

Abstract DAPHNE meeting in Innsbruck, Austria  
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### **First results of an Earth System model including stable water isotopes**

Speleothem records are high-resolution archives of past climatic conditions and can be interpreted in terms of past temperature and precipitation changes. Earth System Models (ESM) can help to better resolve the link between climatic conditions within a cave (as depicted from the speleothems) to the regional to large-scale climate outside the cave. Here we present first results of an ESM (ECHAM5-MPIOM) that has been enhanced by isotope diagnostics within the model's hydrological cycle. Within the framework of the DAPHNE project ("Dated Speleothems Archives of the Paleoenvironment"), ECHAM5 model results are evaluated for the region surrounding the Bunker Cave, located close to Iserlohn in Germany. Model evaluation includes a detailed comparison of ECHAM5 results to various observations (e.g. stations from the Deutsche Wetterdienst and from the Global Network of Isotopes in Precipitation) and to reanalysis data (ECMWF-ERA40). Furthermore, by using a statistical downscaling approach, we establish a connection between large-scale climate pattern and the local climate surrounding the Bunker Cave. This connection will help improving the interpretation of past local climate variability recorded in the speleothems.