Takemura, K., and H. Mukougawa, 2020: Dynamical relationship between quasi-stationary Rossby wave propagation along the Asian jet and Pacific-Japan pattern in boreal summer. *J. Meteor. Soc. Japan*, **98**, 169-187.
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Plain Language Summary: To reveal a new possible process linking the quasi-stationary Rossby wave propagation over Eurasia along the Asian jet and the Pacific-Japan (PJ) pattern through the Rossby wave breaking (RWB) east of Japan during boreal summer, this study conducts a lag composite analysis of the past 44 RWB events. The results of this paper show that the quasi-stationary Rossby wave propagation along the Asian jet can excite the PJ pattern, through high potential vorticity (PV) intrusion toward the subtropical western North Pacific associated with the RWB and the consequent enhanced convection over the region.

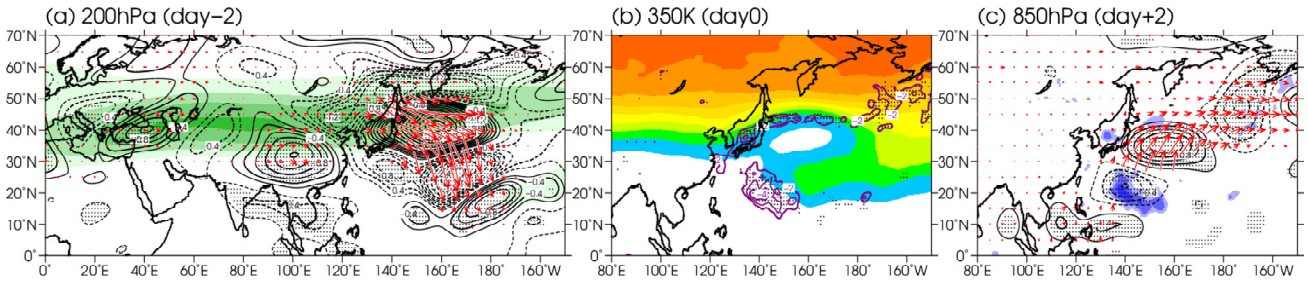

Figure 1. Composite of (a) 200-hPa anomalous relative vorticity (contour; unit: 10^{-5} s^{-1}), climatological zonal wind (shading; unit: m s^{-1}) on day –2, (b) 350-K PV (shading; unit: PVU), 500-hPa anomalous negative vertical p-velocity (purple contour; unit: 10^{-2} Pa s^{-1}) on day 0, and (c) 850-hPa anomalous relative vorticity (contour), 500-hPa anomalous vertical p-velocity (shading) on day +2 for the 44 RWB cases east of Japan. Solid and dashed contours in (a) and (c) denote negative and positive vorticity anomalies, respectively. Red vectors indicate wave activity flux (unit: m^2 s^{-2}). Black dots indicate statistical significance at a 95% level of the anomalous (a, c) relative vorticity and (b) 500-hPa vertical p-velocity.

- The lag composite analysis shows that the quasi-stationary Rossby wave propagation along the Asian jet induces the “inverse-S” shaped RWB east of Japan, the associated southwestward high-PV intrusion toward the subtropical western North Pacific and the consequent enhanced convection over the region, which in turn excites the subsequent PJ pattern.
- Q-vector diagnosis and vorticity budget analysis show an essential contribution of the high-PV intrusion to the enhanced convection over the subtropical western North Pacific, through dynamically induced ascent.
- A partial correlation analysis quantitatively shows greater contribution of the high-PV intrusion to the enhanced convection over the subtropical western North Pacific and the formation of the PJ pattern, compared to the anomalous warm sea surface temperature condition over the region.