

ANNUAL REPORT ON GEOTRACES ACTIVITIES IN IRELAND

May 1st, 2016 to April 30th, 2017

National and international service

- Ireland is represented on the International GEOTRACES Standards and Intercalibration committee by Prof. Peter Croot (also the national contact for GEOTRACES and IMBER).

New Results

- Radium Quartet in the North East Atlantic: Measurements of the Radium quartet were undertaken during CE16008 & CE16009 along the western Irish continental shelf and the North East Atlantic. Samples for ^{223}Ra , ^{224}Ra and ^{226}Ra were measured using a RADDEC and ^{228}Ra is being assessed by ^{224}Ra in-growth over time. Preliminary data for ^{223}Ra and ^{224}Ra have indicated new potential ground water sources along the Irish coast.
- Titanium in the South Pacific: Data collected from a transect across the South Pacific during Sonne expedition SO245 is currently being finalized for publication. This data is being assessed in terms of the water mass contributions for Ti in South Pacific water masses and the role of scavenging in this low dust supply region.
- Dr Sarah Nicholas (NUI Galway) was a co-author on a Nature Geosciences paper on iron cycling in the water column supplied by hydrothermal vents resulting from GEOTRACES GP16 (Fitzsimmons et al., 2017).
- New work was published on the role of reactive oxygen species on metal and CDOM/FDOM cycling along the Mauritanian coast (Heller et al., 2016). This work suggests that some FDOM originally classified as terrestrial may be produced in situ in marine environments.

Cruises

- Biogeochemical (Radium isotopes, Nutrients) and optical measurements (CDOM/FDOM) during Western European Shelf Pelagic Acoustic Survey (WESPAS). Expedition on the Celtic Explorer (16 June - 30 July, 2016, CE16008 & CE16009, Galway to Cork & Cork to Falmouth). (iCRAG project)
- Biogeochemical (Radium isotopes, Nutrients) and optical measurements (CDOM/FDOM, light profiles) along the south west coast of Ireland. Expedition on the Celtic Voyager (October 10-17, CV16035, Galway to Galway). (iCRAG project)
- NUI Galway is collaborating with IFREMER during the HERMINE hydrothermal vent expedition (March 2016) and will analyse samples collected during that expedition for Ti.
- NUI Galway and the Marine Institute (Ireland) in collaboration with Dalhousie University (Canada), Exeter University (U.K.), GEOMAR (Germany) and W.H.O.I. (USA) are carrying out a resurvey of the A02 line for GO-Ship using the Irish vessel *RV Celtic Explorer* (April – May 2017). This is the first time that an Irish research vessel has been used for a major physical and chemical oceanographic research survey, it is hoped in the future to be able to carry out a dedicated GEOTRACES related research expedition using the same vessel.

- Prof. Peter Croot participated as an at sea POGO lecturer on the recent North South Atlantic (NoSoAT) training school onboard the *RV Polarstern* from Bremerhaven to Cape Town during Oct/Nov 2016. During this training school Prof Croot ran the physical oceanography program and also introduced the students to the work of GEOTRACES.

Other activities

- COST Action TD1407: Network on technology-critical elements (NOTICE), Prof Peter Croot is a co-chair of WG1 which is involved in intercalibration efforts for TCEs (e.g. REE, Pt group etc).
- Synchrotron work on marine aerosols and particles at ALS in Berkeley, USA and ESRF in Grenoble, France. Collaboration with LEMAR and IFREMER in France. Aerosol collection at Mace Head (in collaboration with Sarah Nicholas & Darius Ceburnis).
- NUI Galway hosted a joint SMART/POGO Atlantic Ocean Climate School in Galway in Sept 2016. This summer school was attended by 30 international students from all around the world.

Projects

- Determination of the Radium quartet along the western Irish shelf (iCRAG project)
- Spatially-resolved speciation of Fe aerosols entering the waters of the Irish Shelf. Analysis of aerosols collected at Mace Head using μ XRF and μ XANES at beamline 10.3.2 at the Advanced Light Source – Lawrence Berkeley National Laboratory (USA).

New publications (involving GEOTRACES researchers in Ireland):

- Fitzsimmons, J.N., John, S.G., Marsay, C.M., Hoffman, C.L., Nicholas, S.L., Toner, B.M., German, C.R., Sherrell, R.M., 2017. Iron persistence in a distal hydrothermal plume supported by dissolved-particulate exchange. *Nature Geosci* advance online publication.
- Heller, M.I., Wuttig, K., Croot, P.L., 2016. Identifying the Sources and Sinks of CDOM/FDOM across the Mauritanian Shelf and Their Potential Role in the Decomposition of Superoxide (O₂⁻). *Frontiers in Marine Science* 3 (132).

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