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Moist Static Energy Budget of Super MJO

**摘要**

Recent observations of the tropical atmosphere reveal that Madden and Julian Oscillation(MJO) play an important role in the onset of the Indian and Australian monsoons and the cyclone activities in the western north pacific. Therefore, this study investigates the frequency and strength of super MJOs with time and also use ERA-interim data to analysis the column-integrated moist static energy (MSE) budget to compare the different between the composites of extreme MJO events and climate averaged MJOs.

The statistical results show that the strength of MJO events are obviously related to the seasonal cycle, but nearly irrelevant to ENSO. Because of the summer monsoon, the strength of MJOs in summer is weaker than in winter. In addition, there are 80% super MJO cases, the definition of which means the intensity exceeds the climate average strength of MJO over two standard deviations and maintain at least two consecutive phases, burst in winter and spring. Moreover, the average period of super MJO cases is about 41 days which is shorter than the climate average period (about 46 days).

To generalize the reasons that make MJOs become the extreme cases, the MSE budget analysis is applied on comparing the different between extreme cases and climate average MJOs. The results present that when the precipitation reach to its minimum, the moist static energy would get to its minimum, too. At the same time, both the vertical and horizontal advection effects release the column MSE and then the advection terms become moderate until next event. It’s notable that the different between the two is at the phase eight. When the weaker easterly wind reduces the effect of advection and increase the local moist static energy which may make MJO become stronger. Therefore, monitoring the wind flied and column MSE at the phase eight might be conduce to predict extreme MJO cases.

**關鍵字**

Madden-Julian Oscillation   
溼静能 (Moist static energy)