## <u>Croatia</u>

The Croatian GEOTRACES activities are mainly related to: (1) improvement of electrochemical methods which, in combination with ICPMS, are used for trace metals speciation (including interaction with organic matter), determination and quantification (mostly Zn, Cd, Pb, Cu, Fe, Ni, Co); (2) development of automatic voltammetric monitoring system and solid (gold wire) micro sensors for on-site and in-situ metal analysis in seawater; (3) assessment of metal bioavailability in aquatic environment using passive samplers for metals (DGT) and cytosolic metal levels in tissues of aquatic organisms. Very recently we have started research on development of electroanalytical methods for chalcogenide nanoparticles determination in natural waters.

The Croatian GEOTRACES activities of the past year were manly dominated by preparations and organization for marine voltammetry themed workshop: "Voltammetry and GEOTRACES", which will be held in Šibenik, Croatia, at the Rudjer Boskovic Institute marine station Martinska, from October 6th to October 9th 2012.

Two PhD students applied and obtained funding for STSM in the frame of COST action ES0801 (The Ocean Chemistry of Bioactive Trace Metals and Paleoclimate Proxies) with the subjects:

- "Colloidal trace metal distribution and speciation in estuary waters" (Host: Dr. Ricardo Riso, Université de Bretagne Occidentale, Institut Universitaire Européen de la Mer, France)
- "Determination of trace metal concentrations by ICP-MS in seawater and biological matrices"(Host: Prof. Dr. Andreas Prange, Helmholtz-Zentrum Geesthacht, Department for Marine Bioanalytical Chemistry, Geesthacht, Germany).

One PhD student obtained funding for training on "Modeling of metal speciation in seawater" (Host: Dr. Cedric Garnier, University of Toulon, France). One PhD student participated on a 3-day essential training school on data quality of marine trace elements and isotopes in Geel, Belgium in May.

One PhD thesis with the title "Voltammetry of iron(III) complexes with organic ligands involved in natural processes" was defended in December 2011 at the Rudjer Boskovic Institute in Zagreb.

## Meetings

Dr. Ivanka Pižeta participated at a meeting in Salt Lake City on the 25th February 2012 as a full member of the SCOR working group 139 on 'Organic Ligands – A Key Control on Trace Metal Biogeochemistry in the Ocean'

## Participation at international conferences

- I. Ciglenečki, E. Bura-Nakić, M.Marguš, I.Milanović, N.Batina. A.Avalos-Perez, D.Krznarić: Nanoparticles in aqueous environments: electrochemical, nanogravimetric, STM and AFM studies Goldschmidt 2011 abstract: Mineralogical Magazine, Vol. 75 (3), 2011, 677.
- E. Bura-Nakić, I.Ciglenečki, E. Viollier: Vertical distribution of Fe and S species in anoxic water column of Pavin Lake (France); electrochemical evidence for nanoparticulate FeS Mineralogical Magazine, Vol. 75 (3), 2011, 597.
- I. Ciglenečki, E. Bura-Nakić, M.Marguš, I.Milanović, N.Batina. A.Avalos-Perez, D.Krznarić: "Electrochemical, nanogravimetric, STM, AFM and DLS studies of nanoparticles in aqueous environment", ASC meting San Diego, March 2012.
- E. Bura-Nakić, M. Marguš, I.Milanović, I. Ciglenečki, Amperometric and voltammetric study of FeS nanoparticles, ISE Regional meeting on Electrochemistry, Buckarest May 2012,
- M. Marguš, N. Batina, E. Bura-Nakić, I. Ciglenečki, Electrochemical and STM studies of FeS nanoparticles in NaCl model solutions, ISE Regional meeting on Electrochemistry, Buckarest May 2012.
- I. Ciglenečki, E. Bura-Nakić, I.Milanović, M. Marguš, D. Krznarić, G. Helz, E. Viollier:

Environmental electrochemistry as a tool for water quality monitoring: sulfidic and iron rich environment, GRC Environmental Sciences:Water, Holderness school, NH,US, June 2012

