IMPACTS OF WATER VAPOR WINDS ON TROPICAL CYCLONE PREDICTIONS

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The impact of water vapor track and sounding winds in the prediction of tropical cyclones using a high-resolution limited area model is evaluated. Water vapor track winds are retrieved from subsequent images in the water vapor channel, the water vapor sounding winds are retrieved from multi-channel images to obtain a vertical profile. These winds, located in both cloudy and cloud-free region, have proven to be very valuable in predicting tropical cyclone tracks in the U. S. Navy global forecast system after been assimilated in the initial analysis.

The water vapor winds are mostly distributed between 100 hPa and 400 hPa. Out-flow structure of tropical cyclones and near-by synoptic features such as upper-level trough that are usually unavailable in conventional data set can provide more detailed and correct initial conditions for tropical cyclones. The non-hydrostatic limited area model of the U. S. Navy, the Coupled Ocean/Atmospheric Mesoscale Prediction System (COAMPS) is used to study the impact of water vapor winds in high resolution prediction of tropical cyclones. Results indicate that the impacts are positive but also case dependent due to different situation of the cyclone at different time.

Key Words: Tropical Cyclone, Water Vapor Winds, Predictions.