

Fig. S1: Reconstructed European summer temperature anomalies (w.r.t. 1961-1990) for the years 1430-1439. For further information, see Euro-Med2k Consortium, in press.

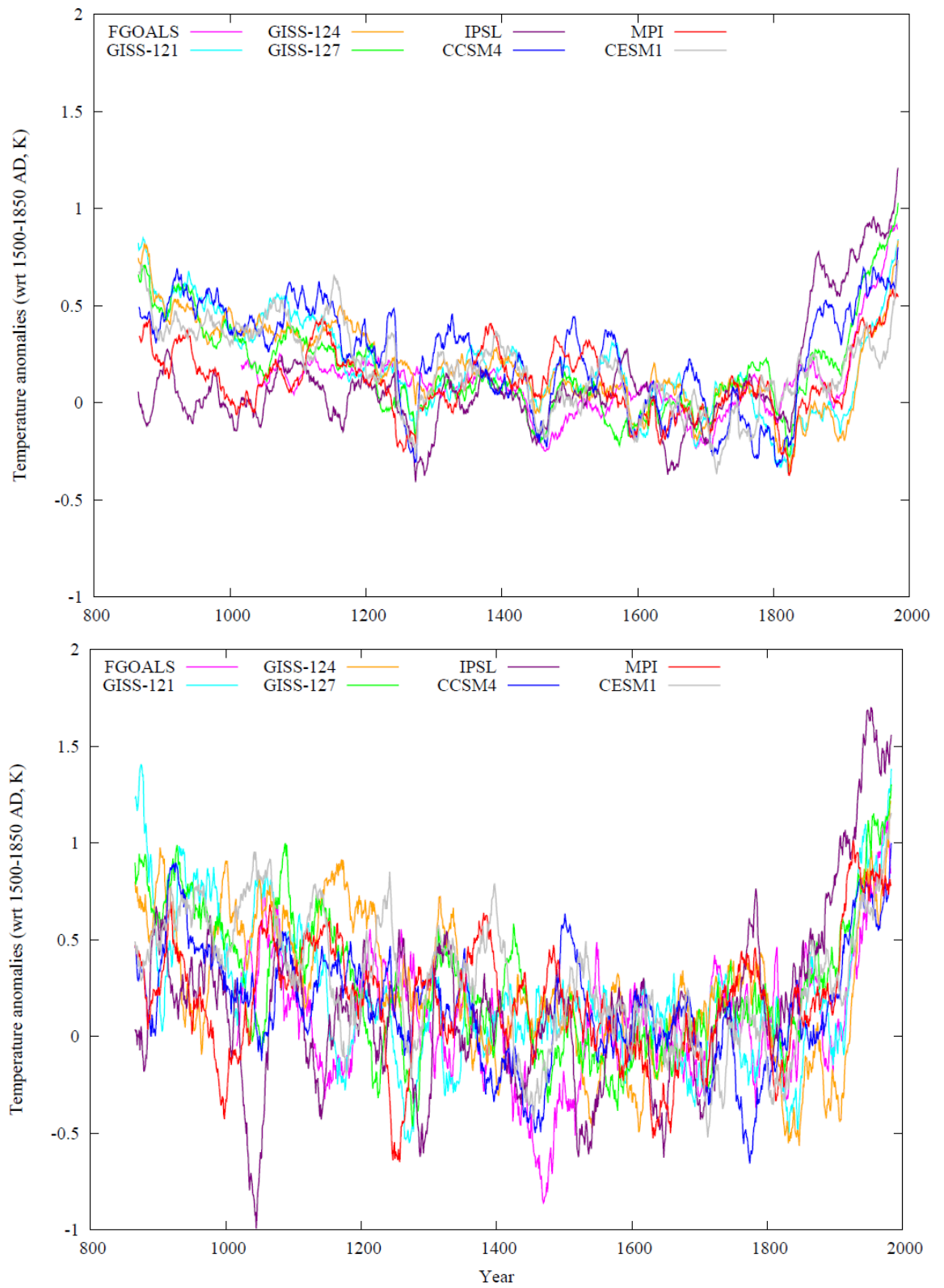


Fig. S2: Time series of summer (JJA; top) and winter (DJF; bottom) temperatures averaged over Europe (8°W-22°E, 41-55°N) simulated by the models in Tab. 2. Values are given as anomalies w.r.t. 1500-1850.

