



Supplement of

Stationary wave biases and their effect on upward troposphere–stratosphere coupling in sub-seasonal prediction models

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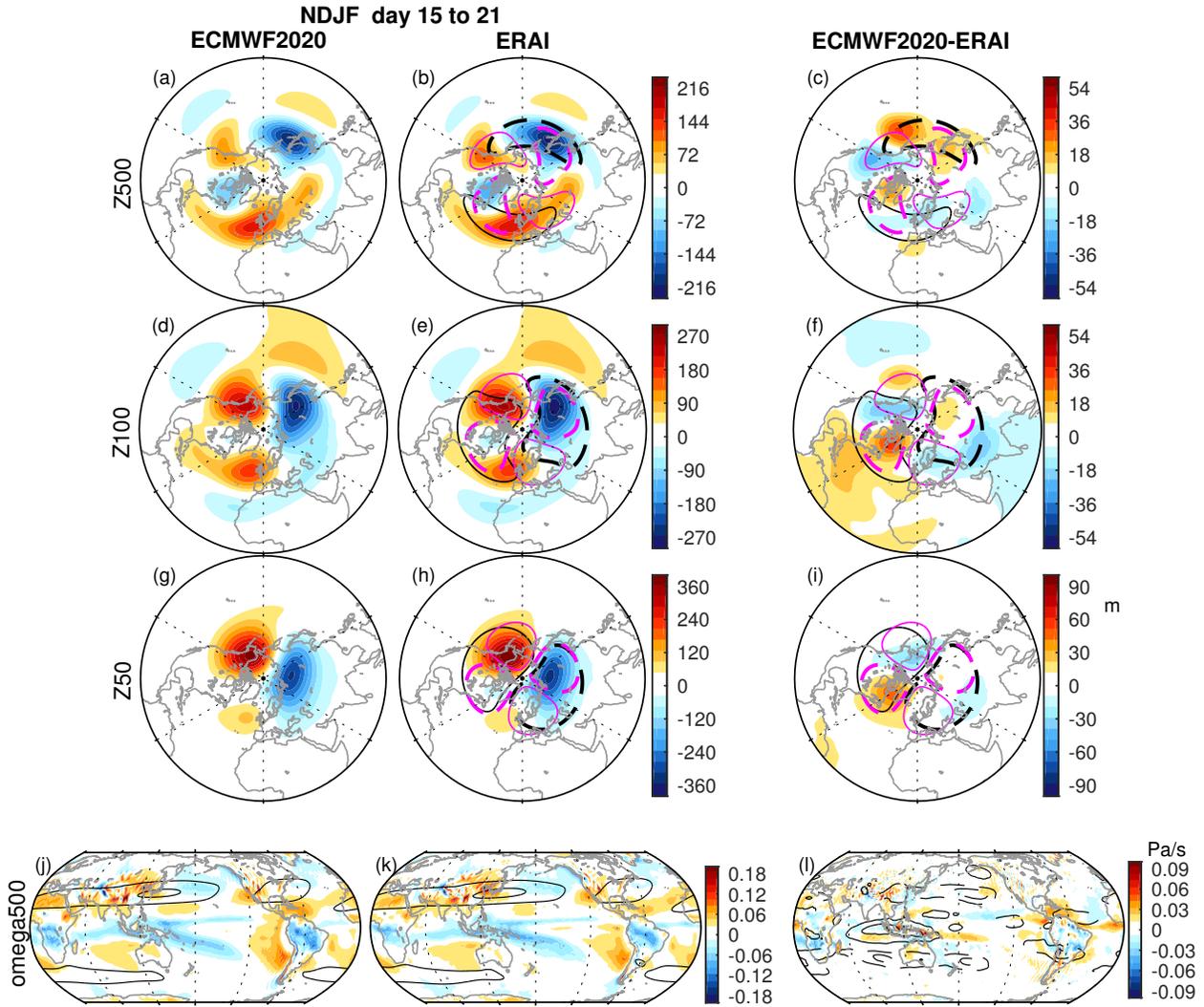


Figure S1. Top: anomalies from zonal mean of geopotential height (m) during week 3 for initializations during NDJF in the ECMWF-2020 model at (a) 500 hPa (d) 100 hPa; (g) 50 hPa; the middle column (b,e,h) is for ERA-I to subsampled to match the dates chosen for ECMWF-2020; the right column (c,f,i) is for the difference between ERA-I and ECMWF-2020; black and magenta contours denote the stationary wavenumber-1 and wavenumber-2 components in ERA-I; Bottom: pressure velocity (color) and zonal wind (contours) during week 3 for initializations during NDJF: (j) in the ECMWF-2020 model; (k) for ERA-I to subsampled to match the dates chosen for ECMWF-2020; (l) the difference between ERA-I and ECMWF-2020. Black and magenta contours denote the stationary wavenumber-1 and wavenumber-2 components in ERA-I with contour intervals of ± 60 m and ± 40 m, respectively, with dashed (solid) contours representing negative (positive) anomalies; Contour intervals in panels (j) and (k) are at 30 m/s and 60 m/s and in panel (l) are at ± 2 , ± 4 , ± 6 , ± 8 and ± 10 m/s.

