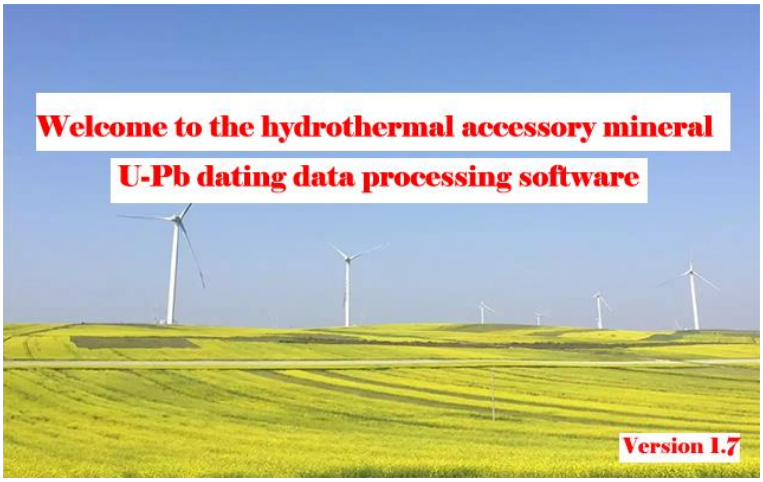
User Operation Manual for Hydrothermal Accessory Minerals U-Pb Dating Data Processing Software v1.7



Guoqi Liu

(642847452@qq.com)

School of Earth Sciences, East China Institute of Technology

Nanchang,Jiangxi ,China

Address: No.418 Guanglan Avenue, Nanchang Economic& Technological Development Zone, Jiangxi 330013, P.R.CHINA

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1.Registration and installation

system requirements: win10 64bites;

Double-click“AM dating alpha V1.7(64bits)EN.exe”, the program will start.

The first time you use the application, you will need to input authorization code (Figure 1). Send the machine code to the author's email and attach personal contact information (name, company, telephone and email information to facilitate subsequent update notification) to complete the registration. When get the authorization code from the Author(642847452@qq.com), enter it into the registration or copy it to “register.txt” file.

Note: When the registration fails, you can press "Alt + CRL + delete" at the same time to end the software process in the task manager.

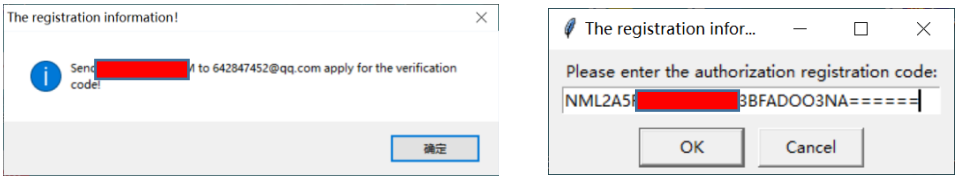

Fig.1 Registration interface

2. General steps of data processing:

The software interface is divided into different functional areas according to color (Figure 1).

（1）①Select Mode.

If the standard sample is a mineral containing ordinary lead (such as apatite, sphene, wolframite, etc.) and ordinary lead needs to be corrected, select the **< standard Cor >** button. Otherwise, select < **standard not Cor** > button(such as zircon).

（2）②Set standard sample

As shown in Figure 3, you can customize the age and name of the standard sample, or directly select the corresponding method.

Note: when selecting the corresponding method directly, it is necessary to ensure that the standard sample name is completely consistent with the software display name.

（3）③Select ICPMS instrument model.

At present, the software provides three formats to choose from:

(a) <**Thermo**> mass spectrometer. The software does not need to provide a “List file”(Excel with two columns of file serial number and sample name), and the software can automatically extract the document serial number and sample name;

