Stress Inversion user guide

This application evaluates stress axis orientation (σ1, σ2, σ3 axis orientation as well as P and T axes orientation) and relative stress magnitude (R value) by inverting earthquake focal mechanisms. Stress state can be defined for a point (0D case), profile or time change (1D case), map (2D). The framework of calculating the deviatoric stress tensor together with its uncertainties using bootstrap resampling method is also provided along with a variety of plots.
See also *MSATSI* documentation.

open in IS-EPOS PLATFORM

REFERENCES Document Repository

CATEGORY Visualizations

KEYWORDS Source mechanism, Moment tensor, Stress inversion

CITATION Please acknowledge use of this application in your work: IS-EPOS. (2018). *Stress inversion* [Web application]. Retrieved from https://tcs.ah-epos.eu/

Step by Step

After selecting a catalog in the User's workspace, click on 'ACTIONS', then 'USE IN APPLICATION' and then 'Stress Inversion' as highlighted in Figure 1.

An alternative approach to perform stress inversion, by computing and adding in the workspace the parameters one by one is appended at the end of the chapter.

For a comprehensive scientific description of the process and the parameters definition and constraints please visit http://www.induced.pl/msatsi)

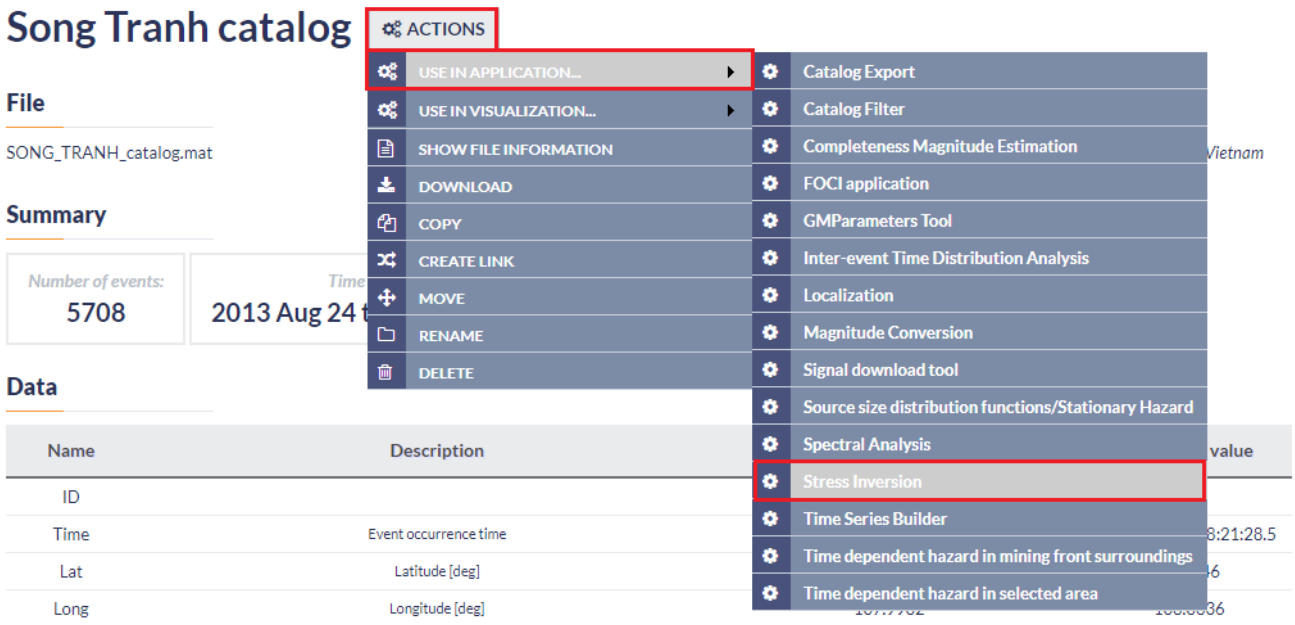

Figure 1. Selection of the application from the data uploaded in the workspace

The following screen now appears (Figure 2) and the following fields, corresponding to parameter values and options, are requested to be fulfilled by the user:

