



P2P Tools

# Scanned Data Combination – S-C Tool

## User's Manual

Version 1.50

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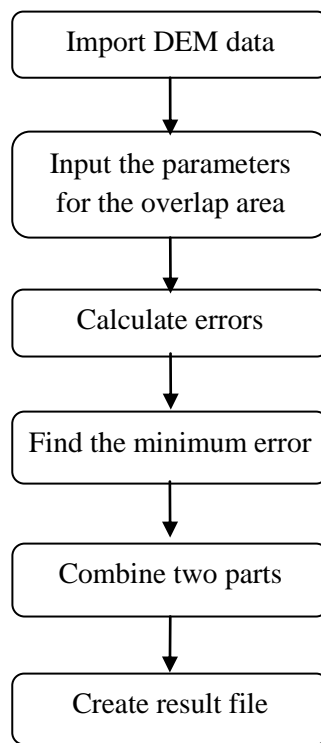
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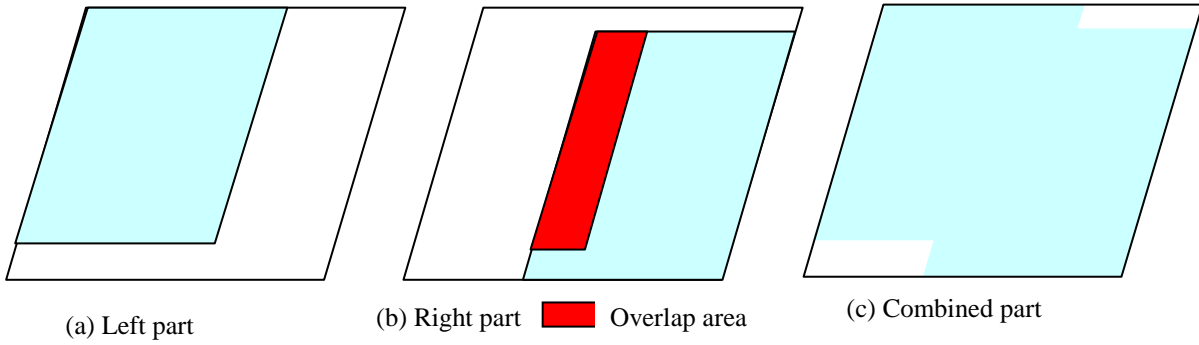
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This program is designed to combine two separate scanned data sets into a single file. The primary requirement for the two data sets is that they must have an overlapping area to be successfully and accurately combined by the program. In addition, the data files must be prepared in the required format. The x, y, and z data should be organized in three columns and the column headers should contain the number of rows and the number of columns of the user's data. All data should be sorted based on either y or x values from the smallest to the largest with either a comma or a space as the separator. The following flowchart shows the steps for scanned data combination:

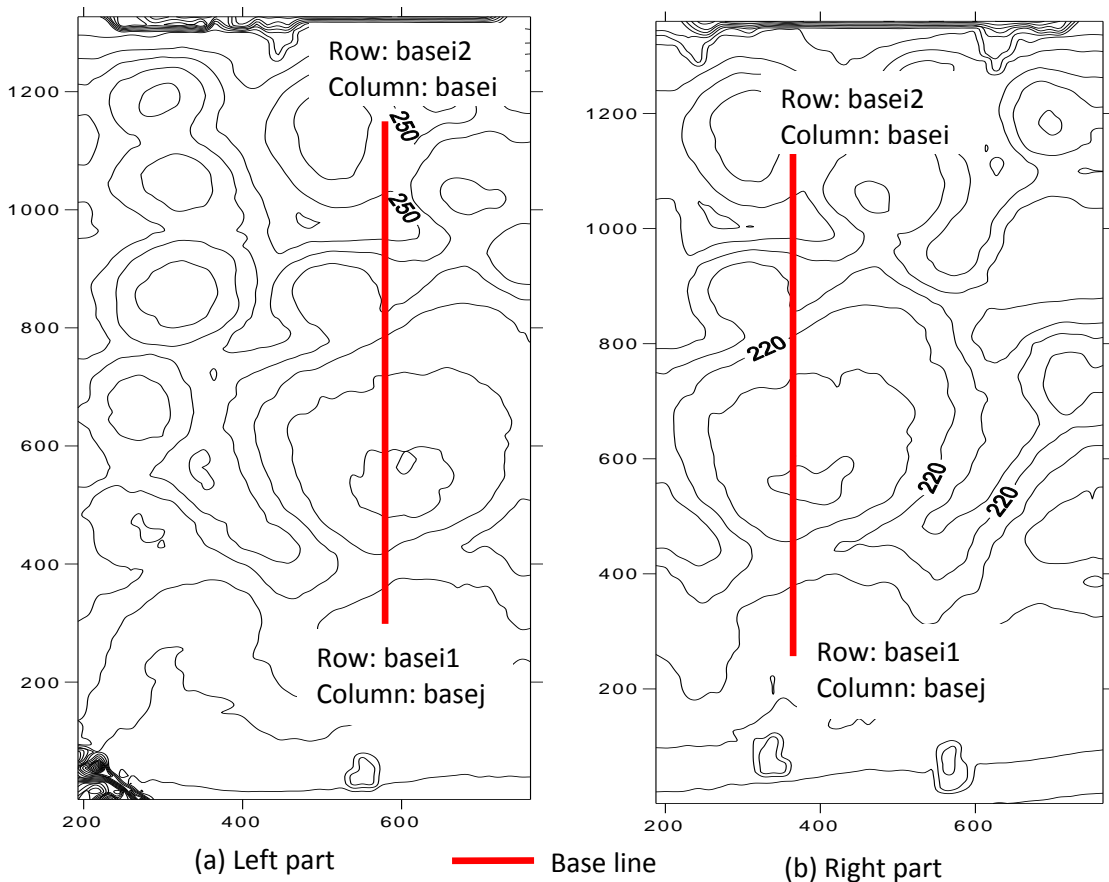


## 1. Methodology

The following figure schematically shows the combination of two data sets and the overlapping area required for successful combination of the two files.



First, users should identify the overlap area from the figures that are generated from the two data sets. Some third-party graphic software (e.g., Surfer, Golden Software, Golden, CO) can be helpful for this purpose. The users can find the same “object” in both files and locate the column number (basej) in both files. In addition, the starting row (basei1) and the ending row (basei2) of the featured object should be identified in both files. Then, a searching process commences, starting from the first column (from bottom to the top row) in the right part figure and proceeds until the matched line is found.



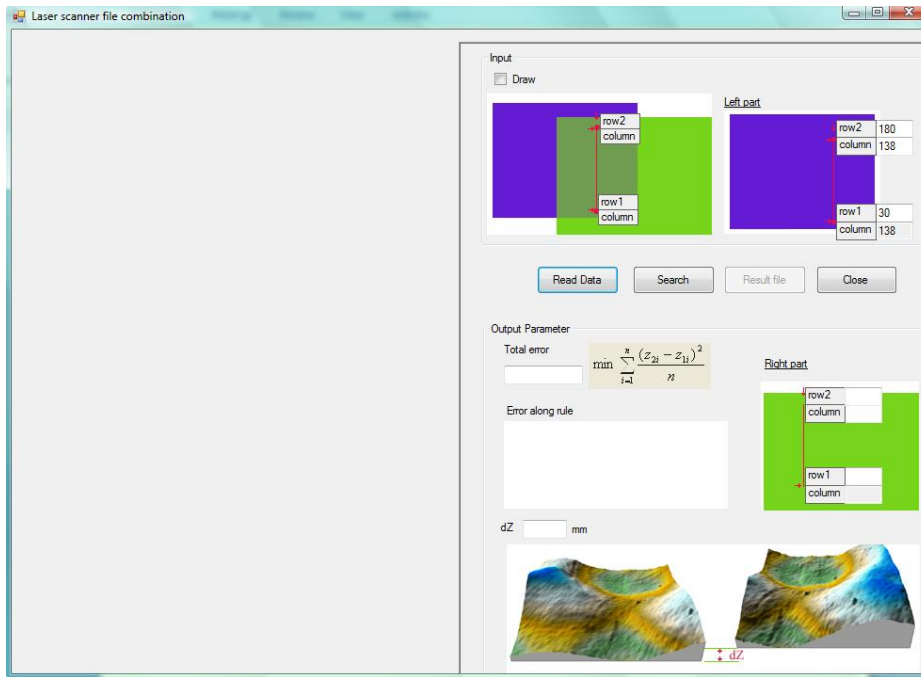
Since the same object in the two files may have different elevations, the total error of the elevations of the matched part will be minimized:

