S. Bony: **Long-term climate change: forcing, response and climate sensitivity**

Anticipating the effects of CO2 on climate has been a research issue for several decades, and remains the focus of ongoing scientific assessments. An early assessment was the “Charney report” published in 1979. It was prescient both in its assessment of the effects of increasing CO2 on climate (the climate sensitivity) but also in its identification of the key uncertainties. The insights of the report were not an accident. Rather they reflected the power the report's authors gained through their physical understanding of the climate system, which was built up through the use of theory, simple models and General Circulation Models.

In this talk, we will discuss the progress achieved in our assessment of long-term climate change since the Charney report. We will suggest that this progress continues to be paced by our ability to develop physical understanding, and that this understanding continues to be developed through the use of a spectrum of models, often in very idealized settings. Results from a range of WCRP projects will illustrate how a better understanding of the physical processes that control the response of clouds and of the large-scale circulation to increased CO2 remains crucial to improving assessments of long-term climate changes. Recommendations for future research will be proposed.

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Dr Sandrine Bony’s main research interests include studying cloud processes and their role in tropical meteorology and in climate change, using observations, models and theory. Other research interests include improving physical parameterizations used in climate models, evaluating large-scale models using satellite and in situ observations, and using water-stable isotopes to infer atmospheric and climate processes.

Dr Bony received a PhD from Pierre et Marie Curie University in Paris, has been a CNRS research scientist since 1996, and worked at the Massachusetts Institute of Technology from 1999 to 2001. Since 2006, she has served as co-chair of the Cloud Feedback Model Intercomparison Project (CFMIP) and, since 2008, as co-chair of the World Climate Research Programme (WCRP) Working Group on Coupled Models (WGCM), which coordinates international global climate model experiments addressing anthropogenic climate

change. She was contributing author (2001) and lead author (2007) for the Intergovernmental Panel on Climate Change (IPCC) assessment reports. She is a member of the American Meteorological Society (AMS), was an editor for the *Journal of Climate* from 2005 to 2008, and is currently an editor for the *Bulletin of the American Meteorological Society* (*BAMS*).