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Rivers in the sky, flooding on the ground: the role of atmospheric rivers in inland flooding in central Europe

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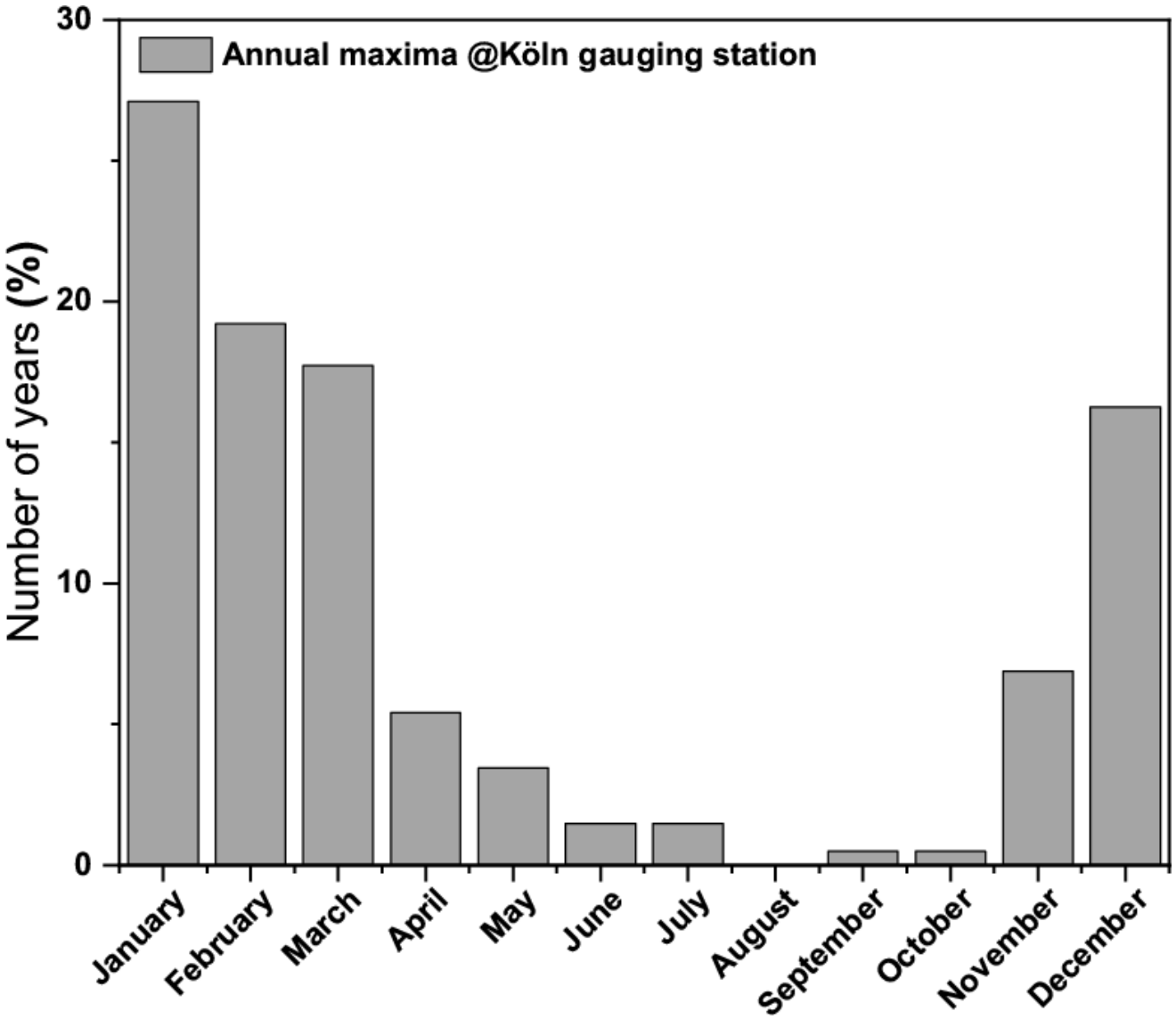

Figure S1. Monthly distribution of annual peak daily flows (% of number of years over the period 1817 – 2019) at Köln gauging station.

