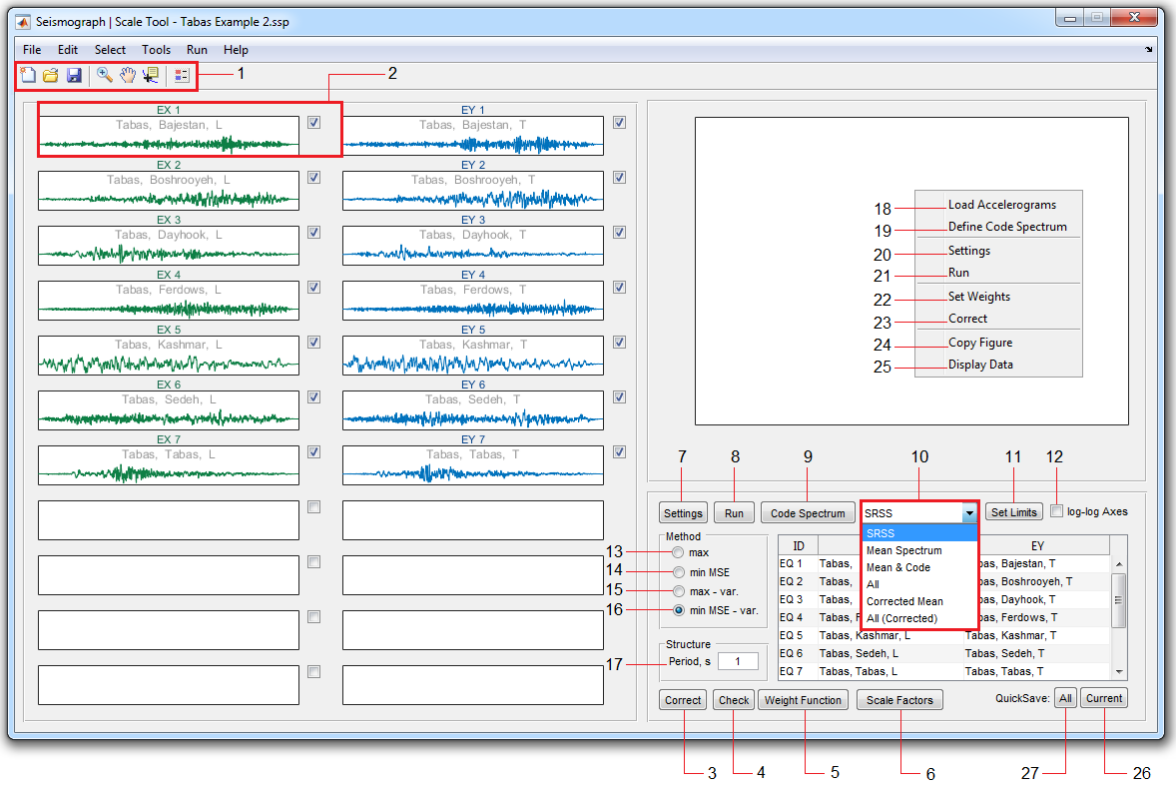
SEISMOGRAPH

Quick Start Guide (A)

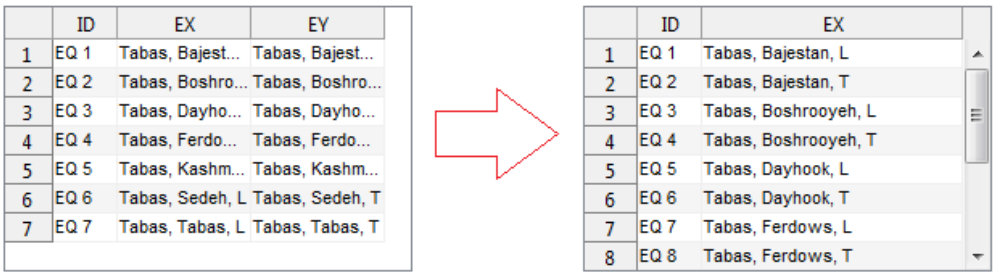
SCALE Tool (v6.2)

Table of Contents

1. Main Window



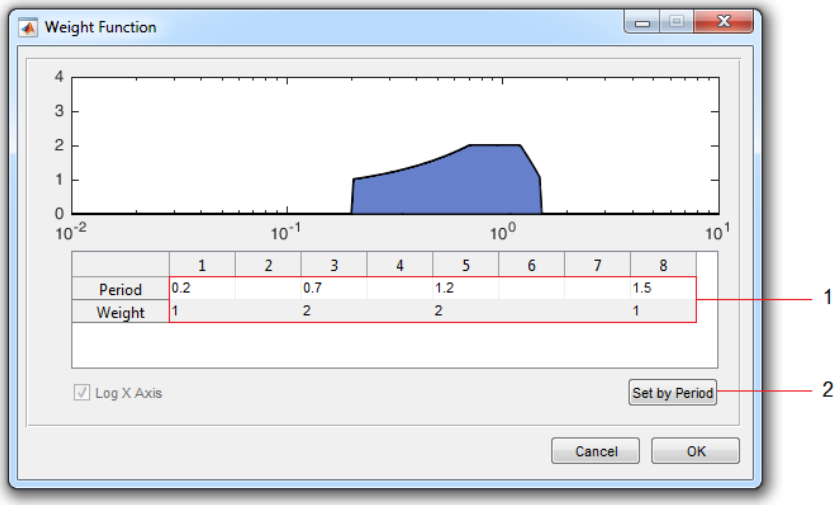
1. Main Toolbar, including the following tools:
    - **New**: to create a new project
    - **Load**: to load a project from file (*.ssp)
    - **Save**: to save current project as a new file (*.ssp)
    - **Zoom tool**
    - **Pan tool**
    - **Datacursormode** (enables selecting a point on the plot and opens a data tip displaying its coordinates)
    - **2D/3D Switch**. In **3D** (default) mode, records are considered as 11 pairs of ground motions and the scale factors are assigned to each pair. In **2D** mode, 22 records are considered independently.



