Seasonal predictability of Ethiopian summer rainfall in climate models

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Operational seasonal forecasts and research studies of Ethiopian summer rainfall are mainly based on statistical models and ENSO indices. Here we investigate the seasonal hindcast skill of 11 climate models (from the CHFP) in predicting Ethiopian summer rainfall, and identify the key factors determining differences in skill.

End of April forecasts of the June-August (JJA) rainfall differ strongly between models in skill with correlations of forecasted and observed rainfall ranging from 0 to 0.5. Skill is greatest skill (r>0.6) for the peak of the rainy season in July. The skill of the individual models seems to depend on the prediction skill of sea surface temperatures (SST) and the strength of the teleconnection between Ethiopian summer rainfall and Tropical Pacific SST. The most skillful models both skillfully predict equatorial Pacific SST and represent the teleconnection well, models with poor skill do badly in either or both. Interestingly, the prediction skill of the fraction of the JJA rainfall that is not linearly related to ENSO determines the overall performance of the models' JJA rainfall prediction, and we find the skill in predicting eastern equatorial SST discriminates their skill in predicting Ethiopian rainfall. We will discuss the source of predictability that could be related to non-linear ENSO effects or other ocean regions.