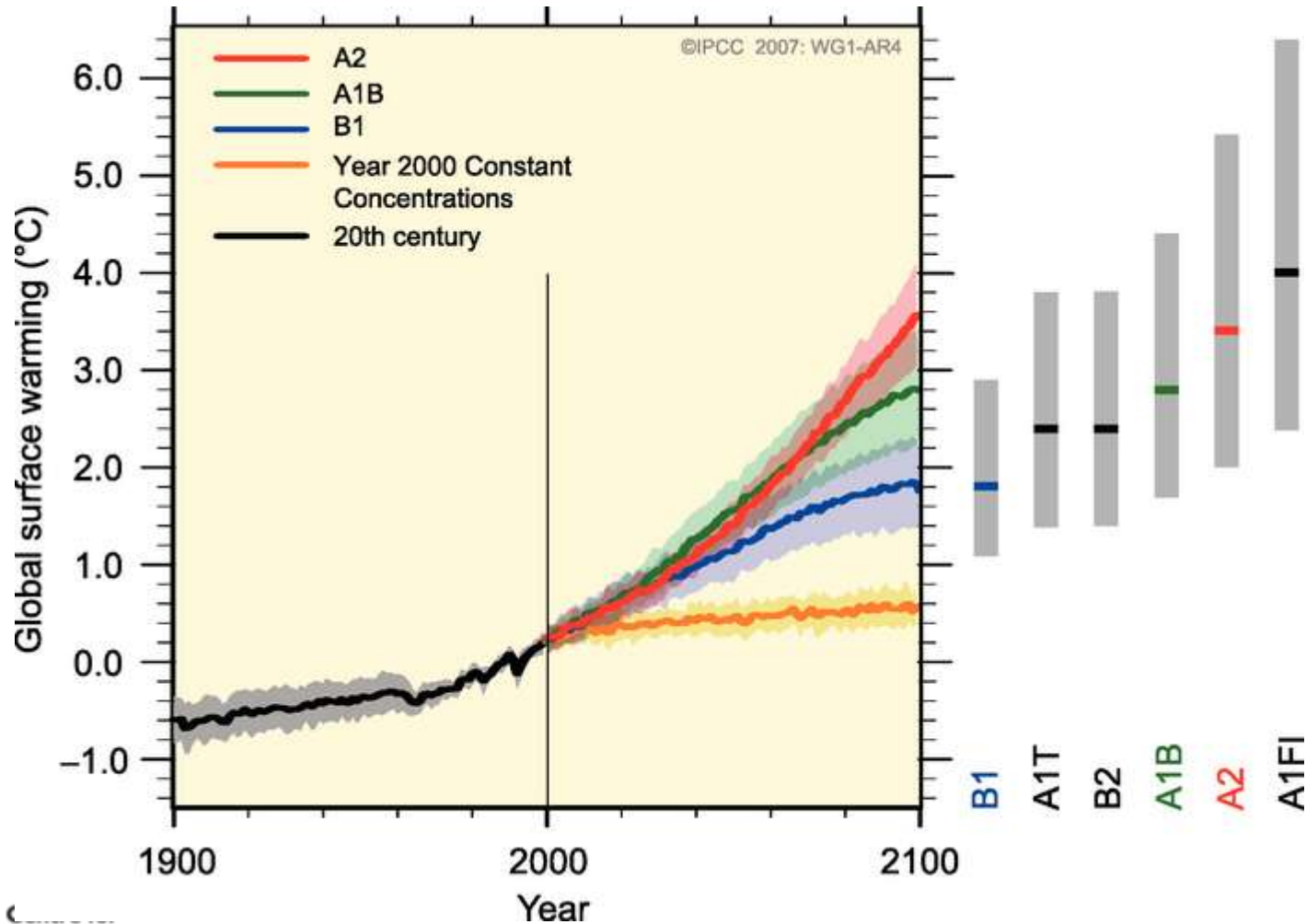


IMOGEN – A QUICK UPDATE

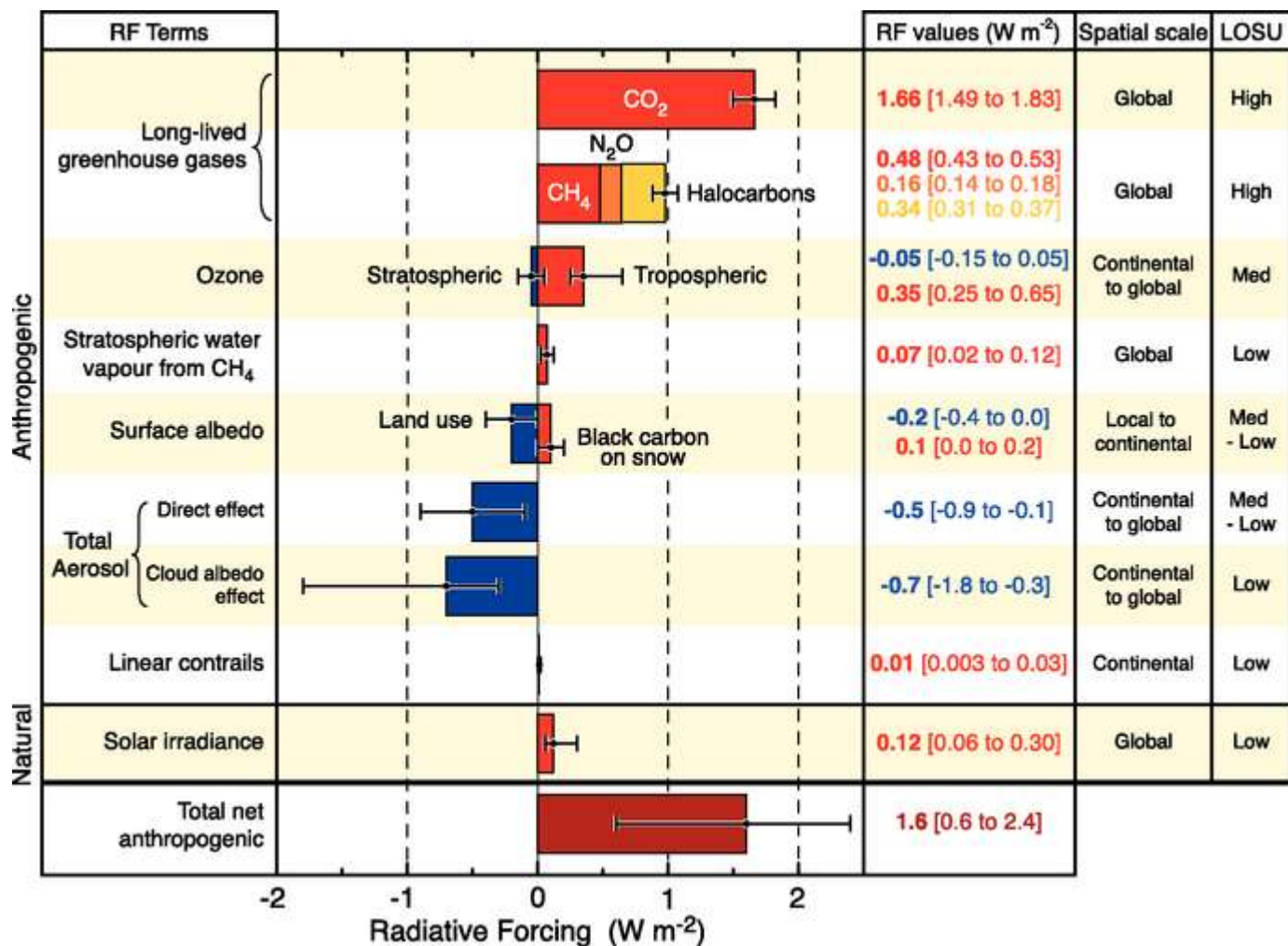
Chris Huntingford and many others including Peter Cox, Przemek Zelazowski, Mark Lomas, Matt Pryor, Lina Mercado, Stephen Sitch, Doug Clark, Nigel Arnell, Andy Wiltshire...

