

ANNUAL REPORT ON GEOTRACES ACTIVITIES IN THE NETHERLANDS

April 1st, 2019 to March 31st, 2020

New GEOTRACES or GEOTRACES relevant scientific results

- Progress is being made with the interpretation and publication of results from cruises GA02 and GA04N
- Samples are being analysed from cruise ANA08B and PS117, two GEOTRACES Process studies
- A manuscript is being prepared describing benthic flux and water column data of Fe and Mn for the Louisiana shelf, as obtained during RV Pelagia cruise from March 12 – April 4, 2018. St Maarten – Nassau.

Outreach activities conducted

- Lecture by R. Middag at the Dutch NIBI conference for biology teachers

Other GEOTRACES activities

- Co-chairing of a meeting session at the February 2020 Ocean Science Meeting in San Diego (USA). (session ‘Revealing Biogeochemical Processes on Basin Scales through Ocean Transects’)

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

- Alderkamp, A-C., van Dijken, G.L., Lowry, K.E., Lewis, K.M., Joy-Warren, H., van de Poll, W., Laan, P., Gerringa, L., Delmont, T., Jenkins, B., L.J.A., Arrigo .K.R., 2019. Effects of iron and light availability on phytoplankton photosynthetic properties in the Ross Sea. MEPS, 621: 33-50. <https://doi.org/10.3354/meps13000>
- Ardiningsih, I., Gledhill, M., Lodeiro, P., Krisch, S., Reichart, G.-J., Achterberg, E.P., Middag, R., Gerringa, L.J.A., 2020.. Natural Fe-binding organic ligands in Fram Strait and over the Northeast Greenland shelf. In press *Mar.Chem.*, <https://doi.org/10.1016/j.marchem.2020.103815>
- Gerringa, L.J.A., Laan, P., Arrigo, K.R., van Dijken, G.L., Alderkamp, A-C., 2019. Fe-binding dissolved organic ligands in the Ross Sea. *Marine Chemistry* 215, 103672.
- Hartland, A., Zitoun, R., Middag, R., Sander, S., Laferriere, A., Saeed, H., De Luca, S. and Ross, P.M., 2019. Aqueous copper bioavailability linked to shipwreck-contaminated reef sediments. *Scientific Reports*, 9(1): 9573.
- Hermans, M, W.K. Lenstra, N.A.G.M. van Helmond, T. Behrends, M. Egger, M.J.M. Seguret, E. Gustafsson, B.G. Gustafsson, C.P. Slomp (2019) Impact of natural re-oxygenation on the sediment dynamics of manganese, iron and phosphorus in a euxinic Baltic Sea basin. *Geochimica et Cosmochimica Acta* 246: 174–196
- Laglera, L.M., Sukekava C., Slagter H.A., Downes J., Aparicio-Gonzalez A., Gerringa L.J.A., 2019. First direct evidence of humic substances controlling iron transport across the surface of the Arctic Ocean, *Env. Sci. & Techn.*, 53, 22, 13136-13145 DOI: 10.1021/acs.est.9b04240
- Lenstra, W.K., Seguret, M., Behrends, T., Groeneveld, R.K., Hermans, M., Witbaard, R., Slomp, C.P. (2020) Controls on the shuttling of manganese over the northwestern Black Sea shelf and its fate in the euxinic deep basin. *Geochimica et Cosmochimica Acta* 15:177-204.

- Middag R., de Baar H.J.W., Bruland K.W., van Heuven S.M.A.C., 2020. The Distribution of Nickel in the West-Atlantic Ocean, Its Relationship With Phosphate and a Comparison to Cadmium and Zinc. *Frontiers in Marine Science*, 7
- Wu, M., McCain, J.S.P., Rowland, E., Middag, R., Sandgren, M., Allen, A.E. and Bertrand, E.M., 2019. Manganese and iron deficiency in Southern Ocean Phaeocystis antarctica populations revealed through taxon-specific protein indicators. *Nature Communications*, 10(1): 3582.

