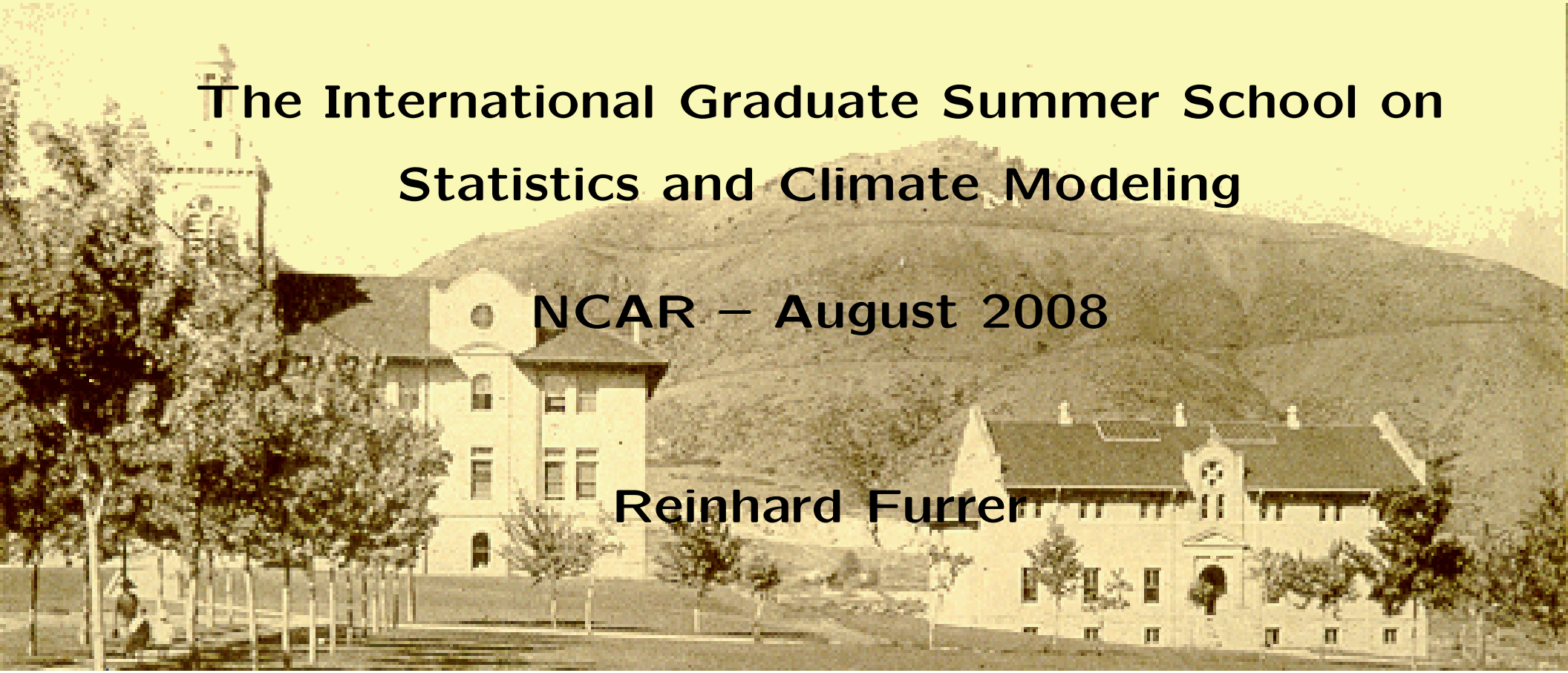
A Bayesian view of climate change: assessing uncertainties of general circulation model projections



