Geophysical Research Abstracts,
Vol. 11, EGU2009-12863, 2009
EGU General Assembly 2009

The seasonal cycle as template for climate variability on astronomical time scales

T. Laepple and G. Lohmann

Alfred-Wegener-Institute for Polar and Marine Research, Paleo-Climate Dynamics, Bremerhaven, Germany
(tlaepple@awi-bremerhaven.de)

A concept for the physical understanding of insolation-driven temperature variability on orbital timescales is developed. It relies on the observed annual cycle of temperature to estimate the climate's sensitivity to local insolation at different seasons. Based on this concept, the temperature evolution of the last 750 ky related to local insolation forcing is estimated. The seasonal template model largely reproduces the Holocene temperature trends as simulated by a coupled climate model. It predicts significant temperature variability in the eccentricity and semiprecession frequency band in the tropics and indicates that the temperature response to local insolation is highly spatially dependent.

In explaining observed climate variability, the local time-independent approach complements the global Milankovitch hypothesis (climate variations are driven by northern summer insolation) and offers new insights in interpreting paleoclimate records.