Geophysical Research Abstracts
Vol. 16, EGU2014-587, 2014
EGU General Assembly 2014

Impact of external forcing on the timing of MIS 7 glacial inception

Florence COLLEONI (1), Simona MASINA (1,2), Annalisa CHERCHI (1,2), and Dorotea IOVINO (1)

(1) Center for Euro-Mediterranean Climate Changes, Bologna, Italy, (2) Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Bologna, Italy

MIS 7 glacial inception is characterised by particularly low GHG values (up to 224 ppm) and low sea-level (-10 to -20 mSLE). On the contrary, MIS 5 glacial inception has larger GHGs values (260 ppm) and a high sea-level (+1-5 m SLE). To understand what are the climate implication of MIS 7 low GHGs on inception processes, we use a coupled Atmosphere-Ocean General Circulation Model (AOGCM) to simulate the mean climate state of four time-slices at 115 kyrs BP, 125 kyrs BP, 229 kyrs BP and 236 kyrs BP, indicative of MIS 5 and MIS 7 pre-inceptions (K236 and K125, perihelion occurring during late summer) and glacial inceptions (K229 and K115, perihelion occurring during late winter). Our results show that in both Northern high and low latitudes, the structure of large scale circulation features is determined by the orbital configuration of the simulated time period while GHGs influence their intensity but only in the high latitudes. The simulated perennial snow cover, classical indicator of glacial inception, is more extended in K115 than in K125, which is in agreement with the orbital forcing of both experiments. However, for MIS 7, the perennial snow cover appears to be more extended in K236 than in K229 as a result of the particularly low GHGs values of this period, which is not what is expected from the orbital forcing. The climate teleconnections, ie. Arctic Oscillation, the ITCZ, the Hadley cell and the Walker circulation, reflecting the orbital configuration of each time slice, indicate K115 and K229 as glacial inception climates and K125 and K236 as pre-inception climates in both high and low latitudes. However, the large perennial snow cover accumulating in K236 contradicts these facts. We conclude that in our experiments, the impact of external forcing, and especially low GHGs values, on MIS 7 glacial inception is to anticipate the real glacial inception time to 236 kyrs BP instead of 229 kyrs BP.