

ANNUAL REPORT ON GEOTRACES ACTIVITIES IN UNITED KINGDOM

May 1st, 2017 to March 30th, 2018

New scientific results

• Where, How And Which Trace Elements Are Released From Dust At The Sea Surface?

Alex Baker and Tim Jickells (2017, see reference below) propose to answer this question thanks to analysis of aerosols collected in the framework of the Atlantic Meridional Transect (AMT). They established the soluble concentrations of a range of trace metals (iron, aluminium, manganese, titanium, zinc, vanadium, nickel and copper) and major ions. They reveal much higher inputs to the North Atlantic Ocean compared to the South Atlantic Ocean, reflecting stronger land based emission sources in the Northern Hemisphere. Comparison of these inputs with the surface water contents of the same trace metals compiled in the GEOTRACES intermediate data product show surprising features.

Baker, A.R. and Jickells, T.D. (2017), Progress in Oceanography.

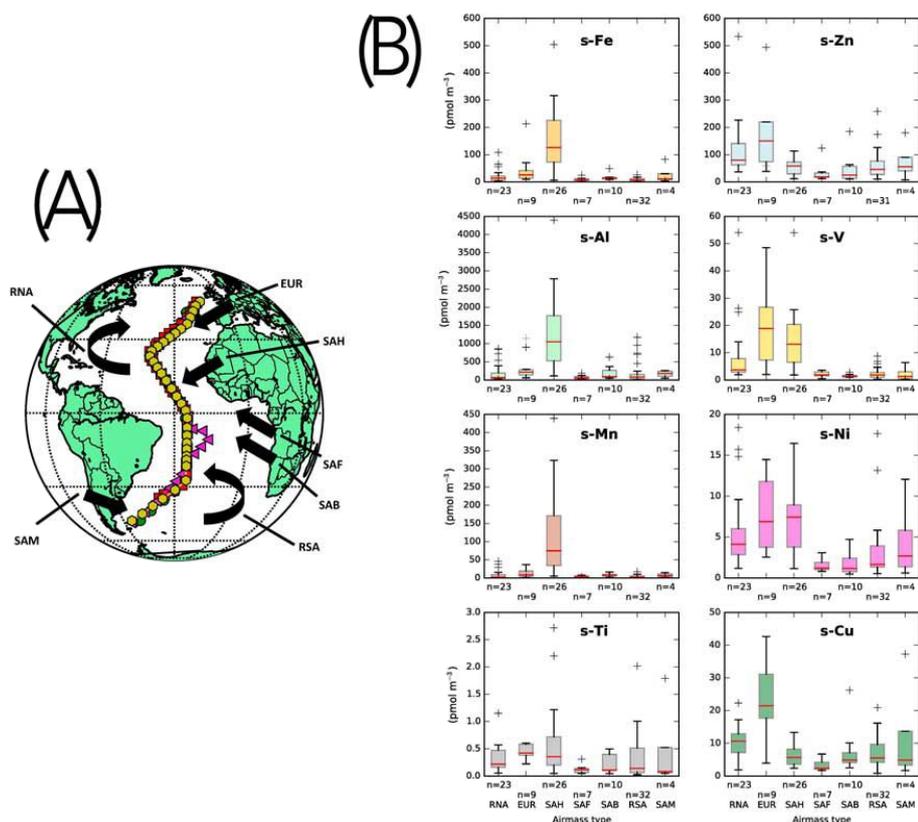


Figure 24: (A) Approximate tracks of the AMT cruises (dots and triangles) and general flow directions of the seven major atmospheric transport routes encountered during the cruises (arrows). Abbreviations for the air transport regimes are: continental Europe (EUR), North Africa including the Sahara and Sahel: (SAH), Southern Africa impacted by biomass burning emissions (SAB), Southern Africa not impacted by biomass burning (SAF), South America (SAM), remote North or South Atlantic i.e. not crossing land for at least 5 days prior to collection (RNA and RSA respectively). (B) Box and whisker plots showing the variations in the concentrations of iron, aluminium, manganese, titanium, zinc, vanadium, nickel and copper with air transport/source type for the AMT transect. They reveal much higher inputs to the North Atlantic Ocean, reflecting stronger land based emission sources in the Northern Hemisphere. <http://www.geotraces.org/science/science-highlight/1481-trace-elements-dust>