Completed GEOTRACES PhD or Master theses

- F. Wille, MSc thesis, University of Utrecht, 21-04-2020. Particulate trace metal dynamics in the Amundsen Sea Polynya, the Southern Ocean. Advisors: R. Middag, M. van Manen and G.J. Reichart.
- W.K. Lenstra. PhD thesis. Dynamics of iron and manganese in the Black Sea and Baltic Sea. *Utrecht studies in Earth Sciences* 192. 275 pages.

GEOTRACES presentations in international conferences

- Ardiningsih, I., Gerringa, L., Middag, R., Gledhill, M., Lodeiro, P., Krisch, S., Reichart, G.J. Natural iron-binding organic ligands in the Fram Strait, Arctic Ocean. Poster presentation at the 2019 Gordon Conference on Chemical Oceanography, 15/18-07-2019, Holderness (NH) USA.
- Dulaquais, G., Crampond, K., Waeles, M., Gerringa, L.J.A., Middag, R., Rijkenberg, M., Boye, M., Riso, R. Links between Iron and Humic Substances Biogeochemistry in the Ocean. Oral presentation at the 2019 Goldschmidt meeting, 22-08-2019, Barcelona, Spain.
- Kleint, C., Bach, W., Sander, S.G., Zitoun, R., Middag, R., Laan, P., Koschinsky, A. Hydrothermal Fluxes of Trace Metals (Such as Zn and Fe) into Surface Waters along the Kermadec Intraoceanic Arc. Oral presentation at the 2019 Goldschmidt meeting, 19-08-2019, Barcelona, Spain.
- Lenstra, W.K., N.A.G.M. van Helmond, Olga Zygadlowska, R. van Zummeren, R. Witbaard, C.P. Slomp. Release of iron and manganese from Louisiana shelf sediments and impact on the water column. Oral Presentation. Goldschmidt, Barcelona, 2019.
- Middag, R., Bertrand, E.M., Brussaard, C.P.D., Ardiningsih, I., Eich, C.U.M, Gerringa, L.J.A., van Manen, M.H., Pont, S.B.E.H., Reichart, G.J., Tian, H.A. Dissolved bio-essential metals in the Lazarev and Weddell Sea. Poster Presentation at the 2020 Ocean Science Meeting, 18-02-2020, San Diego, USA.
- Middag, R., Bertrand, E.M., Brussaard, I. Ardiningsih. C.P.D., Eich, C.U.M, Gerringa, L.J.A., van Manen, M.H., McCain, J.S.P., Pont, S.B.E.H., Reichart, G.J., Tian, H.A. Dissolved iron in the Southern Ocean and coastal seas. Oral presentation at the 2019 NAC (Netherlands earth science meeting), 15-03-2019, Utrecht, Netherlands.
- Middag, R., de Baar, H., Bruland, K. Distribution of Nickel along the GEOTRACES GA02 section and correlations with Phosphate, Cadmium and Zinc. Poster presentation at the 2019 Gordon Conference on Chemical Oceanography, 15/18-07-2019, Holderness (NH) USA.
- Seyitmuhammedov, K., Stirling, C., Reid, M., Van Hale, R., Arrigo, K., Middag, R. Sources and Sinks of Fe during the Early Austral Spring Offshore from the Western Antarctic Peninsula. Oral presentation at the 2019 Goldschmidt meeting, 22-08-2019, Barcelona, Spain.

- Tian, H.A., Middag, R., Conway, T., van Manen, M., Reichart, G.J. Dissolved iron in the Amundsen Sea: Quantification and identification of sources of iron. Poster presentation at the 2019 Gordon Conference on Chemical Oceanography, 15/18-07-2019, Holderness (NH) USA.
- van Manen, M., Gerringa, L., Laan, P., Reichart, G.J., Tian, H.A., Middag, R. Dissolved trace metals in the southern ocean (Amundsen Sea). Poster presentation at the 2019. Gordon Conference on Chemical Oceanography, 15/18-07-2019, Holderness (NH) USA.

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