



Supplement of

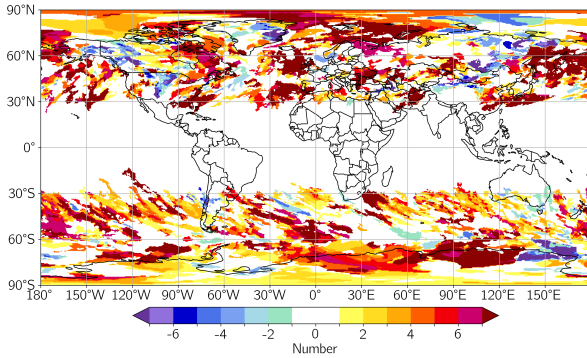
Frequency anomalies and characteristics of extratropical cyclones during extremely wet, dry, windy, and calm seasons in the extratropics

Hanin Binder and Heini Wernli

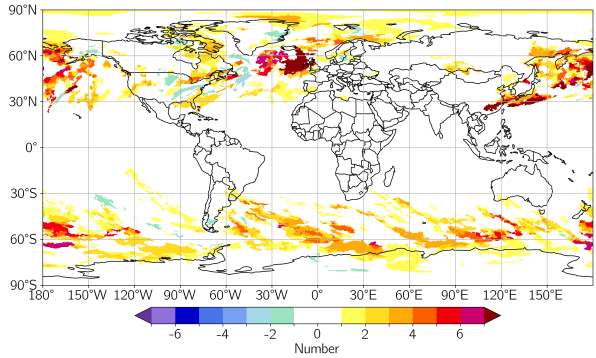
Correspondence to: Hanin Binder (hanin.binder@env.ethz.ch)

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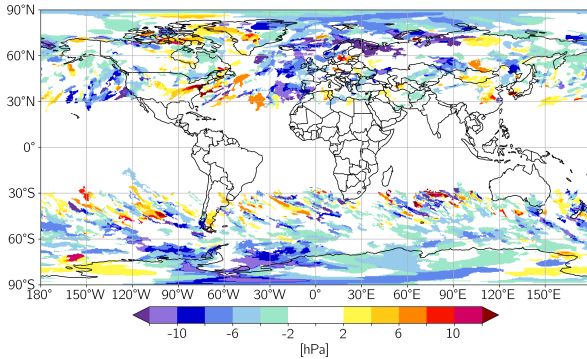
(a) Anomaly in cyclone number



