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Supplement of

A Lagrangian analysis of upper-tropospheric anticyclones associated with heat waves in Europe

Philipp Zschenderlein et al.

Correspondence to: Philipp Zschenderlein (philipp.zschenderlein@kit.edu)

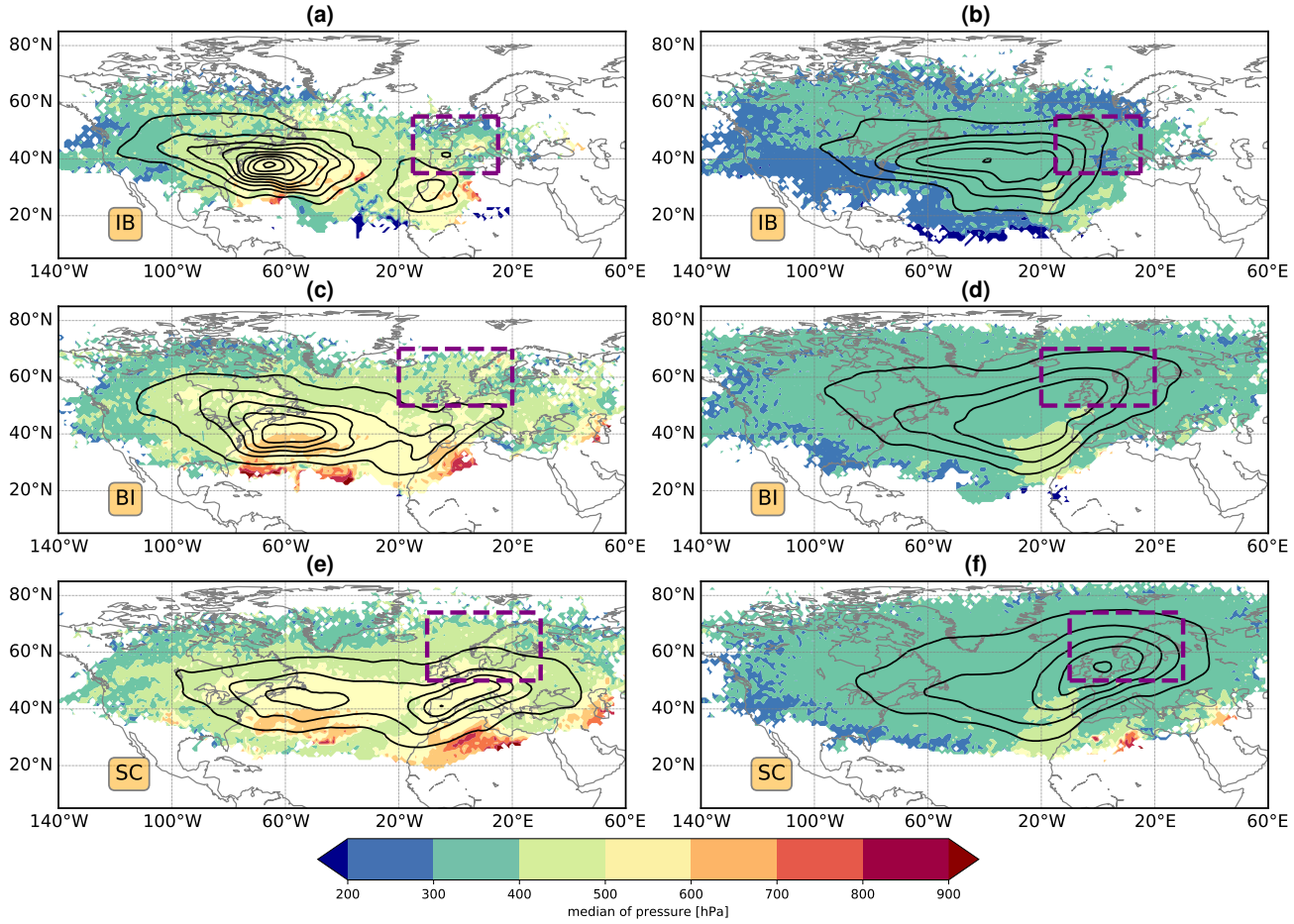

Figure S1. Spatial distribution of diabatically heated (left) and cooled (right) trajectories three days prior to arrival in the upper-tropospheric anticyclones for (a,b) Iberian