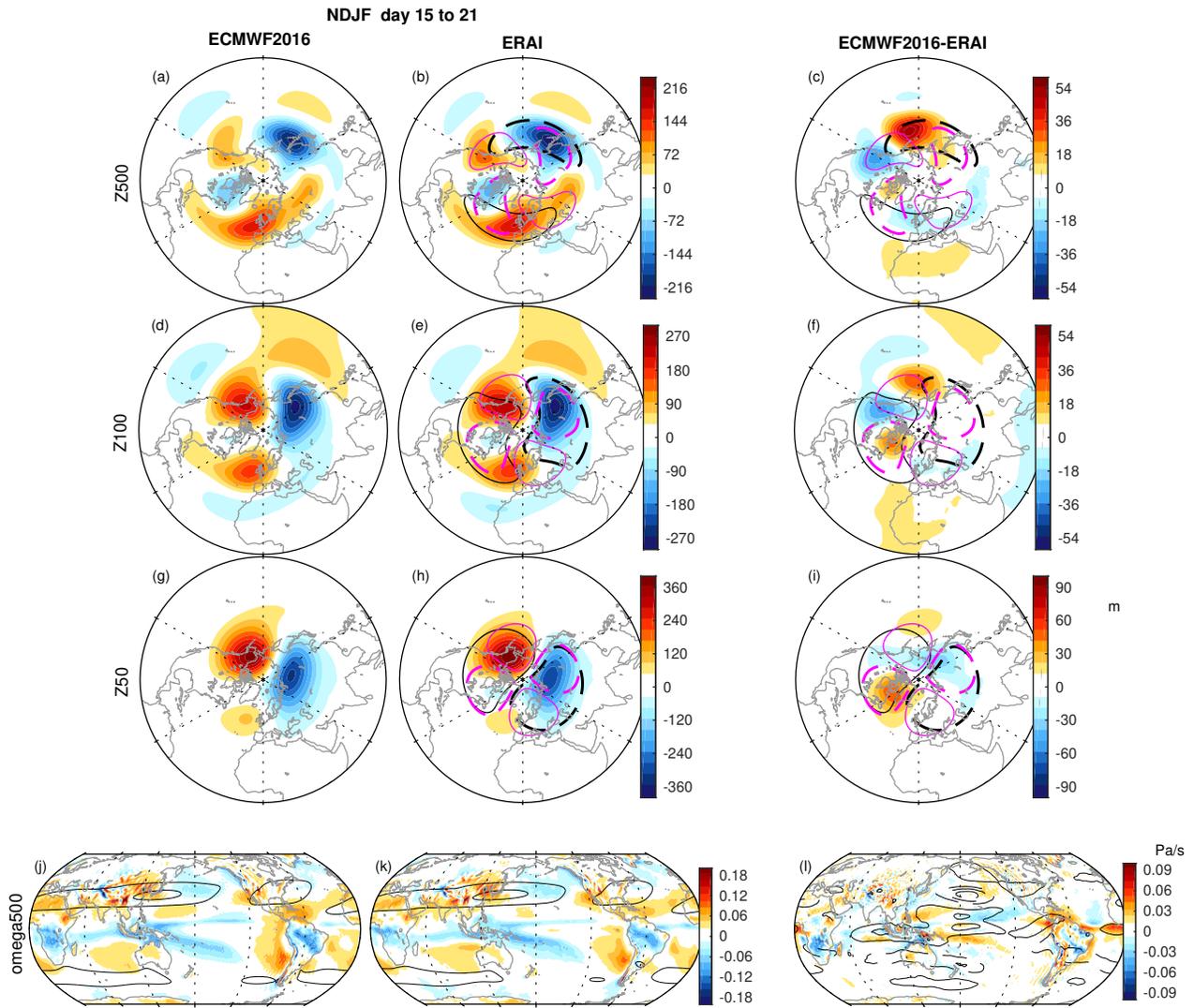


Figure S2. Same as figure the ECMWF-2016 model.

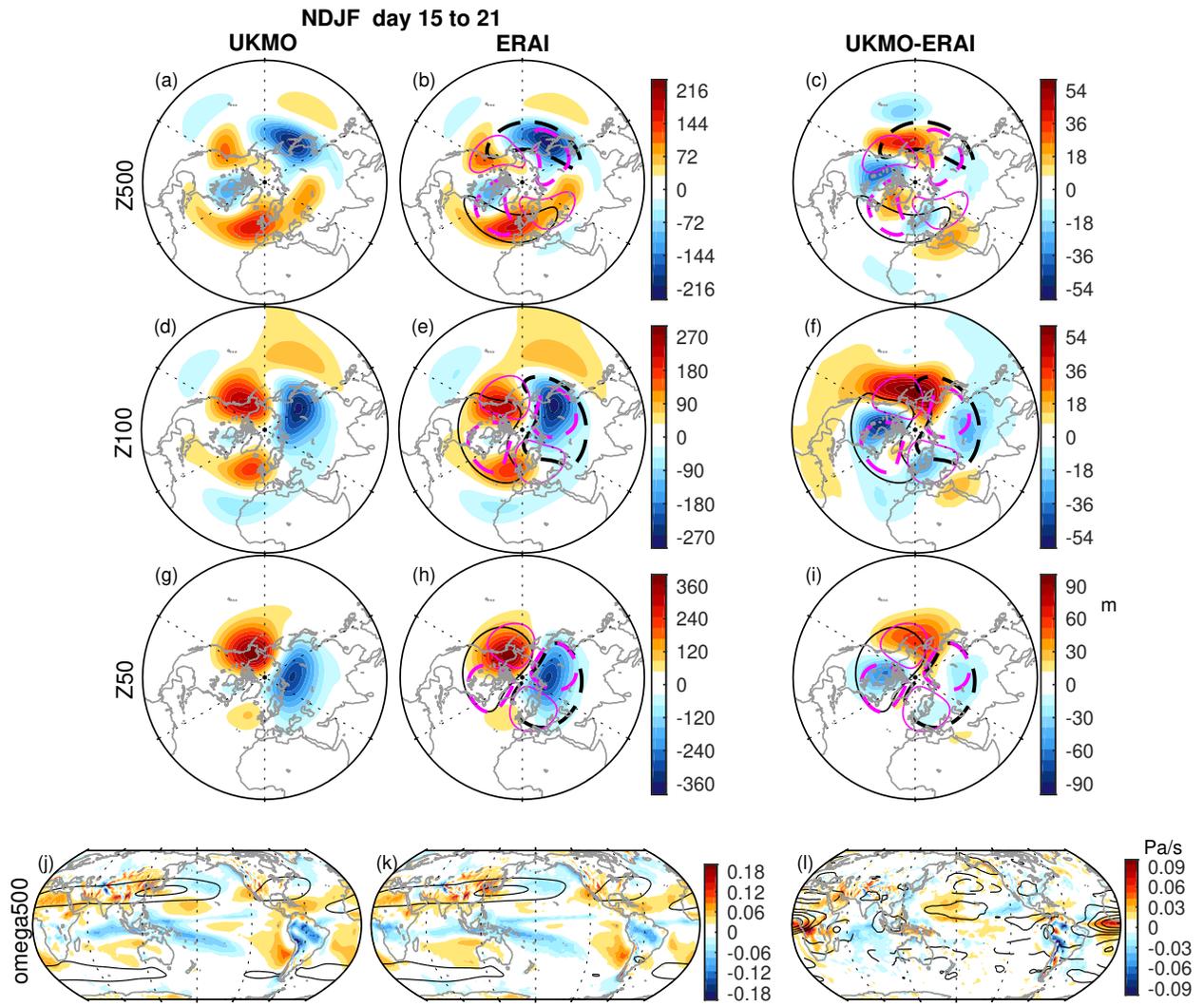


Figure S3. Same as figure S1 but the UKMO-2016 model.

