

ANNUAL REPORT ON GEOTRACES ACTIVITIES IN THE NETHERLANDS

May 1st, 2022 to April 30th, 2023

New GEOTRACES or GEOTRACES relevant scientific results

- Progress is being made with the interpretation and publication of results from cruises ANA08B, PS117 and MetalGate (64PE474)

GEOTRACES or GEOTRACES relevant cruises

- 64PE517; North Sea-Atlantic Exchange (NoSE) expedition aboard *RV Pelagia* to the Norwegian Trench, including trace metal measurements from May 26th till June 14th 2023 from Texel (Netherlands) to Texel (Netherlands)

New projects and/or funding

- NWO XL proposal. The role of the North Sea in the Atlantic Ocean biogeochemical system: North Sea-Atlantic Exchange (NoSE). P.I. Dr F. Mienis. A.I.'s: Dr. M.P. Humphreys, Prof. Dr. R. Middag, Prof. Dr. P.M.J. Herman, Dr. ir. B.C. van Prooijen, Dr. P. Kraal, Dr. F. Sangiorgi, Dr. R. Hennekam, Dr. M.T.J. van der Meer, Prof. Dr. S. Schouten, Prof. Dr. R. Bintanja, Dr. Ir. J. van der Molen, Prof. Dr. K. Soetaert.
- Polair Programma Polaire Strategische Kansen 2022. East Antarctic Ice Sheet Expedition aboard FS Polarstern; a strategic opportunity. PI Rob Middag.

GEOTRACES workshops and meetings organized

- Netherlands BioGeoSCAPES scoping workshop for the International BioGeoSCAPES community at the University of Amsterdam on 22 February 2023

Outreach activities conducted

- Sporenmetalen, de oceaan en een veranderende wereld: de kracht van de allerkleinsten. Inaugural lecture by R. Middag, University of Groningen Press
- Lecture on trace metals and limitation 'Plankton Overleg Nederland' meeting 23/03/2023
- Interview Radio 1 'vroege vogels', 'Oceaanleven kan niet zonder metalen' 30/10/2022

New GEOTRACES or GEOTRACES-relevant publications (published or in press)

- Zhu, K., Achterberg, E.P., Bates, N.R., Gerringa, L.J.A., Middag, R., Hopwood, M.J. and Gledhill, M., 2023. Influence of Changes in pH and Temperature on the Distribution of Apparent Iron Solubility in the Oceans. *Global Biogeochemical Cycles*, 37(5): e2022GB007617
- Olivelli, A., Murphy, K., Bridgestock, L., Wilson, D.J., Rijkenberg, M., Middag, R., Weiss, D.J., van de Flierdt, T. and Rehkämper, M., 2023. Decline of anthropogenic lead in South Atlantic Ocean surface waters from 1990 to 2011: New constraints from concentration and isotope data. *Marine Pollution Bulletin*, 189: 114798

