Analysis of Aerosol Size Distributions for the Period of 2007-2009 Observed in Busan in Korea

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Measurements of aerosol size distributions were made by Optical Particle Counter(OPC) to characterize the physical properties of ambient particle concentrations observed in Busan, Korea during the period of Oct. 1 2007 ~ Feb. 28 2009. Particle volume and mass concentrations according to size distributions were calculated from OPC data obtained in Pusan National University, and analysis of size distribution is interpretected. The results of analysis show that number distributions predominate in separated three distribution modes with the highest range of 0.3 ㎛ to 0.4 ㎛. Volume distribution indicate the highest value at about 3~4 ㎛, showing the dominant characteristics of oceanic aerosols size distribution presumably due to the sea salt particles. In comparison with the concentration and size distribution between summer and autumn, summer shows relatively higher than autumn by almost a factor of 2, implying that the secondary aerosol formation through photochemical reactions was largely contributed to the increasing aerosol concentrations.

Measurements are also classified to four types of days: clear day, precipitation day, foggy day and Asian Dust day, and physical characteristics observed in each categorized day are analyzed. Especially the effects of the particle concentrations and mass difference by relative humidity and precipitation were considered The results implied that significantly smaller and fine particles with the diameter of less than 1 ㎛ are clearly observed for the foggy days whereas coarse particles with the diameter of more than 3~5 ㎛ are frequently observed for Asian Dust days. No differences of size distributions are found between clear and rainy days, but the particle mass concentration is found to be closely related to the relative humidity for clear days. Particle concentrations increases as relative humidity increases up to 70 ～90%, with significantly higher particle concentrations are found with the relative humidity of 90% for clear days, implying the importance of aerosol formation achieved by both homogeneous formation and heterogeneous transformation resulting from hygroscopic aerosol characteristics.

Key words: Aerosol, Size distribution, OPC, Asian Dust, Relative humidity