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Millennial scale events during Terminations III and V and their role in shaping the deglaciation

Natalia Vazquez Riveiros (1), Luke Skinner (2), Claire Waelbroeck (1), Didier Roche (1), and Nathaelle Bouttes (1)

(1) LSCE - CNRS, Laboratoire des Sciences du Climat et de l'Environnement, Gif-sur-Yvette, France (natalia.vazquez@lsce.ipsl.fr), (2) Department of Earth Sciences, University of Cambridge, Cambridge, UK

Marine Isotope Stage (MIS) 7, the interglacial period dated ca. 195 – 245 kyr ago, exemplifies the non-linearity subjacent in the astronomical theory of the ice ages. Despite the fact that it coincides with some of the strongest insolation increases over the last 500,000 years, MIS7 is a relatively mild interglacial. In comparison, MIS11, the interglacial period that took place ∼400 kyr ago, presents a major response of the climate system in most paleoclimatic records at a time of feeble orbital forcing. This mismatch between insolation forcing and climate response implies that if insolation is driving glacial-interglacial climate change, it can only be as a 'pace-maker' that triggers strong, positive feedbacks. Foremost among the mechanisms that may have amplified insolation-paced global change are millennial-scale ocean circulation perturbations, that have been linked to Antarctic temperature and atmospheric CO_2 increases.
This study investigates the influence of millennial-scale ocean perturbations in determining global climate during MIS7, by comparing marine sediment cores on a common time scale. New high-resolution data from core MD07-3077 in the Atlantic sector of the Southern Ocean, together with data from North Atlantic cores, indicate that the terminal seesaw events that took place during Terminations III and IIIa are of a different nature than those acting during Termination I or V. Their impact on global climate is not related in a simple way to their magnitude and duration, and they were probably influenced by the background state of the ocean during MIS8 and by the relative extent of European and North American ice sheets. The comparison of the records with simulations of the isotope-enabled Earth System Model of intermediate complexity iLOVECLIM sheds light on the respective roles of insolation and millennial scale events on the development of each interglacial.