Some Challenges for Climate Impact Research in the Arctic

EuRuCAS 2nd Workshop

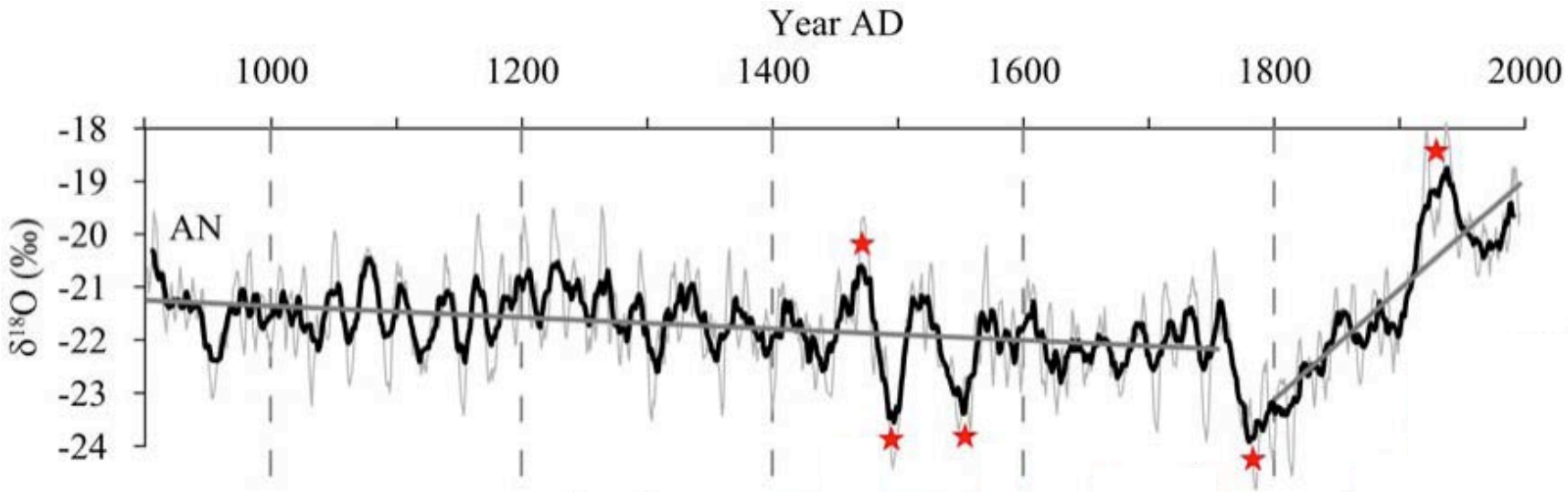