The International Graduate Summer School on Statistics and Climate Modeling

NCAR – August 2008

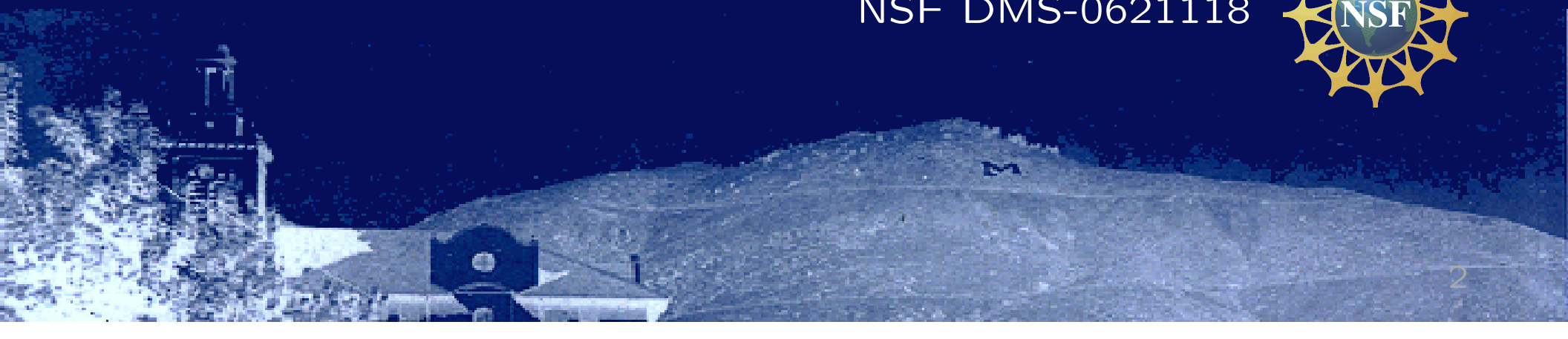
Reinhard Furrer

We present probabilistic projections for spatial patterns of future temperature change using a hierarchical Bayesian model.

Collaboration with: Reto Knutti - ETHZ

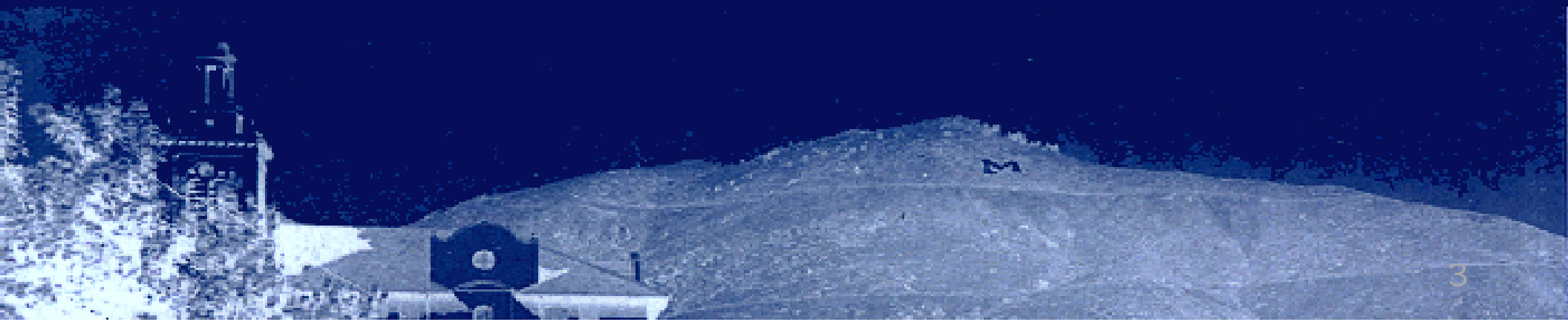
Stephan Sain, Doug Nychka, Claudia Tebaldi,
Jerry Meehl, Linda Mearns, . . . - NCAR

