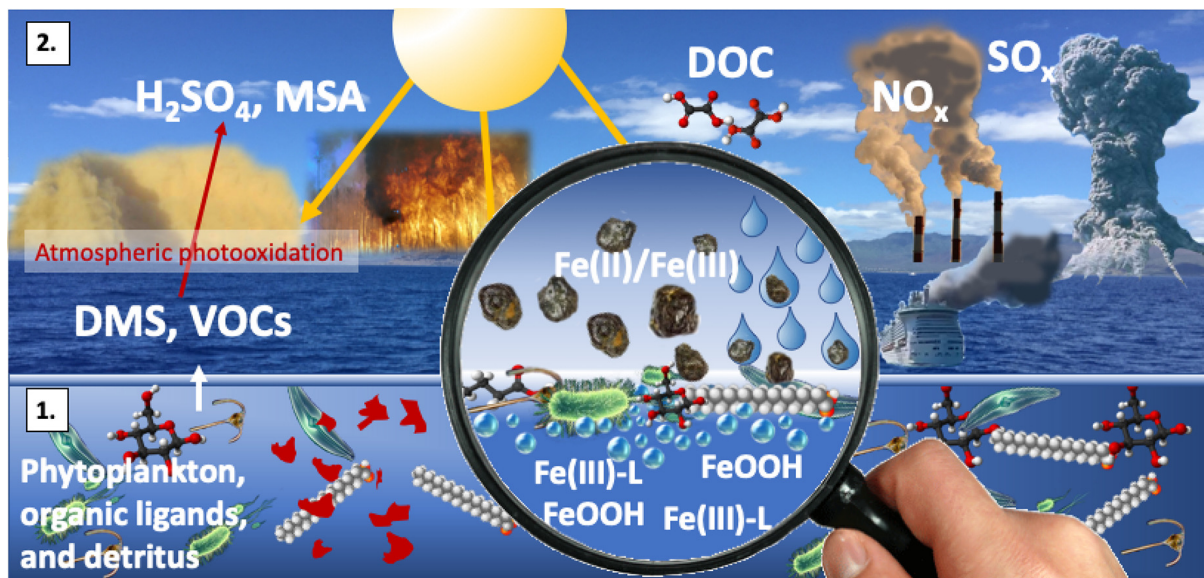


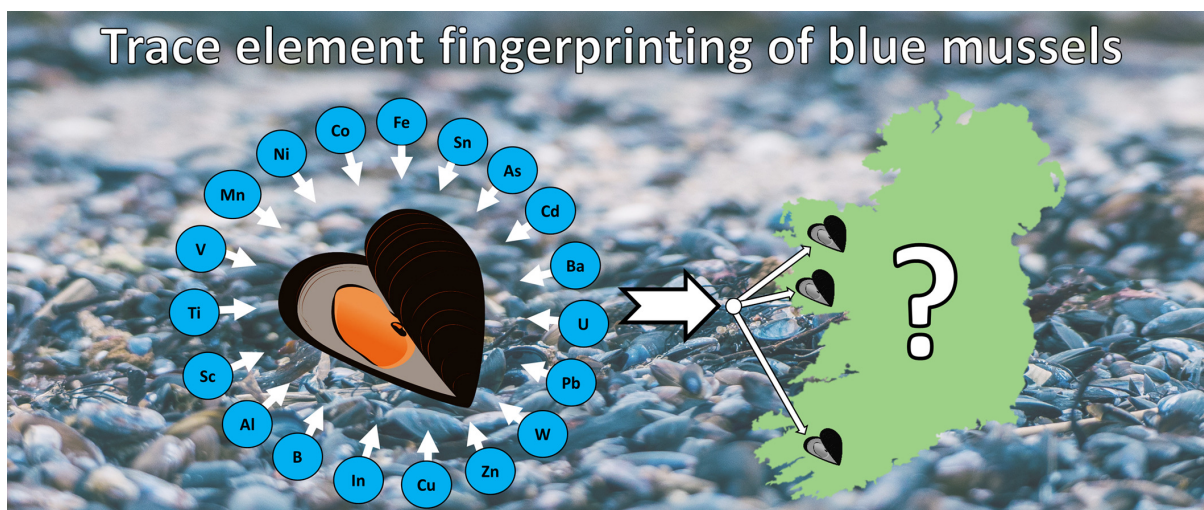
ANNUAL REPORT ON GEOTRACES ACTIVITIES IN IRELAND

April 1st, 2019 to March 31st, 2020

New GEOTRACES or GEOTRACES relevant scientific results



- During the last year, Irish researchers published with international GEOTRACES colleagues, two major review papers; (i) an assessment report on where the current state of knowledge is with regard to the Fe atmosphere-ocean biogeochemical cycles and where future research emphasis would have the highest impact in furthering this field (Meskhidze et al., 2019) and (ii) a review of present knowledge and future challenges facing the Weddell Gyre (Vernet et al., 2019).