(Jules meeting, 12th January 2012).

IPCC assessment – 22 GCMs submitted

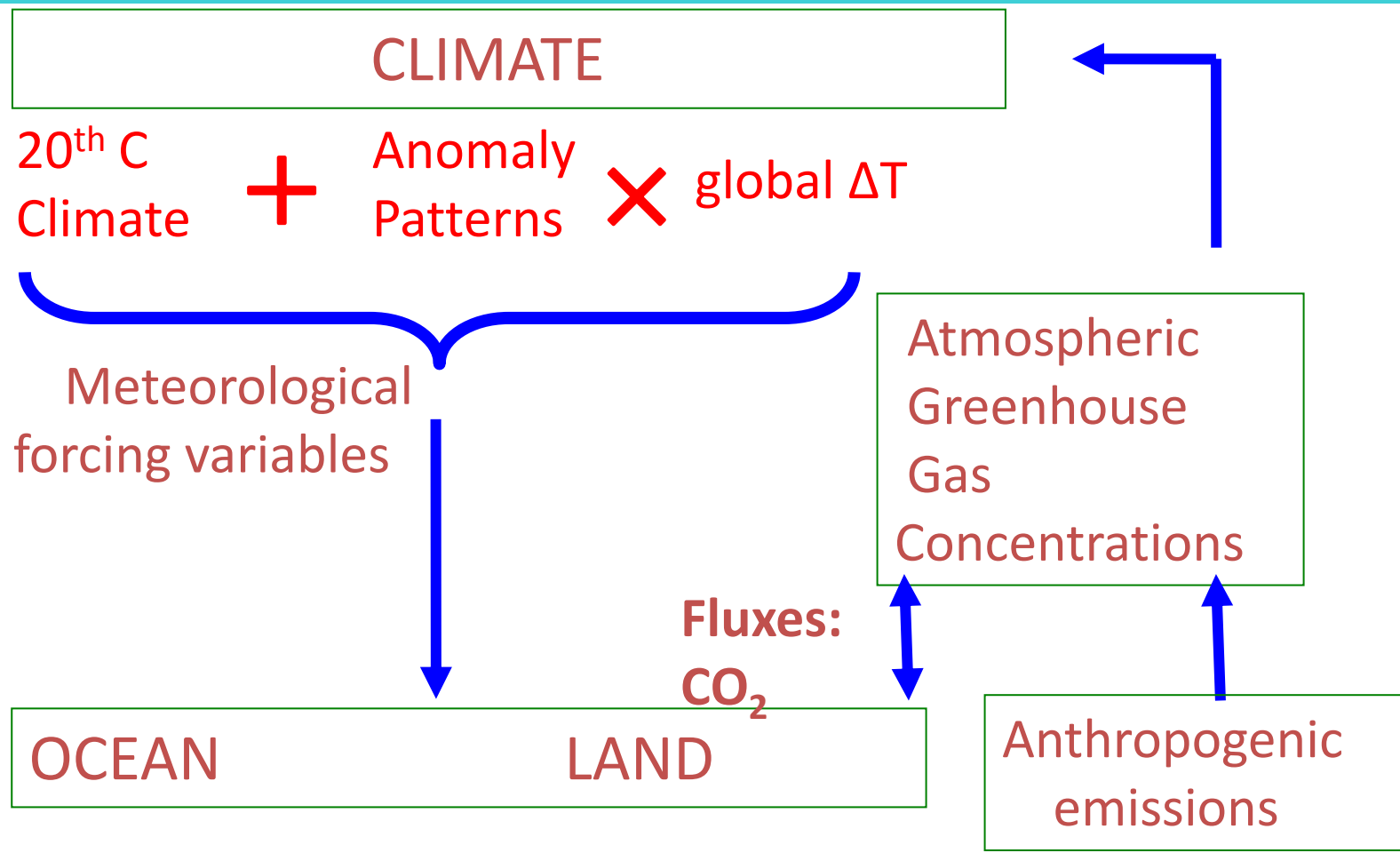


Radiative forcings to present

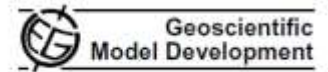


©IPCC 2007: WG1-AR4

IMOGEN as a tool to emulate GCMs



Geosci. Model Dev., 3, 679–687, 2010
www.geosci-model-dev.net/3/679/2010/
doi:10.5194/gmd-3-679-2010
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IMOGEN: an intermediate complexity model to evaluate terrestrial impacts of a changing climate

C. Huntingford¹, B. B. Booth², S. Sitch^{3*}, N. Gedney², J. A. Lowe⁴, S. K. Liddicoat², L. M. Mercado¹, M. J. Best¹, G. P. Weedon¹, R. A. Fisher^{1,4,5*}, M. R. Lomas⁶, P. Good², P. Zelazowski⁶, A. C. Everitt¹, A. C. Spessa⁷, and C. D. Jones⁷

22-GCMs – calibration of patterns

$$\Delta X(i,j,k) = \Delta T(k) * P(i,j)$$

X = Variable of interest

ΔT = Global warming

i = geographical position

j = month

k = decade

Dark respiration peaks, and not as Q_{10} .

Forced with common CO₂ and non-CO₂ radiative forcing – based on SRES A2 and Bern model mapping for CO₂ concentrations.

CRU initial conditions (so GCM biases removed).

Variables needed to force MOSES/TRIFFID (now JULES) land surface model:

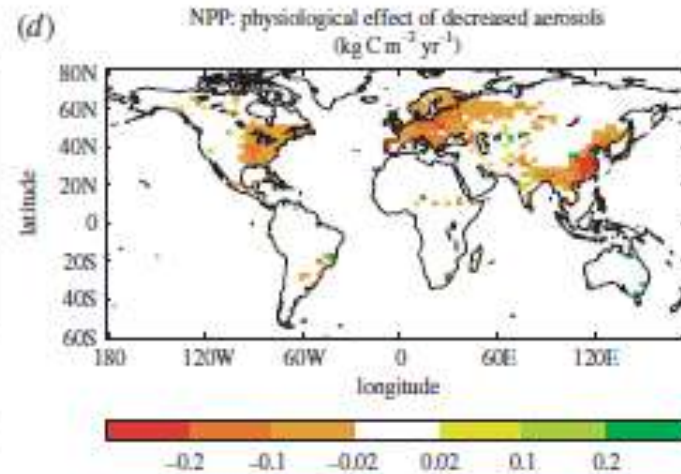
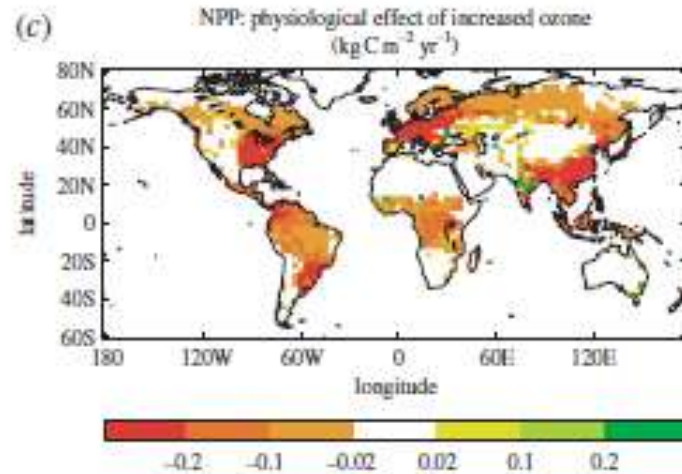
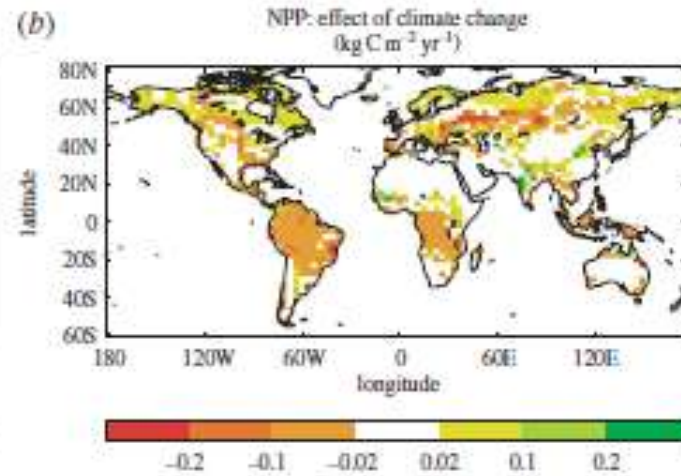
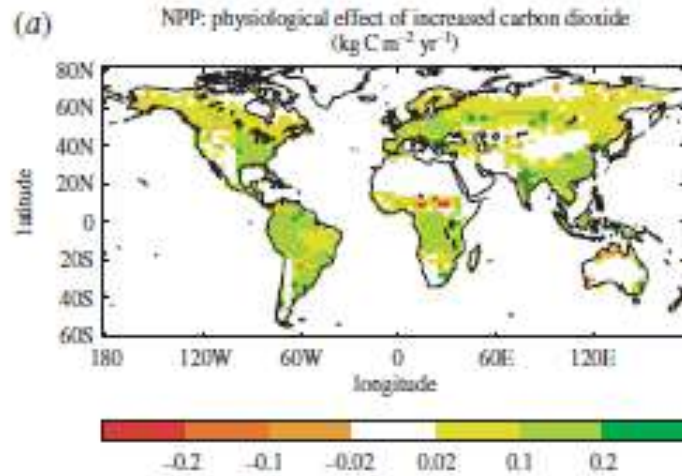
- Temperature
- SW down
- LW down
- Precip
- Windspeed
- Humidity
- Pressure

Original IMOGEN purpose vs actual use.

