Duration of sediment supply from various source rocks deduced from mineral composition of the sediment from the Beppu Bay, southwetern Japan

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The Beppu Bay located in the northeast Kyushu Island, the southwestern Japan receives detrital materials mainly from two drainage systems, the Ohno River and the Oita River. Surface geology of the Ohno River drainage area is roughly divided into two as intermediate to felsic volcanic area covered with andosol in the southwestern headwater region and Paleozoic to Mesozoic sedimentary rocks covered with brown forest soil to the southeast. The drainage basin of the Oita River is located in the north of the Ohno River drainage, which is characterized by mafic volcanic rocks in the headwater region as well as interediate to acidic volcanics along the river path.

Since the Beppu Bay receives the materials from such geologically contrasted drainage systems, the temporal changes in the provenance for the sediment can be utilized to seek for the erosion and sediment supply from hinterland basin. For this purpose, we examined the mineral compositions of BP09 and BP15 sediment cores, covering the last 7,000 yrs, collected from the center of Beppu Bay as well as sediment from surface soils and river beds using X-ray powder diffraction.

Beppu Bay sediments mainly consist of laminated hemipelagic clay with frequent intercalation of feldspathic sand layers. Feldspar compostion (anorthite (An) / albite (Ab) ratio) of the sediment was within the range of surface soils in the drainage of Ohno and Oita Rivers. Feldspars in fine hemipelagic sediments and sand layers in lower sequence showed more An-rich composition while sand layers in upper sequence are more Ab-rich, suggesting that the source rocks supplying sand grains had changed from time to time while the source of fine grained materials have been maintained consistently during these 7,000 years.