Variability of tropospheric pollutants and aerosols in the context of the airborne GLAM campaign

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In the framework of the ChArMEx (Chemistry-Aerosol Mediterranean Experiment) program, the airborne campaign GLAM (Gradient in Longitude of Atmospheric constituents above the Mediterranean basin) has been set up to study the variability of gazeous pollutants with different lifetimes and of aerosols over the Mediterranean Basin (MB). The project mainly focuses on the East-West gradients in pollutants within the mid to upper-troposphere induced by the impact of the Asian Monsoon Anticyclone on the pollutants in the Eastern MB, and on the comparisons with space-borne measurements and model results. On board the Falcon-20, together with an ozone analyzer, humidity and temperature sensors and optical particle counters, a laser absorption spectrometer SPIRIT developed at LPC2E was able to detect very weak changes in the concentration of greenhouse gases. GLAM performed measurements of O_3, CO, CH4, N2O, CO_2, H_2O, temperature and the winds components over the Mediterranean Basin in summer (6-10 August 2014), flying at 5000 m altitude from France to Cyprus and at 9000 m on the flight back. In addition, GLAM performed vertical profiles between about 0.3 and 11 km altitude near the different landing sites. These in situ profiles are an original source to validate what the space-borne instruments detect within the same altitudes. Some of these profiles are also performed close to the surface stations of Lampedusa, Finokalia (Crete) and Ineia (Cyprus), allowing comparison between aircraft and surface measurements.
This presentation will provide the first major GLAM results, highlight the variability of the chemical pollutants and aerosols and synthesize what is learnt from this campaign when compared to model results.