MITIGATE: MonIToring and dIagnosinG ozone formATion from spacE

Description

MITIGATE (MonIToring and dIagnosinG ozone formATion from spacE) aims to unravel the sensitivity of surface O3 production to NOx and VOC precursors over Spain using the high-resolution TROPOMI sensor. Designed to address the aforementioned issues, the specific objectives of the project are:

- to assess the consistency between both TROPOMI and IAGO-2 satellite products and surface mixing ratios;
- to develop indicators of the O3 production regime at the surface;
- to evaluate them against the observed O3 response to altered precursor emissions using the COVID-19 lockdown period.

To fulfil these objectives, MITIGATE will benefit from a synergetic use of multiple observational platforms (satellites, surface monitoringnetwork, intensive campaigns) and numerical data (from an ensemble of air quality simulations). After exhaustively charactering the relationships between tropospheric columns and surface mixing ratios, we will make the bridge between both using innovative approaches based on machine learning (ML) models trained with the physically-consistent air quality model data. We will finally take advantage of the unprecedented COVID-19 lockdowns to quantify the response of surface O3 to mobility restrictions using a ML-based weather normalization and use it to evaluate the reliability of these space-borne O3 sensitivity regime indicators. All in all, MITIGATE proposes to make a leap forward on our understanding of O3-NOx-VOC sensitivity regimes over Spain and to pave the way for the development of continuous monitoring and improved model capabilities.

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