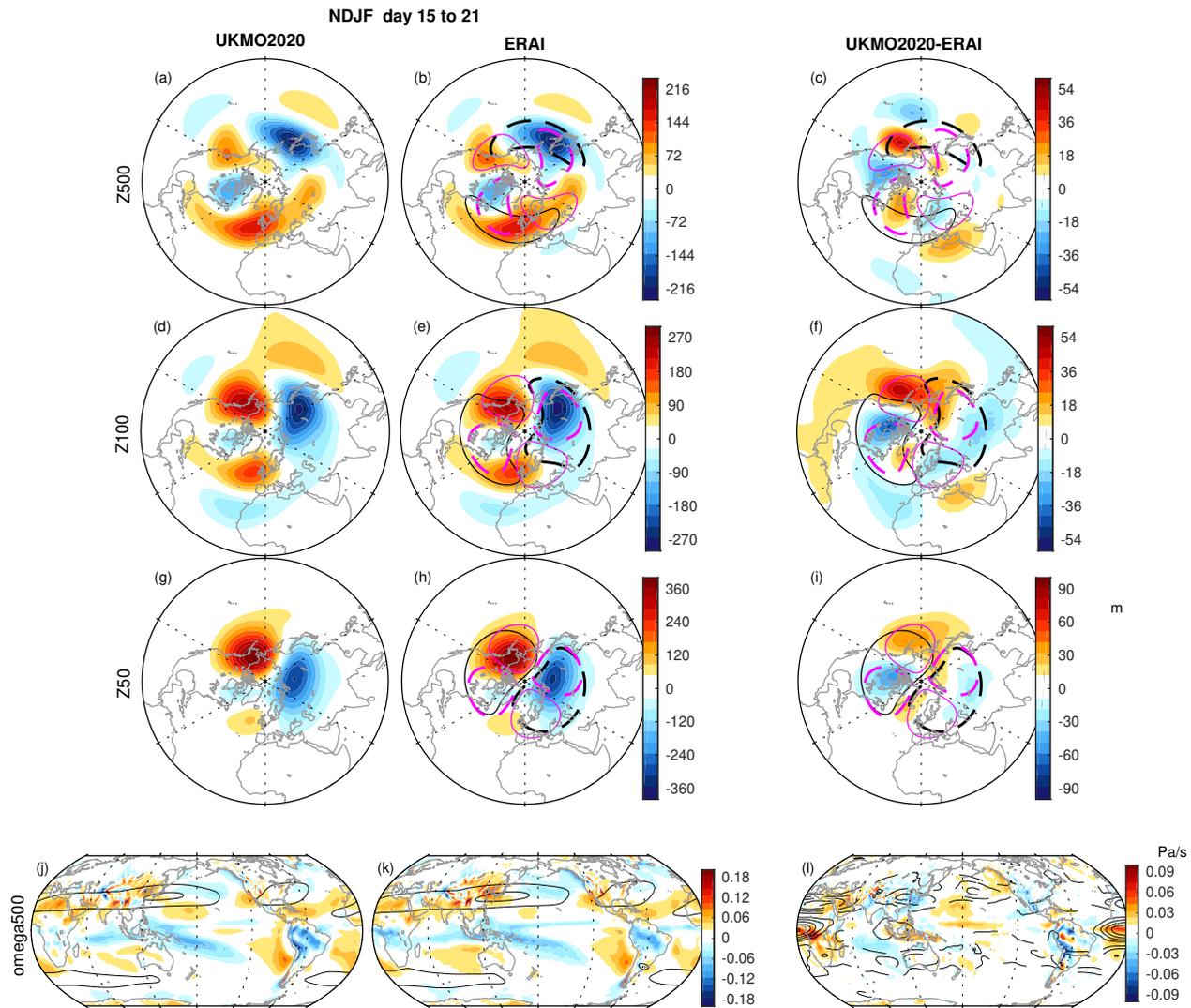


Figure S4. Same as figure S1 but for the UKMO-2020 model.

