simulation

Net Shortwave Radiation

Net Longwave Radiation

Net Radiation

Sensible Heat Flux

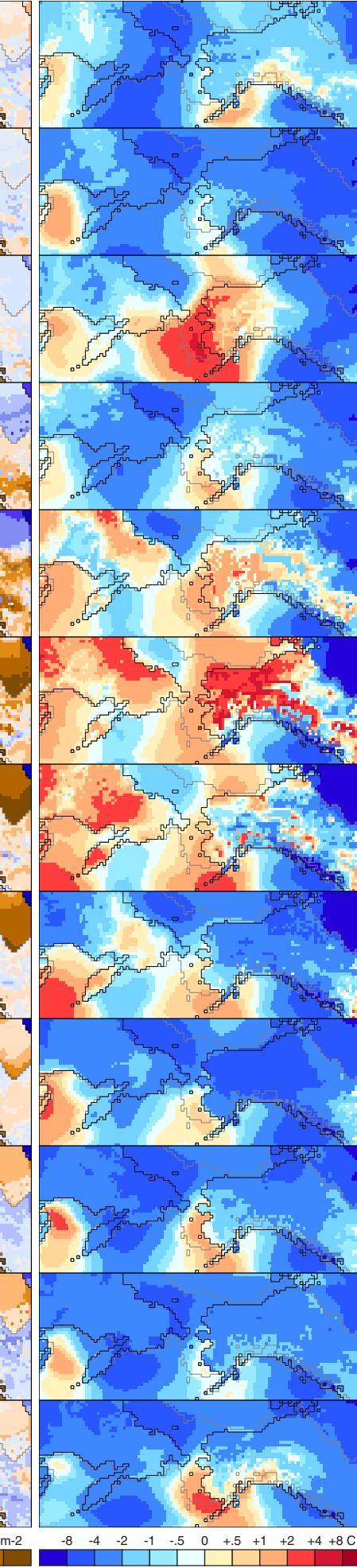
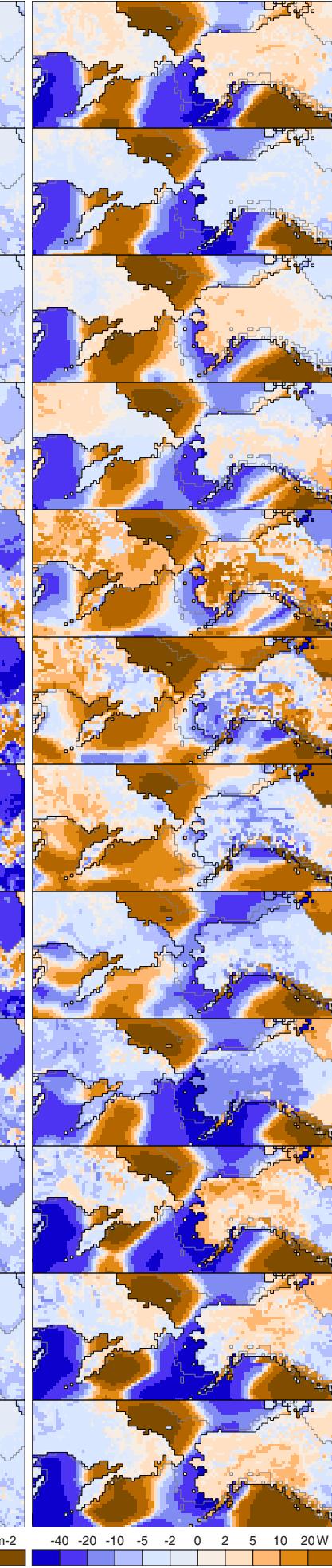
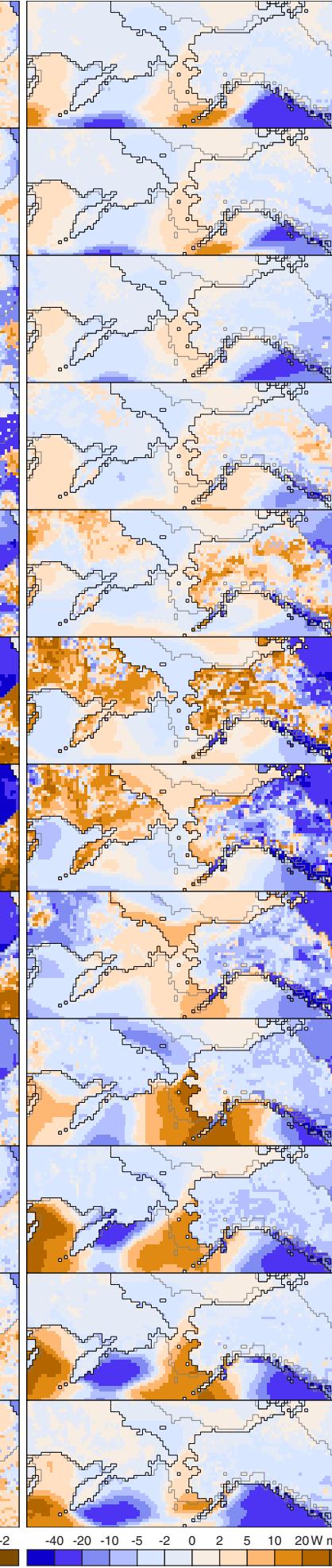
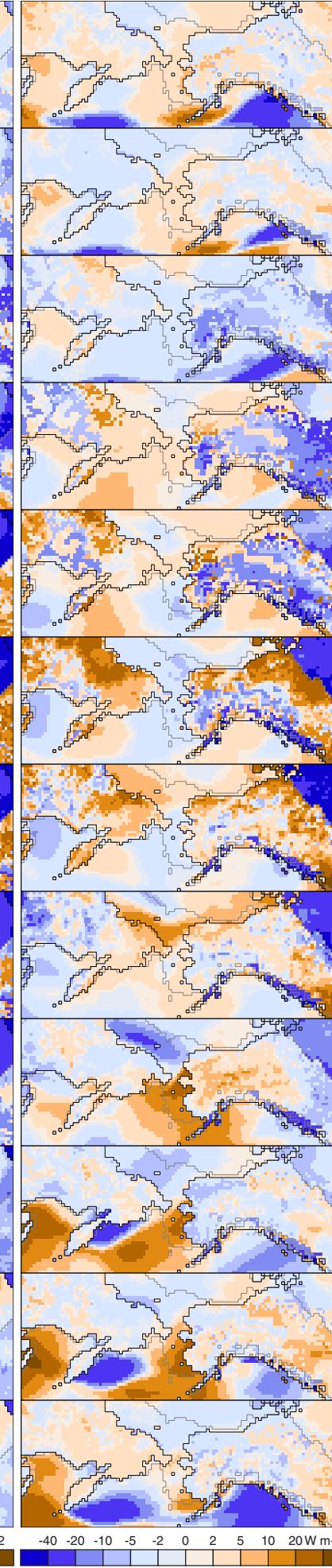
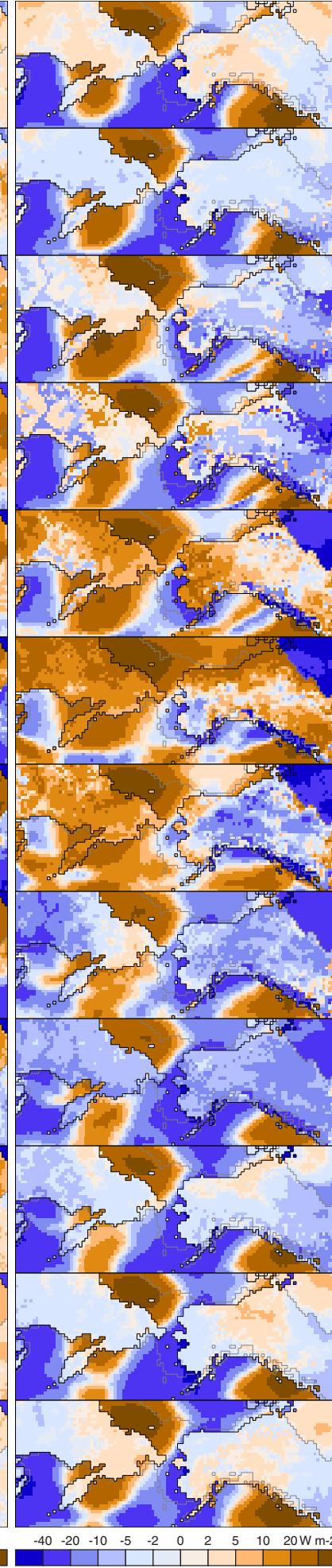
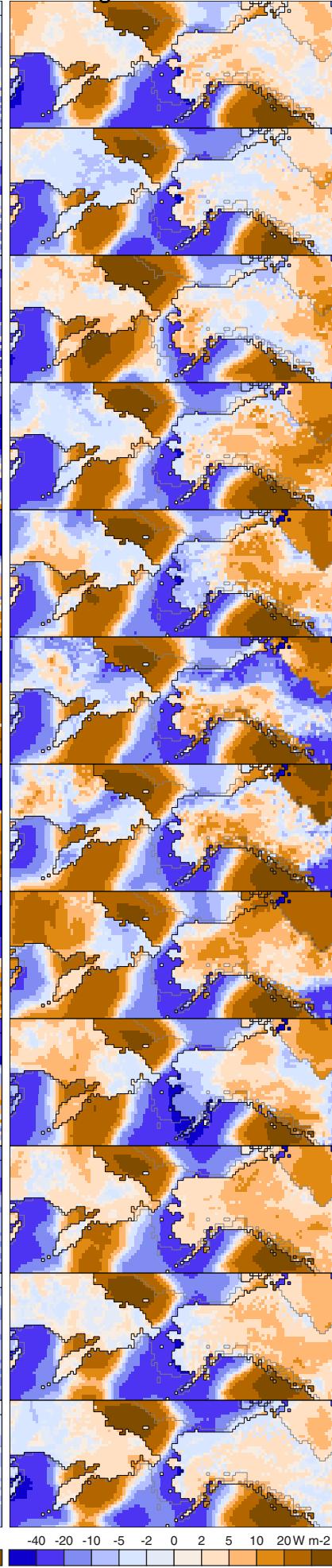
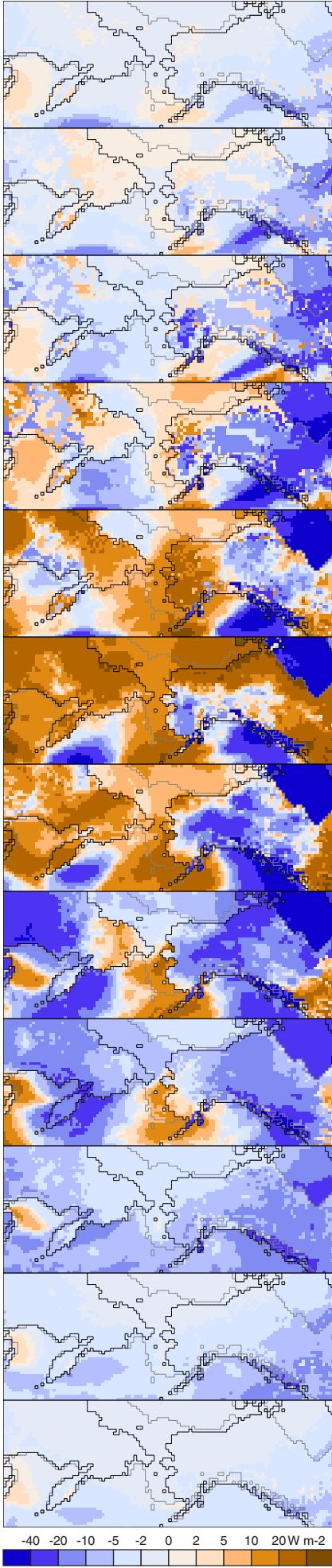
Latent Heat Flux