- **Barium Isotope Measurements Help Constraining the Oceanic Barium Cycle**

Hsieh and Henderson (2017, see reference below) propose a compilation of the oceanic barium (Ba) concentrations together with its isotopic profiles measured so far. Their review covers the main oceanic basins, comparing data obtained in the North and South Atlantic, North Pacific and the Southern Oceans. Their main conclusions are: (i) near-surface Ba isotope values are controlled by basin-scale balances rather than by regional or short-term processes; (ii) isotope Ba fractionation during its removal from the surface is significant: the global Ba isotope data can be fit by mixing and removal/addition of Ba with a single isotope fractionation of 1.00058 ± 0.00010 ; (iii) the resulting Ba isotope composition of the upper ocean waters is correlated with the fraction of Ba utilization at the basin scale; (iv) in the deep waters, it is suspected that external inputs of Ba (released by sediments or hydrothermal sources) can be traced by their specific isotopic signatures.

Hsieh, Y-T. and Henderson, G.M. (2017), *Earth and Planetary Science Letters*.

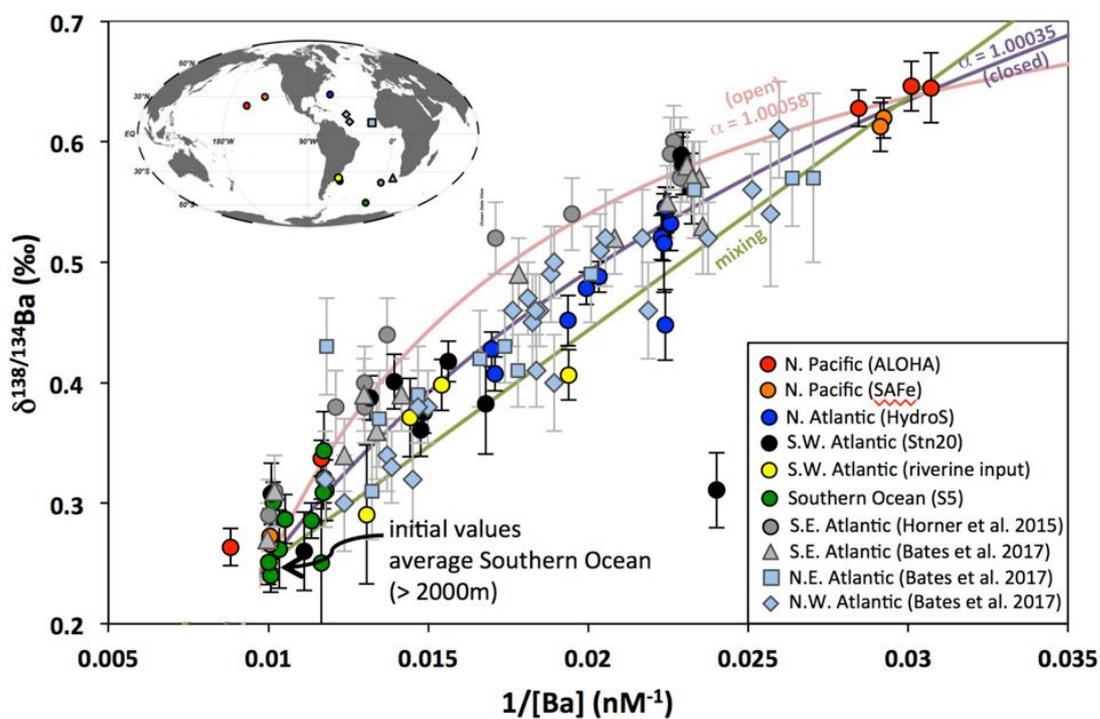


Figure 25: Seawater Ba isotope compositions versus $1/[Ba]$ in the global ocean. The data are fitted with three curves generated by a steady-state (open) model, a Rayleigh fractionation (closed) model and a mixing model, each constrained using an initial composition equal to the average value in the deep Southern Ocean and a final value equal to the surface values in the Pacific Ocean. The results show that seawater Ba isotope compositions are controlled by basin-scale Ba utilization, remineralisation, and ocean mixing during the internal oceanic Ba cycle. External Ba inputs also play important roles in the oceanic Ba isotope budget. For example, riverine input introduces light Ba isotopic signatures to the surface ocean; and sediment or hydrothermal inputs may introduce heavy Ba isotopic compositions to the deep water, which have been identified with the non-conservative behaviour of Ba isotopes during the N-S Atlantic deep water mixing. Such distinct Ba isotope signatures from these sources can become useful tracers for constraining Ba inputs in the present and past ocean.

<http://www.geotraces.org/science/science-highlight/1431-barium-isotope-measurements>

- **Iron plays an important role in zonal alkaline phosphate distribution in the sub-tropical North Atlantic.** This is essential for organism to use DOP as an alternative source of P as phosphate concentrations were limiting.

New and unpublished results from the ZIPLOC cruise (see below).

- **The first 3D global ocean cobalt model shows that sediments are the major global source and that the suppression of cobalt scavenging by low oxygen and reduced bacterial activity is key in extending the residence time of externally supplied cobalt.**

