

## ***Interactive comment on “Stable isotope records for the last 10 000 years from Okshola cave (Fauske, northern Norway), and regional comparisons” by H. Linge et al.***

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Received and published: 27 September 2009

P. 1766, l. 6: on secondary calcite deposition: Speleothem deposition close to or under glaciers (by alternative generation of high PCO<sub>2</sub>) will be acknowledged (e.g. Atkinson et al. 1983; Spötl and Mangini 2007) in the introduction.

P. 1768, l. 27 and 28: on significant numbers: Number of decimals will be changed in the manuscript

P. 1773, l. 23: on the Oks82 age model The U/Th dates from Oks82 had generally high <sup>232</sup>Th concentrations and low <sup>230</sup>Th/<sup>232</sup>Th activity ratios. All results were reported in Table 1 and Figure 2. In order to use the stable isotope data from Oks82 as a  
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complementary record to FM3, we chose to minimise the uncertainty by only using the ‘cleanest’ samples according to a set of criteria common for both stalagmites (P. 1773, l. 17 and onwards). Figure 2 shows all uncorrected and corrected ages and not the age models used for constructing the stable isotope time-series.

It is a misunderstanding that ‘that the authors state that Oks82 was active when sampling’. Oks82 was not active when collected (P. 1768, l. 26). P. 1777, l. 1 states that Oks82 and FM3 were active during the same interval (ca. 7550-5050 yr).

P. 1775, l. 25 and onwards: on kinetic fractionation The kinetic fractionation effects cannot be explained by a single mechanism with the present-day cave conditions and the cause of the apparent covariation between d<sup>18</sup>O<sub>c</sub> and d<sup>13</sup>C<sub>c</sub> is thus considered ‘not obvious’. We argue that 1) evaporation is not likely because of the low temperature and ‘high humidity’ (we agree that that is a vague expression) in these blind cave passages (they are both blocked by breakdown and have little, if any draught). We also argue that the dripwater is probably low in CO<sub>2</sub> because of the average low soil-CO<sub>2</sub> production at a site like this with a short vegetation growth season, although we have no data to confirm this.

The available paired calcite-water oxygen isotope data from Søylegrotta has been added to Table 2.

Attempting a clear one-to-one conversion of the stable oxygen isotopes with temperature is futile here because the cave is not characterised by true ‘deep cave’ conditions. We have restricted our interpretation to be based on relative changes and focussed on whether it is feasible to attribute these to either changes in T or in precipitation (amount and composition).

P. 1783, l. 25 and onwards: on start and end points of individual stalagmites Increased surface instability (mass movement, erosion, deposition) as a result of intensification of extreme weather events would be expected to affect cave percolation systems. For instance, new percolation routes and new locations for calcite deposition could be cre-

ated, whereas pre-existing routes and locations could be affected by variable degrees. Any given 'water seepage – calcite precipitation' system (i.e. cave with active stalagmite deposition) will continuously undergo changes. In the case of a regional intensification of extreme weather events, the existing system will expectedly be disturbed and this will have a potentially strong impact on drip rates at individual drip sites.

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Interactive comment on Clim. Past Discuss., 5, 1763, 2009.

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