



The impact of tropic Indian MJO activities on Intra-Seasonal Oscillation of Southwest Summer Monsoon over Bay of Bengal

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Adopting MJO (Madden and Julian Oscillation) Index, NCAR/NCEP reanalysis data and APHRO_MA_V1003R1 precipitation, the impact of tropic eastern Indian MJO strength and propagation on the Intra-Seasonal Oscillation (ISO) of Southwest Monsoon of Bay of Bengal (BOBSM) with responding precipitation distribution as well as Low Frequency (LF) circulation and convection is analyzed. In years when tropic eastern Indian MJO is active during late spring to early summer, ISO activities of BOBSM during Apr-Aug is advanced about 20d (about half of a cycle) than years when tropic Indian MJO is inactive during the same period. Such impact on ISO of BOBSM can last for the whole monsoon period, so that the preparing period and activating period of ISO of BOBSM is advanced, the monsoon period is extended, and the ISO strength is also stronger. Besides, ISO of Southwest Monsoon (SM) shows pronounced feature of northward (from tropic along the Bay of Bengal (BOB) path to sub-tropic) and eastward (from BOB along 10-20°N to South China Sea (SCS)) propagation. By such an impact on above northward and eastward propagation, the abnormal situation of tropic eastern Indian MJO during late spring to early summer influences the preparation, maintain and activation of ISO of BOBSM, which shows in both of strength and period. The ISO strength of BOBSM shows prominent negative correlation with tropic eastern Indian MJO activities during 21st of Apr to 5th of May, when tropic Indian MJO is more active during late spring to early summer, the ISO strength of BOBSM is stronger, and experiences 3 times ISO waves during May-Aug. The LF convection and circulation fields at phase 1-3 (i.e. ISO of BOBSM is at positive phases) and that at phase 4-6 (negative phases) shows anti-phase character, which caused by eastward propagation of LF convection of MJO and its motivation to ISO northward propagation along BOB and SCS paths at the same time. The area from Indian Peninsula to Philippines is in positive (or negative) abnormal of precipitation at phase 1-3 (or phase 4-6), with the phase 2 (the ISO wave peak of BOBSM) and the phase 5 (the trough) is the largest positive and negative abnormal respectively. Otherwise, in years when tropic Indian MJO is inactive during late spring to early summer, the ISO activity of BOBSM is weak and its oscillation is also irregular.