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Supplement of

The role of cyclones and potential vorticity cutoffs for the occurrence of unusually long wet spells in Europe

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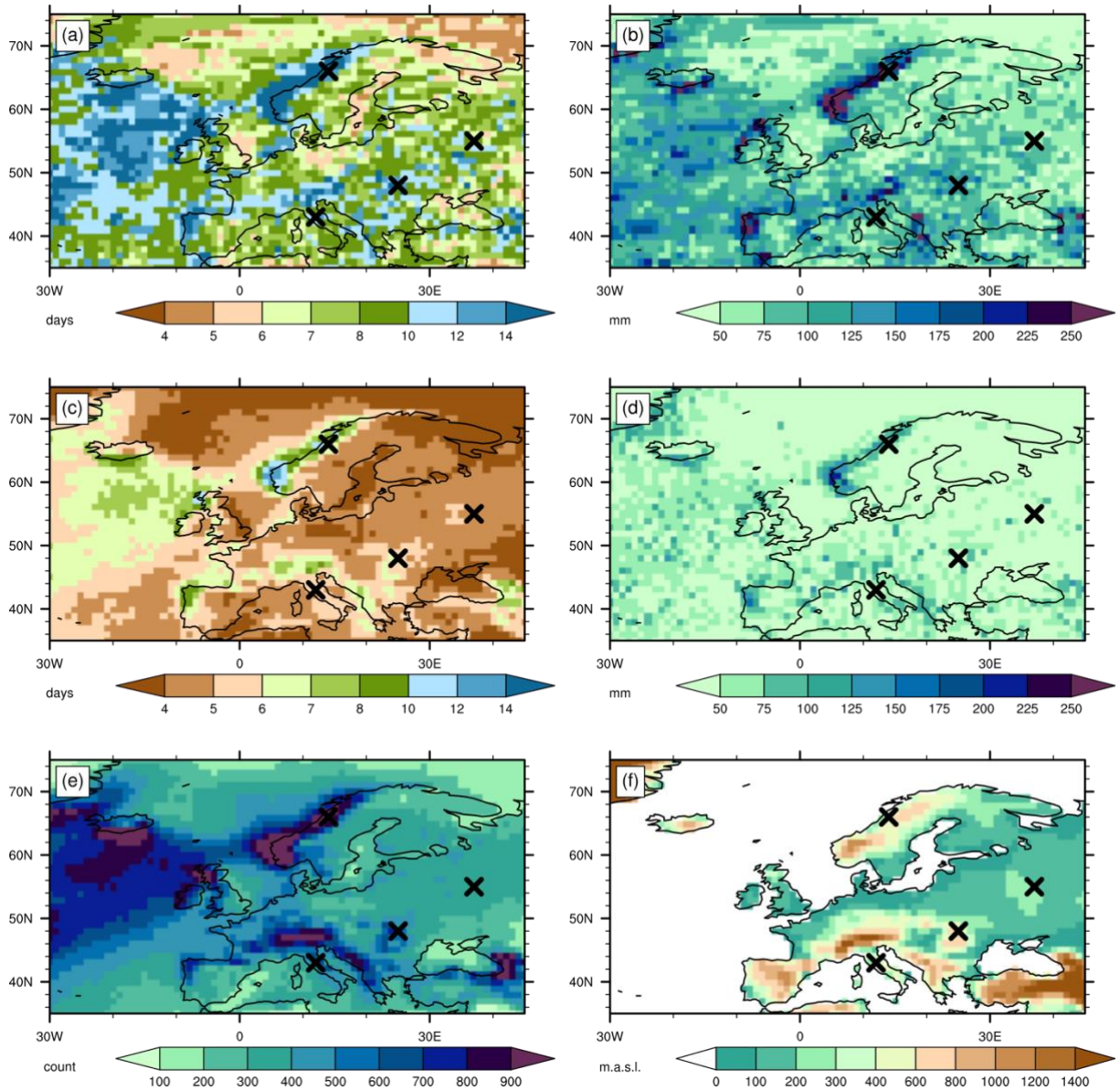

Figure S1. Panels (a,c) show the duration of the S_1 and S_{20} spells, respectively, and (b,d) depict the accumulated precipitation during the S_1 and S_{20} spells, respectively. Panel (e) shows the total number of wet spells with at least two days duration and panel (f) depicts the ERA-Interim topography. Crosses mark the locations of the four case studies discussed in Section 3.2.