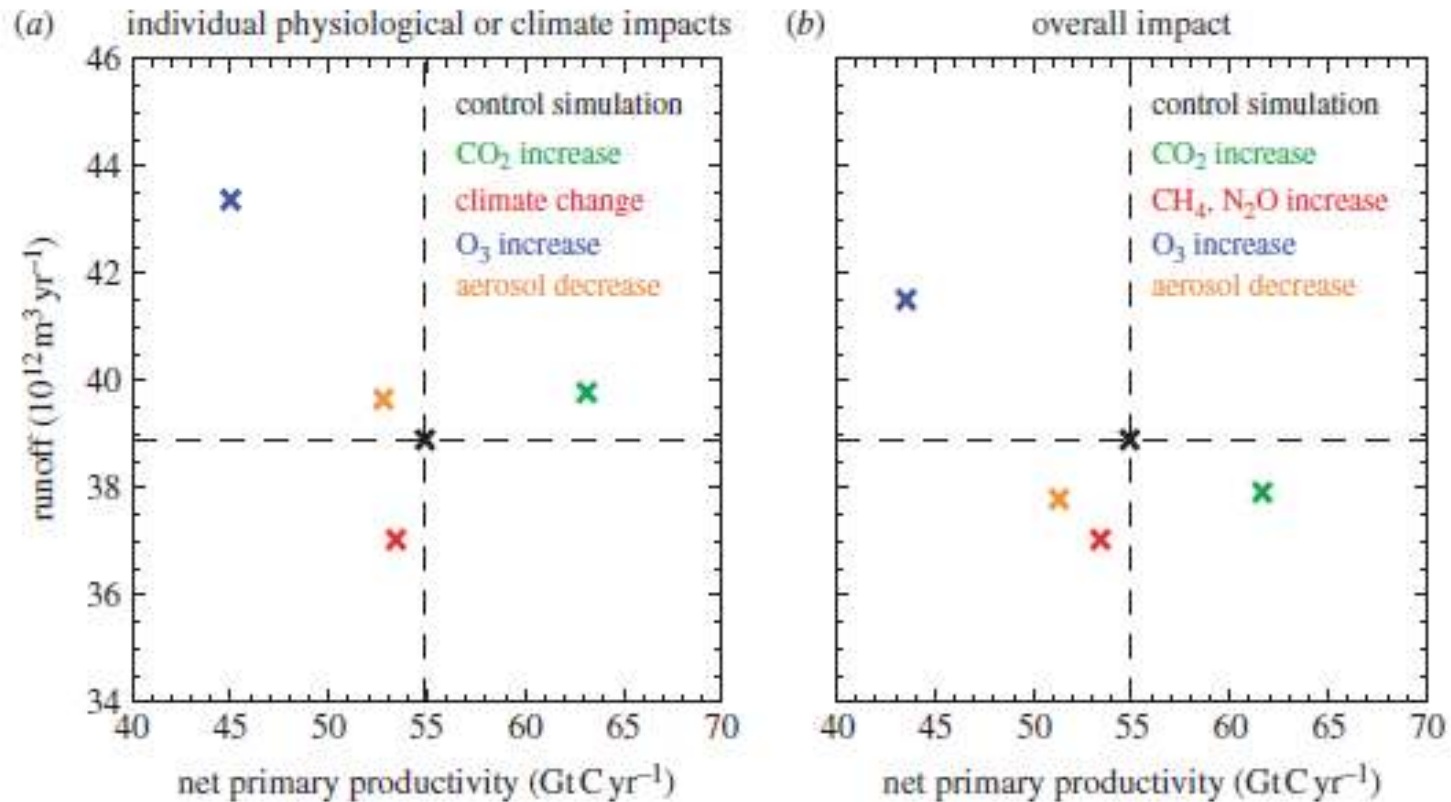
At the start of IMOGEN development, we thought that it would be mainly used to extrapolate away from the few GCMs runs.

In reality, it's been used for impacts assessments and/or testing new things before implementation in full GCMs.