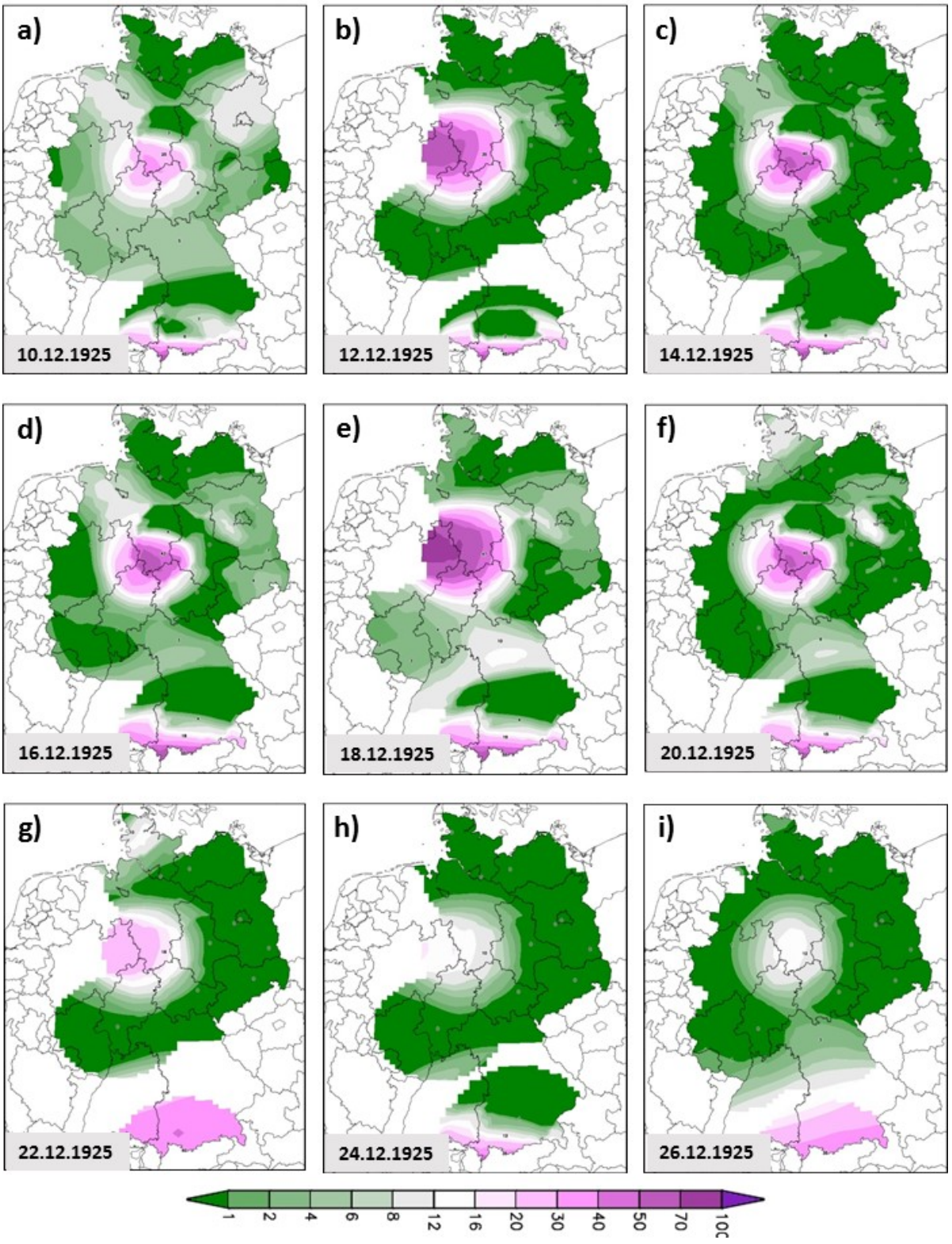

Figure S2. Daily snow depth (cm) for December 1925: a) December 10; b) December 12; c) December 14; d) December 16; e) December 18; f) December 20; g) December 22; h) December 24 and i) December 26. Data source: www.wetterzentrale.de

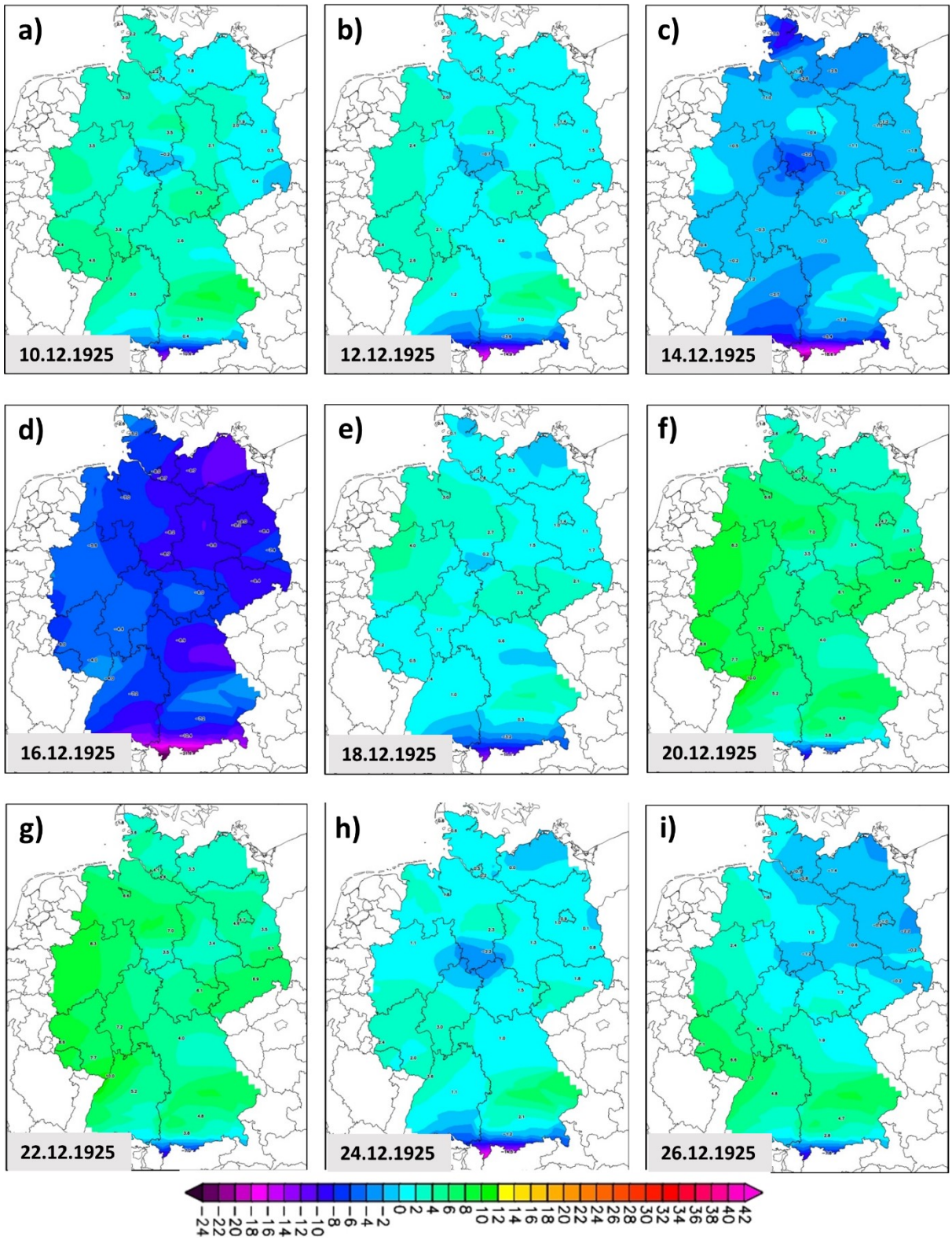

Figure S3. Daily mean temperature (°C) for December 1925: a) December 10; b) December 12; c) December 14; d) December 16; e) December 18; f) December 20; g) December 22; h) December 24 and i) December 26. Data source: www.wetterzentrale.de

