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Impacts of Direct Assimilation of the FY-4A/GIIRS Long-Wave Temperature Sounding Channel Data on Forecasting Typhoon In-Fa (2021)

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The Advanced Weather Research Forecast model (WRF-ARW) is used to investigate the potential impacts of assimilating the FengYun-4A (FY-4A) Geostationary Interferometric Infrared Sounder (GIIRS) long-wave temperature sounding channel data on prediction of Typhoon In-Fa (2021). In addition, a series of data assimilation experiments are conducted to demonstrate the added value of the FY-4A/GIIRS data assimilation for typhoon forecasts. It is shown that the higher spectral resolution and broader coverage of GIIRS radiance data can positively impact the model analysis and forecasts with larger temperature and moisture increments at the initial time of simulations, thus producing the better simulation for typhoon warm core aloft, vortex wind structure and spiral rainfall band. Moreover, the assimilation of the GIIRS data can also lead to better storm steering flows and consequently better typhoon track forecasts. Overall, the assimilation of FY-4A/GIIRS temperature sounding channel data shows some added values to improve the track and storm structure forecasts of Typhoon In-Fa.