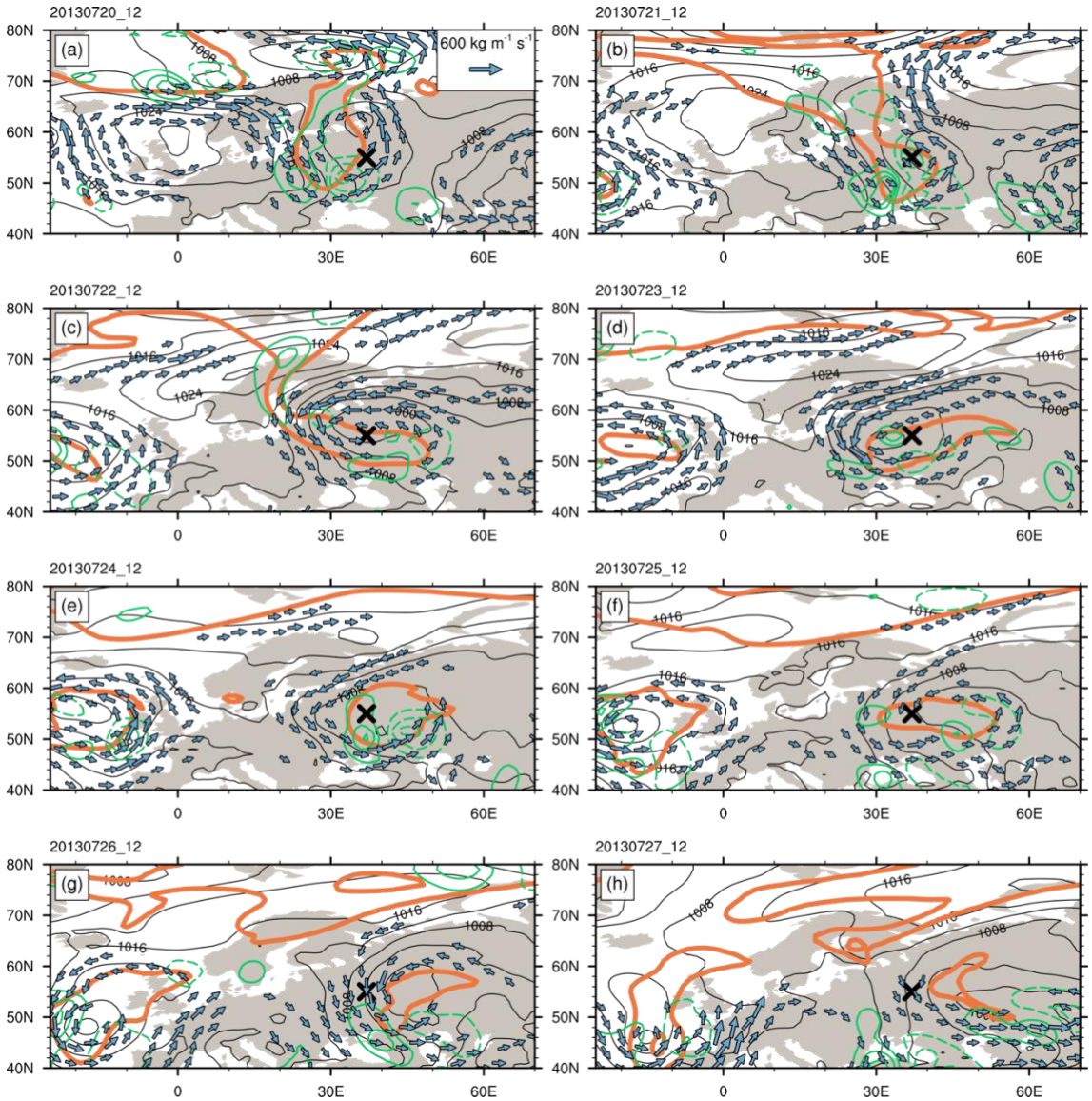

Figure S2. Additional synoptic variables for the the longest wet spell near Moscow, Russia [S_1(37° E, 55° N)]. ***IVT*** (vectors, only drawn for IVT values > 200 kg m^{-1} s^{-1}), QGω (green dashed contours indicating -6, -4, -2 hPa hour^{-1} while solid contours depict 2, 4, and 6 hPa hour^{-1}). SLP (black) and 2 PVU on 320 K (orange) as in Fig. 3.