Substrate Heat Flux

Long-Term Mean Differences

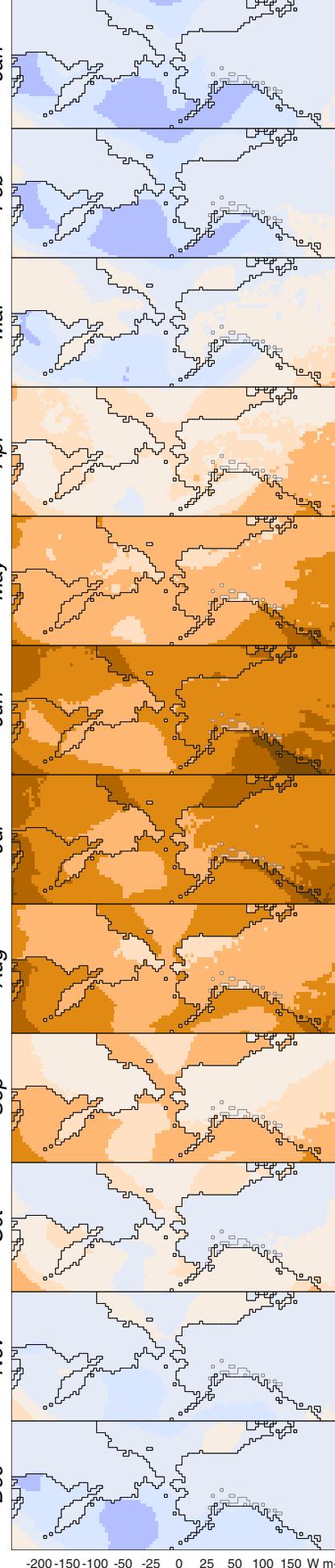
2-m Air Temperature

Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

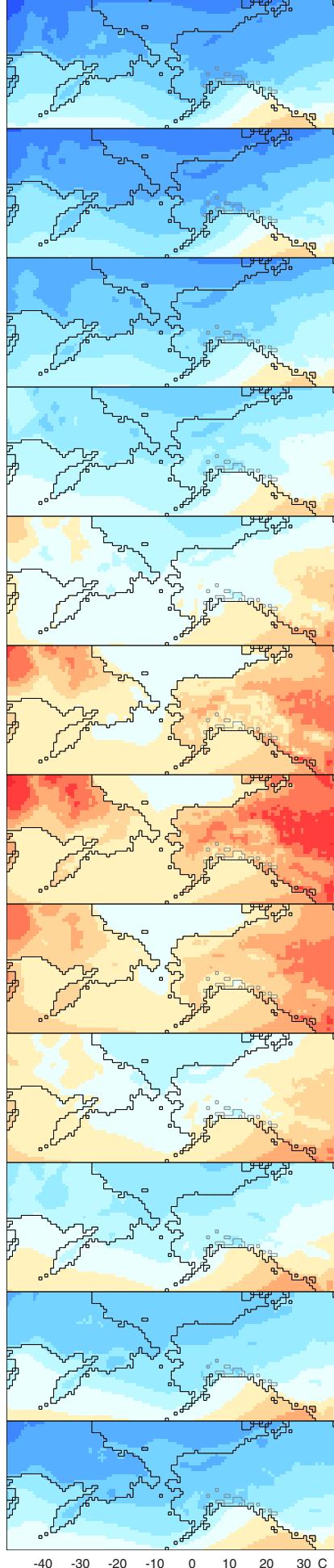


6 ka Simulation

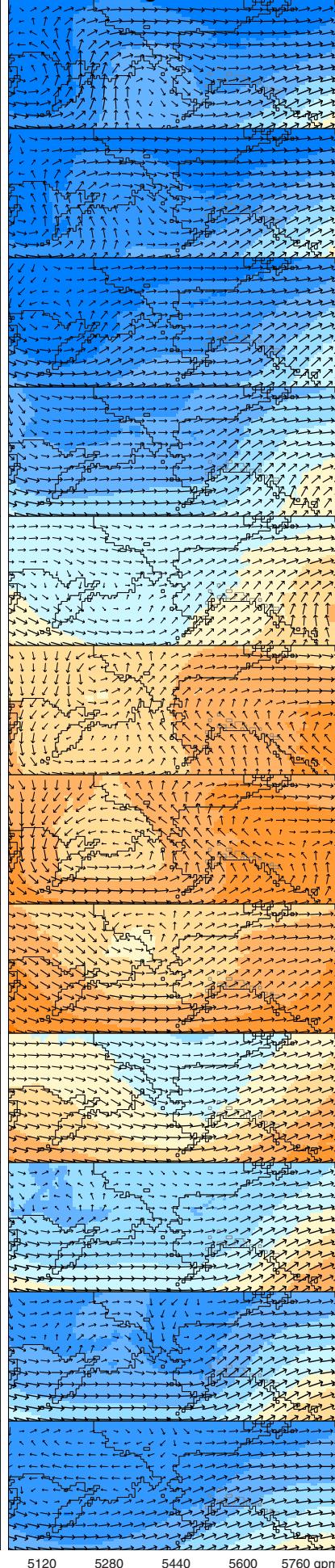
Net Radiation



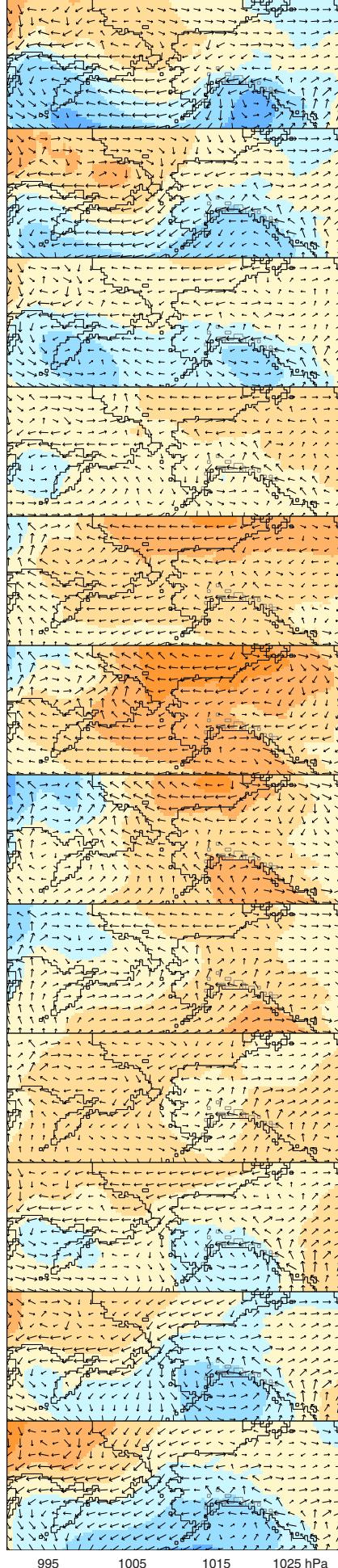
2-m Air Temperature



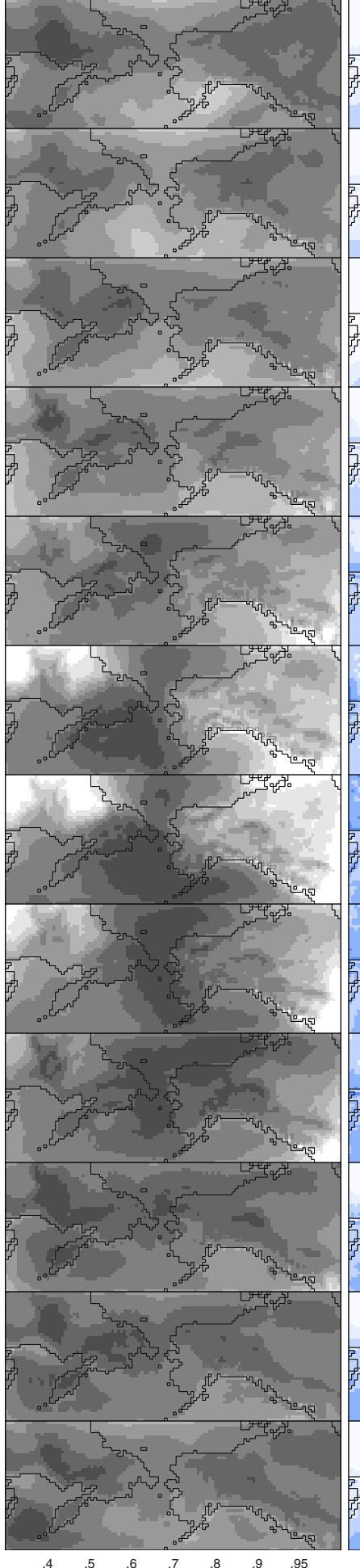
500hPa Heights & Winds



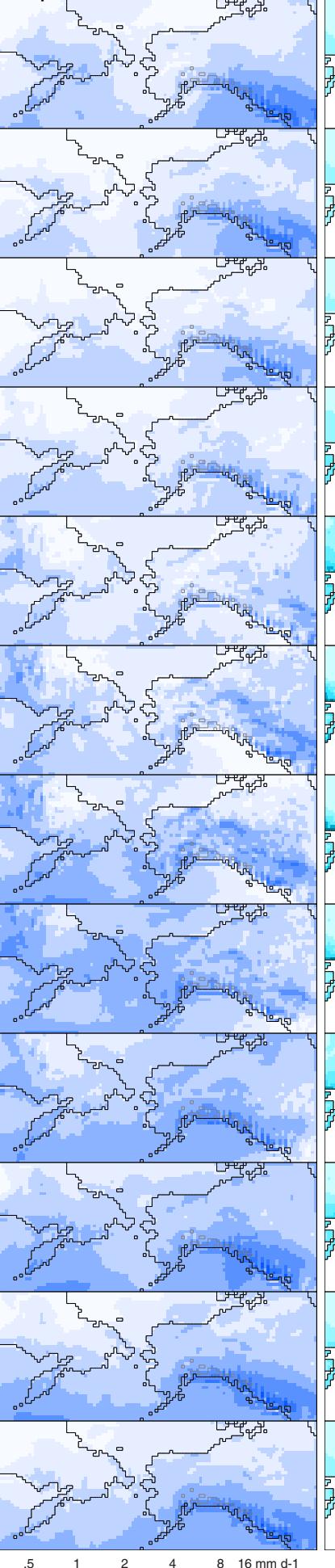
Sea-Level Pressure & Winds



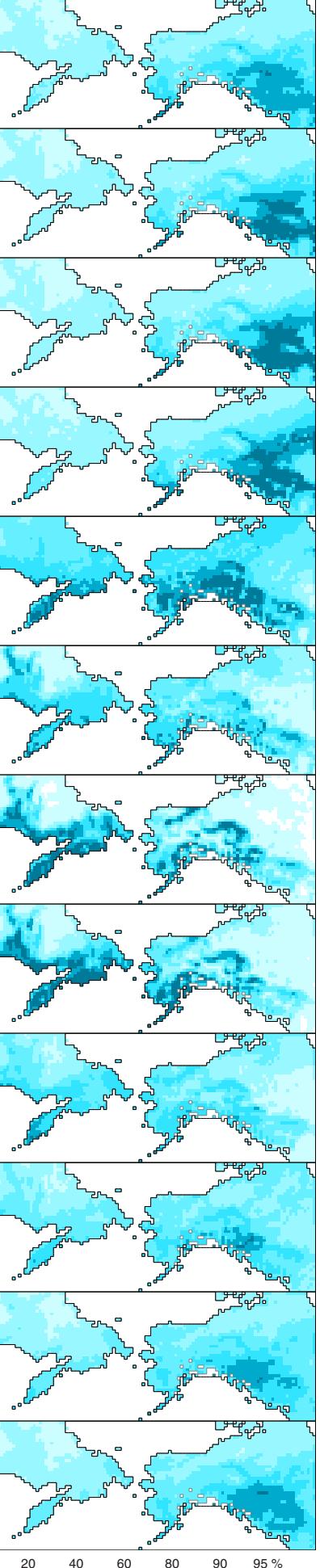
Total Cloud Fraction



Precipitation Rate

