

PE12) Time Integrated Measurement of the Size Segregated EC/OC Concentration of Gosan Aerosol

Kyuwon Whang · Daeyoung Joung · Jooho Lee · Seongheon Kim · Kochy Fung¹⁾
Department of Environmental Engineering, Yonsei University, Wonju, Korea,
¹⁾Atmoslytic Inc., USA

1. Introduction

A series of time integrated measurements of the size segregated elemental carbon (EC) and organic carbon (OC) concentrations in Gosan aerosol were performed during ABC-EAREX2005 Campaign.

The purpose of this paper is to provide a informative data set for the investigation of the size effect on optical scattering and absorbing by ambient aerosol.

2. Methodology

Aerosol sampling was taken at the top of the container 3 located at 3317'N, 12610'E, and 72m above mean sea level by means of a multi-stage impactor (MOUDI, MSP Corp., Minneapolis) during the extended observational phase of ABC-EAREX2005 (7th to 31st in March). The 50% collection efficiency cut points of cascade impactor operated at the flow rate 30 l/min were 10, 5.6, 3.2, 1.8, 1.0, 0.56, 0.32, 0.18, and 0.1 μ m respectively.

Pre-baked Al foils were employed as impaction substrate for the purpose of thermal analysis of carbon contents. All the samples were pre- and post- weighed using an MT5 Microbalance (Mettler Toledo Inc., NJ) after 24 hr equilibrium at controlled temperature and relative humidity to determine the size segregated mass concentrations as well. Elemental and organic carbon (EC/OC) concentrations of Gosan ambient aerosol were determined by thermo-analysis, which is described in detail by Fung (1990).

3. Results

Figure 1 shows the size Distributions of (a) mass concentrations, (b) fraction of elemental carbon, (c) ratio of organic carbon (OC) to elemental carbon (EC) of Gosan aerosol measured at three typical sampling periods. 11st, 17th, and 18th in March, 2005. March 11st was selected as normal sampling day, and March 18th represents the Asian Dust episode day. March 17th, 1 day before the Asian Dust episode, was also shown as a transitional period. Mass concentration depicted in fig. 1 (a) was normalized by the interval of aerodynamic diameter. Asian dust was well characterized by an enhanced mass concentration in the size range between 1~1.8 μ m. What is noticeable is the increased fraction of elemental carbon among the total mass during the Asian dust episode in the size range larger than 1 μ m, and also during the pre-episode period in the size range of 0.3~0.56 μ m, showing clear bi-modal distributions. On the contrary, organic carbon was more enriched in the size range above 1 μ m during the normal sampling period. These size fractionized carbon data will be further investigated together with other chemical compositions (ions, metal contents) collected by means of parallel cascade impactor simultaneously operated by KIST.

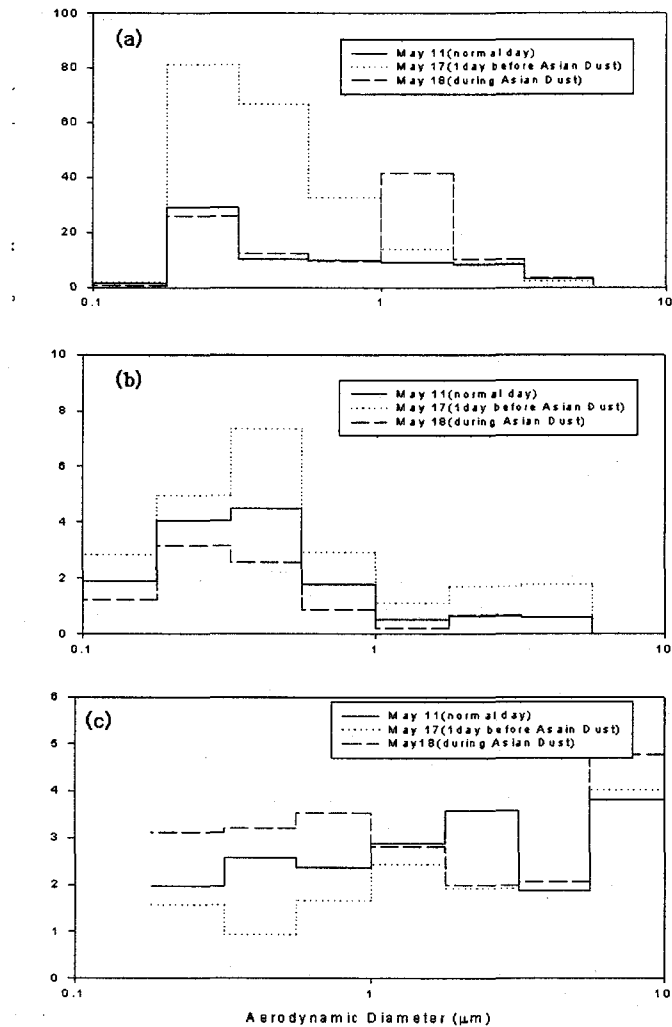


Fig. 1. Size Distributions of (a) mass concentration, (b) fraction of elemental carbon, (c) ratio of organic carbon (OC) to elemental carbon (EC) of Gosan Aerosol measured at 11th (solid line), 17th (dots), and 18th in March, 2005.

References

Fung, K., 1990. Particulate carbon speciation by MnO₂ oxidation. *Aerosol Science and Technology* 12, 122-127.