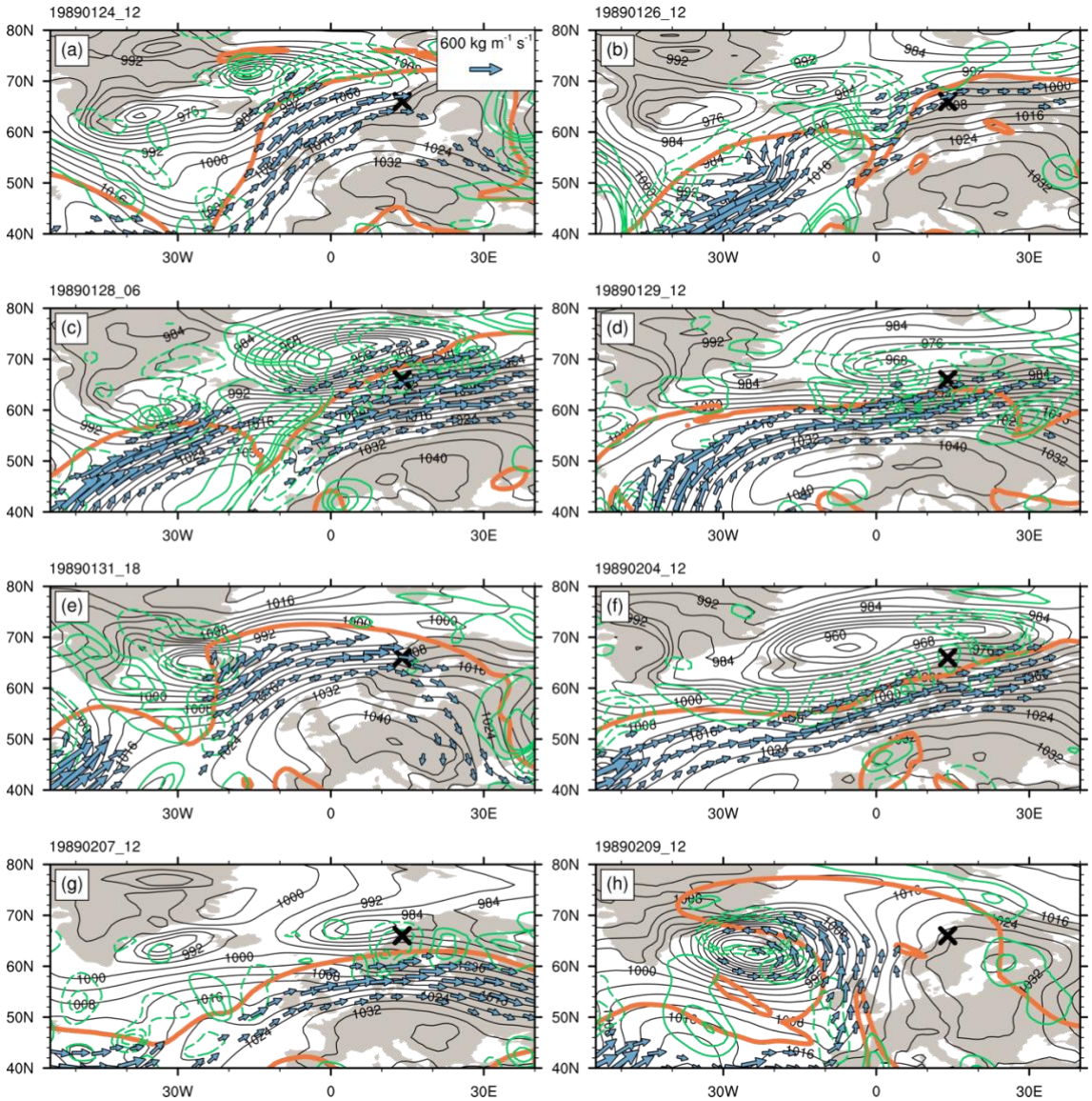

Figure S3. Additional synoptic variables for the the longest wet spell at 14° E/66° N in Norway [$S_1(14°\,E, 66°\,N)$]. ***IVT*** (vectors, only drawn for IVT values > 200 kg m^{-1} s^{-1}), QGω (green dashed contours indicating -6, -4, -2 hPa $hour^{-1}$ while solid contours depict 2, 4, and 6 hPa $hour^{-1}$). SLP (black) and 2 PVU on 310 K (orange) as in Fig. 4.