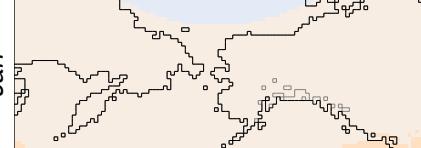


Long-Term Means



6 ka Simulation

Net Shortwave Radiation



Net Longwave Radiation



Net Radiation



Sensible Heat Flux



Latent Heat Flux



Substrate Heat Flux



Long-Term Means

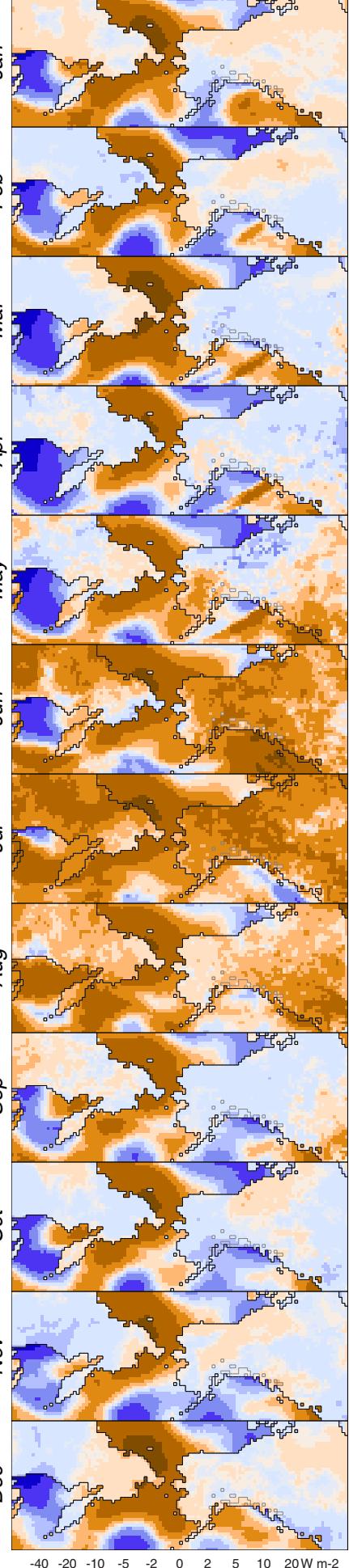
2-m Air Temperature

Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec-200 -150 -100 -50 0 25 50 100 150 W m⁻²-200 -150 -100 -50 0 25 50 100 150 W m⁻²-200 -150 -100 -50 0 25 50 100 150 W m⁻²-200 -150 -100 -50 0 25 50 100 150 W m⁻²-200 -150 -100 -50 0 25 50 100 150 W m⁻²-200 -150 -100 -50 0 25 50 100 150 W m⁻²

