

## ANNUAL REPORT ON GEOTRACES ACTIVITIES IN TURKEY

May 1st, 2022 to April 30th, 2023

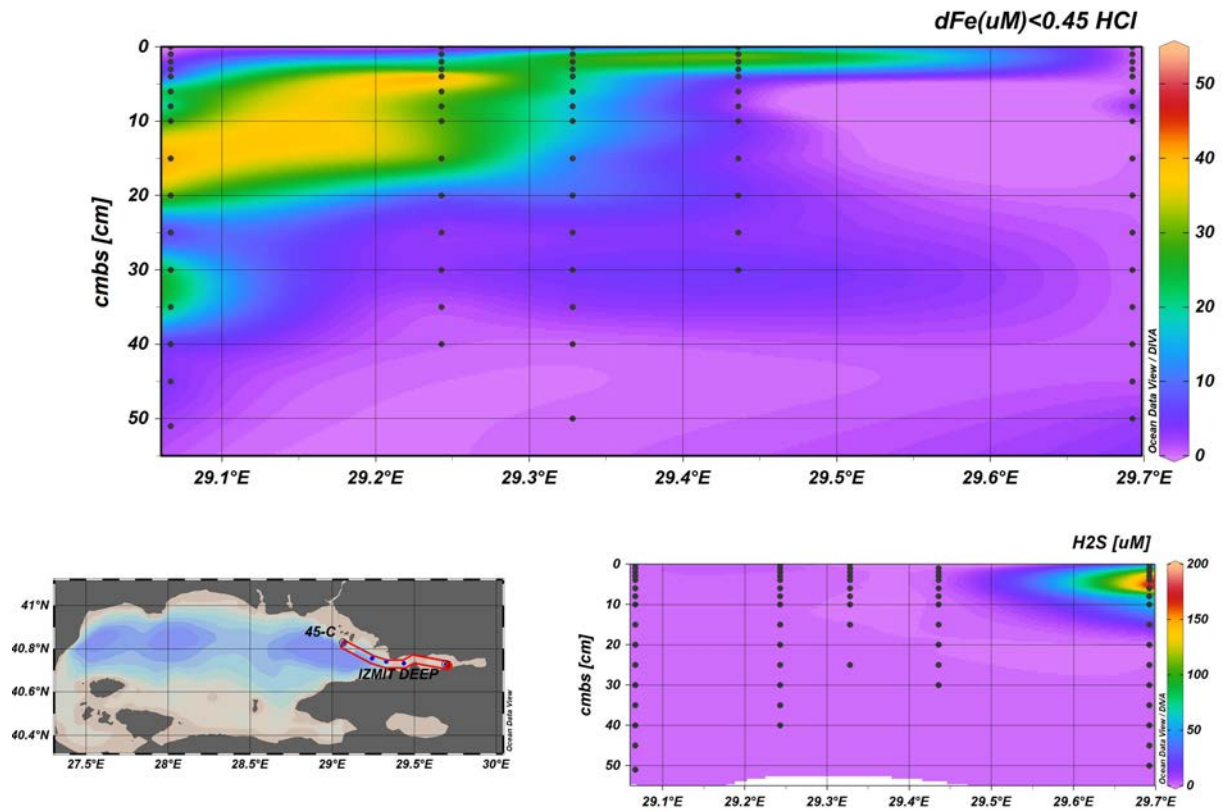
### *New GEOTRACES or GEOTRACES relevant scientific results*

The period from May 2022 to May 2023 witnessed an intensive expedition activity in the seas surrounding Turkey In the Eastern Mediterranean, in the Sea of Marmara and the Black Sea with Turkey`s only oceanographic RV Bilim-2. These expeditions have been performed with the support of national funding (TÜBİTAK, strategic infrastructure funds) as well as European Union's Horizon Programme, to which Turkey is an associated partner.

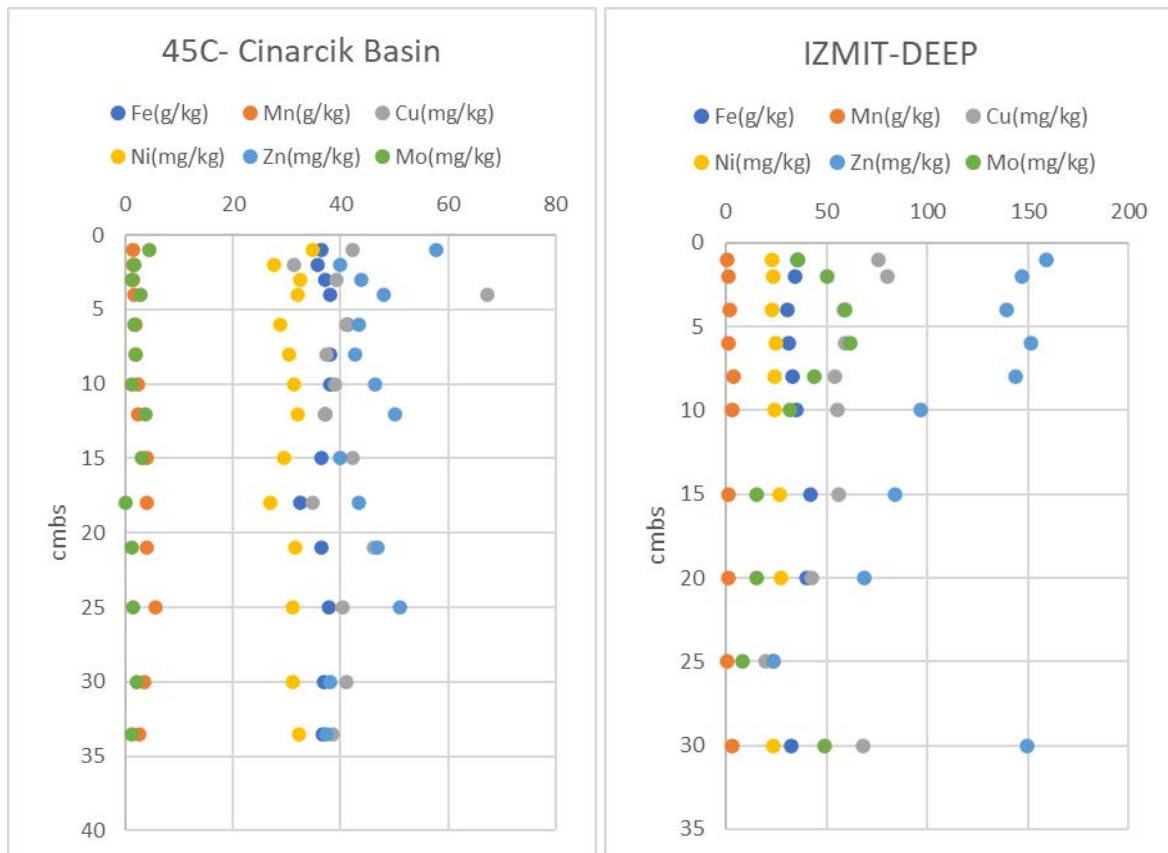
The work in the Black Sea encompassed over 100 CTD hydrocast and bottle sampling stations down to 1800 meters depth, in both western and eastern basins in the Turkish waters. The biogeochemical program of these cruises emphasized redox species such as oxygen, sulfide, iron and manganese. Preparatory work for future trace element sampling across the redox interface in the Black Sea has also been performed. Preliminary measurements

