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The application of an improved gas and aerosol collector for ambient air pollutants in China

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An improved Gas and Aerosol Collector (GAC) equipped with a newly designed aerosol collector and a set of dull-polished wet annular denuder (WAD) was developed by Peking University based on a Steam Jet Aerosol Collector (SJAC) sampler. Combined with Ion Chromatography (IC) the new sampler performed well in laboratory tests with high collection efficiencies for SO_2 (above 98 %) and particulate sulfate (as high as 99.5 %). An inter-comparison between the GAC-IC system and the filter-pack method was performed and the results indicated that the GAC-IC system could supply reliable particulate sulfate, nitrate, chloride, and ammonium data in field measurement with a much wider range of ambient concentrations. From 2008 to 2015, dozens of big field campaigns (rural and coastal sites) were executed in different parts of China, the GAC-IC system took the chance having its field measurement performance checked repeatedly and provided high quality data in ambient conditions either under high loadings of pollutants or background area. Its measurements were highly correlated with data by other commercial instruments such as the SO_2 analyzer, the HONO analyzer, a filter sampler, Aerosol Mass Spectrometer (AMS), etc. over a wide range of concentrations and proved particularly useful in future intensive campaigns or long-term monitoring stations to study various environmental issues such as secondary aerosol and haze formation. During these years of applications of GAC-IC in those field campaigns, we found some problems of several instruments running under field environment and some interesting results could also be drew from the large amount of data measured in near 20 provinces of China. Detail results will be demonstrated on the poster afterwards.