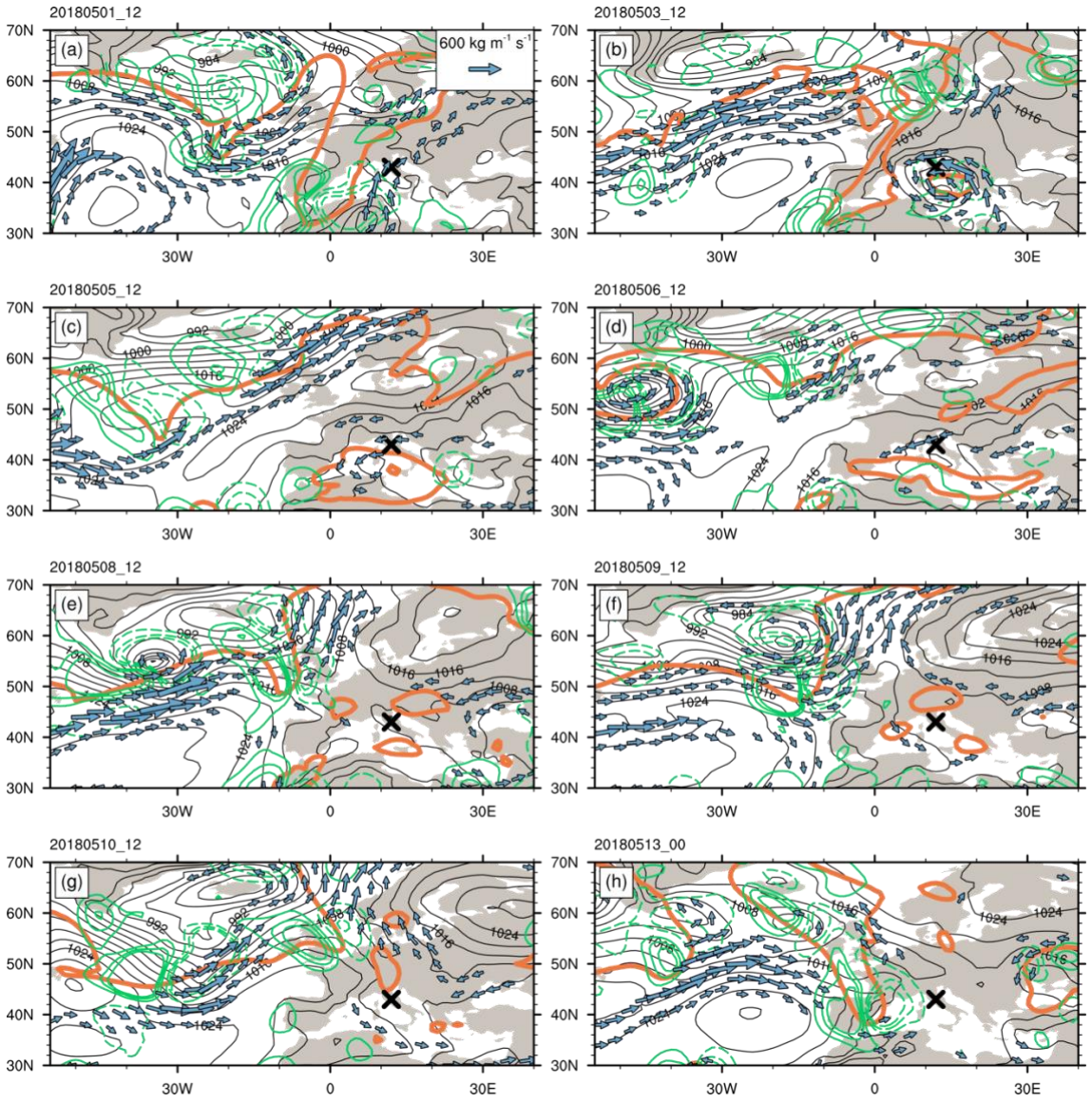

Figure S4. Additional synoptic variables for the the longest wet spell at 12° E/43° N in Tuscany, Italy [S_1 (12° E, 43° N)]. ***IVT*** (vectors, only drawn for IVT values > 200 kg m^{-1} s^{-1}), QGω (green dashed contours indicating -6, -4, -2 hPa hour^{-1} while solid contours depict 2, 4, and 6 hPa hour^{-1}). SLP (black) and 2 PVU on 320 K (orange) as in Fig. 5.

