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Interactive comment on "New on-line method for water isotope analysis of speleothem fluid inclusions using laser absorption spectroscopy (WS-CRDS)" *by* S. Affolter et al.

D. Genty (Referee)

dominique.genty@cea.fr

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This is an excellent work that will mark a milestone. Lot of people were waiting for upgrading the former fluid inclusion devices to the new laser instruments, S. Affolter and co-authors did it in a very good way. First, the procedure appears relatively simple to setup and I guess that we will have several similar systems in the next few months in different labs that work on speleothems, at least. Second, the authors present clever innovations, like the vaporization of a standard water in the line to keep high enough the water background for an accurate and stable measurement. Moreover, desorption tests, laser calibration, stabilization of the system demonstrate the innovation and the carefulness of the approach in order to get the most reliable measurement. Beside the technical aspect of this study, authors present a very good and complete review of the former technical works made on FI. It is well written and figures are clear and all of interest. I would only criticize the beginning and the end of the article : the introduction part should be more careful about what we know on present day systems (i.e. rainfall/drip rate/FI d18O relationships), the last sample analysis on a recent calcite deposit, which, to my opinion is not enough described and, in any case, is not sufficient to draw such conclusion on a possible oxygen exchange between water and calcite. This is a great study that must be published as soon as possible.

p. 431, L11-26 : Despite the fact that the fluid inclusion isotopes has an enormous potential for paleoclimatic reconstructions, I think that the presentation in the Introduction part is sort of idealistic and I would be more careful here : 1) Most of speleothems are out of isotopic equilibrium, the paleotemperature calculation is thus not straightforward with fluid inclusion and calcite isotopes only (see Mickler et al. 2006). A promising way is certainly to combine D47 measurements with fluid inclusions ones (Daeron et al., 2011). 2) What do we know about the exact relationship between : a) rainfall d18O and drip d18O ?; b) drip d18O and FI d18O on modern calcite that precipitated at the same place and on stalagmite-shapped sample ? The Harmon 1979 was certainly a pioneer work, but, first the dD error at that time was quite large, and second, they did not study in details the relationship between present day drip and modern calcite FI d18O fed by the same water. Moreover, does the “pool spar” samples used in Dublyansky and Spotl (2009) to demonstrate the correspondence between FI and parent water d18O reflects the same conditions of a calcite precipitation on stalagmite tip ? Even if these questions do not concern the main topic of this work, they raise more complicated interpretations of FI isotopes. Certainly, the great advance of this study will contribute to clarify most of them.

p. 435, L2 : do you estimate the variability of the vapour flow 65 mL/min + or - ? p. 435 : L21 : it seems that a quite large fraction of the calcite is not well crushed,

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likely reducing the efficiency, i.e. less FI water is extracted p. 436 : I guess that the saw wire is 0.3 mm and not 0.3 μm (?) p. 437 : please indicate also the diameter in cm p. 440 : you decided to fix the mixing ratio at 13000 ppmv, but why not slightly higher, i.e. 18000 ppmv, where the stability is more sure from figure 5 ? p. 442 : how to you proceed to go down to 2H for one sample analysis while it is 5H for a secure procedure ? p. 443, L5 : we skip from figure 7 to figure 10 here, I did not found reference to figures 8 and 9 in the text p. 445, L25-27 and p. 446, L2-5: you should give more information about the modern sample because you first results on it is of first importance. How old is this sample and what constrained its growth age and duration ? Did it grew exactly under the stalactite that produced the analyzed drip water ? Also, is the drip water d18O constant all over the year at this station ? Your last sentence that suggests a possible oxygen exchange between calcite and inclusion water seems to ruin most of the interest of doing FI isotopes because in such a case, the importance of the exchange will not be predictable. I think you don't have enough modern samples to make such a conclusion.

Interactive comment on Clim. Past Discuss., 10, 429, 2014.