St. Peterburg, 5 November 2013

Armin Haas

IASS POTSDAM

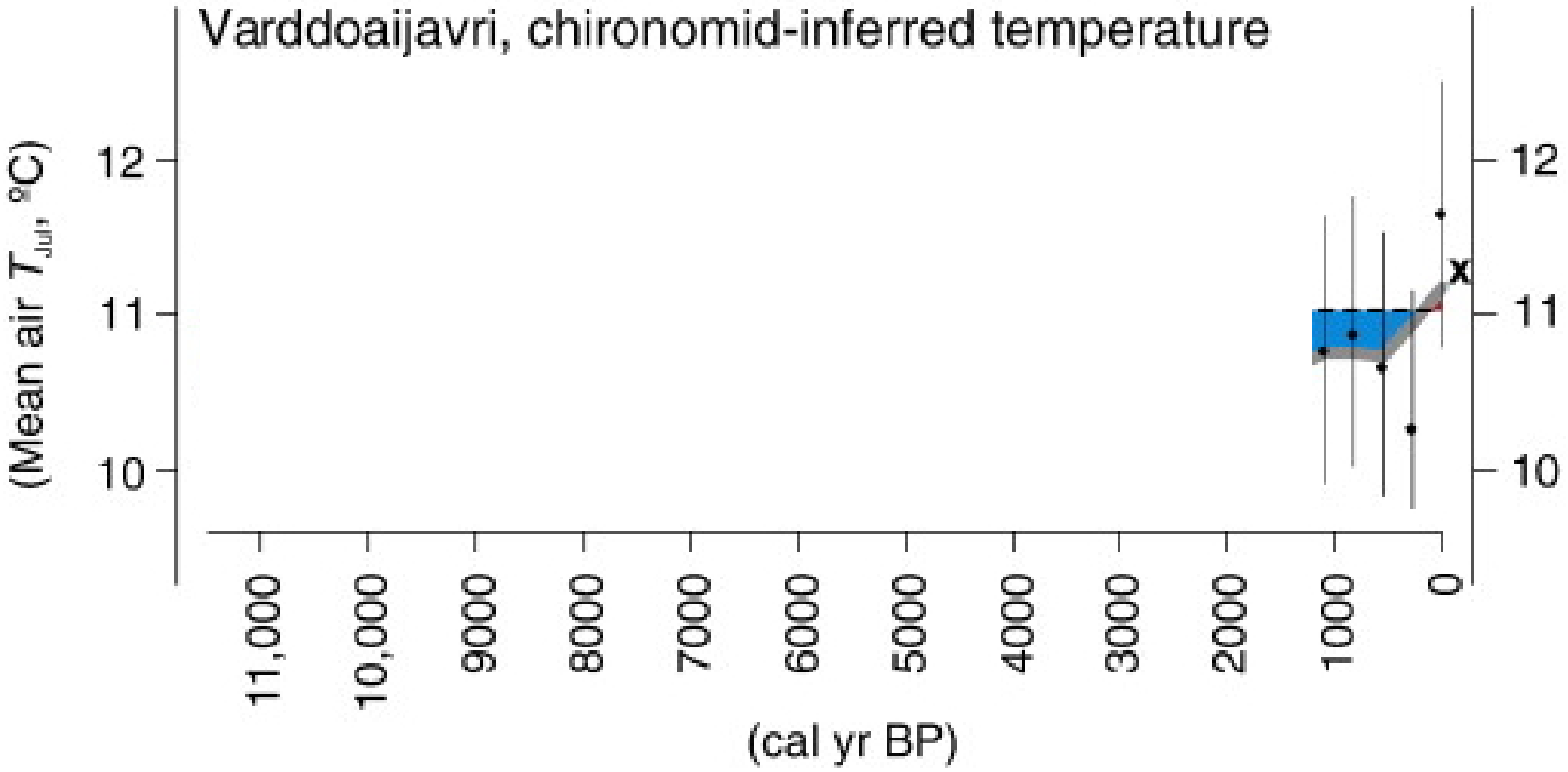
GCF Global Climate Forum

A Hockey Stick?



