Monitoring of atmospheric particles over an urban area

S.Mukai, I.Sano and M.Yasumoto

Kinki University, Faculty of Science and Technology, Higashi-Osaka 577-8502, Japan

It is known that optical properties of atmospheric aerosols are important for the Earth's radiation budget and global climate. It is also known that Asia is the most complicated region for aerosol study, because the dust particles come from continental desert area, carbonaceous aerosols are produced by large Siberian biomass-burning plumes, and small anthropogenic particles are emitted from the increasing industrial activities.

Simultaneous measurements of atmospheric aerosols and suspended particulate matter (SPM) have been undertaken at Kinki University campus in Higashi-Osaka in order to monitor the urban environment during more than two years. The sun/sky photometry has been made as a NASA/AERONET station since 2002, and the SPM-613D (Kimoto Electric) has been taking measurements of the SPM concentrations such as TSP, PM_{10}, $PM_{2.5}$, and OBC at the same site since March 15, 2004. This long term simultaneous monitoring of aerosols and SPM provides us with typical aerosol types over an industrial city of Higashi-Osaka and the relationship between aerosol properties obtained from radiometry with AERONET and the SPM measurements as:

1. The air quality of the Higashi-Osaka site is poor due to not only anthropogenic particles by local emissions, such as diesel vehicles and chemical industries, but also due to dust particles and biomass-burning aerosols by large scale climatic conditions.

2. Fine anthropogenic particles dominate at Higashi-Osaka even during dust events. It is of interest to mention that dust events at Higashi-Osaka seem to be caused by a mixture of non-absorbing coarse dust and other small haze particles.

3. The value of aerosol optical thickness during aerosol event is more than double its usual value.

4. There is a linear correlation between SPM concentrations and aerosol properties, which indicates that aerosol characteristics can be estimated from SPM data, and vice versa.

5. Strong correlations exists between the PM2.5 concentrations and the fine mode aerosol optical thickness.

It is of interest to mention that combining radiometric aerosol information and the surface-level particulate mass is useful when studying air quality and aerosol properties.