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Characterization of Saharan dust properties transported towards Europe in the frame of the FENNEC project: a case study

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In the framework of the FENNEC experiment (6 to 30 June 2011) an effort has been dedicated to characterize Saharan dust plumes transported towards southern Europe. Hence, a multi instrumented field campaign has been conducted. Ground based nitrogen Raman LIDAR (GBNRL) has been deployed in southern Spain close to Marbella, simultaneously with airborne lidar (AL) performing measurements over both the tropical Atlantic Ocean and the western Africa (from 2 to 23 June). The GBNRL was equipped with co-polar and cross-polar channels to perform continuous measurements of the dust aerosols trapped in the troposphere. It was developed by LSCE with the support of the LEOSPHERE Company. The French FALCON 20 research aircraft operated by SAFIRE (Service des Avions Francais Instrumentés pour la Recherche en Environnement) carried the AL Leandre Nouvelle Generation (LNG) as well as a dropsonde releasing system and radiometers. A major, one week long, dust event has been sampled over Spain from 25 June to 1 July with high optical depth (>0.5 at 355nm) and particular depolarization ratios (15 to 25%). Backtrajectory studies suggest that the dust particles observed were from dust uplifts that occurred in Southern Morocco and Northern Mauritania. The event has been also documented 3 days before by the AL flying over Mauritania. AERONET sunphotometer measurements of aerosol properties, along the dust plume transport path appear to be coherent with both the lidar and the backtrajectory analysis. These analysis exhibit a likely major contribution from the Western Sahara sources to the Southern Europe. Such a contribution may impact the visibility and then the airtrafic, modify the tropospheric chemistry, and add nutrients to both the Mediterranean Sea and the continental surfaces. It can also affect the health of European populations. We will present strategy of the experiment and the case study built from measurements performed at the end of June.