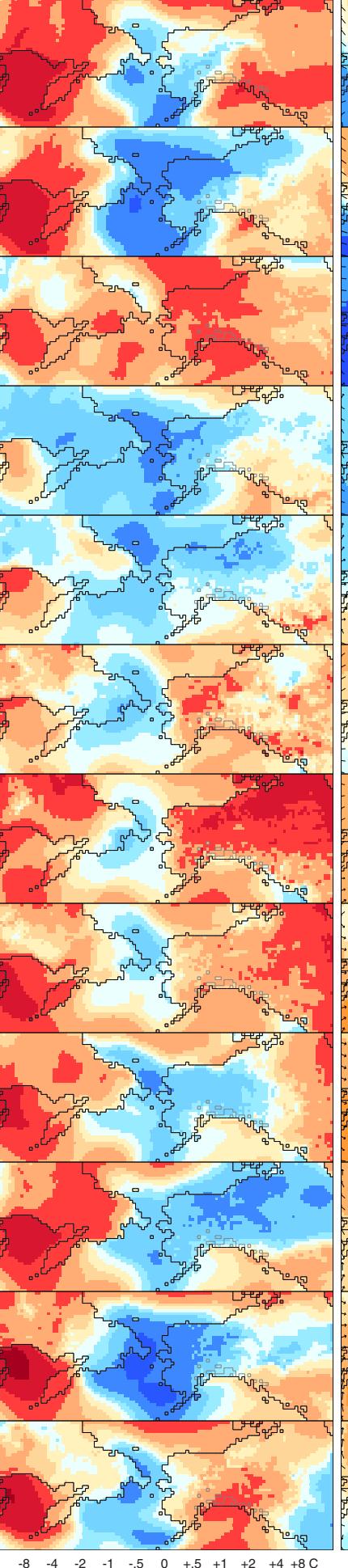
-40 -30 -20 -10 0 10 20 30 C

6 ka Simulation - Present-Day Simulation

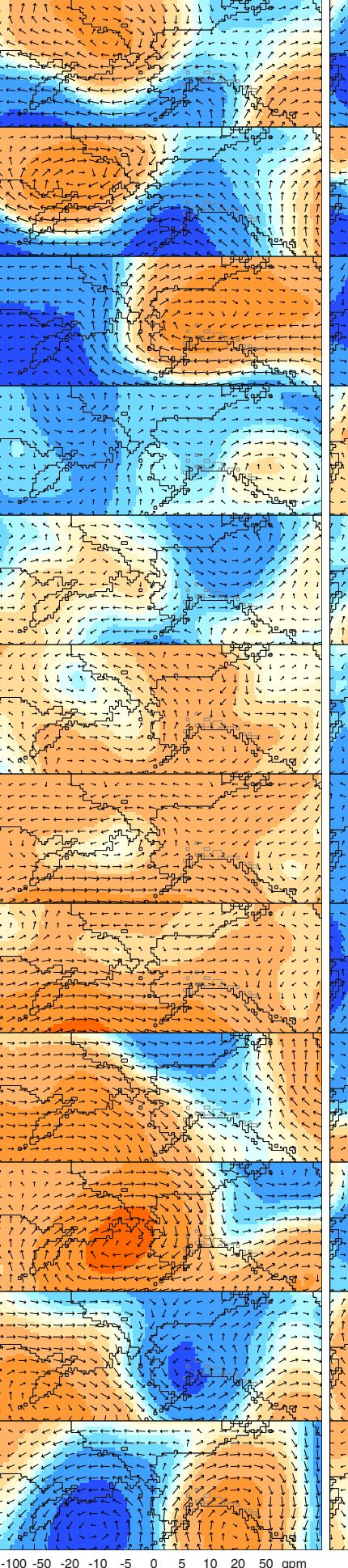
Net Radiation



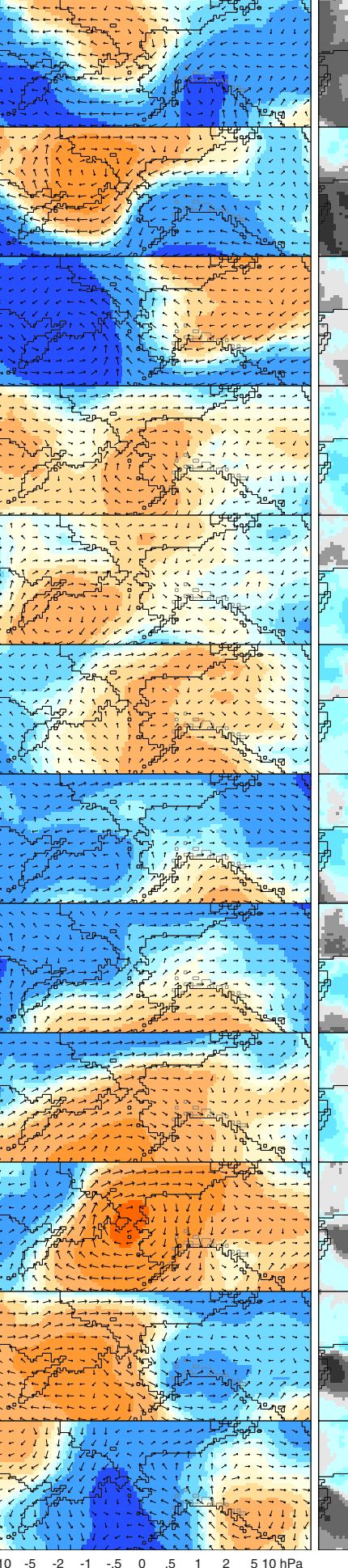
2-m Air Temperature



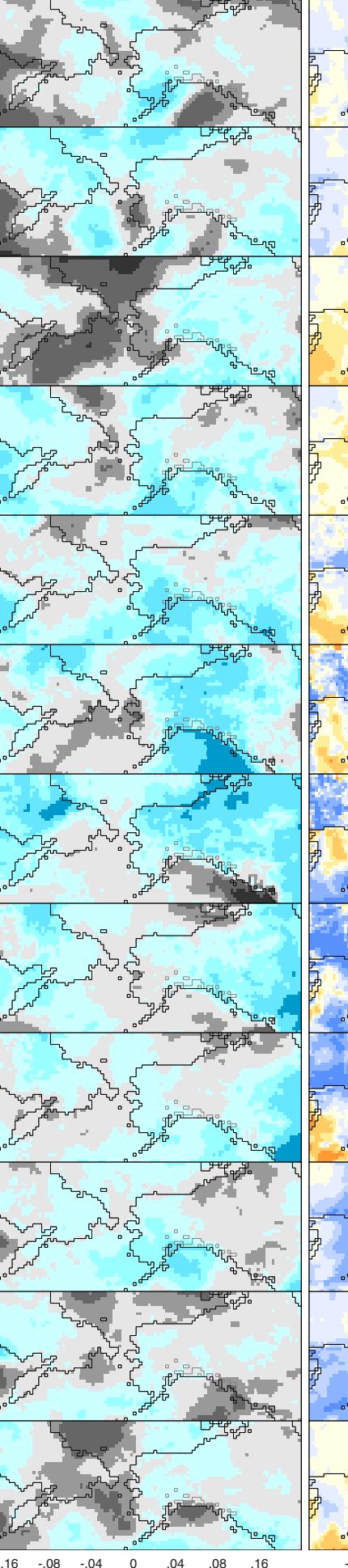
500hPa Heights & Winds



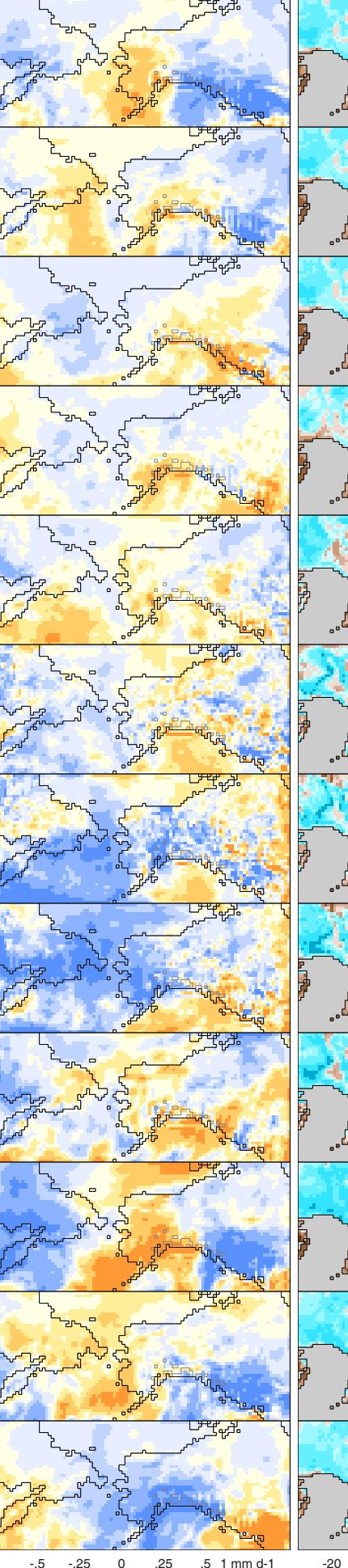
Sea-Level Pressure & Winds



Total Cloud Fraction

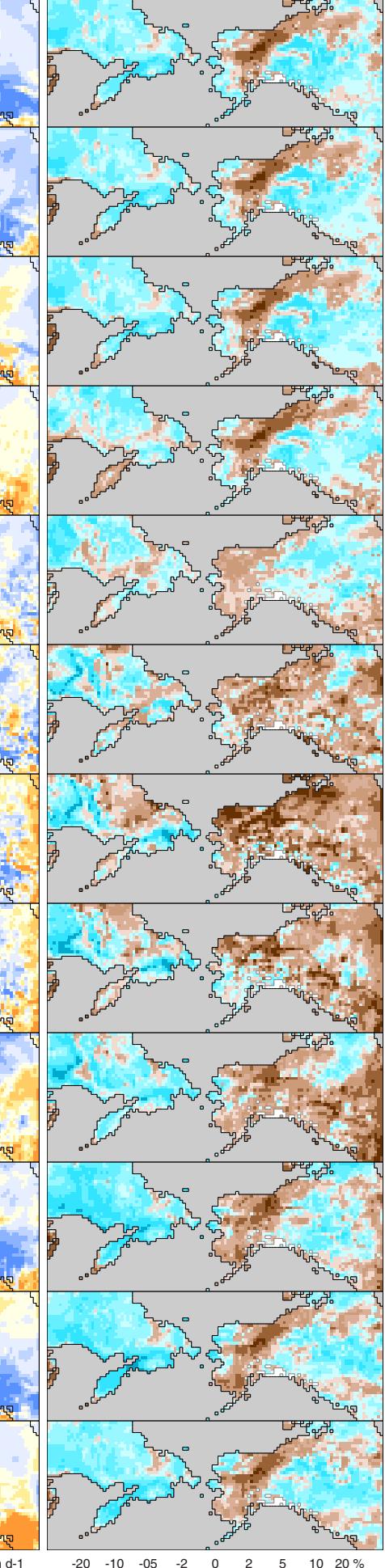


