

Dune morphology under bidirectional flows: the effect of change of flow velocity, duration and angular variation in water flume

Keisuke Taniguchi[1]; Noritaka Endo[2]; Hideo Sekiguchi[3]

[1] Earth and Space Sci., Osaka Univ; [2] Kanazawa U. Earth Sci.; [3] DPRI, Kyoto Univ.

<http://astrogranma.ess.sci.osaka-u.ac.jp/>

It is generally considered that dune morphology depends on the available sand volume and the variability in wind direction. Wasson and Hyde (1983) used RDP/DP as an indicator of the variability of wind direction in the phase diagram of formation conditions of sand dunes. Drift potential (DP) and resultant drift potential (RDP) were defined in Fryberger (1979) and widely used for a measure of wind regime. However, the estimation of variability in wind direction using RDP/DP have a problem that there are a number of flow conditions with the same value of RDP/DP.

In this study, we carried out flume experiments on the development of sand ripples under bidirectional water flows. We used an isolated sand pile without sand supply as the subject of this experiments. This condition simulated an isolated dune such as barchan dune and seif dune, which developed where the available sand was insufficient to cover the entire dune field. RDP/DP was varied in two ways: one is the change of duration ratio, another is the angular variation of two flows. As a result, we found that the angular variation is more influential than the duration ratio in determination about whether a barchan or seif will be formed.

Wasson, R.J., Hyde, R., 1983. Factors determining desert dune type. *Nature* 304, pp. 337-339.

Fryberger, S.G., 1979. Dune Forms and Wind Regime. In: McKee, E.D. (Ed.), *A Study of Global Sand Seas*, vol. 1052. USGS, Washington, pp. 137-169.