

First contributions to the Climate of the 20th Century Detection and Attribution Project

GC11B-1003

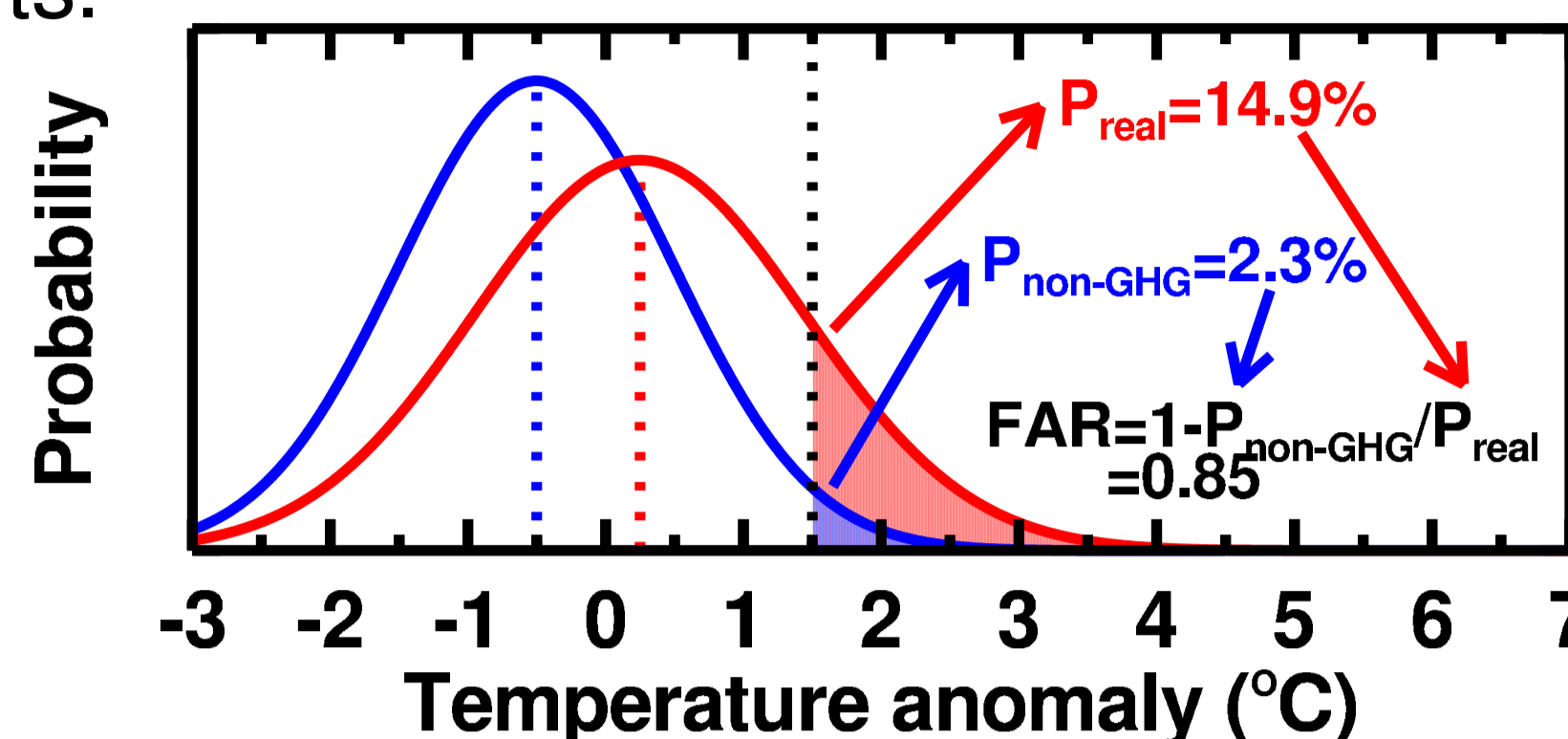
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Abstract

This poster describes the first contributions to the C20C Detection and Attribution Project. This project is a collaboration between modelling groups around the world to produce climate model output suitable for the analysis of trends in extreme weather events and their attribution to anthropogenic activities. The current contributions comprise a pilot exploration of the experimental setup and results as we now start the main experiment.

The C20C D&A project will generate a large pool of data for analysing the anthropogenic contribution to extreme weather events.



The experiment

This pilot experiment has generated simulations for two scenarios of recent climate.

All-Hist: The climate that was experienced

nonGHG-Hist: The climate that might have been experienced had anthropogenic greenhouse gas emissions not occurred

The nonGHG-Hist sea surface temperatures are calculated by subtracting an estimate of the amount and pattern of warming due to greenhouse gas emissions from observed SSTs. This estimate comes from the HadCM3 atmosphere-ocean model, adjusted through an optimal detection analysis against the observed record.

For the CAM5.1-2degree model the change in nonGHG-Hist sea ice is calculated through an empirical model based on observed SST-SIC relationships following Pall et alii (2011).