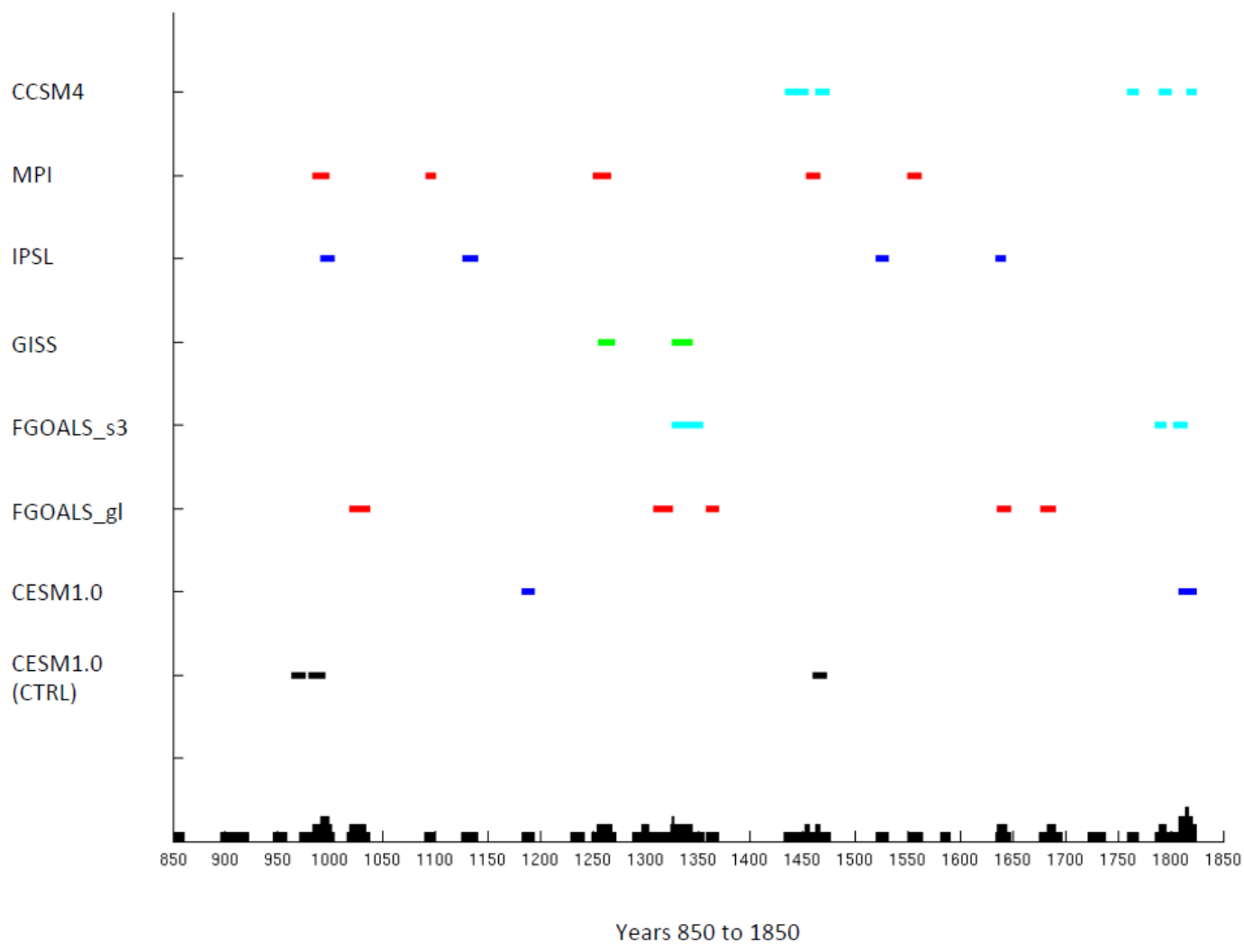


Fig. S3: Cold decades over Europe (8°W-22°E, 41-55°N) based on a 10-yr moving window of winter temperatures. A decade is termed cold when at least 5 out of 10 winter seasons show temperatures cooler than mean-1sigma w.r.t. all winters (yrs 850–1849; CESM CNTRL: 600 yrs). The last line indicates the total number of counts/decade over all simulations.

