Geophysical Research Abstracts
Vol. 18, EGU2016-12731, 2016
EGU General Assembly 2016

Timing and duration of climate variability during the 8.2 ka event reconstructed from four speleothems from Germany

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The most prominent climate anomaly of the Holocene is the 8.2 ka event, which reflects the impact of a dramatic freshwater influx into the North Atlantic during an interglacial climate state. Thus, it can be considered as a possible analogue for future climate change. Due to the short-lived nature of the event (160.5 $\pm$ 5.5 years; Thomas et al., 2007), a detailed investigation requires archives of both high temporal resolution and accurate chronology.

We present high-resolution stable oxygen and carbon isotope (ca. 3-4 years) as well as sub-annually resolved trace element records of the 8.2 ka event from stalagmites (BB-3, Bu4, HLK2 and TV1) from three cave systems in Germany (Blessberg Cave, Bunker Cave and Herbstlabyrinth). The location of these caves in central European is well suited in order to detect changes in temperature and precipitation in relation to changes in the North Atlantic region (Fohlmeister et al., 2012). The 8.2 ka event is clearly recorded as a pronounced negative excursion in the δ^{18}O values of all four speleothems. While stalagmites BB-3 from Blessberg Cave and Bu4 from Bunker Cave also show a negative excursion in the δ^{13}C values during the event, the two speleothems from Herbstlabyrinth show no distinctive features in their δ^{13}C values. The timing, duration and structure of the event differ between the individual records. In BB-3, the event occurs earlier (ca. 8.4 ka) and has a relatively short duration of ca. 90 years. In Bu4, the event occurs later (ca. 8.1 ka) and shows a relatively long duration of more than 200 years. In the two speleothems from the Herbstlabyrinth, the event is replicated and has a timing between 8.3 and 8.1 ka and a duration of ca. 150 years. These differences may at least in part be related to the dating uncertainties of 100-200 years (95 % confidence limits).

References:

Fohlmeister, J., Schroder-Ritzrau, A., Scholz, D., Spötl, C., Riechelmann, D.F.C., Mudelsee, M., Wackerbarth, A., Gerdes, A., Riechelmann, S., Immenhauser, A., Richter, D.K., Mangini, A., 2012. Bunker Cave stalagmites: an archive for central European Holocene climate variability. Climate of the Past 8, 1751-1764.

Thomas, E.R., Wolff, E.W., Mulvaney, R., Steffensen, J.P., Johnsen, S.J., Arrowsmith, C., White, J.W.C., Vaughn, B., Popp, T., 2007. The 8.2 ka event from Greenland ice cores. Quaternary Science Reviews 26, 70-81.