Intraseasonal forecasts of monsoon and tropical cyclones

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In boreal summer, the Madden-Julian Oscillation (MJO) has strong interaction with the circulation and variability of Asian summer monsoon. In addition to the eastward propagation along the equator, the MJO in this season also propagates northeastward as Intraseasonal-Seasonal Variability (ISV) to influence the wet and dry spells of monsoon over the South and East Asian continent. The active/break phases of the MJO/ISV modulate the occurrences of tropical cyclones in northern Indian Ocean and Northwest Pacific Ocean. An atmosphere-ocean coupled system (so-called UH HCM) initialized with NCEP FNL analysis has been used to carry out experimental intraseasonal forecasting of monsoon and tropical cyclones in year 2008 (a target year of YOTC and AMY). It is found that useful skill of monsoon rainfall forecast reaches 3 weeks in the UH_HCM, which is about two weeks longer than that in the CFSv1/v2. The low prediction skill in CFS models is due to slow propagations of the MJO/ISV in the model. Inter-comparison is conducting to understand why CFS models produce slow MJO/ISV propagations. The UH HCM also successfully predicted the genesis of Tropical Cyclone Nargis (2008) with a lead time of two weeks. The UH HCM reproduces the westerly wind bursts in the equatorial Indian Ocean associated with an eastward-propagating MJO event as well as the accompanying northward-propagating westerly and convective disturbances. This northwardpropagating ISV, after reaching the Bay of Bengal, fosters the genesis of Tropical Cyclone Nargis. Present finding demonstrates that a realistic MJO/ISV prediction will make the extended-range forecasting of tropical cyclone genesis possible and also calls for improved representation of the MJO/ISV in contemporary weather and climate forecast models.