Magnetic investigations of atmospheric aerosol particles in Noto region

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Certain type of atmospheric aerosol cause adverse health effects, and are of increasing environmental concern. SPM and PM2.5 are often used as the indicators of the aerosol health effects, but because these values are based only on bulk weight of all aerosol types, they do not necessarily reflect the amount of components that are of immediate health concern (e.g. Asian dust and smoke), but can be biased by those that are considered to be less harmful (e.g. sea salt). It is therefore, important to develop a better proxy that is directly linked to the causal components of the adverse health effects. However, offline analysis of filtered samples are labor intensive and requires time before the results are obtained, making continuous measurement impossible. In this study, we applied magnetic measurement on filtered samples to test its potential as a new and simple indicator of the aerosol health effects.
Magnetic measurement, is a rapid, non-destructive and cost-effective means to, identify the amount and mineralogy of magnetic particles often contained in anthropogenic pollutants. There are few studies which applied magnetic measurement on aerosol samples collected in polluted urban environments, however, it is unclear whether it can be applied also on samples collected in remote environments where pollution level is expected to be much lower. In Japan, it is often subject to transboundary air pollution accompanied by Asian dust (Kosa). Therefore, the purpose of this study was to apply magnetic investigations on the filter samples collected in Noto region directly under the influence of continental transboundary pollution, to acquire the basic dataset and verify the applicability of the magnetic data as an indicator of the health effect of the aerosol particles.
Magnetic properties of 93 samples collected between Aug, 2014 and Sep, 2016 at Noto region were investigated. In this presentation we report the results obtained by stepwise isothermal remanent magnetization acquisition experiment, stepwise alternating field demagnetization experiment and low-temperature magnetic measurement.

Keywords: Environmental Magnetism, aerosol, Asian dust, heavy metals

