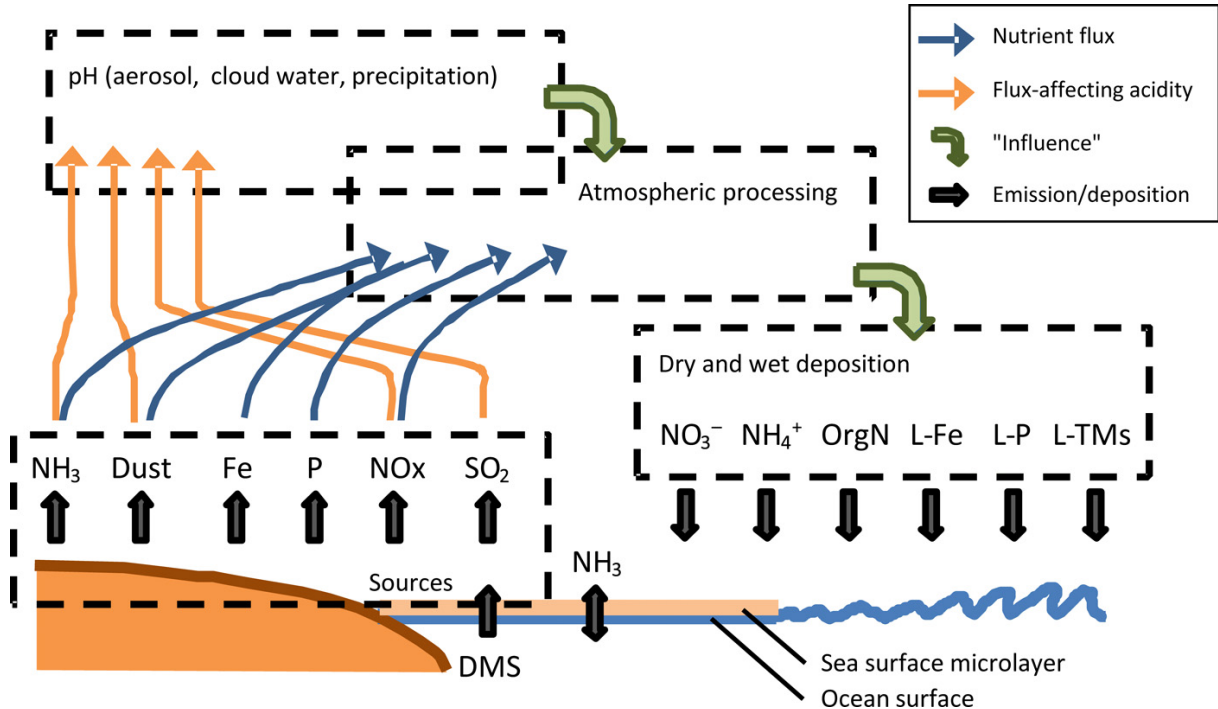


ANNUAL REPORT ON GEOTRACES ACTIVITIES IN IRELAND

May 1st, 2021 to April 30th, 2022

New GEOTRACES or GEOTRACES relevant scientific results



Baker et al. *Changing atmospheric acidity as a modulator of nutrient deposition and ocean biogeochemistry* Science Advances (2021).

Anthropogenic emissions to the atmosphere have increased the flux of nutrients, especially nitrogen, to the ocean, but they have also altered the acidity of aerosol, cloud water, and precipitation over much of the marine atmosphere. For nitrogen, acidity-driven changes in chemical speciation result in altered partitioning between the gas and particulate phases that subsequently affect long-range transport. Other important nutrients, notably iron and phosphorus, are affected, because their soluble fractions increase upon exposure to acidic environments during atmospheric transport. These changes affect the magnitude, distribution, and deposition mode of individual nutrients supplied to the ocean, the extent to which nutrient deposition interacts with the sea surface microlayer during its passage into bulk seawater, and the relative abundances of soluble nutrients in atmospheric deposition. Atmospheric acidity change therefore affects ecosystem composition, in addition to overall marine productivity, and these effects will continue to evolve with changing anthropogenic emissions in the future.

GEOTRACES or GEOTRACES relevant cruises

- There were no GEOTRACES or GEOTRACES relevant cruises during the reporting period. This was in part due to the ongoing covid situation limiting shipboard personnel and activities.

