Geophysical Research Abstracts,
Vol. 11, EGU2009-4140, 2009
EGU General Assembly 2009

Mid-Holocene regional reorganization of climate variability

KW Wirtz (1), K Bernhardt (2,1), G Lohmann (3), C Lemmen (1,4)

(1) GKSS-Forschungszentrum Geesthacht, Institut für Küstenforschung, Ökosystemmodellierung, Geesthacht, Germany, (2) Institut für Chemie und Biologie des Meeres, Carl-von-Ossietzky Universität Oldenburg, Germany, (3) Alfred-Wegener Institut für Polar- und Meeresforschung, Klimawissenschaften, Bremerhaven, Germany, (4) carsten.lemmen@gkss.de / +49 4152 87-2020

We integrate 130 globally distributed proxy time series to refine the understanding of climate variability during the Holocene. Cyclic anomalies and temporal trends in periodicity from the Lower to the Upper Holocene are extracted by combining Lomb-Scargle Fourier-transformed spectra with bootstrapping. Results were cross-checked by counting events in the time series. Main outcomes are: First, the propensity of the climate system to fluctuations is a region specific property. Many records of adjacent sites reveal a similar change in variability although they belong to different proxy types (e.g., δ^{18}O, lithic composition). Secondly, at most sites, irreversible change occured in the Mid- Holocene. We suggest that altered ocean circulation together with slightly modified coupling intensity between regional climate subsystems around the 5.5 kyr BP event (termination of the African Humid Period) were responsible for the shift. Fluctuations especially intensified along a pan- American corridor. This may have led to an unequal crisis probability for early human civilizations in the Old and New World. Our study did not produce evidence for millennial scale cyclicity in some solar activity proxies for the Upper Holocene, nor for a privileged role of the prominent 250, 550, 900 and 1450 yr cycles. This lack of global periodicities corroborates the regional character of climate variability.