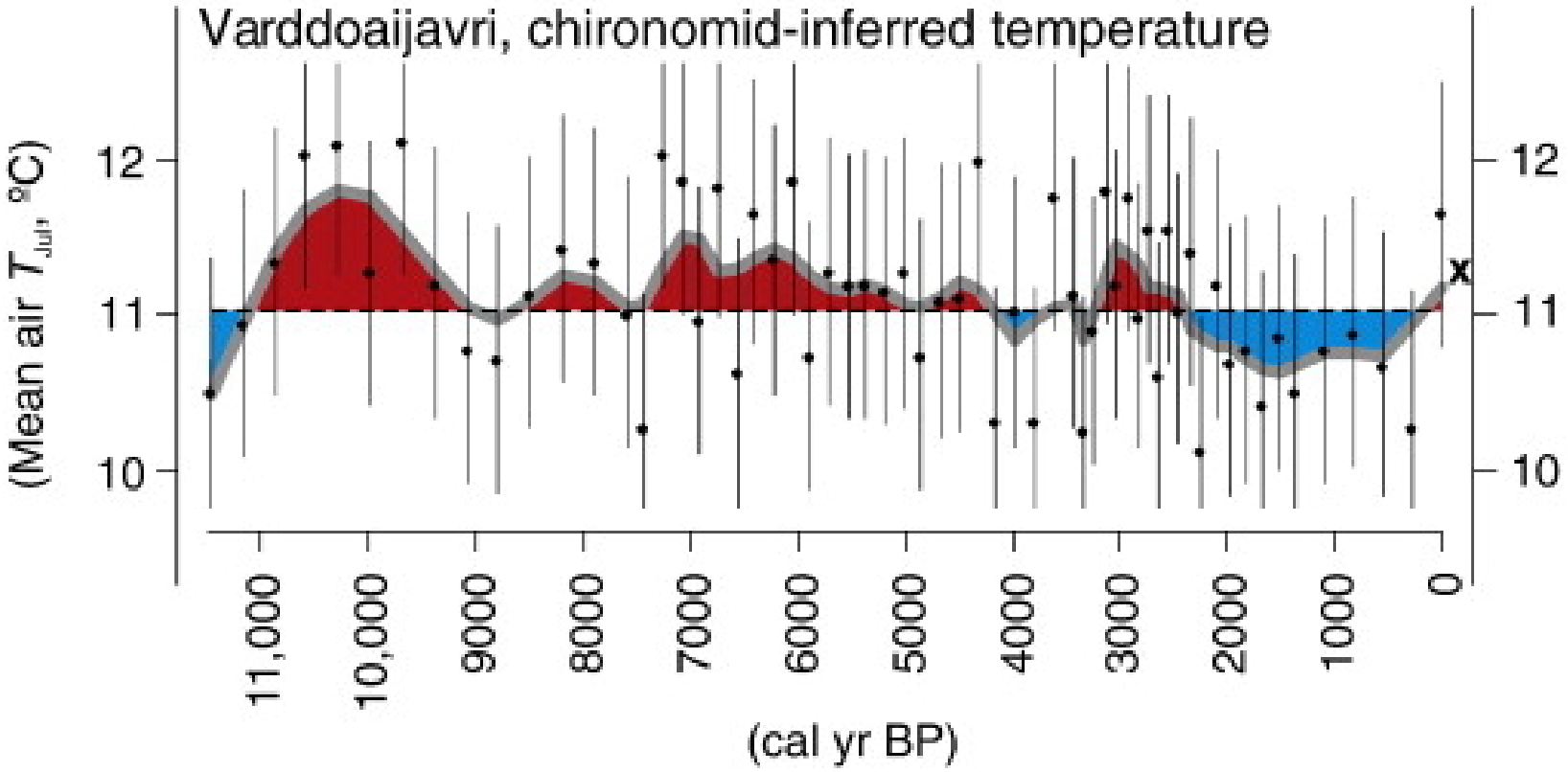
Source: T. Opel, D. Fritzsche, and H. Meyer (2013):
Eurasian Arctic climate over the past millennium as recorded in the Akademii Nauk ice core (Severnaya Zemlya), Climate of the Past, 9, 2379-2389.

A Hockey Stick?



Source: T.P. Luoto, M. Kaukolehto, J. Weckström, A. Korhola, M. Väliranta (2013): New evidence of warm early-Holocene summers in subarctic Finland based on an enhanced regional chironomid-based temperature calibration model, Quaternary Research, DOI:10.1016/j.yqres.2013.09.010.

