Characterization of atmospheric phenomena with SKYNET aerosol properties at Fukue-jima and Amami-Oshima islands

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Abstract

Recently, it is apprehended that aerosols emitted from factories, vehicles and slash-and-burn farming influence environment in East Asia. Atmospheric phenomena such as haze, mist and yellow sand, accompanied with aerosols, have been observed by eye at meteorological observatories and reported operationally for a long time because they usually cause severe visual hindrance. Many studies pointed out that yellow sand phenomena contained not only dust but also air pollution materials such as sulphate particles from megacities in East Asia. Accordingly, it is important to characterize the atmospheric phenomena quantitatively with mechanical or optical observation. In this study, characteristics of the aerosol with the atmospheric phenomena were investigated with sky radiometer observation at Fukue-jima island, Nagasaki (32.75°N, 128.68°E) and Amami-Oshima island, Kagoshima (28.44°N, 129.70°E) from 2003 to 2004.Statistical analyses were carried out with the retrieved aerosol optical properties in 9:00, 12:00, 15:00 (Japan Standard Time; JST=UTC+9) when meteorological data were available. Further, clear sky data with cloud amount less than unity were selected to suppress cloud contamination.As a result of the statistical analyses, it turned out that the average ± standard deviation for aerosol optical depth τ, Ångström exponent α, and single scattering albedo ω were 0.56 ± 0.19 (0.48), 1.26 ± 0.09 (0.69), and 0.97 ± 0.02

(0.99) for four haze events (for a yellow sand event), respectively. Comparing the results, it is suggested that haze consisted of smaller particles from the Ångström exponent α, while light-absorptivity is stronger with the haze events than the yellow sand one, even with fewer events around western islands in Japan from 2003 to 2004. Additional results of the synergetic data analyses with Optical Particle Counter (OPC) and LIDAR, and so on, will be carried out and discussed in terms of the aerosol characteristics in detail.

Acknowledgment: The authors are grateful for a lot of useful comments to Prof. Tadahiro Hayasaka in Tohoku University, Dr. Kazuma Aoki in Toyama University, Prof. Tamio Takamura and Dr. Pradeep Khatri in Chiba University, Dr. Akihiro Uchiyama in Meteorological Research Institute / Japan Meteorological Agency, Dr. Nobuo Sugimoto and Dr. Atsushi Shimizu in National Institute for Environmental Studies, and Ms. Yoshimi Azuma in Nara Women's University. The aerosol optical properties and meteorological data were kindly provided by SKYNET project and Japan Meteorological Agency, respectively.