

Distribution of Sand Dunes with a Cellular Model

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Sand dunes are found in many places such as deserts, the sea bottom and the surface of Mars. Most fascinated dune is barchan, which is crescent dune. We reproduced many barchans in numerical simulations and investigate the dynamics. The motion of sand grains is realized by two processes: saltation and avalanche. Saltation is the transportation process of sand grains by flow. We reproduced a lot of barchans in numerical field by above model. Barchan releases sand from tips of two horns. The downwind barchan can capture the sand stream. Also, barchans sometimes collide each other. These direct and indirect interaction forms complex barchan fields. The size distribution of a few thousand of barchans is fitted by lognormal distribution well. This indicated that the small barchans exist around the large ones and the large barchans are around small barchans. The average size of barchans increase as the amount of supplied sand do.

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