

The Database of Individual Seismogenic Sources, DISS 3.1.1: new twists and turns

DISS Working Group

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DISS was designed at the end of the 1990s as a repository of seismogenic sources to be used as geological input for ground-shaking SHA applications, and it has been continuously updated since then. Through the years DISS has brought together a large amount of original and published geophysical and tectonic data on Italian seismogenic sources having a potential for a **M 5.5+ earthquake** and is currently being extended to the rest of the Euro-Mediterranean area within the EC-funded project SHARE (www.share-eu.org).

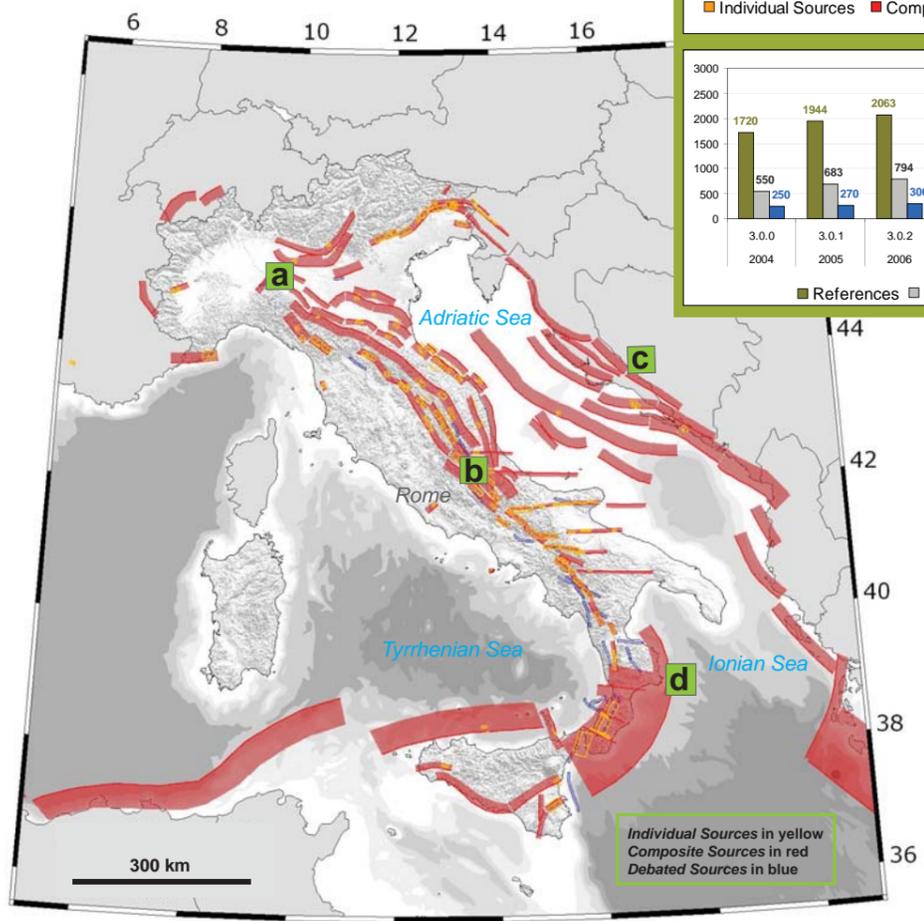
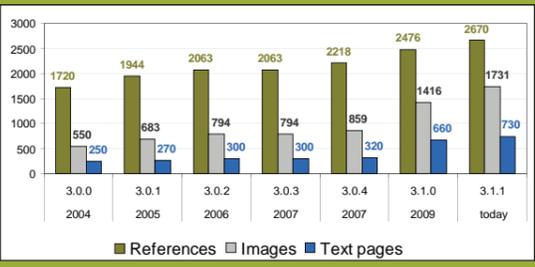
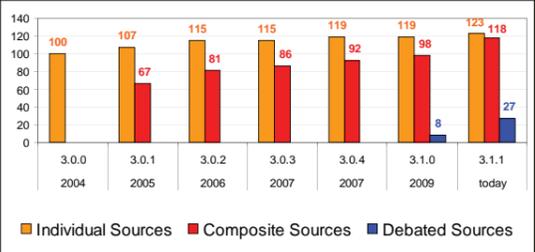
Here we present some highlights on the identification and characterization of **new sources** in key-areas. Each highlight improves the understanding of an extended tectonic domain. The new accomplishments are based on a combination of **original data collected and interpreted by our group** and a thorough review of published literature. The reader may refer to the on-line or Google Earth versions of DISS to obtain information on all sources not discussed here.

