**Can Iron Isotopes Constrain the Ocean Iron Cycle?**

Supervisor: Alessandro Tagliabue – University of Liverpool

The micronutrient iron has received growing attention in recent years due to its role in regulating biological activity over large areas of the ocean [*Tagliabue et al.*, 2017]. While this has now highlighted that understanding the response of marine ecosystems to climate change will be underpinned by iron in many areas of the ocean, our ability to reproduce iron observations remains poor [*Tagliabue et al.*, 2016]. One potential means to improve our understanding of different processes is by using iron isotopes. This is because there are important ‘fractionations’ in iron isotopes during specific iron cycle processes that then enrich or deplete different pools of iron in unique ways. Indeed, recent work has used iron isotopes to assess the role of iron sources [*Conway and John*, 2014], upper ocean recycling [*Ellwood et al.*, 2015] and the balance between different processes along ocean transport pathways [*Abadie et al.*, 2017]. If we had a good understanding of the importance of the relative influence of external sources and internal cycling (biological activity and scavenging) then Fe isotopes would be a powerful tool to understanding the mechanisms driving the ocean cycling of Fe.

This PhD is fully funded by an ERC consolidator grant to Tagliabue (<https://ercbyonic.wordpress.com)>, open to applicants of all nationalities and will be focussed on this exciting topic. The student and will embed a representation of the cycling iron isotopes in an existing state of the art iron model and conduct assessments of model skill and of the key underlying processes. It is expected to yield high impact publications and act as a catalyst to advancing this important aspect of ocean biogeochemistry.

The project will involve close liaison with experts in the observation of iron isotopes and be co supervised by Seth John (USC, Los Angeles, USA) and Francois Lacan (LEGOS, Toulouse, France). There are specific funds allocated for visits to John and Lacan’s laboratories to develop the model further, as well as support to present the outcomes of the work at major international conferences.

This project would be ideal for a student interested in global biogeochemical cycles and trace metal cycling, in particular. Ideally, the candidate will have a background in a biological, chemical or physical science and have strong numeracy skills. You will join a vibrant group of ocean scientists in Liverpool conducting world-class research.

**References**:

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