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## **Assimilation of Himawari – 8 imager radiance data with the WRF – 3DVAR system for the prediction of Typhoon Soudelor**

### **Abstract**

In recent years, although researchers have made significant progress in the field of numerical weather prediction (NWP), there are still major challenges when it comes to tropical cyclones (TCs) with rapid intensification to improve the accuracy of forecasts for these cyclones, data assimilation (DA) has been introduced. The lifespan of most tropical cyclones is over the ocean, where conventional observations are not accessible. As a result, analyzing observational data from satellites and aircraft over the ocean has become essential, and effective DA methods need to be applied to improve the analysis and forecasting of tropical cyclones. The advent of Himawari – 8 marked a major milestone for meteorological forecasting. This is a next – generation geostationary satellite launched by Japan Meteorological Agency (JMA). It is equipped with the Advanced Himawari Imager (AHI), which can continuously monitor weather events with high spatial and temporal frequency. The assimilation of AHI radiance data has been implemented with the three – dimensional variational data assimilation system (3DVAR) of the Weather Research and Forecasting (WRF) model to analyze and predict Typhoon Soudelor (2015). The assimilation of AHI radiance data improved the forecast of tropical cyclones during rapid intensification. The results show that after assimilating AHI radiance data, the position of the cyclone in the background field of the model was effectively adjusted compared to the control experiment without AHI radiance data assimilation. The results also indicate that assimilating AHI radiance data can improve the analysis of water vapor and wind in the cyclone's inner core region. The analysis and forecasts of minimum sea level pressure, maximum surface winds, and the cyclone track were further improved.

### **Keywords**

Data assimilation

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