Peninsula (IB), (c,d) British Isles (BI) and (e,f) Scandinavia (SC). The colours indicate the median pressure of air parcels and contours display the air parcel density (starting from 1‰ per 10^5 km^2 in 2‰ increments). The dashed purple boxes represent the area in which upper-tropospheric anticyclones are associated with heat waves (cf. section 2.1 and Fig. 1 in the paper).

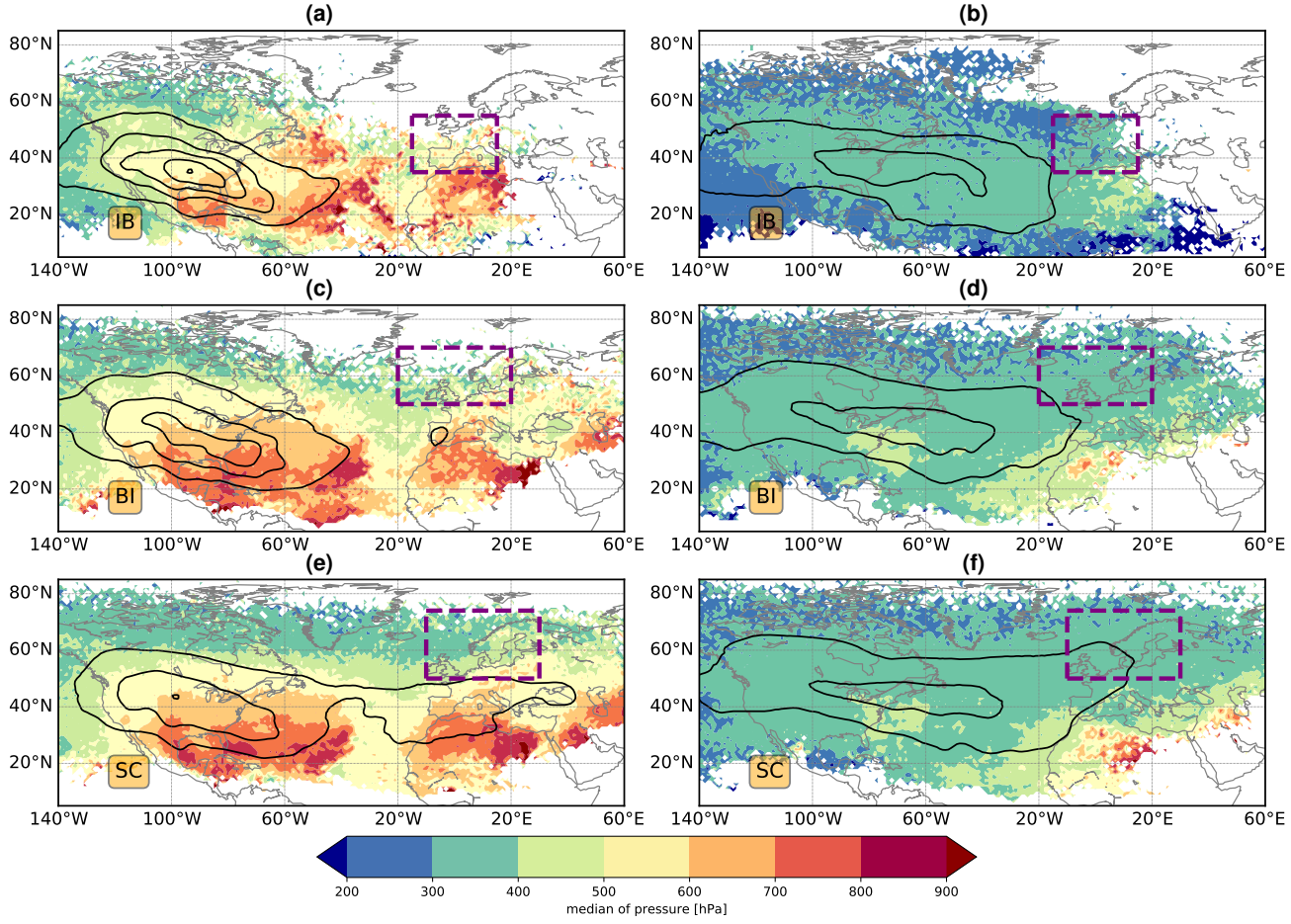

Figure S2. Same as Fig. S1, but seven days prior to arrival.

