

“Intraseasonal Ocean-Atmosphere Interaction and the Indian Summer Monsoon”

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The Indian summer monsoon (ISM) is the rainy season for the Indian subcontinent. The monsoon season is composed of intermittent wet and dry conditions, both of which typically last for 2–3 weeks. Thus, besides the daily and interannual variabilities, the monsoon rainfall also has pronounced intraseasonal variabilities (ISVs), which are vitally important to agricultural planning that affects food production and the livelihoods of billions of people. The ISVs during ISM is closely related to the northward propagating ISVs from the tropics, usually known as monsoon intraseasonal oscillation (MISO). The ocean-atmosphere interaction is found to be important for the MISO. Generally, the warm SST anomalies occur over the tropical Indian Ocean, which changes the vertical wind shear. As a result, the ISVs originating from the western Indian Ocean are shifted northward, and transfer moisture and momentum from the deep tropics to the Indian sub-continent, which tends to initiate an early onset of ISM or trigger heavy precipitation during ISM. In addition, evidence shows that warm SST anomalies can drive the atmosphere and lead to atmospheric instability and convection. This reinforces the more recent view that the ocean does not just play a passive role in the northward-propagating ISVs. These process understandings help shape the path to enhancing predictive understanding and monsoon prediction skills.