

Science of Climate Laboratory - July 10, scheduled time 16.30 - 18.30

Title: *“Is solar radiation a lever or a barrier for the dispersion of pollutants in an urban canyon? An investigation using computational fluid dynamics”*

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Description of the activity: during this laboratory, we will simulate the atmospheric airflow in a simplified geometry which is a prototype of an urban canyon (i.e. the space above the streets and between the buildings) which can be considered as the minimal morphological unit composing the city textile. Numerical simulations techniques will be used to reproduce the airflow and the pollutant dispersion from a canyon under different conditions where buildings are differently heated by the solar radiation (not directly simulated).

Aims and objectives the students will be able to analyze quantitatively and comment on the results of the simulation during the laboratory, understanding how the heating by sun can affect the overall circulation and the effectiveness of pollutant dispersion mechanisms from the canyon.

Materials and Methods: each student should use, on his/her own laptop, the software for simulations and for visualization of results and postprocessing. Both should be installed and tested following the on-line instructions.

(1) Simulation software is **OpenFOAM v9** (<https://openfoam.org/version/9/>), below the instructions for different operating systems:

- Ubuntu Distribution: <https://openfoam.org/download/9-ubuntu/>
- Linux: <https://openfoam.org/download/9-linux/>
- Windows: <https://openfoam.org/download/windows/>
- MacOS: <https://openfoam.org/download/9-macos/>

(2) Postprocessing and visualization software: **ParaView** (<https://www.paraview.org/>). If you follow the above instructions, ParaView will be installed automatically with OpenFOAM. Please check that it is installed.

For Windows users: please note that the software is native on Linux, so you need to install a Linux subsystem provided by Microsoft. Instructions are on the links above. Please be sure that the ParaView software is correctly installed and working, if it is not working in the subsystem, install it directly in the Windows operating system from the website.