	ID	EX	EY
1	EQ 1	Tabas, Bajest...	Tabas, Bajest...
2	EQ 2	Tabas, Boshro...	Tabas, Boshro...
3	EQ 3	Tabas, Dayho...	Tabas, Dayho...
4	EQ 4	Tabas, Ferdo...	Tabas, Ferdo...
5	EQ 5	Tabas, Kashm...	Tabas, Kashm...
6	EQ 6	Tabas, Sedeh, L	Tabas, Sedeh, T
7	EQ 7	Tabas, Tabas, L	Tabas, Tabas, T

	ID	EX
1	EQ 1	Tabas, Bajestan, L
2	EQ 2	Tabas, Bajestan, T
3	EQ 3	Tabas, Boshrooyeh, L
4	EQ 4	Tabas, Boshrooyeh, T
5	EQ 5	Tabas, Dayhook, L
6	EQ 6	Tabas, Dayhook, T
7	EQ 7	Tabas, Ferdows, L
8	EQ 8	Tabas, Ferdows, T

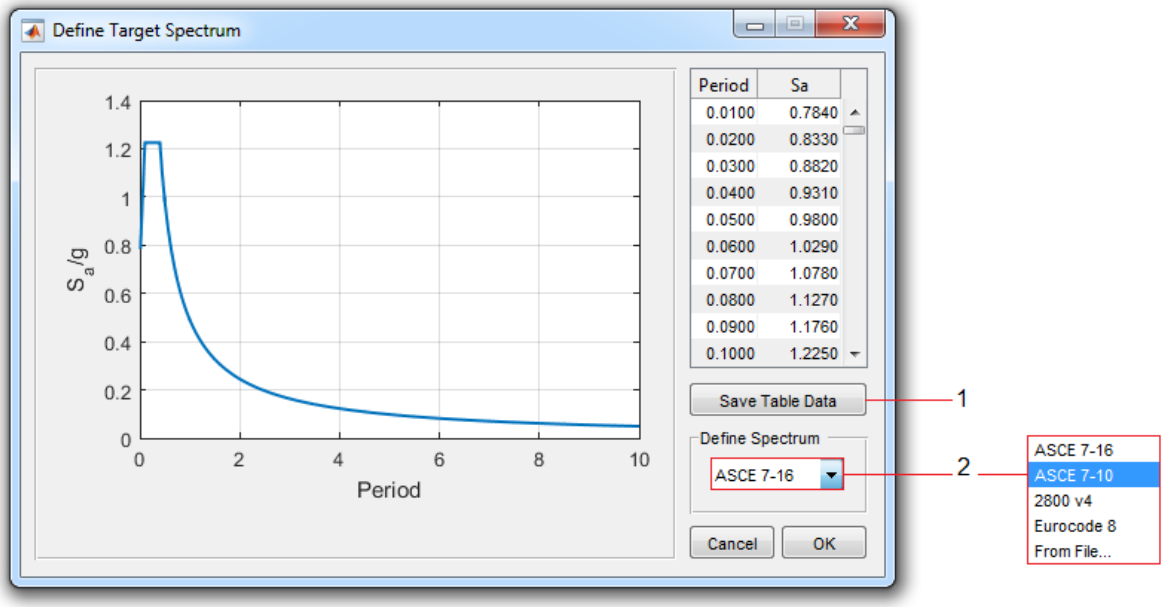
2. Input Record panel. To load acceleration time-history from a file into each panel, simply enable its checkbox. Use the first checkbox to load all records simultaneously. To delete any record, just uncheck the corresponding checkbox. (**Note**: You may need to recalculate the response spectrums after adding new records)
3. Use this button to calculate scale factors using the selected method (from options **13** to **16**). After performing the correction, both original and corrected spectrums data are copied into the clipboard. (**Auto Copy** feature)
4. Use this button to recalculate the mean spectrum using the calculated scale factors. The result is displayed in a new figure.
5. Use this button to define the weight function, required for the Min MSE method:



1. Enter the period value and its weight in the table.
2. Use this button to set a uniform weight throughout the entire scaling period range. (Default: 0.2T to 1.5T)

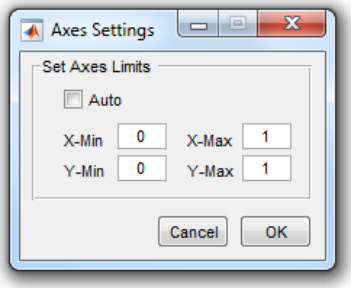
6. Use this button to display the calculated scale factors. Data are displayed in a table and will be automatically copied into the clipboard. (**Auto Copy** feature)

7. Access to the program's main settings.
8. Calculate the response spectrums.
9. Use this button to define Target Spectrum (ASCE, Eurocode, 2800 and User).



1. Use this button to save table data into a *.txt file.
2. Use this menu to select the available code spectrums.

10. Depending on the selected option, the SRSS, RotD or GeoMean spectrums (3D Mode), or the individual spectrum (2D mode), uncorrected mean spectrum, Code spectrum, and the corrected mean spectrum can be displayed.
11. Specify the limits for the current axes.



12. Enable this checkbox to use a logarithmic scale for the current axes.
13. Direct Method (using one scale factor). By preserving the shape of the mean spectrum, shifts it so that it doesn't fall below the Code spectrum within the scaling period range (default: 0.2T to 1.5T).

14. Min MSE Method (using one scale factor). By preserving the shape of the mean spectrum, shifts it to minimize the MSE value. (You should have defined the weight function)
15. Direct Method (using different scale factors): Similar to Option **13** except that the shape of the mean spectrum will change.
16. Min MSE Method (using different scale factor): Similar to Option **14** except that the shape of the spectrum will change. (You should have defined the weight function)
17. Enter the fundamental period of the structure to determine the scaling period range. (default: 0.2T to 1.5T)

Note: If the Min MSE method is used, you will need to modify the weight function once the period of the structure (or default scaling period range) is changed.

