



**Fig. S1.** Composite of 250–200 hPa mean potential vorticity (shaded and contour, PVU) for the 58 PRE cases on **(a)** Day -2, **(b)** Day -1, **(c)** Day 0, and **(d)** Day +1. The contour interval is 1 PVU (solid, 1–9 PVU) and 0.2 PVU (dashed, 0.1–0.9 PVU). The red rectangle shows the extraction area [130–150°E, 30–40°N]. The green circle shows the median point of typhoons on Day 0. The green triangle shows the median point of precipitation on Day 0.

In the PRE cases, from Day -1 to Day 0, the jet streak at 200 hPa intensified from 45 to 55  $\text{m s}^{-1}$  (Please see Fig. 6b and 6c in the manuscript). To clarify the reason for this jet streak intensification, composite results of 250–200 hPa mean potential vorticity is shown in Fig. S1. The results for Day -1 and Day 0 indicate that low potential vorticity air is moving northward from low latitude on the east side of the typhoon and is located near the northeast of the precipitation area at the time of occurrence (Day 0). This low potential vorticity air may have led to an increase in the ridge amplification associated with the potential vorticity gradient and the strengthening and maintenance of the upper-level jet, which is similar to previous studies (Galarneau et al. 2010; Bosart et al. 2012; Moore et al. 2013; Yuan et al.

2018). However, the origin of low potential vorticity air is not clear because of the possibility of typhoons, precipitation areas, and advection from low latitudes, so we did not discuss direct relevance to the mechanism of PRE occurrence in this study.