Response of atmospheric composition to COVID-19 lockdown measures during Spring in Lille

Lockdowns, due to COVID-19 pandemic, resulted in large decreases of some atmospheric pollutant emissions, mostly related to reduction of the vehicular traffic source, especially during Spring 2020. Long-term in-situ monitoring of atmospheric composition provides essential information on gas and particle properties. However, a robust quantitative assessment of the impact of lockdown measures on ambient concentrations is hindered by weather variability. Indeed, meteorological conditions can strongly affect the formation of secondary pollutants, and therefore basic comparisons with previous years may be biased.

To overcome this difficulty, an innovative methodology – called Analog Application for Air Quality (A^3Q) – has been developed by Petit et al. (2021), based on the comparison of each day of lockdown to a group of analog days having similar meteorological conditions. The A^3Q method has been applied to a comprehensive in-situ dataset of primary and secondary pollutants obtained at the SIRTA observatory, a suburban background site of the Paris megacity (France).

This method will be applied to in situ physical, optical and chemical measurements installed at the ATOLL station, on the University of Lille campus. This internship will offer the chance to better understand the episodes of pollution not expected yet observed during the lockdown. The influence of this massive reduction of some anthropogenic sources could then be used to plan future reduction policies to improve air quality.

Reference: Petit et al. (under review) https://acp.copernicus.org/preprints/acp-2021-369/

Key words: aerosol; lockdown; covid-19; pollution