

The particle size distribution variation in fine particle to the inland area of South Kanto from the coastal line of Tokyo bay

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1. Introduction Particle concentration in downtown Tokyo showed decreased tendency from the middle in 90's (Minoura et al., 2006), and it was in a situation that the SPM environmental standard was satisfied. According to the report of the Administration (e.g. Tokyo Metropolis white paper on environment 2006), $PM_{2.5}$ concentration at Tokyo urban background area shows around $20\mu g/m^3$, and a countermeasure for the concentration reduction is examined. Pollutants accumulate during the sea breeze circulation between the inland area of South Kanto and the Tokyo bay, and generate the secondary PMs. However, these processes were investigated only by several points of ground observation or air quality simulation, and our knowledges are limited. An aircraft observation by using a helicopter from the coastal line of Tokyo bay to inland area of South Kanto was carried out, and PM size distribution was measured consecutively.

2. Observation The flight commuted between Kisei (inland town in South Kanto) from Tokyo Bay in two hours ($1km\ m^{-1}$), and we made a round trip nine times during August 1 from July 30, 2008. Except the coast line of 200m altitude, the flight altitude was navigated with 600m uniformity. The PM was measured by APS3321 (TSI, Inc.). For the measurement of the pollutant gas, NOx monitor (Thermo 42C/J) and O₃ monitor (Dylec 1150) were equipped with. Meteorological sonde was launched at Saitama Univ. (inland area in South Kanto) and Urayasu (coastal town of Tokyo bay) every three hours, and the mixing height and upper wind condition were measured.

3. Results

(1) From the measured results of the meteorological sonde, all flights were carried out in the mixing layer. The number of PM concentration increased so as to move ahead to the inland, and the average PM diameter decreased. The ozone concentration also showed increase tendency, but, as for the NOx, a clear variation was not provided. The number concentration and the relationship with the mean PM diameter provided between nine flights of three days showed the correlations shown in Figure 1 which could be approximate as straight lines similar

in the coast line of 200m altitude and the inland area of 600m altitude in each.

(2) The variation of the PM size distribution was shown in Figure2. When we move ahead inland, decrease number in coarse PM and increase in fine PM were observed, and the deposition of sea salt PM and the addition of the secondary PM were suggested.

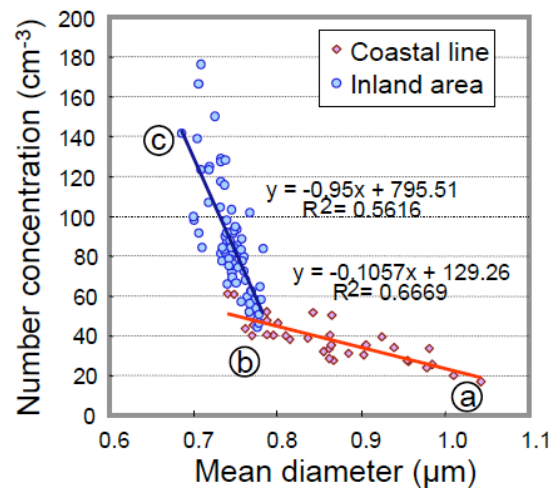


Figure 1: Number concentration and relations with the mean particle diameter

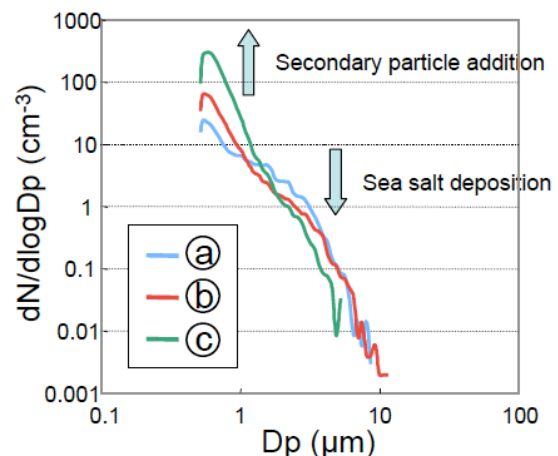


Figure 2: Particle size distribution in the representative spots

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