COMPUTERIZED VARVE MEASUREMENT

Measuring a varve record from a core involves measuring the thicknesses of summer and winter layers in successive couplets from bottom to top in the core. If this is done using a computer, a computer program must be able to load successive images of the varve core and allow the marking of boundaries that separate summer and winter layers. Simultaneously, the computer program must keep track of thicknesses in a spreadsheet and also allow for the posting of comments about individual varves as well as mark the beginning varve of each successive image with an image number. The advantage to doing this is that it creates an image and numerical record of varve measurements that can serve as an invaluable archive and source of information for further study. Below is an example of an analyzed image and data table produced by our program. Note that the data file lists varves from the bottom of the core at the top of the page and progresses down the page with each line representing successively younger varve measurements.

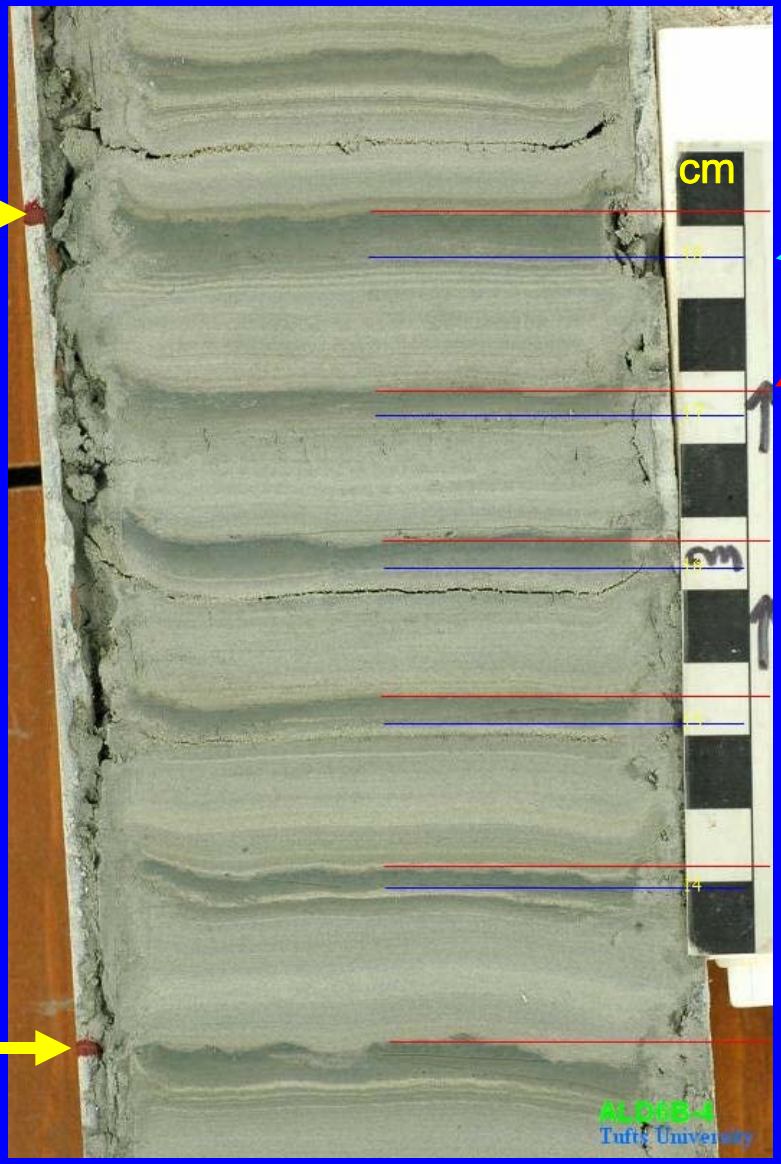
At Tufts University, varve measurement is performed with a script program written for **UTHSCSA Image Tool 3.0**. Image Tool is a free image processing and analysis program developed for medical applications in the Department of Dental Diagnostic Science at The University of Texas Health Science Center, San Antonio, Texas (Wilcox and others, 2002). The script program, **Varve300.itm**, takes advantage of utilities built into Image Tool. Varve300 loads Jpeg or Bitmap images and allows the operator to successively measure the varves on each image, while assembling a data table.

The program shown in this section is included in the supplemental materials. Unfortunately we do not have Mac versions of the programs at this time.

COMPUTERIZED VARVE MEASUREMENT: Creating an Archive

UTHSCSA Image Tool 3.0 + Varve300.itm

Processed Image



Red marks on left core liner (yellow arrows) = image range to be measured on this image.

(blue line) top of summer / bottom of winter

(red line) bottom of summer / top of winter

Data file

Core Yr	Thicknesses: Summer	Winter	Total	Run Total	Number Comment
9	2.038	0.277	2.315	18.478	0
10	2.790	0.237	3.027	21.505	0
11	2.710	0.435	3.146	24.651	0
12	2.291	0.336	2.627	27.278	3
13	3.259	0.711	3.969	31.247	0
14	2.271	0.276	2.548	33.795	bot 0
15	1.896	0.533	2.429	36.224	0
16	2.113	0.296	2.409	38.633	4
17	1.955	0.375	2.330	40.963	0
18	1.758	0.375	2.133	43.096	0
19	1.718	0.336	2.054	45.150	0
20	1.837	0.632	2.469	47.619	0
21	1.771	0.433	2.204	49.823	5
22	2.283	0.295	2.578	52.400	top 0
23	1.200	0.216	1.417	53.817	0
24	3.247	0.236	3.483	57.300	0
25	2.066	0.275	2.342	59.642	0
26	1.650	0.196	1.846	61.488	6

Core ALD6B, image 4 (ALD6B-4) from Aldrich Brook core site in Westmoreland, NH

REFERENCES

Wilcox, C.D., Dove, S.B., McDavid, W.D., and Greer, D.B., 2002, UTHSCSA Image Tool Version 3.0: Freeware software available from the Department of Dental Diagnostic Science at the University of Texas Health Science Center at San Antonio: http://compdent.uthscsa.edu/dig/itdesc.html or search for “Image Tool 3.0”