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Variability of ozone and secondary formed aerosol observed at Fukue in spring 2009

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Rapid economic development in East Asia leads to the increase of NO_x and VOC emission. In spring 2007, high ozone episode was observed at Fukue Island, Nagasaki, where it is relatively clean remote site. High ozone episode was considered to be caused by transport of pollutants from Chinese continent.

We have measured ozone and aerosols at the NIES Fukue observation site (128.7E, 32.8N) in March-May 2009, and observed high ozone and aerosol episode in April and May. We have analyzed variability of ozone and secondary formed aerosol observed at Fukue in spring 2009, which is reported here.

Chemical compositions in fine particulate matters were measured using an aerosol mass spectrometer and mass concentration of PM_{2.5} was measured by TEOM. Ozone and CO were measured by Thermo ozone and CO monitor, respectively. NMHC and NO_y were measured using a gas chromatography and a home-made NO_y monitor, respectively. Regional simulation was carried out using CMAQ.

We have analyzed the variation of ozone and sulfate (SO₄) and both species were high in April 8 and May 9. On April 8, ozone and SO₄ were recorded to be 101ppbv and 35ugm⁻³, respectively. Increase of SO₄ was often caused by transport of pollutants from Chinese continent, and for this time, air mass transport from Chinese continent was also seen in the back trajectory calculations (HYSPLIT4).

Ozone was high on both April 8 and May 9. On the other hand, the concentration of SO₄ was lower on May 8 than that on April 8. According to CMAQ calculation, contribution from China was similar for the concentration increase of ozone and SO₄, but contribution from other region (non-China region) was higher for the increase of ozone. This difference causes the different concentration variation for ozone and SO₄.

Keywords: SO₄, TEOM, CO, CMAQ