

AHW018-P02

Room: Convention Hall

Time: May 27 17:15-18:45

Vertical profile of carbon isotope ratio of Sphagnum for discovery of factors that determine the ratio

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The carbon isotope ratios of different parts and components in Sphagnum were measured to establish a relationship between carbon isotope ratio of Sphagnum and environmental factors such as carbon dioxide concentration in the atmosphere at the time of its growth. Samples of modern Sphagnum used in this study were collected ones from the surface of Unzen Gensei-Numa-Fen and commercial ones of dry peat from New Zealand. Each individual specimen was cut into 1cm sections, and was further dissected into three parts: stem, horizontal branch, and pendant branch. Fat and waxes of each fragment was removed with a mixture of the benzene and ethanol. The deoiled samples were further treated to obtain ligninous component and cellulose components. They were combusted with CuO to produce CO₂, and the carbon isotope ratio was measured using a stable isotope ratio mass spectrometer. The top and bottom sections of each individual specimen were analyzed for the carbon-14 ages.

The results of the carbon isotope ratios of Sphagnum were close to results by Loader et al. (2007). The carbon isotope ratio of ligninous components was greater than that of cellulose component. The carbon isotope ratios of cellulose component in pendant branch and horizontal branch were similar, and that in stem tended to be lighter than that in the other two parts. This isotopic distribution was consistent with that reported by Loader et al. (2007). The relationship between environmental factors and carbon isotope ratios of Sphagnum will be discussed when a statistically significant number of data is obtained.

Keywords: Sphagnum, carbon isotope ratio, environmental condition, modern