Analysis of springtime high ozone events at Mt. Happo from 2014 to 2016

*岡本 祥子[1]、谷本 浩志[1]、奈良 英樹[1]、北 和之[2]、Putero Davide[3]
*Sachiko Okamoto[1], Hiroshi Tanimoto[1], Hideki Nara[1], Kazuyuki Kita[2], Davide Putero[3]

1. 国立環境研究所、2. 茨城大学、3. National Research Council of Italy
1. National Institute for Environmental Studies, 2. Ibaraki University, 3. National Research Council of Italy

Tropospheric ozone (O_3) is one of the most important trace gases in the Earth’ s atmosphere because it plays a central role in determining the oxidizing capacity of the atmosphere and air quality at local, regional, and global scales. Long-term trend of springtime O_3 at Mt. Happo (HPO; 36.70˚N, 137.80˚E, 1850 m a.s.l.) has been controlled by the El Niño Southern Oscillation (ENSO) as well as precursor emissions (Okamoto et al., submitted). Therefore, it is important to analyze long-range transport pattern changes induced by meteorological condition changes. In this study, we examine springtime O_3 enhancement events observed at HPO for the period from 2014 to 2016 focusing on its sources, characteristics of atmospheric composition and meteorological condition. HPO is located in the mountainous area near the Sea of Japan coast, and is one of the contribution site for the Acid Deposition Monitoring Network in East Asia (EANET) program. Surface O_3 has been measured by using UV absorption instrument since April 1998. In addition, we started measuring CO, CO_2 and CH_4 by using a Cavity Ring-Down Spectrometer since July 2013. To examine the origins and transport pathways of large-scale air masses arriving at HPO, 5-day backward trajectories were calculated using the NOAA Hybrid Single-Particle Lagrangian Trajectory (HYSPLIT, Version 4) model. We used STEFLUX (Putero et al., 2016) for evaluation of the effect of stratosphere-to-troposphere exchange (STE) on O_3 concentration at HPO. Our results indicate that STE has not significantly influenced on springtime O_3 concentrations at HPO, however STE is important source for tropospheric springtime O_3 in the Northern Hemisphere at mid-latitudes. We calculate the residence time over the source regions by using back trajectory analysis. In the presentation, we will show the potential source regions, enhancement ratios and meteorological condition for individual O_3 enhancement event.

キーワード：対流圏オゾン、一酸化炭素、STEFLUX、長距離輸送
Keywords: tropospheric ozone, carbon monoxide, STEFLUX, Long-tange transport