Precipitation Rate



Long-Term Mean Differences

Soil Moisture

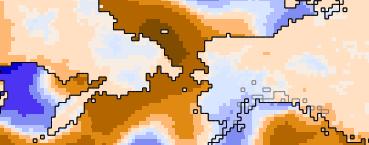


6 ka Simulation - Present-Day Simulation

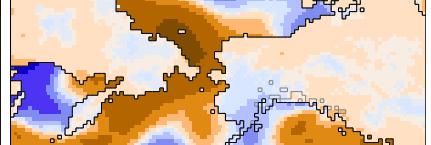
Net Shortwave Radiation



Net Longwave Radiation



Net Radiation



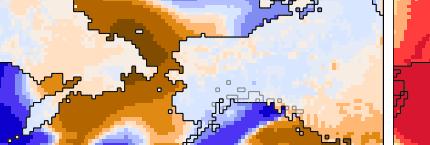
Sensible Heat Flux



Latent Heat Flux

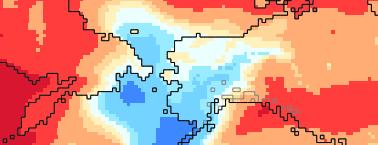


Substrate Heat Flux



Long-Term Mean Differences

2-m Air Temperature



Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

-40 -20 -10 -5 0 2 5 10 20 W m⁻²

-40 -20 -10 -5 0 2 5 10 20 W m⁻²

-40 -20 -10 -5 0 2 5 10 20 W m⁻²

-40 -20 -10 -5 0 2 5 10 20 W m⁻²

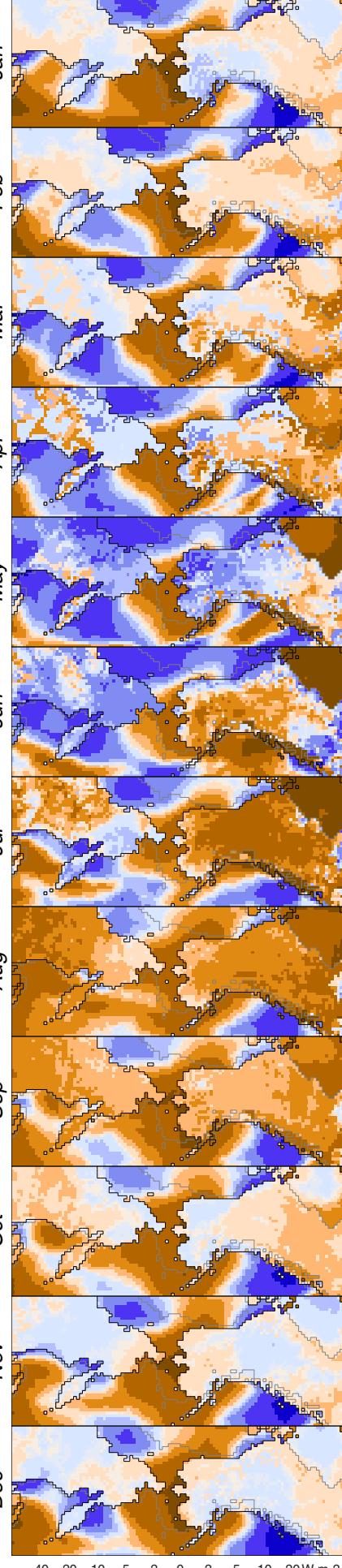
-40 -20 -10 -5 0 2 5 10 20 W m⁻²

-40 -20 -10 -5 0 2 5 10 20 W m⁻²

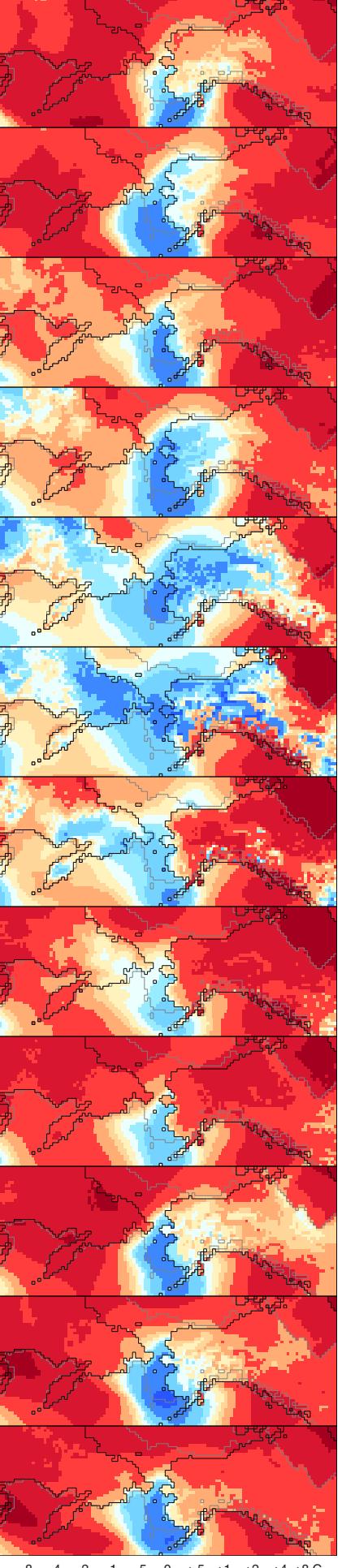
-8 -4 -2 -1 0 +1 +2 +4 +8 C

6 ka Simulation - 11 ka All Simulation

