

Luminescence age of Holocene sand dunes and alluvial lowlands at costal area in Tonbetsu plain, northern Hokkaido, Japan

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In Tonbetsu plain, northern Hokkaido, a series of fluvial terraces and sand dunes are distributed whose detailed chronology is unknown. Reconstructing the Holocene geological evolution in Tonbetsu plain is very important, due to the existence of many prehistoric sites are found on the sand dunes and their around area and also due to a rare ecosystem around the sand dunes and alluvial lowland (Fujita, 2014; Hamatonbetsu Town Education Board, 2014). To establish the chronology of young coastal sediments and fluvial terraces in Tonbetsu plain we used a combination of different luminescence dating methods including OSL dating of quartz and post-IR IRSL (pIRIR; Thomsen et al., 2008) dating of feldspar using both fine silt and sand sized grains. The OSL signal of the coarse grain quartz samples from the dune sand is dominated by slow components, suggesting that the sand sized quartz is not a suitable dosimeter (Thiel et al., 2015). Therefore we applied pIRIR dating of K-feldspar (pIR₁₅₀; Reimann and Tsukamoto, 2012) to the sand samples.

The results indicate that, 1) pIR₁₅₀ dating is an effective tool to date the Holocene sand sized sediments in Tonbetsu plain, 2) it is possible that the sources of quartz are different depending on grain size or geologic period, because the OSL ages of fine grain quartz are reliable in the study area (Kondo et al., 2007), 3) the sand dunes have been formed from the inland side sequentially after ca. 5.7 ka following maximum of the Holocene transgression in central Tonbetsu plain, 4) in southeastern Tonbetsu plain, the sand dune formation has been continued until the late Holocene, with alterations of stable (inactive) stages and destruction events by storm surge, and 5) in northwestern Tonbetsu plain, the sand dune formation stopped by the late Holocene, or younger sand dunes close to the coast were eroded completely by waves.

We will also show the luminescence dating results of the alluvial lowland and lower fluvial terraces in the study area.

Reference

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Keywords: sand dune, alluvial lowland, pIRIR / OSL dating, Tonbetsu plain, Holocene