+ Right-Click Menu

18. To load all records simultaneously. (Same function as the first checkbox.)
19. To define Target Spectrum.
20. To access to the program's main settings.
21. To calculate the response spectrums.
22. To define the weight function.
23. To apply the correction and calculate scale factors.
24. To copy current axes into a new figure.
25. To display numerical XY data for the available plot.
    - **Note:** all data displayed in the table will be automatically copied into the clipboard. (**Auto Copy** feature)

26. Use this button to save current plot to *.PNG format
27. Using this option all available plots are saved to *.PNG format, including All SRSS/Individual spectrums along with:
    1. Mean Spectrum
    2. Mean vs. Code
    3. All
    4. All (Corrected)
    5. Mean (Corrected)

2. Menu Bar

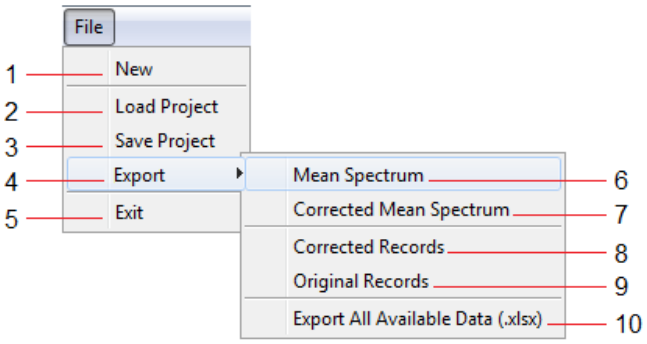
File

1. Create a new project
2. Load a project file (*.ssp)
3. Save current project as a new file (*.ssp)
4. Export outputs
5. Exit the program

Export

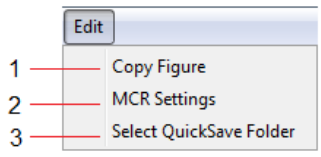
6. Mean Spectrum (*.txt)
7. Corrected Mean Spectrum (*.txt)
8. Corrected Records (*.txt / *.sed)
9. Original Records (*.txt / *.sed)
10. Export all available data to Excel, including:

    - Uncorrected acceleration time histories + scale factors
    - Code spectrum
    - Original and corrected mean spectrums
    - Original response spectrum for all records



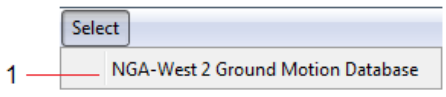
Edit

1. Copy current axes to a new figure
2. Access to MATLAB Runtime settings
3. Set the folder in which the QuickSave images are saved



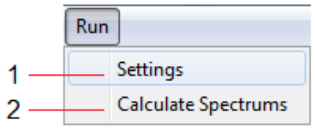
Select

1. Access to the Accelerogram Selection module

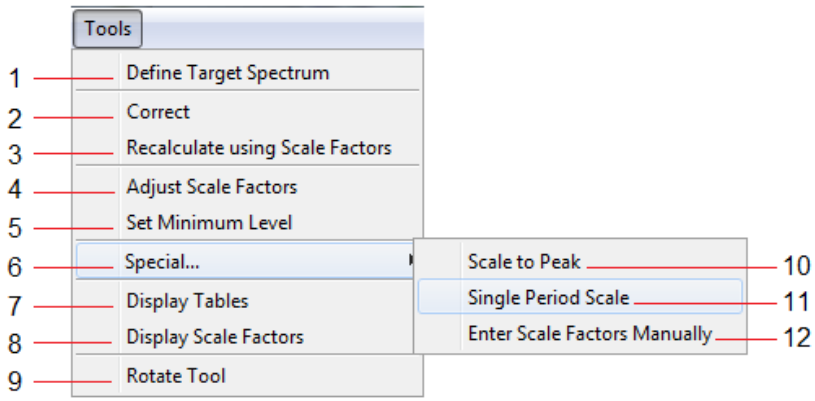


Run

1. Access to the program's main settings
2. Calculate response spectrums for all records



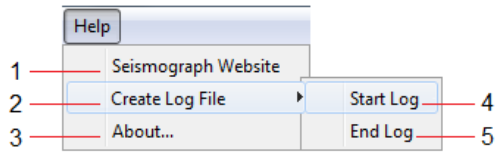
Tools



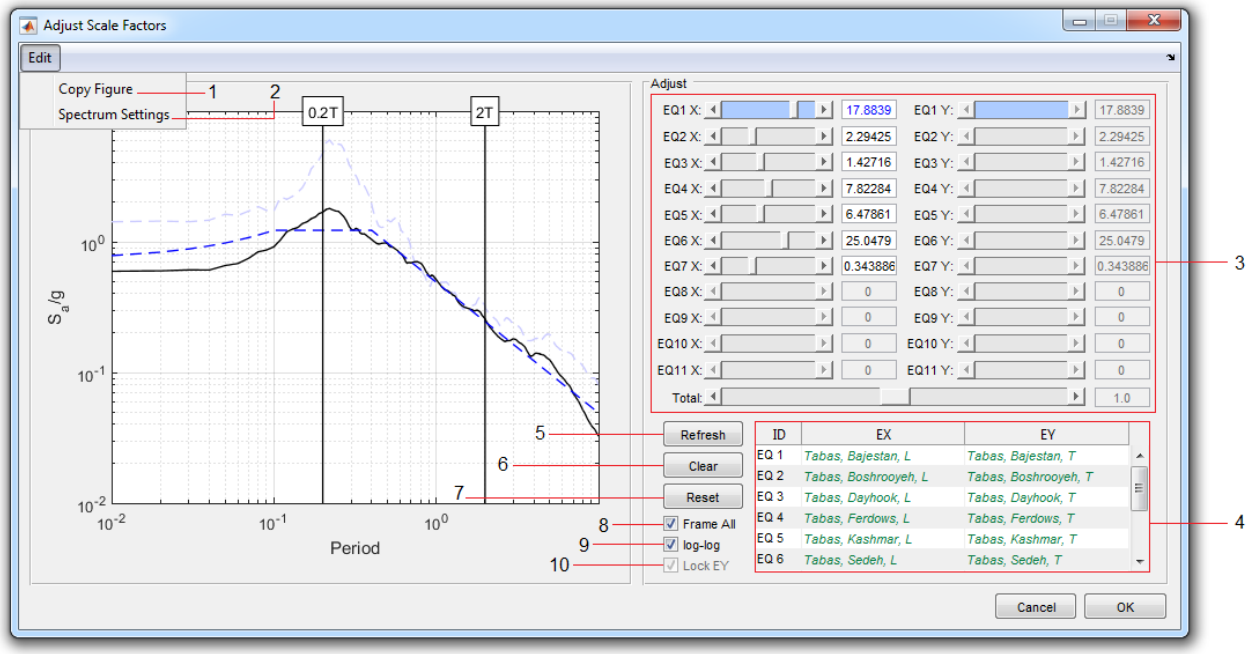
1. Define the target spectrum
2. Apply the Correction (using the selected method)
3. Recalculate the mean spectrum using the computed scale factors
4. Manually adjust scale factors using the **Adjust Tool**
5. Correct the minimum level of the mean spectrum
6. Access to special scaling options...
7. Display all calculated data in table format
8. Display calculated scale factors
9. Access to the Accelerogram Rotation module

Special…

10. Scale to specific PGA/PGV value
11. Scale accelerograms to match target spectrum at the period of interest
12. Scale accelerograms to predefined Scale Factors

Help	
1. Visit the product page on the SEISMOGRAPH website 2. Create a Log file for bug report 3. View description of the current version of the software	
Create Log file	
4. Start writing the Log file 5. Stop writing the Log file (it is saved the in the software's installation folder.	

