



Northward propagating ISOs dynamics over East Asia and an association with ENSO

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The northward propagating intraseasonal oscillation (NPISO) plays an important role in determining the timing of the active and break period of the EASM through the meridional movement of the monsoon trough. The present study aims to investigate the NPISO dynamics over East Asia and the interdecadal change in the relationship between NPISO and El Nino/Southern Oscillation (ENSO). It is demonstrated that the NPISO is significantly coupled to the Indian Ocean SST (IOSST) warming, the western North Pacific (WNP) convection, and the westwardly expanded anticyclonic circulation over WNP, through the atmospheric bridge process.

The interannual variability of the NPISO may induce a quasi-biennial (QB)-type ENSO characteristic through the preceding summer and the concurrent summer. The strong NPISO is connected to the anomalous easterly wind, western North Pacific subtropical high (WNPSH), and the eastward evolution of an oceanic Kelvin wave. On the interdecadal change in the NPISO-ENSO relationship, the differences in intraseasonal variances from the first two leading EOF modes and interdecadal shift in their association to ENSO are investigated in between two epochs of 1958-1979 and 1980-2001 years. Since the late 1970s, a strong dynamical link between NPISO and ENSO has been found during a later summertime (i.e. July to August) rather than the early summer (i.e. May and June) in before the late 1970s. Because of an enhanced Walker-Hadley circulation, the IOSST warming has been maintained until the concurrent summer season, which in turn promotes a strong summertime suppressed convection anomaly over the Philippine Sea. Consequently, ENSO has been intimately linked to the suppressed convection anomalies over the Philippine Sea and eventually western North Pacific subtropical high (WNPSH). The mechanism is suggested as follows: ENSO-related IOSST warming – the suppressed convection over the WNP – WNPSH – the reinforced NPISO activity.