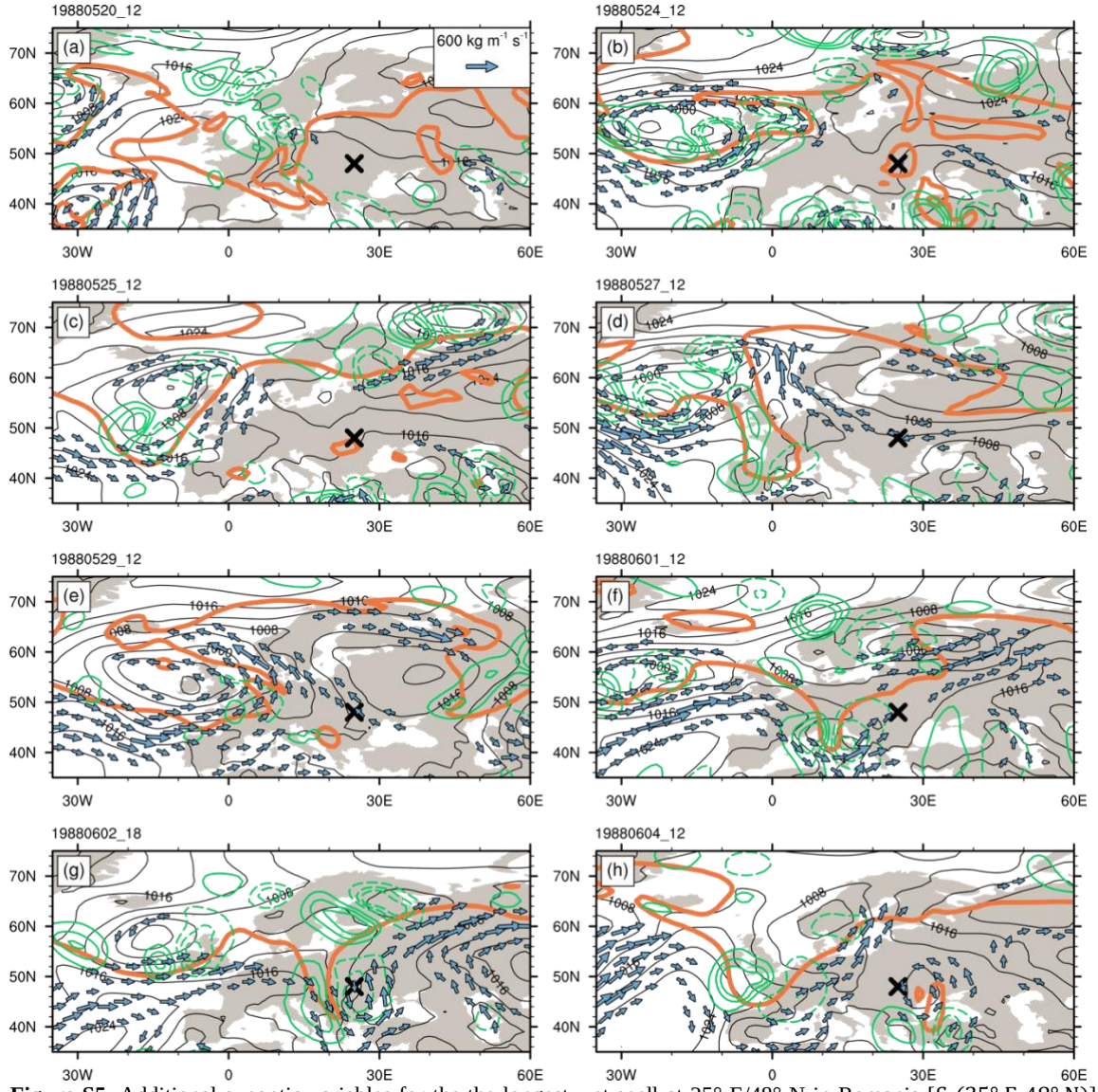

Figure S5. Additional synoptic variables for the the longest wet spell at 25° E/48° N in Romania [$S_1(25°\,\mathrm{E}, 48°\,\mathrm{N})$]. ***IVT*** (vectors, only drawn for IVT values > 200 kg m^{-1} s^{-1}), QGω (green dashed contours indicating -6, -4, -2 hPa hour^{-1} while solid contours depict 2, 4, and 6 hPa hour^{-1}). SLP (black) and 2 PVU on 320 K (orange) as in Fig. 6.

