

Reexamination of the mainstream riverbed height during the Last Glacial period at the narrow pass of the Ara River, connecting Chichibu Basin and Kanto Plain, central Japan

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Along the upper river reaches in the northeastern and central Japan, valley filling occurred during the Last Glacial period. Generally, numerous steep tributaries join the mainstream in the upper reaches. Therefore, for reconstruction of the river profile changes along glacial-interglacial cycles, it is necessary to consider the effect of the sediment supply from tributaries. Takahashi and Sugai (2016) reexamined the origin of the filltop terrace formed in the Last Glacial period in the upper reaches of the Tama River, and indicated that the filltop terrace is toe-cut terrace (tributary fans truncated by the lateral erosion of the mainstream; Larson et al., 2015) and that the height of the filltop terrace is 7 to 23 m higher than that of the mainstream riverbed during the Last Glacial period. Similarly to the Tama River, it is necessary to identify toe-cut terraces at the rivers in the northeastern and central Japan and to reexamine the river profile changes of the mainstream during the Last Glacial.

Several fluvial terraces are distributed along the Ara River, central Japan. Yanagida et al. (1982) and Yoshinaga and Miyadera (1986) discussed the development of these fluvial terraces and the river profile changes since the Last Interglacial period although the effect of tributary confluence has not been considered enough. The narrow pass between Minano and Yorii is the key segment for understanding the relationship of fluvial terrace development between the Chichibu Basin and the Western part of Kanto Plain, the height of the mainstream riverbed during the Last Glacial period in this segment has not been clarified enough. Based on the classification of the fluvial terraces in the narrow pass of the Ara River, this study suggests that the two filltop terraces are toe-cut terraces, and indicates the necessity to reexamine the river profile changes of the Ara River during the Last Glacial.

Fluvial terraces in the narrow pass of the Ara River are classified into Oyabana (Ob), Kagemori (Km), and Onohara (On) terrace levels (Yoshinaga and Miyadera, 1986). Ob and Km terraces are filltop terraces with thick gravel beds, On terrace is a strath terrace with thin gravel bed. Ob and Km terraces are distributed around tributary junctions and have gentle slope toward the mainstream. Sharp scarps separate these terraces and On terrace. These topological characteristics suggest that Ob and Km terraces are toe-cut terraces and are not the mainstream riverbed during the Last Glacial period.

The height of the mainstream riverbed can be estimated from extending the cross-sectional profiles of On and Km terrace surfaces toward the mainstream. The profile of the mainstream riverbed during the Last Glacial period converges with that of On terrace toward upstream. Yanagida et al. (1982) suggested that Ob and Km terraces converge with On terrace toward upstream and that the incision due to sea-level lowering migrated toward upstream because Ob and Km terraces are continue to Kushibiki (MIS 5a to 5c) and Yorii (MIS 3) terraces downstream (Yanagida et al., 1982). Yoshinaga and Miyadera (1986), in contrast, suggested that the profile of Ob terrace do not converge with On terrace. Whether the Ob and Km terraces are toe-cut terraces or not is important to reconstruct the profile of the mainstream riverbed during the Last Glacial period. This presentation reports the river profile changes during the Last Glacial period based on chronological and sedimentological analysis of the terrace deposits.

References

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