In terms of trace elements sedimentary metals and diffusive fluxes of iron, manganese and 10 other transition metals have been studied in detail in the Sea of Marmara given the expansion of hypoxia in this basin and associated release or uptake of previously sediment-bound elements.

Sedimentary porewater dFe and H<sub>2</sub>S measurements from June 2021 are given below depicting the sulfidic to iron rich sedimentary porewater characteristics along the transect from IZMIT-DEEP to Cınarcık Basin.



Some of the results on total trace elements, after the total digestion with HF-HNO<sub>3</sub> of the sediments taken during 2022 June Cruise are given below.



A publication regarding the dissolved Fe, H<sub>2</sub>S and solid phase metal contents of the Sea of Marmara is currently under preparation.

### ***GEOTRACES or GEOTRACES relevant cruises***

- R/V Bilim, November - December 2022, Sea of Marmara and the Black Sea
- R/V Bilim, May-June 2023, Sea of Marmara and the Black Sea

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

**ERC Consolidator Grant Deep Trace** to Prof. Dr. Mustafa Yücel, METU IMS, as the PI.

This 2.4 M Euro project has started in January 2023 and will run until 2028. As a new initiative funded by Horizon Europe's competitive European Research Council (ERC) Consolidator Grants, ERC project DeepTrace aims to build a new approach combining deep-ocean redox research with ocean world habitability analyses. Funded until 2028, the project will aim to uncover the metal nanoparticulate diversity produced across Earth's deep ocean redox gradients as a key tracer of potentially redox-active, chemical-disequilibria-rich conditions. The project will initially focus on the 5 cofactor metal elements but the scope will be broadened as the work progresses. DeepTrace has started to advance a ground-breaking mechanistic, analytical, and predictive framework on the nanoparticle-fuelled co-mobilization of catalyst metals across Earth's marine redox interfaces. We have selected to focus on Earth analogues of pelagic and deep-sea hydrothermal redox gradients and will present some of the first results in this presentation. We are starting to apply time-of-flight mass spectrometry-based single-particle nanoparticle analyses from a pelagic redox gradient in the Black Sea and developing this approach for the first time in order to detect multiple metal cooccurrences in marine nanoparticles across redox interfaces.

Job openings, both doctoral and postdoctoral, are open under this project and can be viewed in the web page below:

<https://ims.metu.edu.tr/announcement/erc-deepttrace-project-seeking-phd-candidates>

### ***New GEOTRACES or GEOTRACES-relevant publications (published or in press) (If possible, please identify those publications acknowledging SCOR funding)***

- Akcay I, **Yücel M** (2023). Distinct patterns of sedimentary phosphorus fractionation and mobilization in the seafloor of the Black Sea, Marmara Sea and Mediterranean ea. *Science of the Total Environment* 863: 160936 (<https://doi.org/10.1016/j.scitotenv.2022.160936>)
- Grégoire, M., Oschlies, A., Canfield, D., Castro, C., Ciglenc̆ki, I., Croot, P., Salin, K., Schneider, B., Serret, P., Slomp, C.P., Tesi, T., **Yücel, M.** (2023). Ocean Oxygen: the role of the Ocean in the oxygen we breathe and the threat of deoxygenation. Rodriguez Perez, A., Kellett, P., Alexander, B., Muñiz Piniella, Á., Van Elslander, J., Heymans, J. J., [Eds.] Future Science Brief No. 10 of the European Marine Board, Ostend, Belgium. ISSN: 2593-5232. ISBN: 9789464206180. DOI: 10.5281/zenodo.7941157

***Completed GEOTRACES PhD or Master theses***

- Master thesis by Nimet Alimli “Seafloor Iron Mobilization Across The Deep-Water Redox Gradients Of The Black Sea And The Sea Of Marmara” can be found in the link <https://open.metu.edu.tr/handle/11511/99800>

***GEOTRACES presentations in international conferences***

- <https://conf.goldschmidt.info/goldschmidt/2023/meetingapp.cgi/Paper/16601>

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