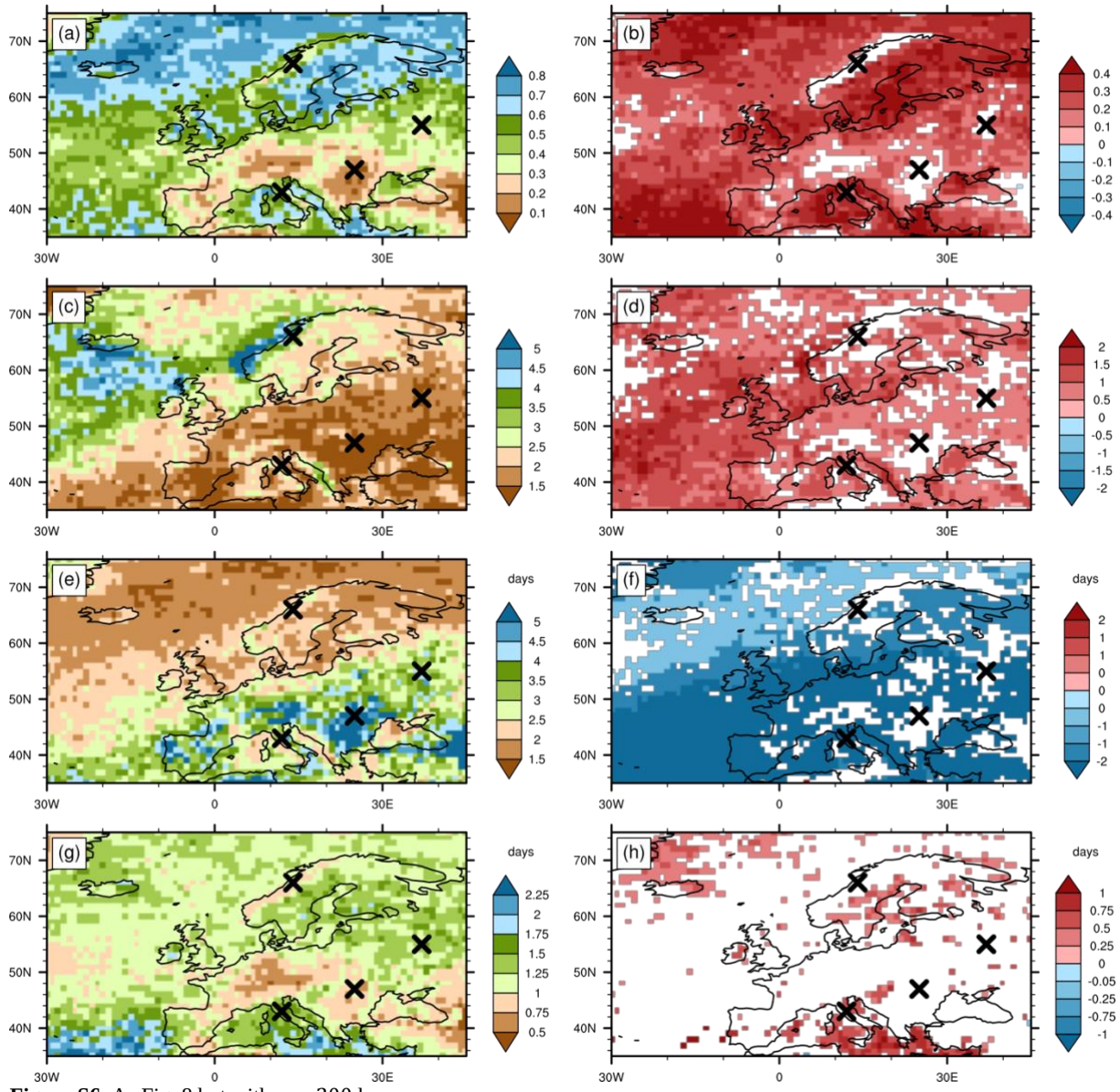

Figure S6. As Fig. 8 but with $r = 200$ km.

