

Extended-range TC Prediction Experiments

Tim Li¹, B. Xiang², M. Zhao² and X. Jiang³

¹University of Hawaii at Manoa; ²Geophysical Fluid Dynamics Laboratory;
³JPL/UCLA

Extended-range tropical cyclone (TC) forecast beyond 5 days is very challenging. Using a new version of Geophysical Fluid Dynamics Laboratory (GFDL) coupled model, we conducted the predictability experiments for two most destructive landfall TCs in the past years, Hurricane Sandy in 2012 and Super Typhoon Haiyan in 2013. Results demonstrate that the genesis of the two TCs is highly predictable with maximum prediction leading time reaching 11 days. Meanwhile, the landfall location and time can be predicted one week ahead for Sandy and two weeks ahead for Haiyan. The “beyond weather time scale” predictability of the TC genesis is primarily attributed to the model’s skillful prediction of the Madden-Julian Oscillation (MJO). To extend the case study above, we further conducted hindcast experiments for global basins during entire TC seasons for a period from 2003 to 2013. It was found that 11-yr average TC genesis forecast skill is generally lower than that of Sandy (2012) and Haiyan (2013). About one third of these cases had a good prediction skill of up to 7-day lead. These good forecasts are generally confined in the tropical western Pacific and tropical eastern Pacific, and during the period when MJO is active.