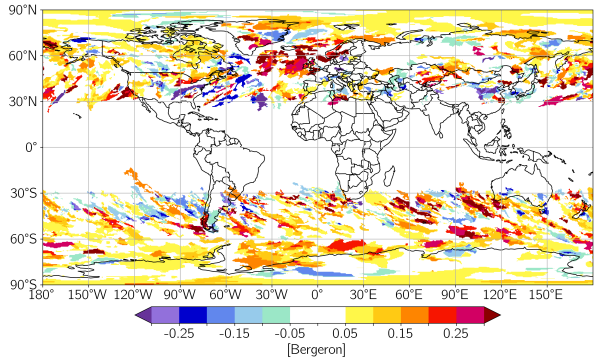
(b) Anomaly in bomb number



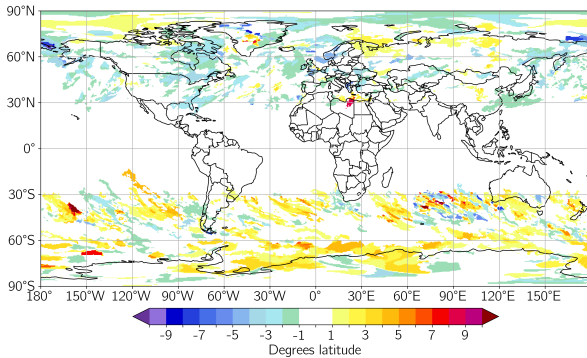
(c) Anomaly in minimum SLP



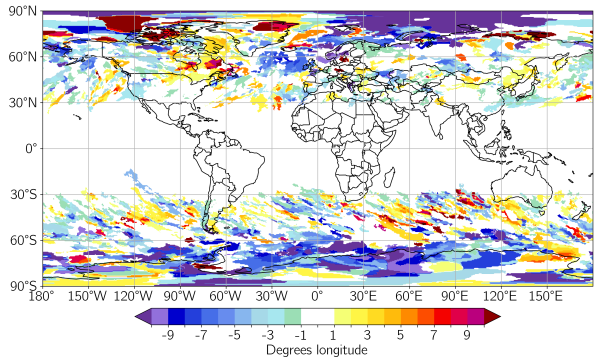
(d) Anomaly in deepening rate



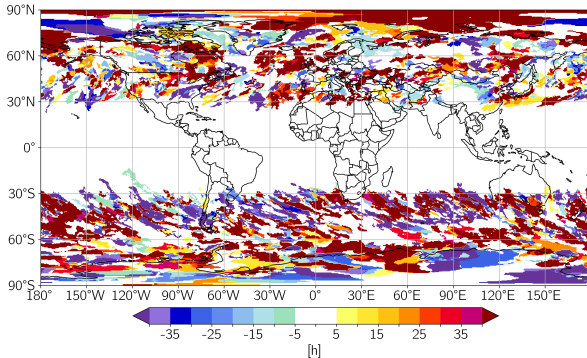
(e) Anomaly in genesis latitude



(f) Anomaly in genesis longitude



(g) Anomaly in lifetime



(h) Anomaly in stationarity

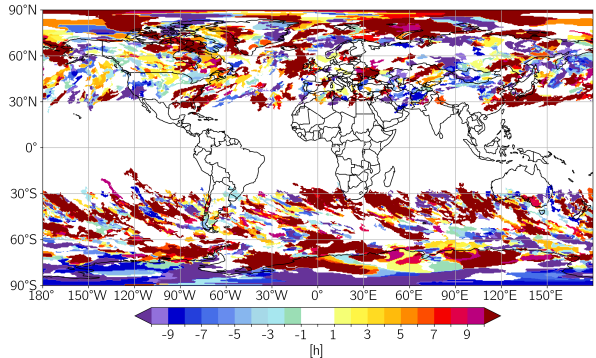
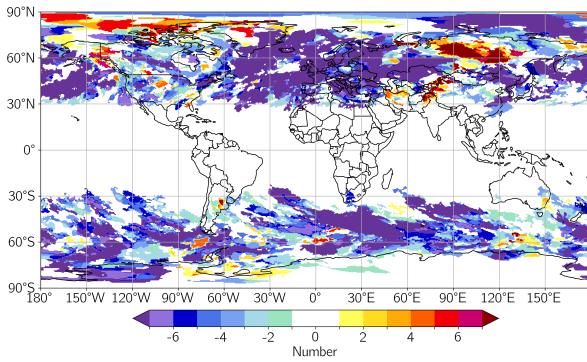
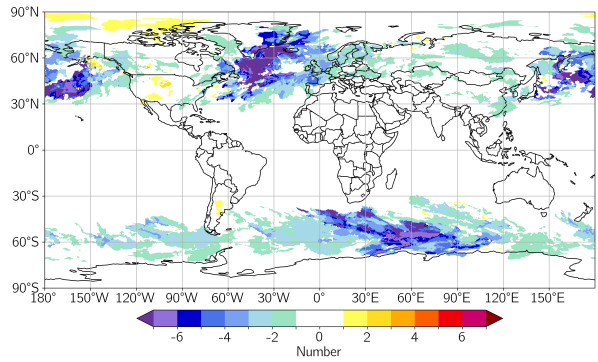


Figure S1. As Figs. 3 and 4 in the main manuscript, but for 940 extremely wet DJF seasons in ERA5. The shading shows seasonal anomalies with respect to the 1950-2020 winter climatology in the (a) number of cyclones, (b) number of bomb cyclones, (c) mean minimum SLP of the cyclones (hPa), (d) mean deepening rate of the cyclones (Bergeron), (e) genesis latitude (degrees), (f) genesis longitude (degrees), (g) lifetime (hours), and (h) stationarity (hours) of the cyclones. The panels include all extreme season objects in the years 1950-2020 with an area larger than 10^5 km² whose centre of mass is located poleward of 30° latitude. Each grid point contains between 0 and 3 objects.

