

# 29B8 Lidar Observation of Kosa (Asian Dust) over the Gobi Desert During the Dust Season of 1991

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Airborne yellow dusts originating from the Asian Continent and transported to Japan is known as "Kosa (Asian dust)". In late winter and spring, the Kosa is normally experienced in Japan. The aerosols associated with Kosa events play an important role in cloud physics and radiative transfer process in the atmosphere over the Eastern Asia. In addition, the Kosa acts as a good tracer for studying the tropospheric circulation. In the study of the long-range transport of the Asian dust, one of the most important and elusive parameters is the vertical structure of the Asian dust over the source regions in China (Kai et al. , 1988).

As a part of HEIFE (Sino-Japanese Cooperational Program on the Atmosphere-Land Surface Interaction Processes in the Heihe River Basin), a lidar observation of the Asian Dust was carried out over the Gobi desert and its oasis from 2 May to 10 May 1991, in order to determine vertical profiles of the Asian dust (Mitsuta, 1994). The HEIFE experimental site

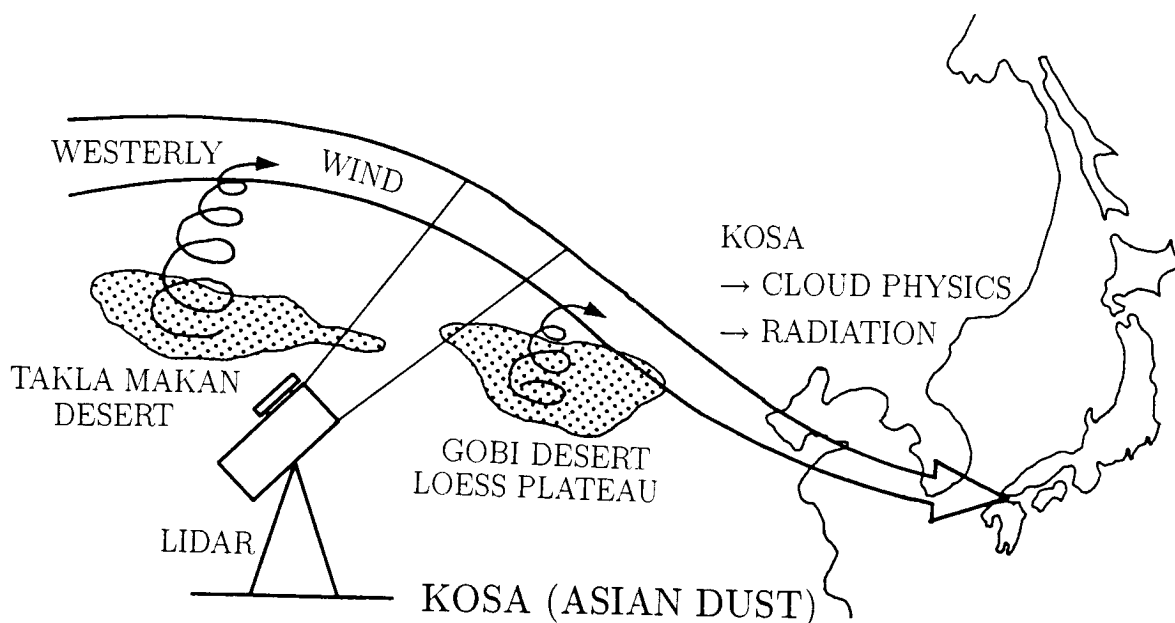


Fig. 1 Schematic diagram of the Asian Dust (Kosa) and the lidar observation.

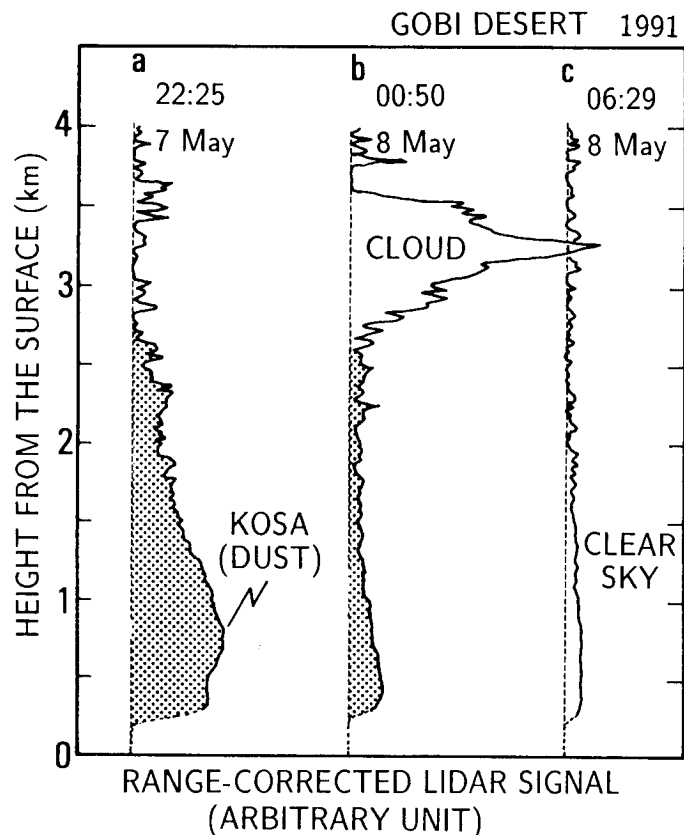


Fig. 2 Range-corrected lidar signals at the Gobi Desert during the duststorm on 7-8 May 1991. (a)22:25 7 May, (b)00:50 8 May, (c)06:29 8 May 1991

is estimated as one of the sources of the Asian Dust.

A portable lidar has been developed for the observation. The weight of the lidar is about 80 kg. The lidar is composed of a laser diode, a 280-mm receiving telescope, two photomultipliers, a signal processor and a laptop computer. The lidar measures the spatial distribution of aerosol and cloud particles from the surface layer (about 300m) to the lower troposphere (about 10km) with a range resolution of 20 m.

During the observation period, two strong duststorms occurred on 5 May and 7 May due to the passages of the cold front. The wind speed was more than 10 m/s, and the ground surface was extremely dry. The strong wind carried up the dusts to greater heights. The sky was filled with dusts, and the visibility was less than 1 km. The lidar observation shows that the dust layers at height of 300-3000m from the surface were present at the night. The maximum altitude of dust layers was about 4500m MSL, if we consider the altitude of the experimental site is 1500m MSL. This means that the dusts over the Gobi Desert and its surrounding areas were lifted up at the long-range transport height of the lower troposphere.

#### REFERENCES

- Kai, K. et al., 1988: Lidar observation and numerical simulation of a Kosa (Asian Dust) over Tsukuba, Japan during the spring of 1986. *J. Meteor. Soc. Japan*, 66, 457-472.
- Mitsuta, Y. ed., 1994: Proceedings of International Symposium on HEIFE. 722p.