



Project S6 – Data base of the Italian strong-motion data relative to the period 1972-2004

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TASK 1 - Deliverable 7

Strong-motion data base

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1. INTRODUCTION

The deliverable 7 is the data base and represents the core-product of the project. It has two different format thought for different uses. The first product is the Ms Access data base, which is the collection of tables and the data can be browsed block-by-block (events, recording sites, waveforms, references) or performing very simple queries.

The second product is the data base that can be accessed through www at the following address <http://itaca.mi.ingv.it> . The data set can be browsed and searched starting from the recording sites, the seismic events, the waveforms or the bibliographic references.

Several parameters can be specified for each of the four different information. In particular, for the sites and the events, the search can be performed either on attribute data or on geographic location, by specifying the coordinate range. A very basic event and station mapping is obtained through a link to Google maps. The queries can also be made in a step-by-step way starting from the event (which can be constrained selecting location, magnitude or time), going through the station information (which can also be constrained selecting location, name or type of network) to the waveforms (which can be constrained selecting the engineering parameters).

The waveforms resulting from the queries can be downloaded in the standard format and displayed together with the corresponding acceleration response spectra, with a graphic Java utility.

2. THE DATA BASE IN MS ACCESS FORMAT

The data base consists in a .mde file. The main mask (Figure 1) reports a list of the searchable blocks of the data base, namely Events, Recording sites, Recording channel, Waveforms and data dictionaries.

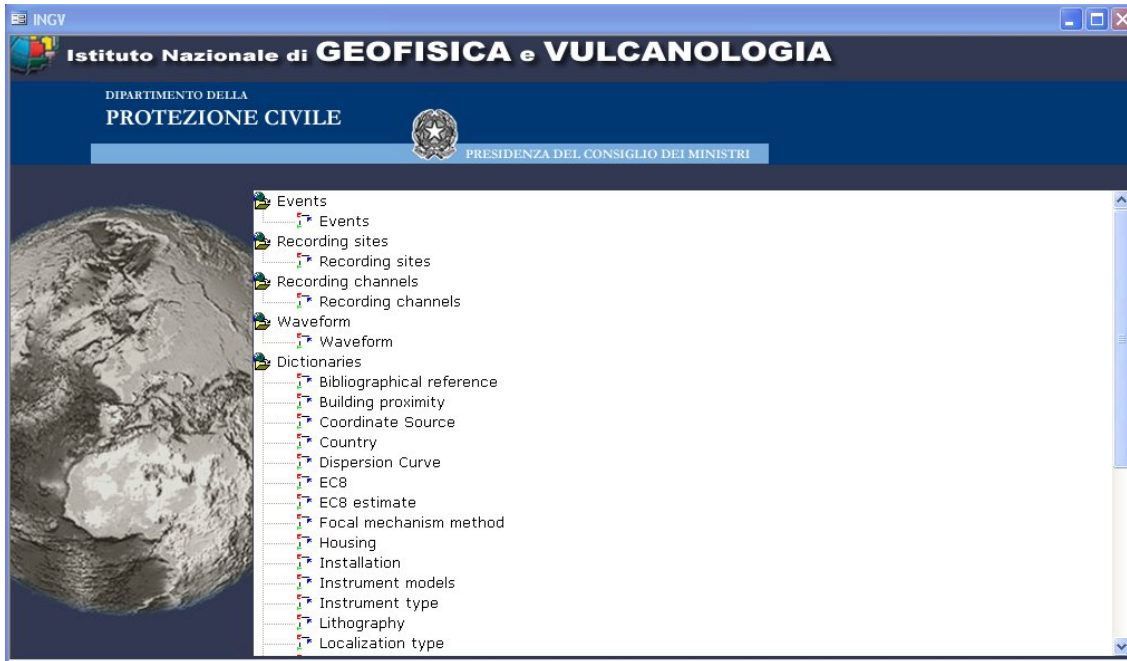


Figure 1: main mask of the data base

The event mask displays the main parameters of the events such as location, focal mechanism, magnitude attribution, macroseismic epicentral intensity, together with the information sources. When the fault has been identified, the strike, dip and rake are displayed, with the corresponding reference catalogue. In the *other fault* field the id of the used catalogue is described, to help the user who wants to increase the detail on this parameter. The events can be searched by input the date in the ISO format (YYYY-MM-DD hh:mm:ss) at the upper right corner of the mask and browsed by clicking the arrows on the toolbar (Figure 2)

method	magnitude type	reference	magnitude	magnitude error
Mb-ISC	Mb	ISC	6	
ML-Oth-ING-	ML	ING Catalogue	6.5	
MS-ISC	MS	ISC	6.8	
Mw-CMT-HA	Mw	Global CMT Catalog	6.9	