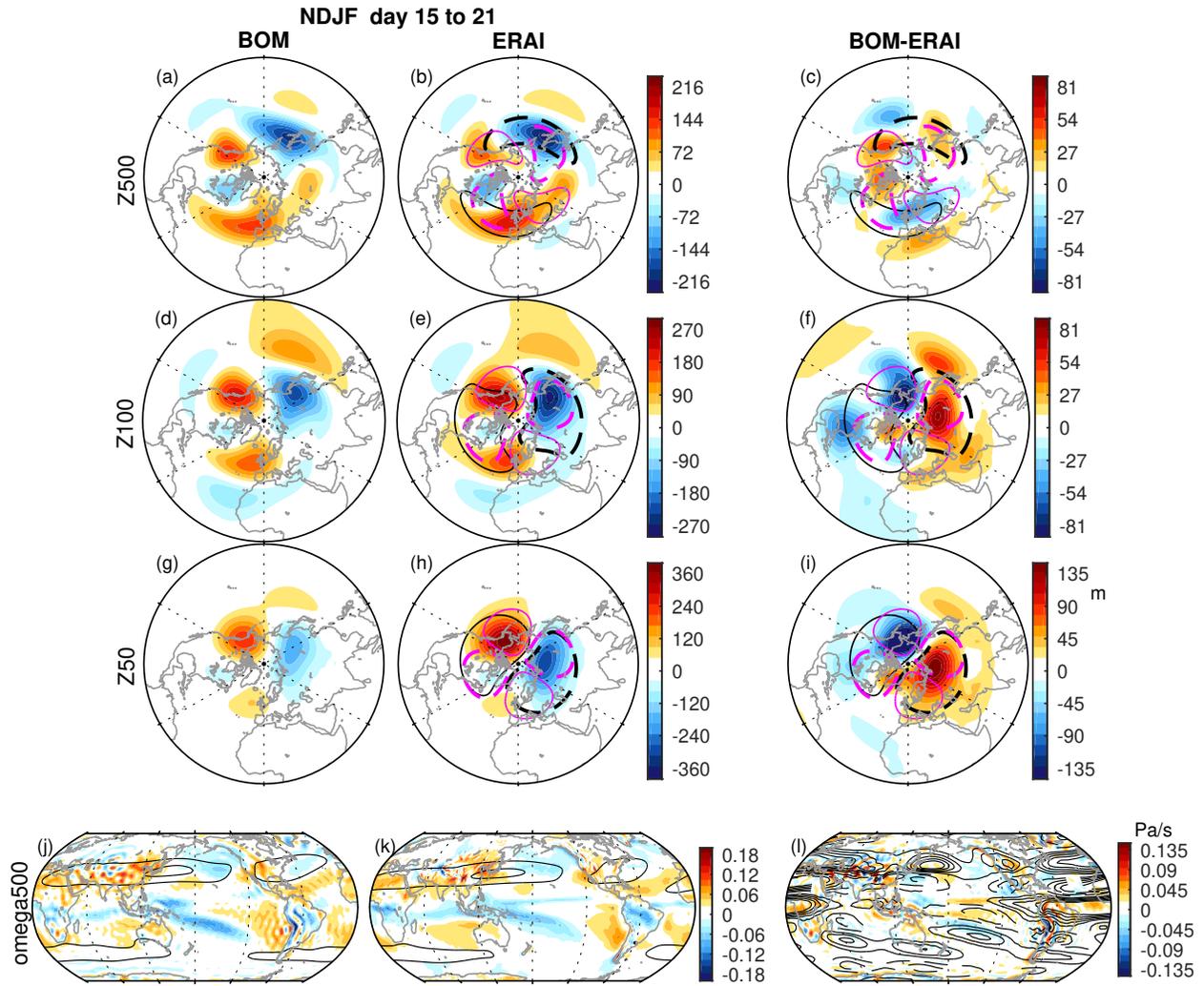


Figure S5. Same as figure S1 but for the BoM model. Note the colorbar for the right column differs from other figures in the supplement.

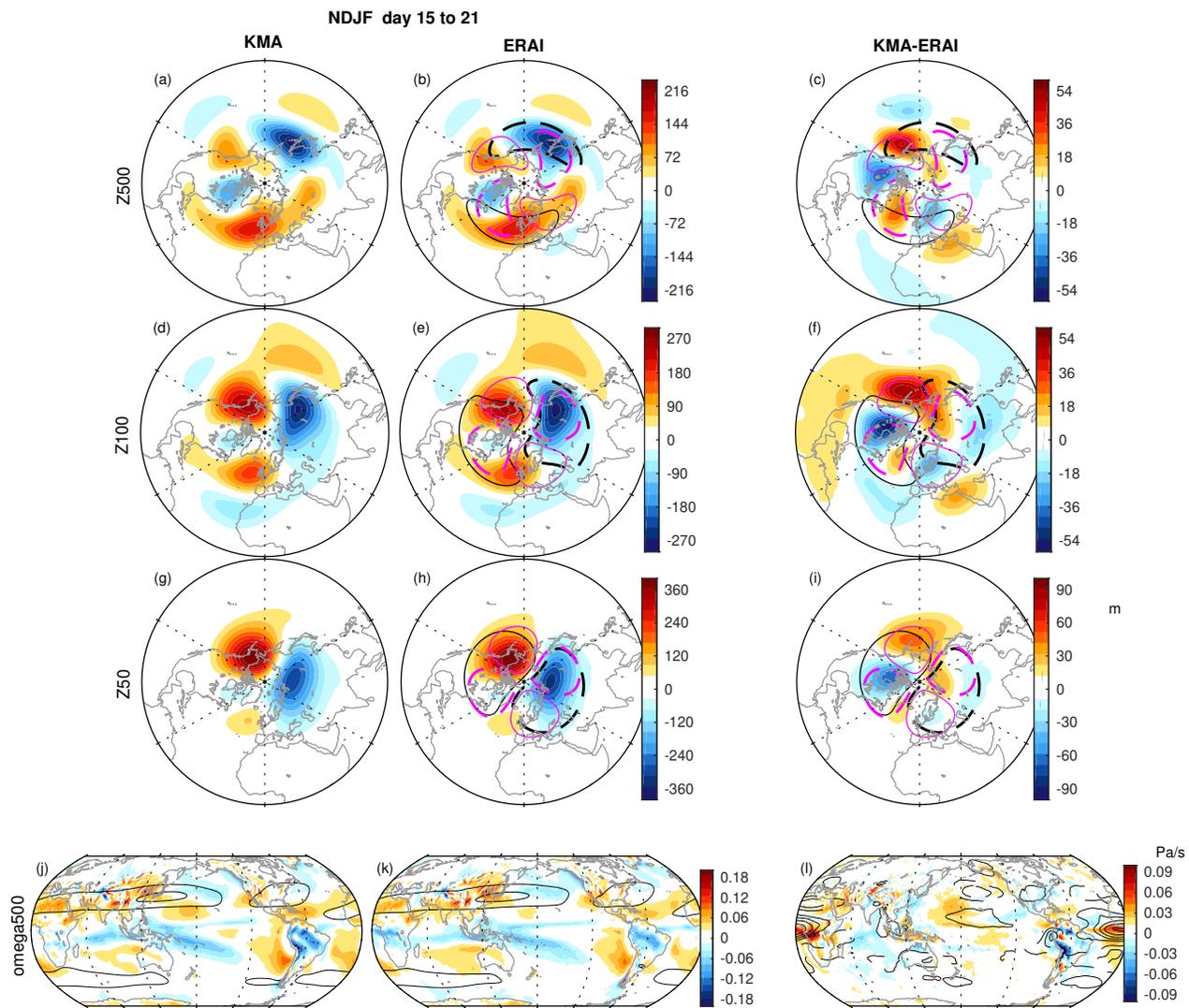


Figure S6. Same as figure S1 but for the KMA model.

