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

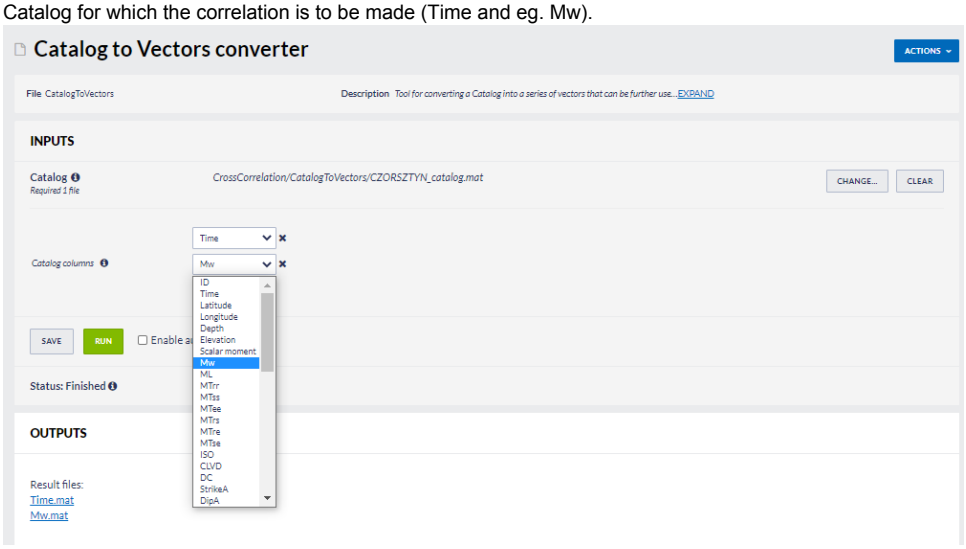
CITATION Please acknowledge use of this application in your work: IS-EPOS. (2017). *Cross Correlation* [Web application]. Retrieved from https://tcs.ah-epos.eu/

Step by step

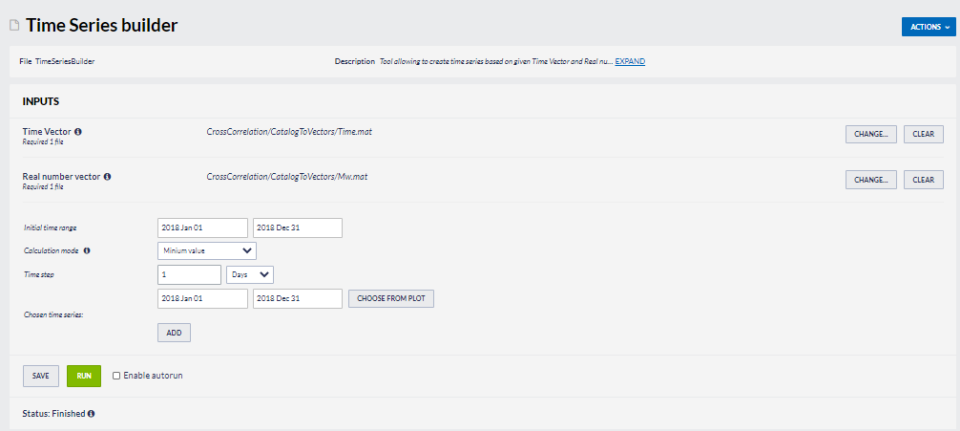
In order to use the **Cross Correlation** application the user must have a time series data available in the workspace. This is the mandatory input to the application. The time series data can be easily created with other tools available on the EPISODES Platform, as described below.

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).



