

B 4

黄砂のライダー観測

KOSA measurement by lidar

岩坂泰信、小野 晃、今須良一、大和政彦

Y. Iwasaka, A. Ono, R. Imasu, M. Yamato

名古屋大学・水圏科学研究所

Water Research Institute, Nagoya University

Lidar measurements and airborne-particle collections were made during KOSARP 87 ('KOSA' Research Program of Nagoya University; April - May 1987) at Nagoya (35° N, 137° E) to research the vertical distribution of Asian dust (KOSA) particles and the transport of these particles. According to the lidar measurements, the highly concentrated particle layers with large depolarization ratio were frequently in the range from about 2km to about 6km.

An electron microscope observed the morphology of individual particles in the height range from near the ground to about 4400m suggested that the particle layers contained many soil particles. It is reasonable to consider that KOSA particles were very frequently transported from Asian desert areas to Japan Islands in the middle tropospheric heights, even when the effect of the KOSA was not detected near the ground. This 'background KOSA' has the concentration of about $1.9 \sim 25 \mu\text{g}/\text{m}^3$ at the layer peaks and one order smaller than the values of severe KOSA. However, the contribution of the 'weak KOSA' to global budget of soil particles is not negligible since occurrence-frequency of 'weak KOSA' is considerably high. The reaction of soil particles sampled on the vapor deposited Ca thin-film suggested that some of particles were coated by water or solution containing SO_4^{2-} . Such particle can absorb various atmospheric gases, and therefore the KOSA particles can play an important role in geochemical cycle of many chemical constituents as chemical reaction site in the atmosphere and the carrier of the chemical products.

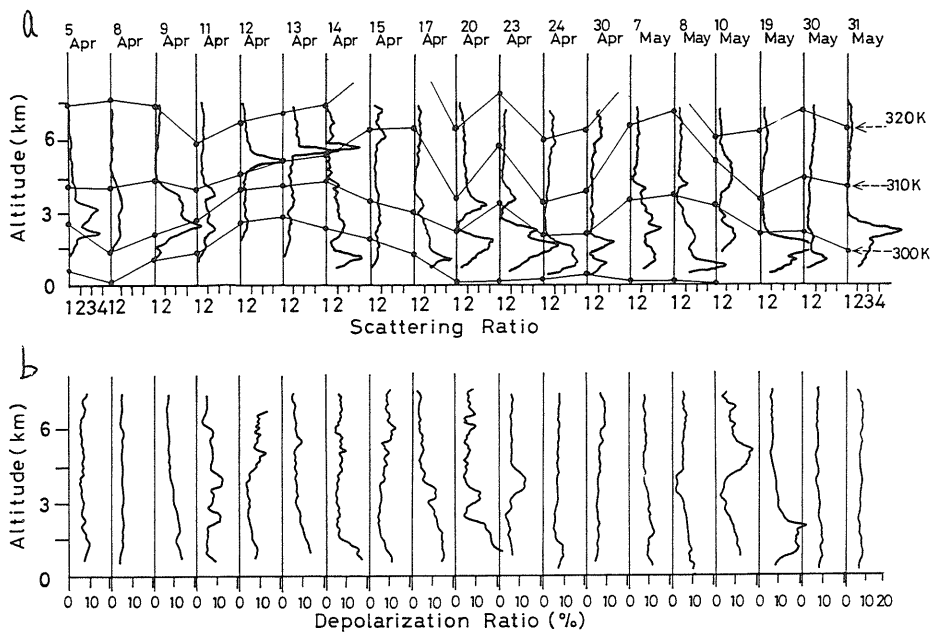


Figure 1. Scattering ratio (a) and depolarization ratio (b) measured by a lidar at Nagoya (35° N, 137° E) during the KOSARP 87 period. The heights of potential temperature of 290 K, 300 K, 310 K and 320 K are estimated on the radiosonde measurements at Hamamatsu (about 100km northeast of Nagoya).

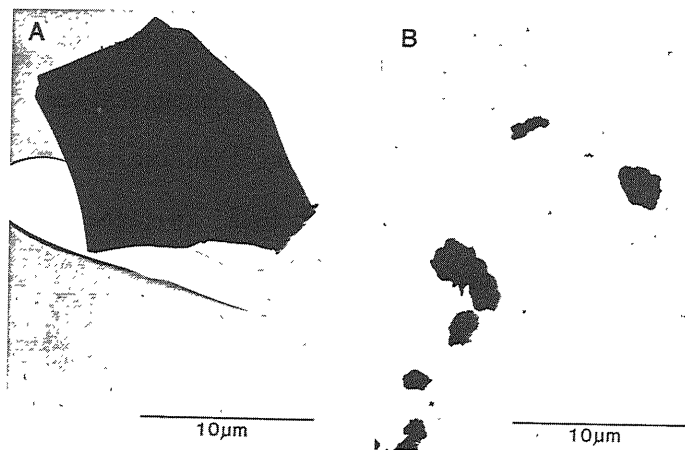


Figure 2. Electron micrograph of particles collected on carbon film. The particle collection was made at 4350 m (a) and 2250 m (b) heights during the flight of 9 April (14:00 - 16:00 LT).