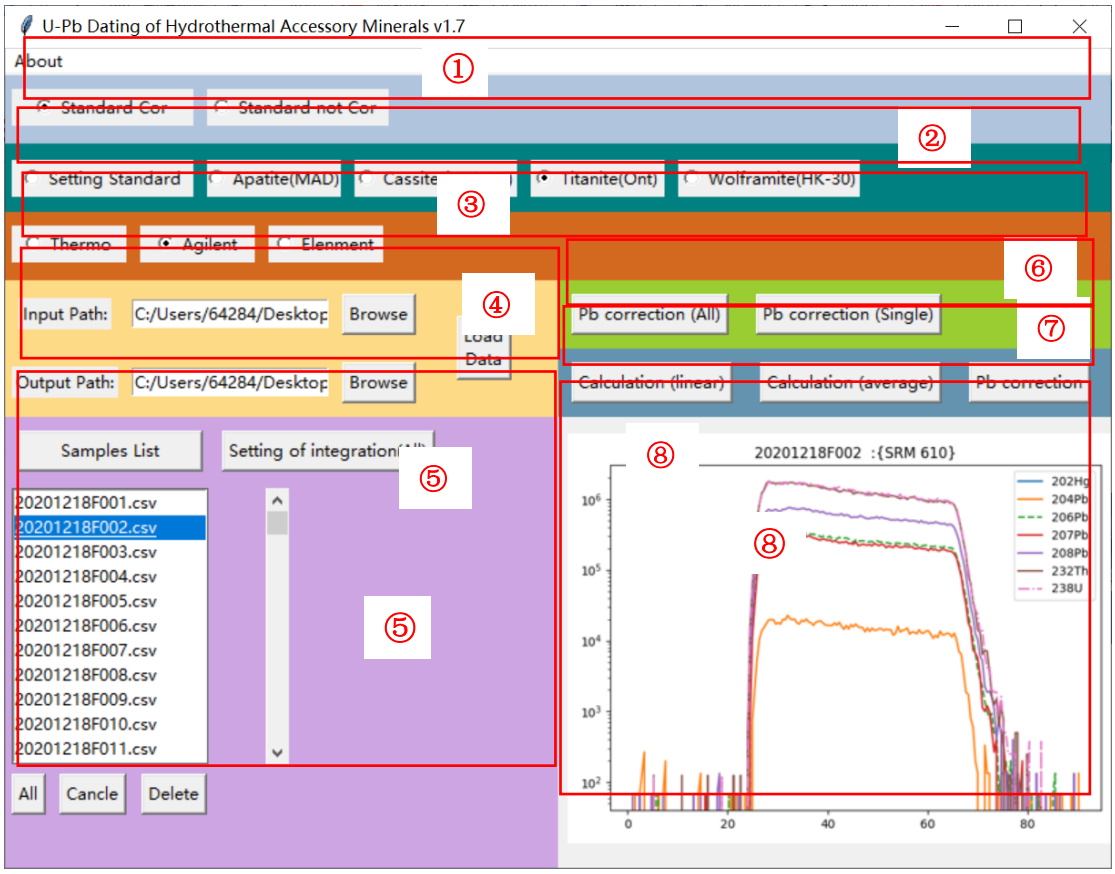

Fig.2 Main interface and function partition

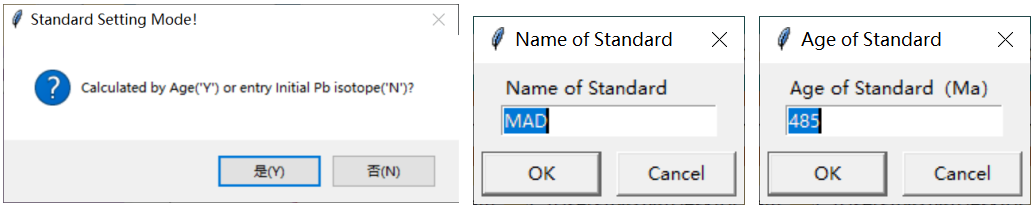

Fig. 3 standard sample selection

(b) **<Agilent>** mass spectrometer. The file is stored in the 'sequence. CSV' file in the 'sequence. D' folder. It is necessary to provide the list format EXCEL file corresponding to the file sequence and sample name (the first column is the folder name, and the second column of the file is the sample or standard sample name);

(c) **<Element>** mass spectrometer. The "*. Fin" format file stores the list sequence file, and the "*. Fin2" format file stores the signal data.

（4）④Environment settings and data import.

Select the data input path and output path, and then click the < **Load Data** > button to import data.

Note: If you select **<Agilent>** instrument, you need to select the list file in the pop-up window.

（5）⑤Signal integration interval setting.

Select the sample number on the left side of ⑤, and the signal diagram will be

displayed in area ⑧. Blank and integration time can be read according to the signal diagram (Fig. 4)

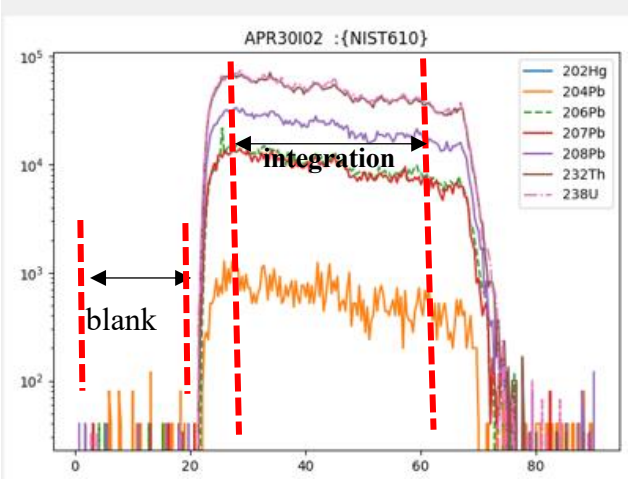

Fig. 4 sample signal diagram display

（6）⑥^{207}Pb correction calculation.。

The software provides two modes: select **all** and **single**:

(a) Select <**all**> mode：

Use the unified integration interval to set all samples and standard samples for calculation.