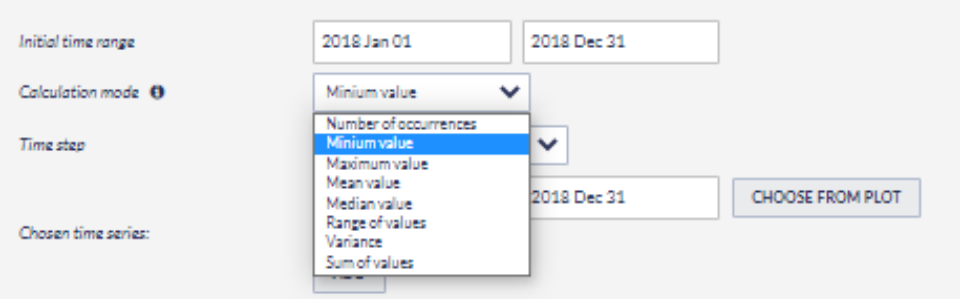
3. The application generates two files: Time.mat and [chosen parameter name].mat. These are input files to the Time Series Builder application that user should to use next.
4. Add the **Time Series Builder** to the workspace. This application allows user to generate data series based on time vector and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



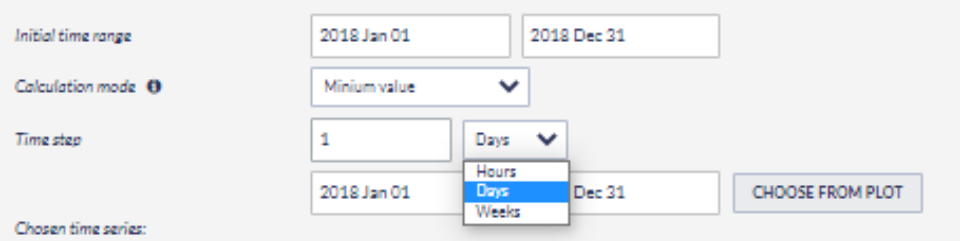
In the following steps user needs to specify:

- Initial time range – initial time range for analysis

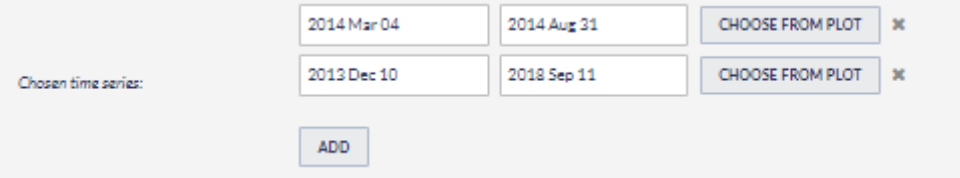
- Calculation mode – specifies way of parameter calculation from the time-correlated parameter vector values to compute time series (see figure below)