- “Fingerprinting” of the elemental composition of shellfish has been used to identify their harvesting location in and around Ireland (Bennion et al, 2019, Morrison et al. 2019). These works help to develop scientific tools to provide specific elemental signatures for use as tracers of the harvesting locations of shellfish allowing industry regulators to trace shellfish production to its source.

GEOTRACES or GEOTRACES relevant cruises

- Indian Ocean GO-SHIP expedition on the RV Mirai MR19-04 (Dec 2019 – Feb 2020). Prof. Peter Croot participated in this expedition through a piggyback project hosted by JAMSTEC to look at urea and iodine cycling in this region. The urea work is part of an ongoing project in Ireland examining Ni biogeochemistry.
- Polarstern PS120 Prof. Croot participated as the chief lecturer for the POGO South North Atlantic (SoNoAT) training school onboard the RV Polarstern from Port Stanley in the Falklands to Bremerhaven, Germany in June 2019. During this shipboard training expedition, Prof Croot lead the teaching program and the shipboard physical oceanography program and introduced the students to the work of GEOTRACES scientists and the GEOTRACES IDP.
- Biogeochemical (Nutrients) and optical measurements (CDOM/FDOM) during Western European Shelf Pelagic Acoustic Survey (WESPAS). Expedition on the Celtic Explorer (13 June - 24 July, 2019, CE19010, Falmouth to Galway). (iCRAG project)

New projects and/or funding

- The 2nd phase (2021-2026) of the Irish Centre for Research in Applied Geoscience (www.icrag-centre.org) has been applied for and an official decision is due in the 3rd quarter of 2020. Within iCRAG2 there are GEOTRACES related projects on submarine groundwater discharge, the elemental composition of marine particles, thorium isotopes as flux tracers and elemental fluxes in the mesopelagic zone.

GEOTRACES workshops and meetings organised

- There were no GEOTRACES specific workshops run in Ireland during the reporting period. GEOTRACES activities were discussed during the second annual SCOR Ireland meeting (Oct 11, 2019) held at the National University of Ireland, Galway.

Other GEOTRACES activities

- Seminar entitled “Titanic Tales from the Big Blue: Titanium speciation and distribution in the South Pacific Gyre and Southern Ocean.” Facultad de Ciencias Del Mar at the Pontificia Universidad de Valparaiso, Valparaiso, Chile (27 May, 2019).
- International workshop entitled “Taller de observación global del océano”, held at the Universidad De Magallanes, Punta Arenas, Chile (May 30-31, 2019). This was a bilingual (Spanish/English) workshop on climate change in the ocean for students going on the POGO SoNoAT expedition and for interested students from the Universidad De Magallanes. The first day was a series of lectures and the 2nd day devoted to teaching modules on a variety of topics. Funding for this workshop was provided by POGO, the Nippon Foundation, AWI, NUI Galway, iCRAG and the Universidad De Magallanes. Prof Croot organized the workshop and developed the program, he introduced the students to the role of the SCOR programs, GEOTRACES, IMBER and SOLAS in ocean climate research.
- International workshop on “Scientific considerations for Environmental Management of Inactive Polymetallic Sulfide (PMS) Ecosystems” held at the National University of Ireland Galway (Oct 22-24, 2019). The workshop was co-sponsored by NUIG, the Ryan

Institute, iCrag, the Global Ocean Biodiversity Initiative (GOBI), Pew Charitable Trusts and the Marine Institute. The International Seabed Authority (ISA) was represented by an official Observer. Prof. Croot acted as the local host and organizer and spoke about the work of the GEOTRACES IDP in providing baseline data for environmental assessments.