$$\min \sum_{i=1}^n \frac{(z_{2i} - z_{1i})^2}{n}$$

The elevations of the matching line will then be averaged, and the elevations of the surrounding columns will be smoothed to create a combined file.

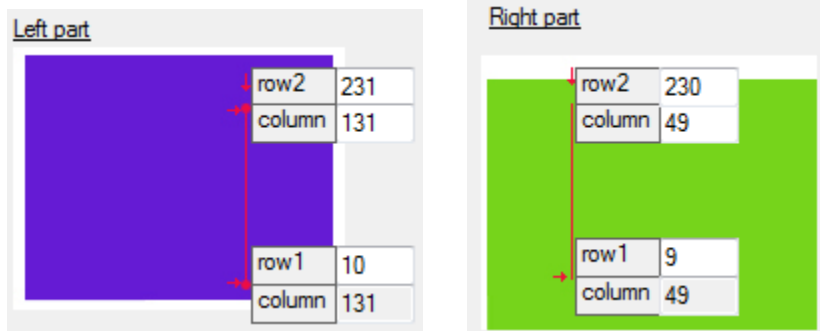
## 2. Procedure

The main interface of the S-C software is shown in the following figure. To combine two data sets using this tool, the following steps should be taken.

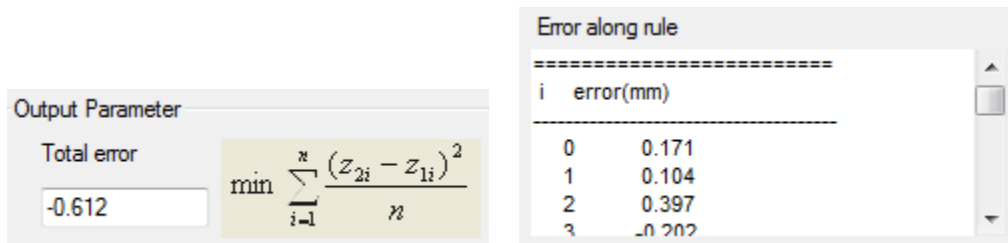


- 1) Input data: Click the button “Read Data.” An open file dialogue will pop up and the user will be asked to input the left file first. After selecting the file and clicking “open,” the user will immediately be asked to input the right file.
- 2) Input parameters of the overlap area: The overlap area should be identified for the two data sets with the aid of some third-party software as aforementioned. First, find a base column that occurs in both left and right parts, and record the number of that column in each file as well as the starting row and the ending row of the overlap area in both files.

The user will then be able to input the location of the base column, and starting row (row1), and ending row (row2) in both the left and right files.



- 3) Combination: Click the button “Search” to perform the combining process. By checking the checkbox “Draw,” the user will be able to see the searching process.
- 4) Results: Click the button “Result file” to show the combined file in a text format. The user can save the file to a specified directory. In addition, this combined file is automatically saved as “combine.dat” in the working directory where the original left and right datasets are located.
- 5) Output parameters: The combining process is successful when the calculated total error between two files is minimized. The errors along the base column for each row are also calculated and output.



The mean elevation difference dz between the left and right files is calculated and shown in the text box.