Seismogenic source categories

- **Individual Source:** a 3D rectangular fault plane (with fault scarp or fold axis data if available)
- **Composite Source:** a fault system without segment boundaries (with fault scarp or fold axis data if available)
- **Debated Source:** a fault proposed in the literature as a seismogenic source but that have not yet been validated


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 Database of Individual Seismogenic Sources **DISS version 3**

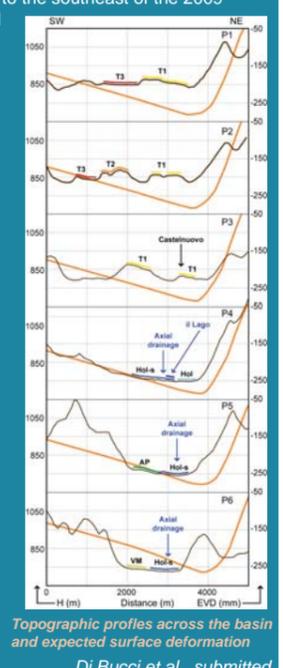
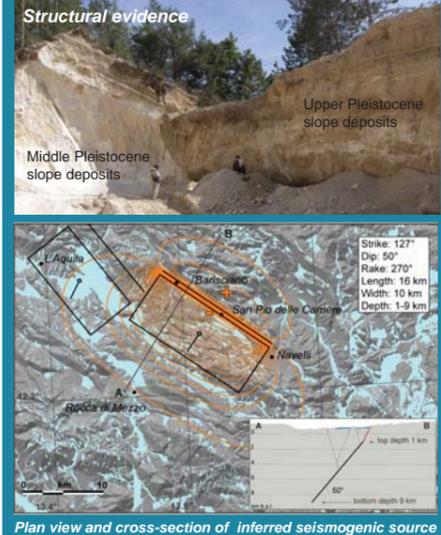
Evolution of DISS contents



San Pio delle Camere Source

Are there additional seismogenic sources adjacent to that responsible for the 6 April 2009, Mw 6.3 L'Aquila earthquake?

Based on the lesson learned from the 2009 earthquake we carried out a number of morphotectonic and geological observations (see also Basili and D'Ambrogio, 2010). We found that the San Pio delle Camere basin, located to the southeast of the 2009 seismogenic fault, is underlain by a major active normal fault. A good agreement exists between the expected subsidence pattern of the proposed fault and the basin asymmetry, the location of max long-term subsidence, and the tilt of paleosurface remnants.

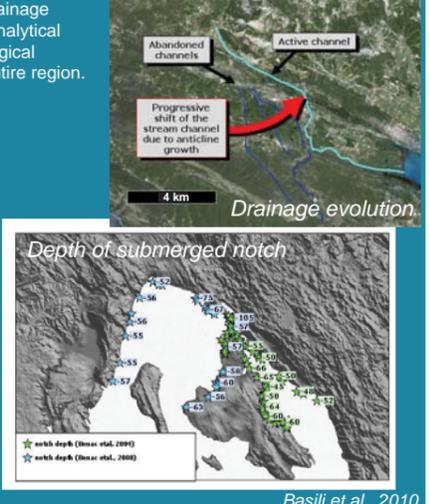
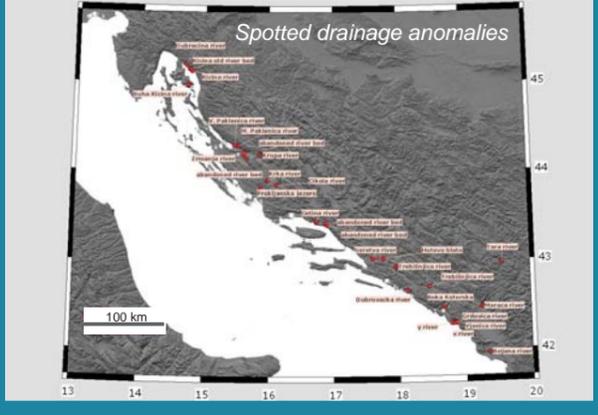


Plan view and cross-section of inferred seismogenic source. Di Bucci et al., submitted

Dinaride thrust belt

Is there any surface evidence for the activity of the buried compressional faults underlying the Croatian coasts?

We analyzed a wide range of indicators of recent tectonic activity, such as drainage anomalies/diversions and displaced or warped geological markers. Careful analytical modeling of these observations constrained by the limited available seismological information allowed the elaboration of a seismogenic source model for the entire region.