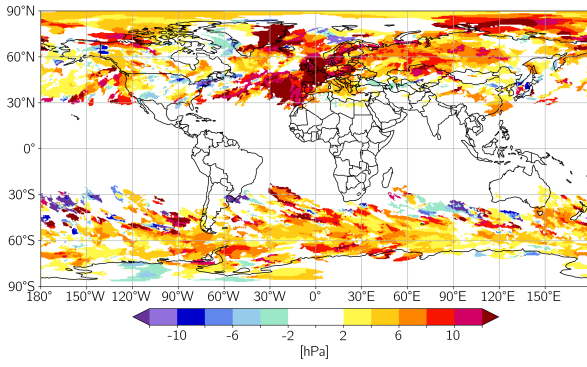
(a) Anomaly in cyclone number



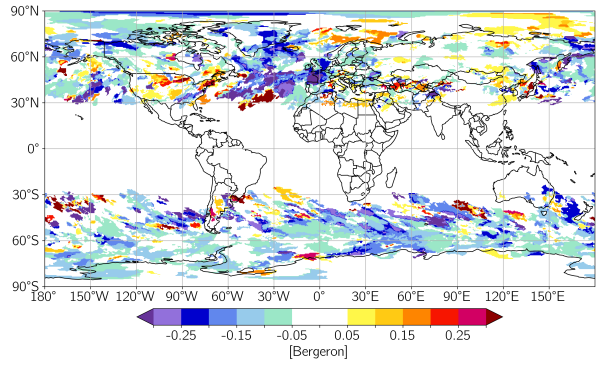
(b) Anomaly in bomb number



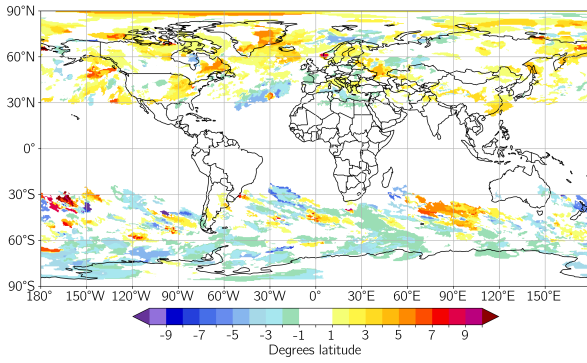
(c) Anomaly in minimum SLP



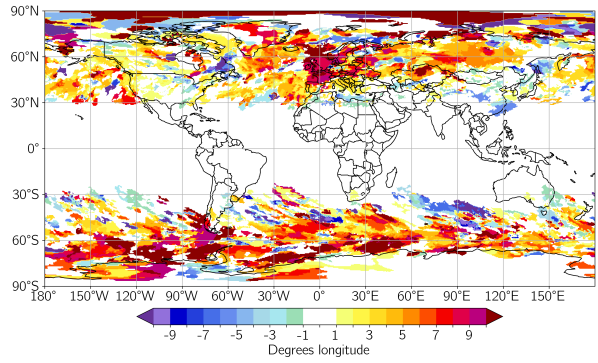
(d) Anomaly in deepening rate



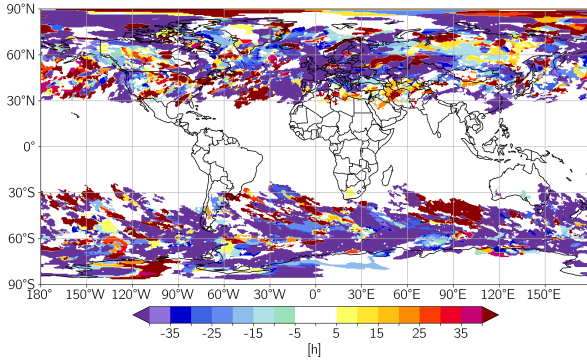
(e) Anomaly in genesis latitude



(f) Anomaly in genesis longitude



(g) Anomaly in lifetime



(h) Anomaly in stationarity

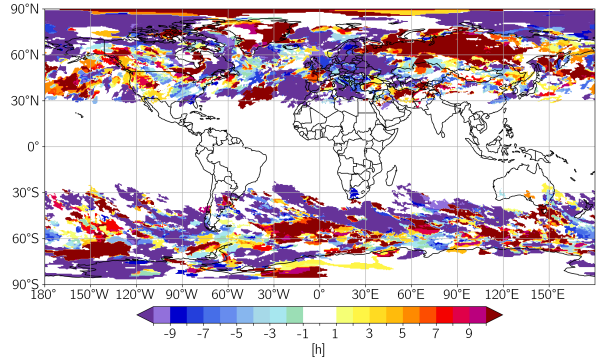
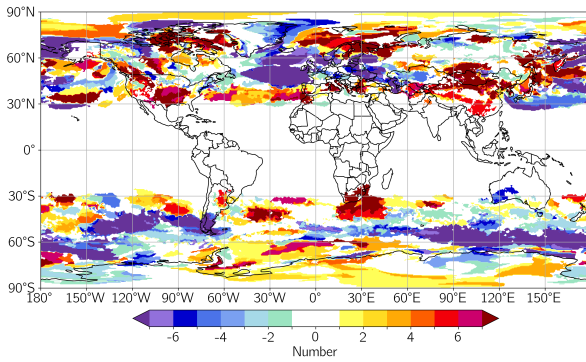
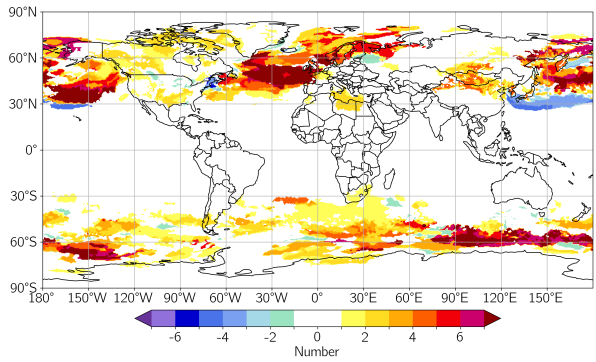


Figure S2. As Fig. S1, but for 874 extremely dry DJF seasons in ERA5.

