# Characteristics and depositional intervals of gravity flow deposits, off Tokachi, Hokkaido

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An area Off Tokachi, eastern Hokkaido, has been attacked by subduction-related large earthquakes, like Tokachi-Oki Earthquake in 1952. Although interval of the earthquakes were inferred to be about 100 years based on historical records, some reports of tsunamites around Tokachi to Nemuro suggested about 500 year intervals of large earthquakes. Such large earthquakes often provoke sedimentary gravity flows under the sea. There is, however, no report about estimation of depositional intervals of gravity flow deposits in this offshore area. In this study, I will report characteristics and depositional intervals of gravity flow deposits that might be caused by earthquakes obtained from off Tokachi.

Research area is located off southeast of the Tokachi Plain and the water depth of the area is less than 2,000 m. Cores have been obtained with a gravity corer of tubes of 12 cm in diameter and 5 m long from 11 localities and four of them (GH02-1024, 1026, 1028, 1031) were analyzed for this study. Three of them (GH02-1024, 1026, and 1031) were located to the south of the Hiroo Submarine Canyon and GH02-1028 were north of the Hiroo Submarine Canyon. Core lengths are 238cm (GH02-1024, water depth -1,296m), 217.5cm (GH02-1026, -1,011m), 133cm (GH02-1028, -1,712m), 205cm (GH02-1031, -1,709m). The cores were photographed and described on board. In the laboratory, X-ray photographs of the cores were taken, water and sand contents were measured and residual sand grains were described under the stereoscope. In addition to those analyses, AMS-14C datings were carried out for benthic foraminifera and shells.

The core of GH02-1028 contains seven gravity flow deposits and has different characteristics from those of other three cores. Water content of GH02-1028 show more than 150% at core bottom and sand content of that is less than 10% at deeper than 95 cm bsf (below the surface). These characteristics of GH02-1028 can be correlated to 20 cm bsf of GH02-1024 and 35 cm bsf of GH02-1031. AMS-14C ages are 4,530+/-50 BP (4,210 cal BP) at 92 cm bsf of GH02-1028 and 5,870+/-50 BP (5,858 cal BP) at 19 cm bsf of GH02-1031. They indicate that sedimentation rate of GH02-1028 is about six times faster than that of GH02-1031.

GH02-1028 consists of diatomaceous silty clay with small proportion of pumice and lithic grains. Few benthic and planktonic foraminifera are recognized. The gravity flow deposits show weak lamina structures, but do not have grading structures. Upper two gravity flow deposits include abundant pumice grains and lower five deposits are rich in lithic fragments, quartz, and feldspar within diatomaceous mud matrix. Sand contents of all gravity flow deposits show less than 50%.

Possible source of gravity flow deposits in GH02-1028 is a steep slope from shelf edge to -1,500 m water depth. Surface sediments obtained from this slope sometimes contain unconformity covered by only 10 cm thick Holocene sediments. I infer that large earthquakes trigger sedimentary gravity flows on the steep slope and redeposited on the gentle slope area. Seven gravity flow deposits indicate about 600 year intervals based on AMS-14C ages. Because the ages were obtained from benthic foraminifera, true ages are probably younger than the results and the depositional intervals are shorter. This result is comparable with the 500 year intervals of tsunamites at eastern Hokkaido, and supports the hypothesis that larger earthquakes could occur off Tokachi area at the interval of about 500 years. More precise correlations between tsunamites on land and gravity flow deposits under the sea are important to estimate intervals of large earthquakes in this region.