

4.127 Analysis of aerosol transport route in East Asia.

Presenting Author:

Takashi Maki, Atmospheric Environment and Applied Meteorology Research Department, Meteorological research Institute, Tsukuba, Ibaraki, Japan,
tmaki@mri-jma.go.jp

Co-Authors:

Yasumichi Tanaka, Atmospheric Environment and Applied Meteorology Research Department, Meteorological research Institute, Tsukuba, Ibaraki, Japan

Tsuyoshi Sekiyama, Atmospheric Environment and Applied Meteorology Research Department, Meteorological research Institute, Tsukuba, Ibaraki, Japan

Keiya Yumimoto, The Research Institute for Applied Mechanics, Kyusyu University, Kasuga, Fukuoka, Japan

Naga Oshima, Atmospheric Environment and Applied Meteorology Research Department, Meteorological research Institute, Tsukuba, Ibaraki, Japan

Atsushi Shimizu, National Institute of Environmental Study. Tsukuba. Ibaraki, Japan

Toshiki Iwasaki, Graduate School of Science and Faculty of Science, Tohoku University, Sendai, Miyagi, Japan

Abstract:

East Asia is a region of high natural and anthropogenic aerosol concentration. In Japan, various aerosols such as yellow sand and PM2.5 are transported by the westerly wind from sources on the continent. The qualitative transport routes of these aerosols are generally known, but quantitative assessment for long periods has not yet been made. For example, in recent years the number of yellow sand observation around Japan has been decreasing, but there are reports that the amount of dust generated at the source regions has not significantly changed, suggesting the influence of fluctuation of the transport route. We analyzed the transport route of the aerosol using global aerosol transport model MASINGAR mk-2 (TL159) developed by Meteorological Research Institute. The model was nudged towards global meteorological analysis of the Japan Meteorological Agency and conducted a 10-year simulation from 2007 to 2016. We calculated an integrated mass flux to study the transport route of aerosol. From the view of the monthly mean value for 10 years, most of the yellow sand that reaches Japan occurs in the Gobi Desert and northeastern China. The yellow sand has been transported mainly in the southeast direction in the winter (December to February), then advanced east of the Shandong peninsula and reached the vicinity of Japan. In the spring period (March to May), the transportation route shifts slightly north, and transportation to the northeastern part of China also increases. As a recent example, we analyzed aerosol transport routes for March 2016 when a small Kosa event was observed in Japan. Compared with the ten-year average in March, transportation to the southeastern part of China was observed as well as weakening transport of the aerosol plume to the southeast direction. On the day of the conference, we will introduce more detailed analysis results including other aerosols.