Figure 2: Event mask (the events can be searched by input on the upper right corner the date in ISO format and browsed by clicking the arrows on the toolbar)

The recording site mask lists all the stations by network (by default the Italian accelerometric network is reported). By the use of the arrows in the toolbar, one can browse among networks (at the moment only two are contained, namely ITDPC and ENEA). Analogously, the network code can be entered at the upper right corner. In order to search a station one should click on the right mouse button and select "Trova" (in Italian), as shown in Figure 3. The information of a single station can be inspected by selecting *see station detail*.

The recording station is characterised by general information, such as the geographic location, the address, the location on a IGM map, the installation type. Detailed information, on the instruments installed, the stratigraphy, the geotechnical logs, the site response function and the dispersion curve are contained in separate tables, that can be displayed one by one. For almost all station there is a link to the document which reports other kind of information, such as the location of the station on an aerial photograph, the geologic map, the images of the stratigraphy, geotechnical and geophysical logs, the results of laboratory tests on soil samples, the graph showing the site response function, among others.

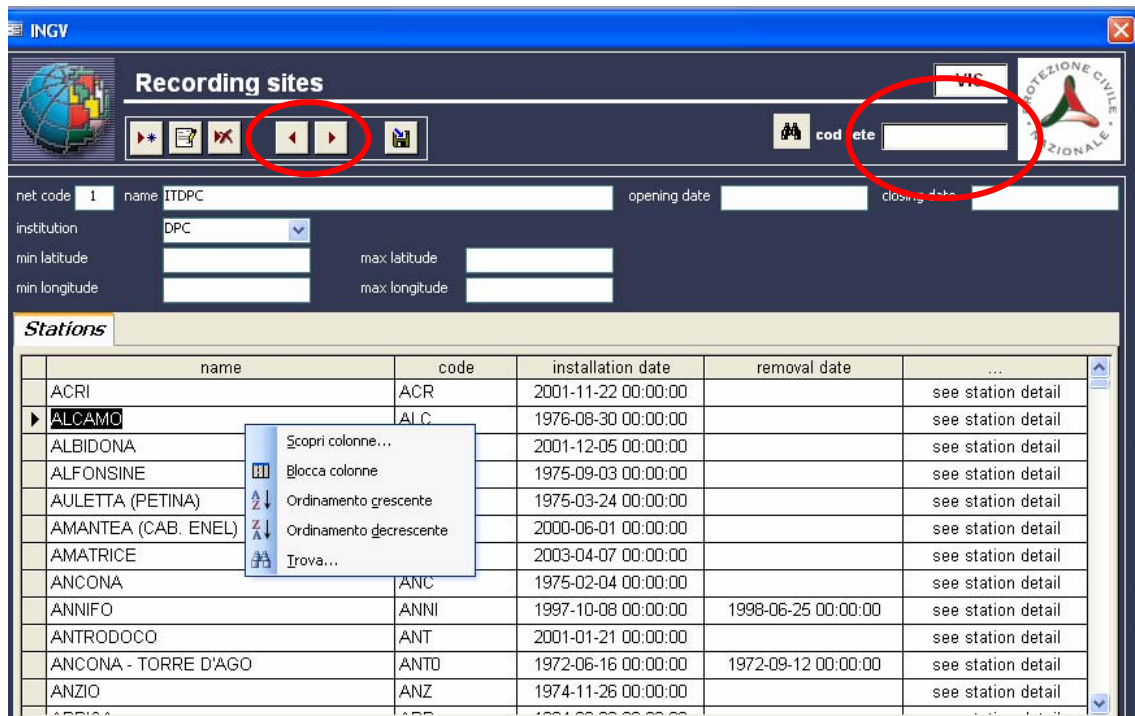


Figure 3: list of the recording station by network; the arrows in the toolbar allow to browse among networks; the network code can be entered at the upper right corner

