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Managing Open and FAIR Data in Geochemistry: Where are we a decade after the Editors Roundtable?

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The ultimate goal of research data management is to achieve the long-term utility and impact of data acquired by research projects. Proper data management ensures that all researchers can validate and replicate findings, and reuse data in the quest for new discoveries. Research data need to be open, consistently and comprehensively documented for meaningful evaluation and reuse following domain-specific guidelines, and available for reuse via public data repositories that make them Findable, persistently Accessible, Interoperable, and Reusable (FAIR).

In the early 2000's, the development of geochemical databases such as GEOROC and PetDB underscored that the reporting and documenting practices of geochemical data in the scientific literature were inconsistent and incomplete. The original data could often not be recovered from the publications, and essential information about samples, analytical procedures, data reduction, and data uncertainties was missing, thus limiting meaningful reuse of the data and reproducibility of the scientific findings. In order to avoid that such poor scientific practice might potentially damage the health of the entire discipline, we launched the Editors Roundtable in 2007, an initiative to bring together editors, publishers, and database providers to implement consistent publication practices for geochemical data. Recognizing that mainstream scientific journals were the most effective agents to rectify problems in data reporting and implement best practices, members of the Editors Roundtable created and signed a policy statement that laid out 'Requirements for the Publication of Geochemical Data' (Goldstein et al. 2014, <http://dx.doi.org/10.1594/IEDA/100426>). This presentation will examine the impact of this initial policy statement, assess the current status of best practices for geochemical data management, and explore what actions are still needed.

While the Editors Roundtable policy statement led to improved data reporting practices in some journals, and provided the basis for data submission policies and guidelines of the EarthChem Library (ECL), data reporting practices overall remained inconsistent and inadequate. Only with the formation of the Coalition for Publishing Data in the Earth and Space Sciences (COPDESS, www.copdess.org), which extended the Editors Roundtable to include publishers and data facilities across the entire Earth and Space Sciences, along with the subsequent AGU project 'Enabling FAIR Data', has the implementation of new requirements by publishers, funders, and data repositories progressed and led to significant compliance with the FAIR Data Principles. Submission of

geochemical data to open and FAIR repositories has increased substantially. Nevertheless, standard guidelines for documenting geochemical data and standard protocols for exchanging geochemical data among distributed data systems still need to be defined, and structures to govern such standards need to be identified by the global geochemistry community. Professional societies such as the Geochemical Society, the European Association of Geochemistry, and the International Association of GeoChemistry can and should take a leading role in this process.