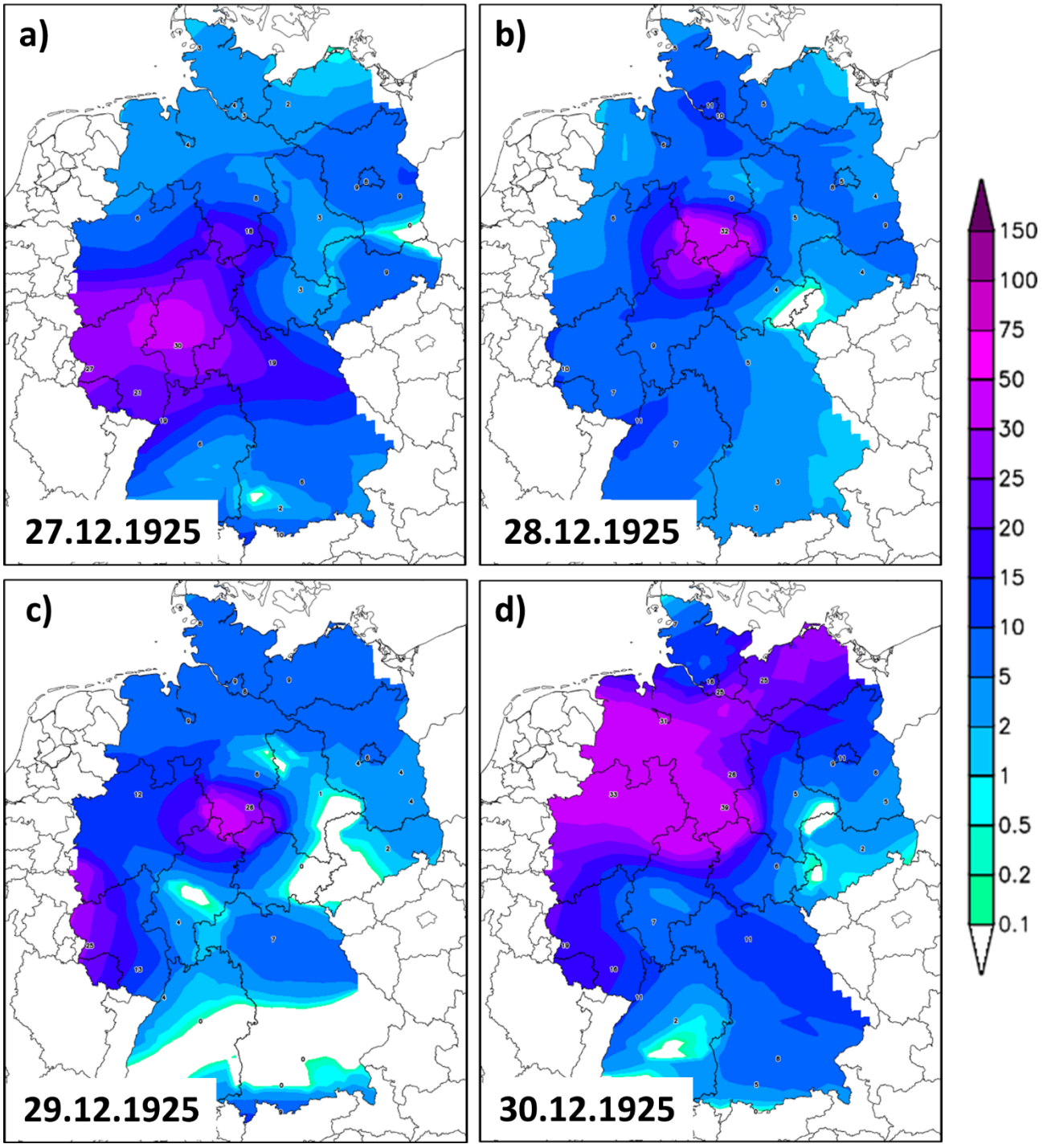

Figure S4. Daily precipitation amount for December 1925: a) December 27; b) December 28; c) December 29 and d) December 30. Units of measure: PP (mm/day). Data source: www.wetterzentrale.de

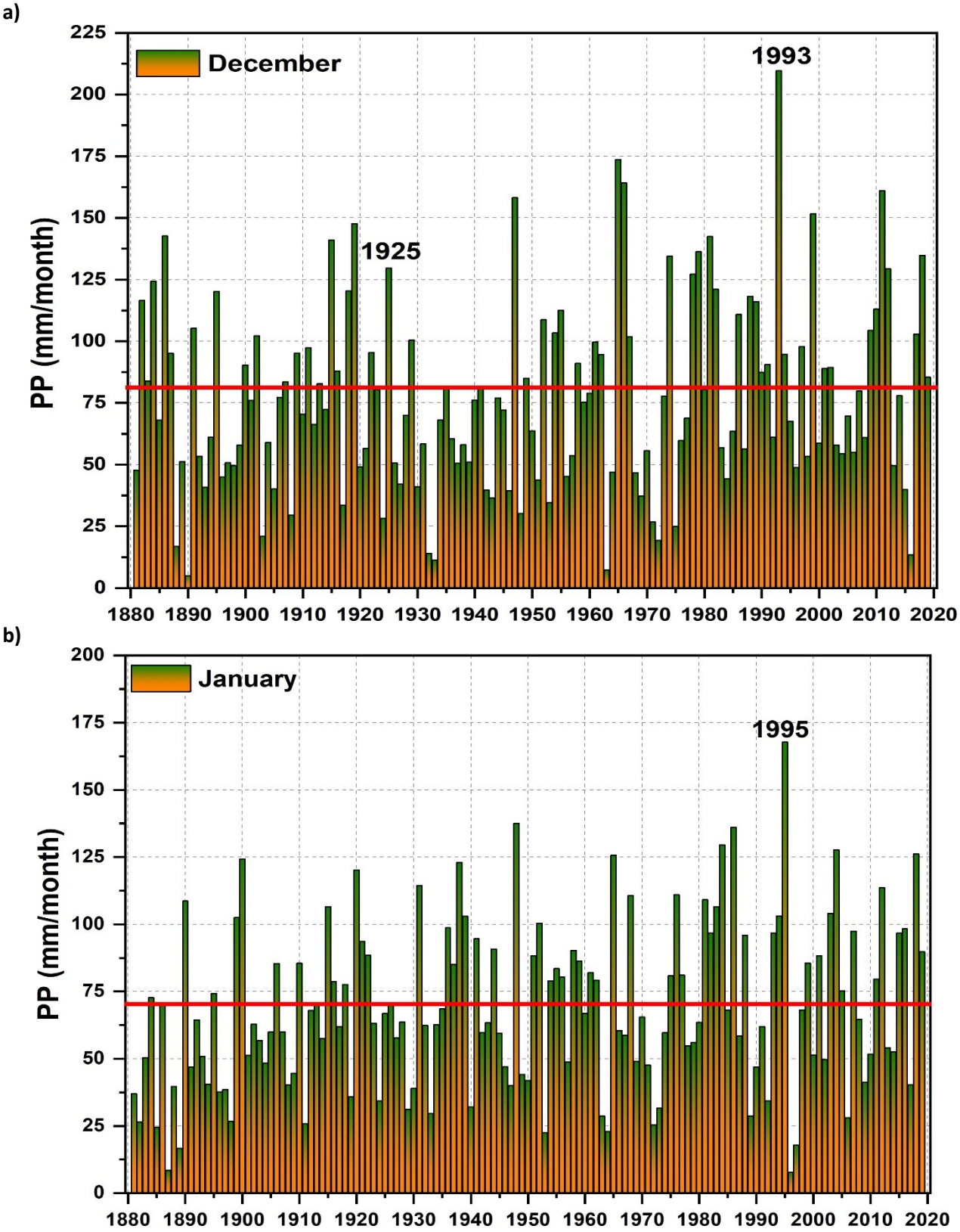

Figure S5. Monthly precipitation total, over the period 1881 -2019, for: a) December and b) January. The red line in a) and b) represents the climatology over the period 1971 – 2000. Data source: www.dwd.de

