PLAN OF MDS LIDAR VALIDATION

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Abstract

For validation of the MDS lidar, two ground-based lidars at Naha(26N), Japan and Bandung(7S), Indonesia, are useful. Stratospheric aerosols have been observed by these lidars in the framework of WCRP/SPARC. In order to measure tropospheric aerosols and clouds, some modifications are necessary for these lidar systems.

Airborne lidars are more mobile and useful for validation of the MDS lidar. The MRI airborne lidar developed in early 1990s will be used for measurements of planetary boundary layers and tropospheric aerosols. An airborne water vapor DIAL system will be also available if it is successfully developed by NASDA, MRI and TMU.

The optical depth of aerosols will be obtained by sunphotometers at Minamitorishima(24N) and Yonagunijima(24N) which are maintained by JMA as WMO/GAW stations.

Also information on cloud heights will be useful for wind data(i.e.,SATOV data) obtained by Geostationary Meteorological Satellites. Those data obtained by the MDS lidar, ground-based lidars, sunphotometers and GLI onboard ADEOS-II or NASA-TOMS will be very valuable for mapping of tropospheric aerosols which is very important for understanding of the effects of aerosols on the radiation budget and atmospheric chemistry.

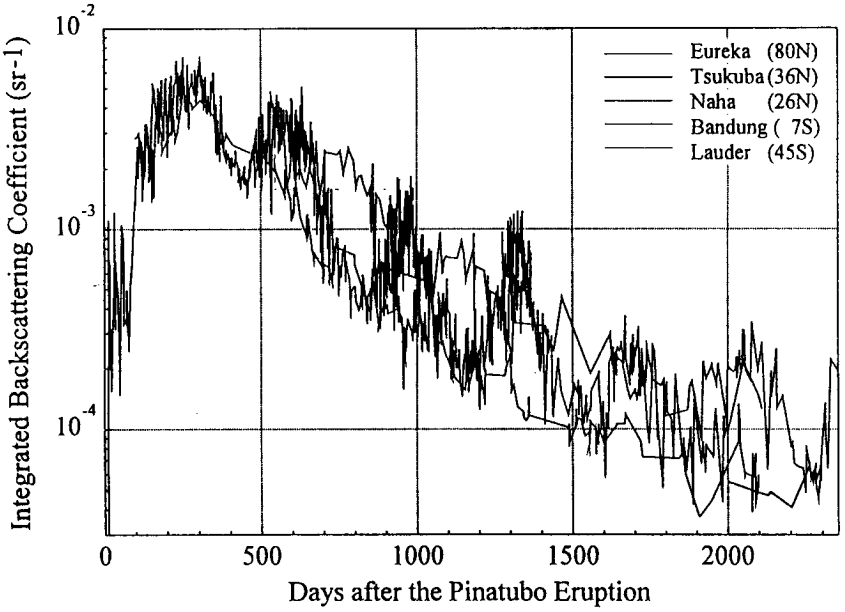


Fig.1 Integrated Backscattering Coefficient IBC, above tropopose observed at five lidar locations. The time scale is in days following the Mt.Pinatubo eruption on 15 June 1991(Uchino et al., Geophys. res. Lett., 21, 809, 1994).

Fig.2 Compact lidar system at Naha(26N)(Nagai et al., J. Met. Soc. Japan, 71, 749, 1993).

