

Decadal oscillation in hydrogen stable isotope ratio of long chain fatty acids in Lake Suigetsu sediment core

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Japanese weathers are affected by the Pacific Decadal Oscillation (PDO), monsoon, and El Niño Southern Oscillation. In this study, we analyzed the hydrogen isotopes of long chain n-fatty acids in sediment cores from Lake Suigetsu in Fukui Prefecture, and reconstructed variability in the isotopic ratio of precipitation from 1362 to 1662 CE and from 1852 to 2017 CE. Hydrogen isotopic composition (δD) showed decadal oscillation ranging from $\sim -170\%$ to $\sim -120\%$. Between 1362 and 1662 CE, this oscillation corresponded to the decadal oscillation seen in the UK37' -based sea surface temperature (SST) in Beppu Bay. Higher SST corresponded to higher δD . Because the SST in Beppu Bay corresponds to the PDO, we suppose that variability in the δD of long chain n-fatty acids in Lake Suigetsu reflected the isotopic ratio of precipitation that responded to the PDO. In Nagoya, the isotope ratio of precipitation is governed by the position of Baiu front. When Baiu front is developed north of Nagoya, the isotope ratio is high. When Baiu front is south of Nagoya, isotope ratio is low (Kurita et al., 2015 Climate of the Past). This suggest that the position of the Baiu front was linked to the PDO from 1362 to 1662 CE. In the conditions of the negative PDO (high SST in Beppu Bay), the Baiu front was tended to be located north of Lake Suigetsu.

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