
HYUNGEUN SHIN, University of Victoria

Effect of tropical waves on the tropical cyclone drift

The prediction of tropical cyclone motion and path have been for a long time a major topic in geophysical science and weather forecasting. The bulk of the motion and path of a tropical cyclone are determined by the so-called beta-gyres that form on its sides due to the variation in the Coriolis parameter with latitude—the so-called beta-drift. Despite such important progress in our understanding, the motion of tropical cyclones is not easily estimated because of dynamical interactions with ambient waves and the background flow. Thus, researchers have investigated how the motion of a tropical cyclone is affected by the environmental flows using numerical simulations. In this study, various types of equatorial waves are considered as the environmental flows for northern hemisphere tropical cyclones. The motion of the tropical cyclone is simulated using a 2D barotropic model. The domain of simulation is from 45 degree north to 45 degree south and all around the earth. For the boundary conditions, east-west is symmetric, and there is no y-direction flow at north-south boundaries. As a consequence, it is common that cyclones move northwestward, but the movement angle and traveling distance of cyclones are different depending on the types of equatorial waves. In addition, the differences become more significant after 12h because the waves have different influences on the beta gyres.