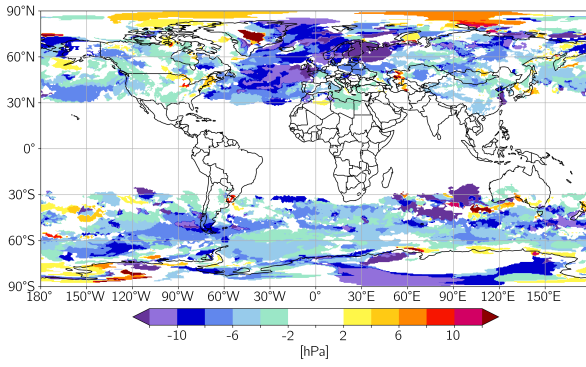
(a) Anomaly in cyclone number



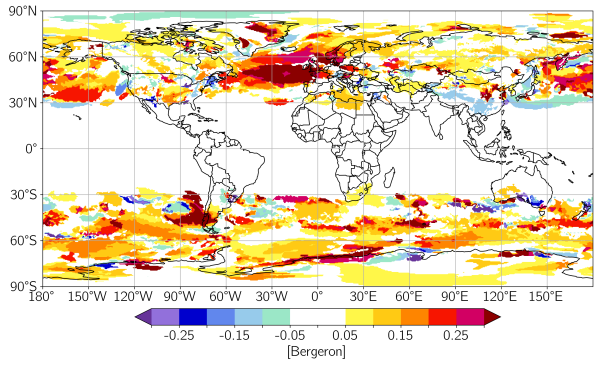
(b) Anomaly in bomb number



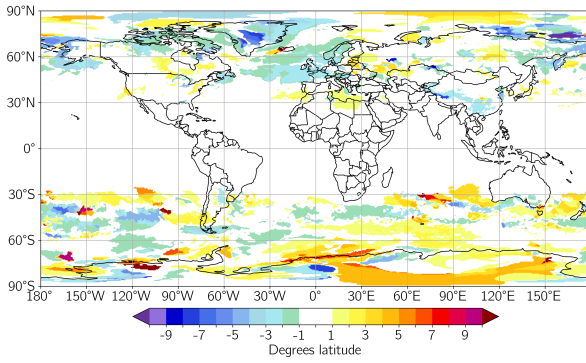
(c) Anomaly in minimum SLP



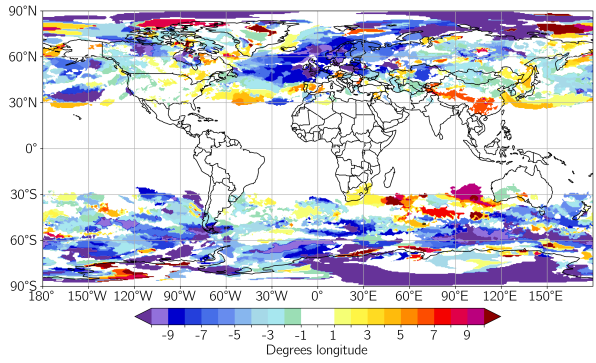
(d) Anomaly in deepening rate



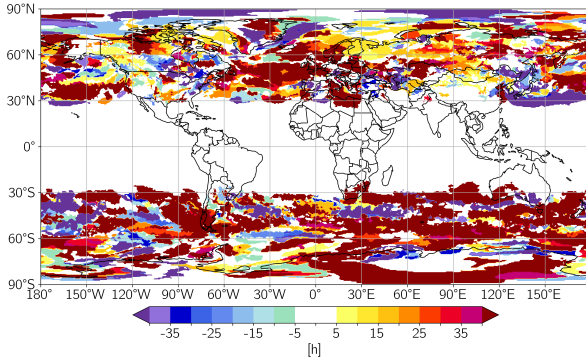
(e) Anomaly in genesis latitude



(f) Anomaly in genesis longitude



(g) Anomaly in lifetime



(h) Anomaly in stationarity

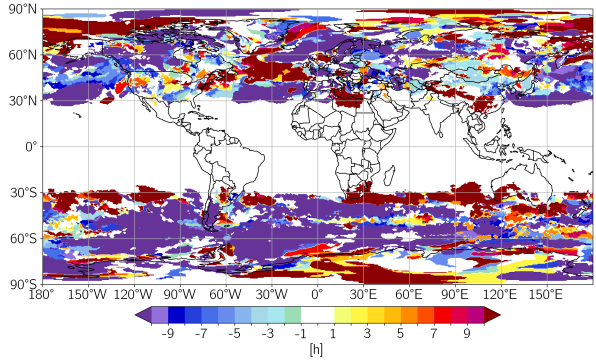
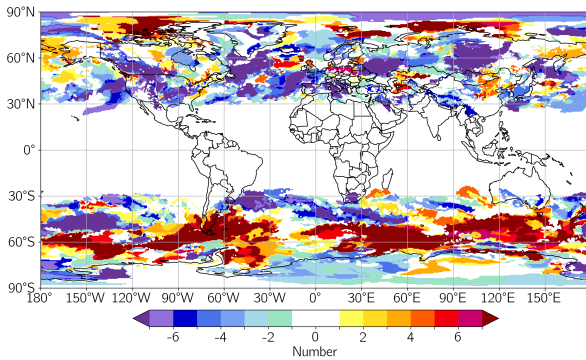
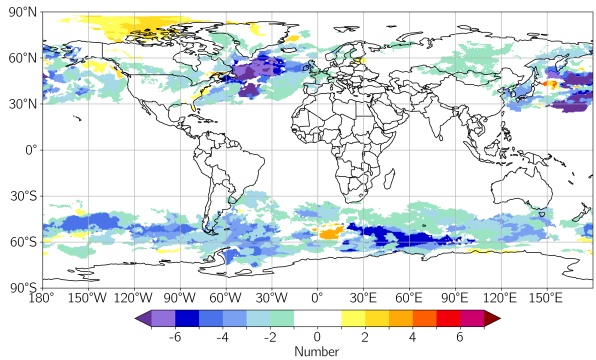


Figure S3. As Fig. S1, but for 613 extremely windy DJF seasons in ERA5.

