

Formation process of the Noshiro coastal dune, northeastern Japan: insight from internal structure and its distribution

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The Noshiro coastal dune extends from the Oga Peninsula in a direction NNE through the margin of the northern Hachiro-gata reclaimed land separating from the Japan Sea and is classified as a superpositioning coastal dune. It is about 30 km in length and reaches a height of almost 40-50 m at its peak (the highest peak is 65.2 m in height, Shiraishi 1990). It is composed mainly of detritus originating from the Neogene to the Quaternary strata around the Ou Mountains and delivered by the Yoneshiro River; which has a drainage basin of approximately 4,100 km².

The stratigraphical division; the units composing the Noshiro coastal dune are labeled, in ascending order, "older dunes (Do)", "older humic soils (Ho)", "younger dunes I (Dy-I)", "younger humic soils (Hy)", and "younger dunes II (Dy-II)" and formation processes of the Noshiro coastal dune have mainly been researched by Shiraishi (1990; 1993). However, the following research has not previously been carried out. Based on the characteristic shape of the dune, which is elongated in a longshore (N-S) direction, this study focuses on the formation process of the dune in the longshore direction. We discuss the processes involved in the formation of the dune, based on topographic maps and on the internal structure discussed in our field survey.

A survey using topographic maps and field studies indicated differences between the topographical characteristics and formation processes of the northern and southern parts of the Noshiro coastal dune.

(1) In E-W direction, the northern part (approximately 750 to 1,500 m) of the dune is shown to be wider than the southern part (approximately 500 to 1,000m). (2) The height of the southern parts of the Noshiro coastal dune tends to be higher than that of the northern parts. (3) At the southern site, a wavy humic soil layer was recognized in the lower part of Dy-I. It means that small sand dune bodies had been scattered at Dy-I forming age.

In addition to differences in crustal movements dipping a northeastward, it is evident that there is another factor to be considered to explain the difference between the topographic characteristics. We deduce that a decreasing supply of the beach deposits that supplied the coastal dune sand, caused a change in the formation processes of the northern and southern parts of the Noshiro coastal dune. It is possible, therefore, that swarm of barchans formed a complex internal structure in the southern part of the dune. It would be worth evaluating the sedimentary supply and its affect on the formation process of other coastal dunes situated in a longshore direction.

References

Shiraishi, T. 1990. Holocene geologic development of the Hachiro-gata lagoon, Akita Prefecture, northeast Honshu, Japan. *The Geological Society of Japan* 36: 47-69.

Shiraishi, T. 1993. The Holocene development of the coastal dunes, Akita Prefecture, northeast Honshu, Japan. *The Japanese Geotechnical Society* 41(3): 25-30

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