Japan Geoscience Union Meeting 2013
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HCG33-P01 Room:Convention Hall Time:May 20 18:15-19:30

Sedimentary process of small washover sediment due to storm surge

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Miyakojima typhoon occurred in the vicinity of Guam on September 12, 1959. Then, Taisei area was affected a maximum wave height 6.2 to 7.0m at 13 to 14 September 18 in the west coast of Oshima Peninsula, southwestern Hokkaido. We excavated small pits (depth: 1.5m) in Hiragana lowland (3.8m elevation, distance from the shoreline: 55m) reported by Nanayama et al.(2000), we described the depositional process and sedimentary structures in detail again. The 1959 washover deposits are poorly sorted fine to very coarse sized sand including gravel and become thinner and the grain size becomes finer landward. These are divided into two sedimentary units, such as in Units S and T. Unit S shows a upper flow regime bedforms, such as anti dunes and plane bed, and Unit T shows a lower flow regime bedforms, such as 2D dunes. The 2D dunes are discriminated as alternation of fine and coarse grain layers. The coarse grain layer was deposited as intermittent gravity flow deposit from top of slip face, and fine grain layer was deposited in the form of grain-fall from suspension.Our interpretation of deposition process is as follows. A large amount of deposits are carried by waves all at once. As the flow velocity irregularly decreases, particle discretion repeated to make such alternative layer. It is concluded that the facies change from Unit T to Unit S occurred because the power of the storm surge decreased as typhoon moved at 13 to 14 September 18.

Keywords: 1959 Miyakojima Typhoon, washover sediments, sedimentary structure, sedimentary process, grain-size analysis

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HCG33-P02 Room:Convention Hall Time:May 20 18:15-19:30

Approach for understanding the Holocene upheaval and subsidence in the Miyazaki Plain

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Holocene uplift rate of the Miyazaki Plain was estimated based on the elevations and depositional ages of four terrace surface (Shimotajima I to IV surfaces; Nagaoka et al., 1991). However, age data are still poor except for the Shimotajima I surface. We report new data of detailed description of abandoned lagoon sediments of the Shimotajima II to IV surfaces.

Nagaoka et al. (1991) suggested that the uplift of the Miyazaki Plain was not seismic because there had been no historical records mentioned rapid uplifts due to large earthquakes. They inferred that it was controlled by isostacy, involved with the subduction of Kyusyu-Palao ridge, relatively light crust. However, deep seismicity data (Uehira et al., 2001) and seismic tomography (Wang and Chao, 2006) show high-angle subduction of the Phillipine Sea Plate in the southern Kyusyu, which seems to be inconsistent with the isostacy hypothesis. Our study will contribute to in-depth discussion concerning the trigger of the Holocene uplift of the Miyazaki Plain.

In the Shimotajima II surface, we studied outcrop sequences exposed due to the river improvement work. Depositional ages will be identified based on close-packed flakes of floodwoods intercalated in sand and silt, as well as sediments themselves. In the Shimotajima III surface, we did multiple borings in the abandoned lagoon sediments. Based on the core observation, terrestrial sediments including pumice fall deposits are covered with sand beach sediments including shell fragments and ichnolites. The succession of strata means an event of subsidence or sea level rise. In the Shimotajima IV surface, we did borings near the pond in the inland side of a sandy ridge. The boring core includes coaly swamp sediments interbeded in sand. We are doing microfossil and tephra analyses, radiometric carbon dating, organic carbon analysis, quality analysis of interstitial water, as well as detailed observation of the sediments. These results will be presented in this session.

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ESR study on thermal metamorphism of kerogen in sedimentary rocks from Oga Peninsula.

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Thermal metamorphism of organic components in geological samples is irreversible and applied to a geo-thermometer. Vitrinite reflectance, Raman and IR spectroscopy have been used for this purpose. Carbon radicals in a carbonaceous sample, which are produced under thermal cracking process, have a potential to be another unique geological thermometer. Until present, many studies on carbon radicals were accumulated for various coal and oil samples including their pyrolysis experiments.

It is known that carbon radicals in kerogen show a broad spectrum at g = 2 by electron spin resonance (ESR) spectroscopy. Bakr et al (1990) reported that the linewidth of ESR spectrum of extracted kerogen decreased as the increase of burial depth[1)]. However, such narrowing of ESR spectrum was not observed in laboratory pyrolysis experiments[2−3)]. We have performed annealing experiments at higher temperature up to 600^{o}C for kerogen extracted from organic-containing sedimentary rocks from Oga Peninsula, such as asphaltum, mudstone and shale. As a result, narrowing of ESR spectrum about one-fourth of original was firstly observed for a sample heated at 600^{o}C for 210min.

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2) A. Uesugi and M. Ikeya, Jpn. J. Appl. Phys. **40**. (2001) 2251-2254.
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Keywords: carbon radical, thermal metamorphism, ESR, kerogen

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Formative processes of channel bar examined from a GPR data of bar and a comparative flume experiment

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Formation of braid bars and point bars in a river channel were influenced by water discharge, slope gradient and sediment supply. GPR (Ground Penetrating Radar) survey was conducted on a braid bar at the Abe River in Shizuoka Prefecture, central Japan. A braid bar, 340m long, 50m wide, 1.5m high, consists of cobble to fine sand including pebble. Internal sedimentary sturutures of the bar were revealed by the GPR survey. The braid bar was divided into two parts, mainly bar and the side bar. The mainly bar was coarser and higher than side bar. Longitudinal GPR profiles obtained along down current direction, showed parallel beddings in the upstream of bar deposits and forest beddings in the downstream one. Transverse profiles showed parallel beddings in the mainly bar and channel-fill structures in the side bar. The formation of the braid bar that a high water-discharge and sediment supply during flood caused the bar migration and accretion was inferred from the sedimentary structures.

We used a plane flume, 3.6m long, 0.9m wide, 0.3m high, to form a braid bar. In the experiment, a large sediment supply caused deposition of braid bars in the channel. We will consider a formation of a channel bar observed in an actual river comparing a flume experiment.

Keywords: Channel bar, GPR, flume experiment

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Discordancy between coastal topography formed by wave erosion and relative sea-level change in a numerical experiment

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A numerical experiment was performed to investigate the relationship between coastal topography formed by wave erosion and relative sea-level change. The mathematical model used in this study includes the effect of wave attenuation depending on width of the surf zone. This experiment also considered the strength of the rock, the gradient of initial slope and tidal range. The result of the experiment suggests the case that the record of periods of stable sea level does not appear as topography, or that step develops without rapid change of relative sea level, because of the effect of wave attenuation.