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**Plain Language Summary:** This study analyzes the modulation of planetary waves associated with the Eurasian pattern through composite analyses to reveal its dynamic mechanism, including wave-mean flow interaction. In the positive phase of the Eurasian pattern (EU+), corresponding to the enhanced Asian monsoon, the upward and eastward propagation of the planetary wave from the Central Eurasia to the North Pacific in the troposphere is enhanced. The enhanced upward and eastward propagating planetary wave converges in the upper troposphere, thereby causing anomalous extratropical direct circulation and cold outflow toward the mid-latitude lower troposphere.

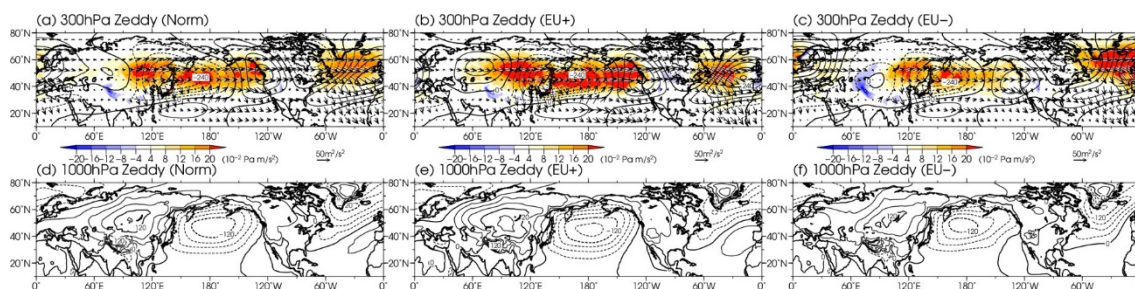


Figure 1 Geopotential height distributions of the eddies (contour) and the horizontal component of 300-hPa WAF defined by Plumb (1985) (arrows; unit:  $\text{m}^2\text{s}^{-2}$ ). (Left column) the climatological eddy, (middle column) composite maps for EU+, and (right column) those for the negative phase of the Eurasian pattern (EU-) at (top row) 300 hPa and (bottom row) 1000 hPa. Contour intervals are 60 m for (a)–(c), and 30 m for (d)–(f), respectively. Color shading in (a)–(c) are vertical component of 500-hPa WAF (unit:  $\text{Pa m s}^{-2}$ ). Color and arrow scale are shown below in each panel.

- In the EU+, the upward and eastward propagation of the planetary wave from the Central Eurasia to the North Pacific in the troposphere is enhanced.
- The baroclinic energy conversion from the zonal mean to the deviation from that over East Asia contributes to the amplified planetary wave.
- The enhanced upward and eastward propagating planetary wave converges in the upper troposphere, thereby causing anomalous extratropical direct circulation.