# Size distribution of barchan dunes by a simple model

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Sand dunes are found in many places such as deserts, the sea bottom and the surface of Mars.They are formed through an interplay between sand and air flow or water flow. When a strong flow blows, sand grains are dislodged over the sand surface. The entrained sand grains collide with the ground and are sometimes deposited. This process takes place repeatedly resulting in the formation of a dune. The pathway of the flow is guided by dune topography. Morphologic shapes of sand dunes are determined by the direction of flow and the amount of available sand on the ground. When the flow is unidirectional and the sand is abundant, dunes with straight crest lines perpendicular to the flow known as transverse dunes are generated. On the other hand, when a unidirectional wind blows steadily but the amount of available sand is insufficient for covering the entire bedrock, crescent-shaped dunes called barchans are formed. A barchan has two horns that point downwind. Most of these researches mainly focused on the morphology and the formation of a single barchan. However, dunes are usually found in groups rather than isolated objects. Dynamics of the barchan's group has come to be focused on only recently.

Thus we has investigated a dune field dynamics of barchan by a simple model.The model included only saltation and avalanche as the basic sand transport processes. We reproduces a few hundred of barchans in a numerical field. The size distribution are fitted by lognormal distribution. This result is similar with real dunes in a desert. Next we studied a contact of barchan corridors, which is dune field formed by unidirection flow in a few tens kilometers long. In the corridor, barchan's size is selected and a homogeneous dune distribution. We studied the collision of two corridors.

In the numerical simulation, we found that the size of barchan in the boudary of corridors is uniform.