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Title: Long term variation of Aeolian dust over globe

Abstract: Through radiation processes, soil dust has a significant role to make climate of the earth. To estimate of it's impact, it needs to know temporal and spatial variation of distribution of aeolian dust in the atmosphere. To know this, we developed a global numerical model of aeolian dust. A dust model which consists of dust emission model, transport model and dust deposition model combine to a global atmospheric general circulation model (AGCM). To get realistic and homogenous meteorological fields in time and space, the AGCM is working under the control of nudging by the reanalyzed data of zonal and meridional wind, which is produced by NCEP. Under the same surface condition for vegetation cover and soil type, 25 years simulation from 1979 to 2003 is done. Thus it is considered that year to year variation of dust events simulated in this model is caused by it of meteorological fields reproduced in the AGCM. Results show that recent increase of Asian dust (2000, 2001, 2002) is well simulated. Year to year variation of global amount of dust emission, deposition and air burden is almost same characteristics as it of Saharan dust, and it does not show recent increase as shown in Asian dust. Major part of Saharan dust transports to Atlantic sea and reach the northern part of southern America. Concentration is higher in lower part of atmosphere, especially planetary boundary layer. On the other hand, Asian dust mainly suspended a strong wind caused by baloclinic cyclone and accompanied cold front. Dust is transported to east ward and also move higher altitude. Residence time which is measured by the ratio of dust emission rate to amount of air burden dust is almost same for smaller particle than 2 micro-meter diameter and 9-days. This duration is same of the water cycle time of whole global atmosphere. For larger particle, residence time becomes shorter with larger particle diameter.

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