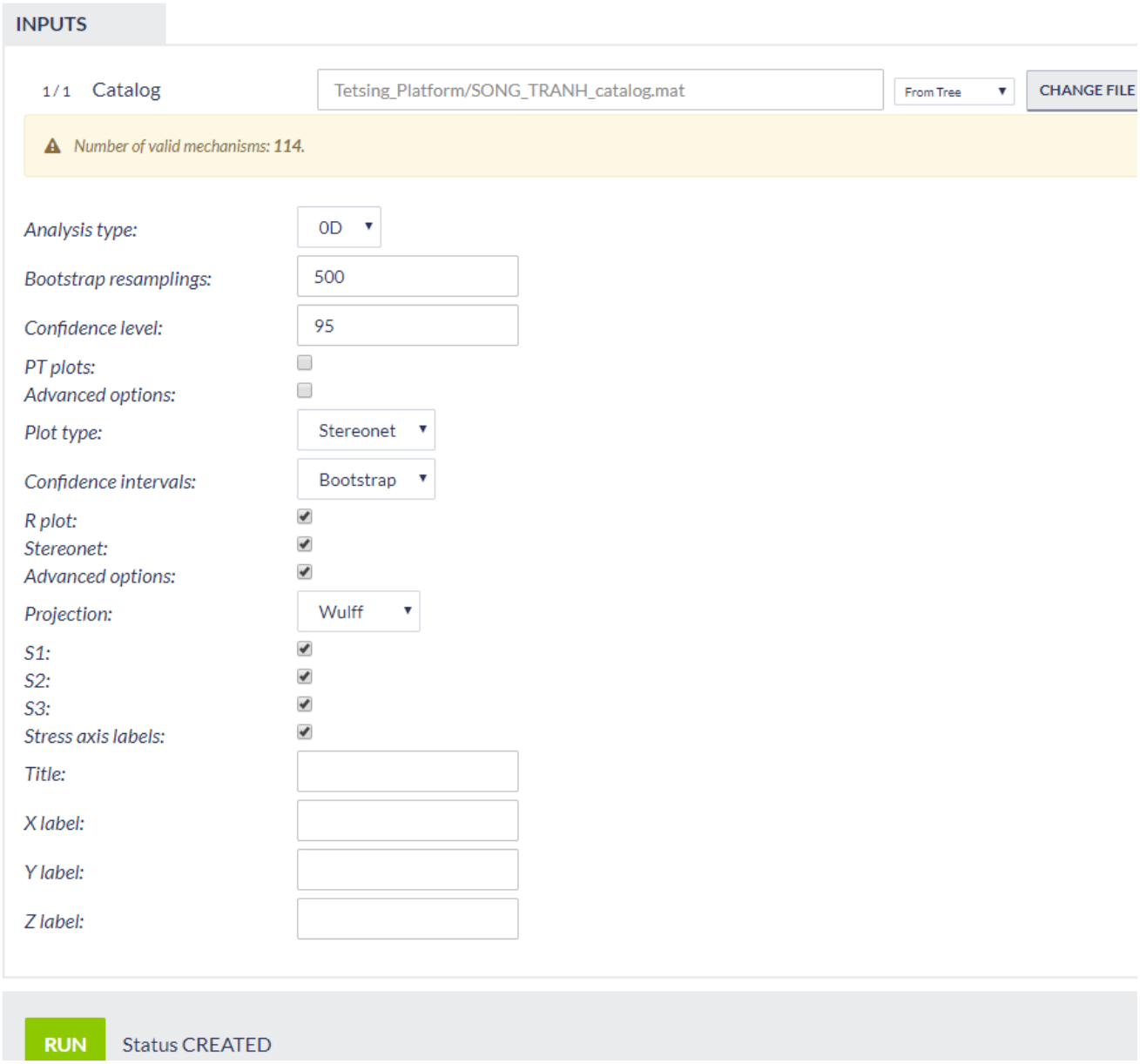

Figure 2. Selection of input parameters and files for the application

Using Seismic Catalog: The seismic catalog has been already selected in the previous step, however, the User may select another dataset from the workspace for stress inversion.