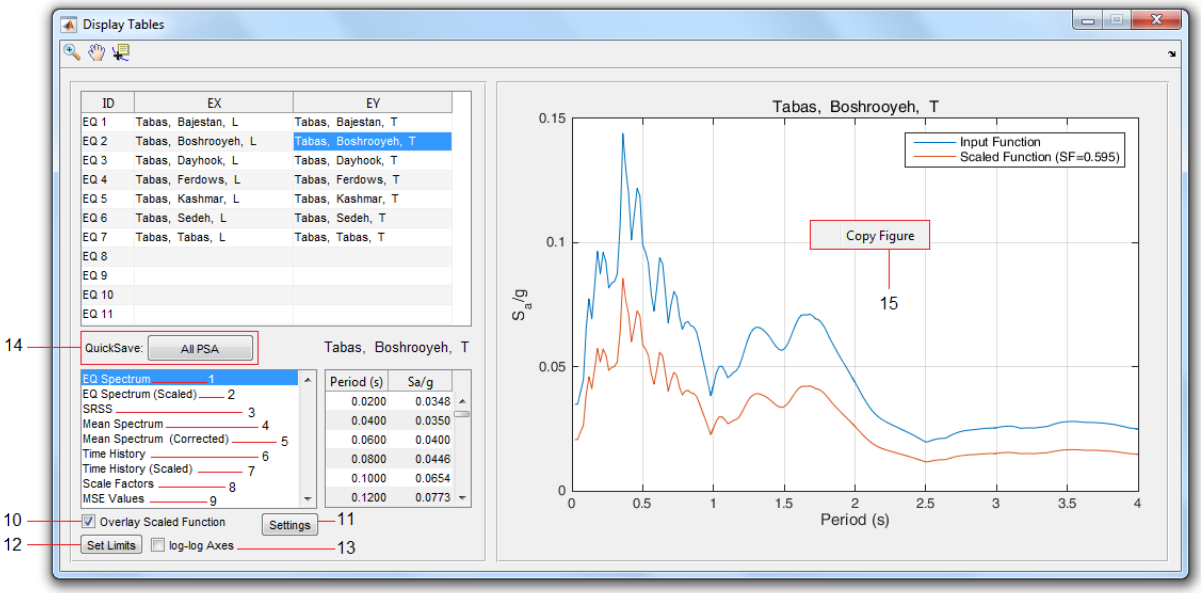
3. Adjust Tool



1. Copy current axes to a new figure.
2. Access to the spectrum calculation settings. (disabled)
3. Use these sliders to change the scale factor for each record. You can also enter the scale factor directly into the textbox. Use the Total slider to change all scale factors simultaneously.
4. Select each record from this table to display its response spectrum (in gray dashed line). Also the corresponding slider and the scale factor (in option **3**) will be highlighted with a distinct color.
5. Use this button to refresh the plot.
6. Use this button to clear current selection.
7. Reset all scale factors to initial values.
8. Enable this checkbox to use logarithmic scale for the y-axis.
9. Use this checkbox to change the limits of the period axis from the scaling period range (default: 0.2T - 1.5T) to full range.
10. To lock the scale factors for Y component of each pair of ground motion. (disabled)

Note: It is not allowed to assign different scale factors to the Ex and Ey components of the ground motion in 3D Mode.

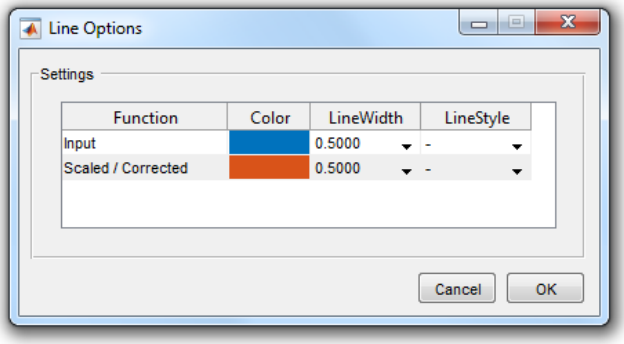
4. Tables



1. Display the response spectrum for the selected record from the table (if checkbox **10** is enabled, scaled response spectrum and the scale factor are also displayed)
2. Display the corrected response spectrum for the selected record.
3. Display the Spectral Ordinate. (SRSS, GeoMean or RotD) for each pairs (in 3D mode)
4. Display the mean spectrum. (and the corrected mean spectrum, if checkbox **10** is enabled)
5. Display the corrected mean spectrum.
6. Display the time history of selected record. (if checkbox **10** is enabled, scaled time history and the scale factor are also displayed)
7. Display the corrected time history for the selected record.
8. Display scale factors.
9. Display MSE values (for Min MSE method only)
10. Use this checkbox to add the scaled response spectrum (or scaled time history or corrected mean spectrum) to the current uncorrected plot.

Note: all data displayed in the table will be automatically copied into the clipboard. (**Auto Copy** feature)

11. Use this option to set the color, line style (solid, dash, dot, dash-dot) and line width (0.5, 1, 1.5, 2) for the input and output (scaled / corrected) plots.

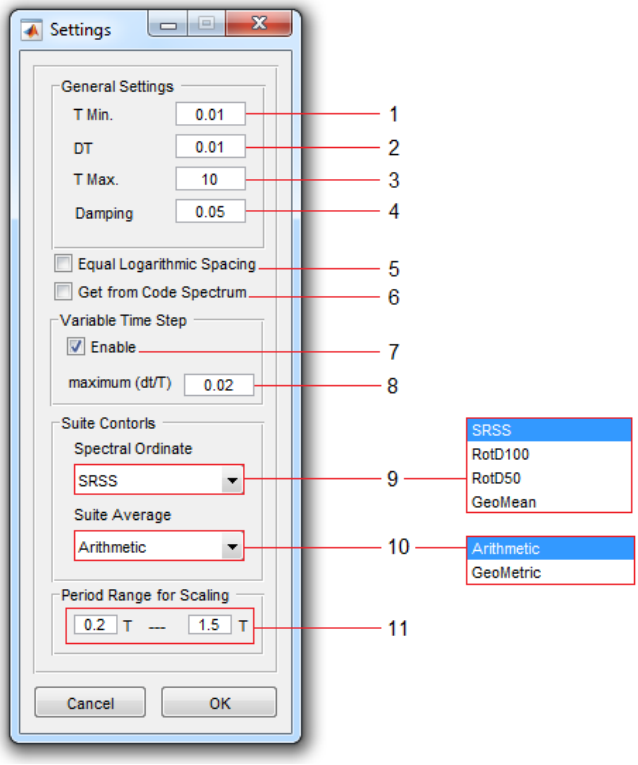


12. Specify a fixed limit for the plots in the current axes. You can also select “auto” option to determine limits for each plot automatically.
13. Enable this checkbox to use a logarithmic scale for the current axes.
14. This option allows to automatically save the selected plot (PSA, SRSS, Time History) for all accelerograms.