No Hockey Stick



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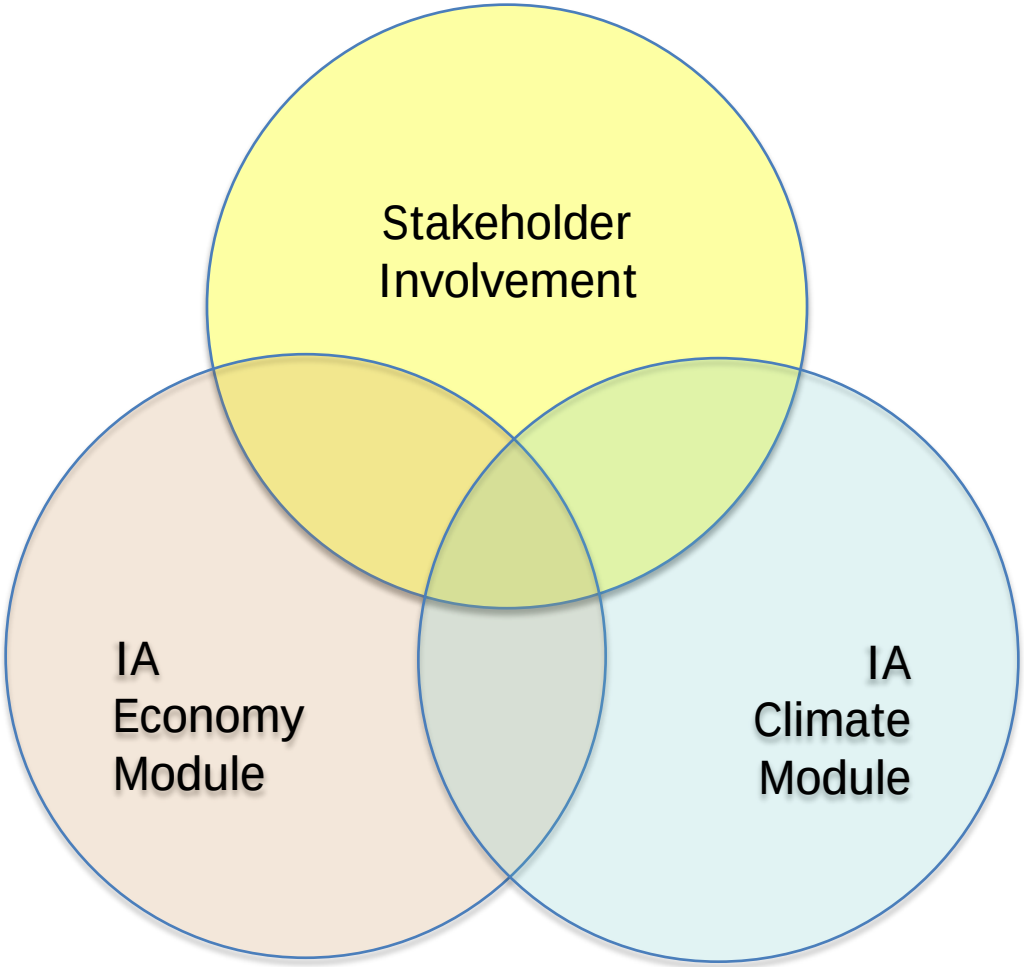
Three Core Challenges



The Stakeholder Challenge

Domain specific languages, mind sets, and success metrics:

