

## **ANNUAL REPORT ON GEOTRACES ACTIVITIES IN CROATIA**

April 1st, 2018 to March 31st, 2019

### ***New scientific results***

The Croatian GEOTRACES activities were mainly related to: 1) application of improved electrochemical methods (which in combination with ICPMS) are used for trace metals speciation (mostly Zn, Cd, Pb, Cu, Fe, Ni, Co; including interaction with organic matter and sulfur species) in natural waters; 2) development of analytical methods for technology critical elements (Pt, Ga, Ge, Nb, Te, Tl, W) determination in natural waters and sediments; 3) development of electroanalytical methods for determination of metal sulphide and colloidal S species, including nanoparticles, in natural waters; 4) assessment of metal bioavailability in aquatic environment using passive samplers for metals (DGT) and cytosolic metal levels in tissues of aquatic organisms, 5) characterization of marine aerosolos (PM2.5) regarding presence of organic matter, sulfur species and trace metals; 6) development of a new samplers for seawater sampling, including sea-surface microlayer; 7) geochemical research in different environmental samples, and systems; 8) study of trace elements as indicators of environmental changes in lakes;

### ***New projects and/or funding***

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 (PI: B.Gašparović).
- 2014-2018 CSF project: "The Sulphur and Carbon dynamics in the Sea- and Fresh-water EnviRonment", SPHERE 1205 (PI: I.Ciglenečki).
- 2015-2019 CSF projekt: "New methodological approach to biogeochemical studies of trace metal speciation in coastal aquatic ecosystems" (MEBTRACE) (PI: D. Omanovic).
- 2015-2019 CSF project "Accumulation, Subcellular Mapping and Effects of Trace Metals in Aquatic Organisms" (AQUAMAPMET) (PI: M. Erk).
- 2015-2017: National Monitoring program of coastal Adriatic Sea (Croatian side) (trace metals, organic matter, organic pollutants).
- 2018-2020: MedPAN project: NaTEF – Nautical Tourism Ecological Footprint in MPAs (PI: Dario Omanović).
- 2018-2020: Chinese/Croatian project: The speciation of trace metals in seawater at phase boundaries - implementation of advanced methodologies (PI: Dario Omanović).
- 2019-2022: MARine lake (Rogoznica) as a model for EcoSystem functioning in a changing environment (PI. I. Ciglenečki-Jušić).
- 2018-2022: Geochemistry and Records of Redox Indicators in Different Environmental Conditions: Towards a better understanding of redox conditions in the past (PI: E. Buranakić).
- Collaboration on VALSE project (2017-2020) "Nouvelles ressources transfrontalières : vers une validation de scenarii de valorisation de sédiments et autres matériaux" INTERREG France - Wallonie – Vlaanderen (PI: M.Marguš).

## ***Outreach activities***

New samplers:

- 4.5L or 12 L "Butterfly" water sampler - rope or rosette mounting (<https://sites.google.com/site/daromasoft/home/sampler>)



- Cheap and efficient SeaSurface Microlyaer "drum" sampler (<https://sites.google.com/site/daromasoft/home/sml-sampler>)



## ***Other activities***

- Active participation in the COST Actions TD 1407 and SCOR WG 139 and 145.