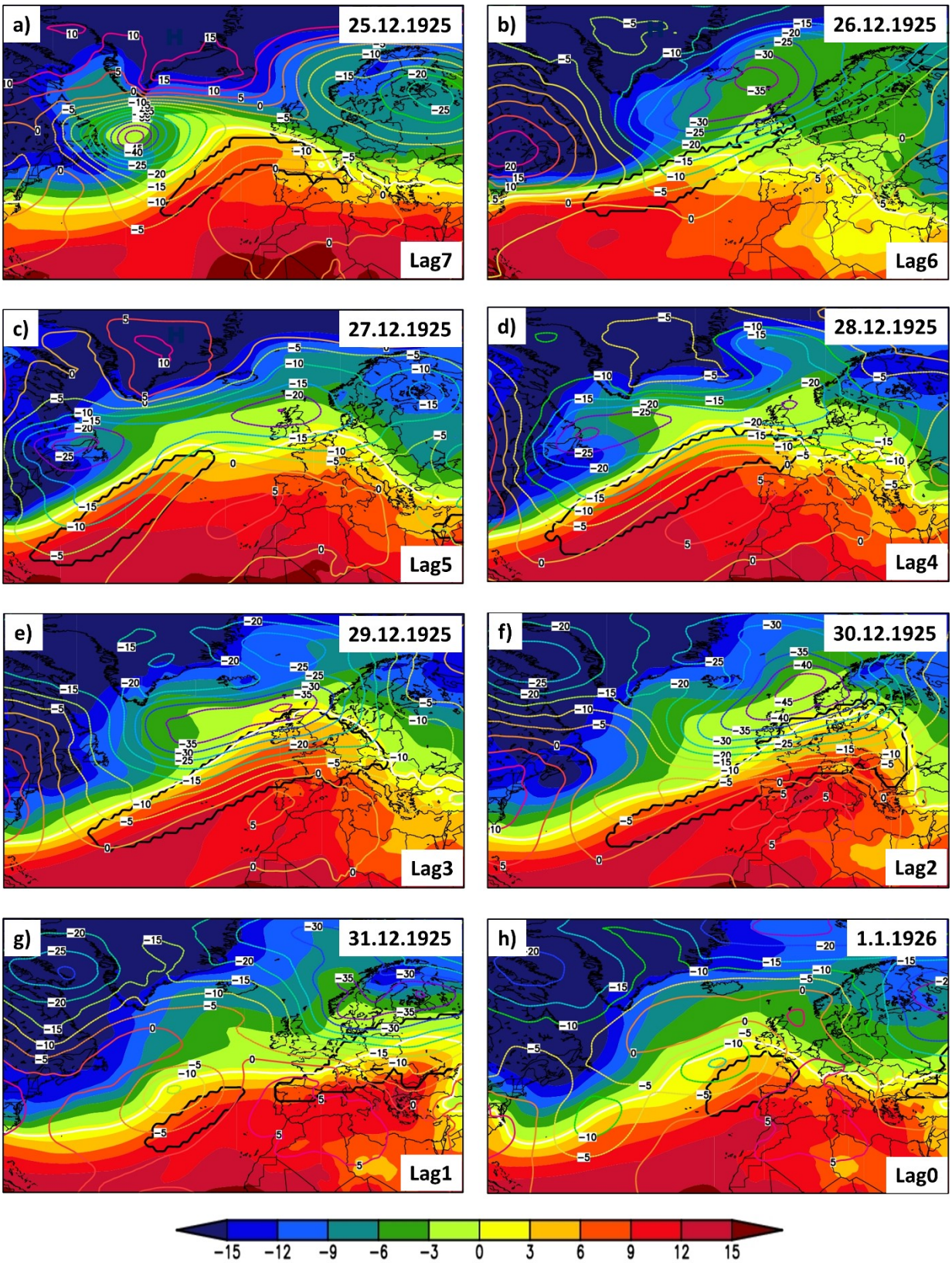

Figure S6. Daily anomalies of the mean sea level pressure (SLP, colored contour lines), daily mean temperature at 850mb level (TT850, shaded colors) and relative area covered by ARs (black contour line) during the days before the 1925/26 flood peak with different time lags (0 – 7 days). Units: SLP (hPa) and TT850 (°C).

