

## **Comparison of fog forecast results by PAFOG model and fog identification by satellite data in Brazil.**

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Adverse phenomena are great danger for society, they can cause economic and social losses, including human lives. This work study fog events in Brazilian Northeast and Porto Alegre (Southern Brazil) to compare satellite fog identification results and fog forecast by PAFOG model. A bibliographical review was carried out to present theoretical point of view. The next data and methodology from different sources were used: a) surface data obtained by the Department of Air Space Control for the airports of Maceio, Campina Grande and Porto Alegre; b) images of the final product of the GOES, METEOSAT and EUMETSAT satellites in the visible, water vapor and infrared channels; c) radiosonde data from the Center of the Weather Forecast and Climate Studies (CPTEC) and the University of Wyoming; d) reanalysis products of the numerical model of the ERA-Interim (ECMWF). GrADS software were used for the composition of the meteorological fields and simulated vertical profiles. Period of study in the Campina Grande and Maceio was from 2008 to 2016, and in Porto Alegre from 2008 to 2009. From 20 fog events identified in the Maceio only 1 was the intense case. Also, one event was identified by the satellite data with the duration superior than observed by METAR code. From 105 events identified in Campina Grande, 18 were intense. Likewise, 4 events were identified by the satellite data with the duration of two events different than observed. Twenty-three events were recorded in Porto Alegre of which 4 were intense. Fifteen events from 23 were identified by the satellite data where start time of 11 events were different than by METAR. Moreover all 15 events presented a different duration, than by METAR. The PAFOG model predicted fog in Maceio (June 11th, 2010) 12 hours in advance and in Porto Alegre (July 5th, 2008) 15 hours in advance. Then this forecast was interrupted for 4 hours. PAFOG model did not forecast the visibility decrease in Campina Grande (August 21st, 2009) 6 hours in advance. For example, 24 hours forecast was not completed because of fog reached the upper layer above 400m. The results can be used in the elaboration of a fog forecasting method for the Brazilian Northeast and improvement of the method for Porto Alegre.