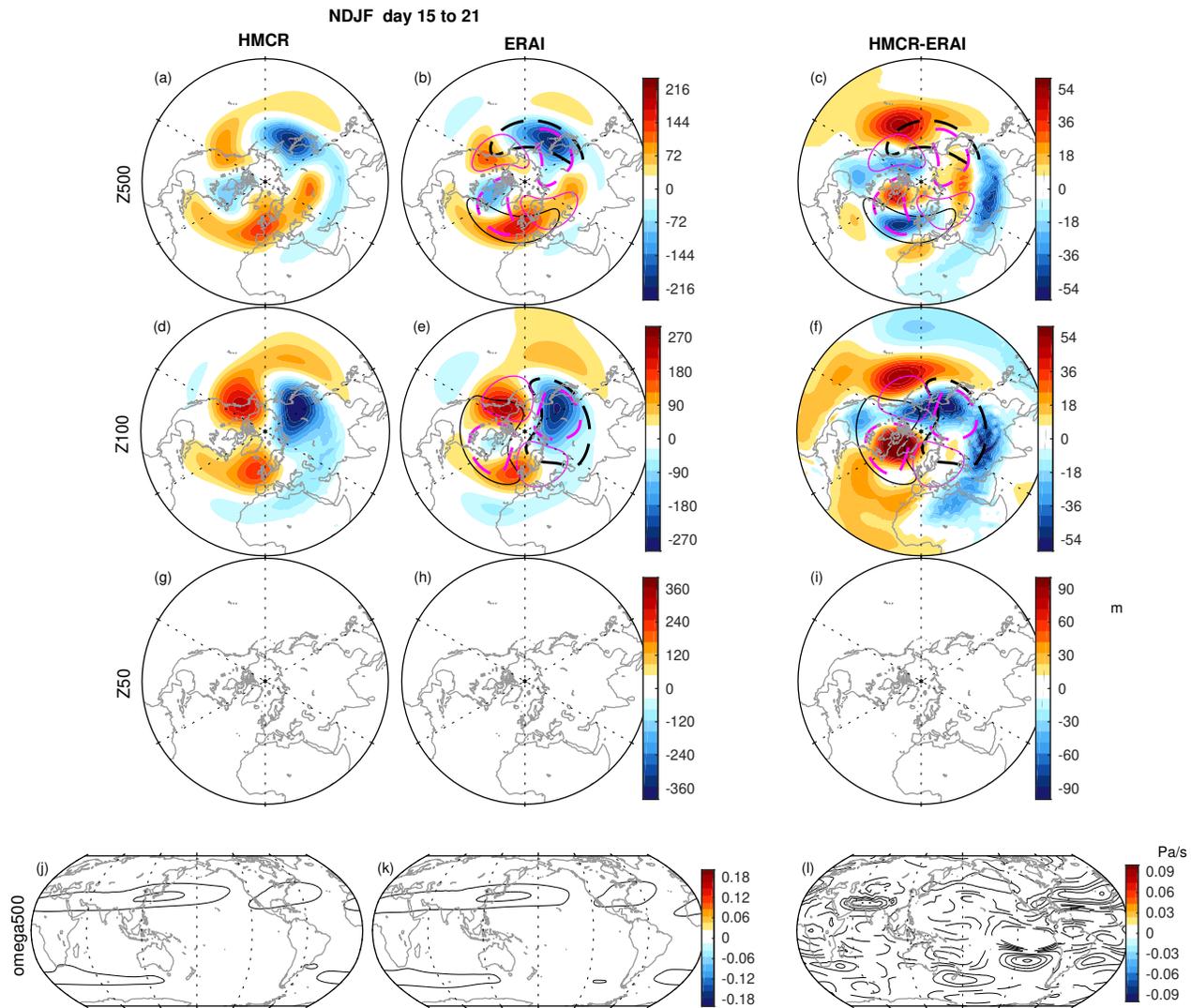


Figure S7. Same as figure S1 but for the HMCRCR model.

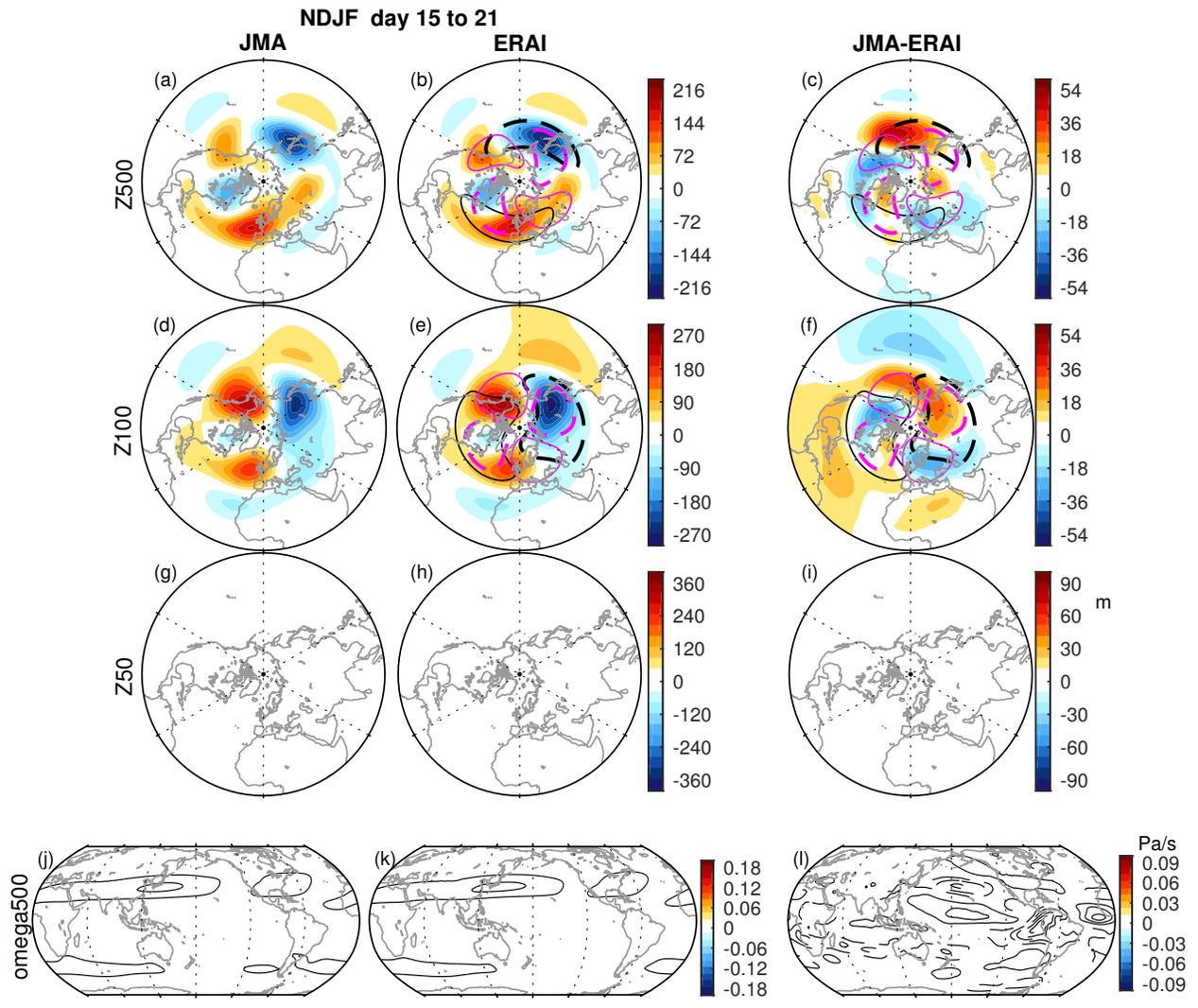


Figure S8. Same as figure S1 but for the JMA model.

