K O L L O Q U I U M

Zentrum für Wasserforschung und Institut für Hydrologie

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Reconstruction of Holocene climate history in central Europe using ice cores of caves in Romania

Although not as spectacular as those in during the last Ice Age, the climatic changes in the Holocene were nevertheless important for both human and vegetation history in Europe. Numerous proxy-based reconstructions have addressed this issue, and we now have a fairly good image of the climate history in Europe, although biased towards the Atlantic-influenced side of the continent, as most of the studies were focused on the western and northern parts of it. Central and Eastern Europe (east of the Alps) have a much poorer image of the climatic history of the past 10,000 years, and the few existing studies are derived mostly from biological proxies, so that the important issue of climate influence on vegetation dynamics is hard to address.
Here we present the first high-resolution reconstruction of climate east of the Alps, based on oxygen and hydrogen stable isotopes measured along a 22 m long ice core extracted from Scărişsoara Ice Cave (Romania).
The stable isotope data spanning the past 2000 years clearly shows four climatic events over this interval, attributed to the Roman Warm period (RWP), the Dark Ages Cold Period (DACP), Medieval Warm Period (MWP) and the Little Ice Age (LIA). Our data suggests that air temperature was highly variable during the LIA and more stable during the warm MWP and RWP. Stable isotope measurements of recently deposited ice (2005-2008), yielded higher values than those from MWP, suggesting that the present day warming is unprecedented over the past millennium.
During the Holocene, the investigated area experienced a warmer-than-present mid-Holocene climate, centred around 5.5 k yrs BP, followed by a gradual decrease of air temperature towards the DACP. The warming started shortly after 8 kyrs BP and was punctuated by a series of rapid cooling, the most notable ones being at ~4.7 kyrs BP and 5.2 kyrs BP. Two episodes of strong cooling are seen in the early part of the record, which we tentatively correlate with the 8.2 k and 9.1 k events.