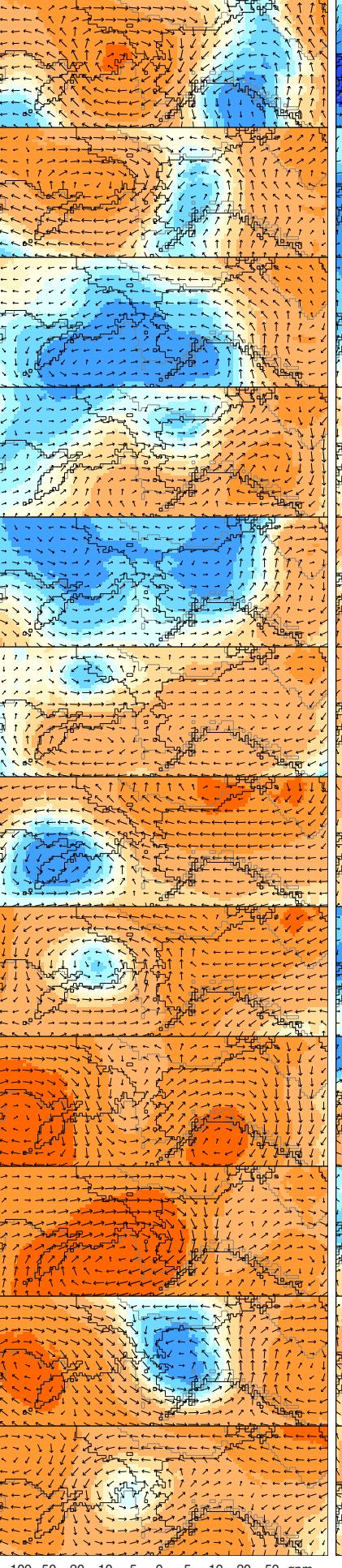
Net Radiation



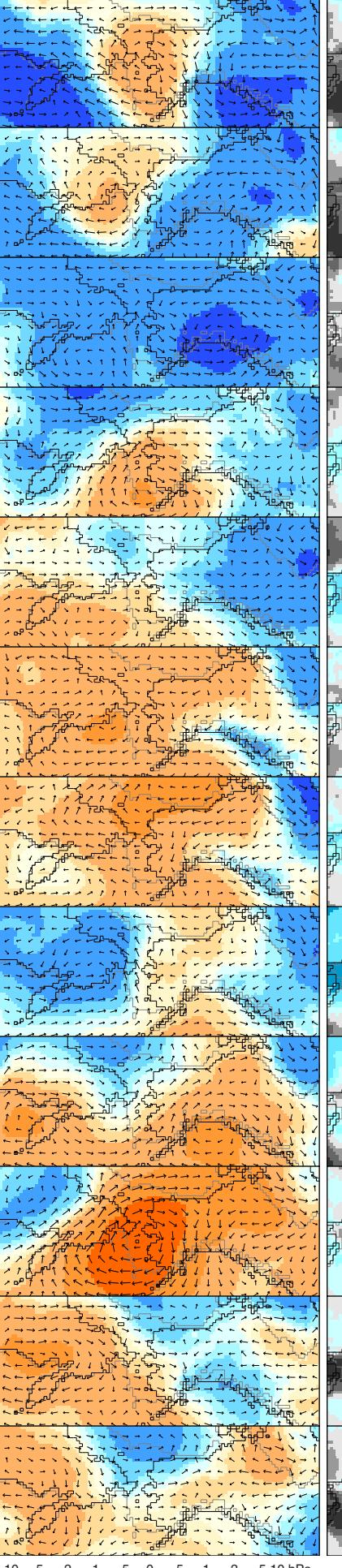
2-m Air Temperature



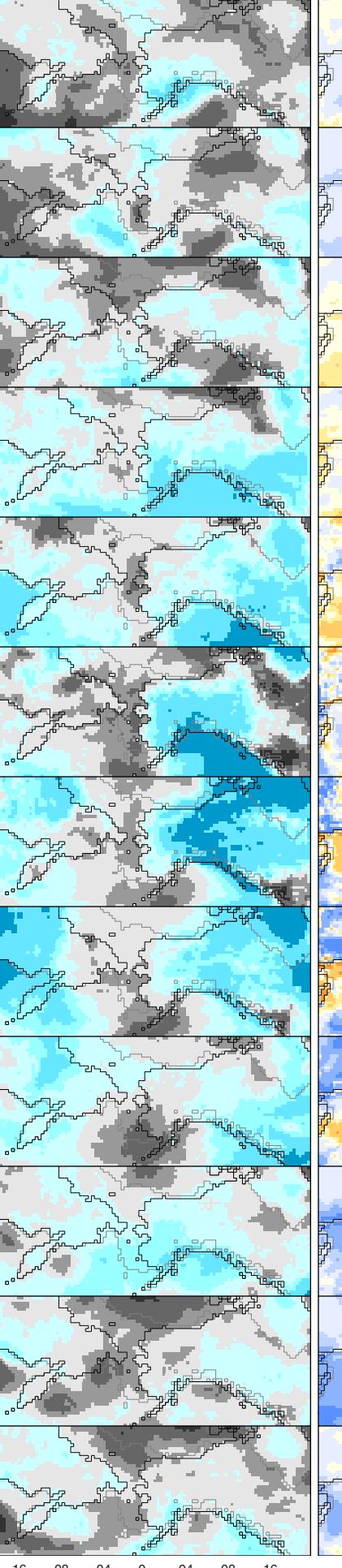
500hPa Heights & Winds



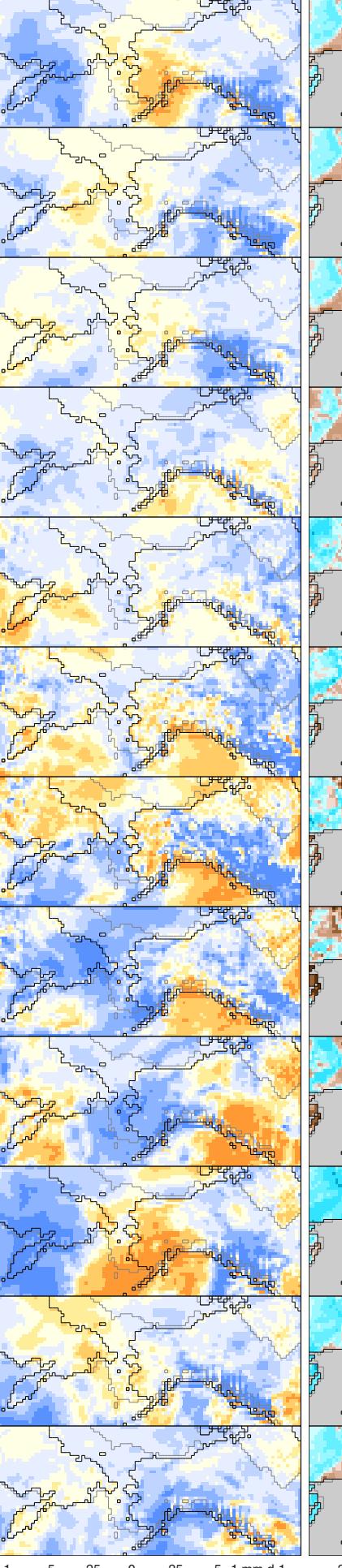
Sea-Level Pressure & Winds



Total Cloud Fraction

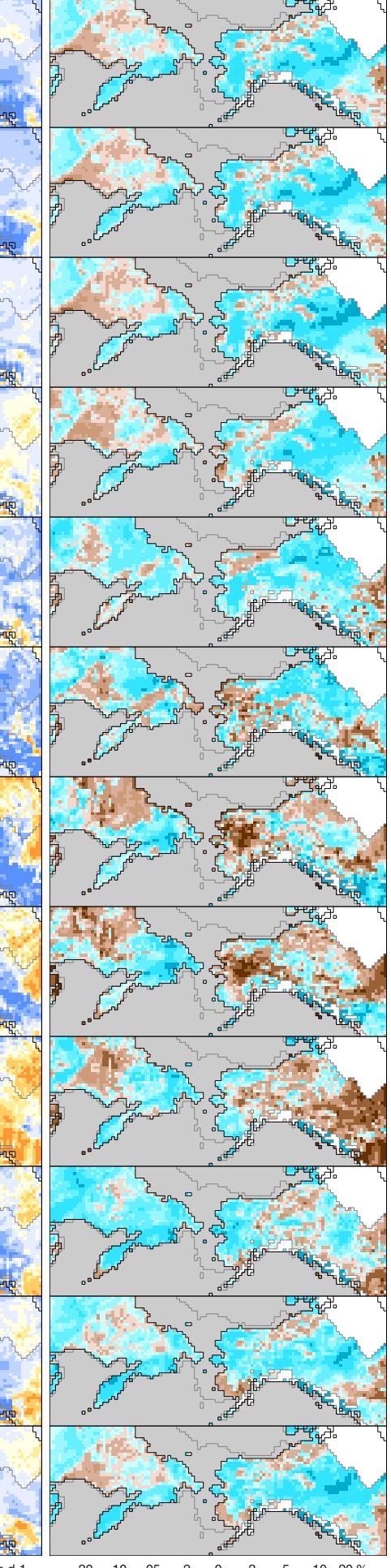


Precipitation Rate



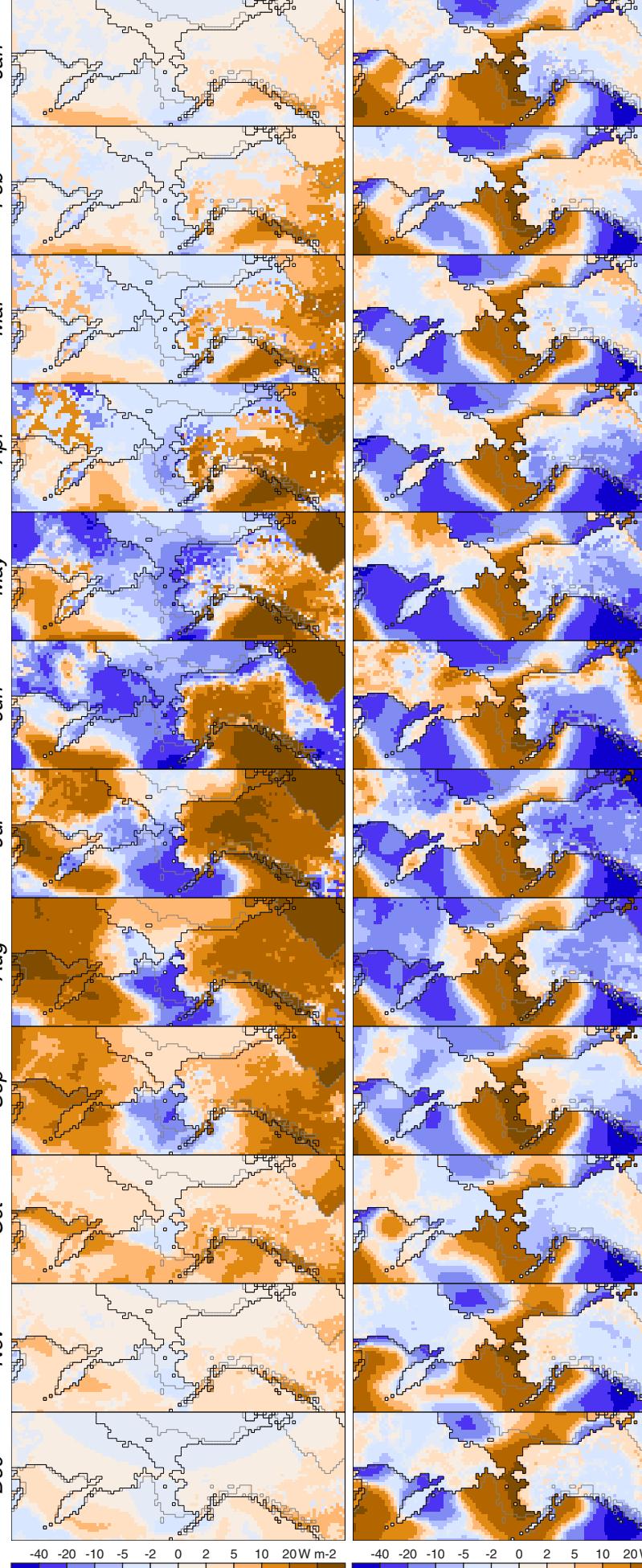
Long-Term Mean Differences

Soil Moisture