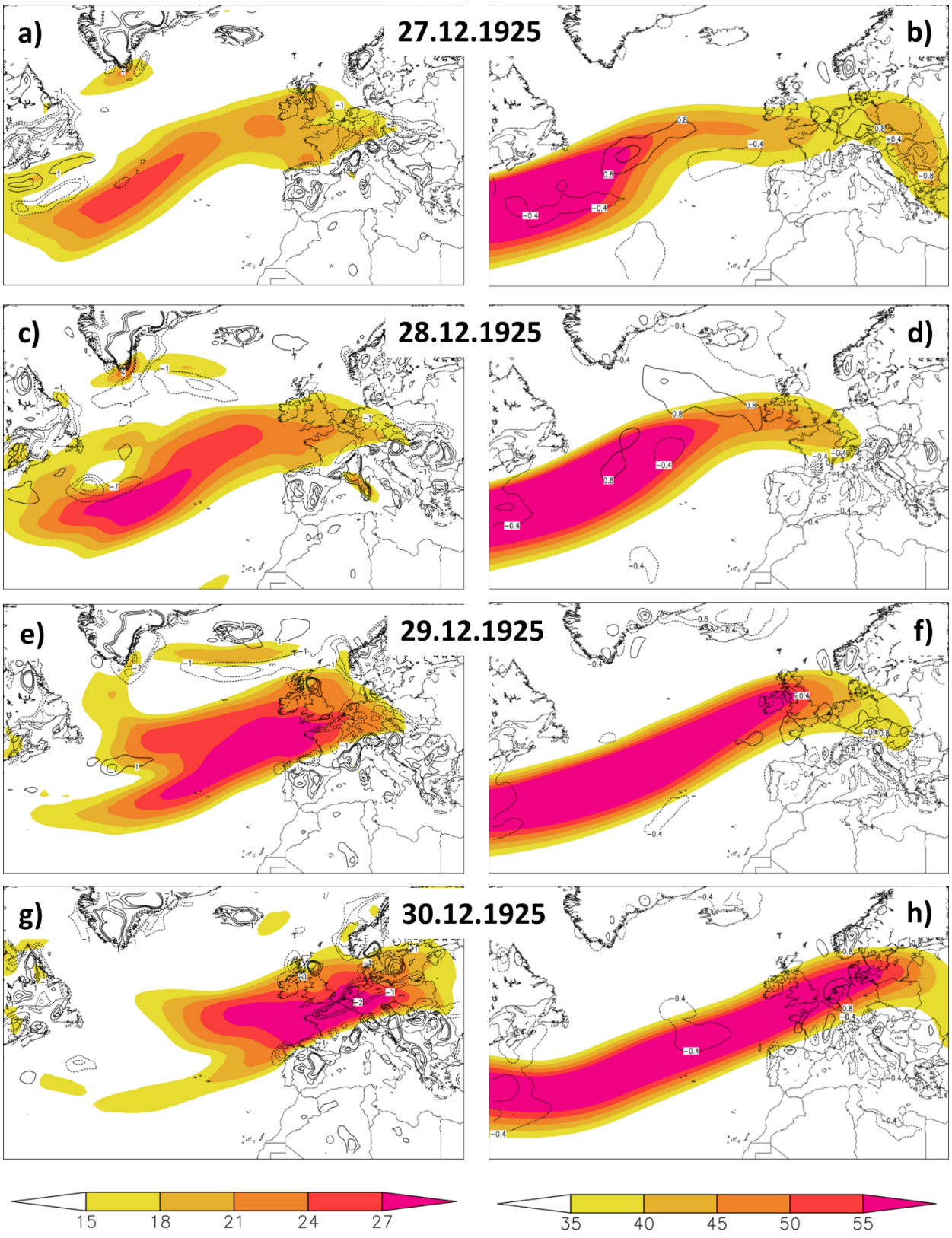

Figure S7. Daily zonal wind at 300 hPa level (shaded colors) and divergence/convergence (contour lines) for a) 27.12.1925; b) 28.12.1925; c) 29.12.1925 and d) 30.12.1925.

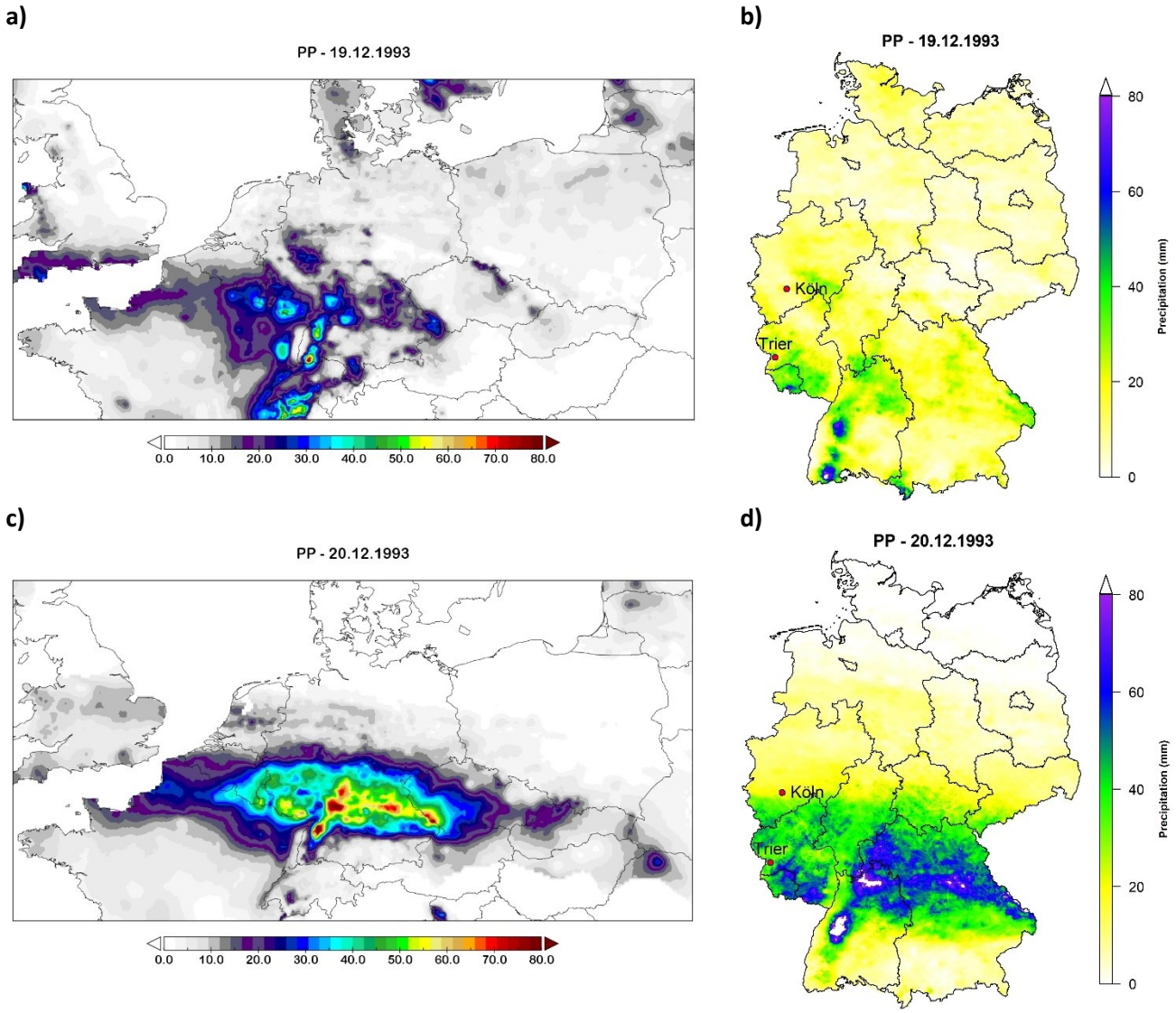

Figure S8. Daily precipitation amount based on the E-OBS data set (left column) and on the REGNIE data set (right column) for: a) and b) 19.12.1993; and c) and d) 20.12.1993. Units of measure: PP (mm).

