

IEDA2: Evolving EarthChem, LEPR/traceDs, and SESAR into a Next Generation Data Infrastructure for Data-Driven Research Paradigms in Geochemistry, Petrology, and Volcanology

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Cyberinfrastructure (CI) needs of science communities evolve as new science priorities and paradigms emerge. Research in geochemistry today requires a comprehensive ecosystem of data, tools, and services that support researchers in sharing, publishing, and accessing data, while advancing new data-driven and computational methodologies in geochemistry, petrology, and volcanology, and integration of geochemical data with those of other disciplines for interdisciplinary research.

EarthChem, LEPR/ traceDs, and SESAR provide essential data infrastructure for thousands of researchers in the US and world-wide. This presentation will describe how these systems are evolving alongside these growing requirements for scientific data into a modern CI with a cloud-based, API-driven architecture that will improve the longevity, utility, and impact of publicly funded data, and support computing and modeling capabilities, as well as data integration, synthesis, and curation. Priority will be given to the development of tools that facilitate user contributions to the data syntheses, and of machine-actionable interfaces that allow researchers to build their own tools for data access, analysis, and modeling.

In order to increase FAIRness and access of data holdings across EarthChem, LEPR/traceDs, and SESAR, these systems will be accessible through a new collaborative infrastructure, IEDA2, the re-envisioned Interdisciplinary Earth Data Alliance that aims to offer new ways for Geoscientists to discover, access, integrate, synthesize, and analyze sample data.

IEDA2 will foster a culture of collaboration and partnerships with researchers, data facilities, publishers and editors, data scientists, professional societies, CI providers, and the global research data management community to leverage existing resources and make them consistent, complementary, and

connected. These efforts will help advance international standards in data management, grow national and global data networks for data synthesis, integration, and interdisciplinary research of societal impact.

IEDA2 also embraces the need for essential social and cultural progress that will amplify its scientific and societal impact: By engaging early career scientists and students, particularly those from historically excluded groups, IEDA2 aims to grow a more diverse and inclusive STEM workforce and to advance justice, equity, diversity and inclusion in the Geosciences.