

ANNUAL REPORT ON GEOTRACES ACTIVITIES IN CROATIA

May 1, 2016 – April 30, 2017

The Croatian GEOTRACES activities were mainly 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 a new sample changer for an automated system for determination of trace metals in natural waters (Voltammetric AutoAnalyser - Volt-AA) and solid (gold array micro disc) micro sensors for analysis of trace metals, 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; 6) improvement of multielemental analysis in geological materials; 7) study of trace elements as indicators of environmental changes in lakes; 8) study of organic persistence in marine sediments; 9) study of stability of silver nanoparticles in seawater.

Meetings

Active participation in the COST Actions ES1205, ES1302, TD1407 and TD1105.

- Organization of WG1 and WG4 meeting group within COST ES1302 (WG 1 - trace metals chemical speciation and bioavailability <http://anaerobicmetals.eu/working-group-1-chemical-speciation-and-bioavailability/>, WG4 -Fate of trace metals in environment), Zagreb, June 2016.
- Atmospheric Deposition of Trace Elements on Carbonate Material of Historic Buildings in Two Urban Sites, K. Vidović, P. Orlović-Leko, I. Ciglencečki, D. Nekić, COST Action TD1105 - Sixth Scientific Meeting EuNetAir, Academy of Sciences, Prague, Czech Republic, October 2016. www.ama-science.org/proceedings, DOI 10.5162/6EuNetAir2016/19
- Application of atomic force microscopy in characterization of marine aerosols, S. Stevanović, A. Cvitešić, V. Jovanović, N. Batina, I. Ciglencečki, COST Action TD1105 - Sixth Scientific Meeting EuNetAir, Academy of Sciences, Prague, Czech Republic, October 2016. www.ama-science.org/proceedings, DOI 10.5162/6EuNetAir2016/08
- Sources and distribution of rare earth elements in the Zrmanja river estuary, Adriatic sea, Croatia, N. Mikac et al. , COST Action TD1407: Network on technology-critical elements - from environmental processes to human health threats, Workshop on Environmental Concentrations, Cycling & Modeling of Technology Critical Elements, 8-19 January 2017, Weizmann institute of science, Rehovot, Israel

PhD thesis

- Marija Marguš: Development of the electroanalytical methods for detection and characterization of metal sulfide and sulphur nanoparticles in aquatic environment. Doctoral study of Oceanology, University of Zagreb, November 2016.

Selected Publications

- Marguš, M., Coha, I., Ciglenečki, I. Voltammetric, dynamic light scattering (DLS) and electrophoretic mobility characterization of FeS nanoparticles (NPs) in different electrolyte solutions. *Journal of Solid State Electrochemistry* 2016, 20 (11) 2981–2989.
- Su, Han; Yang, Rujun; Pižeta, Ivanka; Omanović, Dario; Wang, Shirong; Li, Yan. Distribution and speciation of dissolved iron in Jiaozhou Bay (Yellow Sea, China), *Front. Mar. Sci. - Marine Biogeochemistry*, 3 (2016) 1-17
- Dautović, J., Vojvodić, V., Tepić, N., Čosović, B., Ciglenečki, I., Dissolved organic carbon as potential indicator of global change: A long-term investigation in the northern Adriatic, *Science of the Total Environment*, 2017, DOI 10.1016/j.scitotenv.2017.02.111
- P. Orlović-Leko, D. Omanović, I. Ciglenečki, K. Vidović, T. Brenko, Application of electrochemical methods in the physicochemical characterization of atmospheric precipitation, *Bulgarian Chemical Communications*, Volume 49 Special Issue C 2017 211-217.
- Željka Fiket, Nevenka Mikac and Goran Kniewald, 2017. Mass Fractions of Forty-Six Major and Trace elements, including Rare Earth Elements, in Sediment and Soil Reference Materials used in Environmental Studies *GEOSTANDARDS AND GEOANALYTICAL RESEARCH*, 41, 123-135.
- Furdek, M; Mikac, N; Bueno, M; Tessier, E; Cavalheiro, J; Monperrus, M, 2016. Organotin persistence in contaminated marine sediments and porewaters: In situ degradation study using species-specific stable isotopic tracers, *JOURNAL OF HAZARDOUS MATERIALS*, 307, 263-273.
- Sondi I; Mikac N; Vdović N; Ivanić M; Furdek M; Škapin S, 2017. Geochemistry of recent aragonite-rich sediments in Mediterranean karstic marine lakes: trace elements as pollution and palaeoredox proxies and indicators of authigenic mineral formation, *CHEMOSPHERE*, 168, 586-797.
- Levak, M; Buric, P; Sikiric, MD; Jurasin, DD; Mikac, N; Bacic, N; Drexel, R; Meier, F; Jaksic, Z; Lyons, DM, 2017, Effect of Protein Corona on Silver Nanoparticle Stabilization and Ion Release Kinetics in Artificial Seawater, *ENVIRONMENTAL SCIENCE & TECHNOLOGY*, 51, 1259-1266.

Current Projects

Current 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,„
- 2015-2019 CSF projekt: „New methodological approach to biogeochemical studies of trace metal speciation in coastal aquatic ecosystems“ (MEBTRACE)

- 2016-2018: Monitoring program of coastal Adriatic Sea (Croatian side) (trace metals, organic matter)

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