

Effects of the North Pacific subtropical SST front on the Baiu precipitation
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The Baiu/Meiyu front is manifested as a rain band and is one of the most remarkable features in the East Asia summer monsoon. It appears over the subtropical western North Pacific around late May and then subsequently migrates northward. Focusing on the subtropical SST front that extends almost zonally about 25°N in the western subtropical gyre, the present study examines its effect on the Baiu precipitation in late May using satellite observations and ERA-interim reanalysis data from 2002 to 2014.

The subtropical SST front has a clear seasonal cycle and becomes strong in May. The strong SST front enhances atmospheric baroclinicity and anchors cyclonic surface wind curls that occur intermittently at intervals of a few days. The wind curls are associated with subsynoptic low pressure systems embedded in larger, synoptic highs in the main storm track to the north (Kobashi et al. 2008). The climatology of the precipitation in late May reveals the two rain bands separated by the minimum in precipitation along the SST front. The moisture budget analysis shows that the observed two rain bands correspond well to the horizontal convergence of moisture flux. Dividing the moisture flux into a slowly-varying component and a high-frequency disturbance component, we find that disturbances cause the moisture flux divergence along the SST front and split the slowly-varying large-scale Baiu rain band into the two rain bands. Northerly winds from synoptic highs are locally enhanced behind the subsynoptic lows and carry dry air to the north of the SST front, causing the moisture flux divergence along the front. The subsynoptic lows along the subtropical front are each accompanied by convective rain, but their contribution to the climatological precipitation is outweighed by the effect of the northerly wind-induced moisture divergence.

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