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Enhanced Antarctic climate variability during the last interglacial period

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Past interglacial periods are characterized by global warm climatic conditions comparable to the ones of the current interglacial period, the Holocene. As perfect targets to better understand natural climate variability and benchmarks for climate models, they have been widely documented in recent years, at multi-millennial and millennial scale in particular. However, due to a lack of records at sufficient temporal resolutions, past interglacial climate variability has been barely explored at sub-millennial scale.

Using a new water stable isotope record at decadal resolution from the EPICA Dome C ice core, we here characterize patterns and changes in Antarctic millennial to centennial climate variability occurring over the Last Interglacial period (LIG). Multi-centennial climatic sub-events, bearing comparison in terms of intensity with glacial Antarctic Isotopic Maxima, are for the first time identified in a past interglacial context. From observed changes in variance further arise two major points. First, the end of the LIG is marked by an increase in high frequency variability, preceding the cooling trend into glacial inception (as already observed for Marine Isotopic Stage 11). No such increase in variance can be detected so far over the last millennia. Second, the LIG variance level is significantly higher than the Holocene one. It questions the role of ocean-atmosphere-sea ice interactions in such enhanced variability, during a warmer climatic state likely associated with reduced Antarctic ice sheet.