The number of valid mechanisms: This is an informative field showing the number of available focal mechanisms, such that the User knows about the sample size that is going to be analyzed.

Analysis Type: Three options are currently available in the EPISODES Platform: 0D, 1D and 2D, and can be selected after clicking on the small arrow at the tab. If 1D or 2D options are selected, the user is requested to enter the parameter(s) and window(s) of X, or X and Y dimensions, respectively (Figure 3)

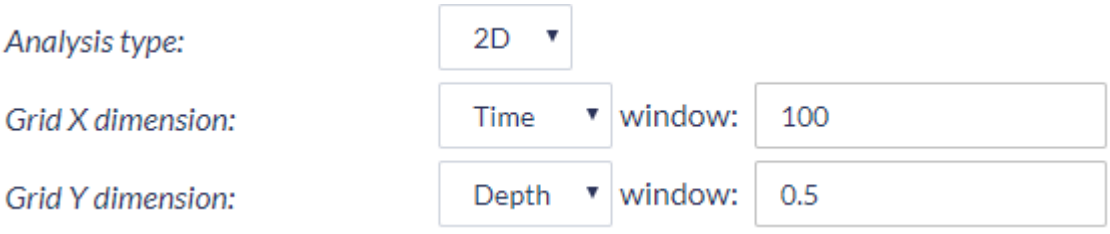

Figure 3. Additional input parameters for the application

Bootstrap Resamplings: Positive integer values are valid in this field, defining the number of Bootstrap Resamplings to be performed.

Confidence Level: A number between 0 and 100 is requested, defining the percentage of confidence interval of the results.

PT Plots: on/off (Switches the plotting of P and T axes).

Advanced Options: A number of advanced options are available after clicking on the small box (Figure 4). See at the MSATSI manual for details (http://www.induced.pl/msatsi)

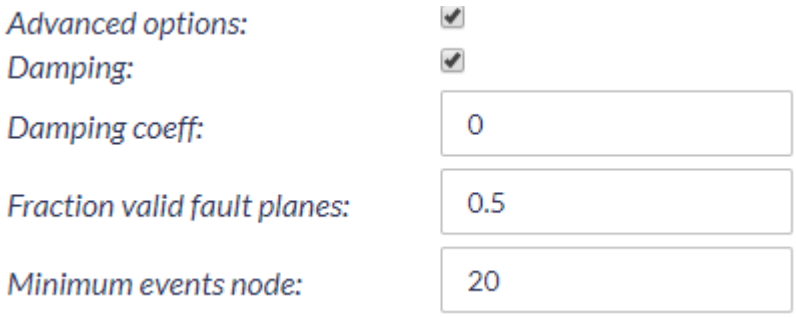

Figure 4. Additional input parameters for the application

Plot Type: The User may select one of the available options (accordingly to the *Analysis Type*) after clicking on the small arrow.

Confidence Intervals: The User may select one of the available options after clicking on the small arrow.

Rplot: on/off, plot can be activated/ deactivated by ticking or not the box, respectively.

Stereonet: on/off, off, plot can be activated/ deactivated by ticking or not the box, respectively.

Advanced Options: A number of advanced options are available after clicking on the small box (Figure 5). See at the MSATSI manual for details (http://www.induced.pl/msatsi)

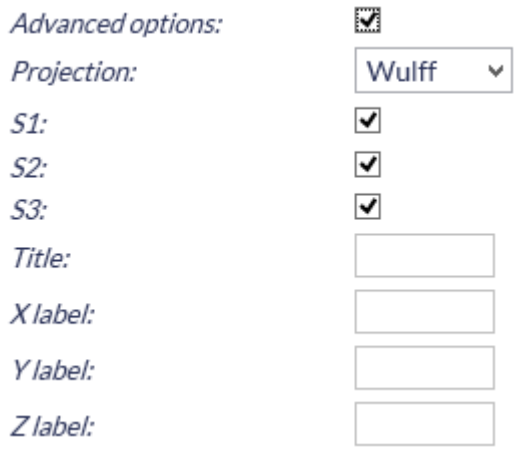

Figure 5. Additional input parameters for the application

After choosing all the aforementioned parameters the User may click on 'RUN' button to proceed to the calculation process. The results are soon to be available and saved by the system (Figure 6). Those results include schemes, as well as tables with results with option to perform simple plots with those results. These results are shown in the red frame of Figure 7.