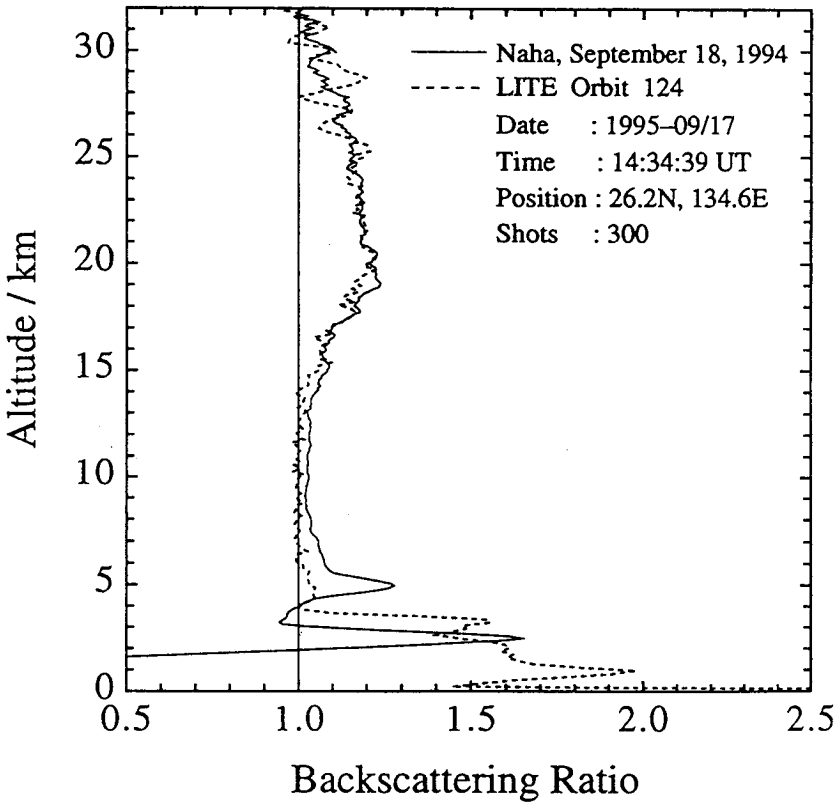


Fig.3 Comparison between LITE and Ground-based lidar over Naha on 18 September 1994.

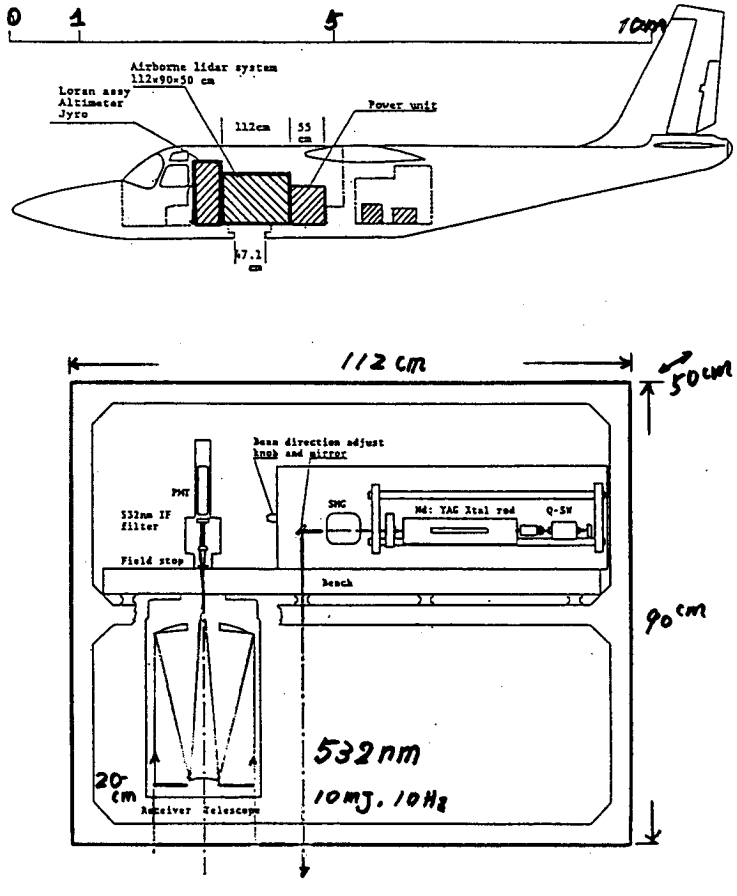


Fig.4 Schematic diagram of airbore lidar system(Uchino, J. Space Technology and Science, 10, 53, 1994).

