

Numerical study on sediment supply from paleo-Tonegawa during the last 13k years

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Numerical estimate of sediment supply from paleo-Tonegawa, which had provided dominant part of sediments to Kanto Plain region during Holocene, is presented. Paleo-Tonegawa is a river that flowed to Tokyo Bay before humane modification of the river channel. The rate of sediment supply during the last 13k years is calculated by hydrologic model HydroTrend, which incorporate changes in drainage area due to sea level change and changes in temperature and precipitation. Average sediment supply is first estimated from drainage area, topographic relief and average temperature at the river mouth. Daily and yearly value of sediment load is then calculated using synthetic daily rainfall. The model predicts 350 cubic meters per second as the average water discharge, and 569 cubic meters as the average annual sediment load, and each of these values are comparable to field measurements. The model predictions indicate that annual sediment load is controlled by occurrence and magnitude of large floods and is less attributed to average water discharge, because large floods provide sediment load several times larger than average annual load, whereas average water discharge is controlled more by annual precipitation than by infrequent floods. The results also suggests possible occurrence of hyperpycnal flows, which is generated when excess density due to suspended material exceeds the density difference between river and sea water.