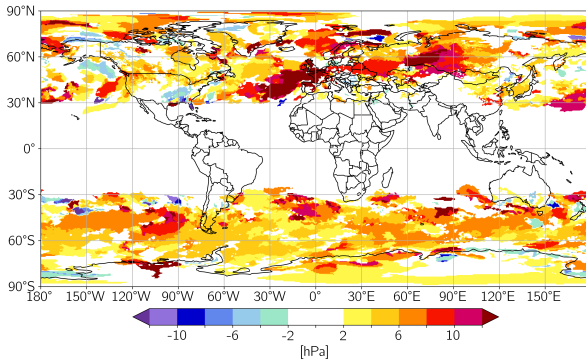
(a) Anomaly in cyclone number



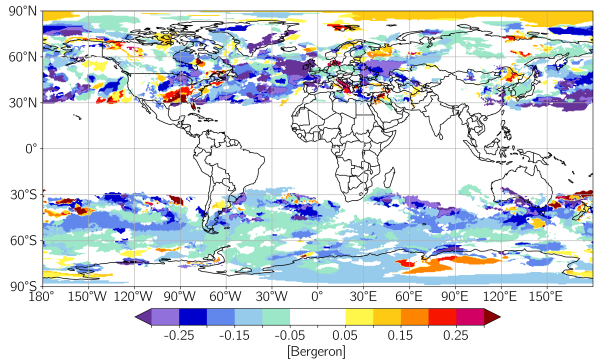
(b) Anomaly in bomb number



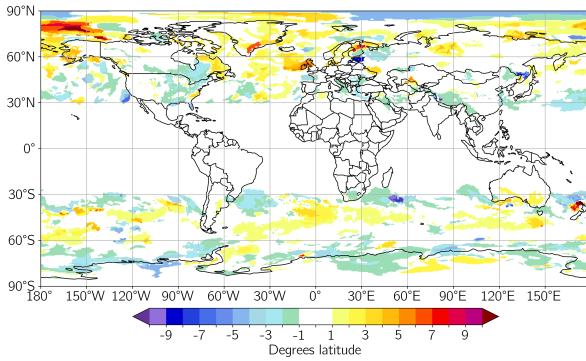
(c) Anomaly in minimum SLP



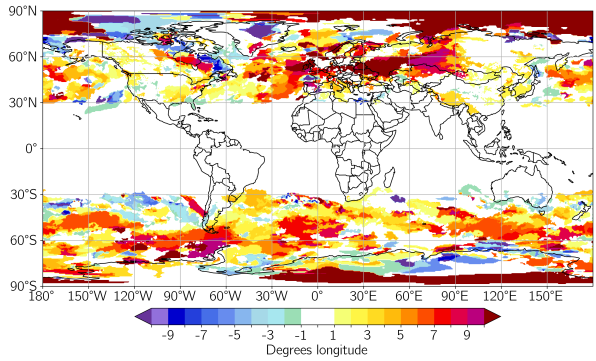
(d) Anomaly in deepening rate



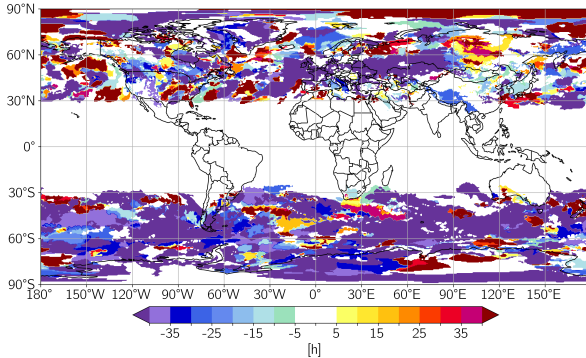
(e) Anomaly in genesis latitude



(f) Anomaly in genesis longitude



(g) Anomaly in lifetime



(h) Anomaly in stationarity

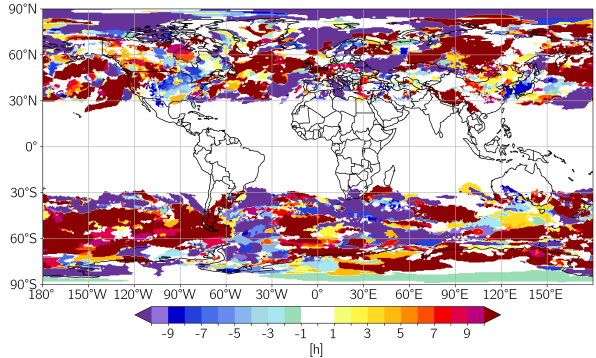
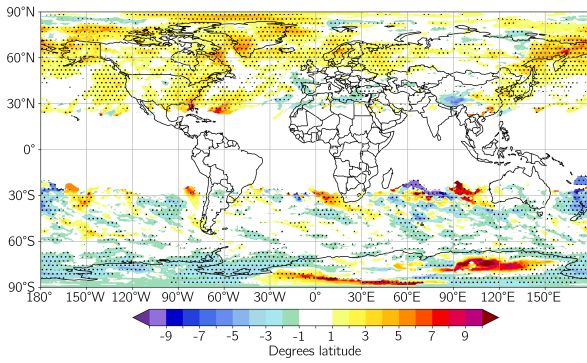
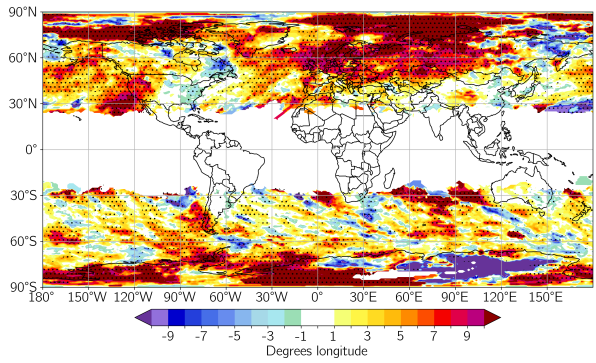


Figure S4. As Fig. S1, but for 703 extremely calm DJF seasons in ERA5.

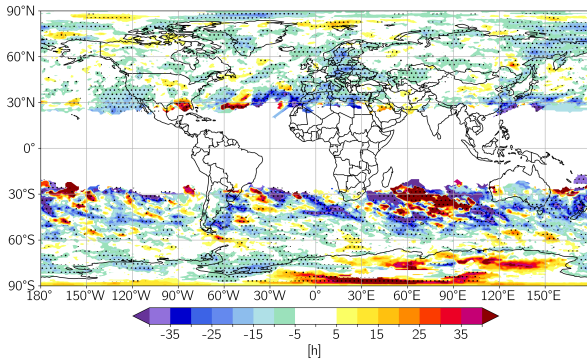
(a) Anomaly in genesis latitude



(b) Anomaly in genesis longitude



(c) Anomaly in lifetime



(d) Anomaly in stationarity

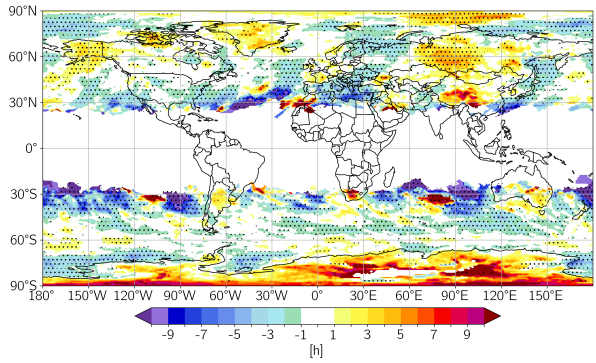
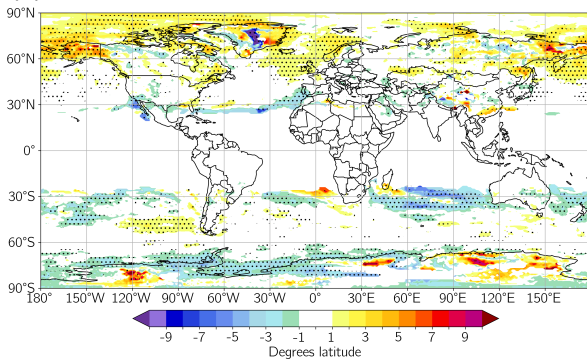
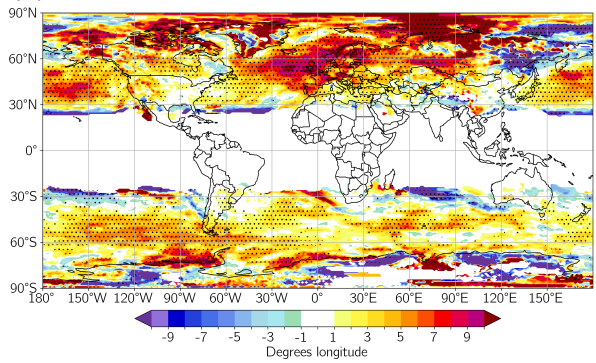


Figure S5. As Fig. 4 in the main manuscript, but for extremely dry DJF seasons.

