

Cross Correlation user guide



The Cross Correlation is a measure of similarity of two data series as a function of the displacement of one relative to the other.

open in IS-EPOS
PLATFORM

REFERENCES [Document Repository](#)

CATEGORY Correlation Analysis

KEYWORDS Statistical analysis, Statistical properties of seismicity, Geo-resource production impact, Production – seismicity interaction

CITATION Please acknowledge use of this application in your work: IS-EPOS. (2017). *Cross Correlation* [Web application]. Retrieved from <https://tcs.ah-epos.eu/>

Step by step

In order to use the **Cross Correlation** application the user must have a time series data available in the workspace. This is the mandatory input to the application. The time series data can be easily created with other tools available on the EPISODES Platform, as described below.

The workflow for Crosscorrelation application:

1. Choose the catalog (or extract part of the catalog with **Catalog Filter**) from a selected episode.
2. Add to user's workspace the **Catalog to Vector converter** application. It allows to extract vectors of time and time-correlated attributes of user's choice from the seismic catalog.
Select the seismic catalog to be used and choose the parameters to be analyzed: a column with time and any parameter from the Catalog for which the correlation is to be made (Time and eg. Mw).

3. The application generates two files: Time.mat and [chosen parameter name].mat. These are input files to the Time Series Builder application that user should to use next.
4. Add the **Time Series Builder** to the workspace. This application allows user to generate data series based on time vector and time-correlated parameter vector files created in the previous step (see figure below).

Time Series builder

File: TimeSeriesBuilder Description: Tool allowing to create time series based on given Time Vector and Real nu... [EXPAND](#)

INPUTS

Time Vector *Required file* CrossCorrelation/CatalogToVectors/Time.mat CHANGE... CLEAR

Real number vector *Required file* CrossCorrelation/CatalogToVectors/Mu.mat CHANGE... CLEAR

Initial time range: 2018 Jan 01 2018 Dec 31

Calculation mode *Minium value* ▼

Time step: 1 Days ▼

Chosen time series: 2018 Jan 01 2018 Dec 31 CHOOSE FROM PLOT

SAVE RUN ☐ Enable autorun

Status: Finished *Info*

In the following steps user needs to specify:

- Initial time range – initial time range for analysis
- Calculation mode – specifies way of parameter calculation from the time-correlated parameter vector values to compute time series (see figure below)

Initial time range: 2018 Jan 01 2018 Dec 31

Calculation mode *Minium value* ▼

Time step: 1 Days ▼

Chosen time series: 2018 Jan 01 2018 Dec 31 CHOOSE FROM PLOT

Calculation mode options:

- Minium value
- Number of occurrences
- Minimum value
- Maximum value
- Mean value
- Median value
- Range of values
- Variance
- Sum of values

- Time step - time step used for the analysis (see figure below)

Initial time range: 2018 Jan 01 2018 Dec 31

Calculation mode *Minium value* ▼

Time step: 1 Days ▼

Chosen time series: 2018 Jan 01 Dec 31 CHOOSE FROM PLOT

Time step options:

- Days
- Hours
- Days
- Weeks

- Chosen time series – select a single or multiple range(s) of time for which time series will be calculated. It can be typed manually or selected from interactive graphs (see figure below)

Chosen time series:

2014 Mar 04 2014 Aug 31 CHOOSE FROM PLOT ✕

2013 Dec 10 2018 Sep 11 CHOOSE FROM PLOT ✕

ADD

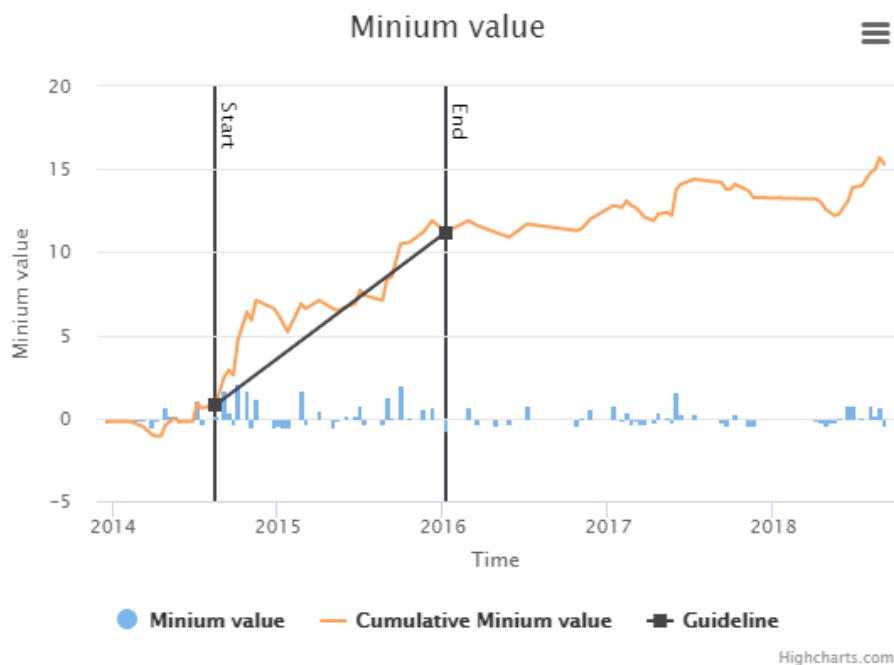
Minium value plot



Choose time values by clicking on the points in the plot.

Chosen start value: 2014 Aug 15 08:07:55 ✕

Chosen end value: 2016 Jan 07 08:07:55 ✕

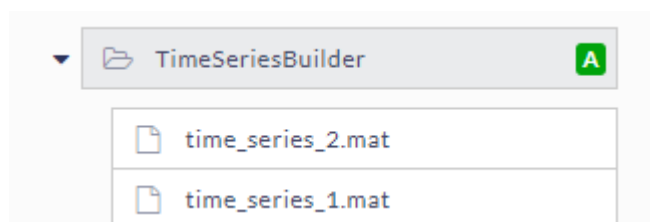


OK

CANCEL

RUN

Press the **RUN** button to initiate the process. Time series are calculated and saved in the user's workspace as .mat file.



5. Add **Cross Correlation** application to the workspace. The mandatory input are the time series files generated in the previous step. Two time series files are required. They may belong to the same episode (eg. two time series from a different period of time) or come from different episodes.
User can also specify additional parameters of crosscorrelation function (see figure below)

Cross Correlation

File CrossCorrelation
Description The Cross Correlation is a measure of similarity of two data series as a func...[EXPAND](#)

INPUTS

Time Series
Required 2 files
TimeSeriesBuilder/time_series_2.mat
TimeSeriesBuilder/time_series_1.mat

CHANGE...
CLEAR

Number of lags (1, 109)
i

Number of standard deviations (min. 0.0)
i

Select time series files holding the Ctrl button:

Select files

Individual files
Files from chosen directory
Application output
Application input
Automatic choice

i Choose 2 files to be added to the application.

▶ CatalogExtractTimeAndParam

▼ TimeSeriesBuilder

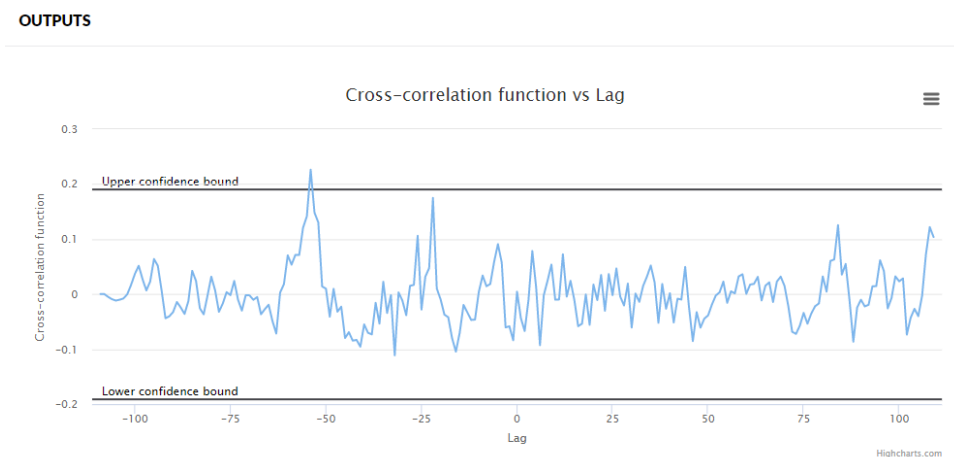
time_series_2.mat
time_series_1.mat

▶ CrossCorrelation

OK
CANCEL

Launch the application by pressing the  button.

The main output from the application is a plot of the crosscorrelation function calculated based on the specified parameters (see figure below):



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Related Documents

- [Application Definition file](#)
- [Common Issues](#)
- [Creating Application Workbench account](#)
- [Handling large files in workspace](#)
- [Running your custom application](#)

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