Geophysical Research Abstracts
Vol. 14, EGU2012-9498, 2012
EGU General Assembly 2012

Remote sensing of GHG over Paris megacity and Orléans forest using ground-based QualAir FTS and TCCON-Orléans

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In a growing world with more than 7 billion inhabitants and big emerging countries such as China, Brazil and India, emissions of anthropogenic pollutants are increasing continuously. Monitoring and control of atmospheric pollutants in megacities have become a major challenge for scientists and public health authorities in environmental research area. The QualAir platform at University Pierre et Marie Curie (UPMC), is an innovating experimental research platform dedicated to survey greenhouse gases (GHGs) and urban air quality. As one of the major instruments of the QualAir platform, the ground-based Fourier transform spectrometer (QualAir FTS, IFS 125HR model) analyses the composition of the urban atmosphere of Paris, which is the third European megacity. The continuous monitoring of atmospheric pollutants is essential to improve the understanding of urban air pollution processes. Associated with a sun-tracker, the QualAir remote sensing FTS operates in solar infrared absorption and enables to monitor many trace gases, and to follow up their variability in the Ile-de-France region. A description of the QualAir FTS will be given. Concentrations of atmospheric GHG, especially CO_2 and CH4, are retrieved by the radiative transfer model PROFFIT. Located in the centre of Paris, the QualAir FTS can provide new and complementary urban measurements as compared to unpolluted ground-based stations of existing networks (NDACC and TCCON). The work made by LPMAA to join the TCCON network will also be presented. TCCON-Orléans is a ground-based FTS of the TCCON network located in the forest of Orléans (100 km south of Paris). Preliminary comparisons of GHGs measurements from both sites will be shown. Such ground-based information will help to better characterize regional GHGs, especially regarding anthropogenic emissions and trends.