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The weather risk attribution forecast for December 2012

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http://www.csag.uct.ac.za/attribution-forecast

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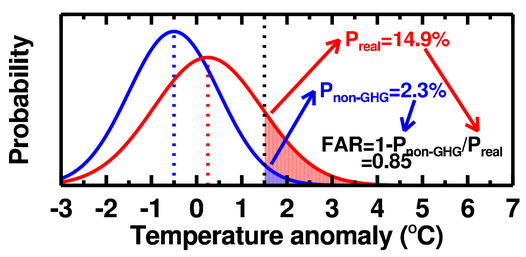
1 Abstract

This poster presents the December 2012 “attribution forecast” from the world’s first objective real-time system for examining how anthropogenic emissions have contributed to weather risk in our current climate. By comparing real seasonal forecasts against parallel counterfactual seasonal forecasts of the climate that might have been had human activities never emitted greenhouse gases, this ”attribution forecast” responds proactively to the question: “Has this event been made more or less frequent by our emissions?”

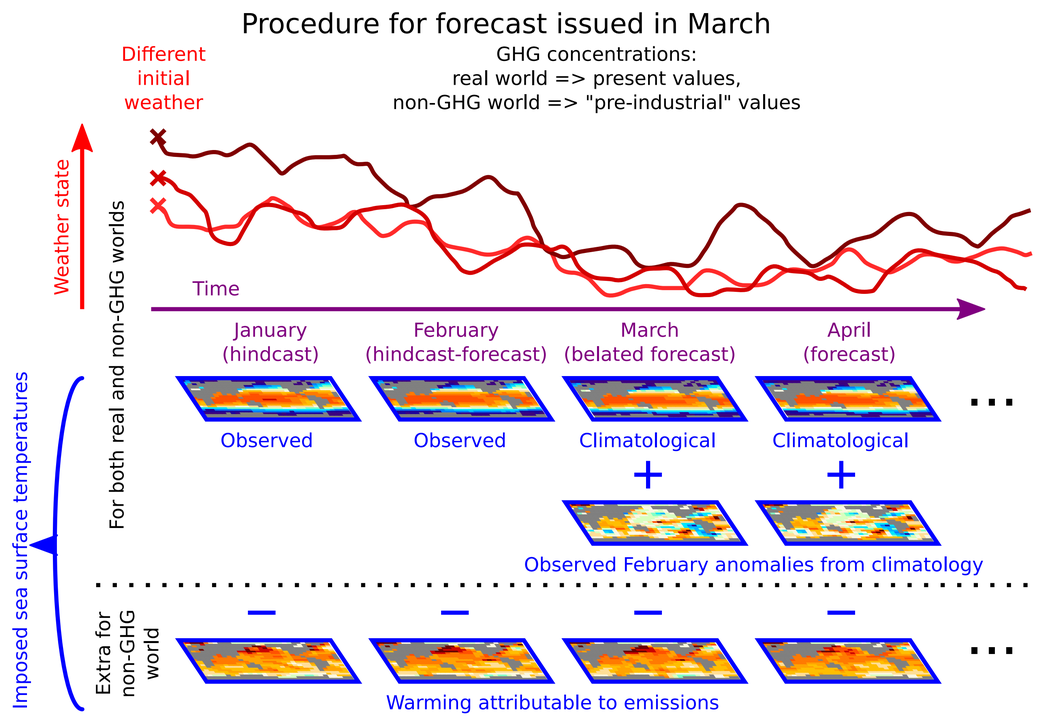
2 Method

This service uses UCT’s standard monthly seasonal forecast and a parallel forecast under a “non-greenhouse-gas” scenario.

The probabilities of pre-defined unusual events are estimated from both forecasts and compared.

