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Measurement of saltation flux and its dependency on the soil wetness in the Taklimakan Desert, China, during ADEC IOP1 and IOP2

MASAHIDE ISHIZUKA[1*], MASAO MIKAMI[2], YUTAKA YAMADA[3], FANJIAN ZENG [4], and WEIDONG GAO[4]

[1]*Department of Environmental Systems, Wakayama University*
[2] *Meteorological Research Institute, Japan Meteorological Agency*
[3] *The Institute of physical and Chemical Research*
[4] *Xinjiang Institute of Ecology and Geography, Chinese Academy of Sciences*

As a part of the Aeolian Dust Experiment on Climate Impact (ADEC) [1], we have made a field research at a sand desert and a gobi (i.e., a desert which soil surface consists of sand and pebbles with flat surface) desert in the south of the Taklimakan desert, China. During two intensive observation periods (ADEC IOP1: April 2002 and ADEC IOP2: March 2003), measurements of the meteorological elements by an automatic weather station and the number of saltation particles at 32 bin classes from 38 to 654 um by a newly developed sand particle counter were conducted [2]. The results were summarized as follows; (1) saltation flux at the gobi site in the April 5 2002 case is one order larger than that of sand dune though the distance between the sites is about 4 km. This will be because that the number of the parent soil around 80 μm at the gobi site is more than 10 times larger than that of the dune site, (2) a height dependency of saltation particle size and number was found in the gobi site, i.e., the saltation particle size distributions at the gobi site in the April 5 2002 case indicate that the number size distribution of the coarse particles, 117-554 um at 20 cm height is greater than that at 30 cm height (3) soil wetness dependency on the saltation flux was clearly found, i.e., the saltation fluxes on the wet conditions, about 0.01 m^3/m^3,of volumetric water content were 10 times smaller than those on the dry conditions for particle size from 69 to 203 um, (4) the threshold wind velocities at a height of 3.8 m on the dry and wet conditions were estimated to be 7.5 and 9.5 m/s, respectively.

Keywords: Aeolian dust; Saltation flux; Sand particle counter; Soil moisture; Taklimakan Desert.

References

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