Toward a renewed data processing of the Engineering Strong Motion (ESM) database

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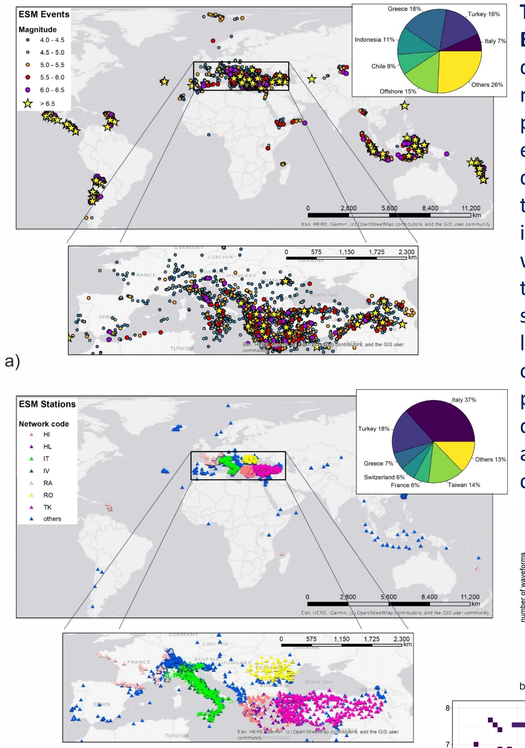
Sharing is encouraged

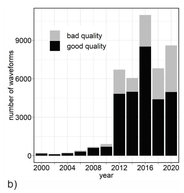
ESM Database

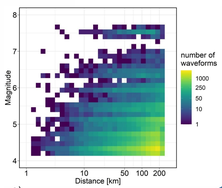
The main archive to disseminate high quality processed waveforms for the European-Mediterranean region is the Engineering Strong-Motion Database (**ESM, https://esm-db.eu**).

ESM is developed under the general coordination of the **ORFEUS** Strong-Motion Management Committee (Observatories and Research facilities for European Seismology; http://orfeus-eu.org/), with the aim to provide users daily access to updated strong-motion waveforms of earthquakes with **M ≥ 4**, mainly recorded in the **Pan-European regions**.



The strategy of ESM is to disseminate only manually processed data to ensure the highest quality. However, the rapid increase in the number of waveforms, due to the increment of seismic stations, leads to the need of automatic procedures for data processing and data quality control.



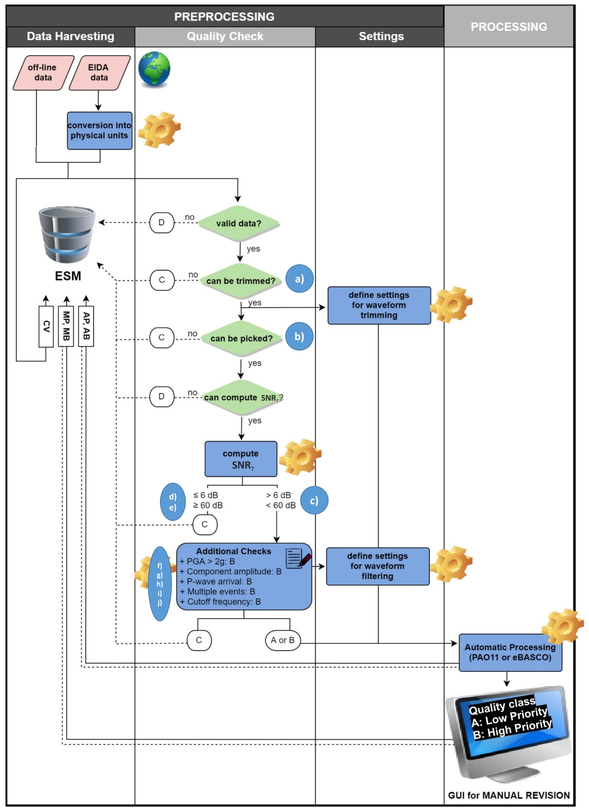


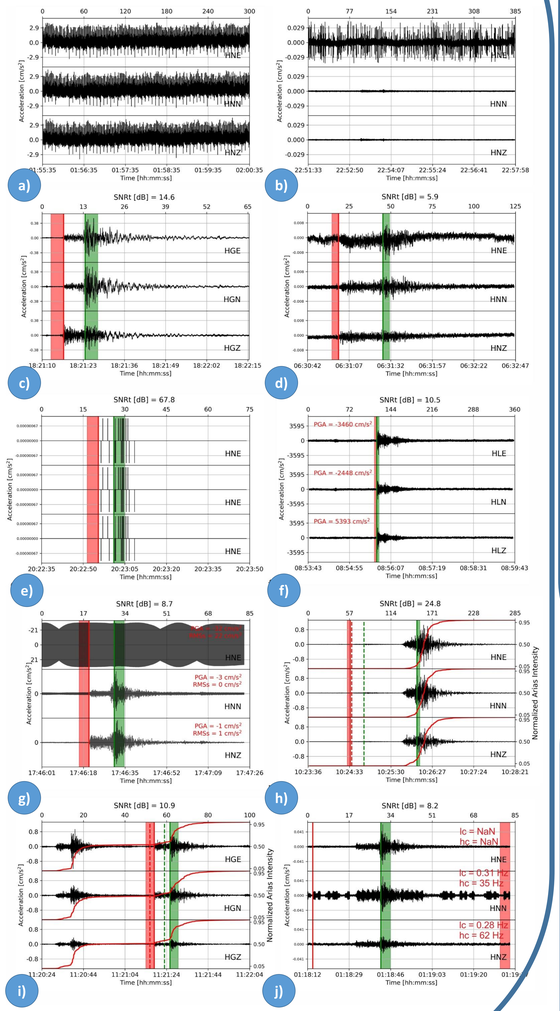
+7,000 events
+4,000 stations
+84,000 waveforms

Proposal for a new data management

Here we present **ESMpro**, a modular Python software for a renewed processing framework of ESM. The ESM data processing is improved with:

1. automated data **quality-check** that speeds up the processing time through the rejection of poor-quality records;
2. advancement of the **automatic settings** for waveform trimming and filtering;
3. introduction of **different algorithms for data processing** (Paolucci et al., 2011; Schiappapietra et al., 2021);
4. **modular and flexible software structure** that allows the addition of new algorithms and custom workflows.





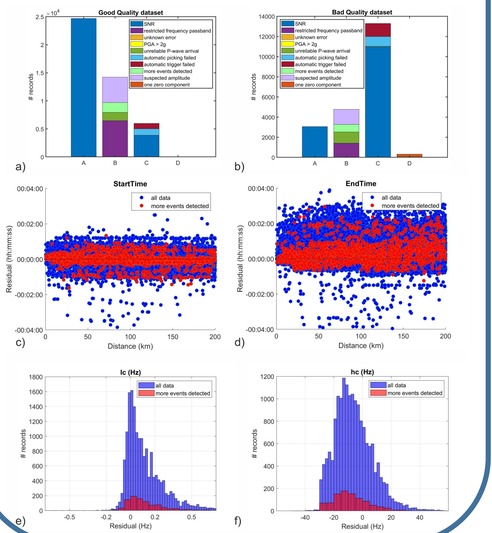
Examples

Testing

Automatic Vs Manual processing

The accuracy of the updated automatic processing is evaluated by comparison with the waveforms manually processed by expert analysts.

Mascandola et al. 2023 ->



GitLab release

ESMpro is distributed in a stand-alone Beta version available on GitLab **(D'Amico et al. 2022)**

https://gitlab.rm.ingv.it/esmpro/groundmotion-processing

Scan for abstract ->