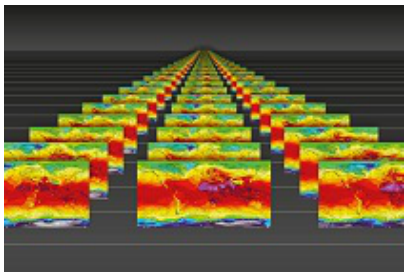

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Performance of the Brazilian Atmospheric Model for Sub-Seasonal Predictions

The aim of this work is evaluate the sub-seasonal prediction ability of the Brazilian Atmospheric Model (BAM), a general circulation model developed by Brazilian Center for Weather Forecast and Climate Studies (CPTEC in Portuguese). BAM is a spectral model with T126 horizontal resolution and 42 levels in the vertical. Hindcasts were generated for the extended austral summer period (November to May) for the period from 2000 to 2011 (12 years). For each month, 2 start dates were used, the first near the beginning of the month and the second near the middle of the month. The hindcasts were composed of an ensemble with 1 control and 10 perturbed members. An Empiric Orthogonal Function Method was used to produce the perturbed members. Prediction ability was assessed using deterministic and probabilistic metrics for accumulated precipitation and mean 2 metre temperature weekly anomalies. The performance of BAM for the Madden-Julian Oscillation (MJO) was also evaluated. For precipitation, the ensemble mean deterministic assessment showed higher correlation scores during the first week and the scores falls quickly as lead time increased. In the fourth week, positive correlation scores were found only over Equatorial Pacific Ocean regions. High values of conditional bias were identified over the eastern Indian Ocean from the second week lead time onwards. The probabilistic assessment indicated that the produced ensemble predictions can successfully distinguish wet events from dry events up to 4 weeks in advance over tropical regions. This feature was identified through values of the area under the Relative Operating Characteristic (ROC) curve greater than 0.5. BAM showed better prediction ability for 2 metre temperature than precipitation. With respect to the MJO, the ensemble mean predictions produced bivariate correlation values higher than 0.5 up to 20 days lead time. These results show that BAM has similar prediction ability to other models that are part of the subseasonal-to-seasonal prediction project.

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