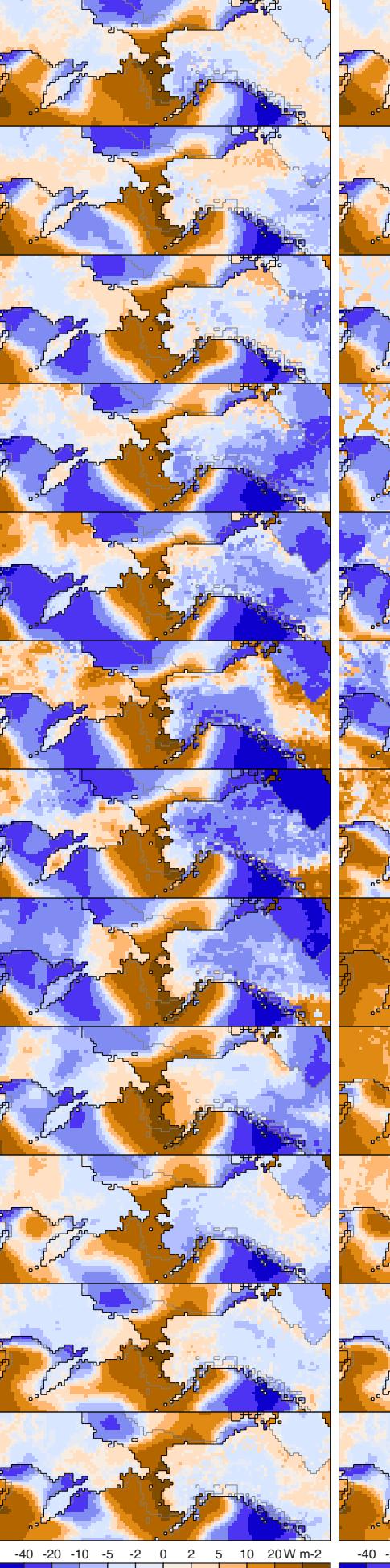


6 ka Simulation - 11 ka All Simulation

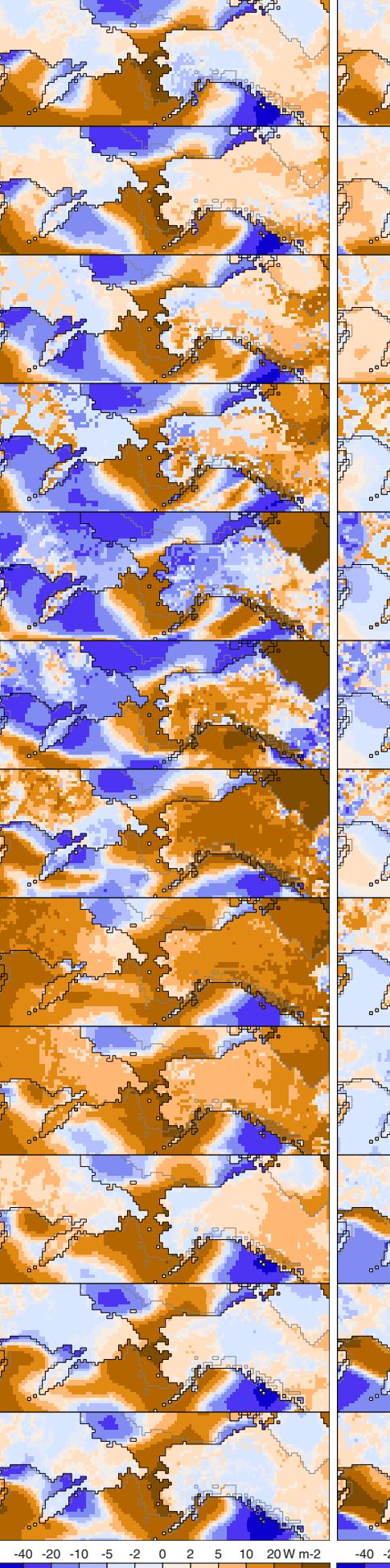
Net Shortwave Radiation



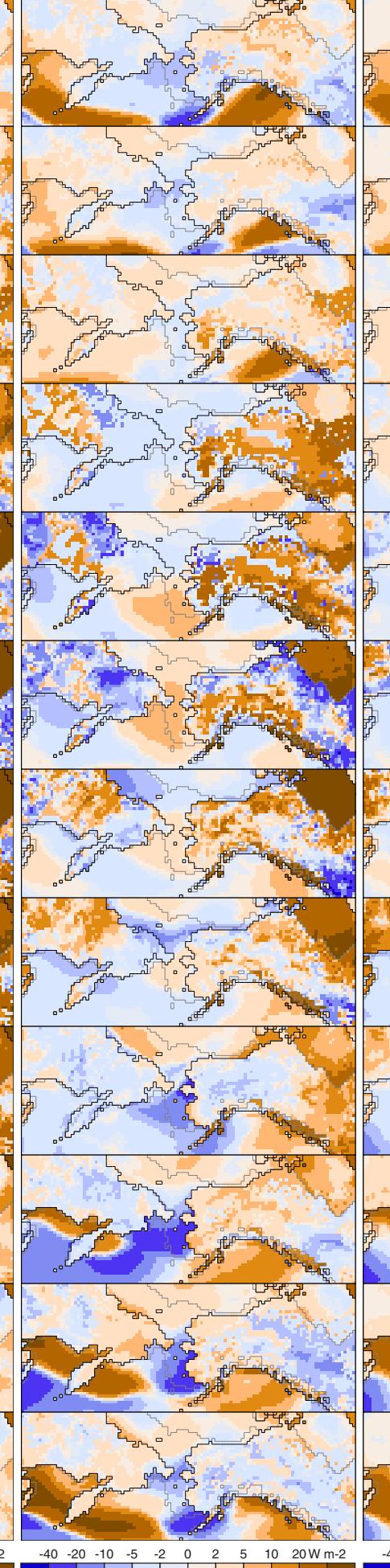
Net Longwave Radiation



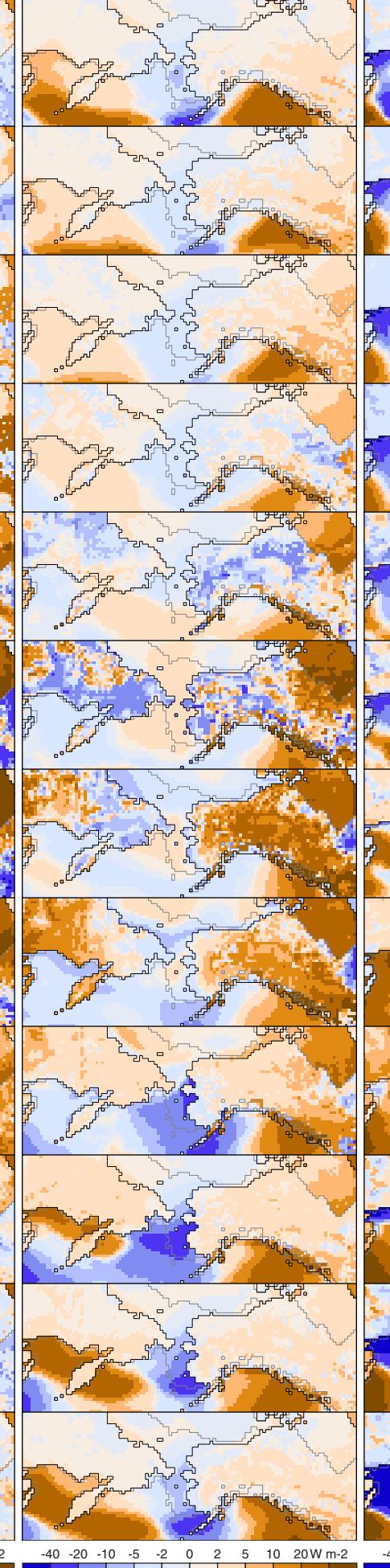
Net Radiation



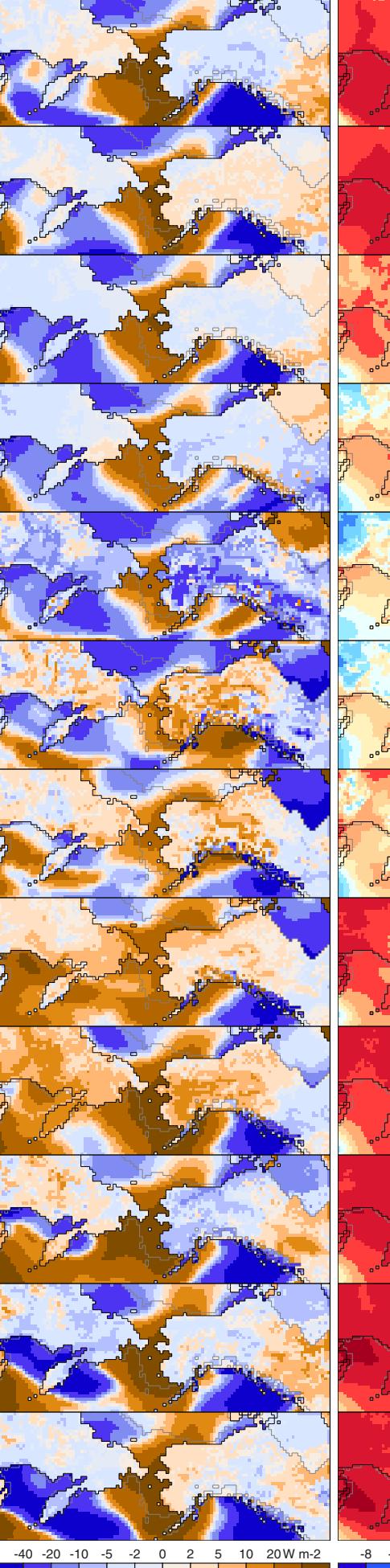
Sensible Heat Flux



Latent Heat Flux



Substrate Heat Flux



Long-Term Mean Differences
2-m Air Temperature