Tagliabue et al. (2018), *Global Biogeochemical Cycles*.

- **Analysis of the Cr isotopic composition of seawater within the oxygen minimum zone of the eastern sub-tropical Atlantic Ocean shows no evidence for reduction of Cr(VI) to Cr(III).** While shelf waters have variable Cr isotopic compositions, intermediate and deep water masses show a rather limited range of values, so authigenic marine precipitates deposited in deep water in the open ocean have the potential to faithfully record the Cr isotopic composition of ancient seawater.

Goring-Harford et al. (in press), *Geochimica et Cosmochimica Acta*.

New publications (published or in press)

- Achterberg, E.P., Steigenberger, S., Marsay, C.M., LeMoigne, F.A.C., Painter, S.C., Baker, A.R., Connelly, D.P., Moore, C.M., Tagliabue, A., Tanhua, T. (2018), Iron Biogeochemistry in the High Latitude North Atlantic Ocean, *Scientific Reports*, 8, 1283, doi:10.1038/s41598-018-19472-1.
- Baker, A.R. and Jickells, T.D. (2017), Atmospheric deposition of soluble trace elements along the Atlantic Meridional Transect (AMT). *Progress in Oceanography*, 158, 41-51, doi:10.1016/j.pocean.2016.10.002.
- Baker, A.R., Kanakidou, M., Altieri, K.E., Daskalakis, N., Okin, G.S., Myriokefalitakis, S., Dentener, F., Uematsu, M., Sarin, M.M., Duce, R.A., Galloway, J.N., Keene, W.C., Singh, A., Zamora, L., Lamarque, J.F., Hsu, S.C., Rohekar, S.S., Prospero, J.M. (2017), Observation- and model-based estimates of particulate dry nitrogen deposition to the oceans, *Atmospheric Chemistry and Physics*, 17, 8189-8210, doi:10.5194/acp-17-8189-2017.
- Birchill, A.J., Milne, A., Woodward, E.M.S., Harris, C., Annett, A., Rusiecka, D., Achterberg, E.A., Gledhill, M., Ussher, S.J., Worsfold, P.J., Geibert, W., Lohan, M.C. (2017), Seasonal iron depletion in a temperature shelf sea. *Geophysical Research Letters*, 44(17), doi:10.1002/2017GL073881.
- Bridgestock, L., Hsieh, Y-T., Porcelli, D., Homoky, W.B., Bryan, A., Henderson, G.M. (2018), Controls on the barium isotope compositions of marine sediments, *Earth and Planetary Science Letters*, 481, 101-110, doi:10.1016/j.epsl.2017.10.019.
- Bridgestock, L., Rehkämper, M., van de Flierdt, T., Paul, M., Milne, A., Lohan, E., Achterberg (2018), The distribution of lead concentrations and isotope compositions in the eastern Tropical Atlantic Ocean, *Geochimica et Cosmochimica Acta*, 225, 36-51, doi:10.1016/j.gca.2018.01.018.
- Browning, T.J., Achterberg, E.P., Rapp, I., Engel, A., Bertrand, E.M., Tagliabue, A., Moore, C.M. (2017), Nutrient co-limitation at the boundary of an oceanic gyre, *Nature*, 551, 242-246, doi:10.1038/nature24063.
- de Souza, G.F., Khatiwala, S.P., Hain, M.P., Little, S.H., Vance, D. (2018), On the origin of the

