



From strong earthquakes to seismogenic sources in the newly released DISS: examples from north-eastern Italy and western Slovenia

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We present an overview of the seismogenic sources of NE Italy and W Slovenia, included in the updated version of the Database of Individual Seismogenic Sources (DISS 3.0.2). We will discuss their location, geometry and kinematics, and give some examples of their morphotectonic signature.

In the Veneto-Friuli area (NE Italy), destructive earthquakes up to M 6.7 are generated by thrust faulting along S-verging structures of the Eastern Southalpine chain, that from W to E follow a NE-SW to E-W trend, and mark the mountain front. Blind thrusting accommodates about 2.0 mm/yr of convergence, and is associated to growing anticlines, tilted and uplifted Quaternary paleolandscapes and forced drainage. To the east, beyond the Italy-Slovenia boundary, dextral strike-slip faulting along the NW-SE trending structures of the Idrija system dominates the seismic release. Activity and faulting mechanism are shown by recent earthquakes (e.g.: the Ms 5.7, 1998 Bovec and the Mw 5.2, 2004 Kobarid earthquakes), while the related morphotectonic imprint is still a debated matter.

DISS (the 3.0.2 version of which is presented in this same meeting session) is a georeferenced repository of tectonic, fault and paleoseismological information for the Italian territory and surrounding regions. The main object of the database is the seismogenic source, a simplified and georeferenced three-dimensional representation of a fault plane. The seismogenic sources, identified through integrated geological and geophysical investigations, are capable of primary slip during a large earthquake, and are assumed to exhibit “characteristic” behaviour with respect to rupture length/width

and expected magnitude. The content of DISS 3.0.2 puts significant emphasis on potential applications in the assessment of seismic hazard, through the synoptic view of different layer of information, and the use of specifically developed GIS tools.

The identification of the seismogenic sources responsible for earthquakes of $M_w \geq 5.5$, and the characterization of their geometry in the study area follow the work by several authors which investigated the area between the Lessini Mountains and the Italian-Slovenian border. Seismogenic sources result from a 3-step procedure routinely applied each time their parameters have to be derived from published works. In the first step, we verify the consistency of geometry and size of faults, as results from geological field studies, with respect to the seismological parameters of the known major earthquakes that can be associated to them. This phase of the procedure includes the usage of empirical and analytical relationships between length, width and slip of faults and magnitude, seismic moment and stress drop of earthquakes. In the second step, we scrutinize the minor or less known earthquakes (down to $M 5+$) as a double check for hints of fault activity. In the third step, we analyze all faults that were not associated to any known earthquake in search for possible seismic gaps. In this phase, we usually rely on the best known sources as model faults for segmentation.

The release of DISS 3.0.2 shows that in Veneto and western Friuli, coseismic deformation seems to be adsorbed almost entirely along a single alignment of thrust faults, while in the epicentral area of the Friuli 1976 earthquake sequence deformation is distributed on more thrust fronts. Western Slovenia, instead, is characterized by several subparallel active strike-slip strands.