S3:
ShakeMap and GMPEs

- Why ?
  - Where no data available GMPEs (and site corrections) are required
- How ?
  - Several GMPEs available within ShakeMap basic distribution
  - We have implemented the Malagnini and co-authors for M<5.5 (see papers since late 1990s)
  - Akkar &Bommer (2007a,2007b) for PGA anf PGV for M≥5.5
  - Local centers have also implemented other “ad hoc” relations but **the goal is to homogenize the installations *(and that everybody is happy!)***
  - ShakeMap, however, scales the GMPEs depending on the available data (i.e., bias correction).

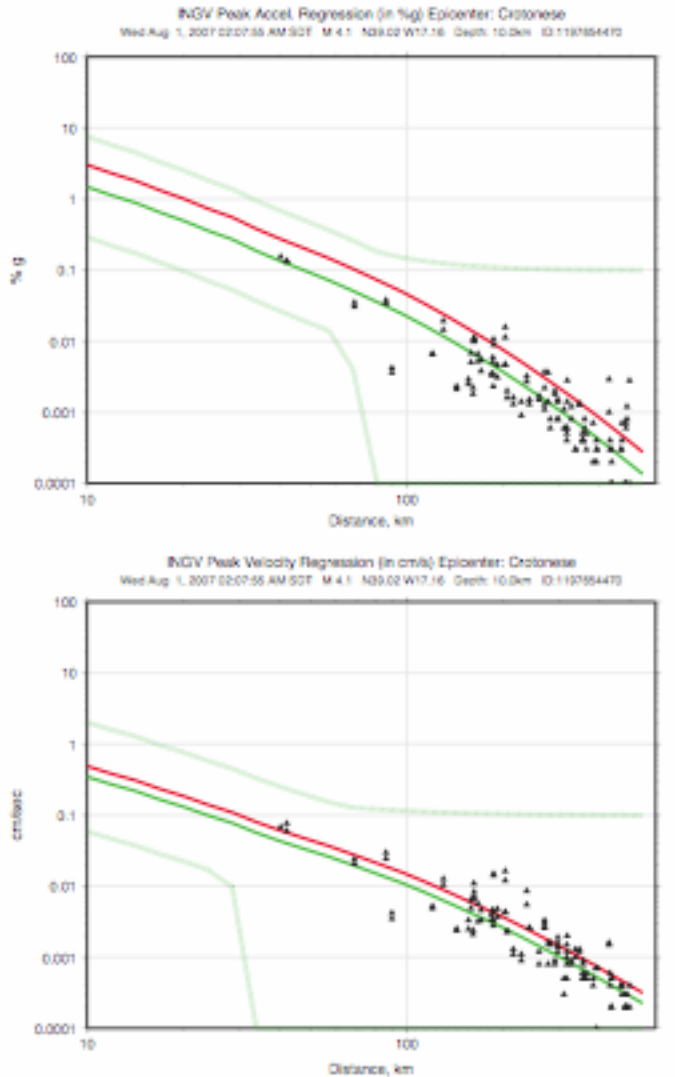
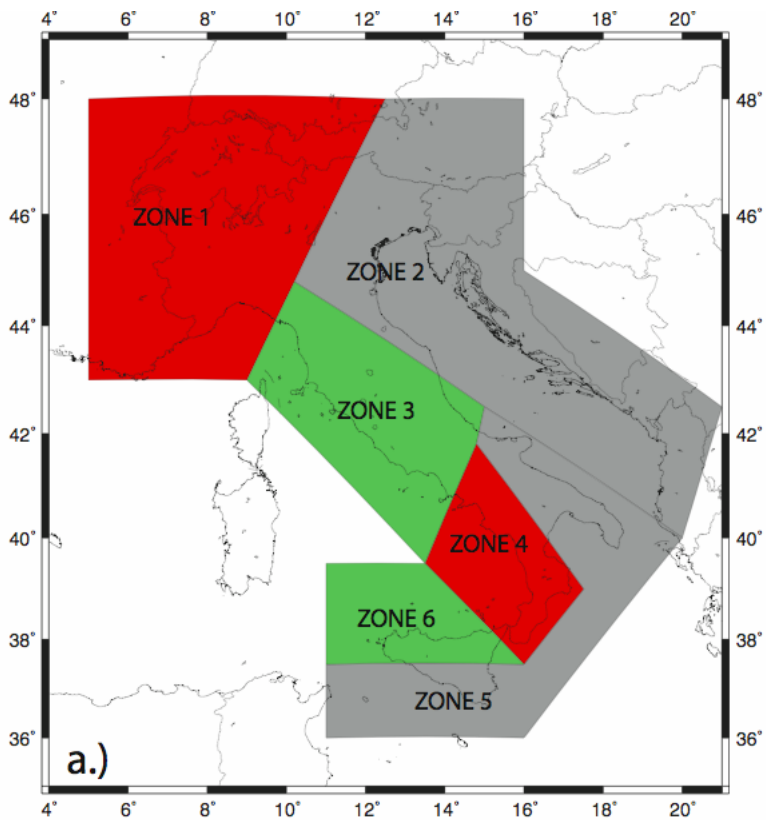
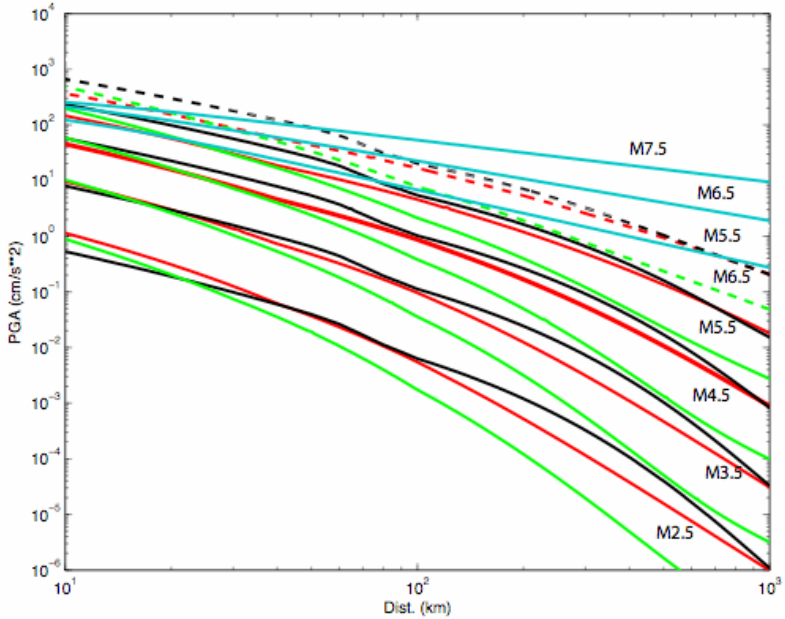