+ Right-Click Menu

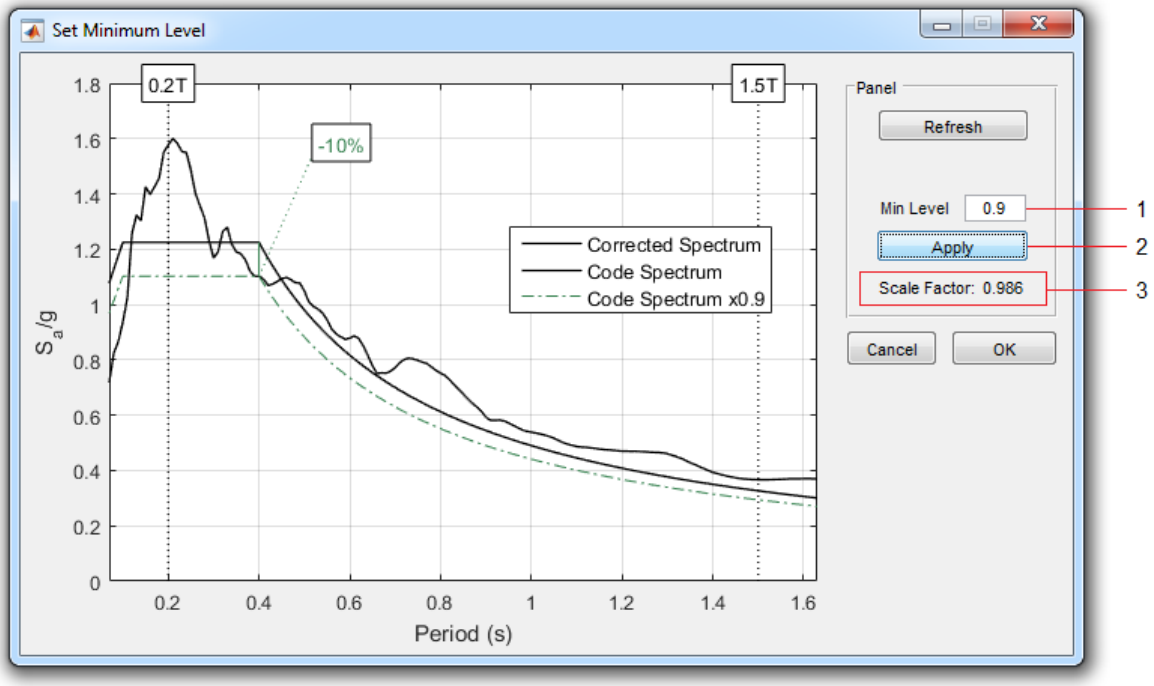
15. To copy current axes into a new figure.

5. Settings



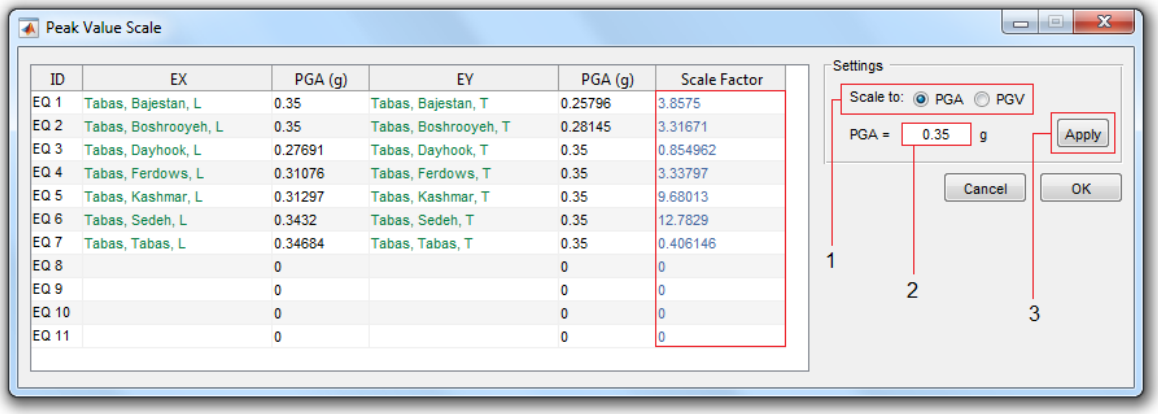
1. Minimum Period.
2. Period increment / or number of points at which the response spectrum values are calculated.
3. Maximum Period.
4. Damping ratio.
5. Enable this checkbox to use equal logarithmic spacing to determine the periods at which the response spectrum values are calculated. If enabled, textbox **2** turns into the number of points (Np).
6. Enable this checkbox to use the code spectrum's periods to calculate the response spectrums.
7. Enable the use of variable time step. Can be used to calculate the spectral values more accurately in the near-zero periods. (more time required)
8. Maximum value for the ratio of record Time Step to Period. (dt/T)
9. Select the spectral ordinates from this menu. (SRSS/RotD100/RotD50/GeoMean)
10. Select the averaging method. (Arithmetic/Geometric)
11. Define the period range for scaling ground motions.