- Science
- Business
- Policy
- Media
- NGOs

The Stakeholder Challenge

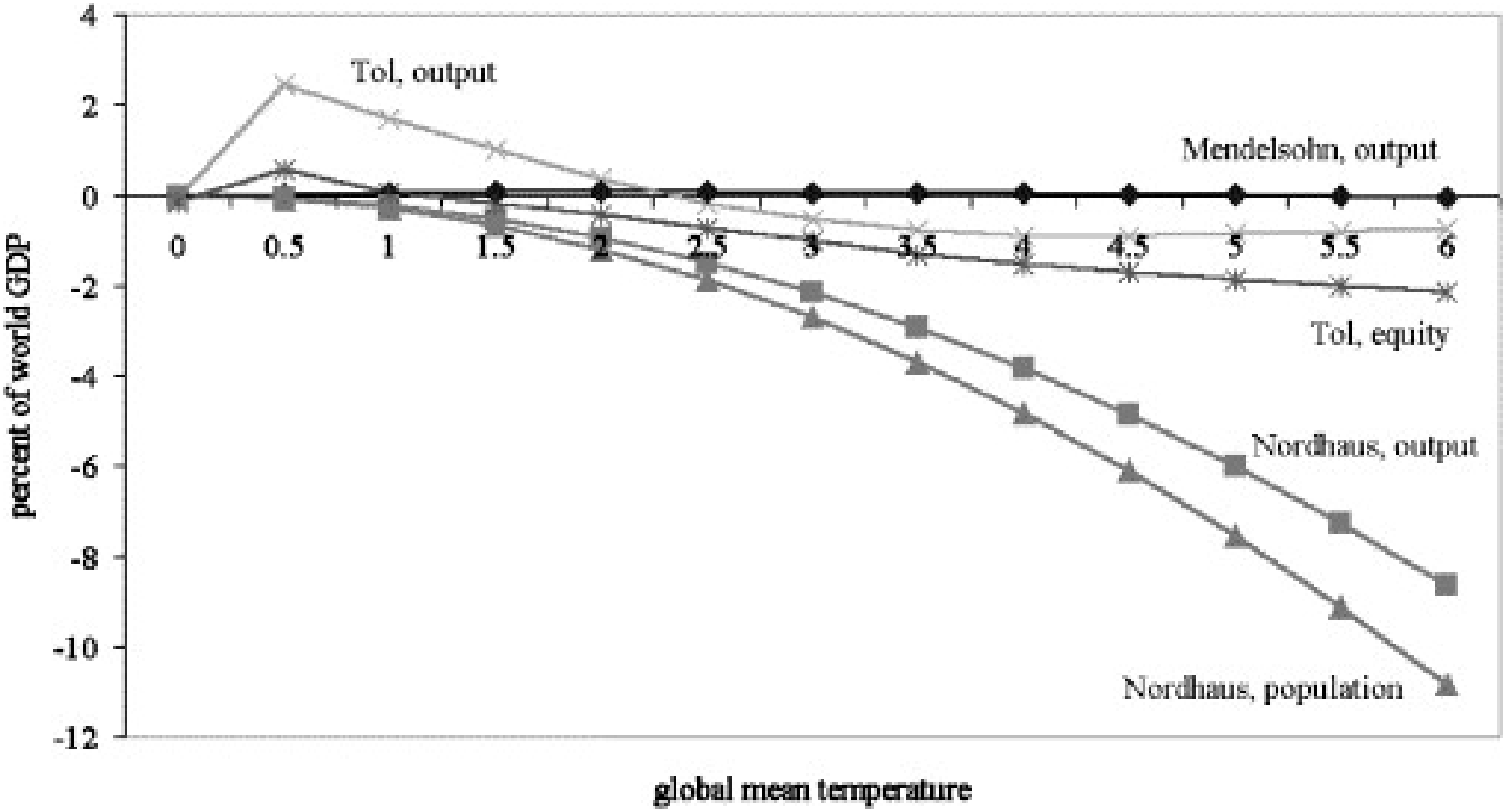
IA – The Economics Challenge

Pindyck (2013): Economic key assumptions in IA models are ad hoc.

- No theoretical foundation.
- No empirical foundation.

Source: R.S. Pindyck (2013): Climate Change Policy: What do the models tell us? Journal of Economic Literature, 51(3), 860-872.

Damage Functions



IA – The Climate Challenge

Michael Ghil (2013):

	Deterministic	Stochastic
Linear		Hasselmann Approach
Nonlinear	Lorenz Approach	Climate System

Source: M. Ghil (2013): A Mathematical Theory of Climate Sensitivity or, How to Deal With Both Anthropogenic Forcing and Natural Variability?

