

## Vertical characterization of PM<sub>2.5</sub> based on observation using compact sensors on and around Mt. Unzen in Nagasaki Prefecture

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Aerosol particles in the atmosphere, including PM<sub>2.5</sub>, are known to have significant impacts on climate, the atmospheric environment, ecosystems, and human health. Whereas both of domestic sources and transboundary pollution from Asian Continent possibly contribute to the PM<sub>2.5</sub> mass concentrations in Japan, high PM<sub>2.5</sub> events owing to the transboundary pollution are often observed, especially in north-western part of Kyushu region (including Nagasaki Prefecture). Although PM<sub>2.5</sub> mass concentrations are observed at the observatories of the Atmospheric Environmental Regional Observation System (AEROS) of the Ministry of the Environment, Japan (MOEJ), the observatory on mountain is very limited, and widely used large and expensive beta attenuation monitor (BAM) is not suitable for the multi-point observations.

We developed a compact PM<sub>2.5</sub> sensor with Panasonic Corporation [Nakayama et al. 2018]. This sensor can measure PM<sub>2.5</sub> mass concentrations by detecting light scattering intensities from individual aerosol particles with diameters greater than 0.3  $\mu\text{m}$ . In this study, this sensor was applied for the observations of PM<sub>2.5</sub> mass concentrations around Mt. Unzen in Nagasaki Prefecture from December 2018. The PM<sub>2.5</sub> sensors were installed at six sites with different altitudes from 20 m to 1300 m to analyze vertical and horizontal distributions of PM<sub>2.5</sub>. During high PM<sub>2.5</sub> events ( $>35 \mu\text{g}/\text{m}^3$ ) in winter, the PM<sub>2.5</sub> mass concentrations at an altitude above 1000 m are similar to those at 20 m in most cases. However, in some cases, high PM<sub>2.5</sub> was observed only at low altitude sites, likely because of inflow of clean air with lower aerosol burden from higher altitude to the mountain sites and/or low boundary layer height. The vertical profile data obtained in this work will be compared with the lidar data obtained by NIES at Omura city, which is located 38 km north-west of Mt. Unzen, to discuss the possible sources and transport patterns of PM<sub>2.5</sub>.

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### Reference

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