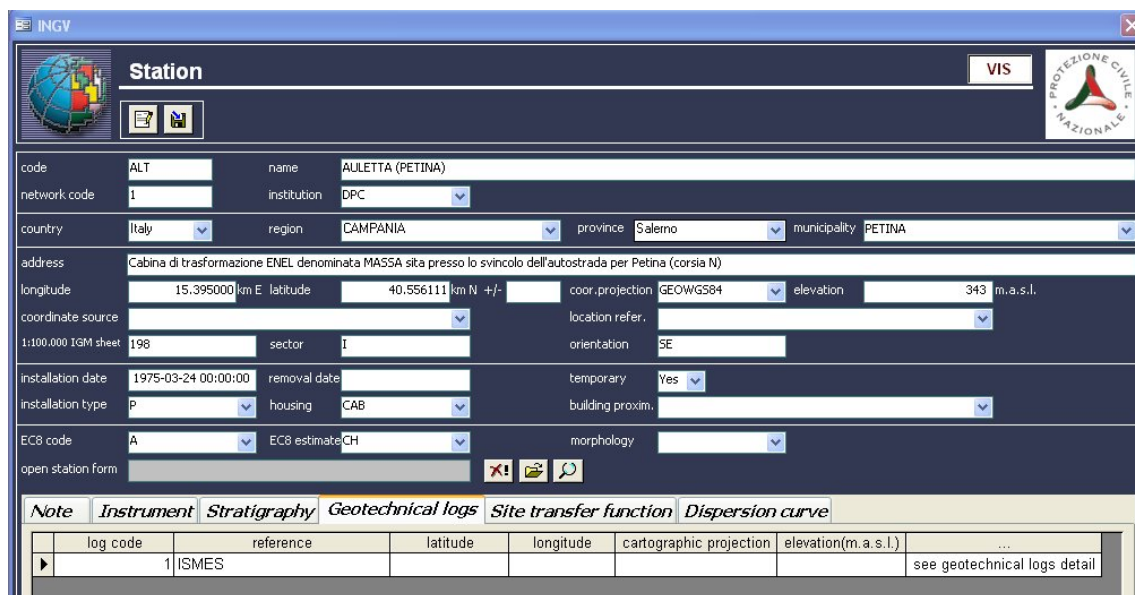


Figure 4: recording station detail

The waveform mask (Figure 5) displays the main engineering parameters of the waveforms, such as uncorrected and corrected peak ground acceleration, velocity, displacement, effective duration, Arias intensity, among others. The mask reports the applied filter and the band-pass frequencies. The waveforms can be browsed by clicking on the arrows on the toolbar, or they can be searched by date, entering the time in ISO format (YYYY-MM-DD hh:mm:ss) on the upper right corner.

