

# Long-range transport of carbon monoxide and black carbon from East Asia to the Arctic

\*Kohei Ikeda<sup>1</sup>, Hiroshi Tanimoto<sup>1</sup>, Takafumi Sugita<sup>1</sup>, Hideharu Akiyoshi<sup>1</sup>

1. National Institute for Environmental Studies

We examined long-range transport events of carbon monoxide (CO) and black carbon (BC) from East Asia to the Arctic with satellite measurements and a global chemical transport model GEOS-Chem. The transport patterns and meteorological conditions associated with the events were analyzed. We used Infrared Atmospheric Sounding Interferometer (IASI) data during 2007–2011 to identify transport events of CO reaching the Arctic. Temporal variations of CO column over the Pacific side of the Arctic (160°–200°E, 60°–80°N) showed that episodic increases occurred several times in each season. We identified 11 strong events (6 in spring, 3 in autumn, and 2 in winter) caused by the long-range transport from East Asia using tagged BC and CO simulations. Two transport pathways from East Asia to the Arctic were found over Siberia and the North Pacific. In the pathway over Siberia, pollutants were transported northeastward from China mainly through the Okhotsk Sea and East Siberia. The low pressures passing from the East Siberia to the Okhotsk Sea played important roles on the transport in the lower troposphere and uplifting to the middle troposphere. In the pathway over the North Pacific, pollutants were transported eastward from the Asian continent and subsequent northward transport took place over the North Pacific. The poleward transport occurred west of the high pressure that stayed around the Bering Sea. While the poleward transport occurred mainly in the middle troposphere over Siberia, the enhancement of BC was also observed by the surface measurement at Barrow for the North Pacific route.

Keywords: Arctic, Black carbon, Long-range transport, SLCP, Asia