



Climate prediction and predictability

Myles Allen

Oxford University, Physics, Oxford, United Kingdom (myles.allen@physics.ox.ac.uk)

Climate prediction is generally accepted to be one of the grand challenges of the Geophysical Sciences. What is less widely acknowledged is that fundamental issues have yet to be resolved concerning the nature of the challenge, even after decades of research in this area. How do we verify or falsify a probabilistic forecast of a singular event such as anthropogenic warming over the 21st century? How do we determine the information content of a climate forecast? What does it mean for a modelling system to be "good enough" to forecast a particular variable? How will we know when models and forecasting systems are "good enough" to provide detailed forecasts of weather at specific locations or, for example, the risks associated with global geo-engineering schemes. This talk will provide an overview of these questions in the light of recent developments in multi-decade climate forecasting, drawing on concepts from information theory, machine learning and statistics. I will draw extensively but not exclusively from the experience of the climateprediction.net project, running multiple versions of climate models on personal computers.