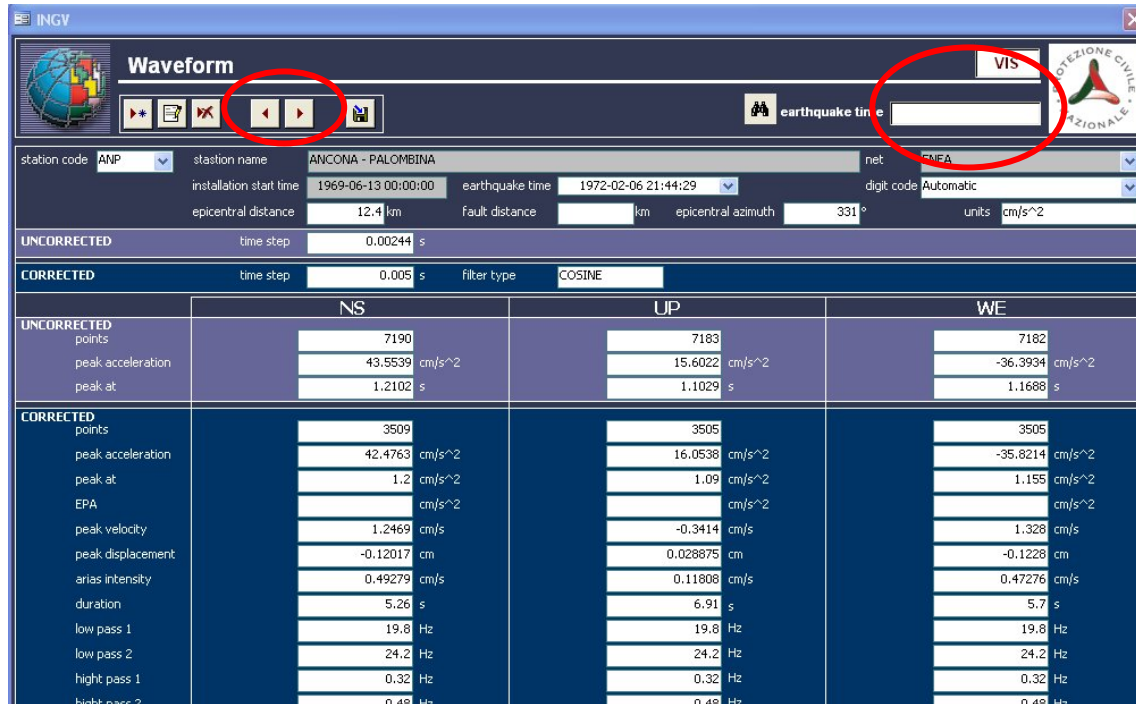


Figure 5: waveform mask; the arrows in the toolbar allow to browse among time series; the date of the event code can be entered in the upper right corner

The data dictionary masks are the descriptions of codes and id's used in the data base.

3. THE WAB DATA BASE

The web data base has been developed in Mysql. Analogously to the Access data base it contains for main “blocks” (events, station, references and waveforms).

It allows to perform queries in each of the separate blocks, or progressive queries, starting from the earthquake parameters and constraining the search with the station and waveform parameters.

The events and the stations are displayed on a geographic map, or on a satellite image, with the aid of Google maps, as shown in Figure 6.

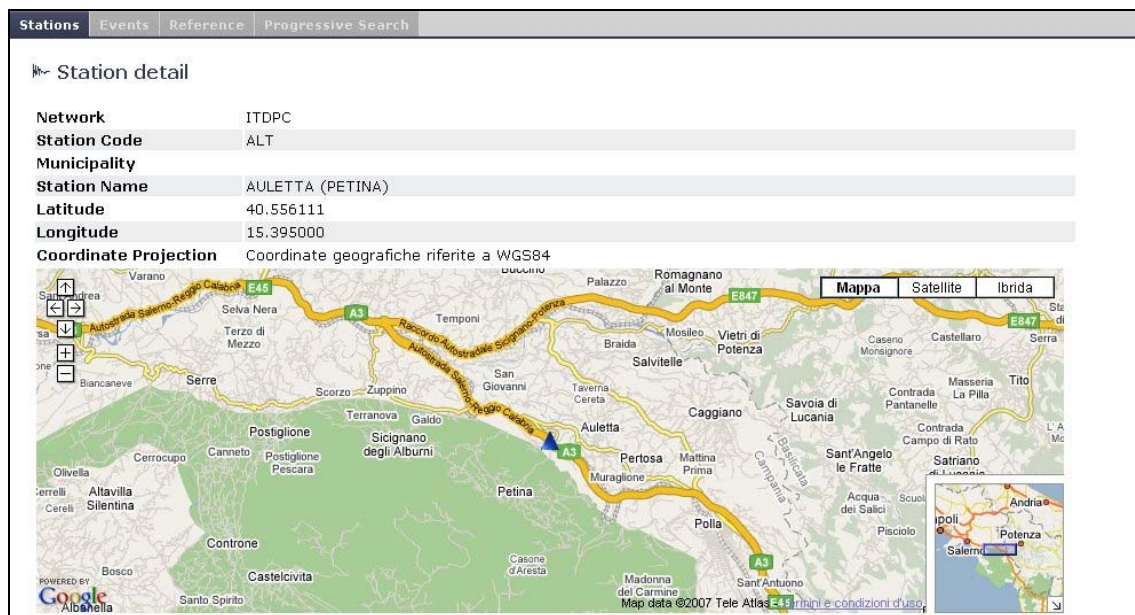


Figure 6: station display on a geographic map, through the connection with Google maps

As an example the query to obtain the waveforms recorded in 1980, with PGA exceeding 150gal, is reported.

The query starts selecting the date of the event, that is 1980. All the events recorded in 1980 are listed, as shown in Figure 7. The query goes on accepting all the recording stations, as shown in Figure 8. The last constraint is the PGA value. In Figure 9 the result of the query is the list of all waveform with the requested characteristics.

The acceleration time-series and the response spectra can be displayed with the aid of a Java application as shown in Figure 10.