NSF DMS-0621118



Outline of the Talk

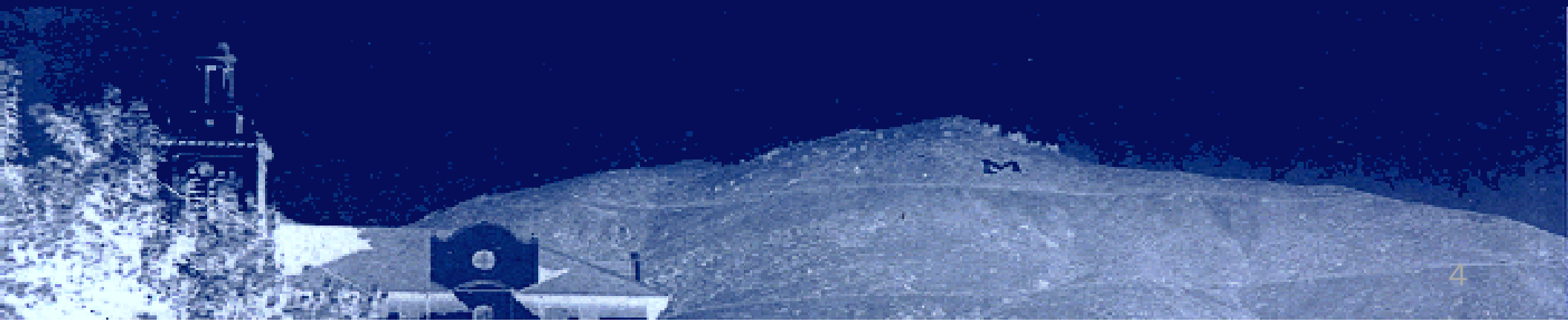
- Climate projection data
- A simple hierarchical Bayesian model
- Presenting uncertainty results
- Model extensions



Studying Climate with AOGCMs

AOGCM: Atmosphere-Ocean General Circulation Models

> Numerical models that calculate the detailed large-scale motions of the atmosphere and the ocean explicitly from hydrodynamical equations.



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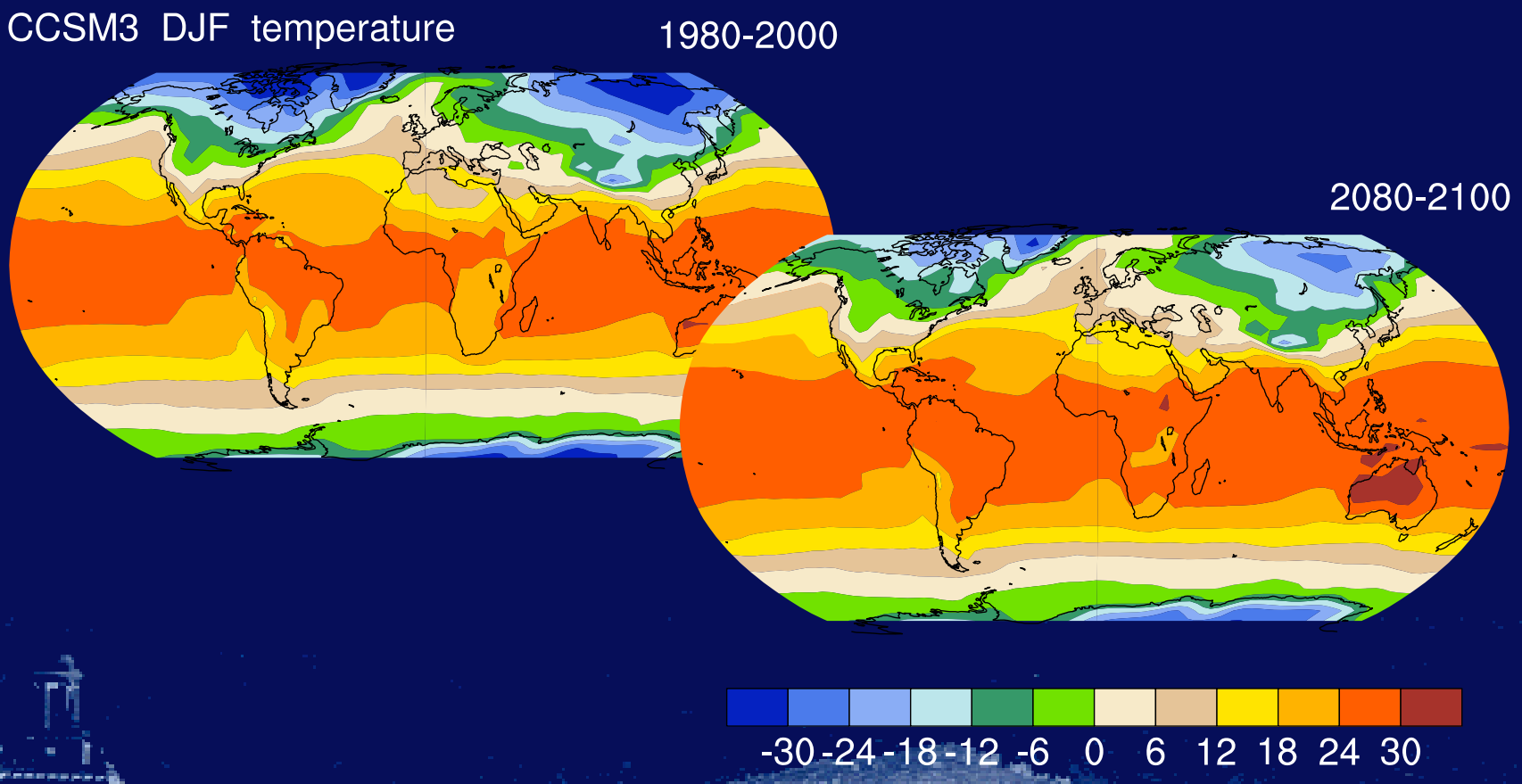

