

## **WEDNESDAY 19 MARCH 2003: CLIMATE VARIABILITY AND PREDICTABILITY**

**Howard Cattle:** International overview and context for the UK

Understanding how the earth's climate system "works", documenting its variability, detecting and attributing human influences, determining the extent to which climate is predictable and developing predictive capabilities are scientific challenges which have huge socio-economic relevance. CLIVAR is the World Climate Research Program's (WCRP) project that addresses the physical aspects of these issues and focuses particularly on the role of the ocean in climate. The CLIVAR program is structured around 3 streams, related to different timescales: seasonal-to-interannual climate variability and predictability of the global ocean-atmosphere-land system; decadal-to-centennial climate variability and predictability; modelling and detection of anthropogenic climate change. This talk will outline the structure and programme of CLIVAR, attempting as it does so to identify some of ways in which the UK is contributing to CLIVAR

**Julia Slingo:** Seasonal to interannual variability and predictability

This talk will review recent advances in understanding and predicting seasonal to inter-annual variations in climate.

**Simon Josey:** Interannual to decadal variability at the air-sea interface

Various topics within the general theme of interannual to decadal variability at the air-sea interface will be addressed during the talk through analysis of several flux datasets including the SOC climatology and the NCEP/NCAR reanalysis. The primary focus will be on the North Atlantic Ocean and Mediterranean Sea. In the North Atlantic, results from a recent analysis of variability in the wind stress fields will be presented which will highlight the role played by the NAO. Results will also be presented from a recent study of the role of air-sea flux variability in determining the site of deep water formation in the Eastern Mediterranean. In addition to the discussion of air-sea flux variability, some background will also be provided into recent developments with the SOC climatology, in particular the use of ocean heat transport constraints to produce an adjusted set of fields in which the global ocean heat budget is closed.

**Rowan Sutton:** Decadal to centennial variability and predictability

Instrumental records, and proxy records before them, provide ample evidence that Earth's climate varies on decadal to centennial timescales. In the broadest terms the causes are understood; the variability arises partly in response to changing external forcings, and partly as a consequence of internal processes such as interactions between the oceans, atmosphere and cryosphere. But, as is spelled out in the CLIVAR programme, there is a major scientific challenge to understand this variability in greater detail, particularly at a regional scale. In this talk we will discuss recent progress in understanding decadal to centennial climate variability, with a particular focus on the Atlantic region and the role of the Atlantic ocean. We will also consider briefly the problem of decadal climate

prediction. This problem is likely to be of increasing importance as societies strive to adapt to anthropogenic climate change.

**John Mitchell:** Predicting anthropogenic climate change

Over the last decade or so, studies of the anthropogenic climate change have advanced from simple idealised experiments with doubled atmospheric CO<sub>2</sub> concentrations to detailed investigations of the time dependent response to plausible changes in human emissions of a range of greenhouse gases and aerosols. The various stages in predicting anthropogenic climate change will be outlined, from the social and economic assumptions made in emission scenarios to the detailed modelling of the climate system. Examples of predictions based on the IPCC SRES emission scenarios will be shown. Various sources of uncertainty are identified and discussed