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Volatile Organic Compounds source contributions in Paris: Measurement and modeling approaches. Focus on the traffic source

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Paris is one of the few European megacities and with 11 Million inhabitants, almost 1/5 French population lives in Paris and its region. The EU-MEGAPOLI project allowed a detailed characterization of gaseous and particulate pollution in Paris in summer (July 2009) and winter (Jan-Feb 2010). Studies about VOCs source contributions performed for these periods have suggested the importance of traffic emissions, in contradiction with the local emission inventory, for which solvent source is the dominant VOC source in Paris. In order to examine the representativity of such conclusions, one-year (March 2010- March 2011) of continuous measurements of VOCs have been performed at the same urban site in Paris (as part of a French program PRIMEQUAL-FRANCIPOL). In addition, VOCs measurements (along with other gaseous and aerosol compounds) have been performed in a tunnel in order to better characterize the traffic source (October 2012, PRIMEQUAL -PREQUALIF project). Preliminary results will be presented here from this unique dataset, with a focus made on oxygenated compounds (methanol, acetaldehyde, acetone) and aromatic compounds (benzene, toluene, xylens...). We will show that the daily variability of oxygenated compounds is mainly linked to the local traffic source, as suggested by their co-variation with other compounds related to traffic emissions (CO, xylens...). In addition to this local source, we will show that oxygenated compounds baseline concentration levels are significantly enhanced during specific events (of a few day duration) characterized by continental air masses. Surprisingly other long-lived compounds (CO) appear to be much less affected by these events, providing evidences that the nature of these continental sources is not yet well established. Results from VOCs source contributions identification, quantification and geographical origin (Positive Matrix Factorization and Potential Source Contribution Function approaches) will be presented as well as first results obtained with the CHIMERE model used both in research and air quality forecasting at local, national and European scales. The wide variety of measured compounds will allow evaluating both VOC's emission inventory and formation/consumption processes.