marine zinc-silicon correlation, *Earth and Planetary Science Letters*, 492, 22-34, doi:10.1016/j.epsl.2018.03.050.

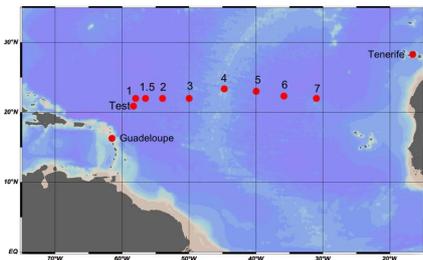
- Ellwood, M.J., Bowie, A., Baker, A., Gault-Ringold, M., Hassler, C., Law, C.S., Maher, W., Marriner, A., Nodder, S., Sander, S., Stevens, C., Townsend, A., van der Merwe, P., Woodward, E.M.S., Wuttig, K., Boyd, P.W. (2018), Insights into the biogeochemical cycling of iron, nitrate and phosphate across a 5300 km South Pacific zonal section (153E-150W). *Global Biogeochemical Cycles*, 32, 187-207, doi: 10.1002/2017GB005736.
- Goring-Harford H.J., Klar J.K., Pearce C.R., Connelly D.P., Achterberg E.P., James R.H. (in press), Behaviour of chromium isotopes in the eastern sub-tropical Atlantic Oxygen Minimum Zone. *Geochimica et Cosmochimica Acta*, doi:10.1016/j.gca.2018.03.004.
- Hawco, N., Lam, P., Lee, J-M., Ohnemus, D., Noble, A., Wyatt, N.J., Lohan, M.C., Saito, M.A. (2018), Cobalt scavenging in the mesopelagic ocean and its influence on global mass balance: Synthesizing water column and sedimentary fluxes. *Marine Chemistry*, 201, 151-166, doi:10.1016/j.marchem.2017.09.001.
- Hopwood, M. J., Birchill, A.J., Gledhill, M., Milne, A., Achterberg, E.P. (2017), A comparison between four analytical methods for the measurement of Fe(II) at nanomolar concentrations in coastal seawater, *Frontiers in Marine Science*, 29, doi:10.3389/fmars.2017.00192.
- Hsieh, Y-T. and Henderson, G.M. (2017) Barium stable isotopes in the global ocean: Tracer of Ba inputs and utilization. *Earth and Planetary Science Letters*, 473, 269-278, doi: 10.1016/j.epsl.2017.06.024.
- John, S.G., Helgoe, J., Townsend, E., Weber, T., DeVries, T., Tagliabue, A., Moore, K., Lam, P., Marsay, C.M., Till, C. (2018), Biogeochemical cycling of Fe and Fe stable isotopes in the Eastern Tropical South Pacific. *Marine Chemistry*, 201, 66-76, doi:10.1016/j.marchem.2017.06.003.
- Klar, J.K., Schlosser, C., Milton, J.A., Woodward, E.M.S, Lacan, F., Parkinson, I.J., Achterberg, E.P., James, R.H. (in press), Sources of dissolved iron to oxygen minimum zone waters of the Senegalese continental margin in the tropical North Atlantic Ocean: Insights from iron isotopes, *Geochimica et Cosmochimica Acta*, doi:10.1016/j.gca.2018.02.031.
- Klar, J.K., Homoky, W.B., Statham, P.J., Harris, E.L., Birchill, A., Woodward, E.M.S., Silburn, B., Cooper, M., James, R.H., Connelly, D.P, Chever, F., Lichtschlag, A., Graves, C. (2017), Stability of dissolved and soluble Fe(II) in shelf sediment pore waters and release to an oxic water column. *Biogeochemistry*, 135 (1-2), 49–67, doi:10.1007/s10533-017-0309-x.
- Little, S.H., Vance, D., McManus, J., Severmann, S., Lyons, T.W. (2017), Copper isotope signatures in modern organic rich sediments. *Geochimica et Cosmochimica Acta*, 212, 253-273, doi:10.1016/j.gca.2017.06.019.
- Milne, A., Schlosser, C., Wake, B., Achterberg, E.P., Chance, R., Baker, A,R, Forryan, A., Lohan, M.C. (2017), Particulate phases are key in controlling dissolved iron concentrations in the (sub)-tropical North Atlantic, *Geophysical Research Letters*, 44, doi: 10.1002/2016GL072314.
- Orr, J.C., Najjar, R.G., Aumont, O., Bopp, L., Bullister, J.L., Danabasoglu, G., Doney, S.C., Dunne, J.P., Dutay, J.-C., Graven, H., Griffies, S.M., John, J.G., Joos, F., Levin, I., Lindsay, K., Matear, R.J., McKinley, G.A., Mouchet, A., Oschlies, A., Romanou, A., Schlitzer, R., Tagliabue, A., Tanhua, T., Yool, A. (2017), Biogeochemical protocols and diagnostics for the CMIP6 Ocean Model Intercomparison Project (OMIP), *Geoscientific Model Development*, 10(6), 2169-2199, doi:10.5194/gmd-10-2169-2017.
- Rusieka, D., Gledhill, M., Milne, A., Achterberg, E.P., Annet, A.L. Atkinson, S., Birchill, A.,