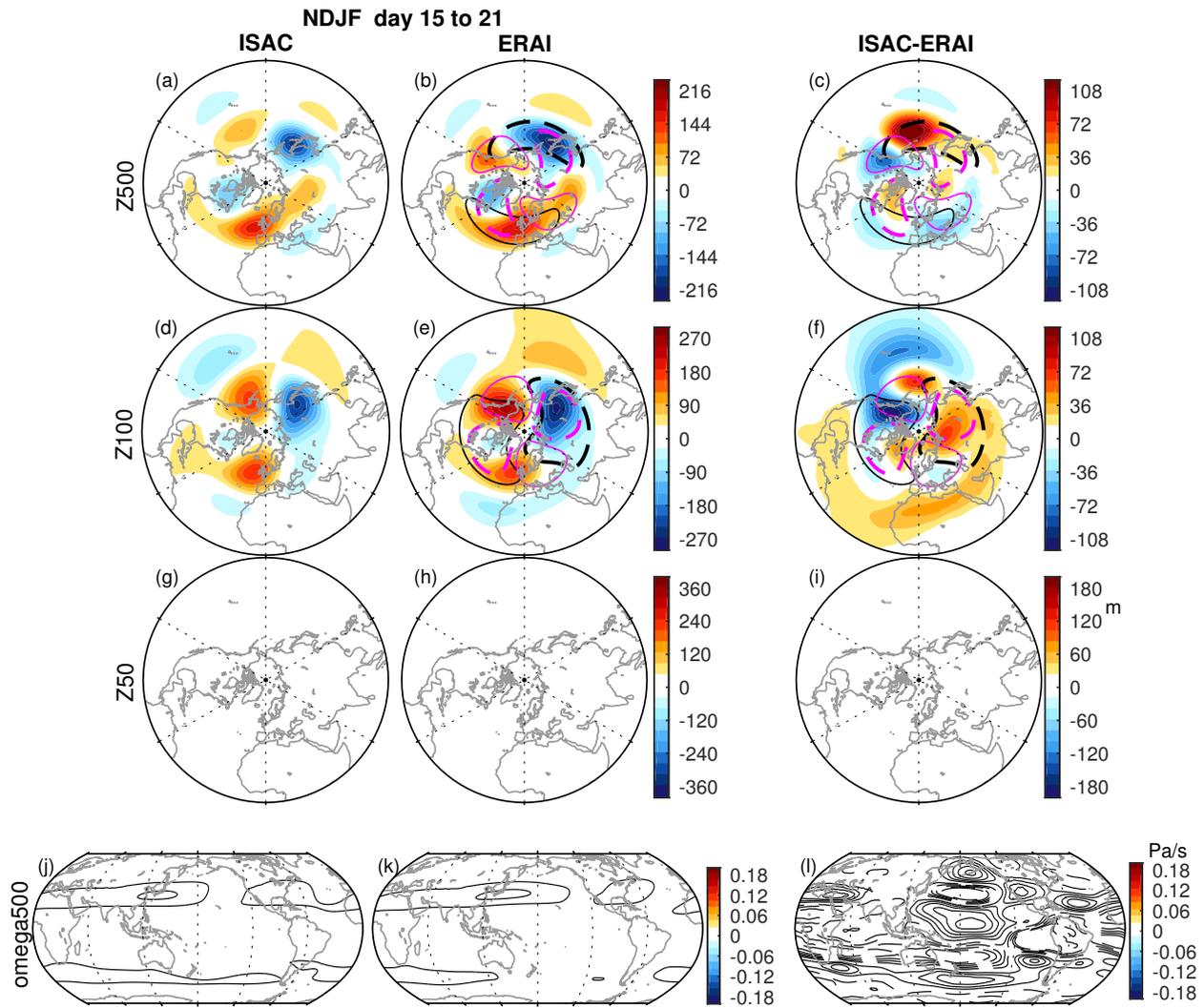


Figure S9. Same as figure S1 but for the ISAC model. Note the colorbar for the right column differs from other figures in the supplement.

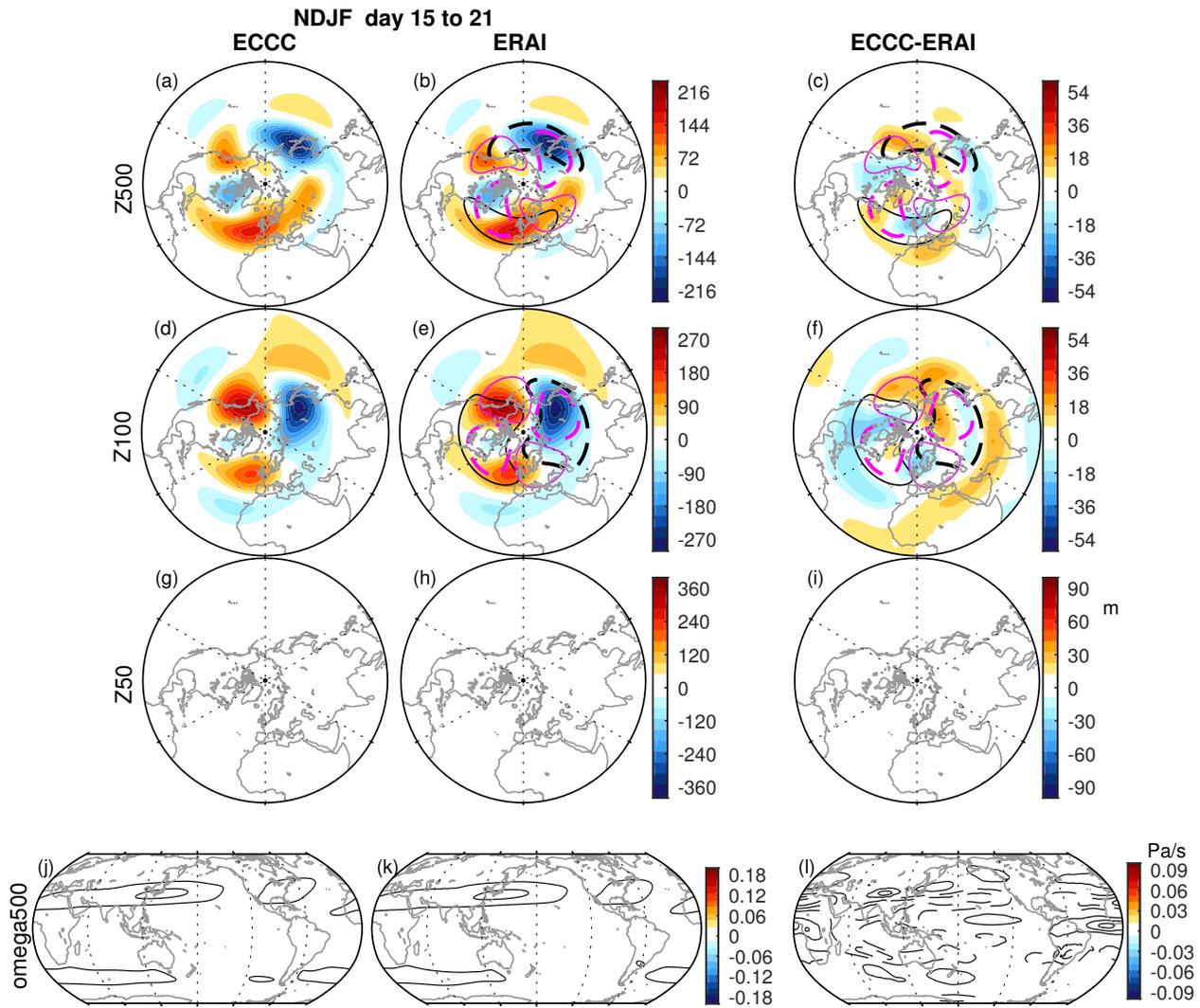


Figure S10. Same as figure S1 but for the ECCC model.

