Geophysical Research Abstracts
Vol. 18, EGU2016-13047, 2016
EGU General Assembly 2016

A 250a speleothem record from Bärenhöhle, Austria: comparison with instrumental data

Marc Luetscher (1,2), John Hellstrom (3), Jens Fohlmeister (4), Wolfgang Müller (5), and Christoph Spötl (2)

(1) Austrian Academy of Sciences, Institute for Interdisciplinary Mountain Research, (2) University of Innsbruck, Inst. Geology, Austria (marc.luetscher@uibk.ac.at), (3) University of Melbourne, School of Earth Sciences, Australia, (4) University of Heidelberg, Institute of Environmental Physics, Germany, (5) Royal Holloway University of London, Department of Earth Sciences, United Kingdom

Bärenhöhle, a cave at the northern rim of the European Alps, is ideally situated to capture paleo-rainfall patterns associated with the advection of North Atlantic moisture. Stable isotope and trace element data from a modern speleothem reveal a marked seasonal signal reflecting a dynamic system subject to forced convection. We examined the uppermost section of a 280 mm-long stalagmite covering the last 250 a. Age control is provided by petrographic and chemical lamina counts and validated by the atmospheric radiocarbon peak as well as U-series ages.

Results show a strongly variable signal both in oxygen isotopes and trace element data suggesting a high sensitivity to variations in the hydrological budget. Here, we explore the significance of a major change in the d18O variability starting around 1810 AD and coinciding with the end of a prolonged low in solar activity. We compared these data with instrumental records and identified a close relationship between our proxy signal and decadal solar cycles. We surmise that solar insolation may control local evapotranspiration and thus the hydrological recharge of the karst aquifer during the summer season. The implications of our model are discussed with respect to local environmental conditions during the Little Ice Age.