



Satellite Observations from SEVIRI of Saharan dust over West Africa, within the context of the Fennec project

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During the summer months, the atmosphere over the western half of the Sahara carries some of the highest dust loadings on the planet. This situation develops when intense solar heating over the dry desert creates a deep and hot low pressure system (the Saharan Heat Low, SHL), which allows a strong vertical mixing of dust. The Fennec* consortium project aims to address the deficiency in observations from the sparsely populated western Sahara through the use of field campaign measurements made in June 2011, incorporating observations from ground instruments, aircraft, and from satellite instruments such as SEVIRI, in combination with climate modelling. Fennec aims to study the poorly understood behaviour of the SHL, and the processes which take place within it.

Due to their high temporal resolution, observations from SEVIRI can offer new insights into the timing of activation of specific dust sources, and the processes governing their behaviour. Here we employ a multi-year, high time-resolution record of dust detection and aerosol optical depth (AOD) derived from SEVIRI using an algorithm developed at Imperial College to both identify areas of high dust loading and diagnose diurnal patterns in their activation. We will present results from the SEVIRI record alongside results from other satellite instruments such as MODIS, and place these findings in the context of the initial ground-based and in-situ observations available from the Fennec field campaign. We will also identify surface features which can contaminate the dust detection retrieval, due to their emissivities in the 8.7 micron channel. New techniques can be used to filter out these features, based on the difference between the brightness temperatures at 10.8 and 8.7 microns. Using surface visibility measurements and AERONET data, we will evaluate the consequences of this on the dust detection and AOD record.

* Fennec is a consortium project which includes groups from the universities of Oxford, Imperial College London, Leeds, Reading, and Sussex, as well as the UK Met Office and collaborators in France, Germany, Algeria, and Mauritania.