Python Program to Input, Sort, View, and Store Detrital Zircon Geochronological Data in a SQL Database

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Detrital zircon datasets contain vast amounts of geochronological data, and different labs, researchers, and institutions all have their own standards of formatting. Detrital zircon data are also becoming cheaper and easier to produce which increases the quantity of datasets available to researchers. This increase of data only makes the existing problem of having to organize, sort and filter the data that much more difficult. This program aims to fix this problem of organizing and managing by automatically assuming how data is formatted and storing it into a personalized SQL database. When the program is unsure how to import the data, it prompts the user with a step-by-step wizard to confirm or modify the assumed data values. This is to ensure all data are accurate while still having the bulk of the behind-the-scenes processes automated. The program then remembers the specific formatting that was used and would apply that to future datasets of the same format to be imported. Users can create custom tags for filtering that are not available on existing online databases. The data inside the SQL database can then be used by the built-in filtering and basic plotting to allow users to quickly visualize the data based on current filtering options. Once the user is satisfied with the selected data, it can be outputted in varying formats such as Excel, IsoplotR, DZstats, detritalPy, etc. Users can also split, merge, and share the SQL database for other researchers to merge into their own databases with little user input unless there are conflicting entries. New AI tools such as Chat GPT are intriguing, but we find it is insufficient for our needs as it still unreliable and the results cannot be shared, merged, or stored. The program will use open-source methods of version control which will allow for users to submit their own feedback or help contribute to the program through GitHub. Once the program exits closed alpha development and is published, it will help assist all geochronologists in optimizing their own research methods while seamlessly being able to integrate with already existing tools.