Geophysical Research Abstracts
Vol. 12, EGU2010-11630, 2010
EGU General Assembly 2010

Iberulites and meteorological formation conditions

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It has recently been established that iberulites are heterogeneous, complex components of the atmosphere, coexisting with other particulate matter that establishes genetic relations with them in the context of the troposphere in the vicinity of the Sahara Desert. Unlike the other particulate matter, the appearance of iberulites is a discrete phenomenon.

The main period for iberulite collection is in the summer, characterised in the southern Iberian Peninsula by high temperatures and considerable decrease in precipitation. Iberulites have been obtained in this season under two main meteorological conditions: fair weather and wet deposition ("red rain" conditions). Both conditions can have in common the occasional presence of masses of air loaded with aerosols from the Sahara.

Fair weather conditions are more favourable for iberulites formation. They occur in the central, hottest times of the summer. In this context iberulites have been collected under two conditions: clear days only interrupted by daytime cumulus clouds and hazy days with reduced visibility. In both cases a mixture of iberulites and aerosols was obtained.

Wet deposition conditions are mainly found during the overlapping periods between spring-summer and summer-autumn (May-June and September-October), when there is a higher risk of precipitation than in summer. "Red rains" (or muddy rains) occur when these precipitations are superposed on Sahara dust plumes and they often contain iberulites among their components. The proportion of water to solid load in these precipitations is very variable, but the character of red rain can be lost with a very high proportion of water and iberulite formation can even pass unnoticed as they disintegrate. In this case, only impacts of very varied sizes and shapes water droplets loaded with aerosols would be visible, with no apparent sign of iberulites. If the proportion is more balanced, we observe impacts of droplets that vary considerably in size and solid charge, together with well-formed iberulites. In this case, all types of gradations of droplet-iberulites are visible, as well as all the final stages of iberulite evolution.

Outside the periods mentioned above, the influence of the North Atlantic Oscillation (NAO) on the southern Iberian region is stronger, with the westerly and north-westerly winds providing less aerosols and more rain, cleaning the atmosphere and thus preventing the formation of iberulites.