



Retrieval of tropospheric NO₂ vertical column densities and aerosol optical properties from MAXDOAS measurements in Yangtze River Delta, China

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Air pollution is one of the most important environmental problems in developing Asian countries like China. Due to huge consumption of fossil fuels and rapid increase of traffic emissions in the past decades, many regions in China have been experiencing heavy air pollution. The Yangtze River Delta (YRD) region includes the mega-city Shanghai and the well-industrialized and urbanized areas of Zhejiang Province and Jiangsu Province, with over ten large cities, such as Hangzhou, Suzhou and Nanjing. Covering only 2% land area, this region produces over 20% of China's Gross Domestic Product (GDP) which makes it the most densely populated region and one of the most polluted regions in China. For instance, there more than 60% of a year was haze days with poor visibility in Shanghai over the last few years. In the YRD region, knowledge gaps still exist in the understanding of the source and transport of air pollutants because only few measurement studies have been conducted.

MAX-DOAS measurements were performed in Shanghai city center and Wujiang (border of Shanghai and Jiangsu Province) from 2010 to 2012 and in Nanjing (capital of Jiangsu Province) from April 2013. A retrieval algorithm, based on an on-line implementation of the radiative transfer code LIDORT and the optimal estimation technique, has been used to provide information on aerosol extinction vertical profiles. The total aerosol optical depths (AODs) calculated from the retrieved profiles were compared to MODIS, AERONET and local PM measurements. The aerosol information was input to LIDORT to calculate NO₂ air mass factors. The retrieved tropospheric NO₂ vertical column densities (VCDs) were compared to in-situ and satellite NO₂ measurements.