



Mineral dust deposition in Western Mediterranean basin

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North African deserts are the world's largest sources of atmospheric mineral dust produced by aeolian erosion. Saharan dust is frequently transported toward Europe over the Mediterranean basin. When deposited in oceanic areas, mineral dust can constitute a key input of nutrients bioavailable for the oceanic biosphere. For instance, Saharan dust deposited in the in the Mediterranean Sea can be a significant source of nutrient like Fe, P and N during summer and autumn.

Our objective is to study the deposition Saharan mineral dust in the western Mediterranean basin and to improve how deposition processes are parameterized in 3D regional models.

To quantify the deposition flux of Saharan dust in the western Mediterranean region a specific collector (CARAGA) to sample automatically the insoluble atmospheric particle deposition was developed (LISA-ICARE) and a network of CARAGA collectors have been set up. Since 2011, eight CARAGA are then deployed in Frioul, Casset, Montandon and Ersa in France, Mallorca and Granada in Spain, Lampedusa in Italia, and Medenine in Tunisia, along a South-North gradient of almost 2000km from the North African coast to the South of Europe.

We observe 10 well identified dust Saharan deposition events at Lampedusa and 6 at Mallorca for a 1-yr sampling period. These dust events are sporadic and the South-North gradient of deposition intensity and frequency is observed (the highest dust mass sampled at the stations are : 2,66 g.m⁻² at Lampedusa ; 0,54 g.m⁻² at Majorque ; 0,33 g.m⁻² at Frioul ; 0,16 g.m⁻² at Casset).

The ability of the CHIMERE model to reproduce the deposition measurements is tested. The mineral dust plumes simulated over the western Mediterranean basin are also compared to satellite observations (OMI, MODIS) and in-situ measurements performed during the ChArMEx campaign and in the AERONET stations.