CLIVAR/PAGES Intersection Panel: Understanding natural climate variability through integrating the climate dynamics and paleoclimate communities

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Understanding the mechanisms and history of natural climate variability is important for improving climate predictability and properly attributing ongoing climate changes to human and natural forcings. The paleoclimate record contains a much wider range in terms of duration and amplitudes of climate changes, than the instrumental record, and can provide insights into how the climate system responds when forced by non-anthropogenic forcings. In order to capitalize on this record it is imperative that the scientists analysing the paleoclimate records are well integrated with the communities involved in studies of ongoing climate change and in providing future scenarios. Thus the CLIVAR/PAGES Intersection Working Group has been formed, jointly sponsored by the Past Global Changes (PAGES) project of the IGBP and the Climate Variability and Predictability (CLIVAR) project of the WCRP. The panel aims to play an important role in developing and implementing the research programmes of both CLIVAR and PAGES. The objectives of the panel are:

- To promote improved high resolution, well-dated, quantitative paleoclimate records with seasonal to interannual resolution in regions which are of direct relevance to IGBP and WCRP.
- To formulate and promote, in collaboration with PAGES and CLIVAR, a programme for analyzing and synthesizing paleoclimatic data in order to reveal evidence of patterns of variability within the climate system over seasonal to millennial time scales.
- To promote improved quantitative methods of model-data comparison and evaluation in order to understand the variability present in both the paleoclimatic record and the models.
- To promote the use of paleoclimate data to examine issues of climate predictability.
- To coordinate with other modelling activities of relevance to IGBP and WCRP.

The panel has produced a 5 year vision document (see www.clivar.org/organisation/pages/doc/visionTOC-Final.pdf) and identified key scientific issues, which will promoted via a set of initiatives:

- Climate variability over the last few millennia
- Abrupt climate change
- Hydrologic, biospheric, and land-surface interactions
- Tropical-extratropical links including ocean and atmospheric teleconnections.

Aside from this issue of the joint CLIVAR / PAGES newsletter on climate forcings, which we hope will stimulate further developments of accurate climate forcing histories, the panel will in 2006 organise two special workshops:

1. Past Millennia Climate Variability: proxy based reconstructions, Modelling and Methodology – Synthesis and Outlook, June 7-10, Wengen, Switzerland.

2. Abrupt changes and the 8.2 ka event. Co-organised with the UK RAPID Programme, 24-27 October in Birmingham, UK.

Further plans for the following years are to initiate synthesis activities on hydrologic, biospheric and land-surface interactions, and a potential workshop on interactions between the Southern Ocean and the lower latitudes. The panel is also very eager to stimulate further progress in forward modelling of paleoclimate proxies, and aims to bring together scientists working on developing this promising field.

If you have comments or ideas for the panel, please contact the panel chairs or the PAGES and CLIVAR project offices.

Editorial

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The Earth's climate system is driven by solar power. Since the low latitudes receive a larger share of this power, the climate system redistributes it by transporting heat continuously through the ocean and the atmosphere towards the polar regions. In this way, any perturbation to the radiative budget of the Earth induces a reaction of the climate machine, involving amplifying or stabilising effects within the climate system. This climate machine consists of many complex dynamic components that interact with each other on very different timescales: atmosphere and ocean circulation, cryosphere and biosphere. In order to understand the climate system, it is crucial to identify and investigate the main processes that are responsible for changes. These forcings can be natural as well as man-made and play a central role in past, present and future climate change. However, there is also an 'unforced' component which is due to internal variability of the climate system. Climate models are useful tools for studying the complex relationship between the various forcings and the corresponding response of the climate system.

On geological timescales, much more powerful forcings were active. The solar luminosity changed by some 30%, the composition of the atmosphere and the distribution of the continents, as well as the build-up of mountain ranges, were completely different. On behalf of the PAGES / CLIVAR Intersection Panel, established in November 2004 in Canada, we present several aspects of climate forcings on annual-to-millennial timescales in this special joint issue of PAGES News and CLIVAR Exchanges. When considering climate change with the modern distribution of land and ocean, the primary forcing over tens of thousands of years is related to the orbital parameters of the Earth