Details of the model simulations

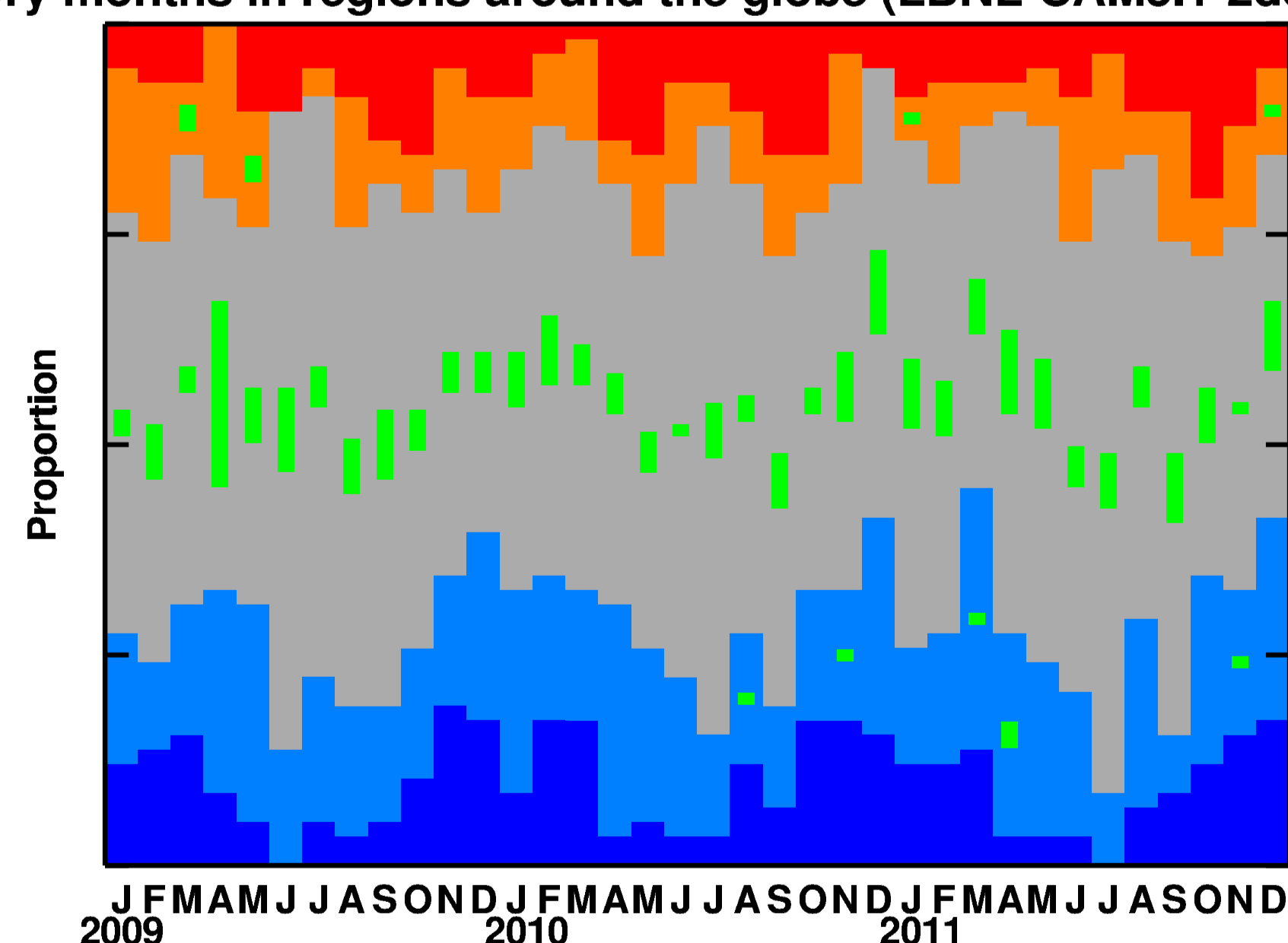
	CAM5.1-2degree	HadAM3P-N96
All-Hist		
No. of sims	36 (1959-2007) 51 (2008-2011)	10 (1960-2008) 60 (2009-2011)
GHG-forcing	As observed	As observed
Aer, Vol, Sol forcing	As observed	Not included
SSTs	As observed	As observed
Sea ice	As observed	Climatology
nonGHG-Hist(HadCM3-p50)		
No. of sims	51 (2008-2011)	60 (2009-2011)
GHG-forcing	Pre-industrial value	Pre-industrial value
Aer, Vol, Sol forcing	As observed	Not included
SSTs	As observed minus GHG warming	As observed minus GHG warming
Sea ice	As observed minus GHG retreat	Climatology

Model comparison

For the following plots we have defined 58 regions around the world based on political/economic criteria, each about 2 Mm² large. We can compare the chance of having an unusual event over each region (the historical 1-in-10 year event), and then classify each region based on what we can say with confidence based on the model simulations based on a statistical analysis.