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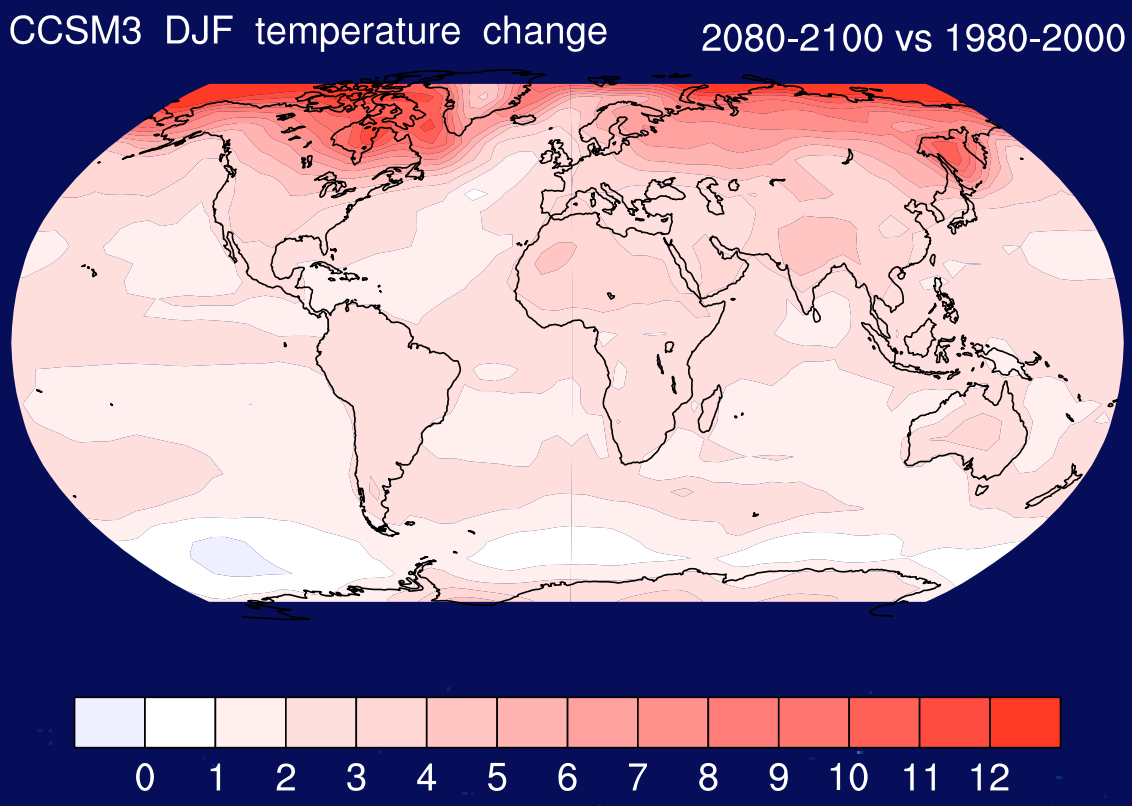
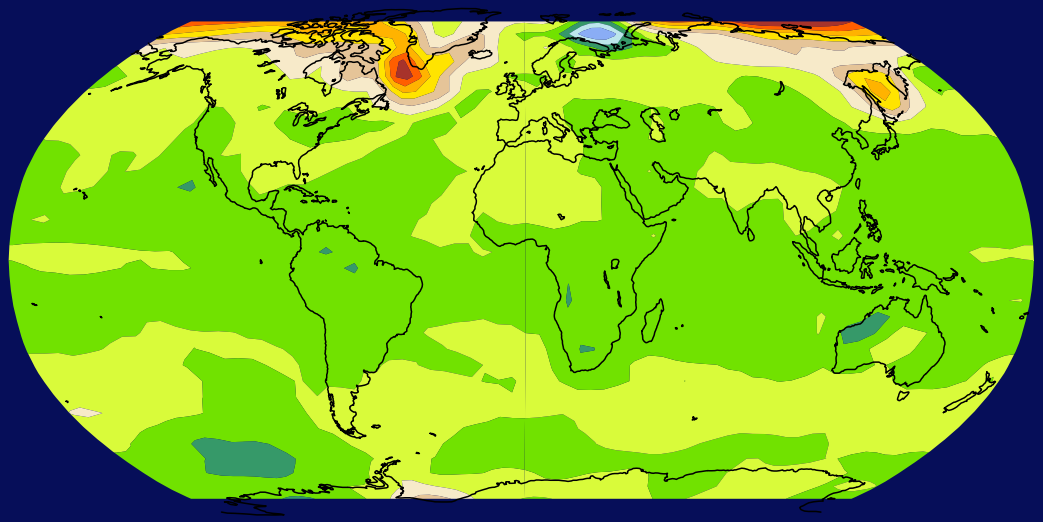
AOGCM: Atmosphere-Ocean General Circulation Models