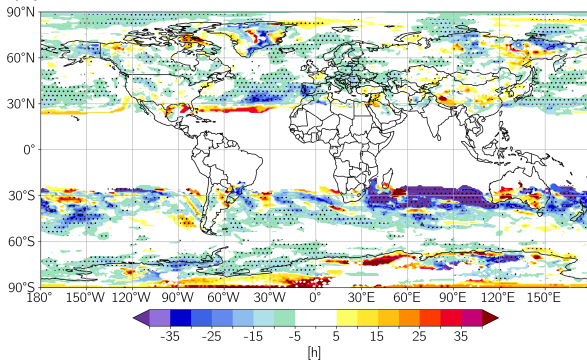
(a) Anomaly in genesis latitude



(b) Anomaly in genesis longitude



(c) Anomaly in lifetime



(d) Anomaly in stationarity

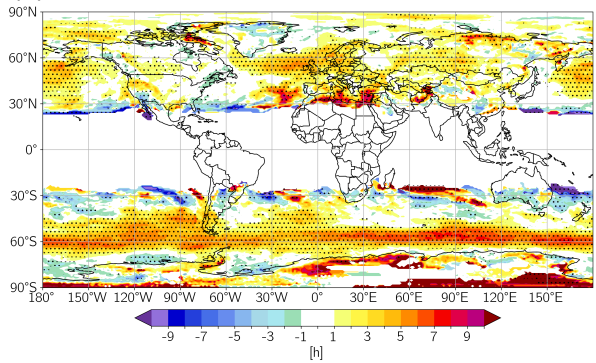
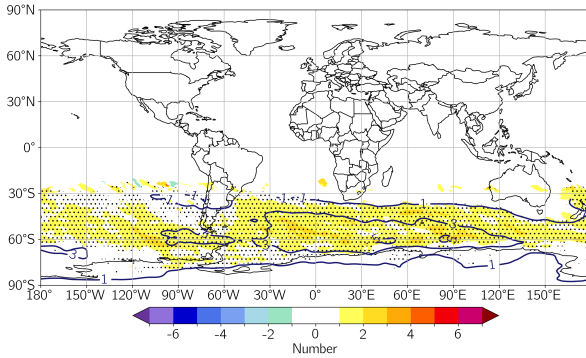
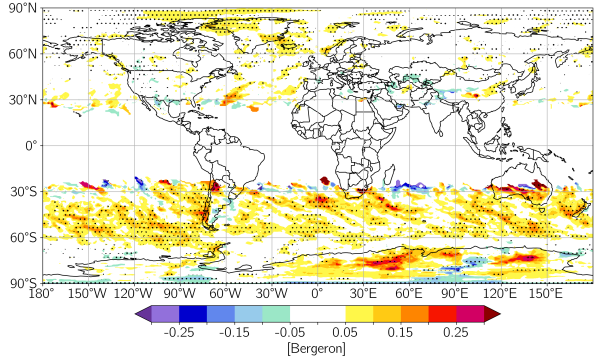


Figure S6. As Fig. 4 in the main manuscript, but for extremely calm DJF seasons.

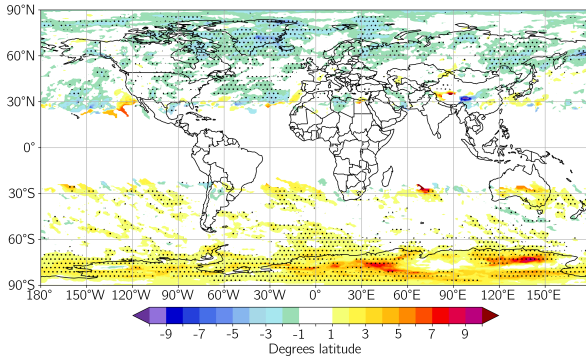
(a) Anomaly in bomb number



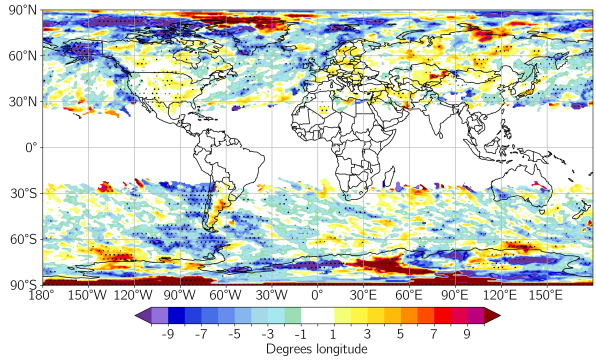
(b) Anomaly in deepening rate



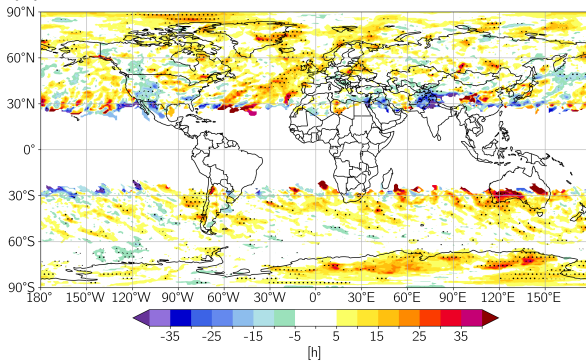
(c) Anomaly in genesis latitude



(d) Anomaly in genesis longitude



(e) Anomaly in lifetime



(f) Anomaly in stationarity

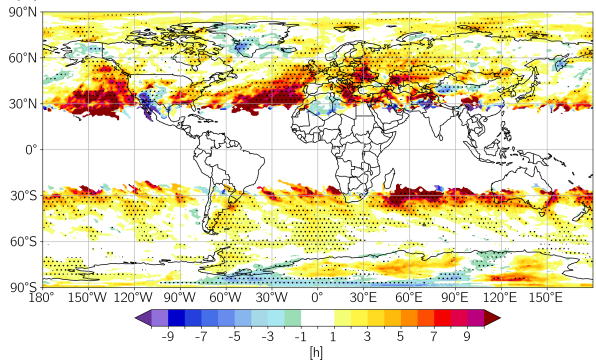
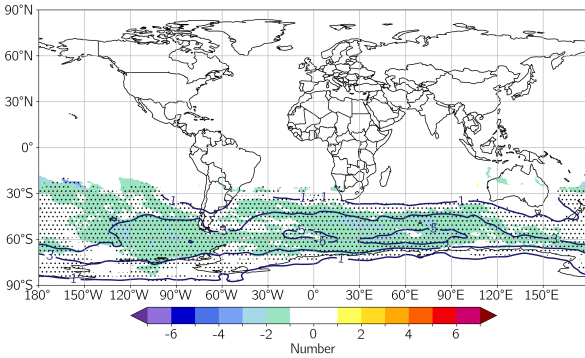
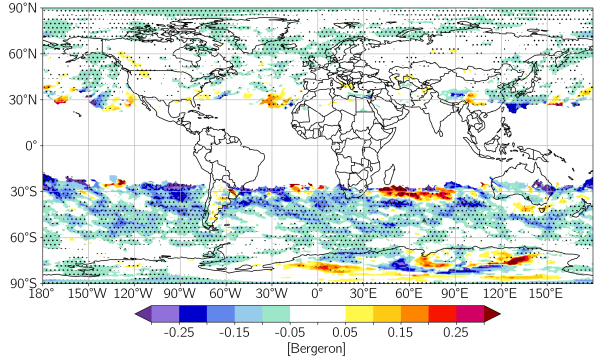


Figure S7. As (a) Fig. 3b, (b) Fig. 3d, and (c-f) Fig. 4 in the main manuscript, but for extremely wet JJA seasons.

