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Regional air quality issues in Pearl River Delta of China

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Pearl River Delta (PRD) is one of areas, which have experienced the fastest economic development in China. Urbanization in PRD is characterized by city clusters with two mega-cities (Guangzhou and Hong Kong) and many medium-small cities linked by dense highways. Economy increases in an impressive speed for decades, fueled by higher demands for energy, mobility and communications. As consequences, coal smog and traffic exhaust together cause serious photochemical smog and particulate pollution problems. Atmospheric visibility has been deteriorated with less blue sky year by year and air pollution has expanded from urban scale to region scale with high concentration of O_3 and fine particles. Transformation and transport of air pollutants show unique characteristics under such conditions of high concentrations of primary and secondary pollutants.

An intensive campaign was conducted during October 1 and November 5, 2004 in PRD by a science team of 12 institutes of China, Taiwan and Germany, which team was chaired by Peking University. The objective of the PRD October intensive campaign is to characterize temporal and spatial changes of aerosol, oxidant, and their precursors, to understand chemical composition, size distribution, hygroscopic properties, and optical properties of aerosols, to quantify ozone formation by measurements and modeling, and to explore the relationship between species of aerosols and gaseous phase. The campaign included a regional monitoring network of O_3, NOx, CO, SO_2, PM_{10} and $PM_{2.5}$, 2 super sites with various real-time measurement techniques, and aircraft measurements. This paper will give an overview of results obtained in the PRD October intensive campaign.