

Data assimilation of lightning observation data for global numerical weather prediction

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To improve the accuracy of global numerical weather prediction (NWP), it is necessary to assimilate more observation data with a data assimilation system (DAS). Lightning observation data is new valuable observation data including information on the deep part of cumulonimbus clouds. Lightning observation from satellites has been ongoing since the 1990s. The third generation geostationary meteorological satellites are equipped with lightning sensors and have high spatiotemporal resolution and wide observation coverage. However, to assimilate the lightning observation data adequately, there are some basic difficulties, which are the nonlinearity of the lightning observation operator, shortage of forecast accuracy for water substances, and water substance error statistics. In this research, we first summarize lightning observations and observation operators, and then describe our initial results such as forward calculation of lightning. We also consider next steps of the data assimilation of lightning observations.

Keywords: data assimilation, numerical weather prediction, lightning