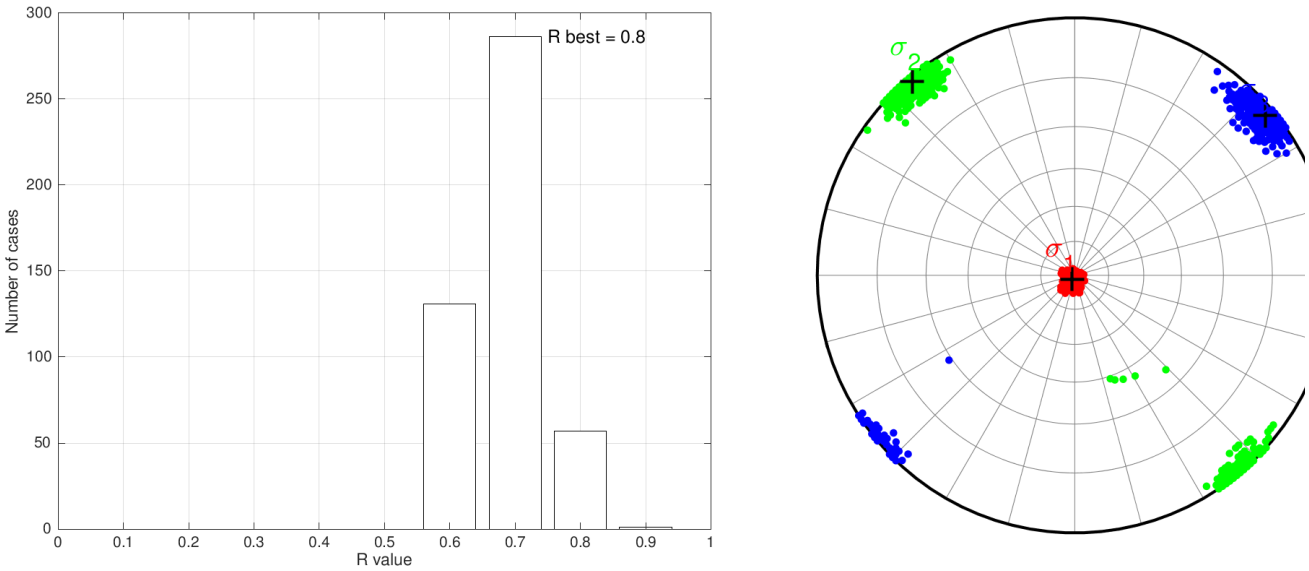

Figure 6. Example of some of the output graphs produced by the application

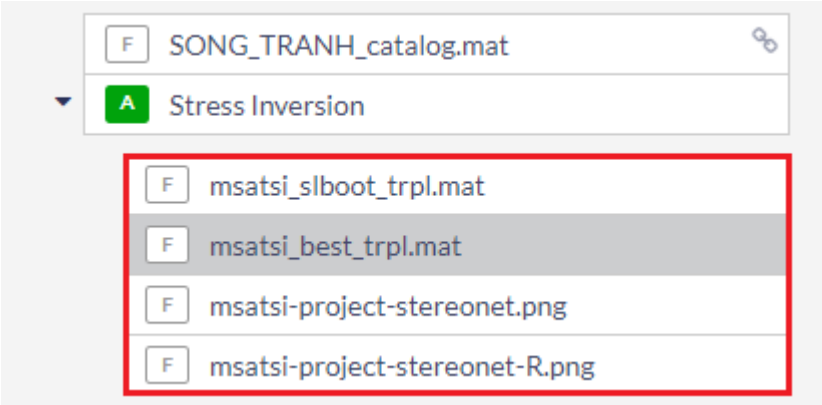

Figure 7. Outputs of the application

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