Geophysical Research Abstracts
Vol. 15, EGU2013-3313, 2013
EGU General Assembly 2013

Interglacial climate dynamics and advanced time series analysis

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Studying the climate dynamics of past interglacials (IGs) helps to better assess the anthropogenically influenced dynamics of the current IG, the Holocene. We select the IG portions from the EPICA Dome C ice core archive, which covers the past 800 ka, to apply methods of statistical time series analysis (Mudelsee 2010). The analysed variables are deuterium/H (indicating temperature) (Jouzel et al. 2007), greenhouse gases (Siegenthaler et al. 2005, Loulergue et al. 2008, Lüthi et al. 2008) and a model-co-derived climate radiative forcing (Köhler et al. 2010). We select additionally high-resolution sea-surface-temperature records from the marine sedimentary archive. The first statistical method, persistence time estimation (Mudelsee 2002) lets us infer the 'climate memory' property of IGs. Second, linear regression informs about long-term climate trends during IGs. Third, ramp function regression (Mudelsee 2000) is adapted to look on abrupt climate changes during IGs. We compare the Holocene with previous IGs in terms of these mathematical approaches, interprete results in a climate context, assess uncertainties and the requirements to data from old IGs for yielding results of 'acceptable' accuracy.

This work receives financial support from the Deutsche Forschungsgemeinschaft (Project ClimSens within the DFG Research Priority Program INTERDYNAMIK) and the European Commission (Marie Curie Initial Training Network LINC, No. 289447, within the 7th Framework Programme).

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