Grapes and wines on basic anorogenic volcanic rock terrains in South Lessini (Italy): Geochemical fingerprint and heavy metals assimilation

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In the 2009 in some experimental sites in Veneto (Vicenza and Treviso Provinces) has been collected 36 samples of soils in order to define, through XRF analysis, the content (wt%) of major elements (Si, Ti, Al, Fe, Mn, Mg, Ca, Na, K, P) and the concentration (ppm) of trace elements (Ba, Ce, Co, Cr, La, Nb, Ni, Pb, Rb, Sr, Th, V, Y, Zn, Zr, Cu, Ga, Nd, S, Sc). Moreover on 4 samples of grape juices, 4 samples of wines (cultivars Fiano, Verdicchio, NeroD′ Avola e Refosco p. r.) and 2 samples of grapes (NeroD′ Avola e Refosco p. r.) has been determined, using ICP-MS technique, the concentration of the most important trace elements (Li, Be, B, Na, Al, K, Rb, Ca, Sr, Ba, Mg, Mn, Fe, V, Cr, Co, Ni, Cu, Zn, Ga, As, Se, Mo, Ag, Cd, Sb, Te, Hg, Tl, Pb, Bi, U). These analysis has been useful to define quality of wines and grapes, typical ratios of every soils considered and to identify the geochemical fingerprint in an area where climatic differences are slightly important to influence the assimilation dynamics. In this work has been defined the relationship between soil matrix and wines through the comparison of the heavy metals concentration. Also for the purposes of food security, for both provinces concerned, were performed in gamma spectrometry analysis to determine the levels of natural radionuclides (^{238}U, ^{232}Th and ^{40}K) and ^{137}Cs.

Organic carbon and microbial remnants in Mazon Creek fossils

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Mazon Creek Area fossils represent a Konservat-Lagerstätten formed in Northeastern Illinois during the Middle Pennsylvanian. Concretions found in the Francis Creek Shale Member of the Carbondale formation were deposited in a deltaic-estuarine environment. Samples collected from a spoil-heap of 'Peabody Coal Company Pit 11' were analyzed using light microscopy, SEM, SEM-EDX, μXRD, and ToF-SIMS. The fossil concretions consist of mainly Essex (marine) with some Braidwood (terrestrial and freshwater) flora and fauna. One concretion was determined to contain the scyphomedusan *Essexella asherae*. Examination of a polished section using scanning electron microscopy revealed a well-developed pyrite film and halo surrounding this organism, containing discontinuous crystal aggregates of non-framboidal pyrite, suggesting bacterially mediated pyrite aggregation at organic fronts. Detrital quartz clasts, clay grains, and micrometer-sized 'coccoid' bodies were found cemented throughout the siderite matrix, suggesting suspension within bacterially-derived extracellular polymeric substance during early concretion development (Fig. 1). ToF-SIMS analysis of clot-like organic remains between siderite crystallites revealed CN, CNO, and C_4H to $C_{14}H$ hydrocarbon groups. Reflected light micrographs of two worm-like concretions have revealed black spots throughout the siderite matrix that may contain organics. SEM, SEM-EDX and ToF-SIMS analysis of the worm-like concretions and other representative organisms will help determine the role of microorganisms in the formation and preservation of Mazon Creek Fossils.

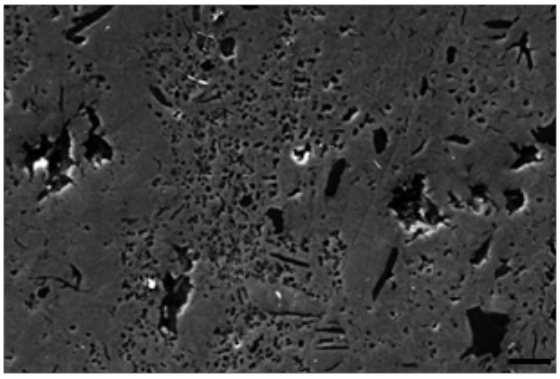

Figure 1. Scanning electron micrograph of *Essexella* polished section showing bacterial texture (scalebar = 10 μm)