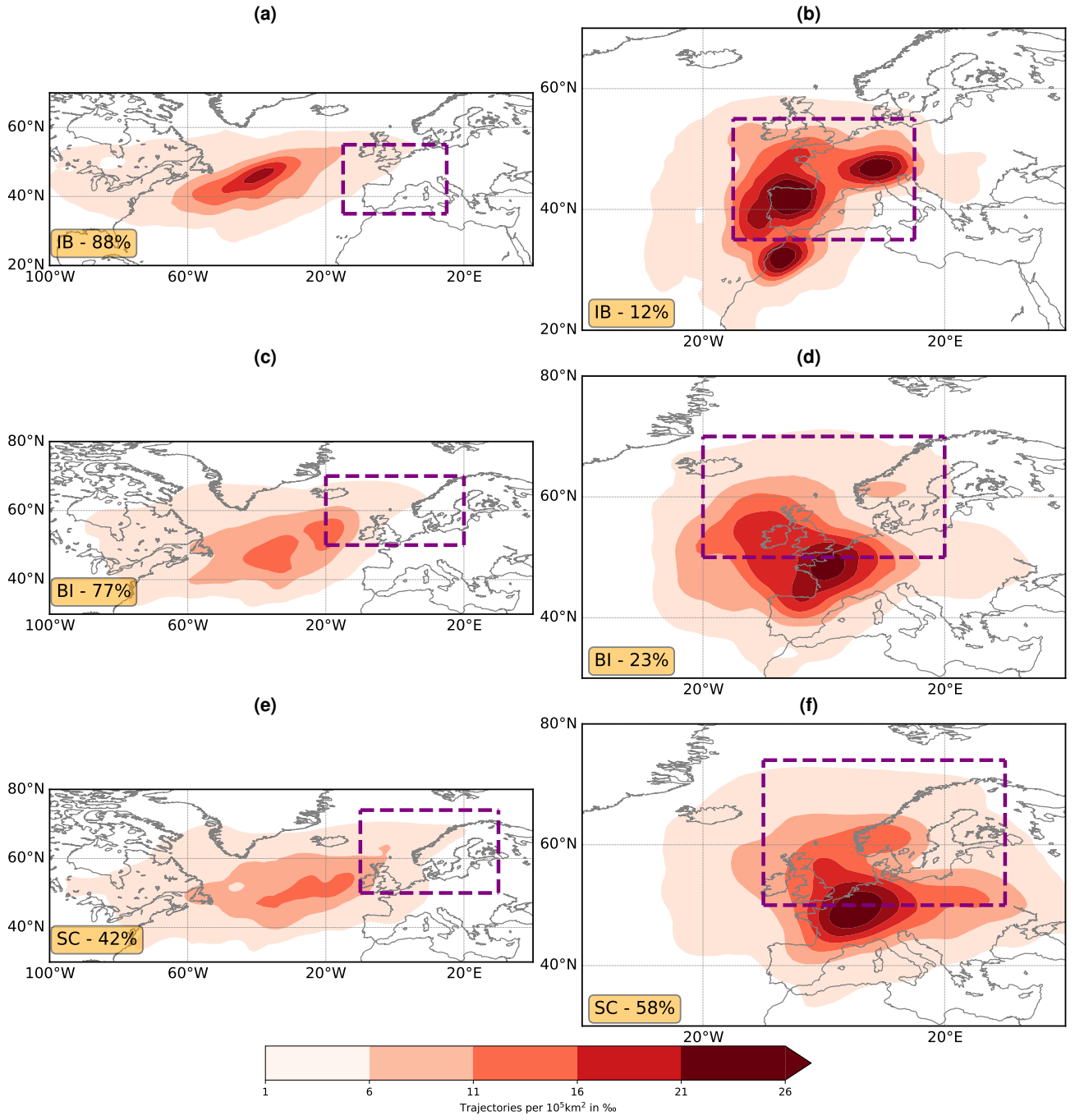

Figure S3. Geographic location of the maximum diabatic heating along trajectories for the remote (left column) and nearby heating branch (right column) during the last three days prior to reaching upper-tropospheric anticyclones above the Iberian Peninsula (IB), British Isles (BI) and Scandinavia (SC). The percentages in the orange boxes denote the fraction of the remote/ nearby heating branch with respect to the whole heating branch. The dashed purple boxes are as in Fig. S1.

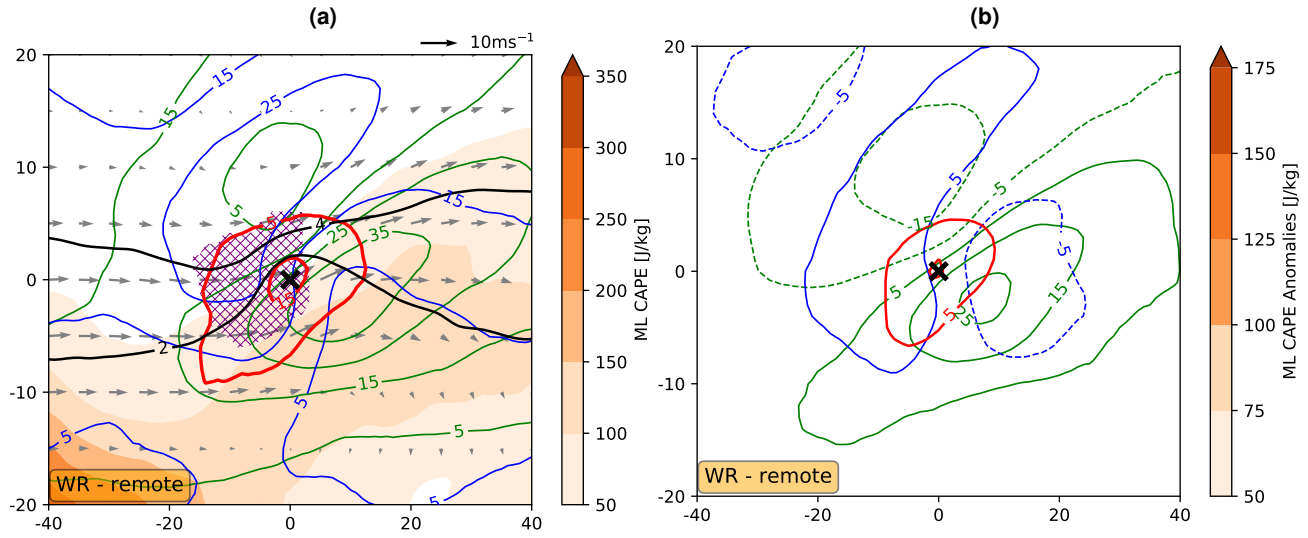

Figure S4. Composites around the position of maximum diabatic heating of the trajectories in the remote heating branch reaching upper-tropospheric anticyclones above western Russia. (a): Frequencies of extratropical cyclones (blue), blocks (green) and warm conveyor belts (red) starting from 5% in 10% increments. The orange shading shows the ML CAPE (in J kg^{-1}) and the arrows the wind at 800 hPa. Black contours indicate PV (2 and 4 PVU contours) at 330 K. The purple hatching marks the region where the stratiform precipitation exceeds the convective precipitation (only for areas with total precipitation $\geq$ 2 mm d^{-1}). (b) Anomalies of cyclone (blue), blocking (green) and warm conveyor belt (red) frequency.

