

Transport processes during MIS 5.1 and MIS 3 to 2 estimated from fluvial terrace gravels in Tama and Sagami rivers

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Fluvial terrace sediments are formed by depositional process of rivers in the past, therefore it may be possible to infer the paleo-river transport processes and the paleo-climate from terrace sediments. To reveal the differences of the river transport processes between MIS 5.1, which is a relative warm period, and MIS 3 to 2, which is a relative cold period, this study examines the change in size and roundness on gravels of fluvial terraces.

Field survey was conducted at Musashino 2 terrace (M2 terrace; MIS 5.1) and the Tachikawa 2 terrace (Tc2 terrace; MIS 3 to 2) in the fan region in the Tama River, and at the Sagamihara 3 terrace (Sg3 terrace; MIS 5.1) and the Tanahara terrace (Th terrace; MIS 3) along the Sagami River around the fan apex in the Sagami River. The mean maximum gravel size and the mean roundness were obtained from the long axes of the 10 largest gravels and 50 gravels, respectively. The distance from the fan apex and the mean slope of the terraces are obtained from 5m mesh DEM published from Geospatial Information Authority of Japan.

Because the Tama and Sagami rivers are estimated to have been under similar scale and paleo-climate conditions, we attempted to explain uniformly the changing trend in the mean roundness of both rivers. As the results, it is estimated that the roundness of MIS 5.1 gravels increases at downstream reaches than that of MIS 3 to 2 gravels.

If the production of fine gravels is active, which is made by crushing, fine gravels should be angular. Conversely, if the production of gravels is inactive, fine gravels which tend to be transported longer distance should be rounded. Relationships between the size and roundness of the measured gravels of mountain region and fan region in the Sagami River suggest that a transport process accompanying with large gravel crushing was active in MIS 5.1. Postulating that gravel crushing occurred by debris flows, it is suggested that the effect of debris flows from tributaries was active during MIS 5.1 than during MIS 3 to 2.

Keywords: fluvial terrace, terrace gravels, Tama River, Sagami River, debris flow