

# **Inclusion of *Pseudo-Temps* on Inicial Condition of CPTEC-AGCM: analysis and forecasting of hurricane Catarina**

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The transition of an extratropical cyclone formed along the coast of Southeastern Brazil to a tropical cyclone March 2004 gave origin to the first hurricane seen at South Atlantic, named Catarina. During 20<sup>th</sup> to 23<sup>rd</sup> March a cold front crossing that region, leading to the formation of a perturbation over the ocean that propagated westward from 23<sup>rd</sup> to 27<sup>th</sup>. The system hit the Brazilian Southern coast between 27<sup>th</sup> to 28<sup>th</sup> March, causing destruction and deaths. In that occasion, the model forecasts underestimated the system because do not have sufficiently data observations over the South Atlantic to represent better the atmospheric patterns. The conventional observation network is insufficient in this region causing not realistic representation in the initial conditions of the models. The present study is performed to verify the inclusion in the Data Assimilation System (DAS) of the Center for Weather Prediction and Climate Studies (CPTEC) removed vertical profiles (*Pseudo-Temps*) from National Centers for Environmental Prediction (NCEP) analysis over the South Atlantic. The DAS implemented at CPTEC is the Physical-space Statistical Analysis System (PSAS). The *Pseudo-Temps* data were included to prepare the initial conditions of the Atmosphere Global Circulation Model (AGCM) to verify the impact on the Catarina system representation by the CPTEC-AGCM. Two experiments were performed: one without *Pseudo-Temps* data (control) and another one including these data (experiment). Surface wind, wind in 850 hPa, vorticity cross sections and sea level pressure (SLP) of the control and experiment were evaluated. The results indicated that only in the analysis and in 24-forecast model the tropical cyclone circulation was simulated. After this forecast the model not presented the system. As in the analysis how as in the forecasts the transition of the extratropical cyclone to a tropical cyclone is better represented in the experiment. In general the control wind and SLP fields at 06 UTC and 18 UTC showed a small skill to represent the Catarina's circulation. On the other hand the experiment represented the Catarina in all times. The control and experiment vorticity cross section fields showed that only in the analysis the cyclonic vorticity associated is seen. The *Pseudo-Temps* inclusion on the CPTEC-DAS improved the analysis and the 24-forecast of the Catarina. The results encourage the use of the *Pseudo-Temps* how a way to increase the quality analysis of the AGCM-CPTEC and consequently contribute to best forecasts of systems how hurricane Catarina.