6. Set Minimum Level

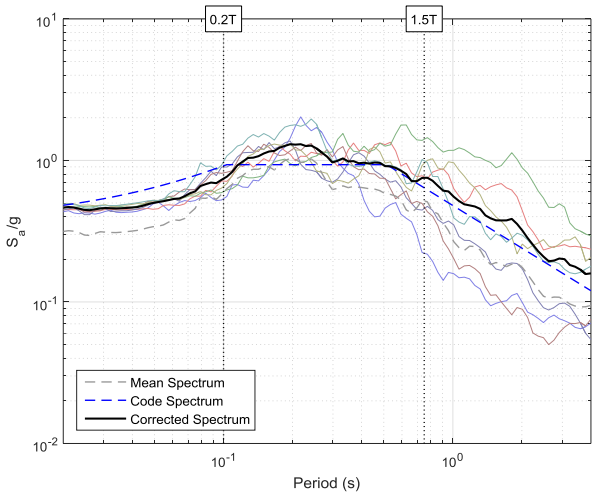


1. Specify the minimum value for the ratio of the corrected spectrum to the target spectrum. (e.g. 0.9)
2. Use this button to apply the Specified minimum value.
3. The calculated scale factor is displayed in this section. (It is applied to all records to correct the minimum value.)

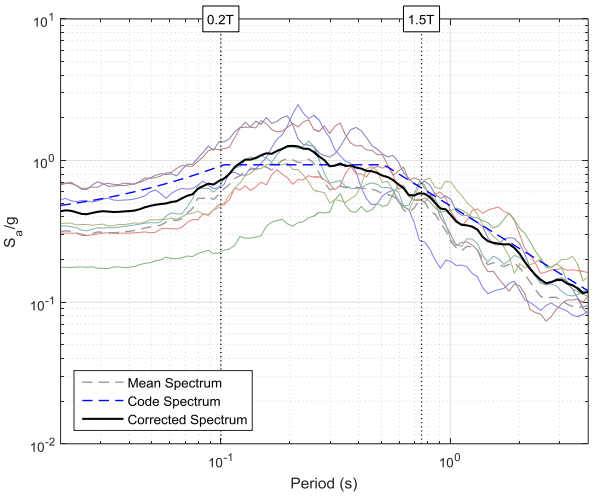
7. Scale to Peak Values (PGA/PGV)



1. Choose the preferred peak parameter for which the scaling is performed.
2. Specify the target value for the PGA (or PGV).
3. Use this button to apply the Specified peak value. Calculated scale factors are displayed in the table.

