## Editorial

HOLIVAR (Holocene Climate Variability) is a new ESF (European Science Foundation) scientific program that seeks to bring together researchers interested in short- and long-term climate variability over the Holocene period. HOLIVAR is concerned with scientific issues identified as being of international importance for climate change studies by the PEPIII research community in IGBP-PAGES. It is also a contribution to the PAGES/CLIVAR intersection, which is a shared research agenda between WCRP and IGBP. The central questions addressed by the HOLIVAR program concern how climate has varied naturally on annual to centennial time-scales and determining the cause of Holocene climate variability. The main natural forcing factors under discussion are solar irradiance and volcanic activity, and a key focus of the HOLIVAR program is to determine how the various natural archives (e.g. tree rings, speleothems, lake and marine sediments, mires, and glaciers) can be used together to reconstruct past climate on these time-scales and in relation to these forcings Archives with visible annual resolution are of special importance because they provide a precise chronology and offer the best resolution as climate proxies. The relationship between climate proxies and climate variables—temperature and rainfall—is more often indirect and complex than linear over time. One of the main tasks of HOLIVAR is to combine natural proxies with instrumental records and documentary data in order to understand past natural climate variability more fully and to calibrate and test paleoclimate reconstruction methodologies. Holocene climate modeling is also of particular interest within the HOLIVAR community. Combined paleoclimate data can be used to test and improve the performance of climate models, whereas model experiments can help in the understanding of the causes of past climate variability. The papers presented in the science highlights section of this PAGES Newsletter are based on the extended abstracts volumes and the many fruitful discussions that took place during the first and second ESF-HOLIVAR workshops "Combining climate proxies" and "Investigating Holocene climate variability using data-model comparisons" held at Lammi Biological Station, Finland in April 2002 (http://www.gsf.fi/esf_holivar/) and Louvain-la-Neuve, Belgium in June 2002 (http://www.cru.uea.ac.uk/~timo/holivar/), respectively.

**Antti Ojala, Matti Saarnisto**
Geological Survey of Finland, antti.ojala@gsf.fi, matti.saarnisto@gsf.fi
**Rick Battarbee**
University College London, r.battarbee@ucl.ac.uk

## AGU Meeting, 8 - 12 Dec. 2003, San Francisco, USA
## Special PAGES Session: Rates of Change in the Earth System

**Convenors:** *Keith Alverson*, PAGES IPO, Bern, Switzerland; alverson@pages.unibe.ch
*Julie Brigham-Grette*, University of Massachusetts, USA; juliebg@geo.umass.edu
*Thomas Stocker*, University of Bern, Switzerland; stocker@climate.unibe.ch

**Description:**
Much of paleoenvironmental research has focused 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 inferred 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. However only non-equilibrium or transient climate states, such as the last deglaciation, allow us to assess the magnitude of the inertia in the Earth system. Areas of interest include, but are not limited to, forcing factors (greenhouse gas concentrations), climatic variables (temperature, hydrological balance, glacier mass balance, sea level) and the biosphere (biodiversity, alpine timberline, landcover change). Estimates of past rates of change can 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 field-based estimates for the inertia of the climate system in order to make reliable predictions for the future.

Further information: http://www.agu.org/meetings/fm03/