# IMPACT OF RADIO OCCULTATION DATA ON THE PREDICTION OF TROPICAL CYCLOGENESIS

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Tropical cyclones are one of the most devastating severe weather systems that are responsible for huge loss of lives and properties every year. Accurate prediction of tropical cyclogenesis by numerical models has been a significant challenge, largely because of the lack of observations over the tropical oceans. In this paper, we study the impact of GPS radio occultation data on the prediction of tropical cyclogenesis using the regional WRF modeling and data assimilation system.

First, we investigate the impact of radio occultation (RO) data on the prediction of 22 tropical cyclones that formed in the monsoon environment and 13 tropical cyclones that formed in the Easterly environment from 2006 to 2010. We found that the synoptic-scale environment for the monsoon tropical cyclone is moister, and the model has a better skill in predicting the formation of these storms when the GPS radio occultation data are not assimilated. Because the synoptic-scale environment for the Easterly tropical cyclones is drier, tropical cyclones that form in such environment tend to be more sensitive to the quality of moisture analysis. As a result, the assimilation of GPS radio occultation has a much bigger impact for tropical cyclones that form in the Easterly environment.

Second, we assess the impact of RO data (80% from COSMIC-2) on the prediction of 9 developing and 23 non-developing storms in September – October 2019. We found that the assimilation of RO data increases the probability of detection from 0.44 to 0.78 and reduces the false alarm rate from 0.73 to 0.53. We found that the assimilation of RO data improves the analysis of moisture and vorticity fields, leading to more accurate forecast of tropical cyclogenesis.