New projects and/or funding

- A new SEAL AA500 nutrient analyzer was funded in the 2nd phase of the Irish Centre for research in Applied Geoscience (iCRAG2). This is scheduled to be installed at the National University of Ireland Galway in Sept 2022 and will be available to Irish researchers on a cost share basis.

GEOTRACES workshops and meetings organized

- There were no GEOTRACES specific workshops run in Ireland during the reporting period. A joint SCOR Ireland workshop is planned for late 2022 or early 2023.

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

- Baker, A.R., Kanakidou, M., Nenes, A., Myriokefalitakis, S., **Croot, P.L.**, Duce, R.A., Gao, Y., Guieu, C., Ito, A., Jickells, T.D., Mahowald, N.M., Middag, R., Perron, M.M.G., Sarin, M.M., Shelley, R., Turner, D.R., 2021. Changing atmospheric acidity as a modulator of nutrient deposition and ocean biogeochemistry. *Science Advances* 7, eabd8800.
- Duerschlag, J., Mohr, W., Ferdelman, T.G., LaRoche, J., Desai, D., **Croot, P.L.**, Voß, D., Zielinski, O., Lavik, G., Littmann, S., Martínez-Pérez, C., Tschitschko, B., Bartlau, N., Osterholz, H., Dittmar, T., Kuypers, M.M.M., 2021. Niche partitioning by photosynthetic plankton as a driver of CO₂-fixation across the oligotrophic South Pacific Subtropical Ocean. *The ISME Journal*.
- Hanna, G.S., Choo, Y.-M., Harbit, R., Paeth, H., Wilde, S., Mackle, J., Verga, J.-U., Wolf, B.J., Thomas, O.P., **Croot, P.**, Cray, J., Thomas, C., Li, L.-Z., Hardiman, G., Hu, J.-F., Wang, X., Patel, D., Schinazi, R.F., O’Keefe, B.R., Hamann, M.T., 2021. Contemporary Approaches to the Discovery and Development of Broad-Spectrum Natural Product Prototypes for the Control of Coronaviruses. *Journal of Natural Products*.
- Jordan, C., Cusack, C., Tomlinson, M.C., Meredith, A., McGeady, R., Salas, R., Gregory, C., **Croot, P.L.**, 2021. Using the Red Band Difference Algorithm to Detect and Monitor a *Karenia* spp. Bloom Off the South Coast of Ireland, June 2019. *Frontiers in Marine Science* 8.
- Lyons, W.B., Carey, A.E., Gardner, C.B., Welch, S.A., Smith, D.F., Szykiewicz, A., Diaz, M.A., **Croot, P.**, Henry, T., Flynn, R., 2021. The geochemistry of Irish rivers. *Journal of Hydrology: Regional Studies* 37, 100881.
- **Rocha, C.**, Robinson, C.E., Santos, I.R., Waska, H., Michael, H.A., Bokuniewicz, H.J., 2021. A place for subterranean estuaries in the coastal zone. *Estuarine, Coastal and Shelf Science* 250, 107167.
- Savatier, M., Guerra, M.T., Murphy, J.E., **Rocha, C.**, 2021. Radium isotope ratios as a tool to characterise nutrient dynamics in a variably stratified temperate fjord. *Marine Chemistry* 231, 103934.
- Savatier, M., **Rocha, C.**, 2021. Rethinking tracer-based (Ra, Rn, salinity) approaches to estimate point-source submarine groundwater discharge (SGD) into coastal systems. *Journal of Hydrology* 598, 126247.

- Xu, H., **Croot, P.**, Zhang, C., 2021. Discovering hidden spatial patterns and their associations with controlling factors for potentially toxic elements in topsoil using hot spot analysis and K-means clustering analysis. *Environment International* 151, 106456.

Completed GEOTRACES PhD or Master theses (please include the URL link to the pdf file of the thesis, if available)

- Maxime Savatier, Trinity College Dublin (PhD). *Effect of groundwater-surface interactions on coastal areas hosting aquaculture activities.*

GEOTRACES presentations in international conferences

- **Croot, P.**, Nicholas, S., Heller, M. “Dissolved titanium as a tracer for dust input in the Southern Hemisphere”, Proceedings of the Blowing South: Southern Hemisphere Dust Symposium, Argentina, 8-10 Nov, 2021.

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