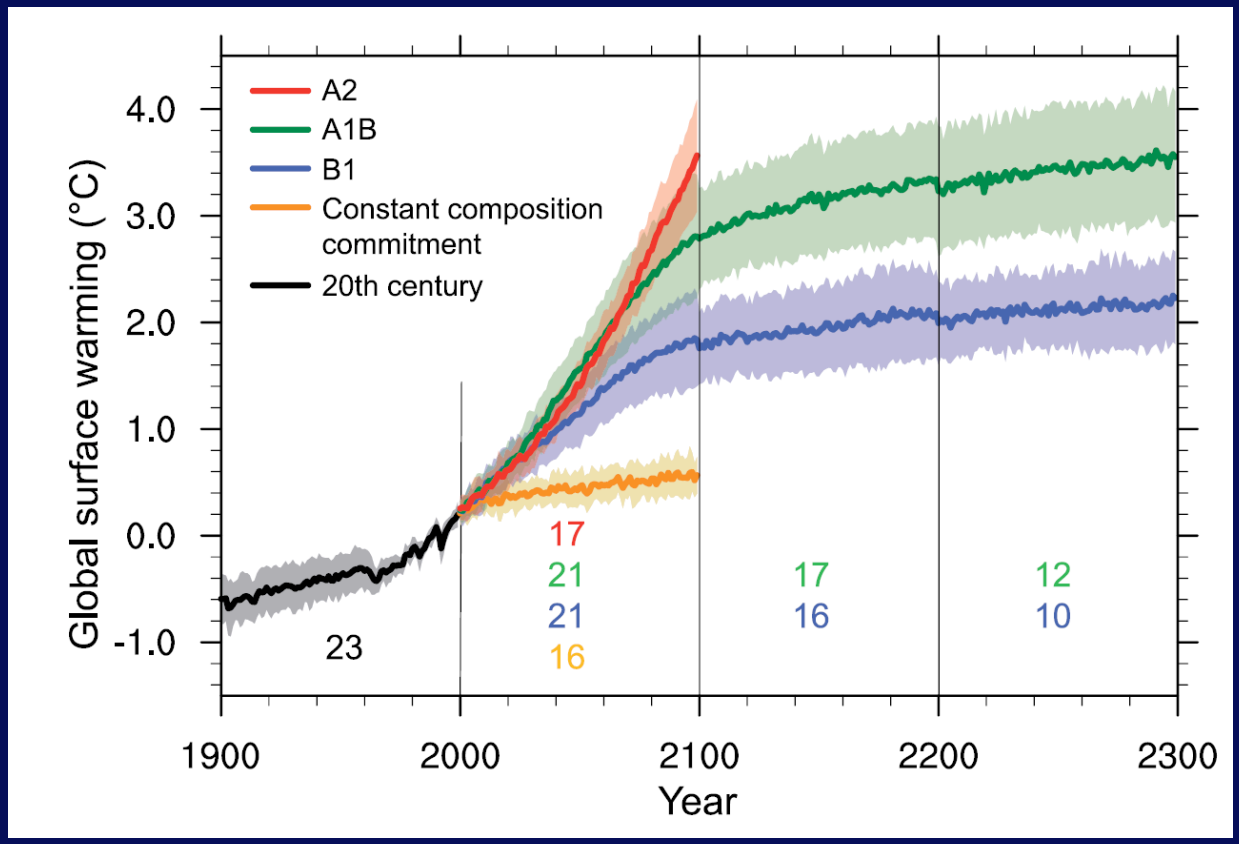


Models Do Not Agree

CCSM3 DJF temp change difference to sample mean (21 models)

