



## **Cyclic steps due to the surge-type turbidity currents in flume experiments: effect of surge duration on the topography of steps**

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Field observations of turbidity currents and seabed topography on the Squamish delta in British Columbia, Canada revealed that cyclic steps formed by the surge-type turbidity currents (e.g., Hughes Clarke et al., 2014). The high-density portion of the flow, which affects the sea floor morphology, lasted only 30-60 seconds. We are doing flume experiments aiming to investigate the relationship between the condition of surges and topography of resultant steps. In this presentation, we are going to discuss about the effect of surge duration on the topography of steps.

The experiments have been performed at Osaka Institute of Technology. A flume, which is 7.0 m long, 0.3 m deep and 2 cm wide, was suspended in a larger tank, which is 7.6 m long, 1.2 m deep and 0.3 m wide, filled with water. The inner flume tilted at 7 degrees. As a source of turbidity currents, mixture of salt water (1.17 g/cm<sup>3</sup>) and plastic particles (1.3 g/cm<sup>3</sup>, 0.1-0.18 mm in diameter) was prepared. The concentration of the sediments was 6.1 weight % (5.5 volume %) in the head tank. This mixture of salt water and plastic particles poured into the upstream end of the inner flume from head tank for 3 seconds or 7 seconds. 140 surges were made respectively. Discharge of the currents were fluctuated but range from 306 to 870 mL for 3s-surge, and from 1134 to 2030 mL for 7s-surge. As a result, five or six steps were formed respectively. At the case of 3s-surge, steps located at upstream portion of the flume moved vigorously toward upstream direction, whereas steps at downstream portion of the flume moved toward upstream direction at the case of 7s-surge. The wavelengths and wave heights of the steps by 3s-surge are larger than those of 7s-surge at the upstream portion of the flume, but the size of steps of 3s-surge are smaller than those of 7s-surge at the downstream portion of the flume. In this condition of slope and concentration, the longer surge duration, i.e. larger discharge of the current transports the sediment further and makes the steps larger and active at the further location from the source of the currents.