

Name: Claudine Dereczynski

claudine@acd.ufrj.br

IGEO/UFRJ

Praia de Botafogo, 528 - Bloco C/402 - Botafogo - Rio de Janeiro - RJ - 22250-040

Country: Brazil

Title: Evaluation of Seasonal Ensemble Precipitation Hindcasts at Upper São Francisco River in Brazil

Additional authors: T M Weber (1), R H S Souza (1), S C Chou (2), J F Bustamante (2), R M G Vieira (2), A J P Silva (2), A C Paiva Neto (3)

Additional Affiliations: (1) IGEO/UFRJ, (2) CPTEC/INPE, (3) CEMIG

Abstract:

Seasonal ensemble hindcasts for the rainy season over São Francisco River Basin, upstream Três Marias Hydroelectric Power Plant (HPP) in Minas Gerais, Brazil, are evaluated in this work. The energy generated in Três Marias HPP contributes with 23% of the energy consumed by Northeast Brazil. The objective of this work is to investigate the skill of the Eta model seasonal rainfall forecasts to serve as input for the energy planning in order to optimize the production, transmission, and distribution of energy. The hindcasts are initiated in 5 consecutive days from 13, 14, 15, 16 and 17th October of the ten years, 2001-2010; the integrations end on the 28th of February of the following years. The signal to noise ratio showed low predictability in the area (values ranging from 0.4 to 0.8). In general precipitation was underestimated and the Root Mean Square Error (313 mm) was high, almost twice its standard deviation. The forecasts were not able to capture the strong interannual variability of precipitation which was observed in the region. The Category Precipitation Hit Index constructed to measure the degree of agreement between the sign of the forecast anomaly and the sign of the observed anomaly of precipitation, of about 33% was considered low. Although, during the 10 years studied, the ensemble mean correctly predicted the precipitation anomaly in 5 years: 2001, 2002, 2004, 2005 and 2006. In conclusion, despite the low seasonal predictability at subtropical regions, Eta-15km model can be used to predict the anomaly signal of precipitation in the studied region. Future research will investigate the model forecast behavior in La Niña years (2007 and 2010) as it was observed convergence of all ensemble members of the forecasts. In addition, the relation between the hindcasts errors for the region and the occurrence of La Niña years will be investigated.

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