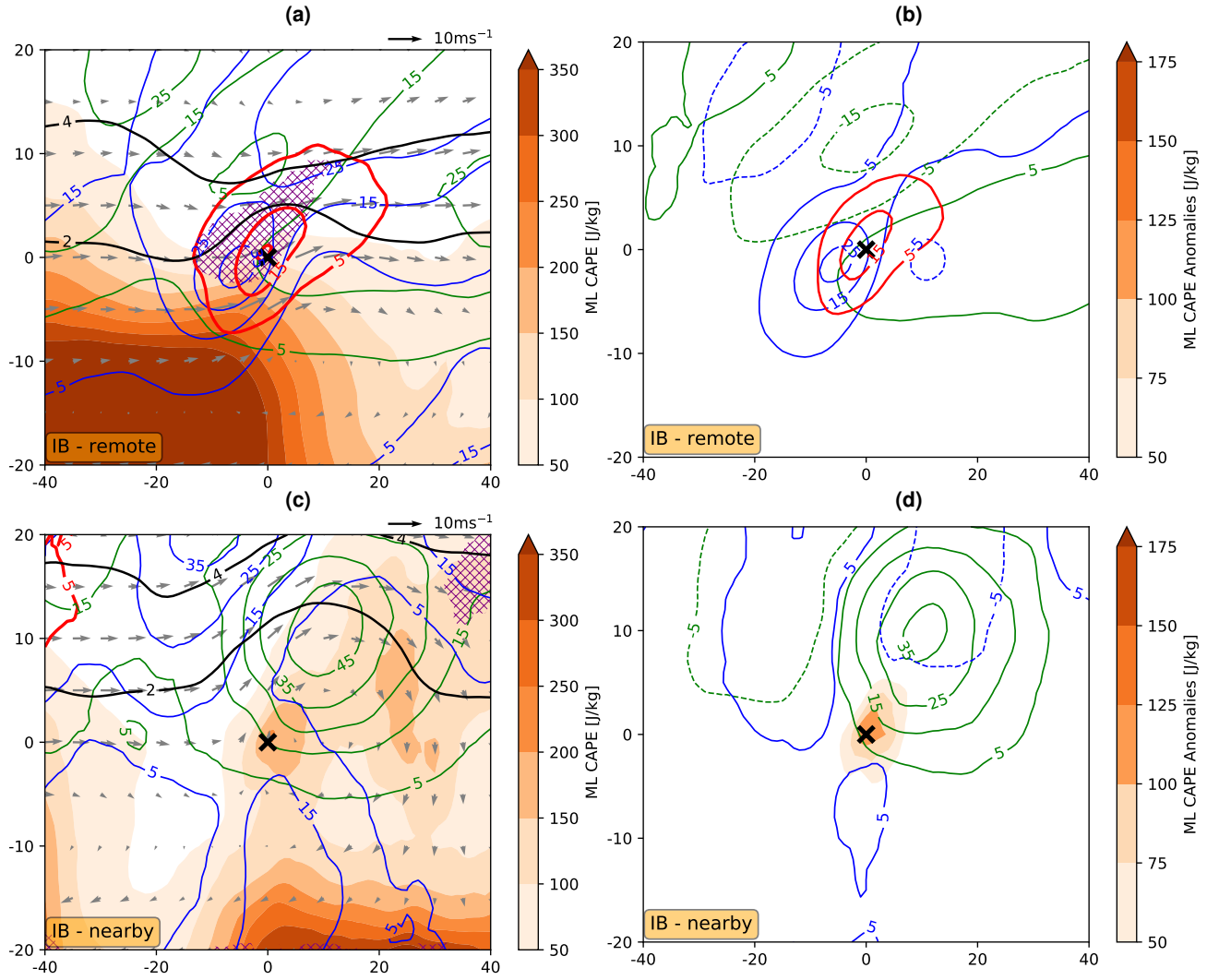

Figure S5. Same as Fig. S4, but for the remote (upper row) and nearby heating branch (lower row) reaching anticyclones over the Iberian Peninsula. Absolute frequencies are shown in (a) and (c); anomalies in (b) and (d). Note that the purple hatching in (a) marks the region where the stratiform precipitation exceeds the convective precipitation, in contrast to (c), where the purple hatching marks the region, where convective exceeds stratiform precipitation. Orange shading in (d) shows ML CAPE anomalies (in J kg^{-1}).