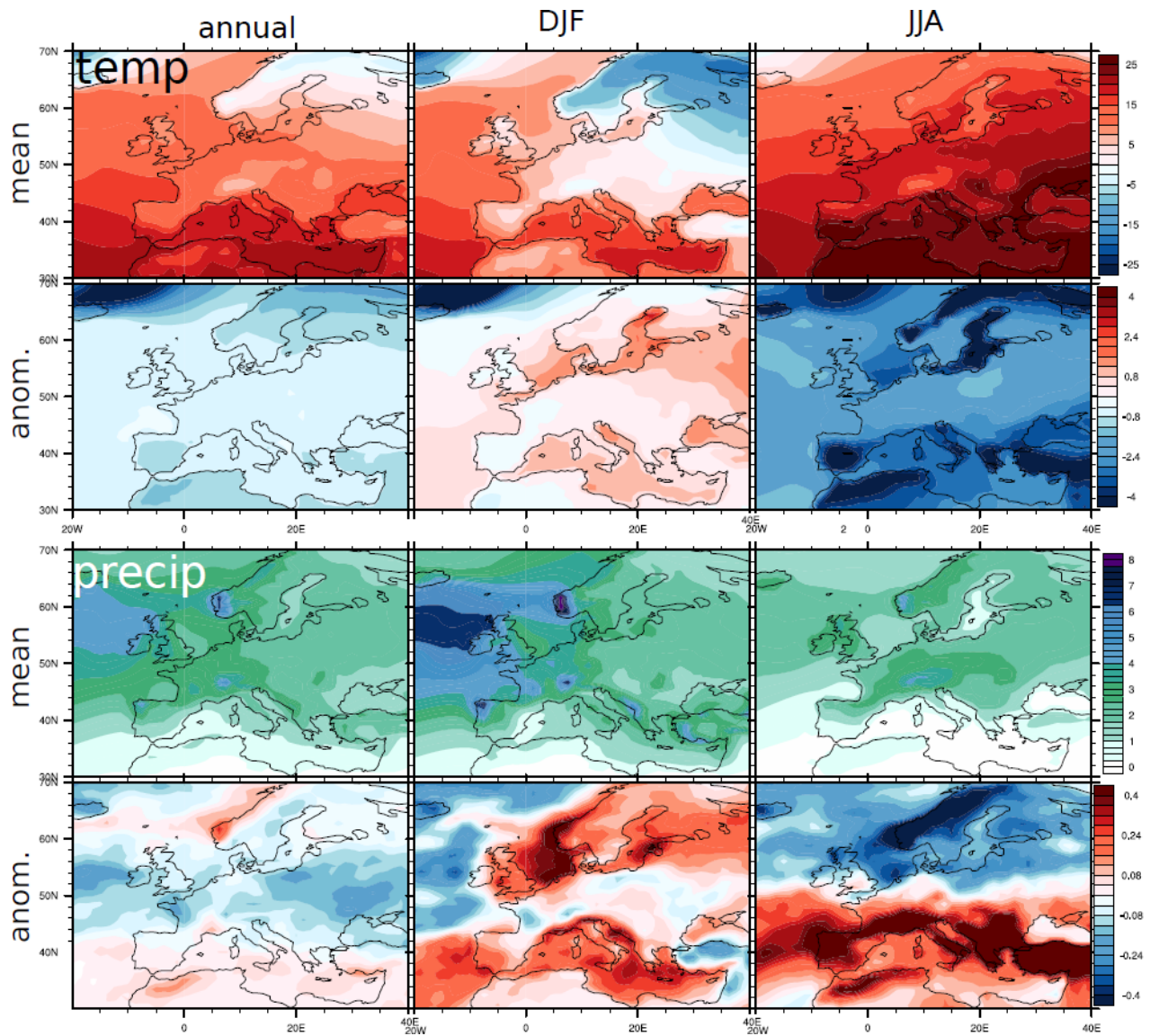


Fig. S4: Maps of surface temperature (top; °C) and precipitation (below; mm/day). Shown are annual (left), DJF (middle) and JJA (right) averages based on the transient simulation (years 850–1849) with CESM. First row: mean for all years. Second row: mean anomalies for the ten years after the strongest three volcanic eruptions (30 years in total; 1258-1287, 1453-1482 and 1816-1845) compared to all years.

References

Euro-Med2k Consortium: Luterbacher, J., J.P. Werner, J.E. Smerdon, L. Fernández-Donado, J. Gonzalez-Rouco, D. Barriopedro, F. Ljungqvist, U. Büntgen, E. Zorita, S. Wagner, J. Esper, D. McCarroll, A. Toreti, D. Frank, J. Jungclauss, M. Barriendos, C. Bertolin, O. Bothe, R. Brázdil, C. Dario, P. Dobrovolný, M. Gagen, E. García-Bustamante, Q. Ge, J. Gómez-Navarro, J. Guiot, Z. Hao, G. Hegerl, K. Holmgren, V. Klimenko, J. Martín-Chivelet, C. Pfister, N. Roberts, A. Schindler, A. Schurer, O. Solomina, L. von Gunten, E. Wahl, H. Wanner, O. Wetter, E. Xoplaki, N. Yuan, D. Zanchetti, H. Zhang, C. Zerefos, European summer temperatures since Roman times, *Environmental Research Letters*, in press.