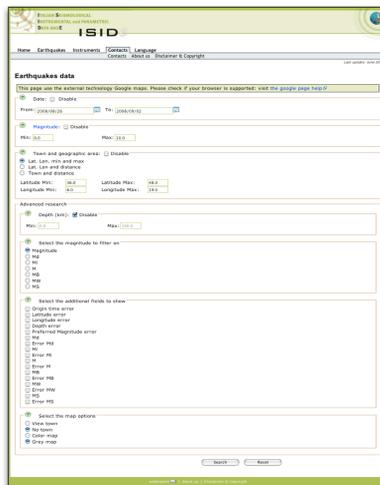


Abstract

ISIDe, the *Italian Seismic Instrumental and parametric DatabasE*, includes today more than 17000 earthquakes occurred in Italy and surrounding seas since April 16 2005, ranging from magnitude ML 0.2 to ML 5.7. All the ML are computed from synthetic Wood-Anderson records obtained from horizontal broad band and very-broad band registrations. The minimum magnitude of completeness is ML 1.8, as computed from the cumulated Gutenberg-Richter distribution. The ML 4.8 event occurred in the Gargano peninsula (southern Italy) on May 29 2006 is the crustal earthquake of maximum magnitude included in the catalog; it was followed on December 10 2006 by an ML 4.5 earthquake, about 40 km northeast of the previous event. The largest earthquake of the catalog (ML 5.7) occurred on October 26 2006 in the southern Tyrrhenian sea at a depth of 220 km. Although ISIDe is spanning only the last three years and half of Italian seismicity, it is unprecedented in Italy for completeness and homogeneity and represents an optimum test data set for small and moderate seismicity pattern model verification. ISIDe is now available at <http://iside.rm.ingv.it/>.



ISIDe Interface

We started the web page [ISIDe.rm.ingv.it](http://iside.rm.ingv.it) in April 2005 with the aim of easily distribute to the seismological community a revised information on the Italian seismicity in quasi-real-time, as produced by the *Rete Sismica Nazionale (RSN)*, the Italian National Seismic Network). The ISIDe web page is an interface to a relational data base that includes today the *Bollettino Sismico Italiano*. The simple ISIDe page allows the user to select earthquakes by date, magnitude, regional area or distance from geographic coordinates. The advanced search (fig. 1) gives access to additional information (ipocentre and magnitude errors) and mapping options.

Triggered records are available in real time in SAC format at <ftp://iside.rm.ingv.it/>; phases and old Bulletins since 1983 are available at <ftp://ftp.ingv.it/bollet/>.

Figure 1 | ISIDe form to interactively request, download and map locations from the Italian Seismic Bulletin.



Figure 2 | Stations joining the Italian Seismic Network monitoring system. The National Earthquake Center of INGV collects in Rome seismograms in real time from about 250 velocimeters (640 channels).

The New Italian Seismic Bulletin

Until April 15th 2005, robust procedures, consolidated by a long practice, were used to review seismograms and produce the Bulletin. Daily analysis based on them was unfortunately limited to analog 1-component short period instruments only. Starting from April 2005, we have been using new procedures to create the Seismic Bulletin for Italy: beside the original 80 analog instruments, more than 180 3-component broad-band velocimeters are now included in the routine analysis. Furthermore, the density of high quality stations of the Italian Seismic Network (fig.2) allows to detect low magnitude seismicity trends inside the Bulletin, that could be identified only by means of local (often temporary) networks (fig. 3).

Magnitudo

The big number of horizontal broad-band instruments (STS2, Trillium 40s, 120s) ensures Local Magnitude estimates based on synthetic Wood-Anderson waveforms for a very large majority of the events reported in the Bulletin after April 15, 2005. In 2006, we have located 6125 regional earthquakes, with a Local Magnitude estimate for 5906 of them (96.4% of the whole set).