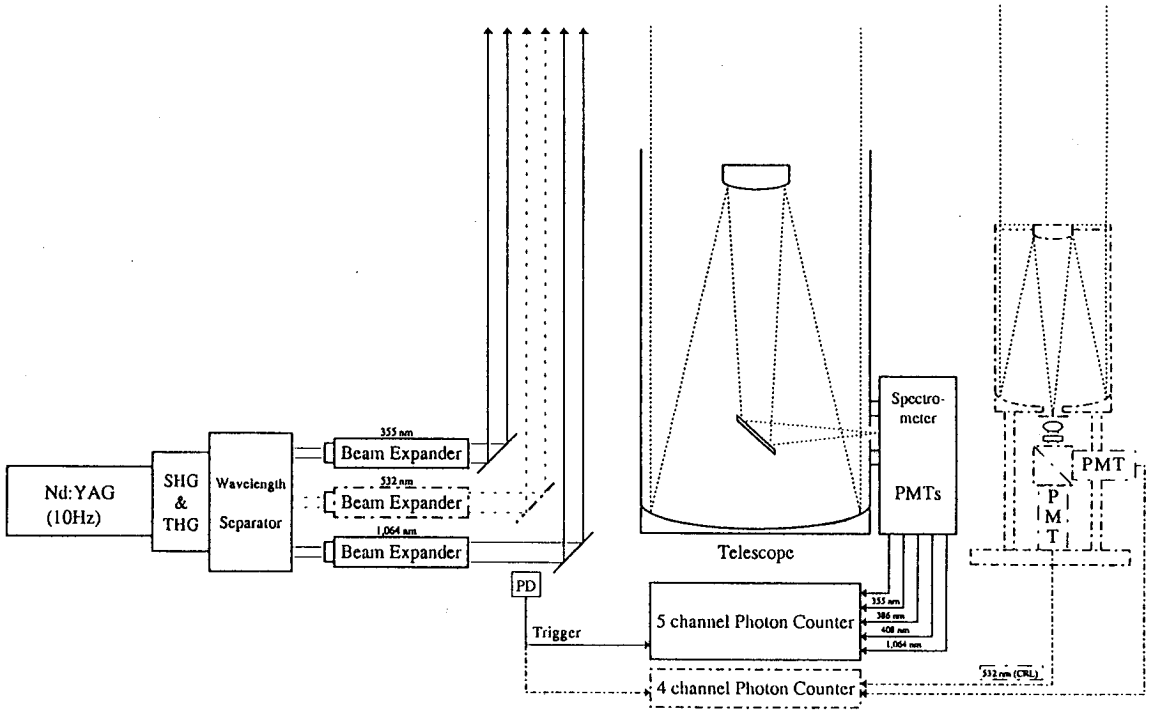
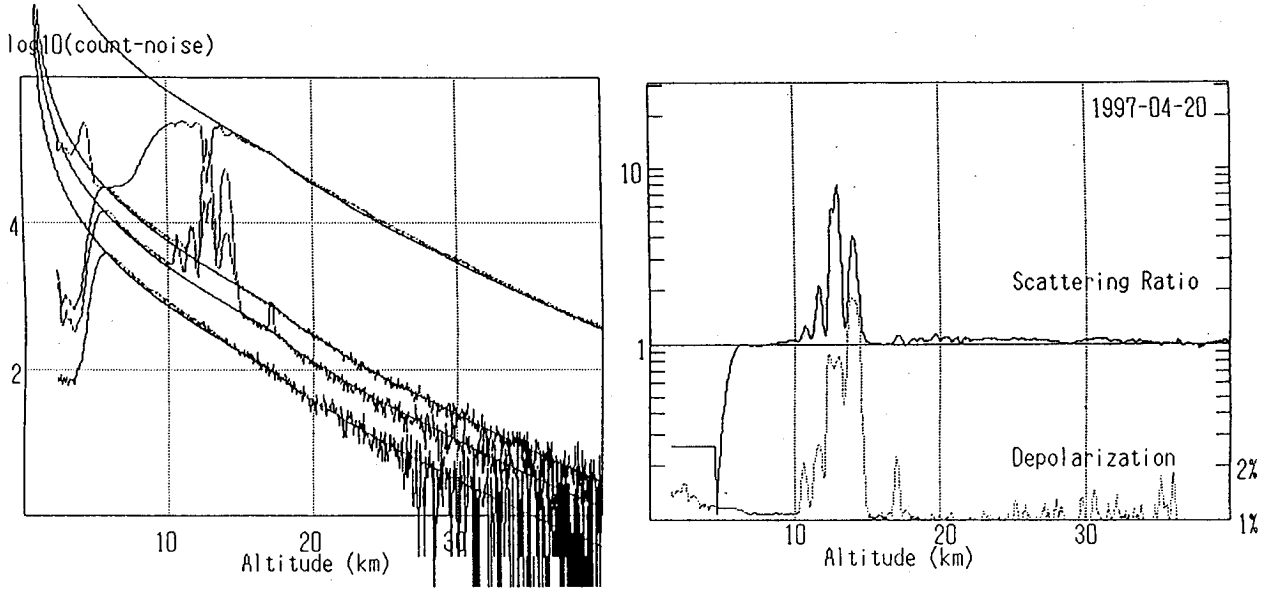


Fig.5 Schematic diagram lidar system installed at Bandung(6.9S), Indonesia(Nagai et al., Proceedings of the Tsukuba International Workshop on Stratospheric Change and Its Role in Climate and on the ATMOS-C1 Satellite Mission, October 20-22, 1997,Tsukuba, Japan, p.121).



Photon count number versus altitude observed on April 20, 1997.
From upper to lower,
Upper altitude channel of P-component at 532nm
Lower altitude channel of P-component at 532nm
S-component at 532nm
Raman-channel of N_2 at 607nm.

Scattering ratio and Depolarization rat observed on April 20, 1997.
Upper altitude channel and lower altitude channel are connected at an altitude of 22km.

Fig.6 Lidar profiles over Bandung(Mizutani et al., ibid in Fig.5, p.113).

