

AAS021-12

Room:102

Time:May 23 11:30-11:45

Intensive field observations of trace gases/aerosols in Rudong, China in spring 2010: Objectives and initial results

Yugo Kanaya^{1*}, Xiaole Pan¹, Fumikazu Taketani¹, Hitoshi Irie¹, Hisahiro Takashima¹, Yuichi Komazaki¹, Shinji Saito², Satoshi Inomata², Hiroshi Tanimoto², Huabin Dong³, Jie Li³, Xiquan Wang³, Hongyan Chen³, Meigen Zhang³, Qingli Wang³, Guoshun Zhuang⁴, Bin Zhu⁵, Zifa Wang³

¹JAMSTEC, ²NIES, ³IAP/CAS, ⁴Fudan Univ, ⁵NUIST

Although Central East China is regarded as an emerging region with high emission rates of precursors of ozone and aerosols, available observational data are still limited. We conducted an intensive field campaign observing ozone and its precursors and chemical components/physical and optical parameters of aerosol particles at Rudong (32.26N, 121.37E), Jiangsu, China in May/June 2010 under international collaboration. The location is near the west side of Yellow sea and is away from Shanghai by 100 km and from Rudong city center by 15 km. In this presentation, objectives of the field measurement and initial results are summarized. The main objectives are to characterize typical emission ratios of primary pollutants for this region (including those from biomass burning), to examine the mass closure and point optical closure of aerosols and to obtain useful information to evaluate and improve the capability of the tropospheric chemical transport model to simulate PM_{2.5} and AOD, to study ozone production rates/controlling factors including the effect of aerosols on ozone photochemistry, and to achieve instrument intercomparisons to improve our observational capabilities. Three distinct periods are clearly found: relatively polluted period (possibly under influence from urban, May 15-28), clean period with easterly wind (May 29? June 9), and post-harvest biomass burning period (June 10- 24). The BC/CO ratio during the biomass burning period was clearly higher than other periods, in accordance with the emission inventory. The features of the BC/CO and other ratios potentially characteristic to emission sources are compared to past observations in China. Within the 1.5 month observation period, we found several cases where the air mass traveled from Rudong to Fukue Island (32.75N, 128.68E), located at the opposite east side of the Yellow Sea, allowing the direct comparison of the observational features at the two sites. At Rudong, photolysis frequencies (J values) important to ozone photochemistry were found to be attenuated significantly by the presence of dense aerosols. The effect of the aerosols on ozone photochemistry was analyzed. The relationship between the increase in the aerosol scattering coefficient with relative humidity and chemical composition of aerosols was analyzed and the results were compared to those for Fukue Island in the previous year. Comparison of black carbon concentrations measured by three different instruments resulted in a magnitude relationship similar to those obtained at different locations (e.g., Fukue Island and Mt. Tai), contributing to reduction of the observational uncertainty or to improvement of the consistency among the existing black carbon concentration data observed by different instruments in East Asia.

Keywords: China, ozone, aerosol, intensive field observation