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## From Field Application to Publication: An end-to-end Solution for FAIR Geoscience Data

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In this abstract we introduce a suite of free applications to produce FAIR consistent, clean and easily available geoscience data for research and industry alike.

Creation of data starts with sample collection in the field and the assigning of a unique global IGSN sample identifier to samples, these samples are stored along with any subsequent analytical data in our fine-grained and detailed geochemical data models allowing visualising and publishing acquired datasets. This unique solution has been developed by Lithodat Pty Ltd in conjunction with the AuScope Geochemical Network (AGN), Australian geochemical laboratories and can be accessed by the public on the AusGeochem web platform.

Using our fully integrated field application users can enter and store all sample details on-the-fly during field collection, the data will be stored in the user's private data collection. Once the researchers return from the field they can log into their account on the browser-based AusGeochem platform and view or edit all collected samples. After running subsequent geochemical analyses on the sample those results, including all metadata, can be stored in the database and attached to the sample. Once uploaded, data can be visualised within AusGeochem, using simple data analytics via technique-specific dashboards and graphs. The data can be shared with collaborators, downloaded in multiple formats and made public enabling FAIR data for the research community.

Here we show a complete sample workflow example, from collection in the field to the final result as a thermochronology study. Sample analysis using fission track and (U-Th)/He and all associated data will be uploaded and stored in the AusGeochem platform. Once all analyses are complete, the data will be shared with collaborators and made available to the public. An important step during this process is by having an integrated IGSN minting option which will give the sample a unique global sample identifier, making the sample globally discoverable.

Having all data stored in a clean and curated relational database with very detailed and fine-grained data models gives researchers free access to large amounts of structured and normalised data, helping them develop new technologies using machine learning and automated data

integration in numerical models. Having all data in one place including all metadata such as ORCIDs from involved researchers, funding sources, grant numbers and laboratories enables the quantification and quality assessment of research projects over time.