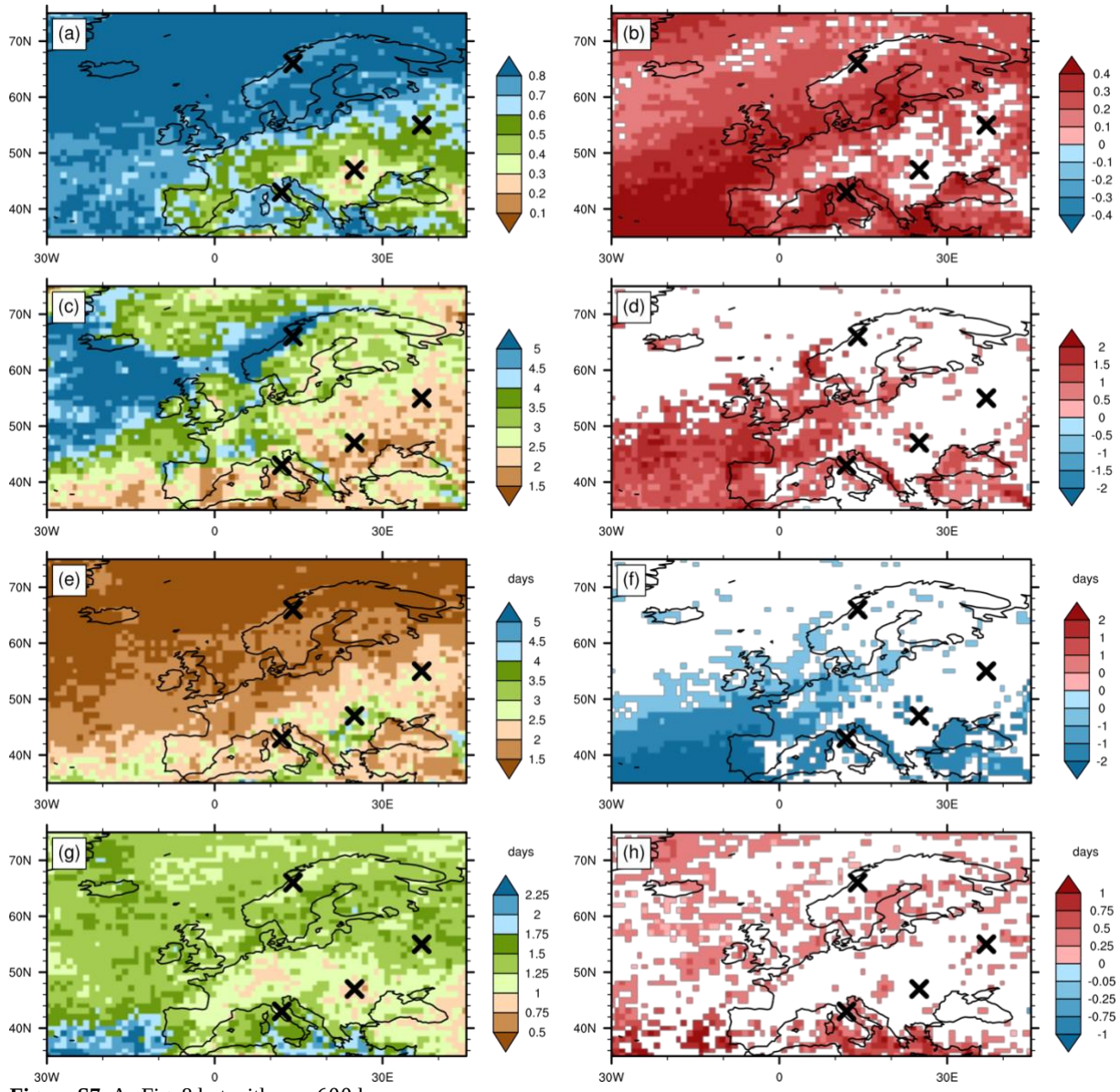

Figure S7. As Fig. 8 but with $r = 600$ km.

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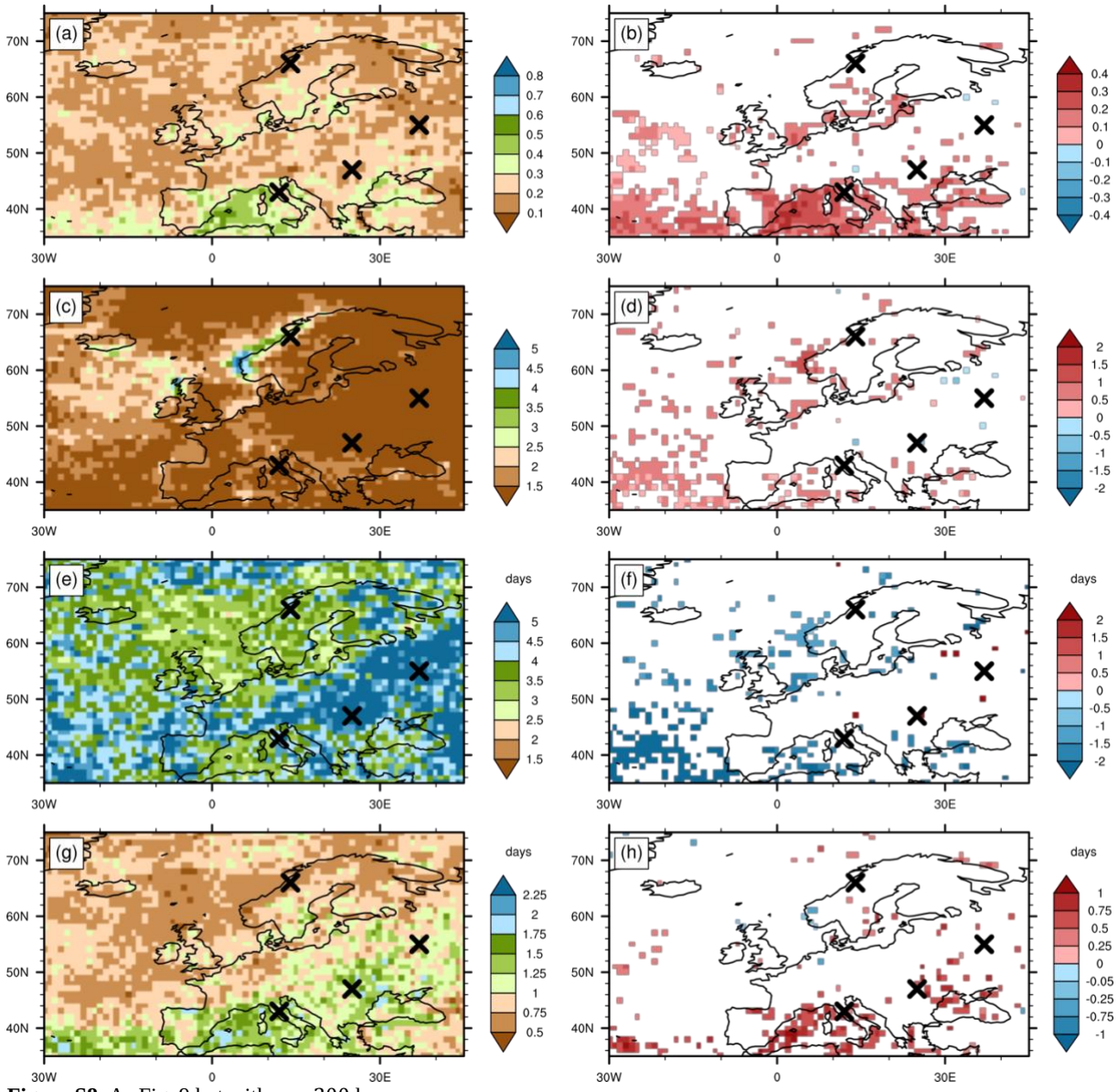

