The Characteristics of Tropical Cyclone Formation in an Environment with Strong Low Frequency Vorticity in the Western North Pacific

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Fourteen selected tropical cyclones (TC) formed in the western North Pacific during 2008-2009 are simulated to examine the degree of environmental influences on TC formation (Vmax ~ 25 knots). Results show that the model is more capable of simulating TC formation process for TCs formed under the environments with strong low-frequency vorticity than with weak low-frequency vorticity. All simulation can reproduce the TC formation process in an environment with strong low-frequency vorticity, even with the high-frequency parts being removed in initial conditions. Results of this study reveal that the strength of environmental low-frequency vorticity is a crucial factor in dictating the formation of some TCs. A TC formation process is expected to occur under an environment with strong low-frequency vorticity, which can extend the lead-time of TC formation forecast under such an environment in the WNP.