



Discrimination assessment of empirical, dynamical and combined probabilistic rainy season onset forecasts for São Paulo, Brazil

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Prior information about the likelihood of an early or late onset of the rainy season for a given region is an important societal demand. Several sectors including agriculture, energy production, water management and public health are constantly looking for this information to help strategic decisions. The use of a pre-defined criterion applied to historical rainfall records allows the construction of climatological distributions of rainfall onset dates. The analysis of this historical information allows diagnosis of the historical mean rainy season onset dates, and the earliest and latest onset dates ever observed, which provide preliminary information on patterns or characteristics of wet season onset. However, for practical applications, these climatological characteristics might not be sufficient for strategic decisions. Forecasts indicating whether the rainy season onset is more or less likely to occur earlier or later than the mean onset dates estimated from historical records have the potential to provide important complementary information for decision making. This study investigates the feasibility and presents a discrimination assessment of probabilistic rainy season onset forecasts for São Paulo, Brazil, located in a region with a well defined wet season during the austral summer monsoon period. The forecasts were produced with a) a simple empirical Cox-regression model, b) the dynamical coupled atmosphere-land-surface-ocean-sea-ice model used in the UK Met Office Global Seasonal Forecast System (GloSea5), and c) a procedure that combines the empirical and dynamical model onset forecasts. The identified discrimination ability of the probabilistic assessment of around 75-80% among the three investigated approaches indicates good potential for rainy season onset forecasts for São Paulo.