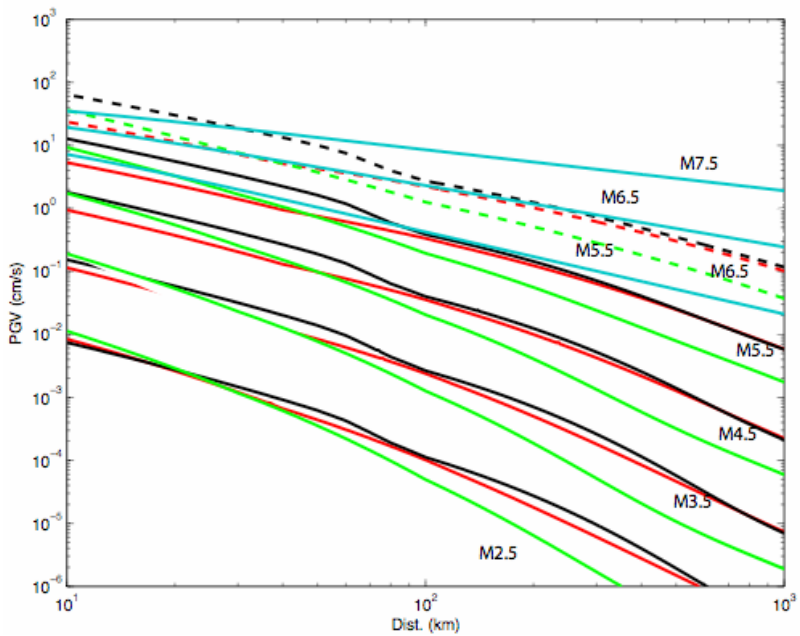
Figure 5. Regressions of the PGA and PGV against the adopted regressions for the 1 August 2007 **M** 4.1 Crotone earthquake. Solid red line = raw regression; solid green line = biased regression; dotted green lines = outlier flagging limits, linked to the bias corrections. Station data plotted are corrected to rock.

