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Preliminary results of the ADEC first IOP in April 2002

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A five-year experiment to investigate the impact of aeolian dust on climate (ADEC) started in April 2000. This Japanese-Seno cooperativeproject aims to estimate the total supply of mineral dust to the atmosphere and to measure the degree of radiative forcing direct effect by aeolian dust particles. The first IOP was put into practice from April 8 to 21, 2002. One of the main objective of this IOP is to observe the wind erosion processes and parameterize them for the GCM dust model. To achieve this, direct observation of the wind erosion process and characterization of the dust is required. For this purpose, in situ observationwas done at seven sites around the Tarim basin and Dunfuang. We will introduce here the preliminary result of Aksu (lat. 40?37'07"N, long. 80?49'43"E) and Qira (lat. 37?00'56"N, long. 80?43'45"E) in the north and south of theTaklimakan Desert. In these sites, observation was made for roughness length, friction velocity, stability, soil particle size distribution and water content on the ground surface, infrared radiation, solar radiation, and stream wise dust flux. Equipment to be used includes automatic weather stations, visibility meters (Mikami, 2000), dust particle measuring systems (Yamada et al., 2001), and Doppler Sodar systems.

For understanding the saltation process, we developed the Dust Particle Measuring System (DPMS). This system enable us to get the total amount of the drifting sand particle, its size class distribution, and time variation of dust particle size distribution. The system consists of dust catcher and dust particle counter. A cyclone type dust catcher makes use of centrifugal force effect by thedrifting sand particle is used in order to collect the drifting dust particles. Dust particle counter is designed for the sequential measurement of dust particle size drifting on the ground surface. For this purpose, we use a semiconductor laser of 670 nm in wavelength and 1 mm in diameter. This instrument is originally from snow particle counter first developed by Schmidt (1977). When a dust particle passes through the laser beam, the detector output drop in proportion to its cross-sectional area. From the time sequence of the detector output, dustparticle size, from 40 micron meter to 400 micron meter, and its number of individual bins can be obtained. Stream wise dust flux can be estimated from these data. For long-term use in desert, the instrument is designed for integral-type including sensor, data logging system, and data storage memory (Compact Flash Memory). In addition, solar panel with 42 W of maximum output power is used for the power supply. As is the same as dust catcher, detector slit is designed to be always turning to the windward direction by use of wind plate.

During the First IOP, we came across two weak dust event. Here we summarized the floating dust particle size distribution just before andthe after the dust storm event, soil particle size information on the gobi surface, and verification of the Gillette scheme used in the MRI GCM dust model. Threshold wind velocity at the gobi site was decided at 7.4 m/s and the saltation flux at each particle size is also discussed.