

Reconstruction of climate during the Last Interglacial and the Last Glacial periods based on TOC profile of Takano Formation.

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Generally, the Last Interglacial period is regarded as warm period, but large climate variation actually occurred during the period. The early time of the period (MIS 5e) may be warmer than the present days, and the study of paleoclimate during the period can bring about significant information to estimate how climate systems may change with global warming. However, high-resolution and continuous study of paleoclimate during the Last Interglacial period is scarce in Japan as well as in middle latitude land region.

The Takano Formation is a relict lake sediment from 20 to 150 ka in Takano Basin, southern Nagano City (Kimura, 1987). The all-drilling-core of Takano Formation (TKN-2004 core) was performed in June 2004 at former Nobuta Elementary School, and almost continuous sediment of 53.88m length was recovered successfully (recovery rate 99%). The cored sediment can be correlated well to the Upper to Lower Members of Takano Formation, and is composed of clayey silt sediment associated with 87 tephra layers. Some of tephtras are identified as wide-spread marker tephtras such as DKP (or DSP?), Epm, On-Ng, Aso-4, On-Kt, Kikai-Tozurahara (K-Tz), On-Pm1, Aso-ABCD, Ata, Dpm, SK, BT34, BT35, Nanko-3, Nanko-2, Aso-3, Aso-2, and Csc (Nagahashi et al., 2005; Takeshita et al., 2005).

The age model of TKN-2004 core was determined using radiometric ages and calibrated depths of the marker tephtras such as DKP (55ka; 14C, pollen stratigraphy), Aso-4 (89ka; K-Ar), K-Tz (98ka; FT), Ata (108ka; K-Ar), Aso-3 (123ka; K-Ar), and Aso-2 (141ka; K-Ar), postulating that whole sedimentation rate is constant. The calibrated depth means the depth which excludes the thickness of all tephtra layers.

The TOC and TN contents were analyzed at 1cm-interval, and their time-sequence profile was constituted based on the age model. The TOC profile shows considerable fluctuations with long (several thousands to several ten thousands year) and short (a several hundreds to a few thousands year) periodicities. The long periodicity fluctuation of TOC contents is similar to delta-18O profile during MIS 3 to 6 by SPECMAP, and stage and/or substage boundaries are almost same. The fluctuations of short periodicity are very similar to Dansgaard-Oeschger cycle in Greenland ice core. Interstadial Stages 9 to 25 are well identified on TOC profile. Furthermore, marker tephtra horizons are well identified on the climate history through the TOC profile. This information is very useful to discuss about the process of sedimentation and topographic development in Japan.