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Aerosol type classification using aerosol scattering / absorption properties and size information from AERONET on the Korean Peninsula

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Atmospheric aerosols generated by natural or anthropogenic emission source influence climate change as well as air quality deterioration. Because aerosols with large temporal-spatial variations during short residence times have different effects on the radiative forcing depending on the aerosol type of radiation absorption property and size, studies to classify and analyze aerosol types based on long-term observations need to be continued. Aerosols have been observed through satellite remote sensing, ground-based or in-situ measurements, and aerosol type classification using these data have been studied persistently (e.g., Lee et al., 2007; Russell et al., 2010; Giles et al., 2012; Chen et al., 2016; Schmeisser et al., 2017).

The East Asia region is attracting attention as a major source of aerosol emission. Especially, the Korean peninsula is located on the downwind area, and is affected by various aerosol types generated in the Asian continent or the Korean peninsula. Therefore, aerosols over the Korean peninsula are required to be studied because they can be classified into various types according to seasonal characteristics. The studies of aerosols in the Korean Peninsula utilizing AERONET data, which observes aerosols based on the ground, have continued since 1999 when Anmyon site was established. After 2010, AERONET sites in the Korean peninsula have been increasing, and measurements continue until recently, providing relatively long-term measurement data. These data are used to classify various aerosol types in the Korean Peninsula and increase their potential for identifying influences in radiative forcing and impacts on climate change. In this study, aerosol types were classified by various methods using the aerosol scattering / absorption characteristics and size data provided by AERONET, and seasonal characteristics of the classified types were analyzed.