

Basis for geochemistry data science applications; data standardisation through the OneGeochemistry initiative

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Geochemical data help answer questions about planetary systems and Earth, improving our understanding, as well as help address societal issues. Attempting to further our understanding and taking into account multiple factors increases the complexity of research questions, which in turn require larger and larger data compilations to be solved. Analysis of large data compilations requires them to be consistently organised. The published, factual, geochemical data; i.e., the basis for interpretations is most accessible through data infrastructures such as EarthChem, GEOROC, MetBase, PANGAEA, GFZ data services, AusGeochem and others the authors do not yet know of. Still, the access and reusability of these data rely heavily on common formats, standards and metadata used and collated by the databases. It is therefore tremendous that many large geo- and cosmochemical data infrastructure organisations joined efforts during the past years under the OneGeochemistry initiative to align their data models and use e.g., common vocabularies, schemas etc. This is only really the beginning, and an effort by the entire community is required to make geochemical data Findable, Accessible, Interoperable, Reusable (FAIR).

The OneGeochemistry initiative was launched to establish a framework of geochemical standards to be defined and then used by the geochemical community, thereby making data FAIR. FAIR geochemical data provides the opportunity to seek new insights, allow for systematic gap analyses, and provide students with a powerful tool to explore the mineralogy of the Earth and our Planetary System. The predominantly voluntary OneGeochemistry initiative is currently operated through the OneGeochemistry CODATA Working Group. As part of the funding received through the larger “WorldFAIR: Global cooperation on FAIR data policy and practise” the initiative is generating an overview of common variables from published and known best practices of a variety of analytical methods and techniques popular with the geochemistry community (e.g. U–

Pb, (U–Th)/He, ⁴⁰Ar/³⁹Ar).

OneGeochemistry invites for everyone interested in this initiative to participate in topical expert committees that make recommendations for community standards, which will then be implemented in an IUPAC colour book as a set of community-agreed recommended standards for all geochemists to be applied to their data in publications and online databases.