Kartensen, J., Lohan, M.C., Mariez, C., Middag, R., Rolison, J.M., Tanhua, T., Ussher, S., Connelly, D. (2018), Anthropogenic signatures of lead in the Northeast Atlantic. *Geophysical Research Letter*, 45, 2734-2743, doi: 10.1002/2017GL076825.

- Sabadel, A.J.M., Browning, T.J., Kruimer, D., Airs, R.L., Woodward, E.M.S., Van Hale, R., Frew, R.D. (2017). Determination of picomolar dissolved free amino acids along a South Atlantic transect using reversed-phase high-performance liquid chromatography, *Marine Chemistry*, 196, 173-180, doi:10.1016/j.marchem.2017.09.008.
- Sherrell, R.M., Annett, A.L., Fitzsimmons, J.N., Rocanova, V.J., Meredith, M.P. (in press), A “shallow bathtub ring” of local sedimentary iron input maintains the Palmer Deep biological hotspot on the West Antarctic Peninsula shelf. *Philosophical Transactions of the Royal Society A*.
- Tagliabue, A., Hawco, N.J., Bundy, R.M., Landing, W.M., Milne, A., Morton, P.L., Saito, M.A. (2018), The role of external inputs and internal cycling in shaping the global ocean cobalt distribution: insights from the first cobalt biogeochemical model, *Global Biogeochemical Cycles*, doi: 10.1002/2017GB005830.

Cruises

- **GEOTRACES process study GApr08, ZIPLOc** (Zinc Iron Phosphorus co-limitation in the Ocean), on the *RRS James Cook* (JC150) was successfully completed (26 June - 12 August 2017; Guadeloupe to Tenerife). Chief scientist: Claire Mahaffey. GEOTRACES PIs: Claire Mahaffey, Alessandro Tagliabue and Maeve Lohan.



Bioassay experiments were conducted at seven stations involving the addition of iron, zinc and cobalt. 130 samples were collected from the trace metal clean FISH device to define zonal gradients in nutrients, trace metals, phytoplankton biomass and community structure and rates of nitrogen fixation and alkaline phosphatase activity.