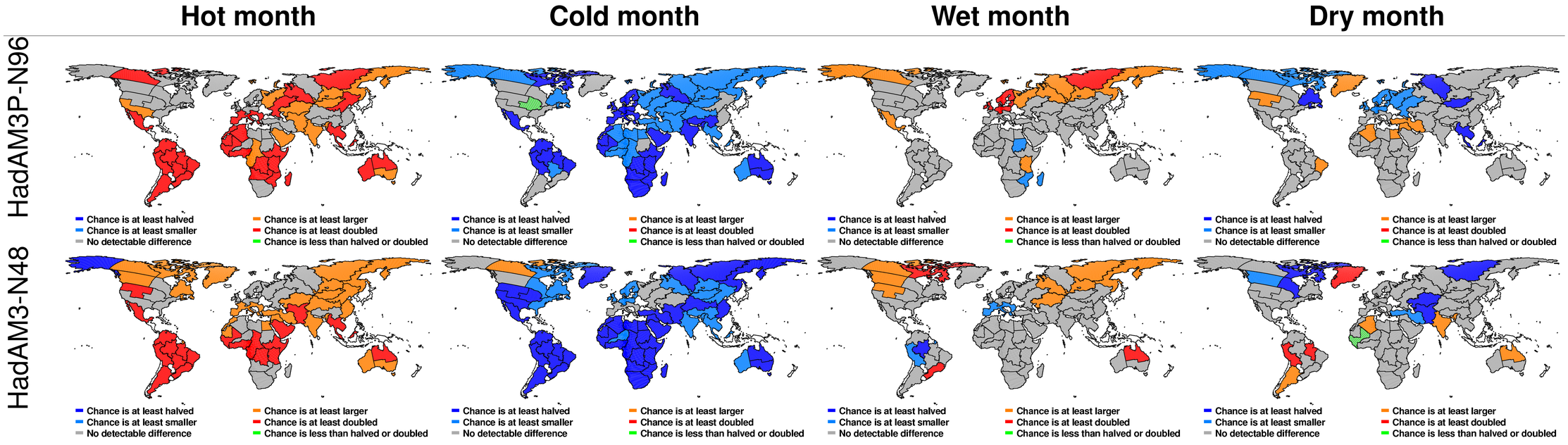


Attribution forecasts are made for unusually (historically 1-in-10 year) hot, cold, wet, and dry months over 58 regions around the world using HadAM3P-N96 and HadAM3-N48. Attribution statements are made regardless of whether an event is forecast (or has occurred in the case of “attribution hindcasts”). A new version was started with the recent September issue, with the most notable change being a change from $\sim$10 Mm^2 to $\sim$2 Mm^2 regions.



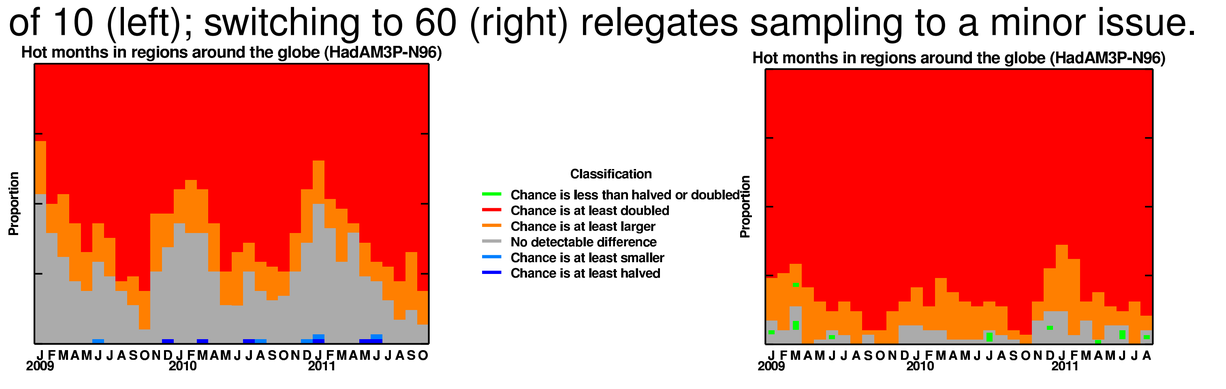
3 The attribution forecast for December, produced in November

Statements concern what can be said with confidence concerning exceedance of various attribution thresholds, rather than estimates of what is most likely.



4 Lessons from experience

- Regions on the order of 10 Mm^2 are not relevant because they do not match the scales of synoptic blocking systems. Attribution signals seem to be emerging for wet and dry events at 2 Mm^2 that were canceled out at 10 Mm^2.
- Shifting to smaller regions is problematic because it becomes easier to select the neighbour that is showing what you would like it to show.
- The two model versions and different forecast lead times have some agreement with each other at the 2 Mm^2 scale.
- Much of the limit in accuracy results from the simulation ensemble size of 10 (left); switching to 60 (right) relegates sampling to a minor issue.



- While generated within a seasonal forecasting platform, this product is not a seasonal forecast product but rather a climate change product.