Fan delta deposits at the lower reaches of the Tenryu River, central Japan

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Japanese Islands have large sediment production and high relief energy because of heavy rainfall driven by a monsoon climate and active crustal movements. Additionally, some coasts have narrow shelf width, and their gradient is relatively steep. As a result, fan deltas occurred at the mouth of the Kurobe, Fuji, Abe, and Tenryu rivers, which originate from the Chubu Mountain Range and flow into the Japan Sea and the Pacific Ocean.

Previous studies about the fan deltas are mainly based on aerial photographic interpretation and analysis of existing boring data. Recently, many studies have discussed the relationship between sedimentary environments and their accumulation rates of Late Pleistocene to Holocene coastal depositional systems by analyzing radiocarbon-dated borehole cores. This method can be applied to the fan delta deposits. We obtained two sediment cores (TR1 and TR2) from the fan delta developed at the lower reaches of the Tenryu River, central Japan. Sedimentary facies, radiocarbon dates, and sediment properties of the cores were analyzed for clarifying stratigraphy and sedimentary environments of the fan delta.

Two sediment cores are similar to each other, and are divided into three depositional units, Units 1 to 3, on the basis of the sediment facies and sediment properties in ascending order. Unit 1 consists of alternation of pebble to pebbly sand, which is interpreted as fluvial sediments. Unit 2 is characterized by organic-rich, sand-mud alternation. Electric conductivity suggests that the unit was formed under marine influence. Unit 3 is composed of clast-supported gravels underlain by mud. Radiocarbon dates show that each unit was deposited almost simultaneously between the both sites. Units 1 and 2 were formed before 9600 cal yr BP, and 9600 to 7100 cal yr BP, respectively. Unit 3 was accumulated after about 7100 cal yr BP. Large accumulation rates, approximately 12 m/kyr, occurred between about 11000 and 8000 cal BP. In contrast, accumulation rates decreased considerably after about 8000 cal BP. The change is probably related to the rate of post-glacial sea-level rise. Moreover, upward-coarsening successions observed at both cores around 8000 cal yr BP suggest the beginning of regression.