An ancient cold event 12 thousand years ago provides clues for future climate change

Dr. Chuan-Chou Shen, a Distinguished Professor in the Department of Geosciences, National Taiwan University (NTU), collaborated with Dr. Jud Partin of the University of Texas (UT) at Austin to publish new research results regarding a well-known abrupt cooling event 12 thousand years ago (ka), called the Younger Dryas, in the renowned journal Nature Communications on September 2, 2015 (ref. 1). In this study, researchers used stalagmite records to show that this event occurred rapidly, over decades, in North Atlantic regions but gradually, over centuries, in low-latitude Pacific zones. This finding could offer important clues for future global climate change.

The Younger Dryas affected the global climate at 12.8 to 11.6 ka. It was induced by a sudden influx of freshwater into the North Atlantic and the consequent slowdown of ocean currents due to multi-millennial global warming after the end of the last glacial maximum at 18 ka. Greenland ice core records suggest that the onset of this event occurred rapidly, possibly within 3 years at 12.8 ka, and termination lasted for 60 years at 11.6 ka.

The research team combined new stalagmite-inferred rainfall records from Palawan, Philippines, and published records to highlight the difference between regional climate responses to the Younger Dryas. Although the onset and termination are synchronous across the global records, tropical hydroclimate changes were more gradual (> 100 years) than the abrupt (10-100 years) temperature changes in the North Atlantic Ocean during the climate transition.

A recent on-site monitoring study indicated that the ocean currents in the North Atlantic are already slowing down. Contemporary global summer temperatures have reached record highs; combined with extremely cold winters in the northern hemisphere, these observations could suggest another possible global cooling event in the near future. If such an abrupt event occurs, it may not produce the same climate shifts as those observed in the North Atlantic. For this case, southern Taiwan could gradually become dry and cold, and northern Taiwan could experience cold but humid winters associated with a strengthened northeastern monsoon.

Reference

Judson W. Partin, Terrence M. Quinn, Chuan-Chou Shen, Yuko M. Okumura, Meinhard Bayani R. Cardenas, Fernando P. Siringan, Jay L. Banner, Ke Lin, Hsun-Ming Hu and Frederick W. Taylor. (2015). Gradual onset and recovery of the Younger Dryas abrupt climate event in the tropics. *Nature Communications*, 6:8061, DOI: 10.1038/ncomms9061.

Professor Chuan-Chou Shen
Department of Geosciences
river@ntu.edu.tw