Abstract Volume
14th Swiss Geoscience Meeting
Geneva, 18th – 19th November 2016

Time in Geosciences:
Knowledge for a new beginning
Abstract Volume
14th Swiss Geoscience Meeting
Geneva, 18th – 19th November 2016

2. Mineralogy, Petrology, Geochemistry
P 2.16 Jollands M.C., Ulyanov A., Müntener O.: Protocol for Be analysis by LA-ICP-MS and Be distribution in some olivine- and pyroxene-bearing rocks

P 2.17 Farré de Pablo J., Chiaradia M., Rizzo A., Landi P.: Geochemistry and Cu, Zn isotope composition of volcanic rocks in Stromboli Island, Italy

P 2.15 Weber G., Probst L., Schaltegger U., Arce J.L., Caricchi L.: Construction, architecture and evolution of the plumbing system of Nevado de Toluca volcano (Mexico)

P 2.19 Mirza A., Ilbeyli N.: Field, Mineralogical and Petrographical Characteristics of the Ladakh Batholith in NW India

P 2.20 Shengelia D., Tsutsunava T., Chichinadze G., Beridze G., Vadanashvili K., Javakhishvili I.: Petrogenetic and geodynamic types of Late Paleozoic (Sudetan) granitoids of the Caucasus

P 2.21 Freystein M., Heinrich C.: Relative timing and characterization of Au-associated veins in the Gothard Massif, Graubünden, Switzerland

P 2.22 Fisch M., Eggenberger U., Kündig R.: Inventory of Swiss gravel wash mud

P 2.23 Schlatter D.M., Schloglhofer K., Hughes J.: Comparisons of Paleoproterozoic orogenic gold deposits/occurrences of Nalunaq and Vagar in South Greenland and Svalbard in Northern Sweden

P 2.24 Huseynova A.: Correlation of reservoir properties of productive series and the red series within Absheron-Pribalkhan threshold


P 2.26 Kempf E., Hermann J., Reusser E.: Monitoring dehydration reactions in subducted serpentinites by metamorphic olivine formation in the Zermatt-Saas Ophiolites

P 2.27 Lafay R., Baumgartner L.P.: Textural characterization of forsterite + ilic assemblage resulting from antigorite breakdown in the bergitl contact aureole (Italy)

P 2.28 Ricchi E., Gnó E., Bergemann C.: Crystallization ages of Alpine cleist monazite: correlation with exhumation history and shear zone activity

P 2.29 Oliveras M., Kouzmanov K., Schloglhofer K., De los Santos M.: Composition, origin and time evolution of ore-forming fluids and trace element geochemistry of enargite in the Lepanto epithermal high-sulfidation deposit (Philippines)


P 2.31 Peters, D., Pettke, T.: Evaluation of major to ultra trace element bulk rock chemical analysis of nanoparticulate pressed powder pellets by LA-ICP-MS

P 2.32 Ordóñez L., Arzúguel D., Chiaradia M., Vogel H., Mortlock M., Melles M., Russell J.M., Blajkansana S., & the TDP scientific team: Fe isotopes as indicators of biogeochemical cycling in Lake Towuti (Indonesia)

P 2.33 DuPasquier A., Grolimd D., Pena J., Verrecchia E.P.: Manganese oxides in travertines from Skoura (Morocco): geochemical or biological deposits?
Size Dependant Physico-Chemical and Geochemical Characteristics of Two Distinct Carbonate-Rich Marine Sediments (Adriatic Sea)

Maja Ivančić, Srečko D. Škapin, Neda Vdović, Nevenka Mikac & Ivan Sondić

1 Division for Marine and Environmental Research, Ruder Bošković Institute, Bijenička c. 54, 10 000 Zagreb, Croatia (mivanic@rbo.hr)
2 Department of Advanced Materials, Jožef Stefan Institute, Jamova cesta 39, 1000 Ljubljana, Slovenia
3 Faculty of Mining, Geology and Petroleum Engineering, Pierrotijeve 6, University of Zagreb, 10 000 Zagreb, Croatia

Micron- and submicron-sized mineral particles, omnipresent in natural environments, comprise most of the potentially reactive surfaces responsible for transfer and removal of organic and inorganic contaminants (1). On account of the size-related changes in surface reactivity, mineral particles occurring in the nanosized range (1-100 nm) are of considerable interest in investigations of fate of contaminants. In marine environment, micron- and submicron-sized mineral particles mostly consist of clay minerals, metal oxides and oxyhydroxides and sulphides while carbonate minerals more often occur as larger lithogenic and biogenic fragments. Even though investigations of their occurrence in the nanosized range are rare (Morse, 2007), authigenic precipitation can produce carbonate minerals in the submicron size (Sonči & Jurašić, 2010).

This research investigates occurrence of carbonate minerals in different size fractions of two distinct sedimentological environments characterized by high carbonate content in sediment (Figure 1). One is a highly stratified karstic estuary (Kika River Estuary), supersaturated in calcite, with calc tufa barriers formed at the uppermost part of the estuary. The second is an enclosed marine lake (Mljet Lakes) with limited water exchange, where whiting events (drifting milky clouds of water) and the formation of aragonite-rich lake sediments have been the focus of previous investigations (Sonči and Jurašić, 2010).

Recent marine sediments were retrieved using Uwitec gravity corer during different sampling campaigns. The upper 5 cm of sediment was treated with NaClO for organic matter removal after which micron- and submicron-sized fractions were collected by gravitational settling. The size of each fraction was confirmed by laser-based granulometry and separated fractions were freeze-dried. Samples were mineralogically (XRD) and morphologically (FE-SEM) characterized, their physico-chemical properties (specific surface area, SSA and cation exchange capacity, CEC) and trace element concentrations (HR ICPMS) determined.

The results obtained showed that carbonate minerals resulting from weathering of carbonate rocks and disintegration of biomineral structures (i.e. Kika River samples) do not produce significant share of carbonates in the submicron and, especially, nanosized range. This is reflected in a very significant increase in concentrations of lithogenic trace elements (Al, Li) already in the fraction containing particles <0 μm, suggesting significant removal of carbonate minerals by settling. Their absence was accompanied by a sharp increase in SSA and CEC, as a result of higher concentration of clay minerals and Fe and Mn oxides/oxyhydroxides. Contrarily, in environment where carbonates (mostly aragonite) are produced as a result of authigenic processes (i.e. Mljet), their share is significant even in finest fractions. Incorporation of Sr in the aragonite crystal structure allows it to be used as a tracer of aragonite content. High levels of Sr were measured in all fractions collected from this sample, with a maximum of 4461 μg g⁻¹ determined in fraction containing particles <4 μm. Its concentration lowered only in the finest fraction (<=0.45 μm; 1783 μg g⁻¹), where 90 % of particles were <200 nm. The sharp decrease in Sr concentration was accompanied by a 56 % increase in concentrations of Al. The prevalence of carbonate minerals in all size fractions collected from this sample is reflected in continuously low SSA and CEC values.

The study investigated influence of origin of carbonate mineral phases on their occurrence in various size-fractions. Carbonates were shown to be present in larger quantities in sub-micron sizes in environments where their authigenic formation occurs. Low surface reactivity of carbonate mineral phases of different origin was established.

Figure 1. Map showing sampling locations.