

Frequently Asked Questions - REXELweb

What does it mean to check "Inferred soil class"?

The "inferred soil class" option allows the user to include records from stations characterized not only on the basis of estimates of V_{s30} from velocity profiles obtained from direct geophysical measurements, but also inferred from surface geology or topographic slope. This option substitutes the classes identified with an asterisk in the previous tool *Rexelite*. Inserting the check mark allows the user to significantly expand the set of records in the preliminary search

Which criteria are suggested to use to set the magnitude-distance search parameters?

The search for spectrum-compatible waveforms should be guided by the dominant magnitude-distance scenarios of hazard disaggregation at the site (for Italy, consult the data of the seismic hazard model MPS04 available at the website <http://esse1-gis.mi.ingv.it/>)

Which selection parameters are better to vary to increase the number of spectra in pre-selection?

The criteria that most affect the research are magnitude and distance, as they are directly linked to the dominant scenario of the hazard at the site. The other parameters play a "minor" role, including the site effect, since it is the shape (and therefore the site class) of the target spectrum that constrain the waveforms to respect the spectrum compatibility

What does the tick on "Late Trigger events"?

These are waveforms that do not have the arrival of the P phases because the instrument has recorded starting from the S phase of the signal. They are typical of waveforms from pre-1990 events.

What does the "Limit" field mean?

Represents the maximum number of spectra in the pre-selection. It is advisable to leave the default 500

Why is the "Spectrum-matching" tab again asking for the period interval already defined in the "Preliminary Selection" tab?

By default these values are the same as those entered in the previous screen. What changes is that in the "Preliminary Selection" the program found the n accelerograms whose spectra

are compatible with the options entered. In the "Spectrum-matching" tab it is possible to further restrict the period range of interest for the spectrum-matching, starting from the previously pre-selected spectra.

What does the "Check on PGA" tick mean?

This flag is used to constrain the average PGA of the selected set to be greater than the PGA of the target spectrum as required by EC8. The option is active only in the case of unscaled spectra (adimensional flag not active)

What differences should I find if I use scaled or unscaled accelerograms?

The "Scaling option" flag allows the user to scale the response spectra linearly in amplitude, each for its own PGA.

This is a useful operation to extend the set of pre-selected records and facilitate the spectrum-matching.

How to set the scale factor ?

The user can impose a maximum allowable scaling factor (of the average spectrum only), by entering the corresponding value in the "Maximum scaling factor" field which should not be too high (for example <5), to avoid selecting spectra too far from the target.

What criterion to use to set the range of periods?

It depends on the fundamental period of the structure based on specific indications (e.g. microzonation guidelines). For example, the NTC18 set the T_{min} at 0.15s and T_{max} as a function of the limit state (e.g. for SLV and SLC, T_{max} is equal to the greater between 2s and $2 * T$, being T the fundamental period of the structural model). Instead EC8 establishes $T_{min} = 0.2 * T$ and $T_{max} = 2 * T$.

Why does the program sometimes return a timeout message ("No data matches the selection in the time limit and a solution after the time limit (1 min) is unlikely")?

Because the algorithm, with the assigned options, was unable to find spectrum-compatible solutions within the time limit. In these cases it is necessary to change, or at least relax some selection constraints. In general, the "Preliminary Plot" gives an idea of the probability of finding solutions, or whether it is worthwhile to scale the accelerograms.

Are the accelerograms in REXELweb already scaled?

The unit of measure of the accelerograms in REXELweb is cm/s^2 and the accelerograms are supplied in original as-recorded, so if you have performed a search for scaled accelerograms, they must be multiplied by the scale factor provided by REXELweb before being used.

In what formats are REXELweb waveforms available?

The selected waveform combinations are downloadable in 2 formats: ASCII (text file with .txt extension) with 64 header lines and HDF5 (ASDF file <https://seismic-data.org/>)

REXELweb and the REXEL program 3.5 (<https://www.reluis.it/it/progettazione/software/rexel.html>), do they provide the same solutions?

The two programs have the same algorithm in common, however with the same input options, they cannot return exactly the same waveforms. The reason is linked to the fact that REXELweb draws on the ITACA database which is updated to the last year, not only in terms of new records, but also in terms of associated metadata. This means for example that, if new site characterizations become available, some stations that in the past could have been assigned to certain site classes (for example the "A"), may later have been modified and therefore fall into different classes (typically the measures of Vs30 determine a shift of the generic classes A into classes B). In addition to this, event metadata (magnitude, locations) may also change, or it may happen that a waveform is reprocessed and consequently the ground motion parameters change (e.g. the PGA).

Can the combinations include accelerograms referring to the same event?

It may happen that a combination includes waveforms related to the same event. In any case, the user can decide to carry out specific exclusions by event, station or recording, at the end of the analysis (Tab *Refine Search*).

Why is the Rexelite tool no longer active?

Rexelite is no longer available but has been replaced by REXELweb in the versions linked to either ITACA and the European Engineering Strong-Motion ESM database (<https://esm-db.eu/#/rexel>).

REXELweb includes and updates all functionalities previously implemented in Rexelite.

I have a problem that is not one of those discussed in this document. What can I do?

It is recommended to study the user manual and the bibliography before using REXELweb. In addition to being required to use the program correctly and understand its results, the problem in question is likely to be discussed in the documentation. If none of these alternatives solves the problem, it is advisable to contact the developers at: [<itaca@ingv.it>](mailto:itaca@ingv.it)