

VAISALA

ILDC/ILMC Strikes Again
Network with lightning
experts from around the world

April 27-30, 2020
Broomfield, Colorado, USA

www.vaisala.com/ILDC



Assessing the Impact of Lightning Data Assimilation for Improving Very short-range Forecasts with the NCEP/GSI system

Authors

Mrs. RUTE FERREIRA - National Institute for Space Research

Dr. Dirceu Herdies - National Institute for Space Research

Dr. Eder Vendrasco - National Institute for Space Research

Dr. Milija Zupanski - Cooperative Institute for Research in the Atmospher

Dr. Ting-Chi Wu - Cooperative Institute for Research in the Atmosphere, Colorado State University and NOAA ESRL GSD

Mrs. Karina Apodaca - NOAA

Mr. Vanderlei Vargas - National Institute of Space Research (INPE)

Dr. Thiago Biscaro

Abstract

The World Meteorological Organization (WMO) defines very short-range weather forecasting as a description of weather parameters in a range up to 12 hours. Weather systems that develop in this range frequently produce severe storms. In southern Brazil, these storms produce significant social and economic damage. Typically, these storms are associated with strong winds, lightning, heavy rainfall, and hail.

Several studies have been seeking how to combine the current numerical weather forecast models with hydrometeors information in a severe storm in order to obtain results with significant improvement for operational weather centers, especially for very short-range forecasts.

In recent years, studies proved that lightning data could be used to improve short-term forecasts of the high-impact weather, particularly where weather radar data are unavailable or sparse. Lightning is associated with the vertical velocity of the updraft and the presence of ice within the cloud and it also could be used for improving the weather forecast. Thus, lightning data is an important tool for very short-range weather forecast and weather monitoring, due to their high spatial and temporal resolutions.

Therefore, the goal is to assimilate lightning data in order to improve the physical and dynamic representation of ice and cloud in convective systems in NWP models.

For this, this stud evaluates the impact of lightning data assimilation using Gridpoint Statistical Interpolation (GSI) system in Weather Research and Forecasting (WRF) model. In the present research, the lightning observation operator for GLM was tested with the BrasilDAT network by updating cloud and ice using McCaul's scheme (2009).

Our results shows that lightning data assimilation improved the relationship between dynamics, cloud microphysical fields and displacement of convective systems in high-resolution models.

Topic Areas

Meteorology: Numerical Modeling and Nowcasting

Submission Format

Poster