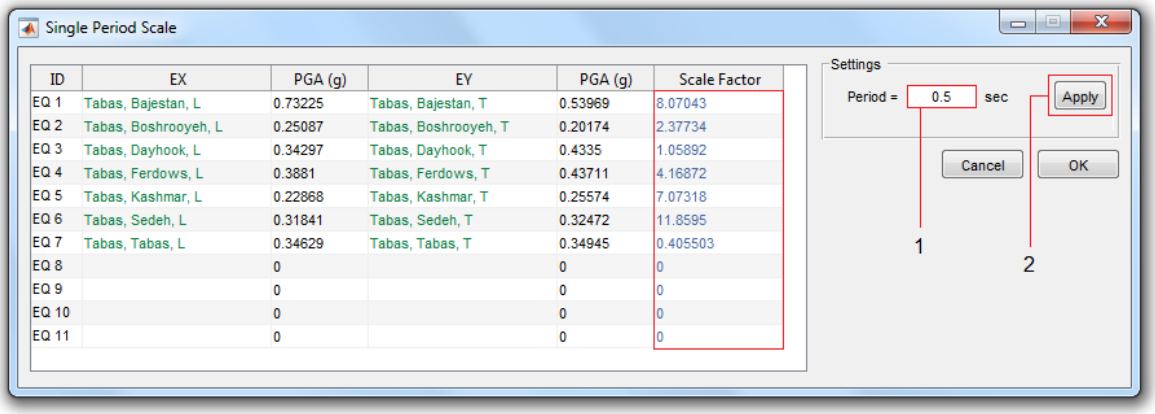


Scale to PGA=0.35 g



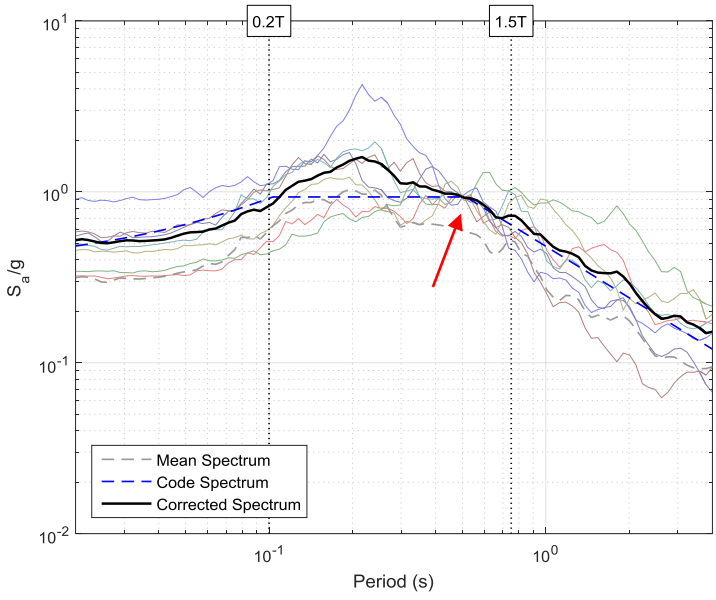
Scale to PGV=35 cm/s

8. Scale to Single Period



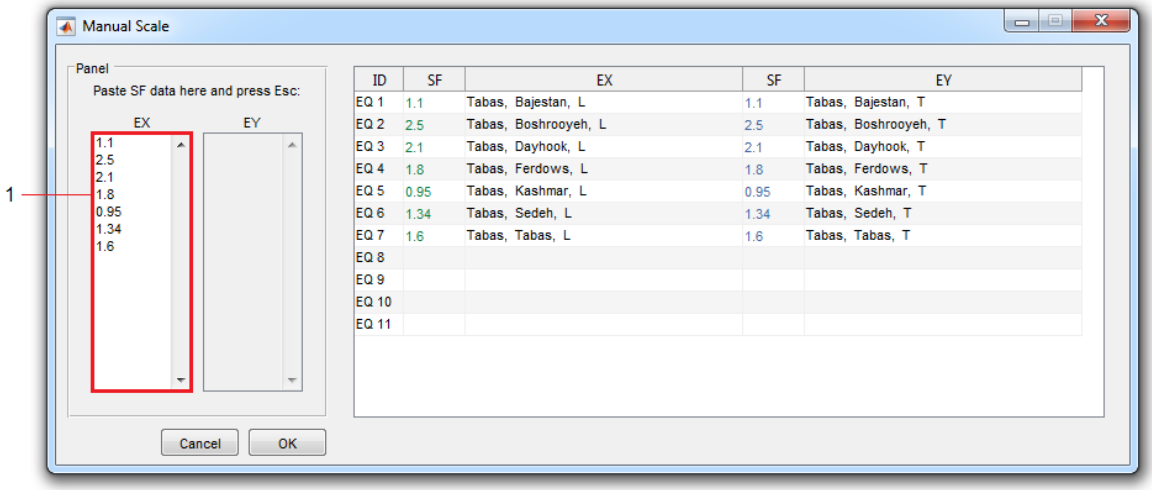
ID	EX	PGA (g)	EY	PGA (g)	Scale Factor
EQ 1	Tabas, Bajestan, L	0.73225	Tabas, Bajestan, T	0.53969	8.07043
EQ 2	Tabas, Boshrooyeh, L	0.25087	Tabas, Boshrooyeh, T	0.20174	2.37734
EQ 3	Tabas, Dayhook, L	0.34297	Tabas, Dayhook, T	0.4335	1.05892
EQ 4	Tabas, Ferdows, L	0.3881	Tabas, Ferdows, T	0.43711	4.16872
EQ 5	Tabas, Kashmar, L	0.22868	Tabas, Kashmar, T	0.25574	7.07318
EQ 6	Tabas, Sedeh, L	0.31841	Tabas, Sedeh, T	0.32472	11.8595
EQ 7	Tabas, Tabas, L	0.34629	Tabas, Tabas, T	0.34945	0.405503
EQ 8		0		0	0
EQ 9		0		0	0
EQ 10		0		0	0
EQ 11		0		0	0

1. Specify the target period.
2. Use this button to calculate scale factors.



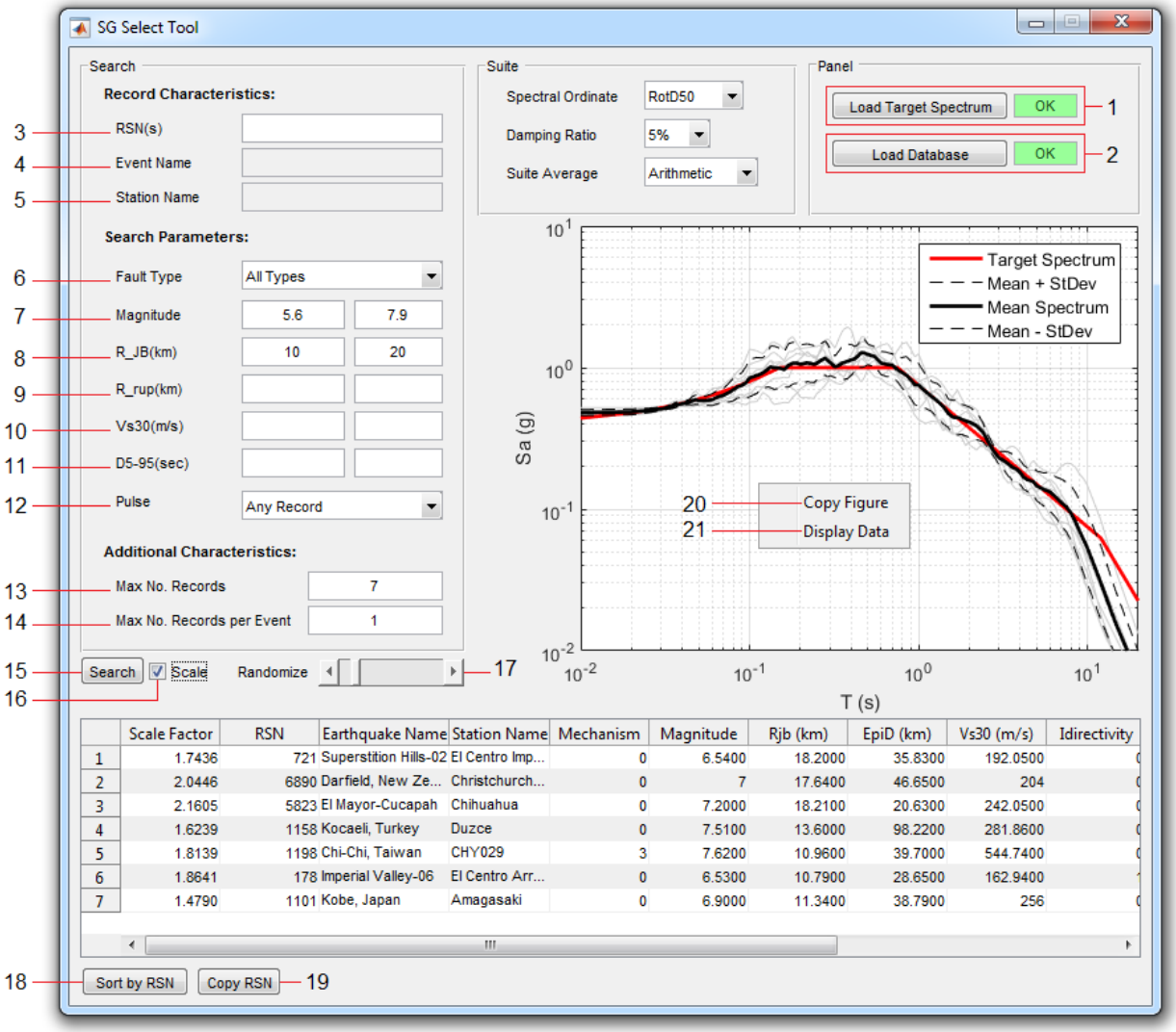
Scale to match target spectrum at T=0.5 s

9. Manual Scale



1. You can manually enter the scale factors in this listbox (or paste data from the clipboard using Ctrl + V). Press Esc to apply the changes.

