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Transport of Pollution and Air Quality experiment over the Mediterranean basin (TRAQA/ChArMEx campaign)

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Surrounded by mountains and several continents and affected by different types of pollution, the Mediterranean Sea is a natural laboratory for studying the variability of the chemical composition in the lower atmospheric layers and the interaction between pollutants from distant regions. In the framework of the Chemistry and Aerosol Mediterranean Experiment (ChArMEx), we carried out a field campaign using important instrumental means (instrumented aircraft including in situ and lidar measurements, pressurized constant level balloons with an O_3 sonde and soundings with O_3 and aerosol measurements, ground based aerosol remote sensing instruments) over the north-western Mediterranean basin during the summer 2012 (from 26 June to 11 July). We focused on four main objectives :
1. The characterization of the dynamic processes of export of polluted air masses from remote continental regions around the Mediterranean Sea
2. The quantification of exchanges between the boundary layer and the free troposphere
above the Mediterranean basin
3. The study of ageing and mixing of pollution plumes in the lower troposphere (gases and aerosols) with Lagrangian tracking.
4. The analysis of representative case studies against long-term measurements to estimate the impact of plumes of pollution on air quality.

The results are compared with simulations from several chemistry-transport models.

The TRAQA field campaign was based on Intensive Observation Periods (IOPs) triggered on alert when the conditions were favourable. A total of seven IOPs were conducted with nearly 60 hours of aircraft flights and 5 flights of constant level pressurized balloons in the boundary layer. We documented an episode of pollution in the Genoa gulf, an established moderate Mistral case, a strong African dust case, a case of export of pollution from Barcelona to the Mediterranean Sea, and an event of starting Mistral. The two remaining IOPs, conducted under standard summer anticyclonic conditions, were devoted to aircraft measurements of biogenic emissions of Mediterranean vegetations, and to a regional survey to quantify the major sources of anthropogenic pollution on the Northern Mediterranean coast. We propose to present the TRAQA campaign and the first results related to the measurements. The data are now available from http://mistrals.sedoo.fr/ChArMEx/TRAQA/

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