

# African dust caused red soil in southern Europe

November 11 2010

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"The first hint of the relationship between African dust and certain soils in the region of the Mediterranean is their reddish or reddish-brown colour, similar to that of African aerosol filters, caused by their clay content", co-author of the study and researcher at the Centre for Ecological Research and Forestry Applications (CREAF) at the Universidad Aut3noma de Barcelona, Anna 1vila explained to SINC.

The study, which has been published in *Quaternary Science Reviews*, finds that African mineral dust additions "play an important role" in the origin of the soils (palaeosols) in the Mediterranean region, namely on the island of Mallorca. The results resemble those published regarding the soils on Sardinia, "which indicates the likelihood of Africa being a common source".

In turn, "African dust explains the origin of the 'terra rossa' soils in the Mediterranean region located on top of mother carbonate rock," 1vila added.

In order to explain the origin of the reddish soils, the researchers considered three hypotheses: the non carbonate residual accumulation theory (soils are derived from the product of non carbonate weathering of the mother carbonate rock), the ascending 'sesquioxide' theory (accumulation of iron and aluminium hydroxides following capillary ascent from the bedrock) and the non-native soil accumulation theory (soil is formed by external sources, including airborne contributions).

The first two hypotheses were discarded due to the geochemical composition of the trace elements of red soils and the underlying rock being different. "The hypothesis of non-native (external) contribution was reinforced due to the geochemical value of the land coinciding with that of African dust," the scientist stated.

However, although the analysis of the soil indicates that African dust is

the main contributor to the formation of the palaeosol, "the underlying rock also contributes, probably with residual quartz," the researcher added.

## Origin and Destination of African Dust

"Terra rossa" (red [soil](#) in Italian) is located on carbonate rock (with a high content of carbonate) and is spread throughout the Iberian Peninsula, the South of France, the islands in the Mediterranean, Italy and along the coast of the Adriatic Sea, from Slovenia to Greece. The largest sources of airborne mineral dust can be found in the Sahara and Sahel regions, with emissions of between 600 and 700 tonnes per year. The destination of this dust has recently aroused great interest among the scientific community for various reasons.

Apart from the formation of red soils, African dust has "adverse effects on human health, such as respiratory problems and reduced visibility. It also arouses interest due to its implications where climate change is concerned, with the role that mineral [aerosols](#) play in the radiation balance, nutrient deposition and oceanic fertilisation", Ávila explained.

**More information:** Muhs, Daniel R.; Budahn, James; Ávila, Anna; Skipp, Gary; Freeman, Joshua; Patterson, DeAnna. "The role of African dust in the formation of Quaternary soils on Mallorca, Spain and implications for the genesis of Red Mediterranean soils" *Quaternary Science Reviews* 29(19-20): 2518-2543, Sept 2010.

Provided by FECYT - Spanish Foundation for Science and Technology

Citation: African dust caused red soil in southern Europe (2010, November 11) retrieved 2 May 2024 from <https://phys.org/news/2010-11-african-red-soil-southern-europe.html>

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