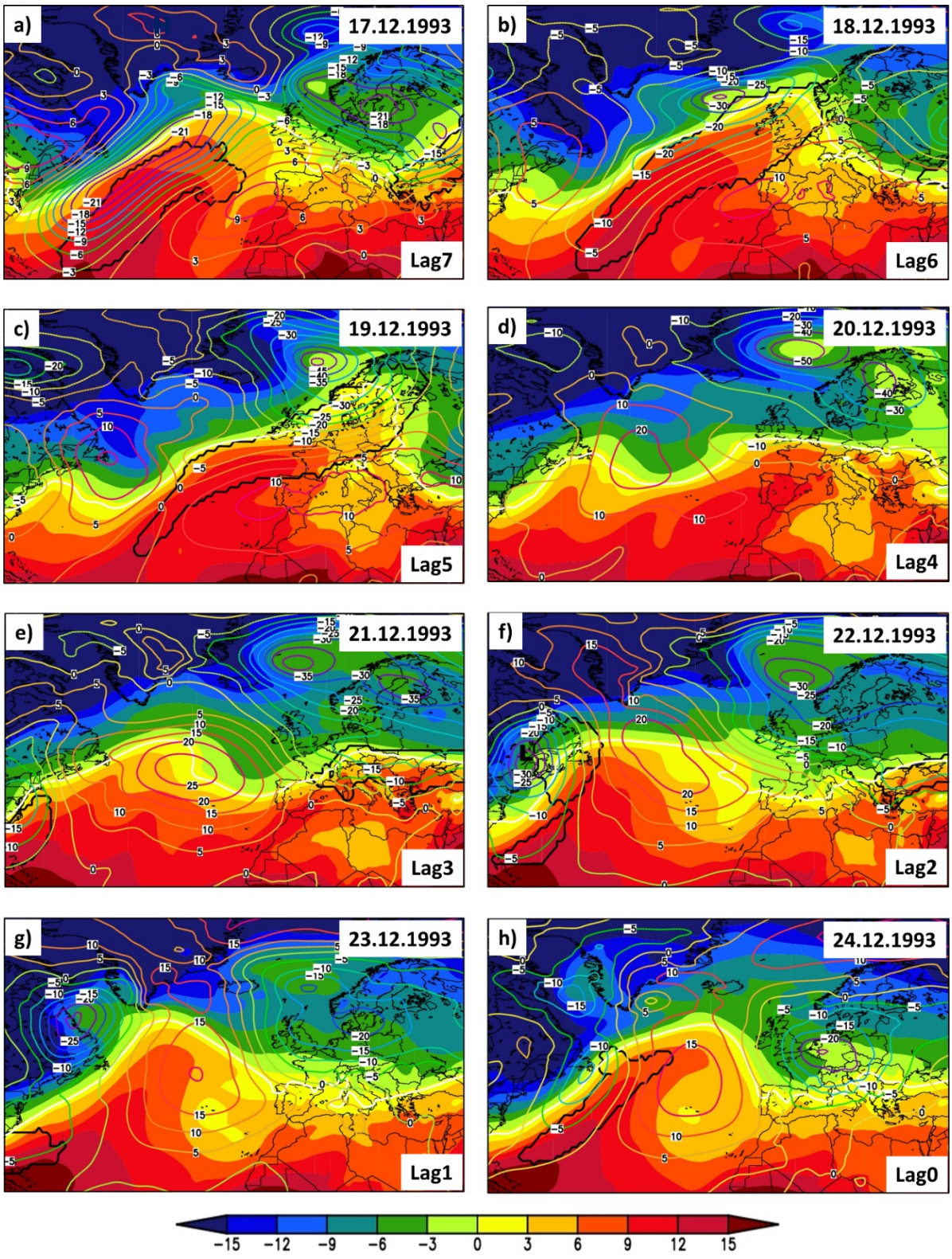

Figure S9. Daily anomalies of the mean sea level pressure (SLP, colored contour lines), daily mean temperature at 850mb level (TT850, shaded colors) and relative area covered by ARs (black contour line) during the days before the 1993 flood peak with different time lags (0 – 7 days). Units: SLP (hPa) and TT850 (°C).

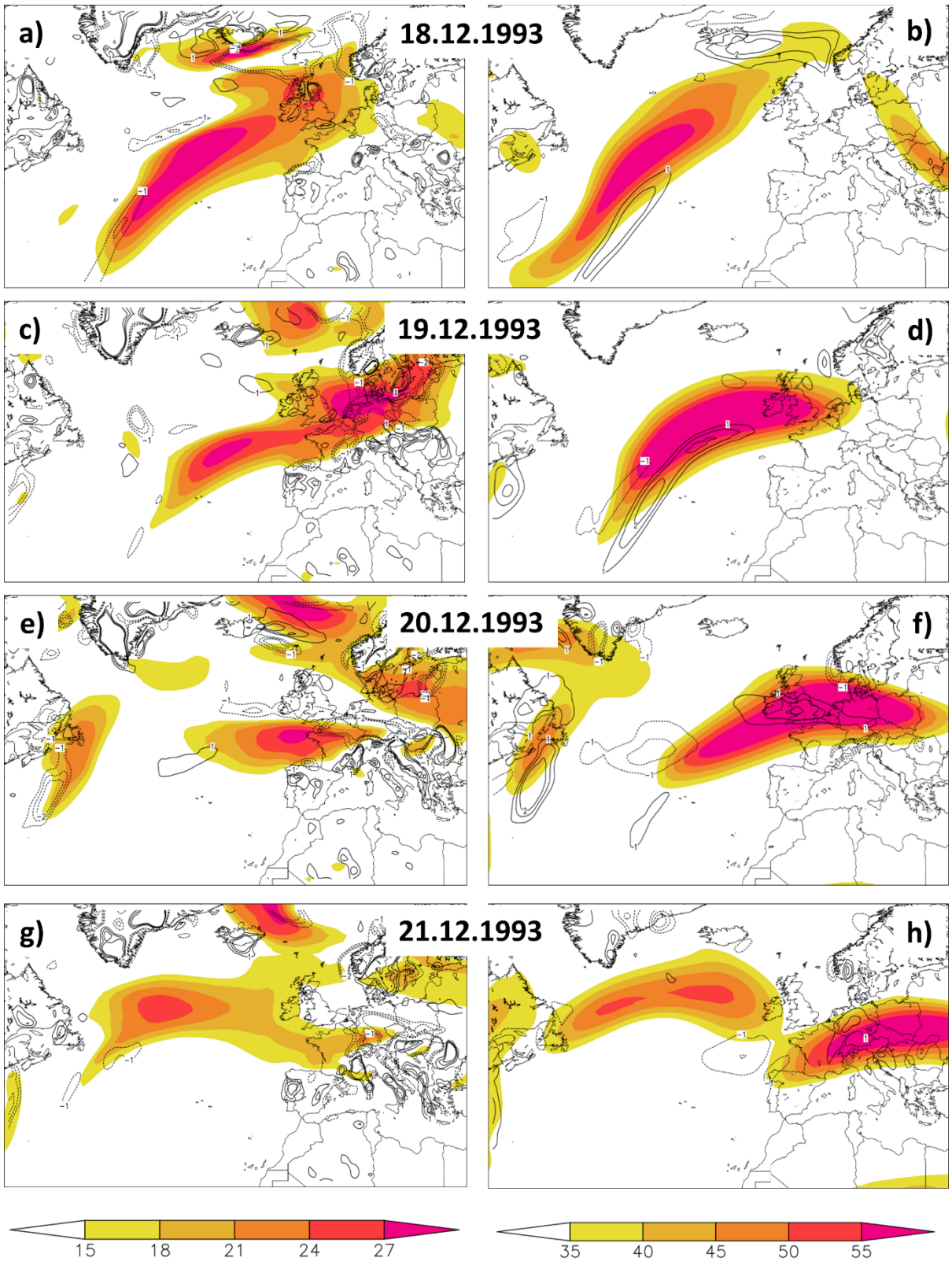

Figure S10. Daily zonal wind at 300 hPa level (shaded colors) and divergence/convergence (contour lines) for a) 19.12.1993 and b) 20.12.1993

