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A multi-archive coherent chronology: from Greenland to the Mediterranean sea

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Understanding the climate mechanisms requires a precise knowledge of the sequence of events during major climate changes. In order to provide precise relationships between changes in orbital and/or greenhouse gases concentration forcing, sea level changes and high vs low latitudes temperatures, a common chronological framework for different paleoclimatic archives is required.

Coherent chronologies for ice cores have been recently produced using a bayesian dating tool, DATICE (Lemieux-Dudon et al., 2010, Bazin et al., 2013, Veres et al., 2013). Such tool has been recently developed to include marine cores and speleothems in addition to ice cores. This new development should enable one to test the coherency of different chronologies using absolute and stratigraphic links as well as to provide relationship between climatic changes recorded in different archives. We present here a first application of multi-archive coherent dating including paleoclimatic archives from (1) Greenland (NGRIP ice core), (2) Mediterranean sea (marine core MD90-917, 41°N17°E, 1010 m) and (3) speleothems from the South of France and North Tunisia (Chauvet, Villars and La Mine speleothems, Genty et al., 2006). Thanks to the good absolute chronological constraints from annual layer counting in NGRIP, ^{14}C and tephra layers in MD90-917 and U-Th dating in speleothems, we can provide a precise chronological framework for the last 50 ka (ie. thousand years before present). Then, we present different tests on how to combine the records from the different archives and give the most plausible scenario for the sequence of events at different latitudes over the last deglaciation.

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