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The occurrence and structure of interglacials in the late Quaternary

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Although interglacials form cover only around 20% of the time period of the late Quaternary, they assume a large importance because we are currently in such a period, and there are examples of periods warmer than the present, that may be especially relevant for the future. For these reasons we particularly need to understand what determines the natural course of each interglacials. The ice core from Dome C retrieved by the European Project for Ice Coring in Antarctica (EPICA) now extends 800,000 years into the past. Records of Antarctic climate (from water isotopes), atmospheric trace gases, and ionic chemistry (linked to Southern Ocean and southern continental processes) exist along most of the core and, taken together with existing marine and terrestrial data, give us numerous examples of how different environmental parameters react during an interglacial. In this paper, we will compare the response of different interglacials to see whether it is possible to understand the timing of the deglaciation, and the length, amplitude and trajectory of each event. The interglacials before 450 kyr BP are weaker (less warm) than later ones, but they do resemble periods of intermediate warmth that occur later in the record, suggesting that there may not be a step change at 450 kyr, but rather a particular circumstance that has led to a short run of warm interglacials. Closer examination reveals that every interglacial we can observe has significantly different characteristics, and probably a more sophisticated approach, based on an integrated history of forcings and feedbacks, is required to make further progress towards prediction of the natural behaviour in an interglacial. By making a first compilation of these different interglacial behaviours, we will assess how differ-

ent components of the Earth System interact to provide interglacials of the kind we now enjoy.