

ANNUAL REPORT ON GEOTRACES ACTIVITIES IN CROATIA

June 1st, 2015 to April 30th, 2016

The Croatian GEOTRACES activities were related to: 1) improvement of electrochemical methods, which in combination with ICPMS, are used for trace metals speciation (including interaction with organic matter and sulfur species), determination and quantification (mostly Zn, Cd, Pb, Cu, Fe, Ni, Co); 2) development of an automated system for determination of trace metals in natural waters (Voltammetric AutoAnalyser - Volt-AA) 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, 4) development of electroanalytical methods (chronocoulometry) for determination of metal sulphide and elemental sulphur species, including nanoparticles, in natural waters, 5) characterization of marine aerosols (PM_{2.5}) regarding presence of organic matter, sulfur species and trace metals

Meetings

- Active participation in the COST Actions ES1205, ES1302 and TD1105, and SCOR WG 139 and 145.
 - I. Pižeta as associated member, participated to the second meeting of SCOR WG145 „Modelling Chemical Speciation in Seawater to Meet 21st Century Needs“ (MARCHEMSPEC), 21. February 2016, New Orleans, USA and attended Ocean Sciences meeting, 21-26 February 2016, New Orleans, USA.
1. Characterization of Marine Aerosols at the highly Eutrophic Seawater Ecosystem Rogoznica Lake in Central Dalmatia, Adriatic Sea, A. Cvitešić, S. Frka, N. Bačić, N. Mikac, I. Ciglenečki, 5th International Workshop and Conference, Particulate Matter: Research and Management -WeBIOPATR2015, Belgrade, Serbia, October 2015.
 2. Trace metals in water soluble fraction of marine aerosols I. Ciglenečki, A. Cvitešić, P. Orlović-Leko, S. Frka-Milosavljević, N. Bačić, N. Mikac, COST Action TD1105 - New Sensing Technologies for Air-Pollution Control and Environmental Sustainability -Fifth Scientific Meeting, organized by Bulgarian Academy of Sciences, Sofia, 16-18 December 2015.
 3. Soluble fraction of metals in the bulk precipitation in an urban area (Zagreb, Croatia), P. Orlović-Leko, D. Omanović, K. Vidović, I. Ciglenečki, New Sensing Technologies for Air-Pollution Control and Environmental Sustainability -Fifth Scientific Meeting, organized by Bulgarian Academy of Sciences, Sofia, 16-18 December 2015.
 4. Dissolved organic carbon in the northern Adriatic: long-term investigations – potential indicator of global changes, J.Dautović, V. Vojvodić, N. Tepić, B. Čosović, I Ciglenečki, MISTRALS international conference 2015, October 2015, Marseilles France.

PhD thesis

- Ana-Marija Cindrić: “Distribution, speciation and fate of trace metals in the stratified Krka River estuary”, June 2015, University of Zagreb, Faculty of Natural Science, Doctoral study of Oceanology.

Selected Publications

- Omanović, Dario; Garnier, Cédric; Kristoff Gibbon-Walsh; Pižeta Ivanka. Electroanalysis in environmental monitoring: tracking trace metals - a mini review. *Electrochemistry Communications*, 61 (2015) 78–83.
- Cindrić, Ana-Marija; Garnier, Cédric; Oursel, Benjamin; Pižeta, Ivanka; Omanović, Dario. Evidencing the natural and anthropogenic processes controlling trace metals dynamic in a highly stratified estuary: the Krka River estuary (Adriatic, Croatia). *Marine pollution bulletin*. 94 (2015) 199-216.
- Mlakar, Marina; Fiket, Željka; Geček, Sunčana; Cukrov, Neven; Cuculić, Vlado. Marine lake as in situ laboratory for studies of organic matter influence on speciation and distribution of trace metals. *Continental shelf research*. 103 (2015) 1-11.
- Ciglencečki, I., Svetličić, V., *Nanoparticles and Marine Environment: An Overview, Nanotechnology to Aid Chemical and Biological Defense* / Terri A. Camesano (ur.). Dordrecht, Netherlands: Springer, 2015. Str. 95-113.
- Ciglencečki, I., Janeković, I., Marguš M., Bura-Nakić, E., Carić, M., Ljubešić, Z., Batistić, M., Dupčić, I., Hrustić, E., Garić, R., The impacts of the extreme weather events on the eutrophicated seawater ecosystem (Rogoznica Lake, Adriatic coast), *Continental Shelf Research* 108 (2015) 144–155
- Marguš, M., Morales-Reyes, I., Bura-Nakić, E., Batina, N., Ciglencečki, I., The anoxic stress conditions explored at the nanoscale by Atomic Force Microscopy in highly eutrophic and sulfidic marine lake, *Continental Shelf Research* 109(2015) 24–34
- Plavšić, M., Strmečki, S., Carbohydrate polymers as constituents of exopolymer substances in seawater, their complexing properties towards copper ions, surface and catalytic activity determined by electrochemical methods, *Carbohydrate Polymers* 135 (2016) 48–56.

New equipment

- YSI EXO2 multiparameter probe with pH/ORP, Conductivity, Oxygen, Turbidity smart sensors

New projects supported by the Croatian Ministry of Science, Education and Sport and Croatian Science Foundation (CSF)

- 2014-2018 CSF project: “Appearance and interaction of biologically important organic molecules and micronutrient metals in marine ecosystem under environmental stress”, AMBIOMERES
- 2014-2018 CSF project: „The Sulphur and Carbon dynamics in the Sea- and Fresh-water Environment“, SPHERE 1205

- 2014-2018 CSF project: „Transport and Chemodynamics of Trace Elements in Freshwater and Coastal Sedimentary Systems,,
- NEWFELLPRO project 2014-2017 “Using lakes to develop isotopic tools for understanding ocean redox through Earth history”
- 2015-2019 CSF projekt: „New methodological approach to biogeochemical studies of trace metal speciation in coastal aquatic ecosystems“ (MEBTRACE)
- 2015-2019 CSF project "Accumulation, Subcellular Mapping and Effects of Trace Metals in Aquatic Organisms" (AQUAMAPMET)
- 2015-2017: Monitoring program of coastal Adriatic Sea (Croatian side) (trace metals, organic matter)

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