

**THE INCLUSION OF HUMIDITY ESTIMATES FROM BRAZILIAN
GROUND-BASED GNSS NETWORK INTO THE CPTEC/INPE GLOBAL
DATA ASSIMILATION SYSTEM**

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ABSTRACT

Although the zenithal tropospheric delay generated in the radio-frequency signal in the ground-based Global Navigation Satellite System (GNSS) receivers should be minimized for geodesic applications, it can be estimated with relative precision and converted in Integrated Water Vapor (IWV) values. These values have shown good quality and their association with GNSS receivers network can mitigate the deficiency for upper tropospheric humidity measurements. In recent years the density of the Brazilian Network for Continuous GNSS Monitoring (RBMC) has increased significantly, doubling the number of ground-based GNSS receivers during the last two years. With continued investment by Brazilian agencies in support of ongoing research, the number of receivers available over Brazilian territory should double again over the next 2 years, reaching a total of 150. Those investments have also been applied to the acquisition of meteorological sensors and real time data transmission systems. One of the main goals of these research projects is the continuous monitoring of the IWV to improve numerical weather prediction over the Brazilian territory. The IWV values from some selected GNSS receivers are used in this work as supplemental source of humidity in the data assimilation system at the CPTEC-INPE. The main objective of this work is to investigate the contribution of humidity values from GNSS receivers to the improvement of the quality of the analyses and forecasts. In order to assess the impact of these datasets on the performance of CPTEC/INPE's assimilation system, experiments with and without the inclusion of humidity values from GNSS receivers were conducted. Other studies by the data assimilation group at CPTEC/INPE are in progress, such as the inclusion of radioccultation GNSS profiles and the operational implementation of a Local Ensemble Transform Kalman Filter methodology in collaboration with the University of Maryland, College Park, USA. Additional studies will be necessary for the future integration of all these developments, which will contribute to CPTEC/INPE's ability to generate improved forecasts over South America.