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Open Access beyond Publications: Data, Software, Samples

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Open Access not only promotes the open availability of peer-reviewed research articles, but of all research outputs including data, software, and samples. Open access to data, software, and samples is essential to build trust in science and to accelerate discovery and creation of new knowledge. In order to fulfill these promises, data, samples, and code need to be managed in a way that they are Findable, Accessible, Interoperable, and Reusable (FAIR). This presentation will discuss the status of Open and FAIR data and samples in Geochemistry, identify current gaps and challenges, and propose actions for overcoming these.

The increasing implementation of open data policies at funding agencies and publishers has improved data sharing in Geochemistry over recent years. Many journals in the Earth Sciences have adopted the FAIR principles and no longer accept data as supplementary files, but rather request that data supporting publications are submitted to trusted repositories and linked to the related papers via persistent identifiers. Similar demands are implemented by funders. Geochemical data repositories such as the EarthChem Library have consequently seen a substantial increase in data submissions. Globally, new data repositories have emerged that host geochemical data. The primary challenge remaining today is the lack of common protocols and vocabularies for formatting and documenting geochemical data so they can be trusted, reused with confidence, and easily integrated with equivalent datasets for advanced data analysis. Editors of journals need community-endorsed guidelines for data reporting in publications that authors should comply with. Similarly, data repositories need community-endorsed guidelines to ensure that the data they curate are not only findable and accessible online, but that they are reusable and interoperable with those of other repositories. Standards are also needed to enable an ecosystem of interoperable tools that help researchers and labs manage geochemical data through their life time from collection to archiving.

International initiatives such as OneGeochemistry aim to take on the development and promotion of data standards for geochemistry. A workshop is planned for 2021 to start the conversation between members of geochemical societies, repositories that house geochemical data, editors and publishers of geochemical journals, and funders.