We apply Hutton-Boore relation to take into account the attenuation with hypocentral distance:

$$ML = \log_{10}(\text{amp}) + 1.110 \log_{10}(\text{hd}/100) + 0.00189 \text{hd} + 3 \quad (\text{Hutton-Boore, 1987})$$

where "amp" is half of the peak-to-peak Wood-Anderson amplitude (in millimeters) and "hd" is the hypocenter-station distance (in kilometers). Analysing the Gutenberg Richter relation, we see that the completeness magnitude of the Italian Bulletin for 2006 is lowered of at least 2 tenths, in comparison to the 2004 value. ISIDe offers at present the Italian Seismic Bulletin since April 16th, 2005. We plan to add very soon to the data-base all the past Bulletins (since 1983), so that they can be requested via the same web page.

Near real time locations

We publish the Italian Seismic Bulletin every 15 days, with delays of 1 to 2 months (after the last reported earthquakes). During this delay, ISIDe is the place where we publish the revised location produced by the Seismic Service, which involves 70 researchers and more than 40 technicians.

According to the protocol, we provide location and magnitude estimations to the Italian Civil Protection for all $M > 2.5$ earthquake inside our National Territory with time increasing accuracy: in two minutes after the first detected Pwave a short notification is due, which indicates the presumed geographical region and a generic indication of the earthquake size.

A preliminary quantitative location and magnitude is provided within 5 minutes, and a robust revised location within 30 minutes after the seismic event. The last, more reliable values are then used to update ISIDe pages. Of course, further location and magnitude refinements are possible just after the communication to the Civil Protection and probable when the Bulletin is eventually published.

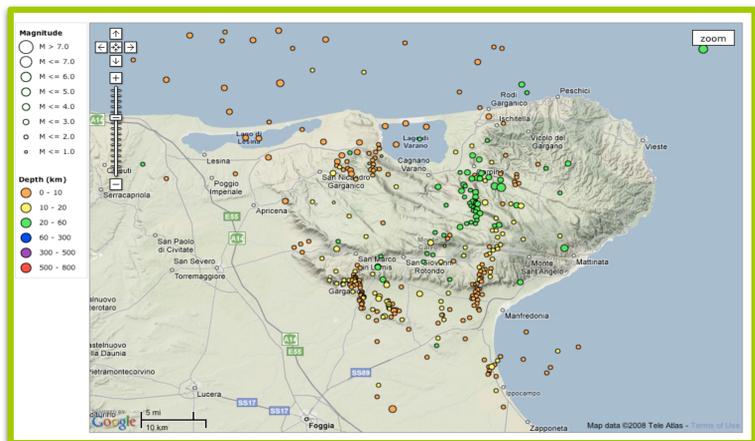
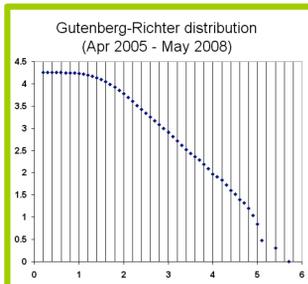


Figure 3 | Seismicity map of the Gargano area, from Jan 1 to Dec 31 2006, extracted from the Italian Seismic Bulletin.



Figure 4 | Central Italy station map, showing the highest density of permanent stations of the whole network.



Station Information

Users can extract, both as table and as maps, geographic information regarding a station (code, latitude, longitude, elevation - Fig. 4) and instrumental parameters (sensitivity, digitizer name, sensor name - Fig. 5). Instrumental responses of all sensor-digitizer sets in use since March 2003 in the Italian Seismic National Network are available as pole and zero zipped files.

Figure 5 | Channel information request: instrumental responses, as pole and zero compressed files, are available for all the instruments since March 2003.

Completeness Analysis

Amato and Mele (2008), exploiting the ISIDe data base, found that the minimum magnitude of completeness M_c of the Italian Seismic Bulletin, as computed from the Gutenberg-Richter distribution, lowered from $M_c \approx 2.3$ in year 2000 to $M_c \approx 1.8$ in 2006. From a different point of view Schorlemmer et al. (2008) used the ISIDe data set to study in detail the detection capability of the Italian National Seismic Network and the completeness threshold of its earthquake catalog as an application of the Probabilistic Method of Completeness (Schorlemmer and Woessner 2008). They showed that the detection capability of the Italian National Seismic Network and, as a consequence, the minimum magnitude of completeness of the catalogue is highly variable from place to place, ranging from $M \approx 1.5$ in some restricted areas of the southern Apennines, while reaching $M = 2.9$ in western Sicily.

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