

# Differences of the sound producing sand from a feature of geological background

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The sound producing sand is well known as musical sand or booming sand. It occurs on the seacoast of every continent, island, and along lake shores. Japan is one of the islands surrounded by ocean, and the sound producing sand is more common and widespread in occurrence. The sand from 30 beaches in the Japanese coasts has made sound. Some of the beaches in Northeastern to Northern Japan and they are fall into 3 geological lines of granite in magnetite series of the Cretaceous, and sandstone of the Upper Jurassic and Miocene age. This study is performed to characterize the sound producing sand geologically and mineralogically. Also the abundances of REEs and other trace elements were determined.

Three sand beaches are located in part of sandstone region in Jurassic age and in part of granite region, and 6 sand beaches are composed from tuff and agglomerate of Tertiary age. All the sound producing sand samples are characterized by medium grain size, 1/2-1/4 mm. They show high concentration of SiO<sub>2</sub>. Sand samples from Jurassic period are mainly composed of sub-angular shaped quartz with a few amounts of magnetite and feldspar. The Cretaceous and the Miocene sand samples had relatively high SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub> and Na<sub>2</sub>O contents and this indicate that most of these composite are quartz and feldspar. Also they have positive Eu anomaly which is not shown in other sand samples in the Jurassic period. The base metal elements of Co, Ni, Cu and Zn correlates well with TiO<sub>2</sub>, MgO and Fe<sub>2</sub>O<sub>3</sub> in sand samples of the Jurassic and Miocene. In these samples, Co, Ni, Cu and Zn correlates well with Eu and Co negatively correlated with Fe<sub>2</sub>O<sub>3</sub>. Sand from the Jurassic line has light REE enriched and flat chondrite-normalized patterns that are similar to local source, sandstone. The sands containing lower HREE contents are due to enriched quartz and feldspar contents. The Cretaceous and Miocene period sand samples have high content of REE and a large positive Eu anomaly as a result of presence of feldspar. There is no significant difference of sand samples in major chemical composition but the chondrite-normalized REE patterns in sand samples are different from the features of their parental rock. This implies some of the REE patterns of sand samples may be useful for deciphering the source rocks of the sand.