Plain Language Summary: The rate at which the Silk-Road pattern (SRP) with Rossby wave breaking (RWB) near the Asian jet exit causes the Pacific–Japan (PJ) pattern in boreal summer is investigated. The presence and absence of RWB for each detected SRP case are evaluated by positive and negative wave breaking (WB) index, respectively.
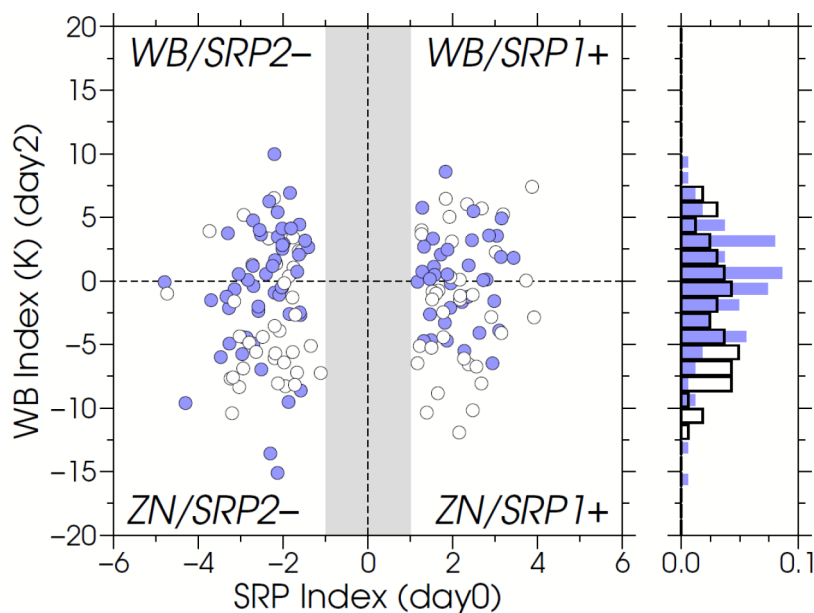
Figure 1. Scatter plot of SRP index on day 0 and WB index on day +2 (unit: K) for the cases of SRP1+ and SRP2–. The magnitude of the Silk-Road pattern along the Asian jet represented by SRP1+ and SRP2– indices becomes maximum on day 0. Blue and white circles indicate positive and negative PJ indices on day +2, respectively. The right figure shows the histogram of the WB index for the SRP case with (blue bars) and without (white bars) a positive PJ pattern, where the frequency distribution is normalized by the number of samples and the bin width is 1.25K.

- In the composite of SRP cases with RWB, a wave train associated with SRP appears over Eurasia, which is accompanied by the RWB near the Asian jet exit. The RWB promotes enhanced convection on the southern side of the RWB region due to the intrusion of upper-level high potential vorticity toward the southwest, resulting in the formation of the PJ pattern. Approximately 60–70% of the SRP cases with RWB are accompanied by the PJ pattern.
- In the case of SRP without RWB, the composite represents a wave train structure over Eurasia but shows neither enhanced convection south of the RWB nor PJ patterns. Approximately 40–50% of the SRP cases without RWB are accompanied by the PJ pattern.
- The presence of RWB increases the formation rate of the positive PJ pattern by a factor of 1.2 to 1.7, indicating that the RWB plays an important role in the excitation of the PJ pattern.