Implementing the Sparrow laboratory data system in multiple subdomains of geochronology and geochemistry

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Data sharing between laboratories is critical for building repeatable, comparable, and robust geochronology and geochemistry workflows. Meanwhile, in the broader geosciences, there is an increasing need for standardized access to aggregated geochemical data tied to basic geological context. Such data can be used to enrich sample and geochemical data repositories (e.g., EarthChem, Geochron.org, publisher archives), align geochemical context with other datasets that capture global change (e.g., Neotoma, the Paleobiology Database), and calibrate digital Earth models (e.g., Macrostrat) against geochronology-driven assessments of geologic time.

A typical geochemical lab manages a large archive of interpreted data; standardizing and contributing data products to community-level archives entails significant manual work that is not usually undertaken. Furthermore, without widely accepted interchange formats, this effort must be repeated for each intended destination.

Sparrow (https://sparrow-data.org), in development by a consortium of geochronology labs, is a standardized system designed to support labs' efforts to manage, contextualize, and share their geochemical data. The system augments existing analytical workflows with tools to manage metadata (e.g., projects, sample context, embargo status) and software interfaces for automated data exchange with community facilities. It is extensible for a wide variety of geochemical methods and analytical processes.

In this update, we will report on the implementation of Sparrow in the Arizona Laserchron Center detrital zircon facility, and how that lab is using the system to capture geological context across its data archive. We will review similar integrations underway with U-Pb, $^{40}Ar/^{39}Ar$, SIMS, optically stimulated luminescence, thermochronology, and cosmogenic nuclide dating. We will also discuss preliminary efforts to aggregate the output of multiple chronometers to refine age calibrations for the Macrostrat stratigraphic model.