

Interdecadal Change in the Tropical Pacific Precipitation Anomaly Pattern around the Late 1990s during Boreal Spring

Zhiping Wen, Yuanyuan Guo, and Renguang Wu
Sun Yat-sen University, Guangzhou, China (eeswzp@mail.sysu.edu.cn)

The leading mode of boreal spring precipitation variability over the tropical Pacific experienced a pronounced interdecadal change around the late 1990s. The pattern before 1998 features positive precipitation anomalies over the equatorial eastern Pacific (EP) with positive principle component years. The counterpart after 1998 exhibits a westward shift of the positive center to the equatorial central Pacific (CP). Observational evidence shows that this interdecadal change in the leading mode of precipitation variability is closely associated with a distinctive sea surface temperature (SST) anomaly pattern. The westward shift of the anomalous precipitation center after 1998 is in tandem with a similar shift of maximum warming from the EP to CP. Diagnostic analyses based on a linear equation of the mixed layer temperature anomaly exhibit that an interdecadal enhancement of zonal advection (ZA) feedback process plays a vital role in the shift in the leading mode of both the tropical Pacific SST and the precipitation anomaly during spring. Moreover, the variability of the anomalous zonal current at the upper ocean dominates the ZA feedback change, while the mean zonal SST gradient associated with a La Niña-like pattern of the mean state only accounts for a relatively trivial proportion of the ZA feedback change. It was found that both the relatively rapid decaying of the SST anomalies in the EP and the La Niña-like mean state make it conceivable that the shift of the leading mode of the tropical precipitation anomaly only occurs in spring. In addition, the largest variance of the anomalous zonal current in spring might contribute to the unique interdecadal change in the tropical spring precipitation anomaly pattern.