Partitioning of attribution classes for the effect of greenhouse gas emissions on the chance of an unusually dry month.

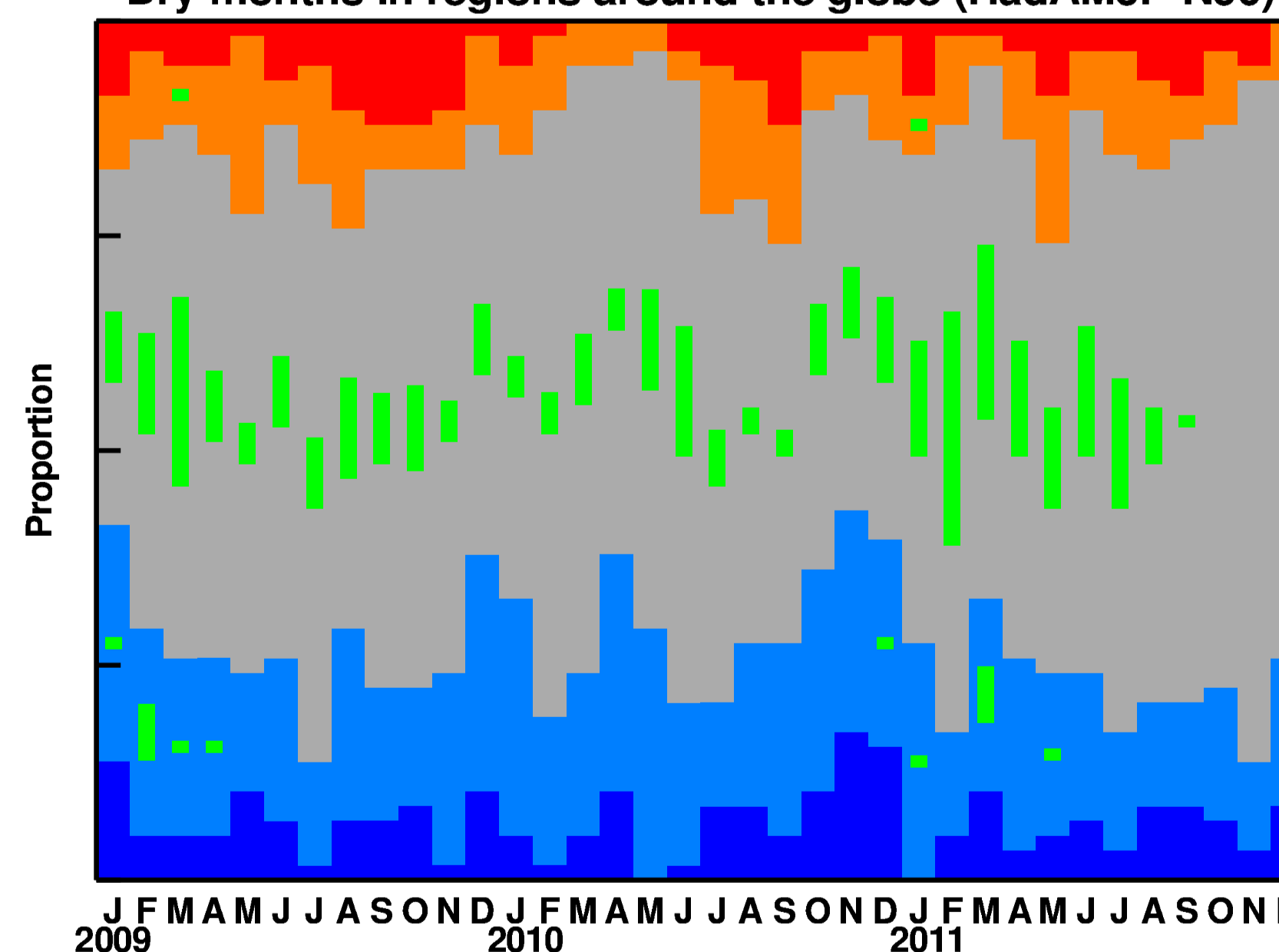
Dry months in regions around the globe (LBNL-CAM5.1-2degree)



Classification

- Chance is less than halved or doubled
- Chance is at least doubled
- Chance is at least larger
- No detectable difference
- Chance is at least smaller
- Chance is at least halved

Dry months in regions around the globe (HadAM3P-N96)



Data at esg.neresc.gov

- Output from these simulations are currently being copied to the C20C Detection and Attribution Project's data portal at esg.neresc.gov.
- More output will become available from these and other models as the C20C D&A project progresses over the coming year.

- The data portal will include derived output, such as extreme value statistics and measures of impacts on non-climatic systems.
- Climate modellers, impact modellers, and analysts are invited to contribute to the C20C D&A project.

Streamflow into the Okavango Basin (HadAM3P-N96)

