Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

AHW28-12 Room:314 Time:April 30 12:00-12:15

Changes of mineral composition and load of suspended materials in the Saru River, Hokkaido before and after 2003

IRINO, Tomohisa[1*] ; NAKADA, Satoshi[2] ; IKEHARA, Ken[3] ; YAMASHITA, Youhei[1] ; SEKI, Osamu[1] ; NAGAO, Seiya[4]

[1]Hokkaido University, [2]Kyoto University, [3]Institute of Geology and Geoinformation, National Institute of Advanced Industrial Science and Techn, [4]Kanazawa University

Supply of detrital material from river can affect the continuity, sedimentation rate, and composition of marine sediments deposited in front of the river system, which is controlled by the relief, weathering rate, and precipitation of the hinterland. In spite of the small drainage area, the small rapid rivers in the island arc located under warm humid climatic condition supply a huge amount of detrital materials to the surrounding seas. In addition, sediment transports tend to be concentrated during flooding events. In order to understand the depositional history and utilized it for paleo-climate reconstruction, it is necessary to study a mechanism of suspension generation and controlling factor of its composition.

We conducted a field survey during 2005-2011 in the Hidaka area in Hokkaido, Japan, to evaluate the influence of the flooding mud to marine sediments, promoted by the typhoon precipitation in August, 2003. We selected the Saru River as our target, and conducted the river water sampling and turbidity measurements along the main stream and a major branch called Nukabira River. Water samples were taken from the surface of flow center of each stream and stored in plastic bottles. The collected water was filtered through Millipore filter with 0.4 um opening and the suspended particles were collected and weighed in the laboratory. Mineral composition of the collected suspended materials on the filter was measured using an X-ray diffraction analysis (XRD).

Distribution of the turbidity in the Saru River drainage shows that high turbid water is localized only to the Nukabira River and others are relatively clear. The turbidity seems to be supplied only from one local source. Mineral composition of the suspended material in the Nukabira River does not contain serpentine, while the upper main stream before the junction with the Nukabira River contain serpentine. The suspended material in the lower main stream is also characterized by the lack of serpentine because of higher contribution from the Nukabira River. The surface sediment at the mouth of the Saru River also shows the same character. We also examined the mineral composition of marine surface sediments supplied as flood mud during the typhoon event in August, 2003. The flood mud contains the major amount of serpentine, which was not expected from the mass budget of suspended materials from the upper main stream and the Nukabira River under usual condition.

In order to estimate the suspension loads from the upper main stream and the Nukabira River, we compared the water discharge and suspension loads and established the rating curve for each tributary. Water discharge data for the main stream was available from the Water Information System of the Ministry of Land, Infrastructure and Transport, Japan. However, since the database contains too many missing data for the Nukabira River after 2008, we calculated the water discharge for this branch using the Hydrometeorological and multi-Runoff Utility Model (Nakada et al., 2012). As a result, the rating curve of the upper main stream is steeper than that of the Nukabira River, and the suspension load of the upper main stream could be larger than the Nukabira River at the water discharge of $>$300 m3/s. Therefore, the Nukabira River transports 5-10 times more suspended materials than the main stream during the usual discharge, which is reversed during the flooding situation.

Keywords: river suspended material, Saru River, Typhoon Etau, mineral composition