Editorial

Much of paleoclimatologic research has focussed on (quasi-) equilibrium climate states of the past, such as the Eemian (roughly between 140,000 and 117,000 years before present) or the Last Glacial Maximum (21,000 years before present). Here the terms "climate state" and "climate system" include the whole Earth system as dealt with by climatologists, geologists and ecologists, among others. By making comparisons with the present-day climate state, we have been able to infer the magnitude of climate-sensitivity parameters, for example, the sensitivity to changes in radiative forcing. However, only non-equilibrium or transient climate states, such as the last deglaciation, allow us to assess the magnitude of the inertia of the climate system, for example, the effective heat capacity of the oceans. This inertia constitutes the resistance to changes in climate forcing and the memory of the climate system. It is of ultimate importance when considering the ongoing climate change in response to greenhouse gas and aerosol concentrations in our atmosphere.

Table 1: Rates of Change - Summary of the results derived from the studies presented in this issue.

Climate Variable (Proxy)	Modern Rate of Change	Past Rate of Change	Region/Period in the Past
CO_2 Change *(Stocker and Monnin)*	Mauna Loa, 1.3 ppmv/year (1958 - 1999) (200 ppmv/century)	1.5 to 2.5 ppmv/century	Antarctica Deglaciation intervals
Mid - Depth Ocean Temperature *(Rühlemann et al.,)*	0.5 °C/century	0.7 - 0.8 °C/century	Beginning of YD
Sea Level Rise *(Harvey)*	1 - 2 mm/year	9 - 24 mm/year	Deglaciation
Mass Balance, Aletschglacier *(Häberli & Holzhauser)*	-0.39 m/year (20th cent.) -1 m/year (1980 -2000)	-0.51 m/year	Onset "Medevial Warm Period"
Ural-Timberline Changes *(Shiatov)*	2 - 4 m /decade	1 - 4 m/decade	Last Millenium
Advance of European Oak Forest *(Cheddadi)*	Adaptation requires: > 100 km /century	100 km/century	Deglaciation

How fast did the climate system respond in the past? Estimates of past rates of change provide us with a long-term perspective on recent changes and help us to appreciate their magnitude. Furthermore, they give us a taste of how rapid climate change may operate in the future. State-of-the-art earth system models require a variety of estimates for the inertia of the climate system in order to make reliable predictions for the future. These inertia coefficients go beyond the effective heat capacity of the oceans that characterized the simple energy balance models of the early days of climate modeling in the late sixties of last century.

In the accompanying table, we collected estimates of rates of change that relate to atmospheric CO_2 as the primary climate forcing, as well as to such diverse components of the climate- and earth system as eurasian forests, alpine glaciers, the hydrological cycle of the Mediterranean area, the intermediate-depth Atlantic Ocean and the global sea level. A large number of important parameters are still missing from our table (e.g. regional air temperature and precipitation, frequency of extreme events such as storms and floods, biodiversity, land-cover etc.) and we would like to challenge our colleagues to fill in the respective values.

Taking into account that climate dynamics are crucial in assessing ongoing climate change, we recommend that the paleoclimatology community shifts gears and moves towards dynamic paleo-reconstructions. These must include the human dimension, which may have played the role of driver in the recent past as well as in the present. The PAGES office could help in this process by editing a special issue of a journal, dedicated to reconstruction and modeling past rates of change, and relating them to the present.

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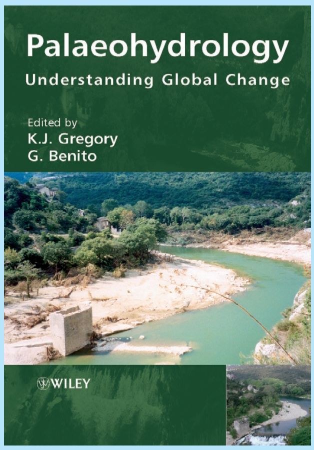
New on the PAGES bookshelf:

Palaeohydrology: Understanding Global Change

K. J. Gregory, Gerardo Benito (Editors)
ISBN: 0-470-84739-5, Hardcover, 392 p, April 2003, £95.00
www.wileyeurope.com/cda/product/0,,0470847395|desc|2877,00.html



With considerable interest in global change, this topical book provides a general overview of global paleohydrology. The first section provides a global review of the field by exploring real world hydrological scenarios during past environmental changes over extensive areas of Europe, America, Africa, Asia and Australasia. This is followed by an up-to-date review of the key methodologies of fluvial palaeohydrology and the hydrological methods for palaeohydrological construction