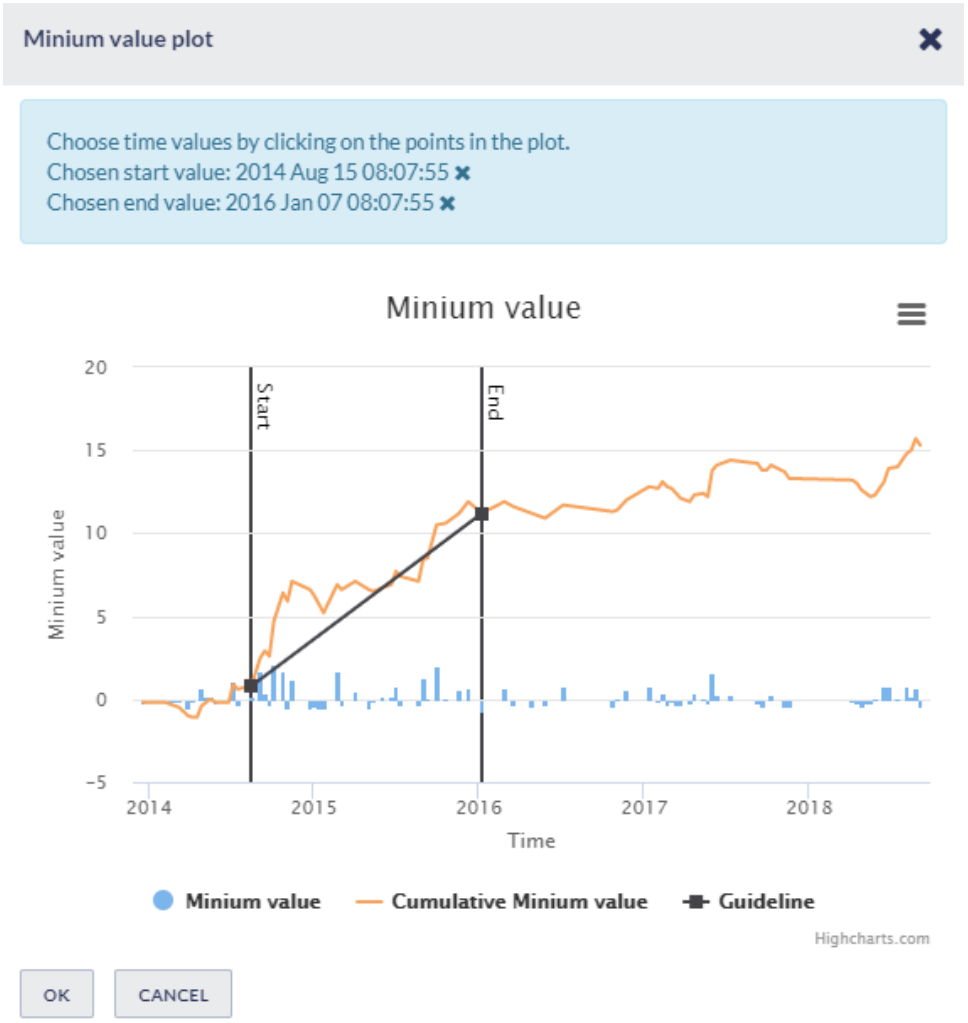


- Time step - time step used for the analysis (see figure below)

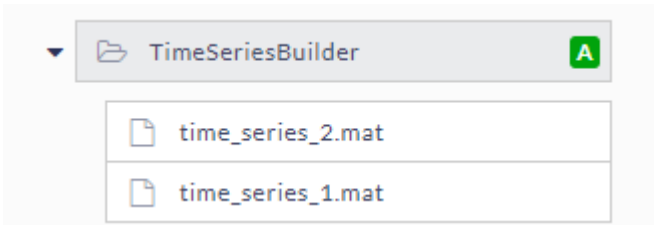


- Chosen time series – select a single or multiple range(s) of time for which time series will be calculated. It can be typed manually or selected from interactive graphs (see figure below)