Objectives:

1. Determine the prevalence of Zn and Fe limitation of alkaline phosphatase in the ocean
 2. Quantify the impact of Zn-P and Fe-P co-limitation on growth, nitrogen fixation and community structure
 3. Quantify the significance of Zn-P and Fe-P co-limitation over basin scales and multi-decadal time scales using PISCES model
- **GEOTRACES GA13 section cruise** on the *RRS James Cook* (JC156) was successfully completed (20 Dec 2017 – 2 Feb 2018; Southampton to Guadeloupe). Chief scientist: Alessandro Tagliabue. GEOTRACES PIs: Maeve Lohan and Alessandro Tagliabue.

New projects and/or funding

- Angela Milne and Simon Ussher (Plymouth University) won funding on the programmes **CUSTARD** (*'Carbon Uptake and Seasonal Traits in Antarctic Remineralisation Depth'*) and **PICCOLO** (*'Processes Influencing Carbon Cycling: Observations of the lower limb of the Antarctic Overturning'*). Both programmes are part of the NERC strategic programme RoSES (*'Role of the Southern Ocean in the Earth System'*). Angela and Simon will conduct dissolved and particulate iron and trace element biogeochemical measurements in the Southern Ocean on

cruises during the austral summer 2020-2021.

- Amber Annett started her 5 year NERC Independent Research Fellowship in Southampton to work on '**Radium in Changing Environments: A novel tracer of iron fluxes at Ocean Margins**'. So far she participated in the ICY-LAB and GA13 cruises, with upcoming cruises along the western Antarctic Peninsula.
Amber has also been awarded a visiting scholar fellowship at the Key State Laboratory of Marine Environmental Science at Xiamen University, to learn and develop the application of Ra/Th disequilibrium in sediments to calculate trace metal fluxes.
- Susan Little has started her 5 year NERC Independent Research Fellowship at Imperial College London to work on '**Beyond Iron in the Ocean: Trace metal micronutrients and the carbon cycle (BIOTrace)**'. So far she has been involved with the ICY-LAB cruise, with upcoming field work in Greenland (trace metal isotopes in glacial meltwaters).

PhD theses

- Heather Jane Goring-Harford (2017). '*Chromium isotope behavior in natural waters*'. University of Southampton. Thesis advisor: Rachel James.
- Antony Birchill (2017). '*The seasonal cycling and physio-chemical speciation of iron in the Celtic and hebridean Shelf sea*'. University of Plymouth. Thesis advisors: Maeve Lohan (DoS), Angie Milne, Simon Ussher.

Meetings

- Goldschmidt conference, Paris, August 2017
 - Yves Plancherel and Tina van de Flierdt co-convended session 10i: 'Cycles of Trace Elements and Isotopes in the Ocean: GEOTRACES and Beyond'.
 - William Homoky co-convended session 10j: 'Bio-Geochemical Processes Across the Sediment-Water Interface: Key Tools, New Sites and Recent Advances'.
 - Archer, C., Vance, D., Lohan, M.C., 'Negligible Ni isotope fractionation associated with phytoplankton uptake in the South Atlantic Ocean'.
 - A. Baker, C. Yodle, E. Droste, J. Bock, L. Ganzeveld. 'Iodine Speciation in Aerosols over the Atlantic, Indian and Pacific Oceans'.
 - A. Birchill, A. Milne, S. Ussher, P. Worsfold, M. Lohan. 'The Physico-Chemical Speciation of Iron over an Oxic Shelf Margin'.
 - A. Bryan, A. Dickson, G. Henderson, D. Porcelli, C. Slomp, W. Homoky, F. Dowdall, S. Van DenBoorn, 'Controls on the Cadmium-Isotope Composition of Modern Marine Sediments'.
 - H. Goring-Harford, R. James, C. Pearce, D. Connelly, J. Klar, I. Parkinson, 'On the Cr Isotopic Composition of Seawater'.
 - A. Griffiths, M. Lambelet, K. Crocket, T. van de Flierdt, M. Rehkämper, R. Abell, F. Nitsche, 'Neodymium Isotopic Composition of East Antarctic Continental Shelf and Deep Water'.
 - W. Homoky and A. Annett, 'Radium Isotopes Resolved Across an Ocean-Sediment interface'.
 - Y-T. Hsie, L. Bridgestock, W.E. Seyfried Jr., G.M. Henderson, 'Barium Isotope Fractionation in Hydrothermal Vent Fluids: Constraints on Ba Inputs to the Ocean'.
 - J. Klar, R. James, D. Gibbs, A. Lough, I. Parkinson, J. Milton, J. Hawkes, 'Evolution of the

