



Atmospheric giant particles (iberulites) from African desert soils and human health

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Earth is twice as dusty as in 19th century. The amount of soil dust in the Earth's atmosphere has doubled over the last century. The circum-Mediterranean area has one of the highest dust accretion rates in the world. The larger deserts (Sahara, Gobi, Badai Jaran, etc.) are the primary sources of mobilized desert-dust top soil that move great distances through the troposphere each year. Erosion, atmospheric transport, and dust-sized soil particles deposition to earth's surface are important process in aeolian environments. Atmospheric dust is associated to global climate change. Iberulites are giant microspherulitic particles (87.9 [U+F0B1] 27.6 μm) rounded and reddish, generated in the atmosphere (troposphere) by coalescence of smaller particles, finally falling to the earth's surface. The name comes from the Iberian Peninsula where they were discovered. An iberulite is a co-association with axial geometry, consisting of well-defined mineral grains, together with non-crystalline compounds, structured around a coarse-grained core with a smectite rind, only one vortex and pinkish color formed in the troposphere by complex aerosol-water-gas interactions.

Sedimentable dust ("dry deposition") in the city of Granada (Spain) for 17 African dust intrusion events occurring in the summer months of 2010 has been studied. In all samples were detected (SEM, stereomicroscope) iberulites. Total dust and the iberulites are composed mainly by mineral particles of different nature (XRD and SEM-EDX) and size less than $10\mu\text{m}$ (laser technique), implying dangerousness by inhalation. In the total dust the dominant mineral is dolomite [$\text{CaMg}(\text{CO}_3)_2$], abundant in the surroundings of the city; in the iberulites dominates the quartz (SiO_2), which indicates Saharan origin. The iberulites and the total dust are associated with metals (ICP-MS) that have a capacity to transport electrons with a high toxic potential in the body. The concentration of Cu and Pb in total dust were 5 and 2.5 times higher than the soil background values of Granada province. In the iberulites we have detected (SEM-EDX) biological material (bacteria, diatoms, nanoplankton, etc.) which allows to emit a hypothesis about their role as vectors (atmospherical "shuttles") for alloctonous diseases. Recently has been observed the role of Saharan dust in the relationship between particulate matter and short-term daily mortality among the elderly in Madrid (Spain).