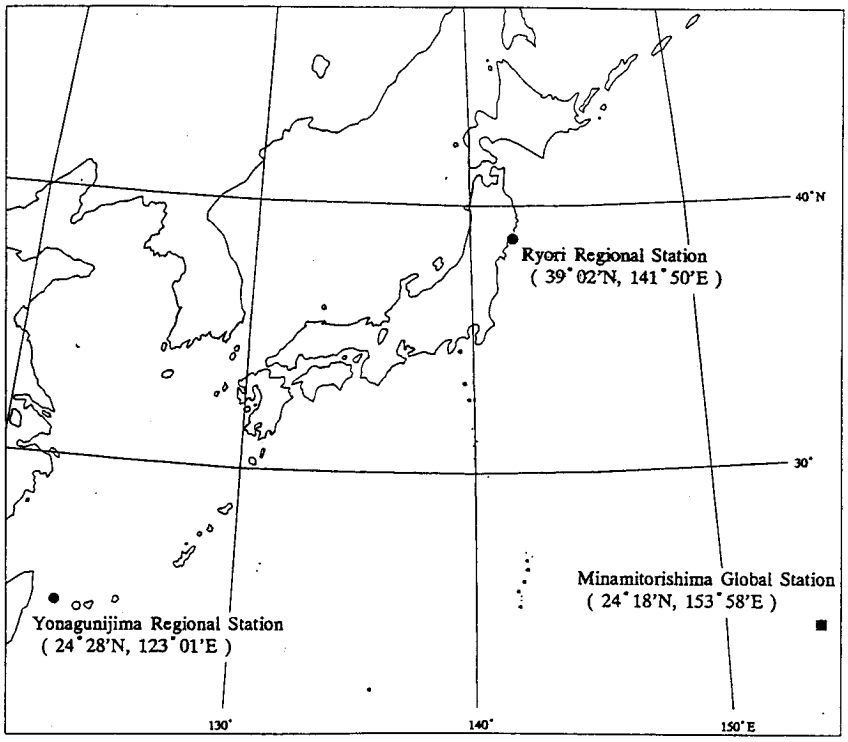


Fig.7 WMO/GAW(Global Atmospheric Watch) monitoring stations operated by the Japan Meteorological Agency.

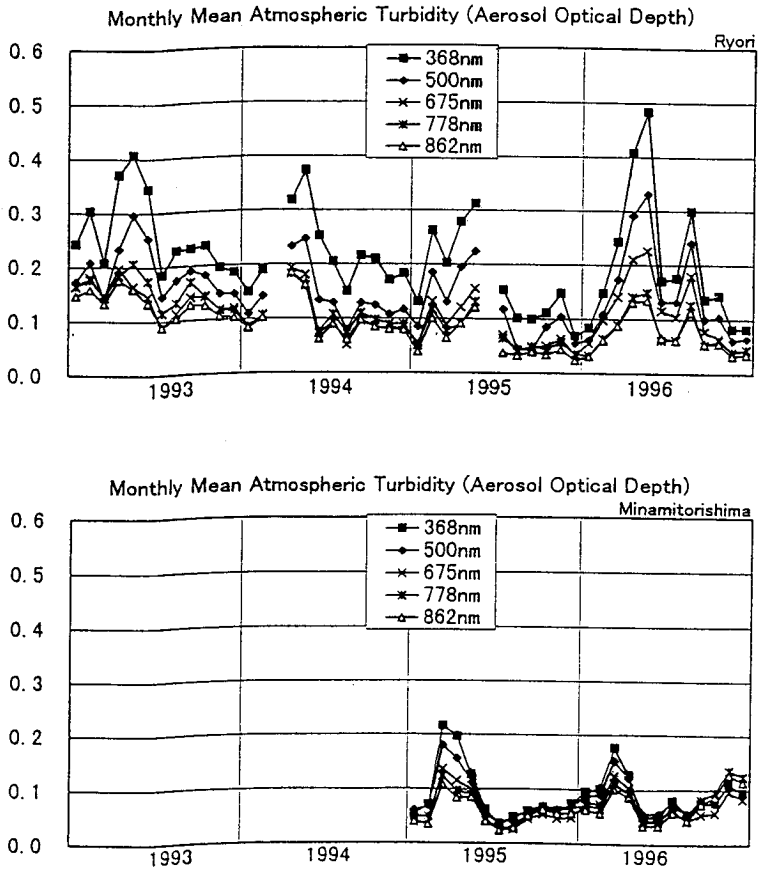


Fig.8 Monthly mean aerosol optical depth at Ryori(39N) and Minamitorisima(24N), Japan(Annual Report of Background Air Pollution Observation, 1995, published by Japan Meteorological Agency 1997).