

Gravel and sand particle structures on bar surfaces and sediment pulse movements in the Sendai River, Tottori

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A slope failure supplied a huge amount of metamorphic black gravel particles, nearly 8,000 dump trucks equivalent, to a middle part of the Sendai River in 1998. After this event, sediment pulse movements of these black particles along the Sendai River were surveyed several times. As a large flood occurred in 2011 after a long time in the Sendai River, we conducted our survey on sediment pulse movement again; detecting ratios of black particle on bar surfaces through sieving gravel according to phi scale, classifying between black particles and others, and weighing them. We also recorded gravel and sand particle sedimentary structures after Kodama (1994) on bar surfaces through a line sampling method. The result shows intermittent 13 km movements of sediment pulses of 16-32 mm & 32-64 mm particles over 13 years. Moreover, a large flood in 2011 had changed gravel and sand particle sedimentary structures from sand rich conditions to sand starved ones. Sediment pulse movements along the Sendai River depend not only on flood discharges but also on gravel particle sedimentary structures which relate to "sand rich" or "sand starved" conditions on gravel bar surfaces: that is size mixture effects.

Keywords: sediment pulse movement, gravel and sand sedimentary structure, surface gravel on river bed, size mixture effect, the Sendai River in Tottori, gravel particles of the Sangun Metamorphic rocks