

# Influences of Secondary Chemical Processes of Gases upon PM<sub>1</sub>, PM<sub>2.5</sub> and PM<sub>10</sub> Concentrations in the Korean Coast

HYO CHOI

*Dept. of Atmospheric Environmental Sciences,  
Kangnung National University, Kangnung 210-702, Korea  
E-mail: du8392@hanmail.net*

Mass concentrations of PM<sub>10</sub>, PM<sub>2.5</sub> and PM<sub>1</sub> and the distribution of particle size from 300 nanometer to 20 micrometer diameters were investigated by two sets of aerosol samples, which were equipped at Gangwon Regional Meteorological Administration (Kangnung coastal city) in the eastern coast of Korea from February 10 through 20, 2005. The hourly concentrations of PM<sub>1</sub>, PM<sub>2.5</sub> and PM<sub>10</sub> showed a typical pattern such as high concentration near 0900 LST (beginning time of office hour) and 1700 LST (ending time of office hour) and their low concentration near noon. PM<sub>10</sub>, PM<sub>2.5</sub> and PM<sub>1</sub> had the first maximum concentrations of 145.12 /m<sup>3</sup> of PM<sub>10</sub> and 88.93 /m<sup>3</sup> of PM<sub>2.5</sub> and 44.71 /m<sup>3</sup> of PM<sub>1</sub> at 2000 LST (three hours later after sunset), respectively. The secondary maximum concentration is detected with a magnitude of 93.06 /m<sup>3</sup> at 0100 LST, February 15. The hourly distribution of CO and NO<sub>x</sub> concentrations showed a similar tendency of PM<sub>10</sub>, PM<sub>2.5</sub> and PM<sub>1</sub> concentrations, except for concentrations in the morning on February 14. When PM<sub>10</sub>, PM<sub>2.5</sub> and PM<sub>1</sub> had the first maximum concentrations at 2000 LST and their second maximum at 0100 LST, February 15, NO<sub>x</sub> had the first and secondary maximum concentrations at the same times. It implies that the increases of emitted gases like NO<sub>x</sub> and CO from vehicles on the street and combustion gases from boilers in the resident area for nighttime heating could make a great contribution to the increase of PM concentration. After sunset, much shrunken surface inversion layer than daytime convective atmospheric boundary layer could also increase the concentrations of particle matters, but after midnight, the concentration gradually decreased due to the reduction of vehicle number on the street. Under westerly wind, the particles transported from the city into the mountain side in the west for daytime returned again to the city and some amount of particles from an upwind side city toward the coastal city could also make a great contribution to the occurrence of secondary maximum. On the other hand, O<sub>3</sub> concentration was not much changed all day long, except for its low concentration in the morning.