IA – The Climate Challenge

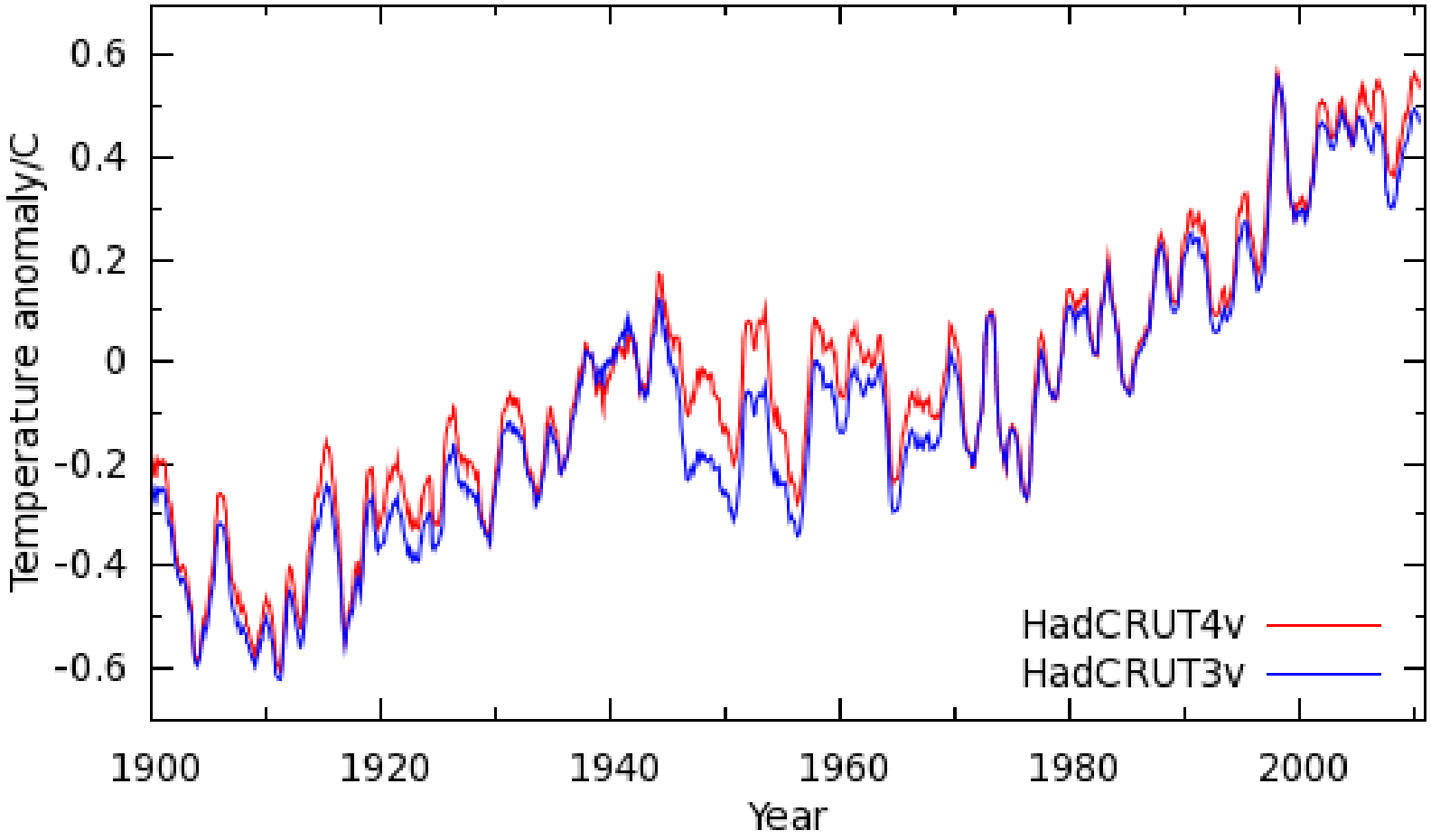
In a genuinely nonlinear stochastic climate system:

- Natural and anthropogenic forcings.
- Endogenous dynamics.
- Stochastic resonance.

$\Rightarrow$Difficult issues:

- Discrimination between trend and oscillation.
- Attribution.

IA – The Climate Challenge



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