10. Accelerogram Selection Tool



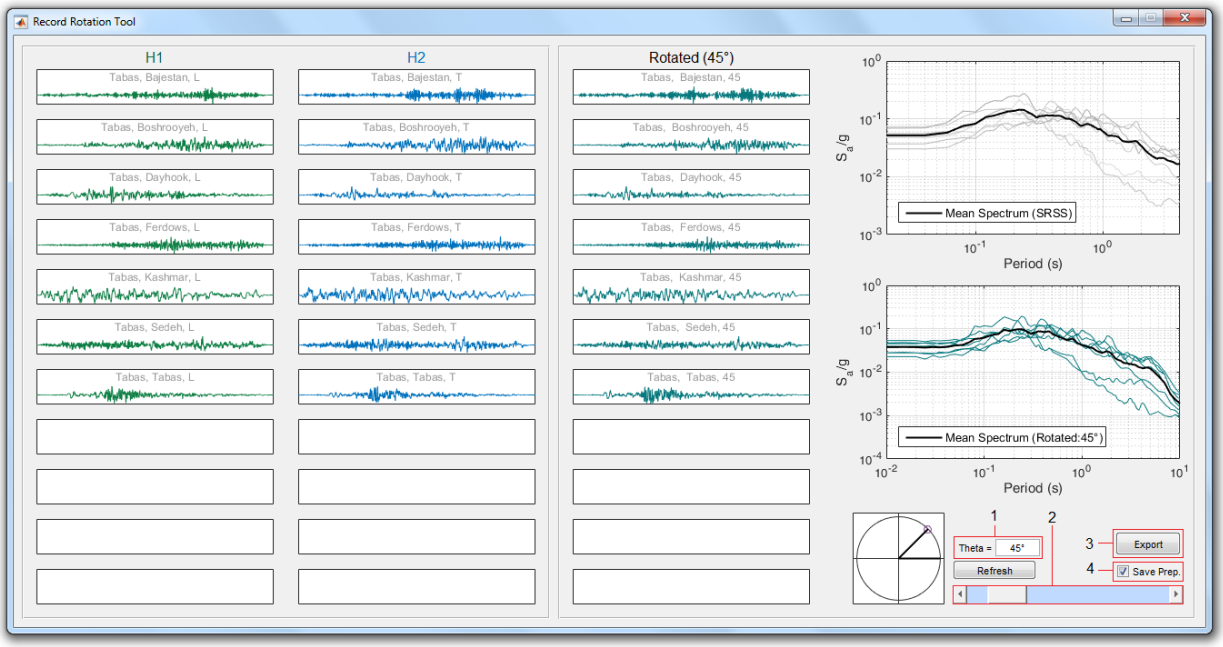
1. Load target spectrum. (By default it is taken from the code spectrum defined in the main window)
2. Before starting the search operation, you need to load the database.
3. Enter the RSN of desired records
4. Not Applicable.
5. Not Applicable.
6. Choose the type of faulting.
7. Set the magnitude range
8. Set the desired range for Joiner-Boor Distance
9. Set the desired range for Rupture Distance

10. Limit the range of Vs30
11. Not Applicable.
12. Restrict the pulse characteristics of the searched record. Available options are:
    - Any record
    - Only pulse-like records
    - No pulse-like records
13. Set the number of accelerograms wanted in the final set.
14. Restrict the maximum number of records per event in the final selection.
15. Press this button to find the records.
16. If enabled, scale factors are determined automatically to find best match.
17. Use this slider to randomize the final selection.
18. Once the search is finished, you must use this option to sort the records by the RSN Number. Then you are ready to copy the list of selected accelerograms (using button **19**) and paste it into the PEER website in order to download the accelerograms.

Disclaimer: We do not offer any accelerograms for download. Selection Tool just provides a user-friendly offline interface to help user to **find** scaled accelerograms matching to a target spectrum.

20. To copy current axes into a new figure.
21. To display numerical XY data for the available plot.
    a. **Note:** all data displayed in the table will be automatically copied into the clipboard. (**Auto Copy** feature)

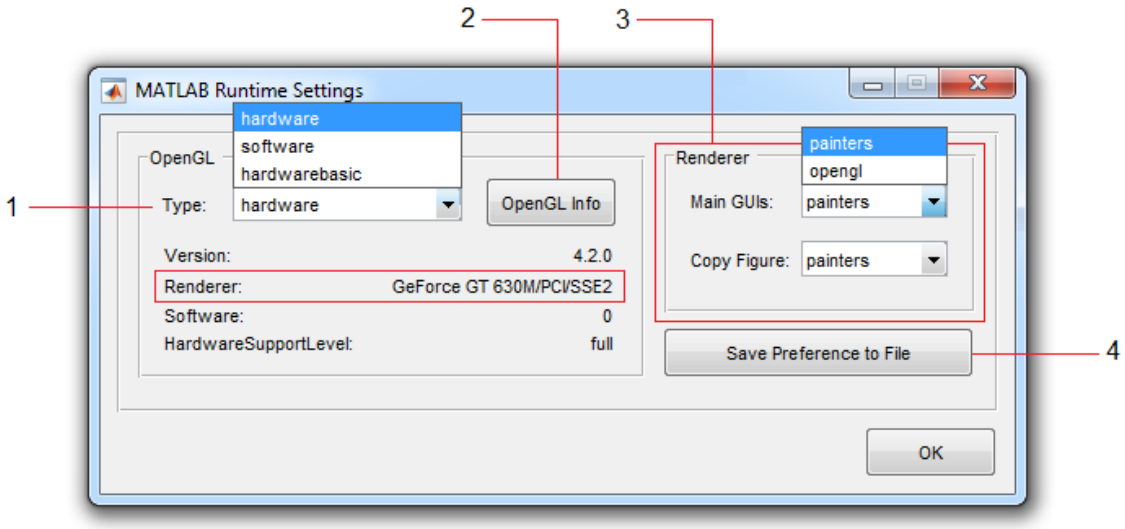
11. Accelerogram Rotation Tool



1. You can directly enter the rotation angle in this textbox.
2. Use the slider to change the rotation angle.
3. Use this option to export the rotated accelerogram to *.txt / *.sed format.
4. Enable this checkbox to save the perpendicular components.

Note: To speed up the visualization, input accelerograms are down-sampled to dt=0.02s. (This will not affect the exported accelerograms)

12. MCR Settings



1. Select OpenGL Type. By default, ***hardware*** is used. If the graphics card driver is not updated there will be some graphic issues. In this case, switch to ***software*** OpenGL for the current session.
2. Display information about the OpenGL® implementation currently in use by the software, such as the version, renderer, and other features. If you don't see your graphics card in the renderer field, you will need to change the preferred graphics processor for the software. (See: MCR Settings for more information)
3. Select Default renderer for: Main software's GUIs as well as the Copied Figures.
4. Save current settings to an output file (which will be used next time when the software launches)

Note: if there is graphics card driver issue, you can lunch program with the ***software*** version of OpenGL. You just need to download the preferences file (pref.xml) from the website and place it into the installation folder.

SEISMOGRAPH

earthquake engineering software