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Comparing the timing of Termination II and the progression of the Last Interglacial using Northern and Southern Hemisphere speleothem records

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Earth has experienced seven glacial-interglacial cycles over the last ∼700 kyr. The glacial periods are generally brought to an abrupt end during so-called 'terminations'. Milankovitch Theory suggests that variations in summer insolation at high northern latitudes drive the glacial-interglacial cycles, and trigger the onset of terminations. To test this hypothesis, it is necessary to firmly establish the precise timing of glacial terminations in both hemispheres and compare this with variations in Northern Hemisphere summer insolation. In spite of an increased number of palaeoclimate data sets, comparisons are still limited by: 1) the weakness of chronologies; 2) the low resolution of some records; and 3) the problems associated with the interpretation of the various proxies. The question of accurate and precise chronologies is probably the most important concern for resolving the 'termination problem'.

One of the main strengths of speleothems is their ability to provide precise and accurate age control for the palaeoclimatic records they preserve. Here we present new speleothem stable isotope records covering Termination II and the Last Interglacial. The speleothems have grown under similar mid-latitude conditions in the Northern (Italy, France) and Southern Hemispheres (New Zealand), where regional climate is subjected to strong North Atlantic and Southern Ocean influences respectively. The

stable isotope records, with support from other speleothem climate proxy data, are tied to an absolute chronology based on Th/U dating. This allows us to investigate cross-hemispheric phasing in the timing of Termination II and the progression of the Last Interglacial. Our data are also compared to other palaeoclimate proxy records, particularly Antarctic ice cores (e.g. Dome Fuji), in order to shed light on the possible forcing mechanisms behind Termination II.