

CV: Igor Živković received his MSc degree in Organic Chemistry and Biochemistry in 2011 and his PhD in Ecotechnology in 2018. Following the completion of his doctoral studies, he worked as an Assistant with a PhD at the Department of Environmental Sciences, Jožef Stefan Institute, Slovenia. Since 2024, he has held the position of Research Associate at the same department and has also served as an Assistant Professor at the Jožef Stefan International Postgraduate School.

His research primarily focuses on the biogeochemistry and environmental behavior of mercury in aquatic and atmospheric environments, with particular emphasis on the Adriatic and Mediterranean Seas. His scientific interests encompass mercury cycling and speciation in marine waters, sediments, and biota; interactions between mercury and microbial communities; the development, optimization, and validation of analytical methods for mercury determination and speciation; and the application of mercury stable isotope measurements. His research also addresses mercury speciation and chemical transformations in the atmosphere and industrial flue gases, as well as the development of traceable calibration systems for atmospheric mercury monitoring. A substantial part of his research is dedicated to environmental analytical chemistry and metrology, particularly the assessment of measurement uncertainty, comparability, accuracy, and traceability of mercury measurements. His work has contributed to advancing both the fundamental understanding of mercury biogeochemical cycling and the analytical and metrological capabilities required for reliable environmental monitoring. The results of his scientific work have been published in more than 30 original research articles and several review articles in internationally recognized scientific journals. He has also contributed to international research projects, scientific reports, methodological guidelines, and specialist reference publications addressing environmental mercury research, analytical chemistry, and measurement science.

Title: Mercury in the Adriatic and Mediterranean Seas: Sources, Biogeochemical Cycling, and Environmental Trends

Mercury (Hg) contamination remains a major environmental concern in the Adriatic Sea and the wider Mediterranean region due to its persistence, toxicity, and capacity to bioaccumulate and biomagnify in marine food webs. Decades of scientific research have substantially advanced our understanding of mercury sources, transport, transformations, and distribution in these marine environments. The Adriatic Sea is a particularly interesting case study because its distinctive geochemical and hydrodynamic characteristics, together with historical and ongoing anthropogenic pressures, shape the complex processes governing mercury inputs, cycling, and accumulation.

Major sources of mercury include historical mining activities, most notably the Idrija mercury mine, industrial emissions and discharges associated with activities such as chlor-alkali production, and atmospheric deposition. These sources have contributed to the regional mercury budget and influenced its distribution among seawater, marine sediments, and biota. Beyond total mercury concentrations, understanding mercury speciation is essential for assessing its environmental behavior and potential risks. In particular, the transformation of inorganic mercury into

methylmercury, a highly toxic and readily bioaccumulative form, represents a critical process linking mercury contamination to marine food-web exposure and potential risks to ecosystem health and human consumers of seafood.

Long-term monitoring and investigations conducted across the Adriatic and Mediterranean Seas have provided valuable insights into spatial and temporal patterns of mercury contamination, identified areas of elevated concentrations, and improved understanding of the factors controlling its environmental fate. This presentation synthesizes established knowledge on the origins, distribution, and biogeochemical cycling of mercury in these regions, with particular emphasis on the Adriatic Sea. It also highlights the importance of integrating geochemical, hydrodynamic, biological, and long-term monitoring approaches to better understand mercury pathways, evaluate environmental impacts, and identify persistent contamination hotspots. By bringing together key findings from decades of research, the lecture aims to provide an integrated overview of the evolution and current understanding of mercury contamination in the Adriatic and Mediterranean marine environments.