Typical IMOGEN output – here +1 W/m²

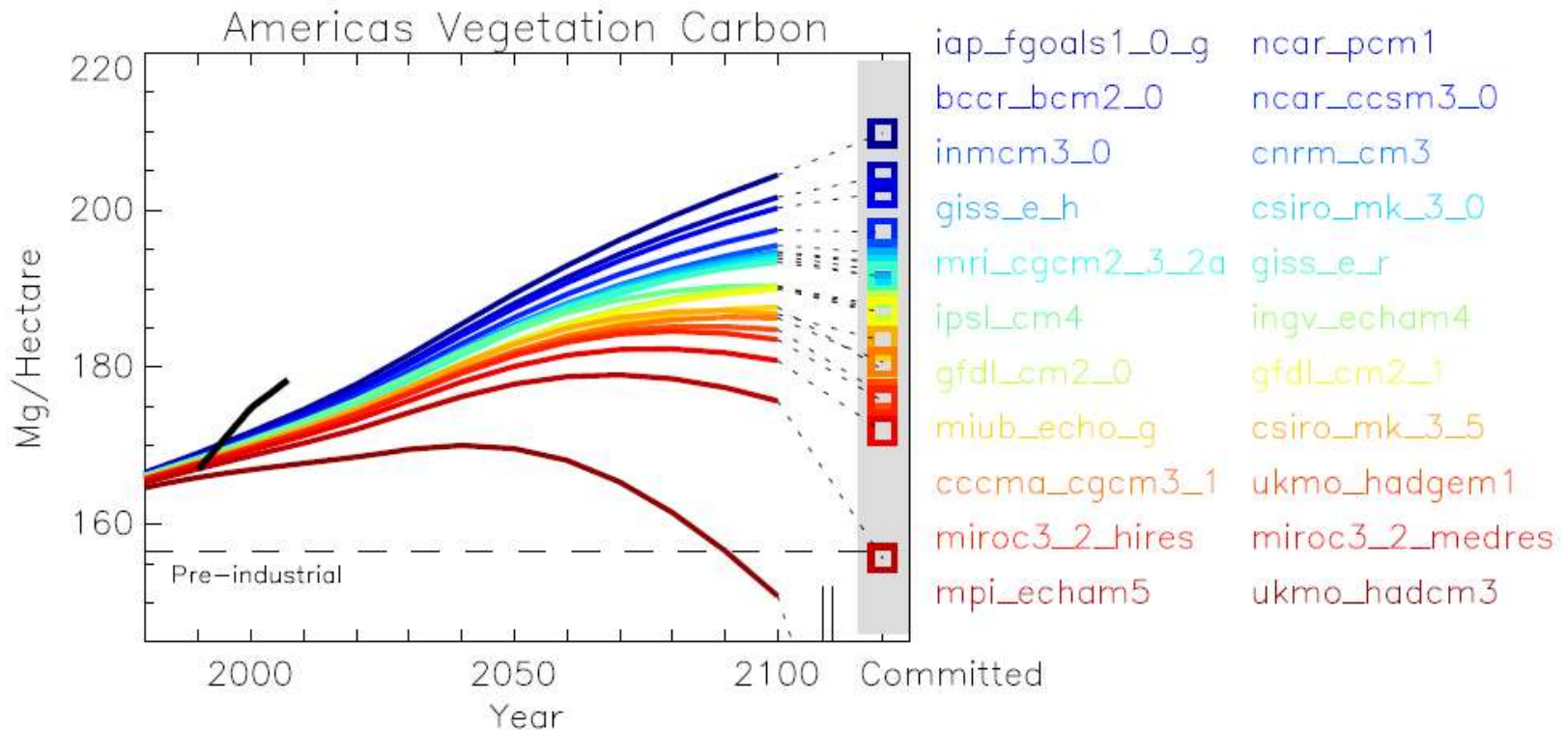


SRES scenarios assume mainly CO₂ up

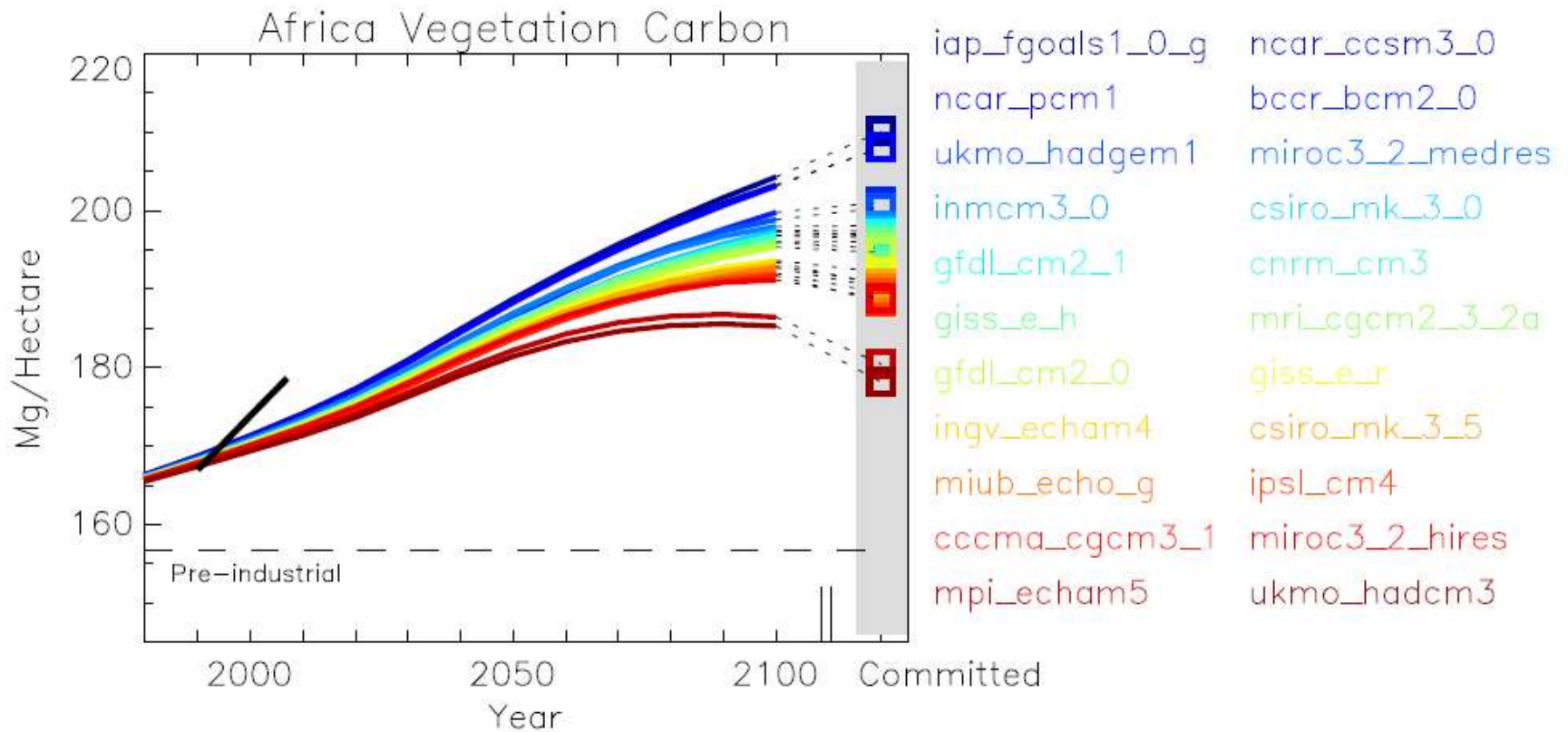


Huntingford et al (2011) *Philos Trans A* 369, 2026-2037.

Amazon results: 22 GCMs.



Africa results: 22 GCMs



A new capability!

“IMOGEN in the CLOUD”

- 60K from DECC to test buying CPU in the cloud, to run IMOGEN.
- Test new land surface configurations/parameterisations.
- Can run multiple DGVMs for multiple climate drivers.
- Implications of new process understanding.

- So it is wide open as to how we might use this capability.

- (Thank you to Bridget Emmett, CEH, for securing these monies).

IMOGEN immediate tasks

- Check reproduces roughly the old IMOGEN-MOSES-TRIFFID framework.
- Check no “spin-up” issues.
- Make sure has the most recent JULES version in it.
- Sweep up a few other queries that have been raised.
- Aim for release in a month or so.

JIM & also is anyone interested in:

Who is JIM, and is he a good partner for my IMOGEN!

We plan to write a “Part C” for JULES documentation, with Przemek as the lead. All welcome to help. This will focus on the 22-patterns and associated EBM vs GCM parameterisation.

Would anyone like to make the initial steps of pattern-scaling for CMIP5? Bribes are available.

Then long-term ideas – (1) merge with CRU, (2) patterns of extremes, (3) does IMOGEN work for long-term stabilisation/“overshoot”? – grateful for Hadley for picking things apart.

Finally:

If it's OK, please just wait a few weeks before using current IMOGEN version released with JULES – until it has been checked thoroughly!

Thanks for listening