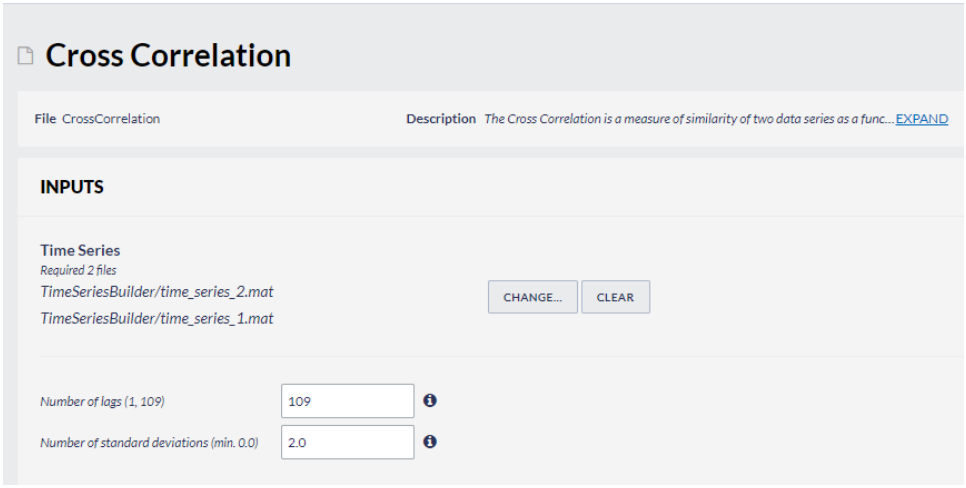




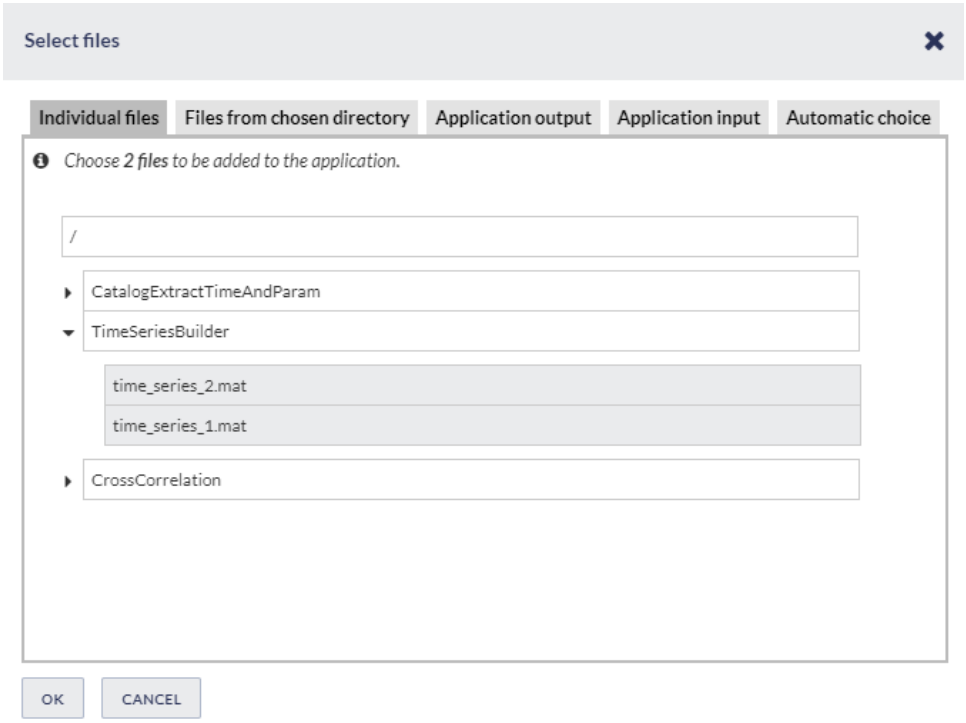
Press the RUN button to initiate the process. Time series are calculated and saved in the user's workspace as .mat file.



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)

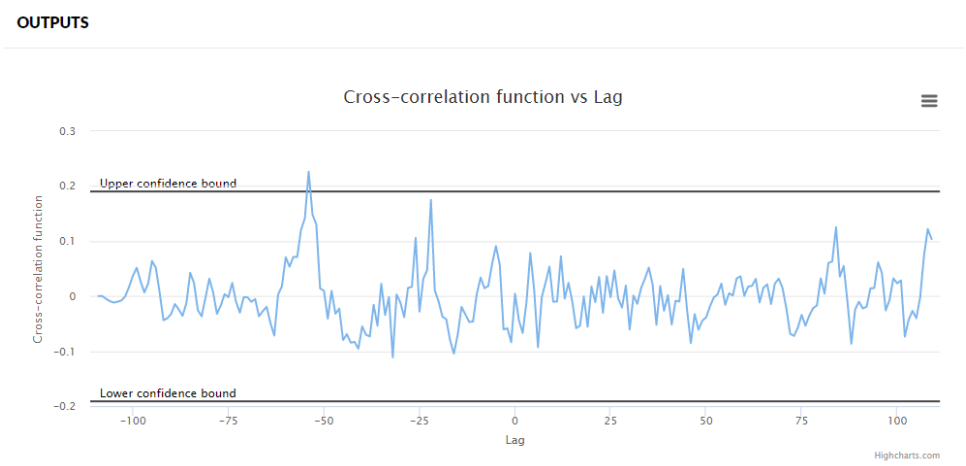


Select time series files holding the Ctrl button:



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):



Back to top

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