

Reconstruction of the climatic information of the Holocene using peat cores in both hemispheres

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Although the Holocene temperature and atmospheric CO₂ concentration have been reported by the study of ice cores, they have uncertainties due to the limited time-resolution and representing temperature of ice cores. In order to discuss the environmental changes for the last 10,000 years, we have studied the vertical profiles of carbon isotope ratios of Sphagnum of two peat cores from high latitudinal areas in both hemispheres: Fallahogy, Northern Ireland and Harrberton, Argentina.

The carbon isotope ratios of the two cores showed a general increasing trend. Interestingly the ranges of the changes were equally 2.5-3permil. A global factor, such as gradual increase in atmospheric CO₂ concentration during last 10,000 years, may be one of the candidates for the cause. The difference of the two carbon isotope profiles well reflected that in condensation temperature records of ice cores between the two hemispheres, indicating that the local temperature also influenced the carbon isotope ratio of Sphagnum. We considered that the isotope signals of local temperature were superimposed on those of atmospheric CO₂ concentration, which is common to both the hemispheres. By comparing the isotope variation with the reported CO₂ concentration records of ice cores and sea level variation, it is considered that our atmospheric CO₂ record reconstructed using carbon isotope ratios of sphagnum may provide more accurate information of the atmospheric CO₂ variation in the past.

Keywords: the carbon isotope ratio, peat, Sphagnum, carbon dioxide concentration, temperature