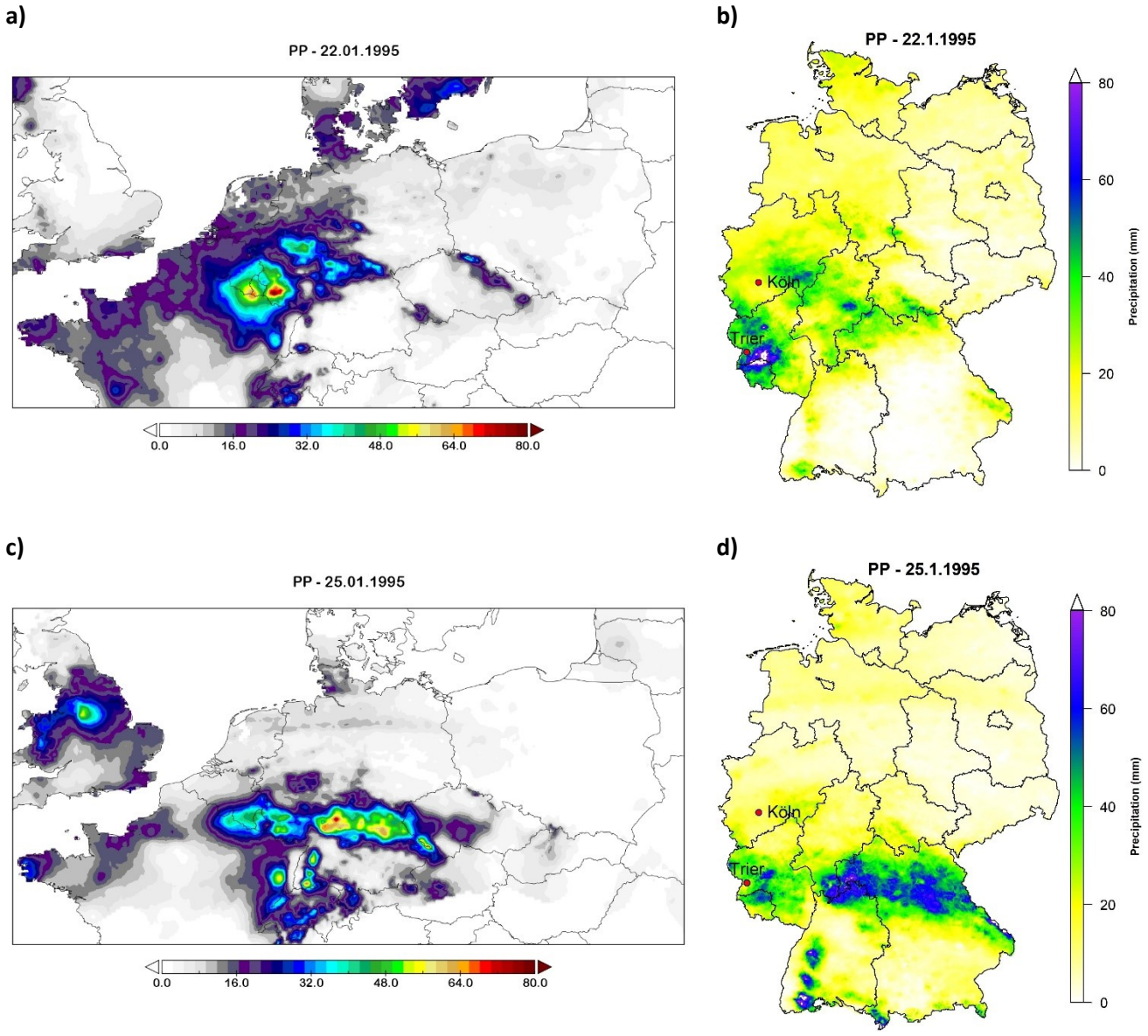

Figure S11. Daily precipitation amount based on the E-OBS data set (left column) and on the REGNIE data set (right column) for: a) and b) 22.1.1995; and c) und d) 25.1.1995. Units of measure: PP (mm).

