CLUES FROM MIS11 TO PREDICT THE FUTURE CLIMATE -A modelling point of view. M.F. Loutre

Abstract

Simulations performed with the LLN 2-D NH climate model have confirmed that climate is largely triggered by changes in insolation forcing although atmospheric CO2 concentration is also playing an important role, in particular in the amplitude of the simulated variations. The Marine Isotope Stage 11 (MIS11) some 400 kyr ago and the future are sharing a common feature related to the climate forcing, i.e. the insolation at these times is displaying small similar variations. MIS11 can be considered as an analogue for future natural climate changes.

Different simulations were performed to identify the conditions constraining the length of the MIS11 simulated interglacial. Clearly its length is strongly depending on the phase relationship between insolation and CO2 variations. It is only if insolation and CO2 are acting together towards a cooling, i.e. they are both decreasing together that the climate enters soon into glaciation and that the interglacial may be short.

Otherwise each forcing alone is not able to drive the system into glaciation and the climate remains in an interglacial state. The same situation applies for the future. However we already know that CO2 and insolation are not playing together. Indeed, insolation is decreasing since 11 kyr BP and CO2 concentration remains above 260 ppmv, with a general increasing tend over the last 8000 yrs. Therefore we conclude that the long interglacial simulated for the future is a robust feature and the Earth will not enter naturally into glaciation before 50 kyr AP.