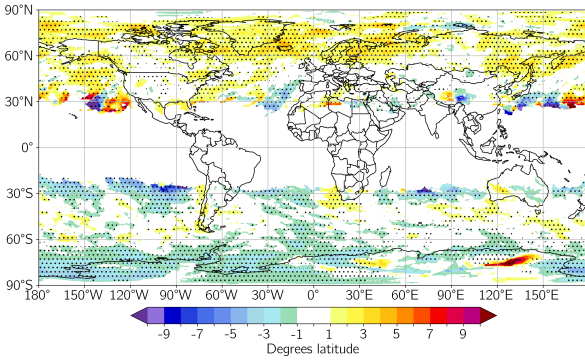
(a) Anomaly in bomb number



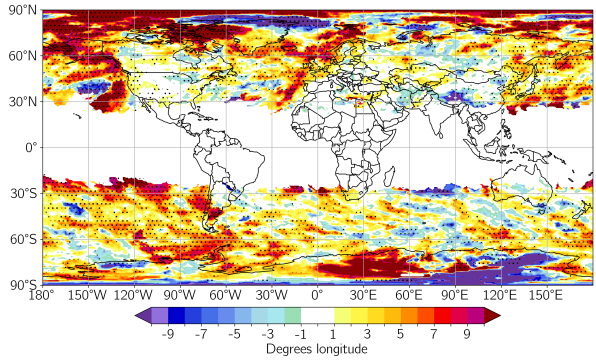
(b) Anomaly in deepening rate



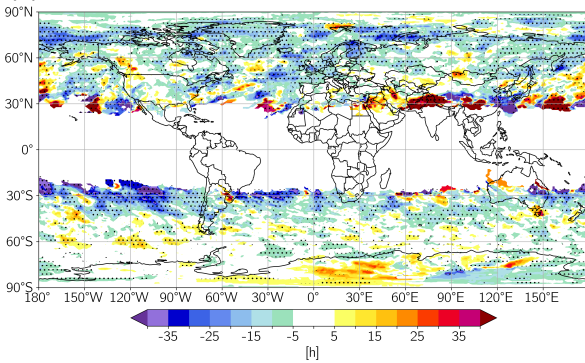
(c) Anomaly in genesis latitude



(d) Anomaly in genesis longitude



(e) Anomaly in lifetime



(f) Anomaly in stationarity

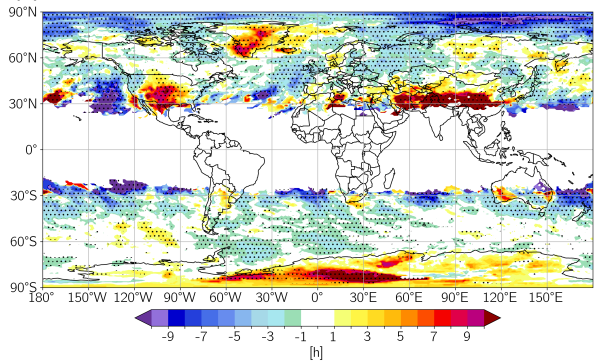
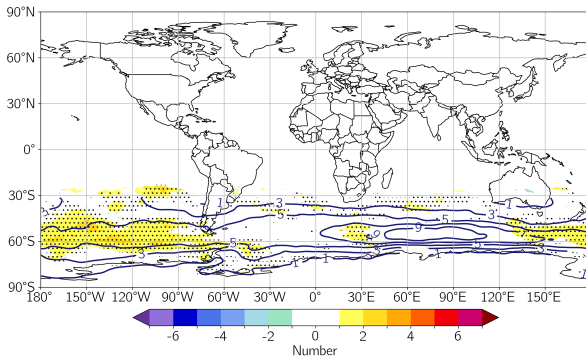
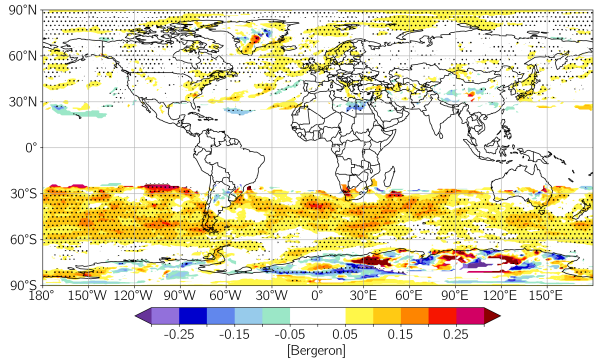


