



HAL
open science

Overview of the Gradient in Longitude of Atmospheric constituents above the Mediterranean basin (GLAM) airborne summer campaign

Philippe Ricaud, Regina Zbinden, Valery Catoire, Vanessa Brocchi, Francois Dulac, Eric Hamonou, Jean-Christophe Canonici, Laaziz El Amraoui, Sebastien Massart, Bruno Piguet, et al.

► To cite this version:

Philippe Ricaud, Regina Zbinden, Valery Catoire, Vanessa Brocchi, Francois Dulac, et al.. Overview of the Gradient in Longitude of Atmospheric constituents above the Mediterranean basin (GLAM) airborne summer campaign. EGU General Assembly 2016, Apr 2016, Vienne, Austria. insu-03573521

HAL Id: insu-03573521

<https://hal-insu.archives-ouvertes.fr/insu-03573521>

Submitted on 15 Feb 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution| 4.0 International License



Overview of the Gradient in Longitude of Atmospheric constituents above the Mediterranean basin (GLAM) airborne summer campaign

Philippe Ricaud (1), Regina Zbinden (1), Valery Catoire (2), Vanessa Brocchi (2), Francois Dulac (3), Eric Hamonou (3), Jean-Christophe Canonici (4), Laaziz El Amraoui (1), Sebastien Massart (5), Bruno Pignatelli (1), Uri Dayan (6), Pierre Nabat (1), Jean Sciare (3,7), Michel Ramonet (3), Alcide di Sarra (8), Nikolaos Mihalopoulos (9), Giorgos Kouvarakis (9), Savvas Kleanthous (7), Michael Pikridas (7), Jean-Luc Attié (1,10)

(1) Meteo-France, GAME/CNRS, UMR 3589, Toulouse, France (philippe.ricaud@meteo.fr), (2) LPC2E, Orleans, France, (3) LSCE, Paris, France, (4) SAFIRE, Toulouse, France, (5) ECMWF, Reading, UK, (6) University Jerusalem, Jerusalem, Israel, (7) The Cyprus Institute, Cyprus, (8) ENEA, Italy, (9) UOC, Greece, (10) Laboratoire Aerologie, Toulouse, France

The Gradient in Longitude of Atmospheric constituents above the Mediterranean basin (GLAM) airborne campaign has been set up to investigate the variability of constituents (pollutants and greenhouse gases) and aerosols between the West and the East of the Mediterranean Basin in summer 2014. This campaign occurred in the framework of the Chemistry-Aerosol Mediterranean Experiment (CHARMEX) as part of the Mediterranean Integrated Studies at Regional And Local Scales (MISTRALS) programme. During the campaign, several instruments including the Spectromètre InfraRouge In situ Toute altitude (SPIRIT) instrument onboard the SAFIRE Falcon-20 aircraft measured aerosols, winds, radiation, humidity and chemical compounds such as O₃, CO, CH₄, N₂O, and CO₂. The campaign took place from 6 to 10 August 2014 from Toulouse (France) to Larnaca (Cyprus) and back, via Menorca (Spain), Lampedusa (Italy) and Heraklion (Crete). The aircraft flew at about 5000 m altitude above sea level to go and at about 9000 m altitude to return. The campaign also provided some vertical profilings from the surface to about 12 km in the vicinity of the landing sites listed above. The present paper shows an overview of the measurements and of the scientific results obtained during GLAM combining space-borne and surface station measurements, modelling (MOCAGE and ALADIN-CLIMAT) and chemical forecasts and analyses from Copernicus Atmospheric Monitoring Service (CAMS) run by the European Centre for Medium range Weather Forecasting (ECMWF). Along an East-West axis or along the vertical, we analyze different processes. Among the different processes that have been studied in detail, we will particularly focus on aerosol results concentrating on the intercontinental transport and comparisons with surface stations. Combining GLAM, back-trajectories, satellite and model data, we demonstrate that the biomass burning from northern America, desert dust from Sahara and O₃-depleted maritime boundary layer air masses from the Arabian Sea impacted the upper tropospheric Mediterranean Basin after 10-15 days of transport. Finally, vertical profiles of aerosols measured by Lidars at different stations of the Mediterranean Basin are compared with in situ GLAM measurements and model outputs.