

Evaluation of the Impact of Synthetic CYGNSS Wind Speed Data on Tropical Cyclone Structure Analyses and Forecasts in a Regional OSSE

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The Cyclone Global Navigation Satellite System (CYGNSS) is a constellation of eight micro-satellites that was launched in December 2016. CYGNSS provides retrievals of wind speed at the ocean surface via reflected GPS signals. The orbital coverage allows for more frequent revisits on average than scatterometers, and the retrievals are feasible under a wide range of precipitating conditions and wind speeds, including the inner core of hurricanes. Prior to the launch of CYGNSS, Observing System Simulation Experiments (OSSEs) were conducted to quantify the potential impact of assimilating CYGNSS data on NOAA HWRF analyses and predictions. In addition to track and intensity, structural metrics such as critical wind radii and integrated kinetic energy were examined. The assimilation frequency (1-hourly, 3-hourly and 6-hourly) was also investigated. Finally, the utilization of the Variational Analysis Method (VAM) to provide wind direction information, and the subsequent improvement to the numerical analyses and forecasts, was conducted. Potential implications of the OSSE results will be discussed, together with plans to evaluate the impact of assimilating the actual CYGNSS data in upcoming hurricane seasons.