Geophysical Research Abstracts
Vol. 14, EGU2012-10522, 2012
EGU General Assembly 2012

Satellite observations of air quality of megacities in China

N. Hao (1), P. Valks (1), I. D. Smedt (2), D. Loyola (1), M. V. Roozendael (2), B. Zhou (3), and W. Zimmer (1)

(1) German Aerospace Center (DLR), Remote Sensing Technology Institute (IMF), Oberpfaffenhofen, Germany, (2) Belgian Institute for Space Aeronomy, Brussels, Belgium, (3) Fudan University, Shanghai, China

In the last three decades, air pollution has become a major environmental issue in metropolitan areas of China as a consequence of fast industrialization and urbanization, and the rapid increase of the vehicle ownership. Now in China there are 3 megacities (Beijing, Shanghai and Guangzhou) in existence. A recent study of Asian megacities showed that they cover less than 2% of the land area, hold more than 30% of the population and produce about 10% of the anthropogenic gas and aerosol emissions. Therefore, it is important to qualify and understand current air pollution distribution and development in and around the megacities of China. Satellite observations provide unique insight into the regional air quality around megacities and air pollution transport from surrounding areas.

In this work, we present an investigation of air quality over Beijing, Shanghai and Guangzhou combining satellite and ground-based measurements. Aerosol optical thickness (AOT), precursors of ozone (notably NO_2 and CH_2O), and SO_2 are observed from space. The operational GOME-2 trace gases products developed at German Aerospace Center and MODIS AOT products will be used. Moreover, near surface concentrations of particular matter (PM), NO_2 and SO_2 in Beijing, Shanghai and Guangzhou are investigated.

The effect of air pollution transport from neighboring areas to megacities will be researched using satellite measurements. Initial comparison between satellite and ground-based measurements of air pollutants in Beijing, Shanghai and Guangzhou will be shown. We will present the relationship between AOT and PM concentrations in megacities. The use of AOT, tropospheric NO_2 and CH_2O columns for air quality applications will also be shown.