Geophysical Research Abstracts
Vol. 14, EGU2012-11491, 2012
EGU General Assembly 2012

Timing and amplitude of glacial cycles from a conceptual model

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The astronomical theory of climate, in which the orbital variations of the Earth are taken to drive the climate changes, explains many features of the paleoclimatic records. Nevertheless, the precise link between insolation variations and climatic changes during the Quaternary remains mysterious in several aspects. In particular, the largest
sea level changes of the past million years occurred when insolation variations were minimal, like during stage 11, and
vice versa like during stage 7. Moreover, recent data from terminations II and III show surprising phase lead and lag
between insolation and sea level variations. To explain these paradoxical amplitude and phase modulations, we suggest here that deglaciations started when a combination of insolation and ice volume was large enough. To illustrate this new idea, we present a simple conceptual model that simulates the sea level curve of the past million years with very realistic amplitude modulations, and with the right timing of terminations.