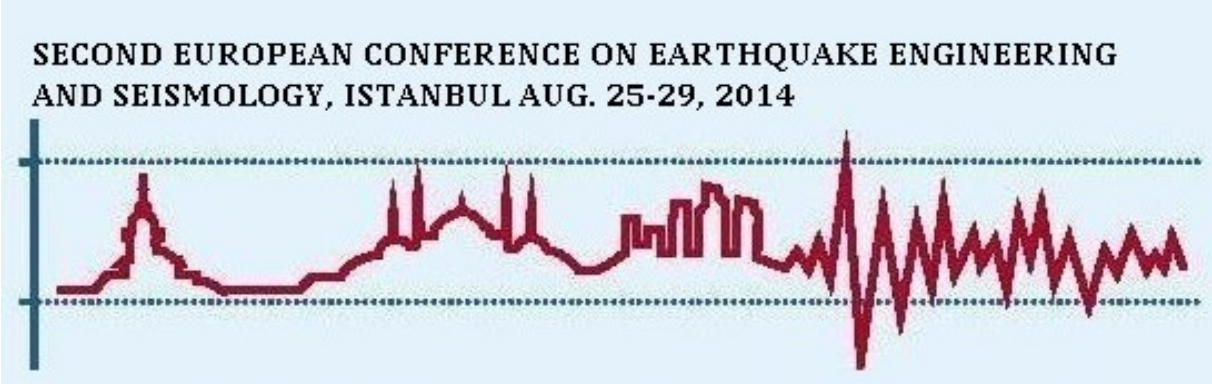

THE ENGINEERING STRONG MOTION DATABASE (NERA-NA3)

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The Engineering Strong Motion database (ESMdb), is currently being developed in the framework of the EU project NERA (www.nera-eu.org), within the Task "Networking accelerometric networks and strong motion data users" (NA3). It combines the expertise and datasets gained within several European projects, such as the Internet Site for European Strong Motion data (FP4 and FP5), NERIES (FP6), SHARE (FP7) and project funded by private companies (SIGMA) and national agencies.

ESMdb is a centralized database that distributes strong-motion recordings available in Europe and surroundings since the 1970s. The current ESMdb prototype for disseminating strong-motion data contains Turkish and Italian strong-motion recordings and it is actually password protected (Figure 1 shows the homepage). The European data contained in the SHARE database will be included before the end of the project.

Differently from the previous databases, ESMdb takes advantage of modern seismological services that provide rapid access to strong motion data and allow to populate the database automatically.

Nevertheless, a manual interaction is still required as the accelerometric data in ESMdb are manually processed and quality checked before being distributed. In the perspective of engineering applications, the database is designed to host as many information as possible contained in 80 related tables. They are relevant to:

- *recording sites*: station information (network code, station code, latitude, longitude, elevation, site morphology, housing, stratigraphy logs, Vs logs, NSPT logs, dispersion curves, HVSR curves, fundamental frequency, etc.) and station documents (photos, maps, papers and reports);
- *seismic events*: latitude, longitude, depth, magnitude, focal mechanism, fault geometry, macroseismic intensity, etc.;
- *waveforms*: sampling rate, number of points and strong motion parameters (PGA, PGV, PGD, filter type and corners, spectral ordinates, Arias Intensity, Housner Intensity, duration, etc.);
- *networks*: international codes, data provider information, logos and contacts;
- *data dictionary and references*.

Unprocessed and processed acceleration time histories are distributed together with velocity and displacement time histories and acceleration and displacement response spectra (5% damping). The ASCII files contains a 55 header lines containing all the relevant information for the correct use of the waveform. Additional tools are provided to convert the ASCII files in binary format used for seismological applications (sac or miniseed).

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About 50 fields can be specified for the selection of events, stations and waveforms and mapping tools are provided to display seismic events and recording stations on Google maps (Figure 2) as well as waveform visualization tools (Figure 3).

Waveforms are processed according to the procedure by Paolucci et al (2011), that takes into account the outcomes of recent researches (Boore and Akkar, 2003; Boore and Bommer, 2005; Boore, 2005a; Boore et al, 2012). This procedure ensures compatibility of corrected records, i.e., velocity and displacement traces, obtained by the first and second integral of the corrected acceleration.

