Global empirical system for probabilistic seasonal climate and fire risk forecasts

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With the onset of global warming, episodes with risks of anomalous weather are becoming more frequent. Forecasts a month to a year ahead remain therefore an important challenge for governments, non-governmental organisations and private companies and is dependent on the availability of reliable forecasts. Most operational seasonal forecasts are made using process-based dynamical models, which are complex, computationally challenging and prone to biases. Empirical forecast approaches built on statistical models to represent physical processes offer an alternative to dynamical systems and can provide either a benchmark for comparison or independent supplementary forecasts. Here, we present an updated version of the relative simple empirical system based on multiple linear regression for producing probabilistic forecasts of seasonal surface air temperature and precipitation (Eden et al., 2015), and expand these to seasonal forecast of monthly drought indices which are used to assess forest fire risk. We evaluate the skill of the forecasting system, and compare our results to the recently released ECMWF System 5 seasonal forecasts in order to assess the (dis)advantages of dynamical vs. empirical statistical models.

Key words: seasonal forecasting, fire weather, empirical, statistical

References:

Eden, J. M., and Coauthors, 2015: *Geosci. Model Dev.*, **8**, 3947-3973