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PRECIPITATION SEASONAL HINDCASTS USING DIFFERENT Eta MODEL VERSIONS OVER SOUTH AMERICA

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Seasonal forecasts over South America using the Eta Model have been produced on a monthly basis since 2002 at CPTEC. A new version of the Eta Model, including the introduction of piecewise-linear vertical advection of dynamic variables; vapor and hydrometeor loading in the hydrostatic equation, and changes aimed at refining the convection schemes available in the Eta, was developed to carried out seasonal forecasts. Four combinations of physics were set up: the first one using Betts-Miller-Janjic convection scheme together with Zhao microphysics scheme; the second one using Betts-Miller-Janjic convection scheme and Ferrier microphysics scheme; the third one using Kain-Fritsch convection scheme and Ferrier microphysics scheme; and the last one using a modified Kain-Fritsch convection scheme and Ferrier microphysics scheme. At longer integration model tends to show some drifts and systematic errors. The main objective of this work is to determine these errors and evaluate each model version's ability to capture inter-annual variability. For this the model climatology of each version was built based on 10-year seasonal hindcasts. This climatology can be later used to extract the anomaly from the seasonal forecasts. The Eta Model was configured, with 40-km horizontal resolution and 38 layers, to cover a domain which includes South America, most of Central America and South Atlantic Ocean. The runs used initial and lateral conditions provided by CPTEC T062L28 GCM. Anomaly persisted sea surface temperature was daily updated during the integration. Soil moisture was initialized from a monthly mean data and the seasonal climatology of albedo was used.
The model was run for the years 2001 until 2010. The forecast length time was 4.5 months. The monthly forecasts were evaluated. Results are shown for two seasons: December-January-February (DJF) and June-July-August (JJA), which are the rainy and dry seasons, respectively, over most of South America. The systematic errors of the regional Eta model were identified for each version. The pattern of the 10-year model climatology of precipitation for each version was compared with surface observation. The results show that all versions are able to predict reasonably well the precipitation occurred.