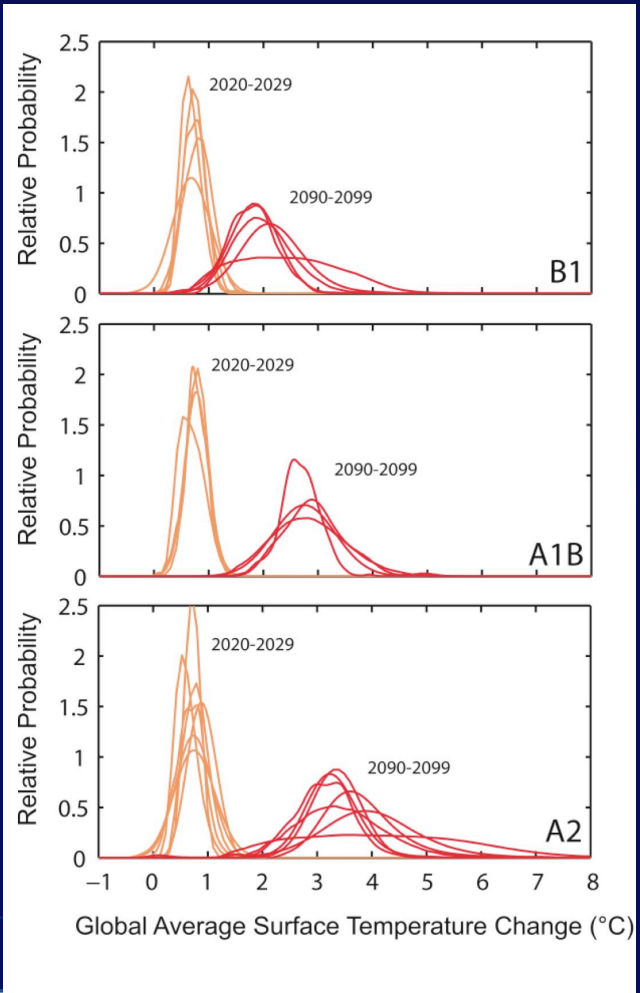


Models Do Not Agree



Source: AR4, IPCC

Quantifying Uncertainty



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