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Attempt of interpretation of the -5 permil oxygen isotopic composition shift during Termination II in a Villars cave speleothem (SW France)

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This study aims to interpret the spectacular shift of -5‰ in calcite oxygen isotopic composition of a flowstone core from Villars Cave (Vil-car-1, Dordogne, France) between the penultimate glacial and the Last Interglacial. Calcite oxygen isotopic composition is controlled by both the temperature of calcite precipitation and the isotopic composition of the dripping water. Because these two parameters are unknown it is difficult to separate the components of the calcite oxygen isotopic composition signal. In order to better understand the large oxygen isotopic composition shift observed in the Villars record, we have used, first, the calcite and fluid inclusions isotopic compositions to estimate paleotemperatures and assuming isotopic equilibrium. Delta 47 measurements were also made as first attempts for paleotemperature estimations without knowledge of the water isotopic composition and to check isotopic equilibrium. Combining oxygen isotopic composition of both calcite and fluid inclusions water to calcite Delta 47 values allows us to correct for isotopic disequilibrium. The second important result of this study is the stability (within $\pm$ 0.5‰) of the fluid inclusions composition through this major climatic transition. By combining our results with other archives data, we modelled drip water isotopic composition during the two considered periods (MIS6 and MIS5) to check the consistency of the fluid inclusion oxygen isotopic composition results. It appears that the different effects that play a role on the drip water oxygen isotopic composition seem to have counteracted each other.