### **New publications (published or in press)**

- Pošćić, Filip; Furdek Turk, Martina; Bačić, Niko; Mikac, Nevenka; Bertoldi Daniela, Camin, Fedrica, Jukić Špika, Maja; Žanetić, Mirella; Rengel, Zed; Perica, Slavko, Removal of pomace residues is critical in quantification of element concentrations in extra virgin olive oil // *Journal of food composition and analysis*, 77 (2019), 39-46
- Fiket, Željka; Fiket, Tomislav; Ivanić, Maja; Mikac, Nevenka; Kniewald, Goran, Pore water geochemistry and diagenesis of estuary sediments – an example of the Zrmanja River estuary (Adriatic coast, Croatia) // *Journal of soils and sediments*, 19 (2019), 4; 2048-2060
- Ivanić, Maja; Fiket, Željka; Medunić, Gordana; Furdek Turk, Martina; Marović, Gordana; Senčar, Jasmina; Kniewald, Goran, Multi-element composition of soil, mosses and mushrooms and assessment of natural and artificial radioactivity of a pristine temperate rainforest system (Slavonia, Croatia) // *Chemosphere*, 215 (2019), 668-677
- Ivanić, Maja; Lojen, Sonja; Grožić, Dino; Jurina, Irena; Škapin, Srećo D.; Troskot-Čorbić, Tamara; Mikac, Nevenka; Juračić, Mladen; Sondi, Ivan, Geochemistry of sedimentary organic matter and trace elements in modern lake sediments from transitional karstic land-sea environment of the Neretva River delta (Kuti Lake, Croatia) // *Quaternary international*, 494 (2018), 286-299
- Lučić, Mavro; Jurina, Irena; Ščančar, Janez; Mikac, Nevenka; Vdović, Neda, Sedimentological and geochemical characterization of river suspended particulate matter (SPM) sampled by time-integrated mass flux sampler (TIMS) in the Sava River (Croatia) // *Journal of soils and sediments*, 18 (2018), 1-16
- Fiket, Željka; Mlakar, Marina; Kniewald, Goran, Distribution of rare earth elements in sediments of the marine lake Mir (Dugi otok, Croatia) // *Geosciences*, 8 (2018), 8; 301, 18
- Pošćić, Filip; Runjić, Marko; Jukić Špika, Maja; Mikac, Nevenka; Rengel, Zed; Romić, Marija; Urlić, Branimir; Bačić, Niko; Lučić, Mavro; Bakić, Helena et al. Nutrient deficiencies in olives grown on typical Mediterranean soils (Terra rossa, Rendzina, Lithosol) // *Archives of Agronomy and Soil Science*, 64 (2018), 13; 1777-1790
- Fiket, Željka; Ivanić, Maja; Furdek Turk, Martina; Mikac, Nevenka; Kniewald, Goran, Distribution of trace elements in waters of the Zrmanja River estuary (eastern Adriatic coast, Croatia) // *Croatica chemica acta*, 91 (2018), 1; 29-41
- L. Cotte, D. Omanović, M. Waeles, A. Laës, C. Cathalot, P.M. Sarradin and R.D. Riso, On the nature of dissolved copper ligands in the early buoyant plume of hydrothermal vents. *Environmental Chemistry* (2017). 15 (2018) 58-73
- Clément Coclet, Cédric Garnier, Gaël Durrieu, Dario Omanović, Sébastien D'Onofrio, Christophe Le Poupon, Jean-Ulrich Mullot, Jean-François Briand, Benjamin Misson, Changes in bacterioplankton communities resulting from direct and indirect interactions with trace metal gradients in an urbanized marine coastal area. *Frontiers in Microbiology*, 10 (2019) 1–14.
- Huy Dang, Duc; Evans, R. Douglas; Wang, Wei; Omanović, Dario; El Houssainy, Amonda; Lenoble, Véronique; Mullot, Jean-Ulrich; Mounier, Stéphane; Garnier, Cédric. Uranium isotope geochemistry in modern coastal sediments: insights from Toulon Bay, France. *Chemical geology*. 481 (2018) 133-145.

*Presentations in international conferences*

- S. Marcinek, N. Layglon, J. Pađan, A-M. Cindrić, C. Santinelli, M. Gonnelli, C. Garnier, S. Mounier and D. Omanović, UV-Vis spectroscopic study of coloured dissolved organic matter (CDOM) in the pristine Krka River estuary (Croatia), International Workshop on Organic Matter Spectroscopy 2018 (WOMS 2018), 23-27. October, 2018, Carqueiranne, France.
- D. Omanović, C. Santinelli, S. Marcinek, ASFit - an all-inclusive tool for analysis of UV-Vis spectra of colored dissolved organic matter (CDOM), International Workshop on Organic Matter Spectroscopy 2018 (WOMS 2018), 23-27. October, 2018, Carqueiranne, France.
- J. Pađan, S. Marcinek, A.M. Cindrić, N. Layglon, G. Durrieu, C. Garnier, D. Omanović, Determination of sub-pico-molar levels of platinum in the Krka river estuary (Croatia), 40th International Conference on Environmental & Food Monitoring, Santiago de Compostela (Spain), 19-22.06.2018.
- S. Marcinek, C. Garnier, J. Pađan, A.M. Cindrić, I. Pižeta, D. Omanović, Segmented multi-detection window approach for organic speciation of trace metals – a model and experimental study in estuarine system, 40th International Conference on Environmental & Food Monitoring, Santiago de Compostela (Spain), 19-22.06.2018.
- I. Ciglenecki, N. Mikac, G. Helz, M. Marguš, M. Čanković, Rogoznica Lake as a proxy for biogeochemical processes in euxinic marine environment, Goldschmidt conference, Boston, August 2018.

Submitted by Irena Ciglenečki-Jušić (irena@irb.hr).