Horizon of a wide-spread Daisen-Kurayoshi (DKP) tephra in the latest Pleistocene with relation to the global climate change

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Daisen-Kurayoshi tephra (DKP) erupted from Daisen Volcano in the Chugoku district more than 55 ka ago is one of the famous and distinguishable marker tephras in the latest Pleistocene. It is characterized by heavy mineral composition with clear hyperthene crystals, and is important to clarify geographical conditions in the initial stage of the Last Glacial time.

Total organic carbon (TOC) content in the drilled sediment (NJ88) from Lake Nojiri fluctuates in concordance with the oxygen isotope ratio curve of the ice core from Greenland in detail. Pollen composition also supports the climate changes estimated from the TOC content. Based on the curve fitting between TOC and oxygen isotope ratio, a warm stage named Oerel and cold stage called MIS 4 can be correlated safely. Additionally, interstadial stages numbered as 16 to 19 are also identified. DKP tephra situates just above the peak of IS 18 in the latest MIS 4.

Takano Formation, sediment of an ancient lake of 30 to 140 ka, is composed of homogenous clayey sediment, and DKP tephra is also intercalated in the upper horizon. TOC content around the DKP horizon shows the fluctuation corresponding with Oerel warm stage, cold MIS 4, and warm MIS 5a. TOC peaks of IS 17 to 20 are also identified. DKP situates just above IS 18.

Therefore, it is concluded that DKP tephra situate at the latest MIS 4, especially just above IS 18. Then, the age of DKP seems to be around 60 ka, a little older than the former estimation in comparison with GRIP ice core timescale or SPECMAP timescale. This fact may become a key to clarify the glacier development in the Japanese Alps in relation to climate conditions.