**WheelerLab Documentation**

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1. WheelerLab is written in MATLAB as a graphical user interface program.
2. Watch the demonstration video “WheelerLab\_demonstration.avi” in the “WheelerLab\_supplementary” folder.
3. Run the “WheelerLab.m” file or install “WheelerLab.mlappinstall” by double clicking on it (Make sure that Matlab is installed first).
4. The program operates in two modes: The “Layer” mode and the “Surface” mode. The “Layer” button (third from the left) switches WheelerLab between the two modes when clicked. In the “Layer” mode, WheelerLab can be used to draw layers or shapes around sequence tracts. In the “Surface” mode, WheelerLab is used to draw surfaces or lines for interpretational purposes.
5. The ‘Load Data” button is used to input and display seismic sections or seismic images in the top axes. When clicked it opens up a dialog box, which allows the user to select a data file in the SEG-Y file format or an image file. The SEGY file format is a standard data format of the Society of Exploration Geophysicists for storing seismic data. When the “W” check box is selected (W stands for wiggle), the program displays the seismic data with an overlay wiggle plot.
6. The program is best controlled with a three-button mouse.
7. Depending on the mode of the program (layer or surface) the “Add” button is used to interpret a layer (Sequence tract) or a surface. If no data is added when the “Add “ button is clicked, a dialog box is displayed, which allows the user to set the horizontal and vertical axis limits for a synthetic sequence stratigraphic section.
8. To draw a layer or surface the user clicks the left mouse button to select points in a sequential order around the sequence tract. The user may delete a point by clicking the middle mouse button. To finish adding the layer or surface the user clicks the right mouse button and the program then draws a line through the points. If in “Layer” mode the line forms a closed shape. A dialog box is then displayed that allows the user to select from a list of common sequence stratigraphic classifications or create a new classification.
9. The “Delete” button is used to delete one layer or one surface at a time, depending on the mode currently selected. To delete a layer, the user clicks the “Delete” button and then clicks within the layer to be removed. To delete a surface the user clicks on the “Delete” button then clicks on or near the surface to be removed.
10. Once all sequence tracts and surfaces have been identified the user clicks on the done button. The layers will be displayed with distinct colors and an image containing movable lines matching the colors of the layers. The user may then rearrange the lines in the correct chronostratigraphic order with the youngest layer at the top and the oldest layer at the bottom. Once the rearrangement is complete the user clicks the “Done” button again.
11. To display the Wheeler diagram, the user clicks the “Display Wheeler” button and the Wheeler diagram is displayed in the lower axes. If the “U” checkbox it selected, the program displays sequence tracts that have same classification using the same color.
12. When the “Save Figures” button is clicked the program generates nine output files, appending the current date and time stamp to the names in a folder titled “WheelerLab\_Output” that is created in the current MATLAB folder. The interpreted sequence stratigraphic section and the chronostratigraphic section are saved in Portable Network Graphics (PNG) and MATLAB FIG formats while the dynamic chronostratigraphic section is saved in Graphics Interchange Format (GIF) and Audio Video Interleve (AVI) formats. Lastly a color map key and numerical coordinates of layers and surfaces are generated and saved
13. Dependency: SegyMat Toolbox (Thomas Mejer Hansen, 2001)- distributed under the terms of the *[GNU Lesser General Public License](http://www.gnu.org/copyleft/lesser.html" \t "_top)*
14. To extract 2D Sections using SegyMat (Inline 400) from a 3D seismic volume (Seismic\_data.segy) and save it as s new file (NewSample.segy)
15. *addpath path\_to\_segymat/SegyMat*
16. *[Data,SegyTraceHeaders,SegyHeader]=ReadSegy('Seismic\_data.segy','jump',1,'minmax','Inline3D',400,400);*
17. *imagesc([SegyTraceHeaders.cdp],SegyHeader.time,Data);*
18. *WriteSegy('NewSample.segy',Data,'dt',.004);*

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