



P2P Tools

Image-based Depression Storage Computation – IDS Tool

User's Manual

Version 1.50

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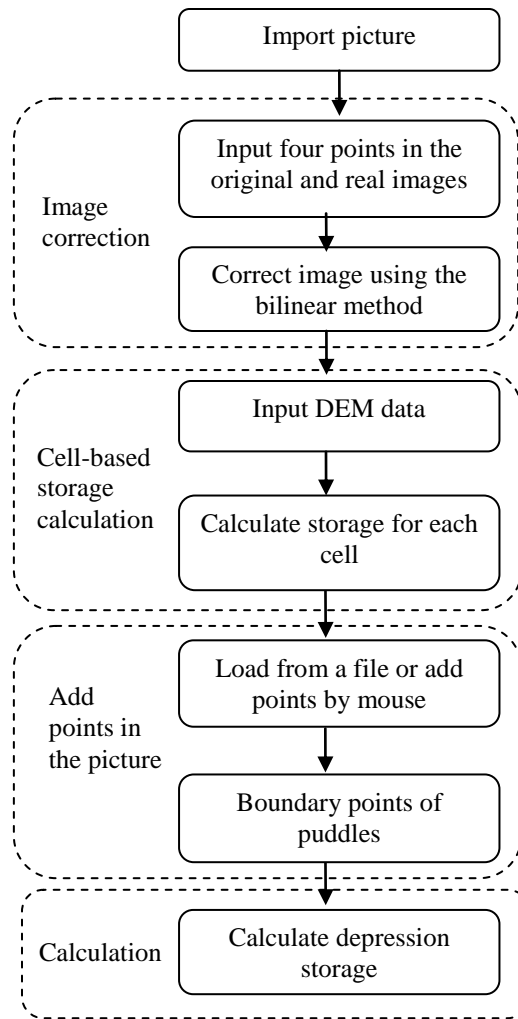
This program is designed to calculate depression storage based on an experimental image. The calculated depression storage can be the maximum depression storage (MDS) of a puddle or the depression storage at any puddle level. Besides the image, the original surface DEM (without any water) is required. The DEM of a surface is often saved for a rectangular area. However, the picture of the surface taken during the experiment is potentially distorted. Thus, image correction is needed to convert the distorted image of the surface into its actual image before calculating the depression storage. For this purpose, the puddle delineation (PD) program has been modified and applied.

1. Windows Interface



2. Flowchart

The following flowchart shows the steps for image-based depression storage computation.



3. Procedure

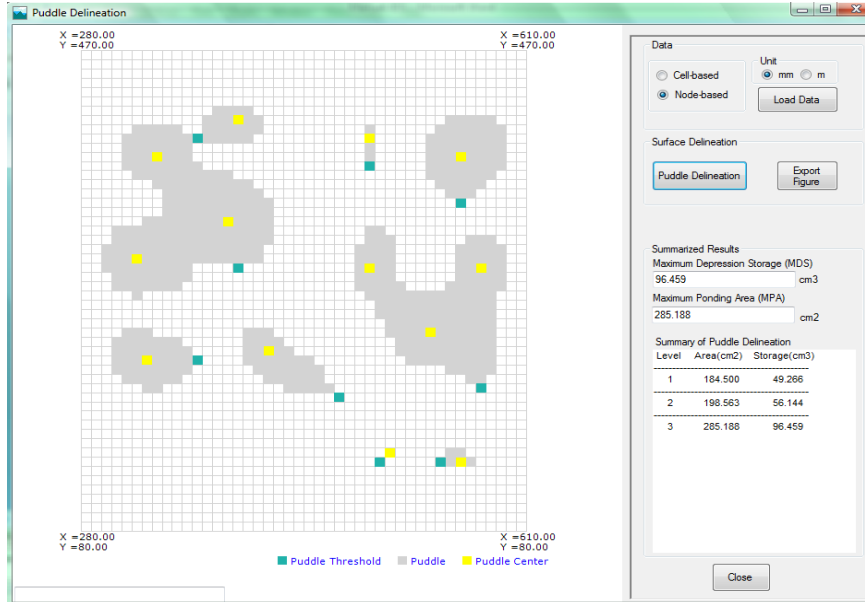
The following steps are implemented to obtain the depression storage for any user defined points in puddles:

- 1) Load picture: Click the button “Load Picture” to select the picture to be processed. The picture can be any format, such as *.bmp, *.jpg, and *.jpeg.
- 2) Processing Parameters: To process the distorted picture, users must select four reference points whose locations in both the distorted and actual picture should be known. The users can either manually input these parameters in the corresponding textbox or load a parameter file by clicking the button “Correction File.” The data in the file is organized in four rows and four columns. The first and second columns are the x and y locations of the

four reference points in the distorted picture, while the third and fourth columns are the actual x and y locations. Next, click the button “Calculation” to calculate the relationship between the distorted and the actual pictures.

Coordinate Transit				
x	y	->	x	y
168.03	201.32		310	200
532.90	382.60		588	208
709.71	218.70		595	410
352.01	68.131		310	403

- 3) Storage Calculation: After correcting the picture, click “Storage of Element” to calculate the storage for each cell. At this stage, a new window will pop up to facilitate the calculation. This window is a simplified puddle delineation (PD) program that is designed for the current purpose. Follow the steps in the PD program by selecting the data type (center-based or node-based) and unit (mm or m), and click the button “Load Data” to load the DEM. Next, click the button “Puddle Delineation” to delineate the surface. The summarized results will be shown immediately. In addition, the storage capacity for each cell will be calculated and saved in the file “s_stor.dat.”



- 4) Specify the Locations of Points: To manually specify any point in the depression, users can check “Add Point,” and then specify any points manually in the depressions by left-

clicking on the image. The selected cell indicates the water level elevation, to which the depression is filled and the storage is computed.

Users can also delete or move the points by clicking on them with the left button of the mouse. The points can be saved to a file by clicking the button “Save Points.” By default, the points added will be displayed in blue color. Users can change the color by clicking on the blue color and selecting a different one. In addition, users can load the points by clicking the button “Load Points” if they have their desired locations in a file. The file should include the total number of points, followed by two columns (x and y).



- 5) Calculate and Draw: By clicking the button “Calculate and Draw,” the storage of each specified point will be shown immediately in the following textbox. In addition, a 2D grid view of puddle distributions with the specified points will be shown. By changing the puddle elevation level, users can visualize the distribution of puddles at the corresponding level.