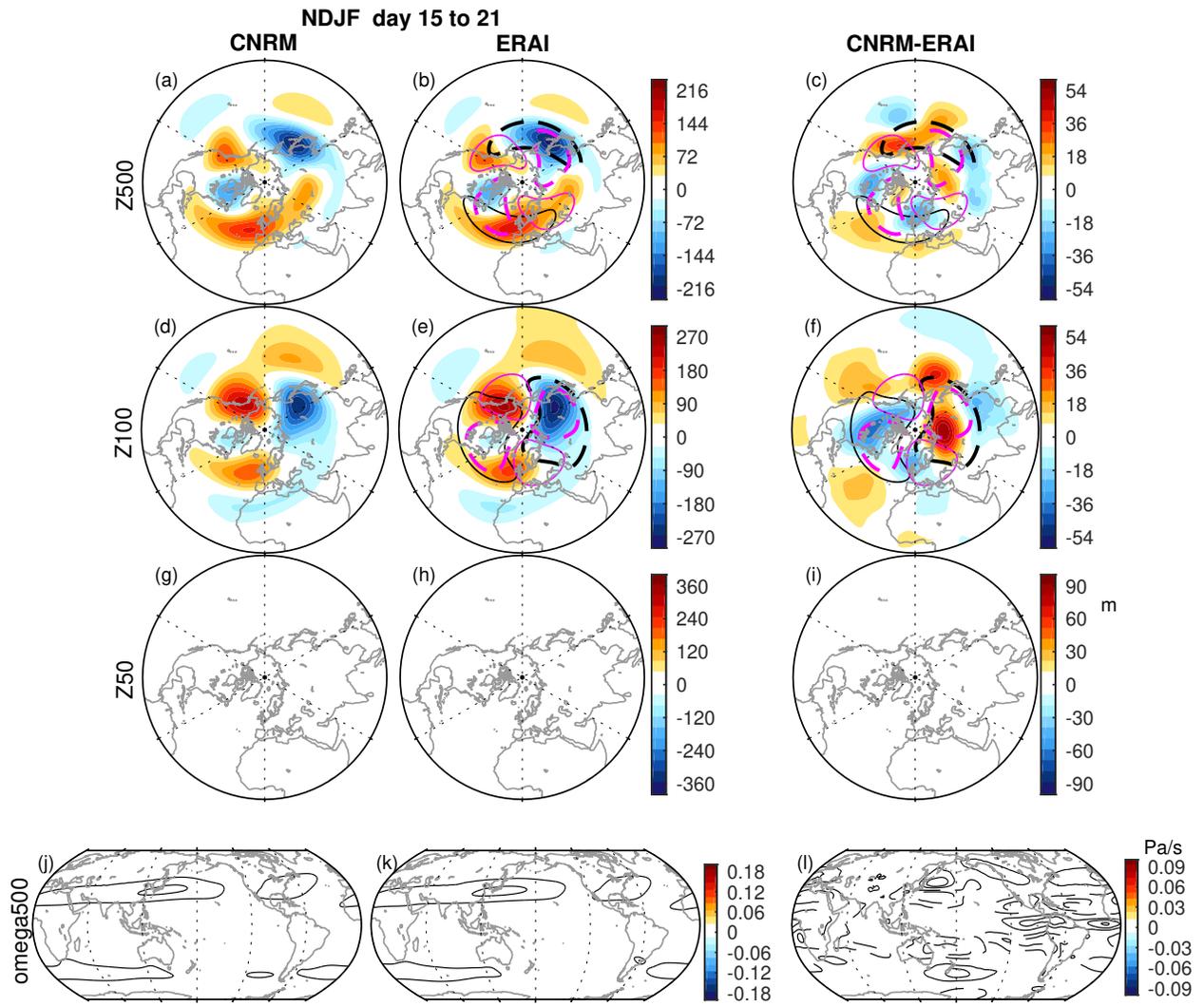


Figure S11. Same as figure S1 but for the CNRM-2014 model.

