4.63.P15

An atmospheric CO_2 change during the last 10,000 years recorded in the Ozegahara peatland, Japan

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The changes of atmospheric CO_2 concentration during the last 10000 years have not been clearly established. The carbon isotope of peat mosses is known to vary depending mainly on the atomospheric CO_2 concentration [1]. We performed the precise measurenment of the carbon isotopic ratio of a peat core in the Ozegahara peatland, which has been accumulating for more than 10000 years, using a double-inlet stable isotope ratio mass spectrometer. The peat core sample was quite uniform consisting maily of peat mosses and a suitable sample for the reconstruction of the past CO_2 concentration.

The incipient rise observed during 8000 and 10000 years is due to the transition from earlier vegetation [2]. The near-surface increase was the result of the selective decay of holocellulose [2]. The moving average of $\delta^{13}C$ of peat showed three periodical increases as much as 1‰ with a period of approximately 2500 years.

Recently Siddall et al. [3] reported a sea level change during the Holocene, which seems to be synchronized with our $\delta^{13}C$ change. The consistent variation between our data and the sea level would indicates that:

1) 10 m rise in sea level would correspond to an increase of atmospheric CO_2 concentration by 10 ppm and to an temperature increase by 0.3 ˚C.

2) their data of sea level [3], although they have considerable uncertainty, may be accurate and are considered to be a reflection of a global phenomenum.

3) the global climate seems to have changed with a period of 2500 years during the last 10000 years.

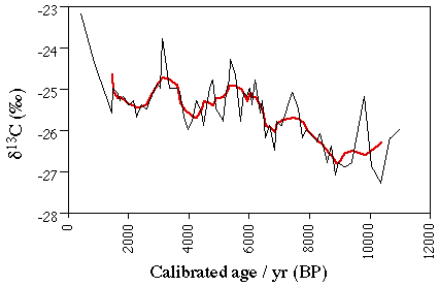

Fig. 1 The $\delta^{13}C$ change for bulk peat of the Ozegahara peatland.

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4.63.P16

$\delta^{13}C$ and ^{14}C in peat of Western Siberia

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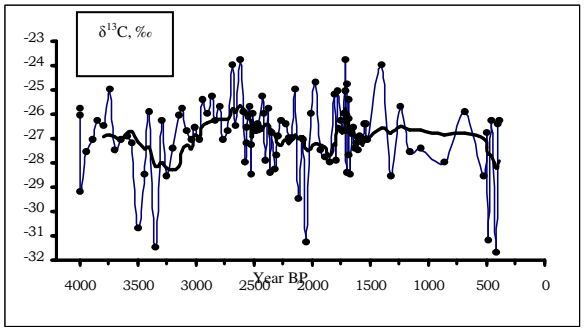
Ongoing anthropogenic perturbations to the atmosphere and biosphere increase the risk of future abrupt changes in the climate system and generate concern about the ability of natural ecosystems to respond to rapid climate change. Study of past climatic events and biotic responses can inform us about potential future change [1].

The stable carbon isotopic compositions of peat have been used as a proxy indicator for relative temperature and humidity or precipitation [1, 3].

Isotopic fractionation of carbon associated with photosynthesis in living terrestrial and freshwater plants is dependent on three main factors: $^{13}C/^{12}C$ value in the inorganic-carbon source used by the plants for their photosynthesis, photosynthetic pathway and environmental parameters [2].

For environmental reconstruction we studied peat from Gladilov's peatbog, Western Siberia (56˚22′ N, 68˚33′ E). We used the following studies: pollen, $\delta^{13}C$ values. The chronology is based on radiocarbon dates.

Consequently, the $\delta^{13}C$ values of the peat entire profile (Figure) range from – 31,7 to – 23,8 ‰. In the period from around 4000 BP to 2500 BP climate changed from a long-term wet period to long-term dry and larger continentality. Around 3800-3550 BP, 3150-2150 BP the climate was dry and warm; around 1800-1550 BP climate was wet and warm. The cold and drought episodes are occurred around 3500-3200 BP, 2600-2500 BP; the cold and wet episodes are occurred around 2400-2300 BP, 2150-1800 BP.



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