Geophysical Research Abstracts
Vol. 21, EGU2019-1266, 2019
EGU General Assembly 2019

Reconstructing central Vietnam's hydroclimate and its forcing mechanisms during the Holocene

Annabel Wolf (1), Vasile Ersek (1), David McGee (2), Jack Longman (3), William Henry Gordon Roberts (1), and Duc Anh Trinh (4)

(1) Department of Geography and Environmental Sciences, Northumbria University Newcastle, Newcastle Upon Tyne, UK, (2) Department of Earth, Atmospheric and Planetary Sciences, Massachusetts Institute of Technology, Cambridge, USA, (3) School of Geography and the Environment, University of Oxford, Oxford, UK, (4) Vietnam Atomic Energy Institute, Nuclear Training Center, Ha Noi, Viet Nam

The hydroclimate of Southeast Asia is driven by complex interactions between monsoonal circulation, changes in sea surface temperature (El Niño Southern Oscillation (ENSO), Indian Ocean Dipole), changes in the position of the intertropical convergence zone, and local topography. Compared to the Indian and East Asian monsoon regions, our understanding of Southeast Asia's climatic history remains fragmentary due to the paucity of long and high-resolution palaeoclimate records. Existing studies describe a link between interannual rainfall variability in Southeast Asia and ENSO, but long-term drivers remain unclear.

Palaeoclimate reconstructions from Southeast Asia are vital in order to understand the drivers of the regional hydroclimate under future climate change scenarios. This is especially critical for central Vietnam, where heavy rainfall events occur regularly, making the region particularly vulnerable to the effects of climate change. Central Vietnam's main rainy season is a unique case within the Asian climate system, in that most precipitation falls during the transition between the summer and winter monsoon. Palaeoclimate records from this region should therefore provide an insight into this monsoonal "shoulder" season and its relation with the rainy season in Southeast Asia.

Here we present the first stable isotope and trace element record covering the Holocene from central Vietnam, using a U-Th dated stalagmite from Thien Duong Cave (Phong Nha-Ke Bang National Park). Data from a nearby GNIP station in Dong Hoi show that circa 70% of changes in $\delta^{18}O$ in precipitation can be explained by rainout along the moisture pathway. Thus, speleothem $\delta^{18}O$ from central Vietnam is likely to reflect changes in the moisture pathway and regional circulation patterns. To document changes in local hydrology, we use the speleothem trace element record. By combining both proxies, we provide a critical assessment of hydroclimatic changes and their forcing mechanisms on local and regional scales during the Holocene.