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High latitude temperature evolution across the Last Interglacial: a model-data comparison

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The Last Interglacial (LIG, 129-116 thousand of years, ka) represents an interesting test bed for climate model feedbacks for warmer-than-present high latitudes. However, mainly because synchronising different paleoclimatic archives from different parts of the world is not trivial, a global picture of LIG temperature changes is difficult to obtain.

In the framework of the UK iGlass consortium and the European Past4Future project, we have selected 49 polar ice core and sub-polar marine sediment records and developed a strategy to synchronise them onto the recent AICC2012 ice core chronology. This new synthesis enables us to describe the spatial and temporal climatic patterns over polar ice sheets (surface air temperature) and around the ice margins (sea surface temperatures) at a pluri-centennial to millennial-scale. Major features highlighted are (i) non synchronous maximum temperature change between the two hemispheres with the Southern Ocean and Antarctica records showing an early warming compared to North Atlantic records and (ii) Southern hemisphere records exhibiting warm conditions for a longer time period compared to records from the Northern Hemisphere and smaller temperature amplitude changes.

Our compiled records are compared with recent snapshot and transient model experiments performed with three state of the art General Circulation Models (HADCM3, CCSM3, FAMOUS) and an Earth Model of Intermediary Complexity (LOVECLIM). Such an exercise enables us to investigate the climate feedbacks which causes the most apparent model-data differences.