Figure S8. As Fig. S7, but for extremely dry JJA seasons

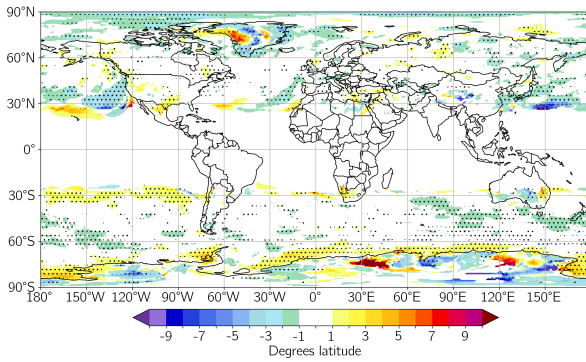
(a) Anomaly in bomb number



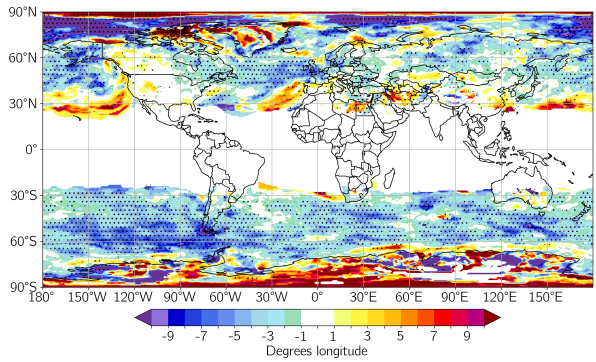
(b) Anomaly in deepening rate



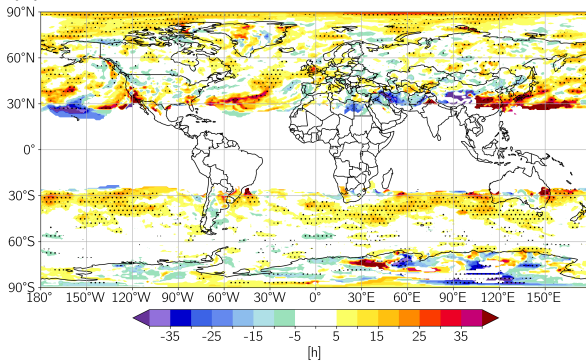
(c) Anomaly in genesis latitude



(d) Anomaly in genesis longitude



(e) Anomaly in lifetime



(f) Anomaly in stationarity

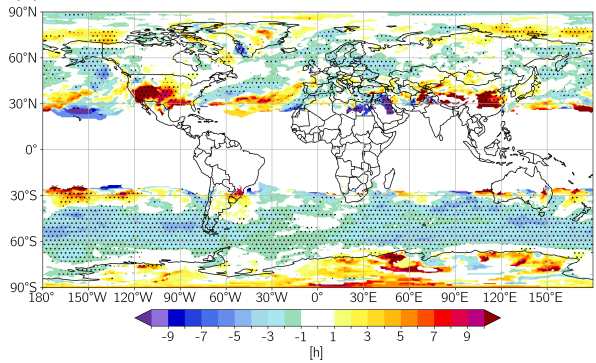
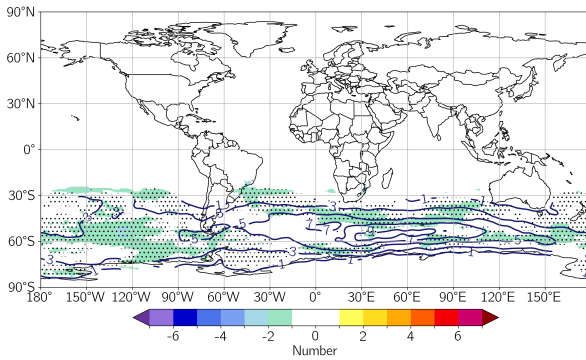
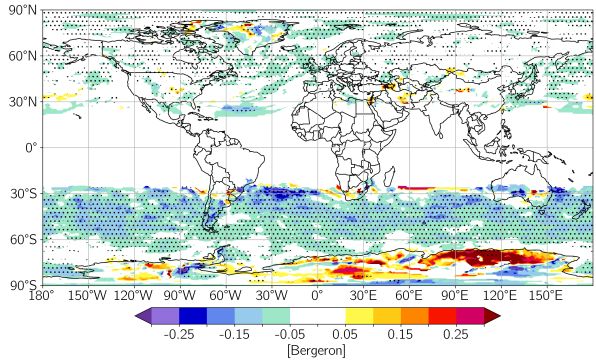


Figure S9. As Fig. S7, but for extremely windy JJA seasons

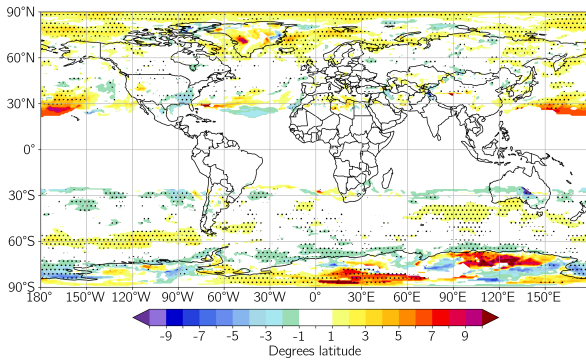
(a) Anomaly in bomb number



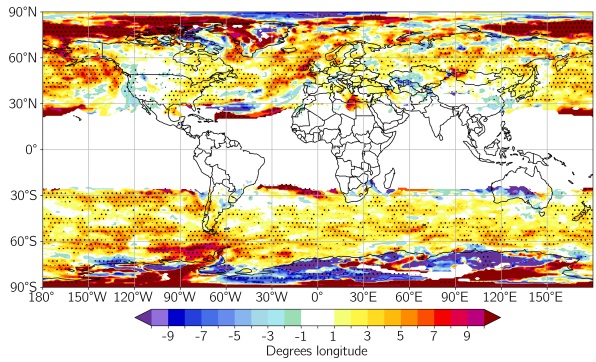
(b) Anomaly in deepening rate



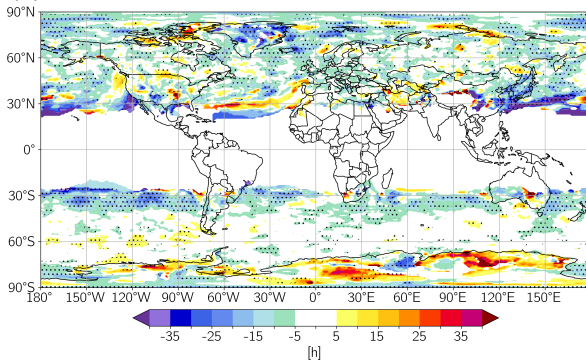
(c) Anomaly in genesis latitude



(d) Anomaly in genesis longitude



(e) Anomaly in lifetime



(f) Anomaly in stationarity

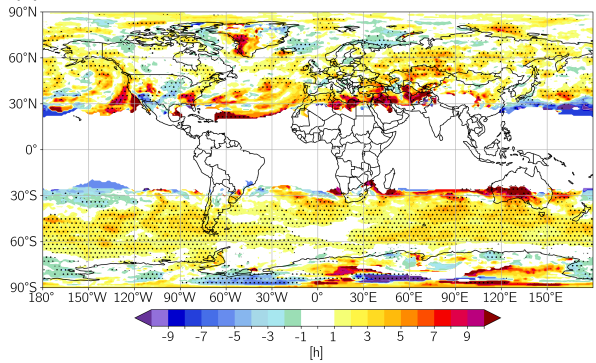


Figure S10. As Fig. S7, but for extremely calm JJA seasons