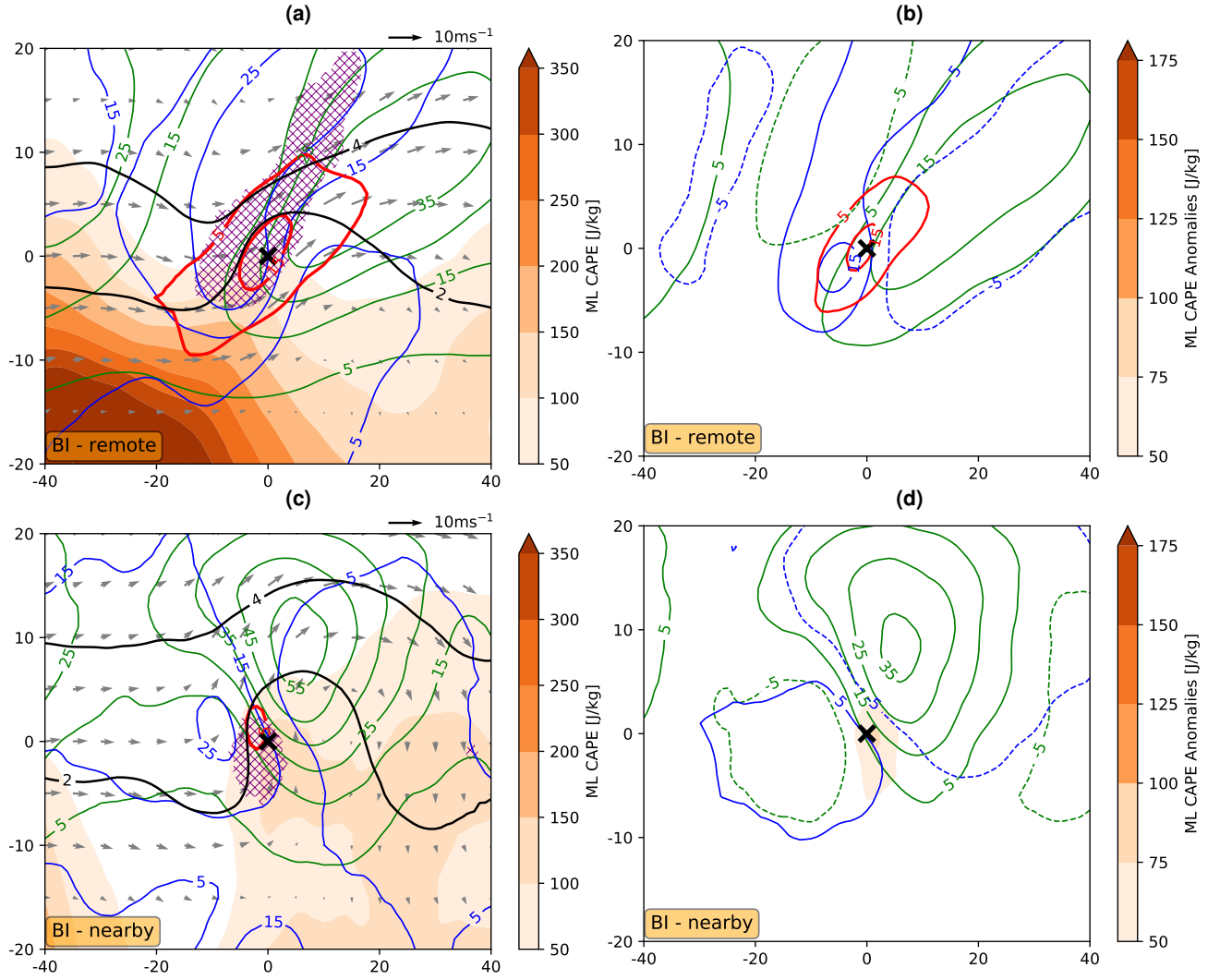

Figure S6. Same as Fig. S5, but for the British Isles.

