

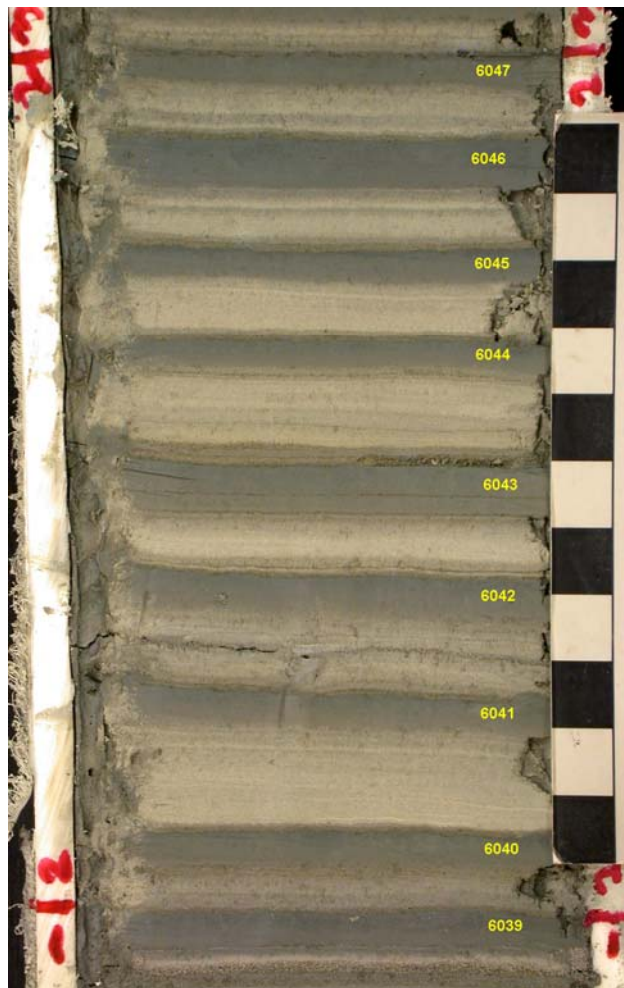
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Analysis Software for Images of Glacial Lake Sediment Cores

This project is the design of a stand-alone program that performs repeated, in-sequence, thickness measurements on overlapping JPG images collected along the axis of a core of glacial lake sediment. A program of this type is used in the Geology Dept. to construct records of annual variation in sediment thickness that serves as a chronologic and correlation tool as well as a proxy variable for climate.

Currently we use a program first written back in 1996 by a Geology undergraduate as a script file for UTHSCSA ImageTool 2.0. Shuai Yuan, an MS graduate student in ECE, revised the script for operation with Windows XP and an updated version of UTHSCSA ImageTool (3.0 available at <http://ddsdx.uthscsa.edu/dig/itdesc.html>).

Shuai did an excellent job of getting us up and running but the existing program has certain limitations. This program accepts digital images (BMP or JPG) that are sequential along the length of a core (bottom to top) and have a low resolution given their size of 800 X 600 pixels (a reduced high resolution example is shown to the right). This low pixel size is something controlled by the way Image Tool displays images. Image Tool will not reduce images to fit on a screen. The program makes measurements by recording marker lines on the images (posted with mouse clicks) and collecting data in a table corresponding to the vertical distances between horizontal lines identified as various types. The program will allow measurements to be corrected and creates a revised image set (BMP) showing the positions of all measurements and annotations placed on the images. Unfortunately the combination of the script and ImageTool 3.0 does not work with high resolution JPG images that would give better resolution to our measurements. Measurements come out misplaced on high resolution images because the program will not display the images in such a way that the slide bars on the image margins will work without registering false data. The program seems to have trouble indexing the images. An early version of the program has also behaved differently on different computers. These problems seem to be related to ImageTool.



We are dodging a bullet every time a new version of ImageTool or Windows comes out or we use a different computer. This is why it seems like an appropriate time to construct a stand alone program that would be universal. With the consent of Prof. Stafford the new program can be constructed in any language that seems appropriate and can be revised at a later date. I would be more than happy to show you how the current program operates and I also have some ideas as to

how the program might be improved or made more general, allowing it to have application beyond my specific needs. A measurement program of this type would likely be useful to any one studying sequences that require repeated distance measurements. In Geology this includes making repeated measurements of the thickness of stacked annual and non-annual sediment layers in images of cores or field exposures and in tree ring analysis. There are probably many other applications outside of geology as well.

To see how the current program operates or to find out more about the research that uses the measurement program you can find information at the following links:

<http://ase.tufts.edu/geology/varves/Lab/computer.asp>

<http://ase.tufts.edu/geology/varves/Data/varveprograms.asp>

<http://ase.tufts.edu/geology/varves/default.asp>