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Present-day climate near the Bunker Cave (Germany): comparison of model simulations to observations.

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Because of their high temporal resolution and good preservation, speleothem records are often used as indicators for past climatic conditions. During the last years, substantial scientific progress has been made on the interpretation of these proxy records in terms of temperature and precipitation changes. Unfortunately, the link between climatic conditions within the cave (as depicted from the speleothems) to the climate outside the cave is not straightforward for many cave locations. In order to improve this connection, it is important to have accurate speleothems data as well as high-resolution large-scale climate data.
In this study we focus on the latter problem. Within the framework of the DAPHNE ("Dated Speleothems Archives of the Paleoenvironment") Project we investigated available climate measurements (stations from the Deutsche Wetterdienst and from the Global Network of Isotopes in Precipitation) in the region surrounding the Bunker Cave, which is located close to Iserlohn in Germany. These measurements are compared, on a larger scale, to reanalysis data (ECMWF-ERA40) and simulation results from an atmospheric general circulation model with isotope diagnostics built into the models hydrological cycle (ECHAM). We used statistical downscaling to establish a connection between the large-scale information and the local climate surrounding the Bunker Cave. Understanding how the local present-day climate above the cave is influenced will largely improve our knowledge of palaeoclimate as derived from the speleothem records.