- Isotopic Composition of Dissolved Iron in Hydrothermal Plumes in the Southern Ocean’.
 - M. Lambelet, K. Crocket, T. van de Flierdt, L. Bridgestock, F. Deng, R. Chance, A. Backer, E. Achterberg, ‘Neodymium Isotopes and Rare Earth Elements in the Tropical Atlantic Ocean: Results from the GEOTRACES GA06 Cruise’.
 - S. Little, T. van de Flierdt, D. Wilson, M. Rehkämper, P. Spooner, J. Adkins, L. Robinson, ‘Deep sea corals as archives of seawater Zn isotopes’.
 - A. Lough, J. Klar., R.H. James, D. Connelly, W. Homoky, P.J. Statham, ‘Iron isotopes track the uptake and exchange of iron across an oxic shelf sea’.
 - A. Milne, T. Conway, C. Schlosser, S. John, E. Achterberg, M. Lohan, ‘Iron along the GEOTRACES South Atlantic Transect GA10’.
 - Y. Plancherel, C. Basak, S. Khatiwala, L. Carney, R. Anderson, G.M. Henderson. ‘The Role of Scavenging on the Oceanic Distribution of ^{231}Pa , ^{230}Th and ^{10}Be ’.
 - D. Rusiecka, E. Achterberg, M. Gledhill, D. Connelly, T. Tanhua, M. Liu, ‘Anthropogenic lead as signature of Mediterranean Waters in the Depp North Atlantic’.
 - T. Stichel, J. Klar, K. Crocket, R. James, P. Statham, M. Lohan, A. Milne, R. Mills. ‘Limited Exchange of Neodymium Isotopes with the NE Atlantic Continental Margin’.
- PAGES 5th Open Science Meeting, Zaragoza, May 2017
 - Susan Little convened a session on ‘Trace elements and their isotopes as geochemical proxies of past ocean conditions’.
 - S.H. Little., D. Vance, C. Archer, J. McManus, S. Severmann, T. Lyons, ‘Copper isotopes signatures in the marine environment’.
- Advances in Marine Biogeochemistry Conference VIII (AMBio), The Challenger Society, SAMS, September 2017
 - Susan Little delivered a keynote talk on ‘Coupling and decoupling of Zn and Si in the global ocean’.
 - Luke Bridgestock delivered a keynote talk on ‘Isotopic insights into the marine biogeochemical barium cycle’.
 - A. Annett, J. Fitzsimmons, R. Sherrell, ‘Trace metal supply from the western Antarctic Peninsula Shelf to the open ocean’.
 - A. Birchill, A. Milne, S. Ussher, M.C. Lohan, ‘Iron deficient waters over the Hebridean shelf break’.
 - J. Klar, W. Homoky, A. Lough, R.H. James, P.J. Statham, ‘Stability of dissolved and soluble Fe(II) in shelf sediment porewater and release to an oxic water column’.
 - K. Kunde, N.J. Wyatt, M.C. Lohan, ‘Iron and phosphorus co-limitation in the sub-tropical North Atlantic’.
 - A. Lough, J. Klar, R.H. James, D. Connelly, W. Homoky, P.J. Statham, ‘Iron isotopes track the uptake and exchange of iron across and oxic shelf sea’.
- Redox-Active Minerals in Natural Systems, Mineralogical Society, Manchester, June 2017
 - Susan Little delivered a keynote talk on ‘Pseudo-redox control on the oceanic budget of Zn and Zn isotopes’.
- Ocean Sciences meeting, Portland, February 2018

