

## ANNUAL REPORT ON GEOTRACES ACTIVITIES IN BELGIUM

May 1st, 2017 to March 30th, 2018

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

- Primary production rates, N<sub>2</sub> fixation rates, <sup>234</sup>Th export fluxes, POC export fluxes, particulate Ba profiles, trace element contents of the large (sinking) particle fraction and isotopic compositions ( $\delta^{15}\text{N}$ ,  $\delta^{18}\text{O}$ ) of nitrate from the GEOVIDE cruise (GA01-GEOTRACES; transect Lisbon to Newfoundland, May-July 2014).
- Isotopic composition ( $\delta^{15}\text{N}$ ,  $\delta^{18}\text{O}$ ) of nitrate from the SWERUS and ARKXXVIII/3 cruises.
- Primary production, N<sub>2</sub> fixation rates, nitrate isotopic compositions from the Belgica 2014/14 cruise (Bay of Biscay and Iberian Continental margin).
- Dissolved Ba from the Canadian Arctic GEOTRACES cruise (collaboration with H. Thomas, Dalhousie University).
- Trace metal geochemistry in the coastal sediments of the northwestern Black Sea.
- Influence of dissolved iron, phosphate and dust deposition on nitrogen fixation.

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

- Fripiat F., M. Declercq, C.J. Sapart, L.G. Anderson, V. Bruechert, F. Deman, D. Fonseca-Batista, C. Humborg, A. Roukaerts, I.P. Semiletov, and F. Dehairs, 2018. Influence of the bordering shelves on nutrient distribution in the Arctic halocline inferred from water column nitrate isotopes, *Limnology and Oceanography*, in press.
- Lemaitre N., H. Planquette, F. Planchon, G. Sarthou, S. Jacquet, M. I. García-Ibáñez, A. Gourain, M. Cheize, L. Monin, L. André, P. Laha, H. Terryn, and F. Dehairs, 2018. Particulate barium tracing significant mesopelagic carbon remineralisation in the North Atlantic, *Biogeosciences*, 15, 2289-2307, <https://doi.org/10.5194/bg-15-2289-2018>.
- Rembauville M., I. Salter, F. Dehairs, J.-C. Miquel and S. Blain, 2018. Annual particulate matter and diatom export in a high nutrient, low chlorophyll area of the Southern Ocean, *Polar Biology*, 41, 25-40, DOI 10.1007/s00300-017-2167-3.
- [Li, X.](#), Roevros, N., [Dehairs, F.](#) & Chou, L., 2017. Biological responses of the marine diatom *Chaetoceros socialis* to changing environmental conditions: A laboratory experiment, *PLoS ONE*, 12, p. 1-23, <https://doi.org/10.1371/journal.pone.0188615>.
- Fonseca-Batista D., F. Dehairs, V. Riou, F. Fripiat, M. Elskens, F. Deman, N. Brion, M. Bode and H. Auel, 2017. Contribution of N<sub>2</sub> fixation to biological productivity along a meridional section in the Eastern Atlantic Ocean, *Journal of Geophysical Research – Oceans*, 122, 1-15, doi:10.1002/2016JC012335.

### ***Cruises***

- EMBLAS-II cruise, National Pilot Monitoring Studies and Joint Open Sea Surveys in Georgia, Russian Federation and Ukraine. Leg I, 17-22 May 2016.
- Joint Black Sea Survey (JBSS) 2017 – part Joint Open Sea Survey in Ukraine and Georgia (JOSS GE-UA), EU-UNDP Project 'Improving Environmental Monitoring in the Black Sea' (EMBLAS-II). 27 August – 8 September 2017, Constanta – Odessa – Batumi – Odessa – Constanta.

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

- OCeANIC, nitrous Oxide and nitrogen Cycling in Antarctic sea Ice Covered zone, Belgium - China Research Cooperation, The role of the oceans in the climate system (CLIMOcean).
- Understanding marine benthic hypoxia and its consequences on benthic-pelagic exchanges, diagenesis and the macrobenthos (BENTHOX), funded by FRS-FNRS (Fund for Scientific Research – FNRS), Wallonia-Brussels Federation.

