



Interannual Variation of the Summer Rainfall in the Taipei Basin Caused by the Impact of ENSO on the Land-Sea Breeze Activity

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The Taipei Basin, located in northern Taiwan, is formed by the intersection of the Tanshui River Valley (~30km) and the Keelung River Valley (~60km). Summer is the dry season in northern Taiwan, but the maximum rainfall in the Taipei Basin occurs during the summer. The majority of summer rainfall (75%) in this Basin is produced by afternoon thunderstorms triggered by the sea breeze interactions with the mountains to the south of this Basin. Environmental conditions for the roughly three million people living in the Taipei Basin are greatly affected by the land-sea breeze and afternoon thunderstorm activities. Thus, the water supply, air-land traffic, and pollution for this extremely urbanized basin can be profoundly affected by interannual variations of thunderstorm days and rainfall. A systematic analysis was made of thunderstorm days and rainfall for the past two decades. Opposite the interannual variation of the sea surface temperature (SST) anomalies over the NOAA NINO3·4 region, Δ SST (NINO3·4), clear interannual variations of these two variables emerge. Occurrence days of afternoon thunderstorm and rainfall amount in the Taipei Basin are double during the cold Δ SST(NINO3·4) phase compared to the warm phase. During the latter (former) El Niño-Southern Oscillation (ENSO) phase, the Taipei Basin needs a stronger (weaker) warm/moist monsoon southwesterly flow channeled through the land-sea breeze to trigger thunderstorm activity. In contrast, the convergence of water vapor flux over the southeast/east Asian monsoon region toward Taiwan is enhanced more (less) to maintain rainfall over the Taipei Basin during the cold (warm) ENSO phase.