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THE INTRODUCTION OF A LOCAL OBJECTIVE ANALYSIS MODULE IN TEH NUMERICAL FORECAST SYSTEM AT THE BRAZILIAN national WEATHER SERVICE

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1. ABSTRACT

The Brazilian National Weather Service (INMET) started its first regional short-term operational numerical modeling system in late 1999. The focus of INMET's NWP team has been broader then just the prognostic model installed, the High Resolution Model (HRM) developed at the German Weather Service (DWD). With a staff of 4 people, INMET's NWP team has been working on several aspects of a forecast system: data decoding, quality control, objective analysis, data assimilation, post-processing, visualization, statistical forecasting (MOS), and model verification.

Following the theme proposed for this conference, this paper will show the preliminary results of the implementation of the Local Analysis and Prediction System (LAPS), developed at NOAA FSL. LAPS is being used to produce an objective analysis for weather monitoring, model initialization, and forecast verification. Currently, the operational model is initialized from the German global model (GME). However, there are several benefits of having a local objective analysis for model initialization, including the advantages of having a data analysis on a grid spacing compatible with that of the forecast model. Currently the HRM is being run with a 25 km horizontal grid spacing, and the GME analysis is done at a 60 km grid spacing. However, the inclusion of shorter scale information has the potential of improving forecast quality, especially in the first hours of forecast.

The implementation of LAPS in INMET uses a mercator projection in a grid covering most of South America and parts of the surrounding Atlantic and Pacific Oceans. The grid spacing is approximately 25 km, therefore similar to the HRM grid spacing. The LAPS and HRM grid points are not coincident because the two systems use different projections.

LAPS integrates data from a background model with virtually every meteorological observation system (satellite, radar, aircraft, rawindsondes, surface stations etc.) in order to generate a high-resolution objective analysis. Whereas now INMET uses solely surface observations and GME data to compose the analysis, in the future other data sources will be integrated, including other background models. Inspection of the results has shown that the analysis will need fine tuning in regions of steep topography before it can be used operationally for HRM initialization and verification. The difference in topography between nearby points of the HRM and LAPS grid over the Andes causes noise when the GME data is interpolated to the LAPS grid, and when the LAPS analysis is prepared for initialization of the HRM.

Although the analysis is not fully satisfactory yet, an experimental 24-hour forecast initialized with the LAPS analysis is carried on daily. Due to the noise in the LAPS analysis, it cannot be used in the non-linear normal mode initialization (NMI) of the HRM because it causes instability. Therefore, in this experimental forecast, the HRM is being initialized without the NMI. The results of the 24 hour forecast have shown that the model is not very sensitive to the different analyses, and the numerical forecasts obtained are similar to the operational ones.

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