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# Oxygen stable isotopes: data-model (iLOVECLIM) comparison for present day and last glacial maximum climates

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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$18O so recorded are various and complex.
Simulation of climate and its associated isotopic signal can provide a "transfer function" between isotopic signal and the considered climate variable.
In our present study, water isotopes have been implemented in the global three-dimensional model of intermediate complexity iLOVECLIM allowing fully coupled atmosphere-ocean simulations (Roche and Caley, in preparation). By modelling the proxy ($\delta$18O) directly in the model, results can be directly compared with data from the different climatic archives.
First, we will validate the model results for present day climate against global database of $\delta$18O measurements in precipitation and seawater.
Combining the $\delta$18O of precipitation and atmospheric temperature, we are able in a second time to reconstruct the calcite $\delta$18O in the model and to compare it with late Holocene calcite $\delta$18O dataset (compilation of speleothems data, Caley and Roche, in preparation). The results highlight the complexity of use the continental calcite $\delta$18O signal for data-model comparison. On the contrary, the reconstructed ocean calcite $\delta$18O signal in the model does show a very good agreement with global late Holocene database (foraminifera) illustrating the potential and the interest of use iLOVECLIM for paleoclimatic studies. For example, applying this data-model comparison for ocean calcite $\delta$18O in past climate is an interesting tool to mapping the potential shifts of the frontal systems and oceanic circulation changes throughout time.
As a test, the first results for this data-model integration for the Last Glacial Maximum climate (19000-23000 years) in comparison to present day climate will also be presented.