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The Last Interglacial climate as recorded in polar and sub-polar regions

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Studying the climatic evolution of the Last Interglacial (LIG, ∼129-116 thousand of years, ka), a time-period warmer than today, provides insights on how current natural changes may interact with those originating from anthropogenic influences. The LIG is the best documented past interglacial in paleoclimatic archives and previous published data compilations led to the construction of a time slice representative of the LIG climate. Unfortunately, such a unique time slice describing the whole LIG prevents discussing sequences of climatic events within this time period.

In the framework of the UK iGlass consortium and the European Past4Future project, we describe here an updated synthesis of the spatial climatic patterns over polar ice sheets (surface air temperature) and around the ice margins (sea and air surface temperatures).

Then, we present our strategy to synchronise on one single timescale, climatic records originating from ice, marine and continental archives, and located in both the Northern and the Southern Hemispheres. Thanks to our new common chronostratigraphic framework and based on records offering at least a multi-centennial temporal resolution, we describe and discuss the temporal and spatial pattern of the LIG climate. In particular, we produce four time slices at 115 ka, 120 ka, 125 ka and 130 ka describing the surface temperature evolution in the high latitudes in comparison with the modern period.

Such a temporal reconstruction confirms previous results and provides new information on the LIG climate such as that (i) surface temperature peaks are not systematically co-incident across the globe (e.g. early warming and early cooling of the southern hemisphere compared to the northern hemisphere) and that (ii) also within a same hemisphere, there are contrasting shapes of the surface temperature evolution and temperature change amplitude from one location to the other.

Finally, we compare our compiled records with recent transient model experiments performed in order to characterise the response of the climate system to LIG changes in various climate forcings and biophysical feedback processes. In addition to be used as targets for LIG climate modelling, our new results will also provide unique inputs to force ice sheet models.