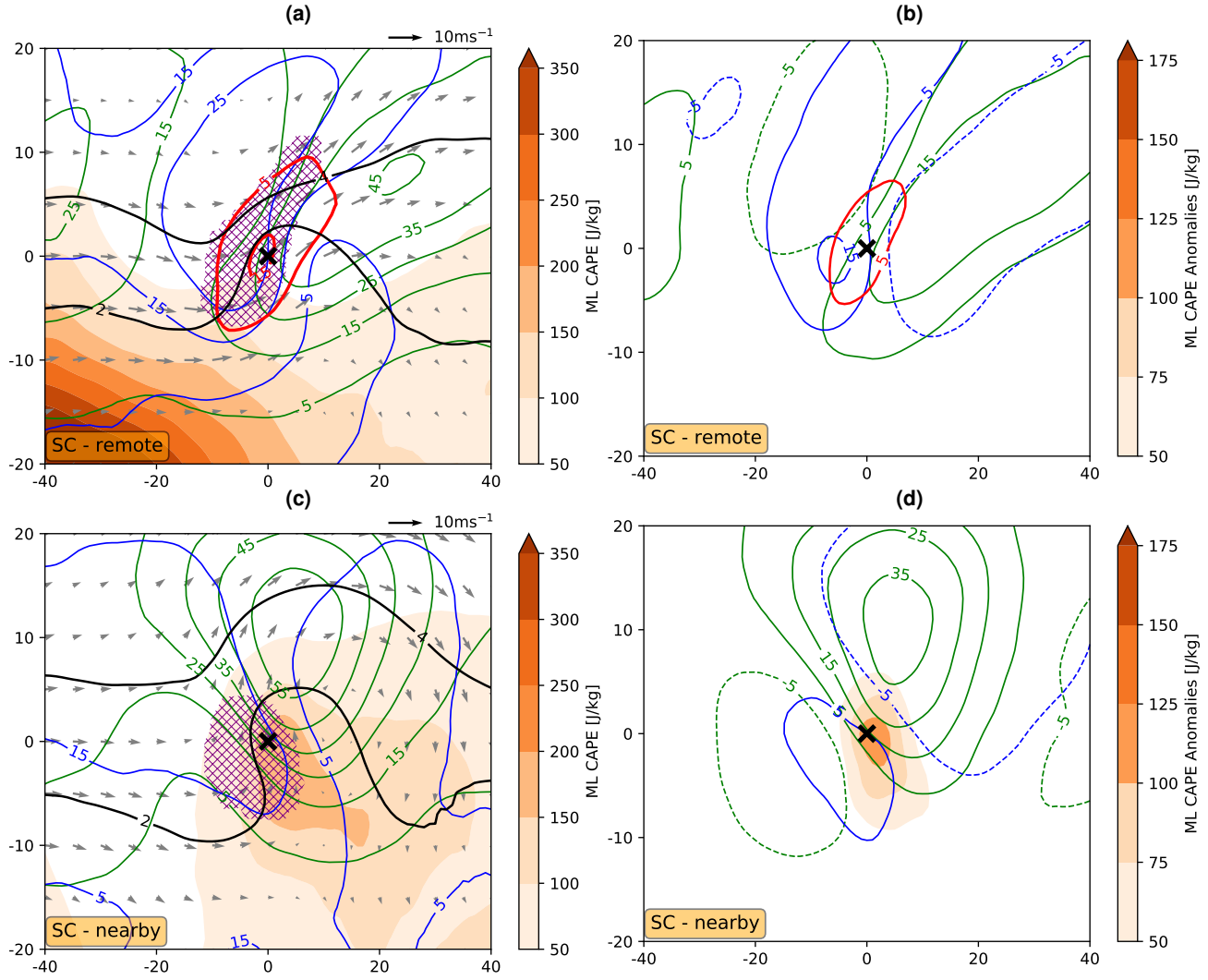

Figure S7. Same as Fig. S5, but for Scandinavia.

