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Title: Continuous measurement of aerosol characteristics by ADEC sky-radiometer network

Abstract:

Aeolian Dust Experiment on Climate impact (ADEC) started in April 2002 to investigate the supply of dust to the atmosphere and to estimate the radiative forcing of dust using the transportation model. In this project, we developed a sky-radiometer network in order to investigate the characteristics of aeolian dust on the way of transportation from the source region to the Japan area. From the analysis of the sky-radiometer data, we can get optical thickness in the visible to near infrared regions and size spectrum from radius 0.01 to 5 μm . The four observation sites are at Aksu, Qira, Shapotou and Qingdao in China and the four observation sites are at Naha, Fukuoka, Nagoya and Tsukuba in Japan. We planned and implemented Intensive Observation in March and April, 2002 and in April, 2003. After the first Intensive Observation period (IOP) in 2002, we have continued a measurement by the sky-radiometer except the calibration, maintenance and malfunction periods as much as we can. We have accumulated the continuous observation data by the ADEC sky-radiometer network. We investigated the aerosol parameters retrieved from the archived sky-radiometer data. The optical thickness has seasonal variation. In the source region (Qira, Aksu, and Shapotou), optical thickness is larger in spring than in summer, and optical thickness is smaller in summer than in spring. The sites in Japan (Fukuoka, Nagoya, Tsukuba) have also seasonal variation; optically thick in summer, and optically thin in winter. Angstrom exponent in Qira is almost constant (0.0 to 0.5) all over the season. This means that in the source region the major part of aerosol consists of dust all over the season. At the other site, Angstrom exponent in spring is lower than that in the other season. The lower Angstrom exponent in spring is observed even in Fukuoka site, which is located in the most southern region and surrounded by the ocean. The lower Angstrom exponent events were more frequently observed in the spring, 2002 than in the other year. This corresponds to more frequent occurrence of dust event in spring 2002 than in the other years. The sky-radiometer network detected the phenomena except the dust event; for example Siberia forest fire in May, 2003.

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