Japan Geoscience Union Meeting 2010
(May 23-28 2010 at Makuhari, Chiba, Japan)

ACG032-10 Room: Exibition hall 7 subroom 2 Time: May 26 11:24-11:37

Climate changes for the last 30 ka based on total organic carbon contents in lake sediments, central Japan

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Total organic carbon contents (TOC) of lake sediments have been measured and compiled from the three lakes, namely, Lakes Nojiri, Aoki and Biwa, for the past 30 ka. Temporal change of the normalized TOC contents in the lake are very similar each other. TOC contents vary concordantly with vegetation changes revealed by pollen analysis and showed also a positive relationship with winter temperature in a case of Lake Kizaki. Therefore, the temporal variation of normalized TOC recognized commonly in the three lakes can be regarded as a proxy of temperature prevailed in central Japan. Based on this proxy, the climate around 28 ka, a little after the fallout of AT tephra was coldest, and the cold climate had continued until around 20 ka. A slight warming started around 20 ka, but it became cold again a little later. Distinct warming started in 14 ka, associated with a little retreat into a cool condition. Warming became to its peak at 11 ka tentatively, and a slight cool climate prevailed around 10 - 9 ka. Stable warmness was dominant around 7 - 6 ka, and it become gradually cool toward the present. On the way, the relatively-warm terms were around 4 and 2 ka. These climate changes have common features to those recorded in the ice cores from Greenland and in the marine sediments form North Atlantic Ocean.

Keywords: climate change, total organic carbon content, Holocene, Last Glacial Maximum, Lake Nojiri, Lake Biwa