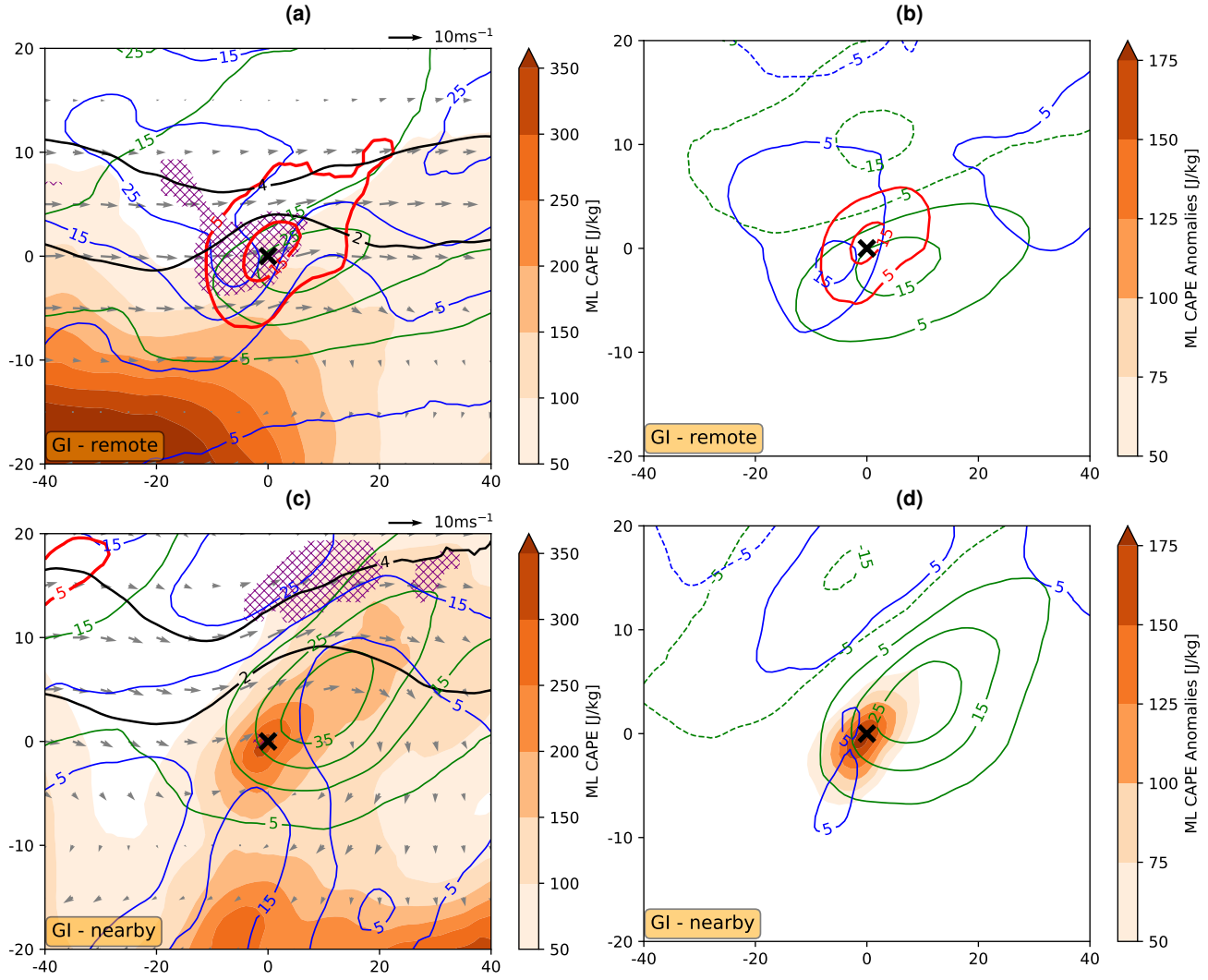

Figure S8. Same as Fig. S5, but for Greece/Italy.