



IMPACT OF THE EXTRATROPICS EOF-PERTURBATION MODES IN THE CPTEC ENSEMBLE WEATHER FORECAST



Antônio Marcos Mendonça (mendonca@cptec.inpe.br)
José Paulo Bonatti (bonatti@cptec.inpe.br)

Center for Weather Forecasting and Climate Studies - CPTEC
National Institute for Space Research - INPE
Cachoeira Paulista, São Paulo, Brazil

INTRODUCTION

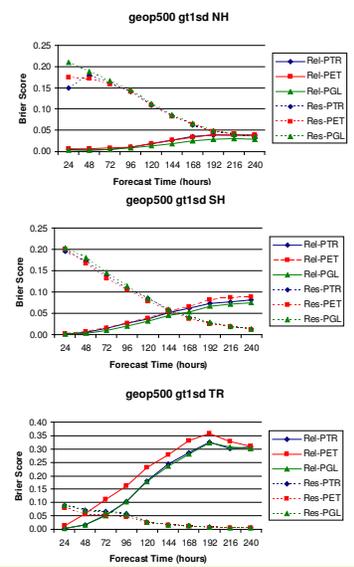
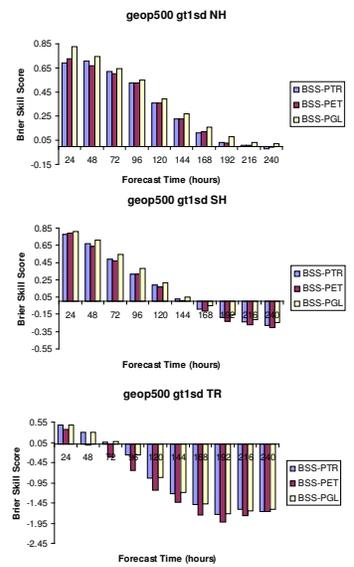
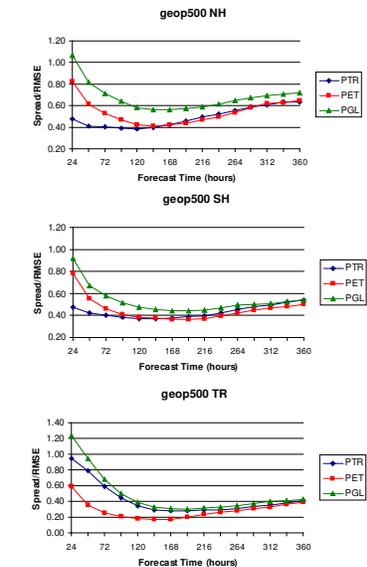
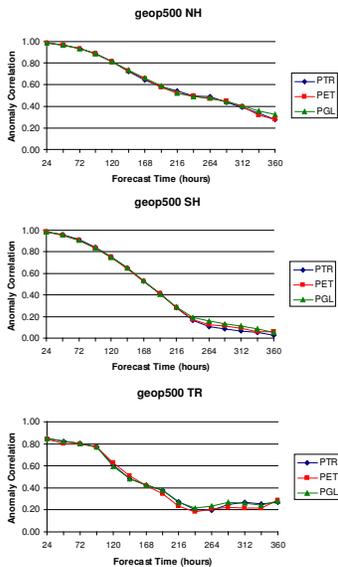
The ensemble weather forecasting started operationally at the Center for Weather Forecasting and Climate Studies (CPTEC) in October 2001. The EOF-based perturbations method (Zhang, 1997; Zhang and Krishnamurti, 1999; Coutinho, 1999) was used to generate the perturbed initial conditions. Since the implementation the initial perturbations has been calculated for a tropical atmosphere belt (0° - 360°W; 45°S - 30°N). In this study, the EOF-method is applied to perturb the midlatitudes in order to evaluate the performance of the CPTEC ensemble prediction system (EPS) with three different configurations of the perturbed initial conditions.

EXPERIMENTS DESIGN

It was performed three experiments:

- Experiment PTR: this experiment represents the configuration of operational initial condition perturbations used currently to generate the ensemble forecasting at CPTEC. The perturbations are computed and applied only to tropical region;
- Experiment PET: the EOF-method is used to compute perturbations in midlatitudes. It is not applied perturbations in the tropics;
- Experiment PGL: the perturbations are computed to tropics and midlatitudes separately and applied simultaneously to the initial conditions.

RESULTS



Average anomaly correlation of 500-hPa geopotential height ensemble mean forecasts. a) Northern Hemisphere; b) Southern Hemisphere; c) Tropics.

Average ratio of ensemble spread over RMSE of ensemble mean for 500-hPa geopotential height forecasts. a) Northern Hemisphere; b) Southern Hemisphere; c) Tropics.

Average Brier Skill Score for 500-hPa geopotential height forecasts. a) Northern Hemisphere; b) Southern Hemisphere; c) Tropics. Probability intervals is determined according the number of ensemble members.

Average reliability and resolution components of the Brier Score for 500-hPa geopotential height forecasts. a) Northern Hemisphere; b) Southern Hemisphere; c) Tropics. Probability intervals is determined according the number of ensemble members.

CONCLUSIONS

It is verified that the experiment in which is applied perturbations in the extratropics simultaneously with perturbations in the tropics is the configuration that present better results. This result is not a complete surprise, since perturbations in middle latitudes tend to increase more quickly than perturbations in the tropical region, contributing to increase the spread of the forecasts and improving the statistical indexes that assess the probability forecast quality. However these results suggest that EOF-method, although originally had been developed to produce perturbations in the tropical region, it can also be used with relative success to produce perturbations in midlatitudes.

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