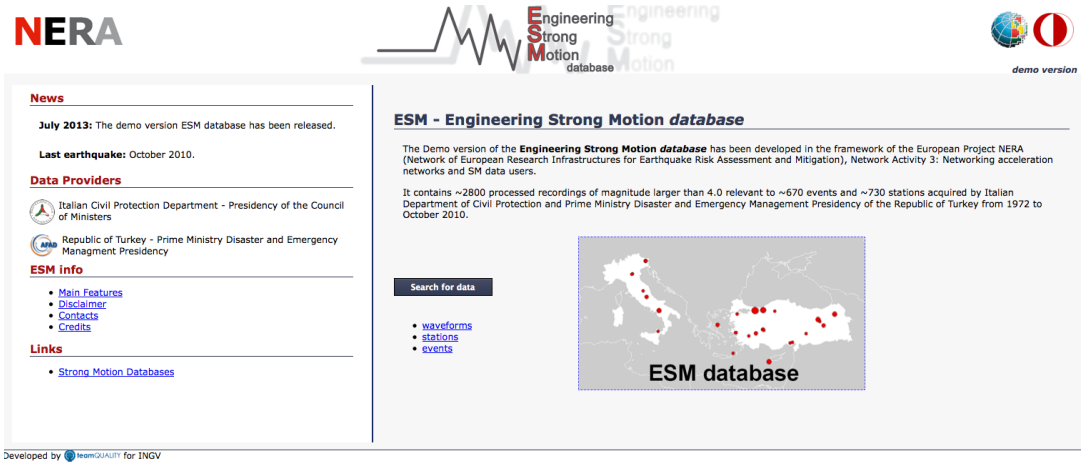

Figure 1: Engineering Strong motion database home page

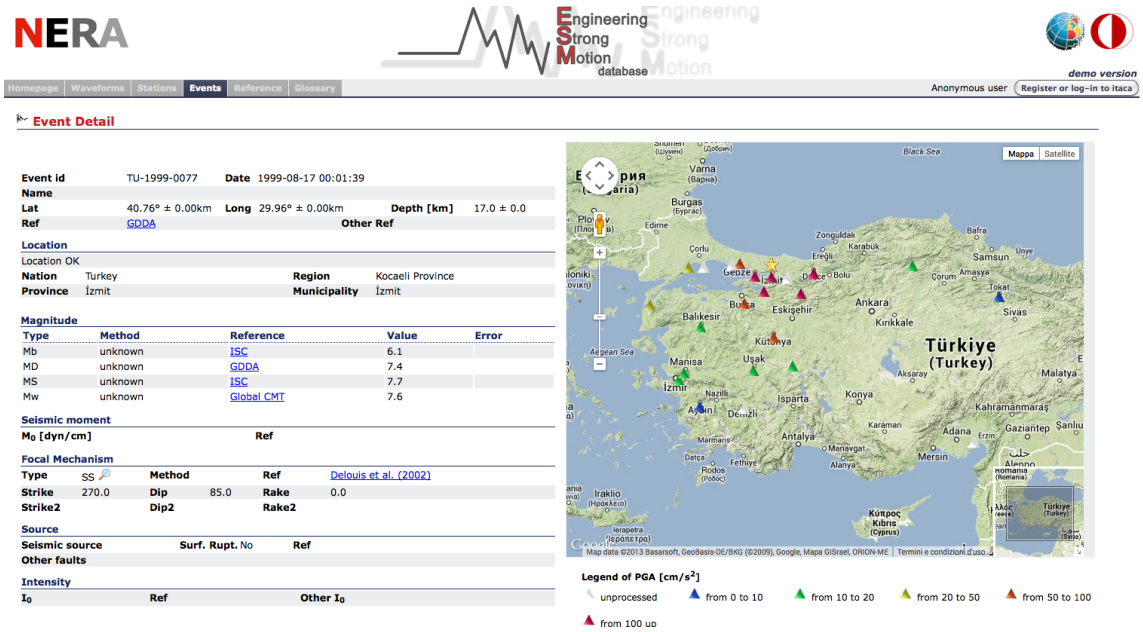

Figure 2. A snapshot from ESMdb portal developed under NA3

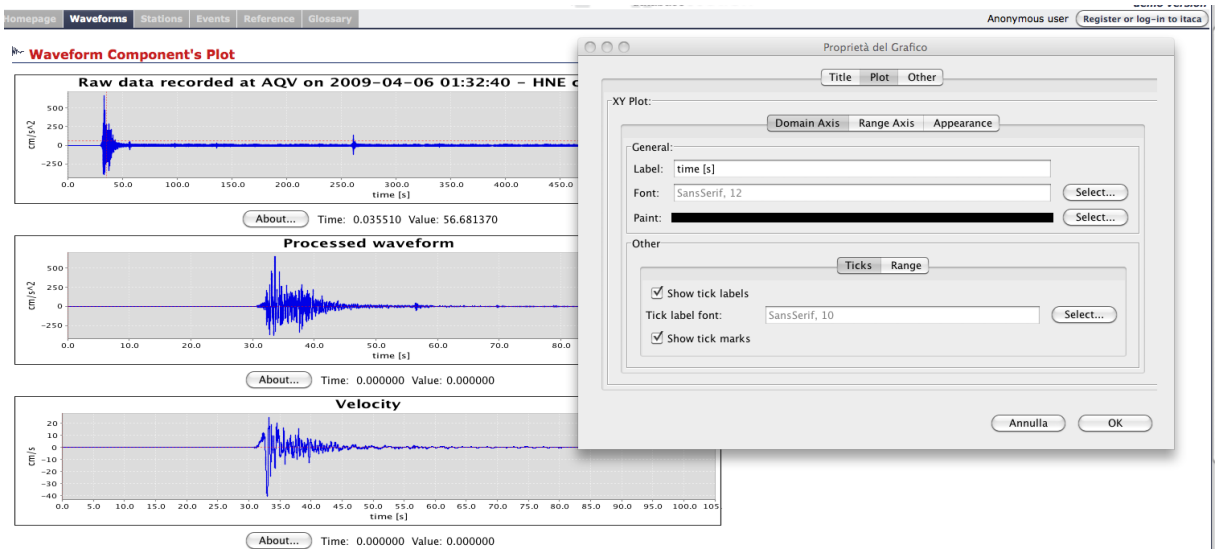

Figure 3. Waveform visualization tool.

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