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Photochemical regimes analysis over several summer pollution episodes: the Upper Rhine Valley case

O. Couach (1,2), J.-F. Vinuesa (3), F. Kirchner (2), I. Balin (2), and M. Parlange (1)

(1) Swiss Federal Institute of Technology, ENAC/ISTE/LPAS, CH 1015 Lausanne, Switzerland, (2) EnviroScopY SA (start-up project), PSE - EPFL, CH-1015 Lausanne, Switzerland, (3) ISPRA, Joint Research Center, Italy. Via Fermi 1 IT-21020 ISPRA (VA) ITALY (olivier.couach@epfl.ch , Phone: +41 21 693 31 89)

The understanding of photochemical regime is critical to derive appropriate emission regulations to reduce the occurrence of ozone pollution episodes. The split of the chemical regimes into NOx-sensitive and VOC-sensitive and the use of indicators including the role of odd hydrogen radicals (OH, HO2, etc.) are essential to understand the relationships between ozone and its precursors.

The upper Rhine valley is considered as a very sensitive area for atmospheric pollution episodes especially photochemical ones during summertime. It is a highly populated and industrialized area surrounded by mountains on three sides (Vosges, Black Forest and Jura on the western, eastern and southern parts respectively). These 3D measurements are used to assess the model calculations (meteorology and chemistry) and understand by comparison with the simulation the dynamics and the photochemical processes of the Strasbourg ozone.

The photochemical episodes is described and validated by a combined approach measurements-modeling. The model outputs and the specification of the simulations are illustrated. The VOC/NOx sensitivity and the photochemical regime analysis is analyzed.

Keywords: photooxidants, VOC/NOx sensitivity, indicators, mesoscale models, photochemical models