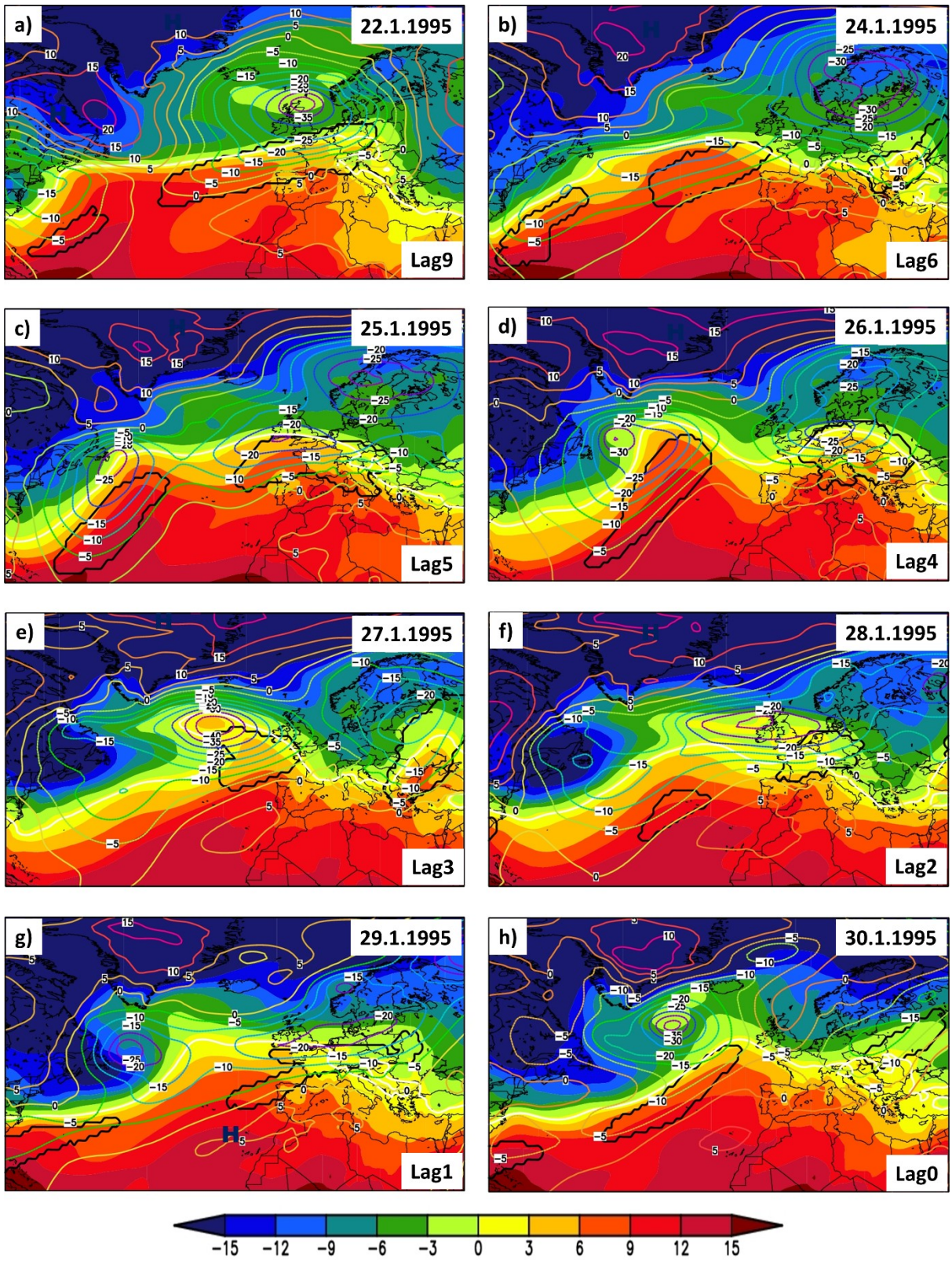

Figure S12. Daily anomalies of the mean sea level pressure (SLP, colored contour lines), daily mean temperature at 850mb level (TT850, shaded colors) and relative area covered by ARs (black contour line) during the days before the 1995 flood peak with different time lags (0 – 7 days). Units: SLP (hPa) and TT850 (°C).

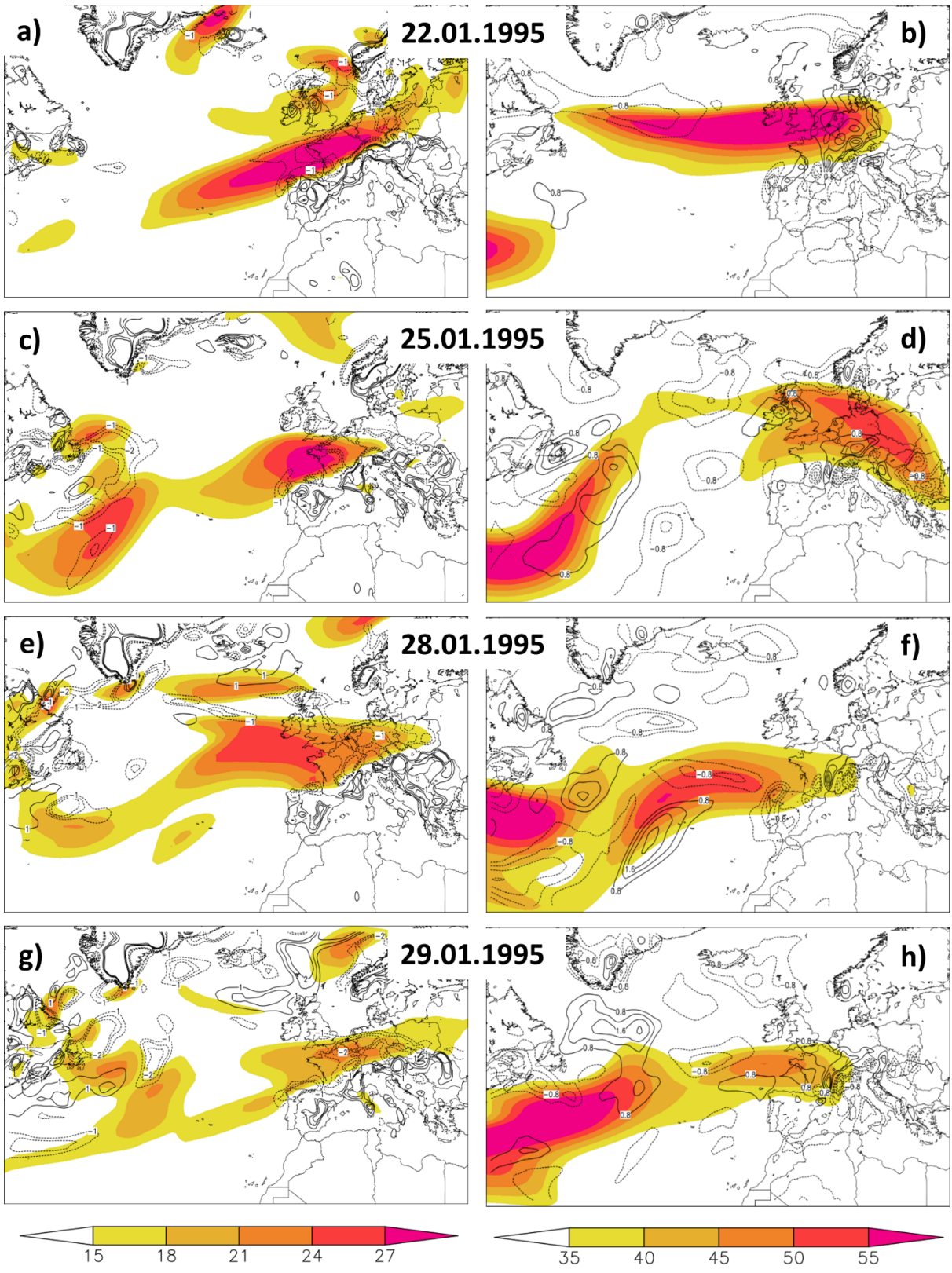

Figure S13. Daily zonal wind at 300 hPa level (shaded colors) and divergence/convergence (contour lines) for a) 22.1.1995; b) 25.1.1995; c) 28.1.1995 and d) 29.1.1995.