The Future of GeoReM: Integration with GEOROC for a Modernized and Interconnected Geochemical Database System

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The GEOROC (Geochemistry of Rocks of the Oceans and Continents) and GeoReM (Geological and Environmental Reference Materials) databases were developed as complementary geochemical resources at the Max Planck Institute for Chemistry in Mainz starting approximately 25 and 20 years ago, respectively. While GEOROC compiles geochemical data from primarily igneous and metamorphic rocks and minerals, GeoReM focuses on geological, biological, and environmental reference materials. GEOROC currently hosts 2.6+ million analyses from 685,000+ samples, compiled from 22,750+ publications. Meanwhile, GeoReM contains 59,890+ analyses from 3,820+ different reference materials, sourced from 13,370+ publications. The two databases were originally cross-linked, facilitating data sharing of published reference materials from GEOROC datasets to GeoReM, however this cross-link has been lost for several years.

In 2021, GEOROC was transferred to the Digital Geochemical Data Infrastructure (DIGIS) project to secure its future at the University of Göttingen, where its IT and data infrastructure underwent significant modernization. However, GeoReM's unique role in the geochemical community is under existential threat due to security concerns, while its outdated system restricts automated data exchange and thus real interoperability. GeoReM data is used in data acquisition and during the calibration of compositional laboratory equipment worldwide. Losing the record of reference materials would be detrimental to the geochemical and geoanalytical research communities. To realign GeoReM with GEOROC and to secure its operability, the DIGIS team and the International Association of Geoanalysts (IAG) joined forces to rebuild the GeoReM IT infrastructure and integrate it into the DIGIS/GEOROC database structure. This transition will restore cross-linking between the databases, enhancing accessibility and interoperability. Additionally, key technical components, particularly vocabularies, will be standardized across both platforms to ensure consistency.

Beyond modernizing GeoReM, the collaboration effort aims to develop an intuitive user interface with API support and to allow cross-link with other geochemical databases, expert users, and manufacturers of analytical instruments. The collaboration will also support the development of data QA/QC tools for the database users and providers in the geochemical/geoanalytical communities and industries. Through collaboration between DIGIS and IAG, GEOROC and GeoReM will reestablish their status as interconnected data resources, better serving the global geochemical community moving forward.