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Into the ISOVERSE – open-source data tools for efficient, transparent, and reproducible processing of stable isotope data

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Reproducible data processing is a key prerequisite for efficient data exchange, methodological progress, consistent training of new users, and productive discourse in stable isotope research. However, producing a faithful record of every step of the data reduction process from raw data to final results in a reproducible manner can currently be prohibitively time-consuming. All too often data processing that is both transparent and easy to communicate thus falls victim to the enormous effort required to design experiments well, run complex analytical procedures, and interpret the results in the proper geochemical/geologic/ecological context. While this is understandable, insufficiently documented data processing workflows create a high risk for errors to go undetected and become propagated. Additionally, they create barriers to sharing and discussing one's approach to data reduction effectively. These drawbacks limit opportunities for exchange of ideas, methodological progress, and large-scale data repository efforts aimed at extracting maximum benefit from stable isotope data across the many disciplines that make us of it.

The goal of the ISOVERSE (www.isoverse.org) is to fill this gap by creating a comprehensive software ecosystem of free, open-source tools for efficient, transparent, and reproducible processing of stable isotope data from raw analytical measurements all the way to fully processed stable isotope data ready for publication and repository deposition. By building on best practices in modern data science and software engineering, the ISOVERSE seeks to empower scientists at all career stages and programming levels to share their work more easily and contribute fully reproducible data sets to data repository efforts. In this presentation, I will introduce some of the existing key capabilities of the ISOVERSE and discuss implementation plans for next stage of development over the coming 2+ (grant-funded) years with the goal of stimulating discussion and eliciting constructive feedback from the community.