Geophysical Research Abstracts
Vol. 14, EGU2012-8306-1, 2012
EGU General Assembly 2012

The French component of the FENNEC Saharan Climate project 2011 Special Observing Period

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The central Sahara has one of the most extreme climates on Earth. During the northern summer months, a large low pressure system caused by intense solar heating develops over a huge, largely uninhabited expanse of northern Mali, southern Algeria and eastern Mauritania. This Saharan heat low plays a pivotal role in the West African Monsoon. Based on this, the interested French, British and German communities have decided to propose the FENNEC project which aims at (i) characterizing the Saharan atmospheric boundary layer, (ii) evaluating its representation in regional and global models, and (iii) improving "aerosol" products issued from space-borne observations. A key element of this programme was the organization of an international field campaign in June 2011 over the Saharan heat low region, which will include both ground-based and airborne detachments.

The Special Observing Period component of FENNEC-France included the implementation of the SAFIRE Falcon 20 to conduct research on the atmospheric boundary layer and the dust cycle of the Sahara, the installation of a remote sensing station in southern Spain, equipped with a backscatter lidar and a sunphotometer, to study the transport of desert dust to Europe, as well as a couple of GPS stations installed in southern Morocco to investigate the moisture inflow from the Atlantic Ocean into the Sahara. For the first time, the ALADIN and AROME models (5 and 24 km grid spacing, respectively) have been implemented operationally to provide forecasts of dust events over the Sahara and parts of the Sahel in June 2011 to assist in planning for airborne operations. This effort was complemented by the forecasts made with the Meso-NH model (5 and 20 km resolution).

During the SOP period, the ground-based, airborne and space-borne observations have documented the evolution of dynamic properties of thermodynamic and the atmospheric boundary layer Saharan Africa (Mauritania and Mali) during the installation phase of the Saharan heat low west of the continent as well as the increase in aerosol loading associated with the phase shift of the heat low from east to west. During this period, episodes of intense uplift of desert aerosols associated with various dynamic phenomena (fronts, "Mediterannean surges", "Atlantic inflow" of low-level jets, etc ...) have also been documented as well as the export of dust over the Atlantic Ocean.

An overview of implementation plan and of the first observational and modelling results acquired during the time of the SOP will be presented.