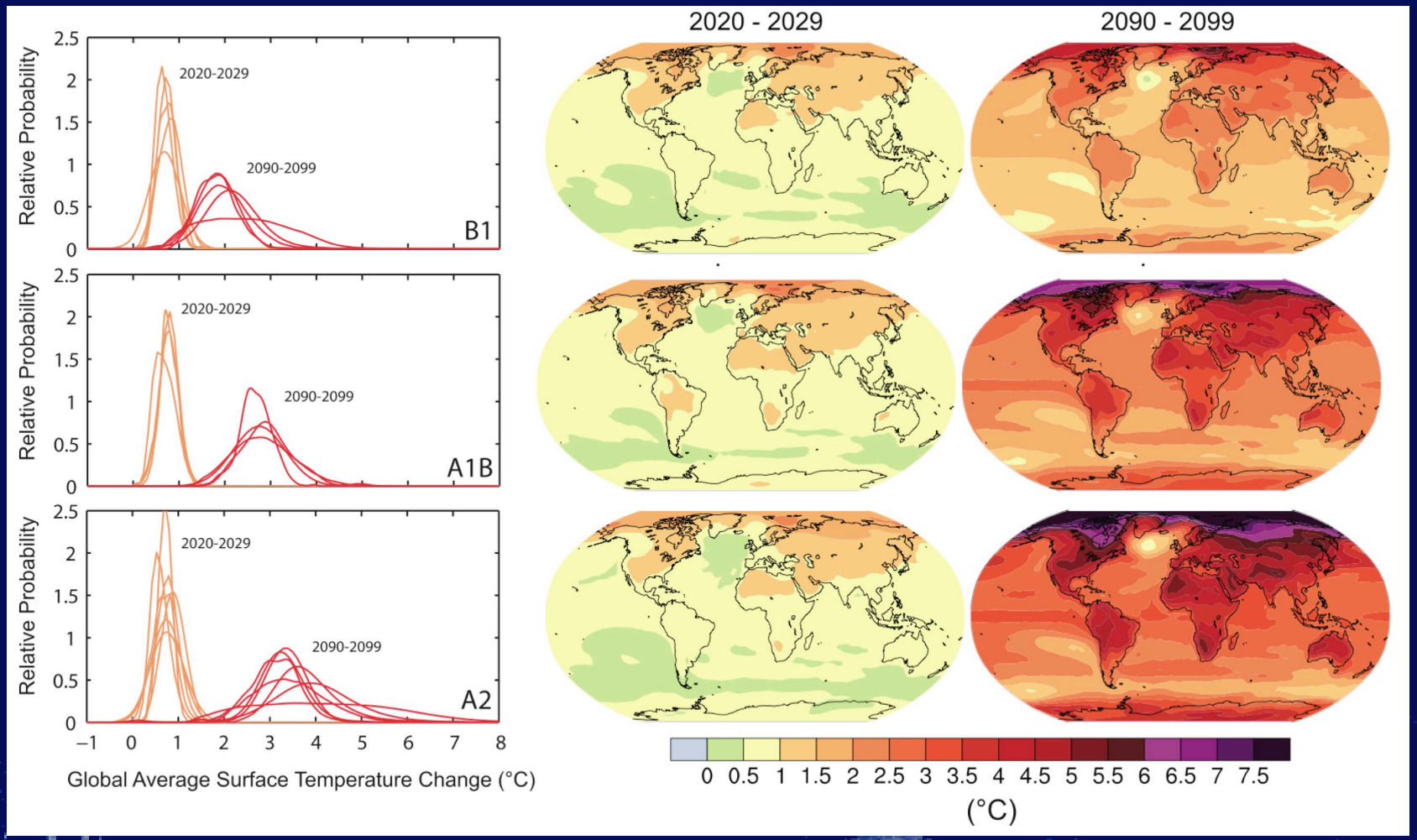
Quantifying Uncertainty



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