Figure S8. As Fig. 9 but with $r = 200$ km.

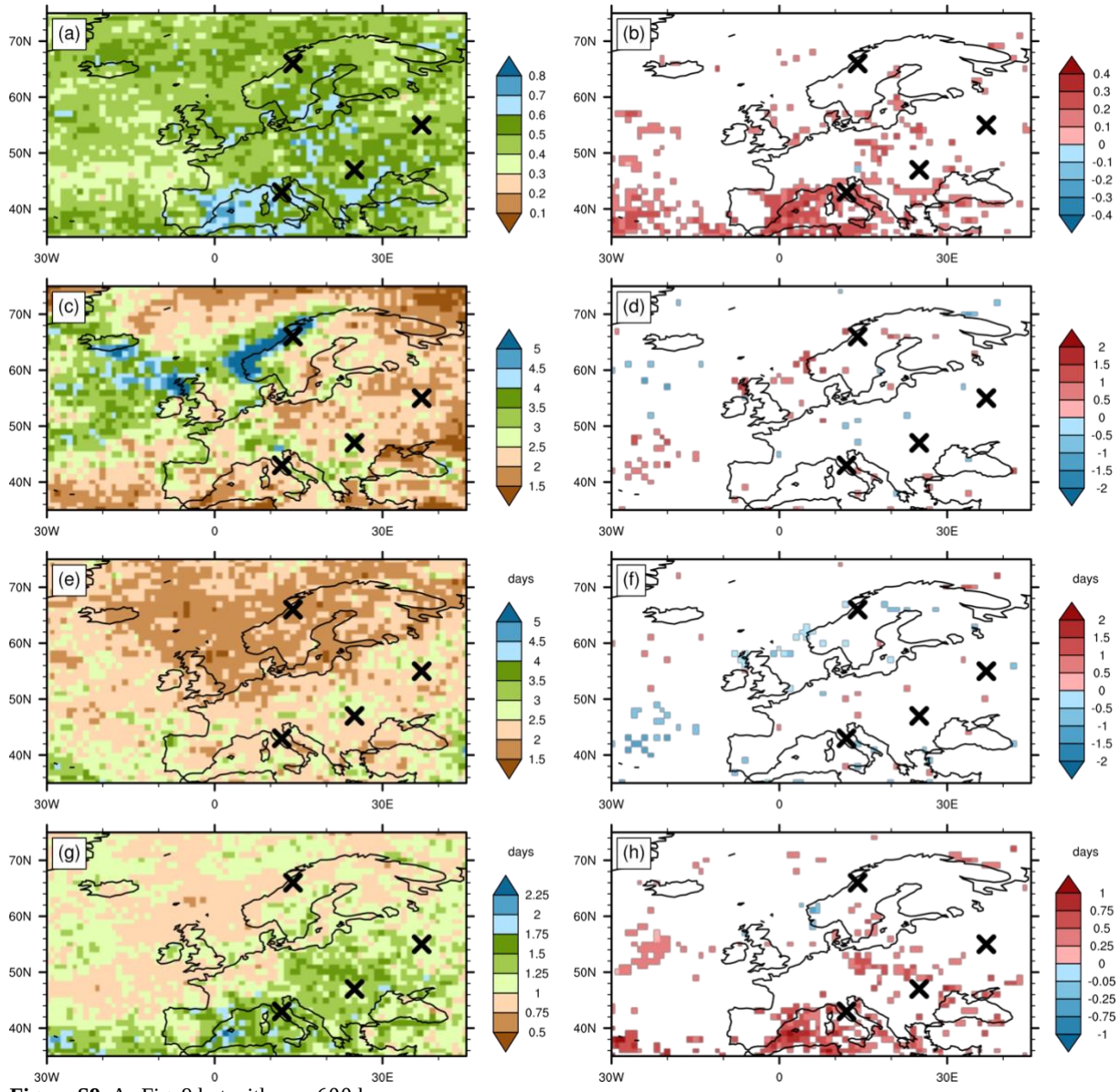

Figure S9. As Fig. 9 but with $r = 600$ km.