Select < **Pb correction (all)** >, generate the "**result_all. csv**" file in the output directory, and check the standard sample correction results.

(b) Select < **single** > mode：

Set the integral interval separately.

Select the sample number in the sample selection box in area ⑤, click area ⑥ < **Pb correction (single)** >, and enter the integral interval according to the prompt to complete the calculation. The "std.csv" and "samples. csv" files can be found in the output folder. Merge the results into the same CSV file named "result_all.csv".

Note: this step cannot be omitted whether standard sample correction is selected or not.

（7）⑦Calculate the age.

The software provides three ways of calculation, and its purposes are as follows (Fig. 5):

（a）< **Calculation (linear)** > :The isotope is corrected by linear method, the standard sample results are not output, and the ordinary lead of the sample is not deducted. The result file is "**cal_age_result_L******.xls**".

（b）< **Calculation (average)** >: Use the average method to correct the isotope, output the standard sample results, and do not deduct the ordinary lead of the sample. The result file is "**cal_age_result_A******.xls**".

（c）< **Pb correction** > :Input sample's age or the input sample's common lead composition according to the prompt to deduct common lead. The output result does

not include the standard sample, and the result file is “**Age_result_corPb******.xls**”.

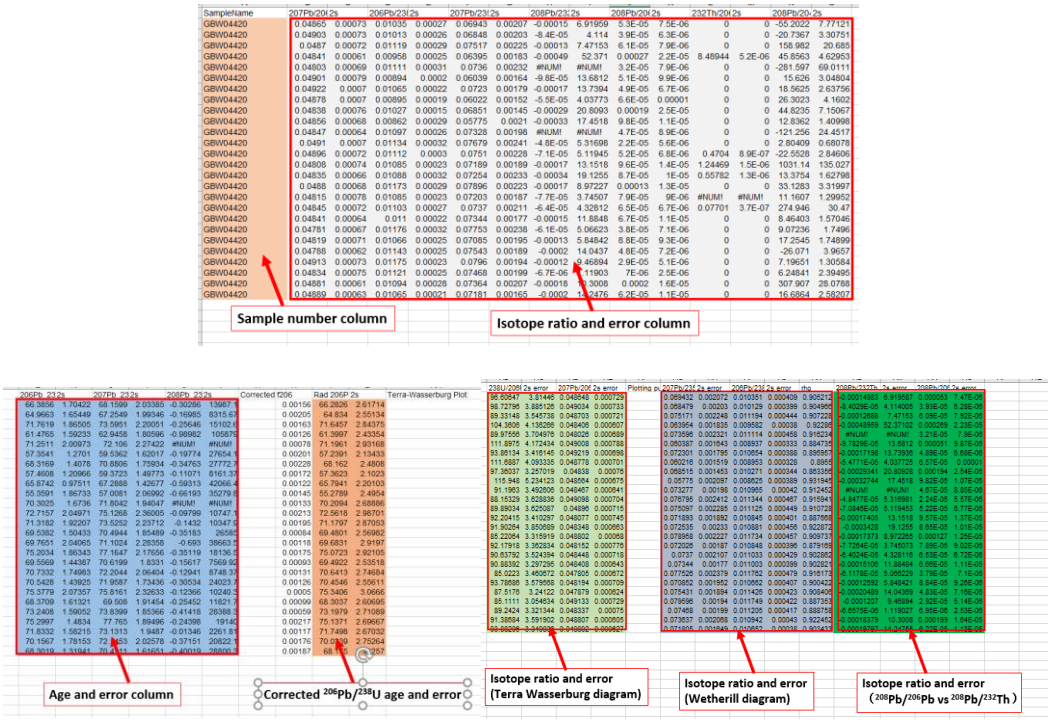

Fig. 5 description of software data processing results

3. Other considerations:

（1）Input folder and output folder cannot be the same；

（2）Only the original data is stored in the input folder, and there can be no other data files(such as CSV file of non-signal data), otherwise the program will report an error!

（3）After processing one sample at a time, restart the program and replace with a new output folder directory.

（4）Note that Pb204, Pb206, Pb207, Pb208, Th232 and U238 are required items, otherwise an error will be reported.

（5）The first line of the “result_all.csv” file is the header, and the rest are in digital format.

（6）When selecting the "Agilent" instrument, it is required to select the list file when loading data. the first column is the folder name, the second column is the sample name, and the name of the list file worksheet must be "Sheet1".

（7）If the data format is inconsistent or the name and age of other mineral standard samples are added, please contact the author.