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Title: Analysis of CFSv2's capability to predict short lived extremes in the day 1-45 range

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Abstract:

The forecast of extremes is important for its obvious impact on society. Such forecasts would be impossible a-priori if models have too little variability and too little diversity of flow patterns to produce the type of extremes that are observed. So, regardless of actual forecast skill, in a situation where nature produced an extreme, one must question a model's ability to produce extremes of a certain magnitude and a certain configuration. We will restrict ourselves to the US, this being our society of concern. The variables to be studied are T2m (for heat waves and cold snaps), prate (for floods only, since drought evolves on slower time scales) and surface pressure (as an indicator of strong wind events). The CFSv2 has generated an archive of four times daily 45 day forecasts retrospectively over the period 1999-2009, and this archive has been kept up to date in real time through 2013. As a function of forecast lead, we will study the range of variability as a function of lead time (days 1-45). Does the CFSv2, a state-of-the-art model (but at modest atmospheric resolution) produce extremes that are like nature? This question can be answered, not only for the shorter ranges when some skill can still be expected, but also at longer lead times where skill is zero but, nevertheless, some verisimilitude needs to exist. Such a detailed study may also help to describe how exactly a model approaches its ultimate systematic errors, how they grow initially, overshoot perhaps, and then settle in the model world.

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