

Formation mechanism of Musashino alluvial fan with long profile analysis of depositional surface of Musashino gravel layer

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1. Introduction

Musashino Upland is considered as the alluvial fan formed by Tama River. However, knickpoints exist on the upland, and so it is not the simple alluvial fan. Musashino Upland is formed out of gravels and sediments transported from Kanto Mountains in the upper stream, on the other hand, eustatic sea level changes have influenced the formation process of Musashino Upland in the lower stream. Although Dury (1959) and Kaizuka (1969) modeled river long-profile changes responding to the glacial-interglacial cycle, they model cannot explain the river process in the middle stream well. To reveal the river process including the middle stream, we carried out the terrain measurements on Musashino-men which is part of Musashino Upland.

2. Methods

The elevation of the depositional surfaces of Musashino gravel layer (ESMG) were extracted from 5692 boring XML data with the program code. The interpolation was performed with ArcGIS, and the contour map of ESGM was attained. Long profiles of ESGM were made by GIS.

3. Results

Depositional surface of Musashino gravel layer can be divided into three areas, I, II and III based on the long profile. In the area I, the long profile is downward convex, and the slope is about 2–3‰ in the lower end. In the area II, the long profile is straight, and the slope is about 2–3‰. In the area III, the long profile is upward convex, and the slope is steeper than that of the area II.

4. Discussion

The three areas are considered to be formed through different processes. In the area I, gravels from the upstream formed alluvial fan. In the area III, sea level drop from MIS 5e to MIS 4 dominantly influenced the formation processes. In the area II, the aggradation forming the alluvial fan and the degradation following the sea level drop was balanced, and the original flat landforms developed in MIS5e was slightly modified and covered by the Musashino gravel layer almost parallel to the flat landform.

Keywords: Tama River, Musashino Upland, Musashino gravel layer, long profile, alluvial fan