- Ž. Strižak, D. Pröfrock, D. Ivanković, Z. Dragun, H. Helmholz, M. Erk, A. Prange: Cytosolic Metal Profile from Digestive Gland of Mediterranean Mussels as a Potential Indicator of Metal Exposure, 50th ESCA Congress, Venice, Italy, June 2012.
- B. Oursel, C. Garnier, G. Durrieu, S. Mounier, D. Omanovic, Y. Lucas: Marseille agglomeration (SE, France), inputs to coastal waters: metal behaviour study in the wastewaters/rivers mixing with sea using voltammetric techniques, 14th International Conference on Electroanalysis (ESEAC12), Portorož, Slovenia, June 2012.
- D. Omanovic, I. Pizeta, C. Garnier. Signal processing and experimental design in electroanalysis, 14th International Conference on Electroanalysis (ESEAC12), Portorož, Slovenia, June 2012.

## **Publications:**

- E. Bura-Nakić, D. Krznarić, G.R. Helz, I. Ciglenečki: Characterization of iron sulfide species in model solutions by cyclic voltammetry. Revisiting an old problem, Electroanalysis, 23(6) (2011) 13762.
- G.R. Helz, E. Bura-Nakić, N. Mikac, I. Ciglenečki: New model for molybdenum behavior in euxinic basins, Chemical Geology, 284 (2011) 323.
- G.R. Helz, I. Ciglenečki, D. Krznarić, E. Bura-Nakić. Voltammetry of Sulfide Nanoparticles and the FeS(aq) Problem // Aquatic Redox Chemistry / Paul G. Tratnyek, Timothy J. Grundl, Stefan B. Haderlein (ur.). Washington, DC : American Chemical Society, 2011. Str. 265-282.
- A. Sakellari, M.Plavšić, S. Karavoltsos, M.Dassenakis, M.Scoullos, Assessment of copper, cadmium and zinc remobilization in Mediterranean marine coastal sediments. Estuar. Coastal Shelf Sci. 91 (2011) 1.
- M.Plavšić, I. Ciglenečki, S. Strmečki, E. Bura-Nakić. Seasonal distribution of organic matter and copper under stratified conditions in the karstic, marine, sulfide rich environment (Rogoznica Lake, Croatia). Estuarine Coastal Shelf Sci. 92 (2011) 277.
- N. Cukrov, S. Frančišković-Bilinski, D. Barišić, B. Hlača, A recent history of metal accumulation in the sediments of Rijeka harbour, Adriatic Sea, Croatia, Marine Pollut. Bull. 62 (2011) 154.
- V.Cuculić, N. Cukrov, Ž. Kwokal, M. Mlakar, Distribution of trace metals in anchialine caves of Adriatic Sea, Croatia. Estuar. Coastal Shelf Sci. 95 (2011) 253-263.
- P-J. Superville, Y. Louis, G. Billon, J. Prygiel, D. Omanović, I. Pižeta, An adaptable automatic trace metal monitoring system for on line measuring in natural waters. Talanta 87 (2011) 85.
- M. Furdek, M. Vahčič, J. Ščančar, R. Milačič, G. Kniewald, Goran, N. Mikac, Organotin compounds in seawater and mussels Mytilus galloprovincialis along the Croatian Adriatic coast, Mar. Pollut. Bull. 64 (2012) 189.
- I. Ciglenečki, E. Bura-Nakić, M. Marguš, Zinc sulfide surface formation on Hg electrode during cyclic voltammetric scan: an implication for previous and future research studies on metal sulfide systems, J. Solid State Electrochemistry 16 (6) (2012) 2041.
- M. Plavšić, S. Strmečki, J. Dautović, V. Vojvodić, G. Olujić, B. Ćosović, Characterization and distribution of organic matter using specific physico-chemical methods: a case study of the southeast Adriatic continental and shelf slope (Albania). Continental Shelf Res. 39/40 (2012) 41.
- P. Vukosav, L. Frkanec, M. Mlakar, Voltammetric investigation of iron (III) complexes with siderophore Chrysobactin in aqueous solution, Electrochim. Acta 59 (2012) 479.

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