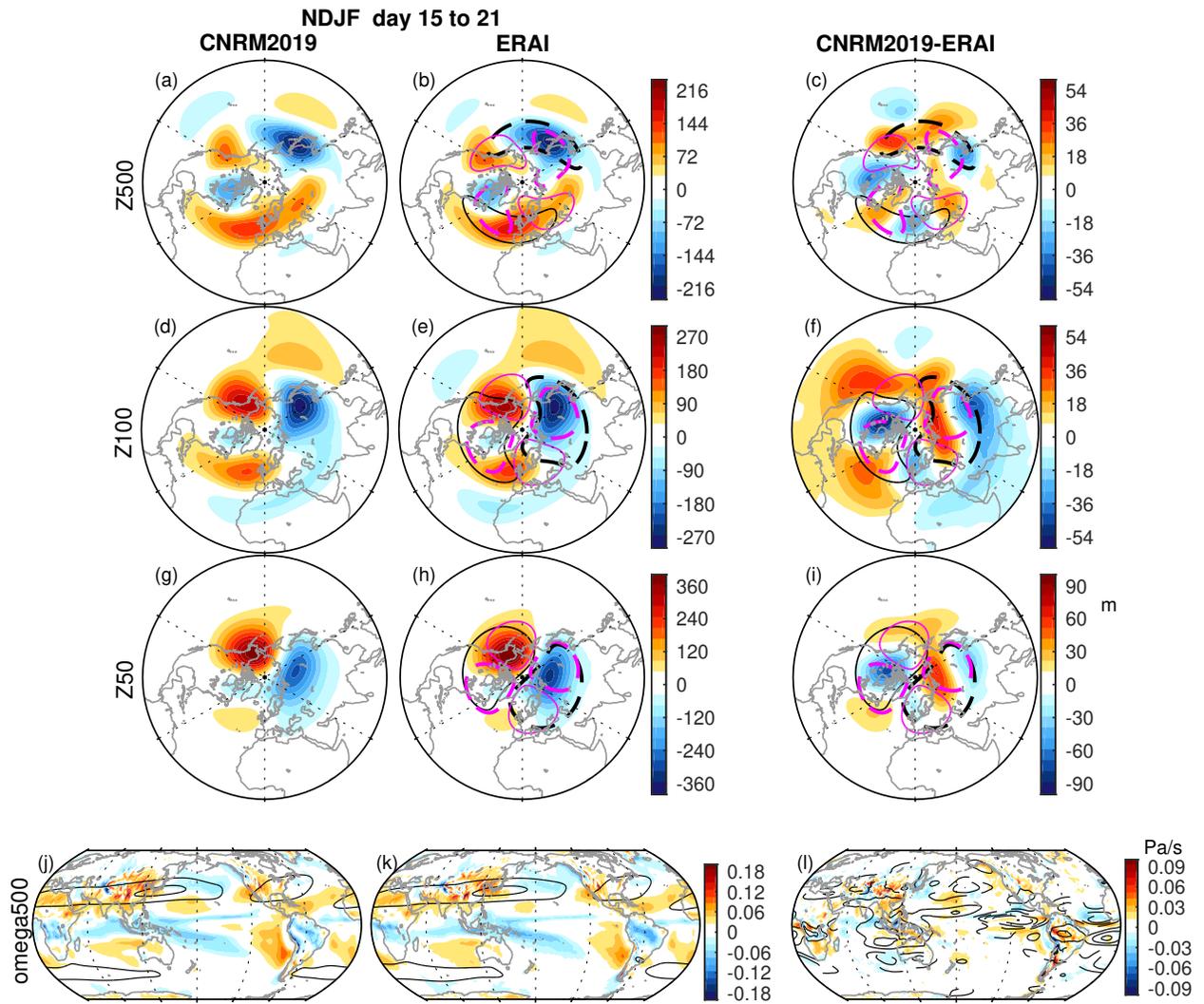


Figure S12. Same as figure S1 but for the CNRM-2019 model.

NDJF initializations

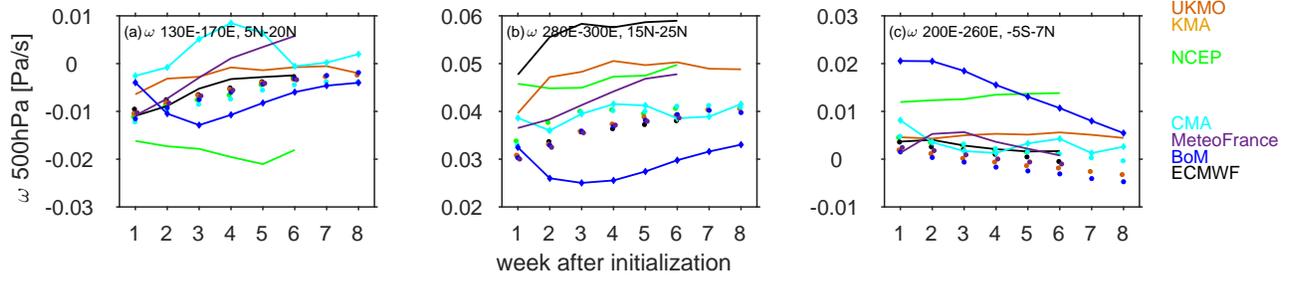


Figure S13. As in Figure 3 in the main text but for the regions of subsidence focused upon for Figure 9.

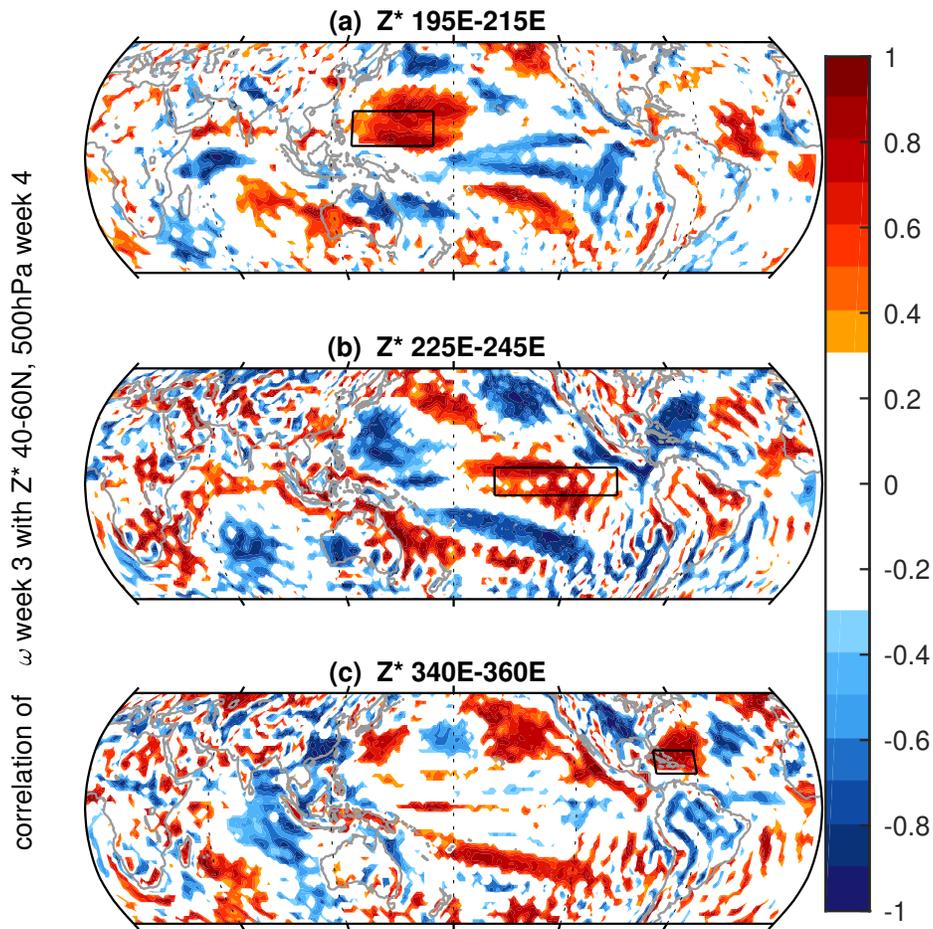


Figure S14. Correlation of Z^* in the three regions focused on in Figure 9 in the main paper with omega. A correlation exceeding ± 0.6 is statistically significant at the 95% confidence level. A box indicates the specific omega region chosen for Figure 9.