- Tian, H.-A., van Manen, M., Wille, F., Jung, J., Lee, S., Kim, T.-W., Aoki, S., Eich, C., Brussaard, C.P.D., Reichart, G.-J., Conway, T.M. and Middag, R., 2023. The biogeochemistry of zinc and cadmium in the Amundsen Sea, coastal Antarctica. *Marine Chemistry*, 249: 104223
- Eich, C., Biggs, T.E.G., van de Poll, W.H., van Manen, M., Tian, H.-A., Jung, J., Lee, Y., Middag, R. and Brussaard, C.P.D., 2022. Ecological Importance of Viral Lysis as a Loss Factor of Phytoplankton in the Amundsen Sea. *Microorganisms*, 10(10): 1967
- van Manen, M., Aoki, S., Brussaard, C.P.D., Conway, T.M., Eich, C., Gerringa, L.J.A., Jung, J., Kim, T.-W., Lee, S., Lee, Y., Reichart, G.-J., Tian, H.-A., Wille, F. and Middag, R., 2022. The role of the Dotson Ice Shelf and Circumpolar Deep Water as driver and source of dissolved and particulate iron and manganese in the Amundsen Sea polynya, Southern Ocean. *Marine Chemistry*, 246: 104161
- Eich, C., Biggs, T.E.G., van de Poll, W.H., van Manen, M., Tian, H.-A., Jung, J., Lee, Y., Middag, R. and Brussaard, C.P.D., 2022. Ecological Importance of Viral Lysis as a Loss Factor of Phytoplankton in the Amundsen Sea. *Microorganisms*, 10(10): 1967.
- Kipp, M.A., Li, H., Ellwood, M.J., John, S.G., Middag, R., Adkins, J.F. and Tissot, F.L.H., 2022. 238U, 235U and 234U in seawater and deep-sea corals: A high-precision reappraisal. *Geochimica et Cosmochimica Acta*, 336: 231-248
- Jensen, L.T., Cullen, J.T., Jackson, S.L., Gerringa, L.J.A., Bauch, D., Middag, R., Sherrell, R.M. and Fitzsimmons, J.N., 2022. A Refinement of the Processes Controlling Dissolved Copper and Nickel Biogeochemistry: Insights From the Pan-Arctic. *Journal of Geophysical Research: Oceans*, 127(5): e2021JC018087

GEOTRACES presentations in international conferences

- Lena Beckley, Loay Jabre, Jennifer Tolman, Rachel Sipler, Willem van de Poll, Julie LaRoche, Rob Middag, Erin Bertrand. Interactive effects of temperature and iron on High Latitude North Atlantic phytoplankton communities and primary production. Oral presentation at the Canadian Meteorological and Oceanographic Society 57th Congress, May 28th-June 1st 2023, Saint John's (NL), Canada.
- B. Rabe, M. Janout, Lars-Eric Heimbürger, Rob Middag, Ellen Damm, Sinhue Torres Valde, Kirstin Schulz. Upper ocean turbulence and vertical mass fluxes from in-situ observations in the central Arctic Ocean 2015. Arctic and Subarctic Ocean Fluxes (ASOF) workshop 2023, Universidad de las Palmas de Gran Canaria (Spain), 10-12 May 2023.
- Duncan Dale, Marcus Christl, Andreas Macrander, Sólveig Ólafsdóttir, Rob Middag, and Núria Casacuberta. Treasure from trash: Using nuclear waste to trace ocean circulation around Iceland. EGU General Assembly 2023, Vienna, Austria, 24–28 Apr 2023, EGU23-12097
- Middag, R. The importance of marine (microbial) life and biogeochemical cycles for a healthy and habitable planet Invited oral presentation at the United Nations workshop in support of the Regular Process for Global Reporting and Assessment of the State of the Marine Environment meeting, The Hague, the Netherlands, 28-30 November 2022.
- Middag, R., Ardiningsih, I., Bertrand, E.M., Brussaard, C.P.D., Eich, Jabre, L., McCain, J., van Manen, M., Tian, H.-A. Effects of Iron and Temperature on Antarctic Phytoplankton. Poster presentation at the Royal Society Meeting ‘Marine microbes in a changing climate’, Whittlebury Park, UK, 13 September 2022.
- Middag, R. Trace element limitation – distribution, impact and significance. Euromarine Foresight Workshop on Biogescapes, Zagreb, Croatia, 16th-17th June 2022.

- Hung-An Tian, Mathijs van Manen, Zach B. Bunnell, Jinyoung Jung, Sang Hoon Lee, Tae-Wan Kim, Gert-Jan Reichart, Tim M. Conway, Rob Middag. Dissolved Fe isotopic compositions in the Amundsen Sea Polynya, Antarctica: insights for external Fe sources and biogeochemical processes. Poster presentation at the 2022 NWO National Polar Symposium, The Hague, the Netherlands, 19th May. 2022

Submitted by Rob Middag (rob.middag@nioz.nl) on behalf of all Dutch GEOTRACES participants