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The Polar Rock Repository: an invaluable asset for geochemical studies in Polar and sub-polar regions

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The Polar Rock Repository (PRR) contains sample collections, metadata, and media relevant to understanding geologic evolution in Polar and sub-polar regions. By making materials and metadata available to the geochemical community, the PRR represents a valuable resource to help answer key questions involving lithospheric and cryospheric processes.

The PRR is a United States National Science Foundation funded facility that provides online access to over 64,000 rock samples, glacial deposits, terrestrial drill cores, and dredge samples from Antarctica and surrounding regions. By providing samples and metadata to the research community, the PRR reduces the financial cost and environmental impact of field work in Antarctica. PRR samples can be requested from the website for research use. Importantly, destructive techniques are allowed on requested samples as an archival piece is always kept at the PRR).

The PRR has also created a media archive of over 7,700 images (with some images dating back over 60 years) that can provide glaciological, geological, and logistical information, as well as provide a record of temporal change associated with surface features (snow cover, ponds, plants, streams, etc.). The repository has added geochemical data associated with PRR samples to the PetDB catalogue to make information more accessible through online databases, facilitate global correlations, and potentially reduce redundant analytical costs. The database also links PRR samples to the ICE-D database.

The PRR website (prr.osu.edu) provides easy-to-use map view searching and multi-field searchable criteria including subglacial precipitates, pedogenic calcite and weathering salts, coral/marine invertebrates on dredge clasts, lichen, moss, soil residues, Fe-Mn nodules, Fe-oxide coatings, glacially striated surfaces, glacial erratics, and photos/videos of outcrops and landscapes.

Results using geochemical indicators from PRR samples/metadata have included:

- Millennial scale climate cycles since the Pleistocene using U-series methods.
- Assessing carbon isotopic composition for evaluation of $\delta^{13}C_{org}$ excursions in paleo-atmospheric reconstruction.
- Provenance studies indicating sea-level oscillations from a large West Antarctic Ice Sheet.
- Paleotemperature proxies using marine invertebrates on dredge samples.
- Studies on CO_2 fluxing and magma transport using volcanic rocks.
- Use of Fe-Mn nodules to assess influxes from the Antarctic Ice Sheet.
- Glacial reconstructions using cosmogenic nuclides & luminescence.

