ACTA UNIVERSITATIS SZEGEDIENSIS

Search

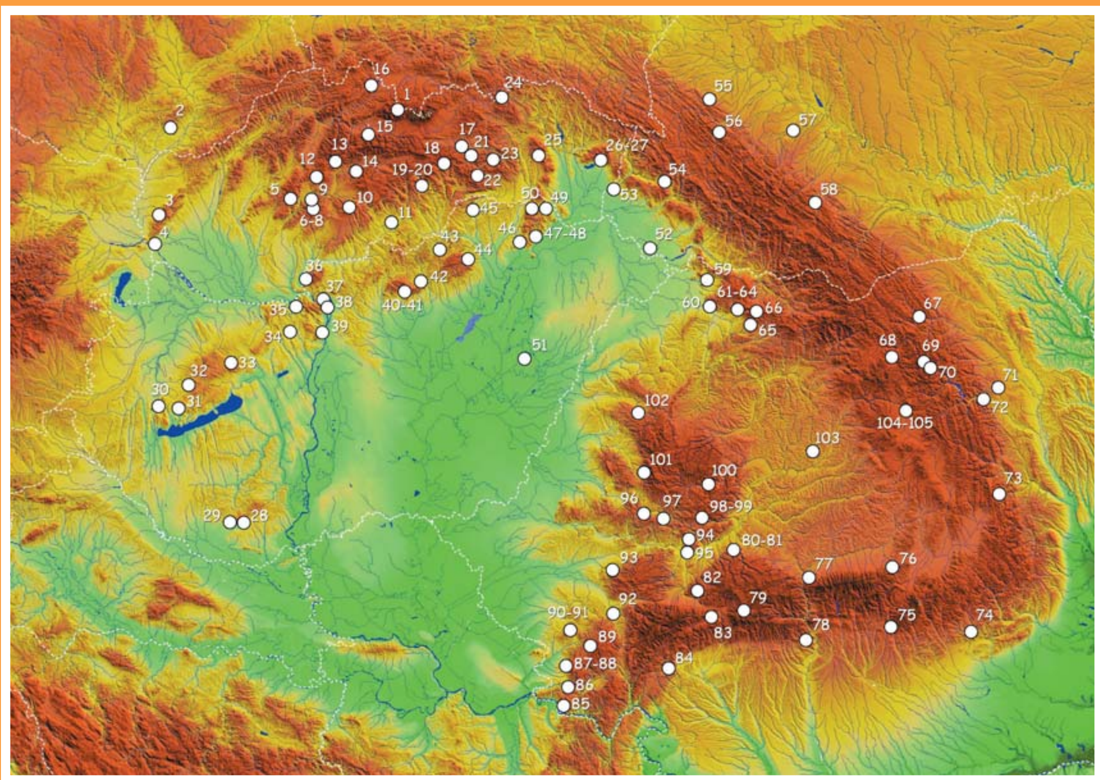
# ACTA
# MINERALOGICA-PETROGRAPHICA
## ABSTRACT SERIES

Volume 6 2010

## IMA2010

20th General Meeting of the International Mineralogical Association
21–27 August, 2010

## Budapest, Hungary



Published by the Department of Mineralogy, Geochemistry and Petrology, University of Szeged

## Authigenic Fe-minerals as indicators of the Late Permian and Early Triassic depositional conditions (Velebit Mt., Croatia)

**Fio, K.[1*], Posilović, H.[1], Sremac, J.[1], Vlahović, I.[2], Bermanec, V.[1] & Velić, I.[3]**
[1]Faculty of Science, University of Zagreb, Croatia
([*]karmen.fio@geol.pmf.hr)
[2]Faculty of Mining, Geology and Petroleum Engineering, University of Zagreb, Croatia
[3]Croatian Geological Survey, Zagreb, Croatia

The uppermost Permian deposits in the Velebit Mt. area (Croatia) are characterized by the stratigraphic break caused by emergence and subsequent transgression which continued through the Permian–Triassic Boundary (PTB) into the Early Triassic. Two informal lithologic units can be distinguished – Transitional Dolomite (TD), relatively rich in fossils, and Sandy Dolomite (SD), characterized by recrystallized grains, scarce fossils, and enhanced input of terrigenous siliciclastic material [1,2].

Selected TD and SD samples were disintegrated, or cut and polished and analyzed by optical microscopy, SEM, EDS, and XRD. Preliminary studies of the authigenic Fe-minerals found in the TD and SD units have shown characteristic mineral associations connected to the changes in the depositional environment. Fossiliferous TD deposits contain randomly dispersed red hematite grains. Highly recrystallized SD deposits above the lithologic change only occasionally contain hematite. Further up in the SD unit, due to the increased siliciclastic input and scarce fossils after the PTB, iron oxides form hematite, identical as in the TD unit, and magnetite. Magnetite, in framboidal form, in places accompanied with larger cubic crystals, is confined to recrystallized calcite and do not appear in the dolomite. The interstices between framboid microcrystals are filled with calcite; some magnetite hexahedra intergrow with calcite rhombohedra or contain calcite crystals.

