Geophysical Research Abstracts
Vol. 16, EGU2014-6112, 2014
EGU General Assembly 2014


# Oxygen stable isotopes: data-model (iLOVECLIM) comparison for last glacial maximum climate

Thibaut Caley (1), Didier Roche (1,2), Claire Waelbroeck (2), and Elisabeth Michel (2)

(1) Earth and Climate Cluster, Climate change and Landscape dynamics, Vrije Universiteit Amsterdam, The Netherlands., (2) Laboratoire des Sciences du Climat et de l'Environnement (LSCE), CEA/CNRS-INSU/UVSQ, Gif-sur-Yvette Cedex, France.

Oxygen stable isotopes ($\delta$18O) are among the most usual tools in paleoclimatology-paleoceanography. $\delta$18O constitute an important tracer of the hydrological cycle from various components of the climatic system (ocean, atmosphere, ice sheets).
While being widely used proxy in climate archives from the different realms, processes that control the $\delta$18O so recorded are various and complex. By using a model (iLOVECLIM) that is able to explicitly simulate the sensor ($\delta$18O), results can be directly compared with data from climatic archives in the different realms.
We present a comparison between LGM simulated and measured oxygen isotopes. Our results indicate that iLOVECLIM reproduces well the main feature of the LGM climate in the atmospheric and oceanic components. The annual mean $\delta$18O in precipitation shows more depleted values in the northern and southern high latitudes during the LGM. The model reproduces very well the spatial gradient observed in ice core records over the Greenland ice-sheet. We observe a general pattern toward more enriched values for continental calcite $\delta$18O in the model at the LGM, in agreement with speleothem data. Our data-model comparison for ocean calcite $\delta$18O allows investigating the large discrepancies with respect to glacial temperatures recorded by different microfossil proxies in the North Atlantic region. The results argue for a strong mean annual cooling between the LGM and present (>6°C).
Our simulation of the deep ocean suggests that changes in $\delta$18Osw between the LGM and present are not spatially homogeneous, a fact that is supported by reconstructions derived from pore fluids in deep-sea sediments.