

石筍酸素同位体組成から推定した岩手県の過去2000年間の降水量変化と飢饉・災害記録

Changes in precipitation over the last 2000 yrs recorded in a stalagmite and famine and disaster records in Iwate Pref.

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Stalagmites are excellent archives of terrestrial paleoclimate information. Some of them are formed in caves near the noosphere and may have recorded past climatic changes influenced human activity. Stable oxygen isotopic compositions of stalagmites especially have been utilized in many paleoclimate studies. However, many factors controlling stalagmite oxygen isotopic composition are known and the degrees of their influence varied from region to region. It is not easy to specify the main controlling factor in Northeast Japan, because the climate is influenced by the East Asian Monsoon and surrounding continental and oceanic air masses struggling with each other. Therefore stalagmite climatic studies is not advanced in this region.

We collected growing stalagmite UT-A from Uchimagi-do Cave, Iwate Prefecture, Northeast Japan. UT-A is 25 cm in height and obvious annual growth layers are found entirely under UV light. The age model of UT-A was based on these growth bands and it revealed that the mean growth rate is 0.12 mm/year and the stalagmite has continuously grown over the last 2000 years. In order to specify the major factor controlling isotopic composition of UT-A, we analyzed changes in annual layer thickness and oxygen isotopic composition of the uppermost part of UT-A and examined the correlations between these changes and weather around the cave over the last 30 years. As the changes in $d^{18}O$ correlates well with the growth rates and amount of precipitation, the oxygen isotopic profiles of UT-A could be interpreted as a proxy of precipitation change over the last 2000 years. The past precipitation deduced from oxygen isotopic composition of UT-A has a 100-200-year cycle and synchronized with famine and disaster caused by excess and lack of precipitation in regional historical records (e.g. Nihon'yanagi, 1968MS). Thus oxygen isotopic composition of stalagmites in Northeast Japan could be a good proxy of past precipitation and we can reconstruct past precipitation and possible famine and disaster events in prehistoric times. Moreover, we may be able to forecast the near future precipitation change in this region by the cyclic fluctuation.

Reference

Nihon'yanagi, S., 1968MS. *Small history of famines in Nanbu-Hachinohe Han in the Thousand Years* (in Japanese). Aomori.

キーワード: 石筍, 安定酸素同位体組成, 降水量, 飢饉・災害記録, 内間木洞, 岩手県

Keywords: stalagmite, $d^{18}O$, precipitation, famine and disaster records, Uchimagi-do Cave, Iwate Prefecture