Fine granulation, random dispersion, and association with fossil remains imply early diagenetic origin of hematite, when pore waters were more oxygenated and iron migrated by diffusion and not by pore water flow. Magnetite was formed during late diagenesis when more oxygen depleted waters penetrated into the sediment and mobilized iron from hematite. Locally concentrated magnetite suggests ion migration with pore water flow. Mineral stability fields of hematite and magnetite in an iron–carbonate–water system display magnetite as dominant mineral at high pH and low Eh conditions. In the absence of oxygen and at the high pH, precipitation was driven through $OH^-$ addition. As precipitation reduces $OH^-$ concentration and lowers pH, a small amount of carbonates was dissolved and restored equilibrium conditions within a solution.

[1] Salopek, M. (1948) *Nat. Sci. Yug. Acad. Sci. Art,* 101-143.
[2] Fio, K. et al. (submitted)

## Ferromagnetic mineralogy of dust accumulated on *Nerium oleander* leaves in the cities of Praia, Cape Verde, and Coimbra, central Portugal

**Gomes, C.R.[1,5*], Rocha, A.F.[2], Gomes, E.C.[3,5] & Pereira, A.[4,5]**
[1]Centre for Geophysics (CG), University of Coimbra, Portugal
[2]Lousã Secondary School, Lousã, Portugal
[3]Geosciences Centre (GC), University of Coimbra, Portugal
[4]IMAR, University of Coimbra, Portugal
[5]Earth Sciences Dept., University of Coimbra, Portugal
([*]romualdo@dct.uc.pt)

Atmospheric dust particles are a mixture of organic and inorganic materials, components of natural and antropic origin. Some of the inorganic particles are ferromagnetic *s.l.* and easily identified by their magnetic properties. In the last decade, some studies have been done in order to characterize airborne dust particles and especially those accumulated on plant leaves, particularly *Nerium oleander* leaves, of the urban area of Coimbra. Magnetic parameters of leaves have been interpreted to characterize ferromagnetic structures, their composition, size and sources. In Coimbra these ferromagnetic particles have been attributed to the vehicular traffic. The main goal of the present study is to compare ferromagnetic mineralogy of urban dust accumulated on the *Nerium oleander* leaves samples from the cities of Praia and Coimbra. Sampling of *Nerium oleander* was done on the 10th and 11th of April 2009. The samples which were taken in Coimbra are from 12 of the most polluted sites, identified in previous studies. Magnetic parameters (isothermal remanent magnetization (IRM), at 1 T, -25 mT, -100 mT and S-ratios) of sampled plant leaves were measured and determined using a pulse magnetizer and a Minispin magnetometer (Molspin). The mineralogical characterization was performed by S-ratios and SEM with an integrated EDS microanalysis system. The size of particles on the surface of plant leaves is between 50 μm and less than 1μm. The $IRM_{1T}$ values measured were normalized for leaf surface area and were in the range $125.00 \times 10^{-6}$ - $844.00 \times 10^{-6}$ A, for samples of Praia, and $24.00 \times 10^{-6}$ - $310.00 \times 10^{-6}$ A, for samples of Coimbra. Mean values are $342.00 \times 10^{-6}$ and $85.80 \times 10^{-6}$ A, respectively. Praia's mean value is 4 times higher than Coimbra's value. These different mean values can be interpreted considering that the SEM images show that the density of particles distribution is higher for samples from Praia, probably due to the drier climate in Cape Verde. These samples show essentially irregular and angular particles and rare spherical structures. The latter are relatively abundant in Coimbra. Some of these ferromagnetic particles from Praia samples (Fig. 1a) have a natural origin in Santiago Island substrate rocks, mainly in basalts. Irregular ferromagnetic particles are also present in Coimbra's samples (Fig. 1b) and they could be either anthropogenic or geogenic. These particles were identified as magnetite-like particles considering the $S_{-300}$ values (0.98 from Praia and Coimbra's samples). Elemental mapping shows that Si, Ca, Fe, and Al are the most abundant elements on dust particles, reflecting the bedrock mineralogy and also the contribution of foreign dust, mainly from Sahara.

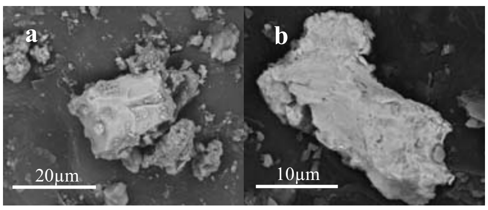



**Fig. 1:** SEM images of iron oxides from Praia a) (EDS: Fe, Ti, Si, Al, Mg, Ca) and Coimbra dust b) (EDS: Fe, C, Si, Ca).