



Evaluating the impact of AMDAR data quality control in China on the short-range convection forecasts using the WRF model

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A quality control system for the Aircraft Meteorological Data Relay (AMDAR) data has been implemented in China. This system is an extension to the AMDAR quality control system used at the US National Centers for Environmental Prediction. We present a study in which the characteristics of each AMDAR data quality type were examined and the impact of the AMDAR data quality system on short-range convective weather forecasts using the WRF model was investigated. The main results obtained from this study are as follows. (1) The hourly rejection rate of AMDAR data during 2014 was 5.79%, and most of the rejections happened in Near Duplicate Check. (2) There was a significant diurnal variation for both quantity and quality of AMDAR data. Duplicated reports increased with the increase of data quantity, while suspicious and disorderly reports decreased with the increase of data quantity. (3) The characteristics of the data quality were different in each model layer, with the quality problems occurring mainly at the surface as well as at the height where the power or the flight mode of the aircraft underwent adjustment. (4) Assimilating the AMDAR data improved the forecast accuracy, particularly over the region where strong convection occurred. (5) Significant improvements made by assimilating AMDAR data were found after six hours into the model forecast. The conclusion from this study is that the newly implemented AMDAR data quality system can help improve the accuracy of short-range convection forecasts using the WRF model.