### ***PhD theses***

- Arnout Roukaerts: Primary production and nutrient cycling in Antarctic sea-ice and open waters. To be submitted summer 2018.
- Debany Fonseca Batista: Contribution of N<sub>2</sub> fixation to primary and new production in the Atlantic Ocean, Vrije Universiteit Brussel, June 2017, 197pp.
- Xu-Feng Li: The marine iron biogeochemistry under a changing climate: impact on the phytoplankton and the diazotroph communities. Joint PhD Université Libre de Bruxelles – Vrije Universiteit Brussel, Dec. 2017, 204pp.
- Florian Deman: Sea ice primary production at the Pan-Antarctic scale and nutrient cycling in the Antarctic sea ice covered areas (both sea ice and water column). In progress.
- Audrey Plante: Study of marine benthic hypoxia and its consequences on the exchange at the sediment-water interface and diagenesis. In progress.

### ***Meetings***

- Plante A., N. Roevros, A. Capet, M. Grégoire, N. Fagel and L. Chou (2018) Black Sea north-western shelf hypoxia: a study based on diagenetic processes and sedimentary proxies. European Geosciences Union (EGU) General Assembly 2018, Vienna, Austria, 8–13 April 2018, EGU2018-11782. Poster.
- Tang W., N. Cassar, S. Wang, D. Fonseca-Batista, F. Dehairs, S.M. Gifford, A.G. Gonzalez and H. Planquette (2018) Contrasting distribution of N<sub>2</sub> fixation from the oligotrophic to the coastal ocean in the western North Atlantic Ocean, 2018 Ocean Sciences meeting, 11-16 February, Portland.
- Fonseca Batista D. & F. Dehairs (2017) N<sub>2</sub> fixation in the Atlantic Ocean, Ocean Science Centre Mindelo, 12-17 November, Mindelo, Cabo Verde.
- Plante A., N. Roevros, O. Roman Romin, A. Capet, M. Grégoire, N. Fagel and L. Chou (2017) Hypoxia evolution on the Ukrainian shelf of the Black Sea. Goldschmidt conference Abstract, Paris, France, August 13-17, 2017. Poster.

- Deman F., D. Fonseca-Batista, F. Fripiat, E. Le Roy, D. Nuwam Thilakarathne, N. Lemaitre, A Roukaerts and F. Dehairs (2017) N<sub>2</sub>-fixation footprint on nitrate isotopic composition in temperate Northeast Atlantic Ocean, Goldschmidt 2017, August 2017, Paris.
- Fonseca-batista D., F. Deman, X. Li, E. Le Roy, R. Inginiero, C. Mariez, S. Roig, N. Lemaitre, F. Fripiat, L. Chou and F. Dehairs (2017) Patterns of N<sub>2</sub> fixation across the North Atlantic, Goldschmidt 2017, August 2017, Paris.
- Lemaitre N., H. Planquette, F. Dehairs, C. Bassoulet, C. Jeandel, M. Castrillejo and F. Planchon (2017) Particulate trace element export in the North Atlantic, Goldschmidt 2017, August 2017, Paris.
- Fripiat F., M. Declercq, C. Sapart, L. Anderson, V. Bruechert, F. Deman, D. Fonseca-Batista, C. Humborg, A. Roukaerts and F. Dehairs (2017) Goldschmidt 2017, August 2017, Paris.
- Li X., D. Fonseca-Batista, N. Roevros, F. Dehairs and L. Chou, 2017. Environment and nutrient control of nitrogen fixation, Goldschmidt 2017, August 2017, Paris.
- Roukaerts A., F. Deman, F. Fripiat and F. Dehairs (2017) New insights in Antarctic fast ice biogeochemistry: The role of biofilm, XII<sup>th</sup> SCAR Biology symposium, 10-14 July 2017.
- Deman, F., Roukaerts, A., Fripiat, F., Lannuzel, D., & Dehairs, F. (2017) Nitrate isotopic composition in landfast sea ice: a time series study. Gordon Research Conference: Polar Marine Science: Understanding Polar Ecosystem Change Through Time Series Observations, Technological Advances, and Biophysical Coupled Modeling, 26-31 March 2017, Ventura.

Submitted by Frank Dehairs ([fdehairs@vub.be](mailto:fdehairs@vub.be); Vrije Universiteit Brussel) and Lei Chou ([lchou@ulb.ac.be](mailto:lchou@ulb.ac.be); Université Libre de Bruxelles)