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Climatic and environmental changes during the last millennium in the Bükk Mts. (NE Hungary) from a stalagmite record

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This paper presents the high-resolution stable isotope and trace element records of a stalagmite from Hungary (Kiskőhát Shaft, Bükk Mts.). Based on the variation of the isotopic and chemical composition of the carbonate deposit along the growth direction changes in temperature and precipitation amount are assumed.
Our first results on the younger part (ca. 1100-years-old record) of the deposit deposit revealed a number of paleoenvironmental features. We interpreted the changes in proxy data from this speleothem as a result of complex changes in the environmental parameters:

1. cold and/or arid years (lower annual mean temperature or longer winter) reduce the average growth rate or even stop the growth of the stalagmite while warm and humid periods results optimal conditions for the accretion (faster growth rate).
2. more positive oxygen isotope values represents warmer periods (Medieval Warm Period), with a comfortable conditions (wet and warm) for biogenic activity in the soil zone.
3. cooling at the end of Medieval Warm Period resulted a reduced soil biogenic activity revealed by the increases stable carbon isotope values.
4. the climate experienced several warmings and coolings and important changes in the precipitation amount over the Medieval Warm Period – Little Ice Age transition both with slower and faster growth rate compared to the previous time period (MWP).
5. during the period of Little Ice Age (LIA) the cave was colder, the growth rate of the deposits was practically zero (presence of hiata). In the case of growing, stalagmite exhibited colder but humid conditions.

The oxygen isotope variation of the stalagmite can be explained mainly by the changes of the temperature while carbon isotope ratios mainly reflect the changes in water recharge or precipitation amount. Combined trace element variations (Mg, Sr and P) can be used to reconstruct palaeo-aridity changes.

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