Plain Language Summary: This study investigated the distribution of, and the interannual variation in, Quasi-stationary heavy precipitation systems (QSPSs) that occur Kyushu, southwestern Japan under the three SLP patterns (FL-, NL-, and NPH-patterns). Moreover, we proposed a new method to decompose the interannual variation in occurrence number of QSPSs into three components: the number of appearances of each SLP pattern (*A*), the probability of QSPS occurrence pre SLP appearance (*P*), and the annual average of simultaneous QSPS occurrences (*S*). This study emphasizes the importance of considering the synoptic atmospheric fields when understanding variation in heavy rainfall, and highlights the usefulness of the proposed method.
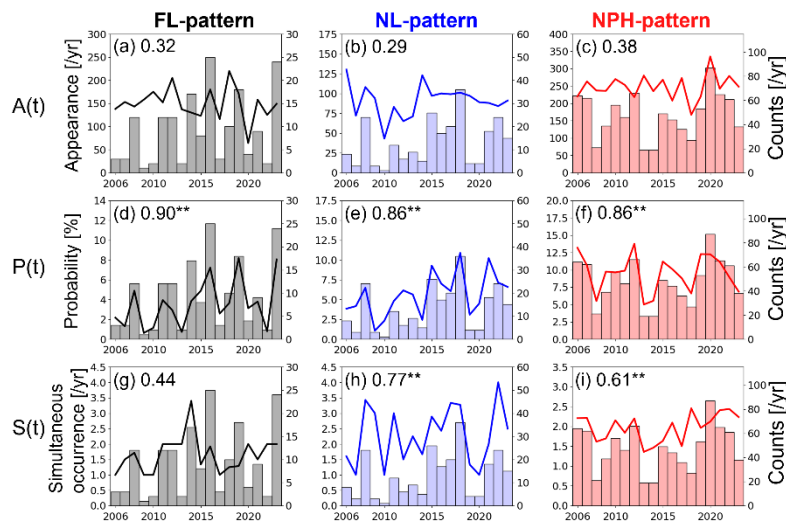

Fig. 1 Interannual variation in the occurrence number of QSPSs in each SLP pattern (bars and right axis, black: FL-pattern, blue: NL-pattern, red: NPH-pattern) and their decomposition parts (lines and left axis): (a)–(c) *A(t)*, (d)–(f) *P(t)*, and (g)–(i) *S(t)*. The value in the upper-left corner of each panel indicates the correlation coefficient. Double asterisks indicate the statistically significant correlation at the 99% confidence level.

- Interannual variation in QSPS occurrences was investigated by applying a new SLP classification method.
- Environmental conditions that contribute to the interannual variation in QSPSs are different depending on the SLP pattern.
- Though primarily regulated by thermodynamic factors, QSPS occurrence may increase in certain years with frequent NPH pressure pattern.