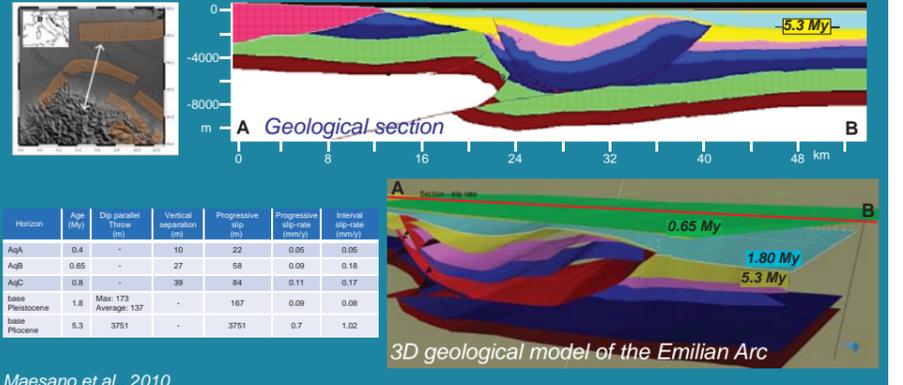


Basili et al., 2010

Emilian Arc (Northern Apennines fronts)

How fast are buried Northern Apennines thrust faults slipping?

We calculated Pleistocene slip rates of a portion of the the Northern Apennines outer thrust fronts after construction of a 3D subsurface geological model. We used the age of known horizons and either the net displacement or the vertical topographic contrast (vertical separation) between the syncline and anticline axes. In the latter case we used trishear and elastic half-space dislocation modeling to derive total fault slip. All calculations were performed after decompaction correction of the geometry of the horizons.

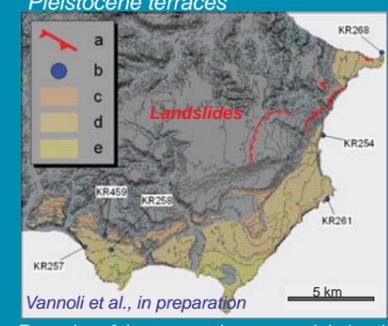
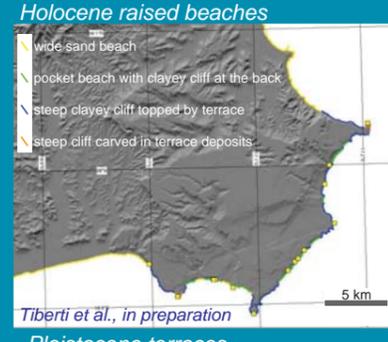


Maesano et al., 2010

Crotone Peninsula

What is the origin of emergent marine terraces in the Crotone Peninsula?

Coastal uplift of the Crotone Peninsula has been the object of investigations for several decades, but very little is known on the origin of the uplift itself. We are investigating and comparing Holocene and Middle-Late Pleistocene uplift rates based on detailed field mapping and on radiocarbon and U/Th dating. The study aims at separating any local components of uplift associated with the contractional tectonics of eastern Calabria from regional-scale uplift of Calabria as a whole.



Examples of the coastline sites mapped during the field surveys

ID	Locality	Lat	Lon	Site description	Marker	Sample	Dating
101	Campolongo	38.930	16.967	Boulders on a sandy beach with lithophae borings.	Lithophae borings on boulders.	T	T
102	Le Castella	38.906	17.024	Raised abrasion platforms on marine terrace deposits.	Raised abrasion platforms.	F	F
103-111, 132	Bosco Soverito	38.918	17.057	Raised beach with notch and sandy dunes at the rear.	Notch.	T	T

Some U/Th datings

Sample name	Single-point age (ka)	3D Inochron age (ka)
KR 254 A	Unsuitable age because of open-system condition	-
KR 254 B	138 ± 23	-
KR 257 A	-	118 ± 54
KR 257 B	-	-
KR 257 C	-	-
KR 257 D	107 ± 5	-
KR 261 A	-	102 ± 4
KR 261 B	-	-
KR 261 D	-	-
KR 268 A	-	-
KR 268 B	Unsuitable age because of open-system condition	-
KR 268 C	-	162 ± 68
KR 268 D	-	-
KR 258 A	139 ± 2	-
KR 258 B	-	-
KR 258 C	139 ± 2	-
KR 258 D	-	-
KR 259 A	145 ± 4	-
KR 255	116 ± 0.3	-

Typical terrace depositional sequence in the area. Example from the Capo Colonna exposure



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