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Atmospheric investigation of the role of the different emission sectors in the total CO_2 emission plume from the Paris megacity.

I. Xueref-Remy, S. Pal, M. Lopez, M. Schmidt, E. Dieudonné, C. Vuillemin, M. Darding, and B. Wastine
IPSL / LSCE, Laboratoire des Sciences du Climat et de l, Gif-sur-Yvette, France (irene.xueref@lsce.ipsl.fr, 0033 169087716)

Urbanized areas are responsible for about 71% of global carbon emissions linked to energy consumption. Thus, cities have a fundamental role to play in matter of CO_2 emission reduction worldwide. This requires to quantifying precisely CO_2 emissions by sector of activity, in order to take appropriate emission reduction policies and to be able to follow up their efficiency. However, CO_2 emissions are known only through inventories that are not validated independently, and which uncertainties can reach several tens of percents. In the first line, megacities such as Paris – the third megacity of Europe – emit large quantities of CO_2. Within the CO_2-MEGAPARIS and ICOS projects, 5 stations for monitoring atmospheric CO_2 were deployed starting from August 2010 within a radius of 100 km around Paris center. The analyzers, based on Cavity Ring Down Spectroscopy, record atmospheric CO_2 but also CO at the frequency of 1 Hz. As the CO_2 over CO ratio is specific for each emission sector, the analysis of CO_2 and CO correlations can be used to infer the relative role of the different emission sectors in the total plume emitted. In this work, we will present an analysis of the CO_2 and CO signals and their correlations in function of wind direction, at different timescales such as seasons, to better assess the role and variability of the CO_2 emission sectors of Paris megacity. A comparison will be made with high resolution CO_2 emission inventories available for Paris region.