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Reconsideration of climate in Japan during the last deglaciation: a stalagmite record

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Evolution of the East Asian monsoon (EAM) in the last deglaciation has been synchronous with Northern Hemisphere (NH) climate dynamics predominately driven by solar insolation. However, the chronological mismatch recognized in pollen record from Lake Suigetsu, Fukui Prefecture (Nakagawa et al., 2003) has presented an unsolved puzzle in terms of the substantially predating Bolling-Allerod (BA) warming. In a U/Th-dated stalagmite from the Maboroshi Cave, Hiroshima Prefecture, we find that the oxygen isotope record during 15.5-10.7 ka is aligned with that in Chinese caves and Greenland ice sheet. Our results represent a distinct shift corresponding BA warming at 14.6 ka, unlikely the gentle slope around 15 ka in the 14C-dated Suigetsu record. Discrepancy likely results from 14C age calibration data sets due to large anomaly in the atmospheric 14C, which in turn generated feedback to the climate. If so, the climate dynamics in Japan joined with the vigorous climatic teleconnection in NH between the low- and high-latitudinal systems during the transitions into the BA warming. Our record also shows the declined EAM during a period of 12.6-11.3 ka, which reflected on a hiatus interval of the stalagmite likely due to paucity of the drip water. This period broadly corresponds to the Younger Dryas in Atlantic (12.8-11.5 ka), as well to a cool period identified in the Suigetsu pollen record.

Nakagawa, T., Kitagawa, H., Yasuda, Y., Tarasov, P.E., Nishida, K., Gotanda, K., Sawai, Y., Yangtze River Civilization Program Members, 2003. Asynchronous climate changes in the North Atlantic and Japan during the Last Termination. Science 299, 688-691.

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