- Alessandro Tagliabue co-chaired sessions on ‘Abiotic and Biotic Retention, Recycling, and Remineralization of Metals in the Ocean’ and ‘The Dawn of BioGEOTRACES: Metal-Microbe Interactions in the Ocean’.
 - C. Davis, K. Kunde, N. Wyatt, L. Wrightson, L. Johnson, M. Woodward, M. Lohan, A. Tagliabue, C. Mahaffey, ‘What drives cross-basin trends in the biological production of metal-enzyme activity in the subtropical North Atlantic?’
 - A. Gourain, P. Salaun, A. Tagliabue, S.M.G. van de Berg, J. Boutorh, M. Cheize, L. Pereira Contreira, P. Lherminier, J-L. Menzel Barraqueta, H. Planquette, G. Sarthou, R. Shelley, ‘Speciation of dissolved copper in North Atlantic along the GEOTRACES GA01 section’.
 - K. Kunde, N. Wyatt, D. Gonzalez-Santana, L. Wrightson, L. Johnson, C. Davis, M. Woodward, C. Mahaffey, M. Lohan, ‘Iron Biogeochemistry in the subtropical North Atlantic’.
 - C. Mahaffey, C. Davis, K. Kunde, N. Wyatt, D. Gonzalez-Santana, L. Wrightson, L. Johnson, M. Woodward, A. Tagliabue, M. Lohan, ‘Influence of iron and zinc on alkaline phosphatase and biological activity in the subtropical North Atlantic during bioassay experiments’.
 - A. Milne, T. Conway, C. Schlosser, S. John, E. Achterberg, M.C. Lohan, ‘Iron along the GEOTRACES South Atlantic Transect GA10’.
 - N. Wyatt, K. Kunde, C. Davis, D. Gonzalez-Santana, M. Woodward, A. Tagliabue, C. Mahaffey, M. Lohan, ‘The biogeochemical cycling of zinc in the subtropical North Atlantic’.
- Geochemistry in Progress Meeting (GGRiP), St Andrews, March 2018
 - Presentations by H. Packman, A. Pegrum-Haram (Imperial College London).

Outreach activities

- Susan Little gave a ‘Pint of Science’ talk in London (May 2017) on ‘Bloom and Bust: Glassy Diatoms and Ocean Nutrients’.
- Blog on ZIPLOC cruise via @MahaffeyLab (June-August 2017).
- Maeve Lohan and Alessandro Tagliabue explain *Intercalibration* and *Modelling* in a new video about the GEOTRACES programme (‘21 Questions and Answers about GEOTRACES’).
https://www.youtube.com/watch?v=3_pC_2eeAtA&feature=youtu
- BBC South today-interview with Maeve Lohan and Alessandro Tagliabue prior to sailing on GA13 (December 2017).
- BBC Solent radio- interview with Maeve Lohan and Alessandro Tagliabue prior to sailing on GA13 (December 2017).
- Twitter @FRidge_GA13 (December 2017 – February 2018).

Other activities

- Alex Baker and Maeve Lohan taught on the 1st GEOTRACES summer school in Brest, France (August 2017). Alessandro Tagliabue and Maeve Lohan served on the scientific organizing committee.
- Will Homoky is the current Chair of the ‘Advances in Marine Biogeochemistry (AMBIO)’ group of the Challenger Society.
- Susan Little is a full committee member of the Geochemistry Group of the Geological and

Mineralogical Society.

- Maeve Lohan (co-chair) and Tina van de Flierdt (committee member) attended two virtual Standards & Intercalibration (S&I) meetings in the the run up to the release of the IDP2017.
- Alessandro Tagliabue co-chaired the Data Management Committee (DMC).
- Maeve Lohan and Alessandro Tagliabue attended the annual DMC and SSC meeting in Brazil, the latter of which was also attended by Gideon Henderson and Tina van de Flierdt.
- Tina van de Flierdt and Amber Annett presented science highlights at the release event for IDP2017 at the Goldschmidt conference in Paris (August 2018), and Alessandro Tagliabue presented at the release at the Ocean Sciences meeting in Portland (February 2018).

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