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

- Aguilar-Camacho, J.M., McCormack, G.P., Longakit, M.B., Marra, M.V., Morrison, L., 2019. Insights gained from the chemical composition of spicules in Haplosclerida (Porifera, Demospongiae). *Marine Biology Research* 15 (3), 275-281.
- Bennion, M., Morrison, L., Brophy, D., Carlsson, J., Abrahantes, J.C., Graham, C.T., 2019. Trace element fingerprinting of blue mussel (*Mytilus edulis*) shells and soft tissues successfully reveals harvesting locations. *Science of The Total Environment* 685, 50-58.
- Chance, R.J., Tinel, L., Sherwen, T., Baker, A.R., Bell, T., Brindle, J., Campos, M.L.A.M., Croot, P., Ducklow, H., Peng, H., Hopkins, F., Hoogakker, B., Hughes, C., Jickells, T.D., Loades, D., Macaya, D.A.R., Mahajan, A.S., Malin, G., Phillips, D., Roberts, I., Roy, R., Sarkar, A., Sinha, A.K., Song, X., Winkelbauer, H., Wuttig, K., Yang, M., Peng, Z., Carpenter, L.J., 2019. Global sea-surface iodide observations, 1967–2018. *Scientific Data* 6 (1), 286.
- Ellwood, M.J., Boyd, P.W., Cornwall, C.E., Croot, P., Currie, K.I., Frew, R.D., Hurd, C.L., Law, C., Liss, P.S., McGraw, C.M., Mosley, L.M., Sander, S.G., Stirling, C., Zitoun, R., 2020. Keith Hunter's legacy to Marine Science in New Zealand. *Marine and Freshwater Research* 71 (3), i-iii.
- Gregory, C., Cave, R.R., Raine, R., McDermott, G., O'Flynn, L., 2020. The interaction of retention areas and submarine ground water (SGD) in small bays: Implications for phytoplankton growth. *Estuarine, Coastal and Shelf Science* 238, 106681.
- Mac Monagail, M., Morrison, L., 2019. Chapter Nine - Arsenic speciation in a variety of seaweeds and associated food products. In: Duarte, A.C., Reis, V. (Eds.), *Comprehensive Analytical Chemistry*. Elsevier, pp. 267-310.
- Meskhidze, N., Völker, C., Al-Abadleh, H.A., Barbeau, K., Bressac, M., Buck, C., Bundy, R.M., Croot, P., Feng, Y., Ito, A., Johansen, A.M., Landing, W.M., Mao, J., Myriokefalitakis, S., Ohnemus, D., Pasquier, B., Ye, Y., 2019. Perspective on identifying and characterizing the processes controlling iron speciation and residence time at the atmosphere-ocean interface. *Marine Chemistry* 217, 103704.
- Morrison, L., Bennion, M., Gill, S., Graham, C.T., 2019. Spatio-temporal trace element fingerprinting of king scallops (*Pecten maximus*) reveals harvesting period and location. *Science of The Total Environment* 697, 134121.
- O'Driscoll, C., McGillicuddy, E., Croot, P., Bartley, P., McMyler, J., Sheahan, J., Morrison, L., 2020. Tracing sources of natural organic matter, trihalomethanes and metals in groundwater from a karst region. *Environmental Science and Pollution Research*.
- Vernet, M., Geibert, W., Hoppema, M., Brown, P.J., Haas, C., Hellmer, H.H., Jokat, W., Jullion, L., Mazloff, M., Bakker, D.C.E., Brearley, J.A., Croot, P., Hattermann, T., Hauck, J., Hillenbrand, C.-D., Hoppe, C.J.M., Huhn, O., Koch, B.P., Lechtenfeld, O.J., Meredith, M.P., Naveira Garabato, A.C., Nöthig, E.-M., Peeken, I., Rutgers van der Loeff, M.M., Schmidtko, S., Schröder, M., Strass, V.H., Torres-Valdés, S., Verdy, A., 2019. The Weddell Gyre, Southern Ocean: Present Knowledge and Future Challenges. *Reviews of Geophysics* 57 (3), 623-708.

- Wieczorek, A.M., Croot, P.L., Lombard, F., Sheahan, J.N., Doyle, T.K., 2019. Microplastic Ingestion by Gelatinous Zooplankton May Lower Efficiency of the Biological Pump. *Environmental Science & Technology* 53 (9), 5387-5395.

GEOTRACES presentations in international conferences

- P.Croot, A. Wieczorek, M.I. Heller. OB21B-02 - Towards a global understanding of the role of urea in the ocean nitrogen cycle Ocean Sciences Meeting 2020 (San Diego, USA)

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