Ground Motion Predictive Relationships

Regionalization of the attenuation relations for M <5.5 events (Malagnini et al.).
For M ≥ 5.5 events the relations of Akkar and Bommer 2007 are used. Colors in PGA

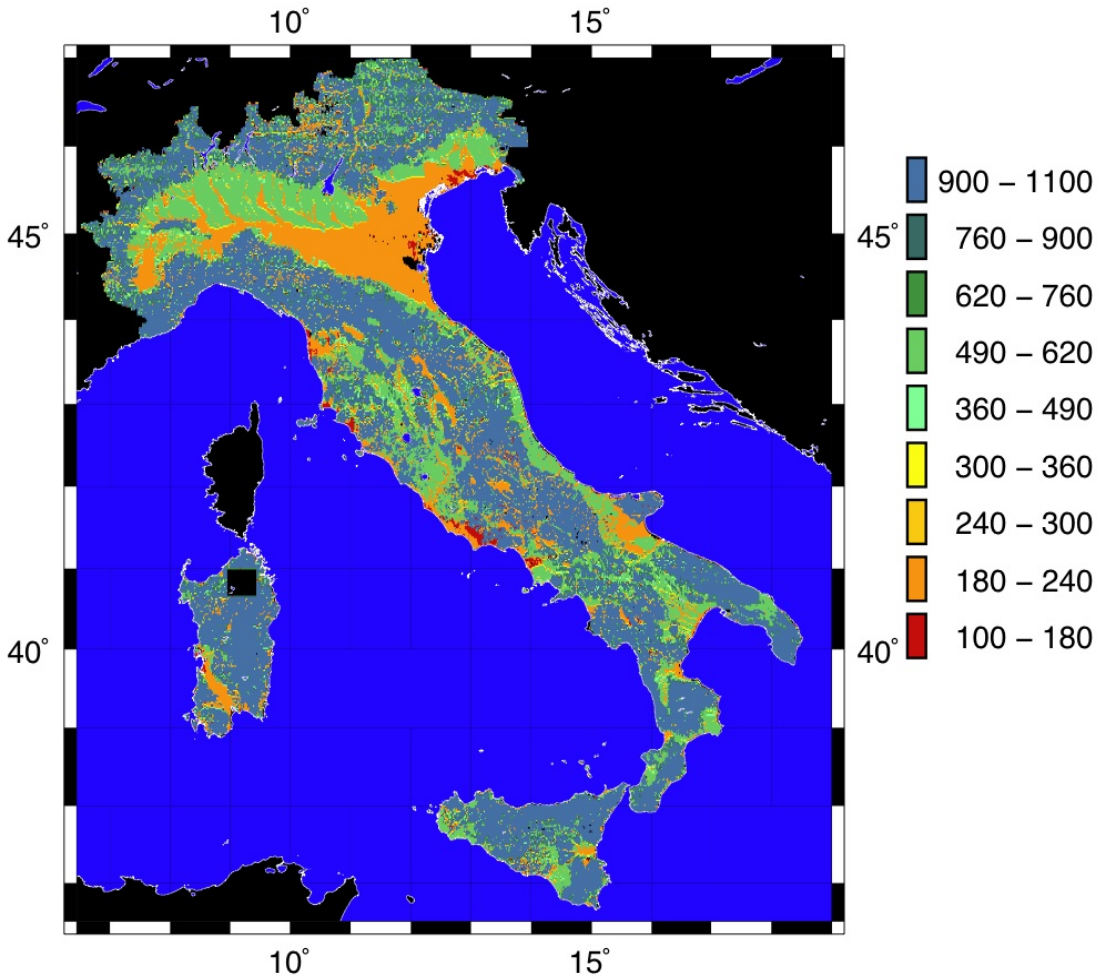




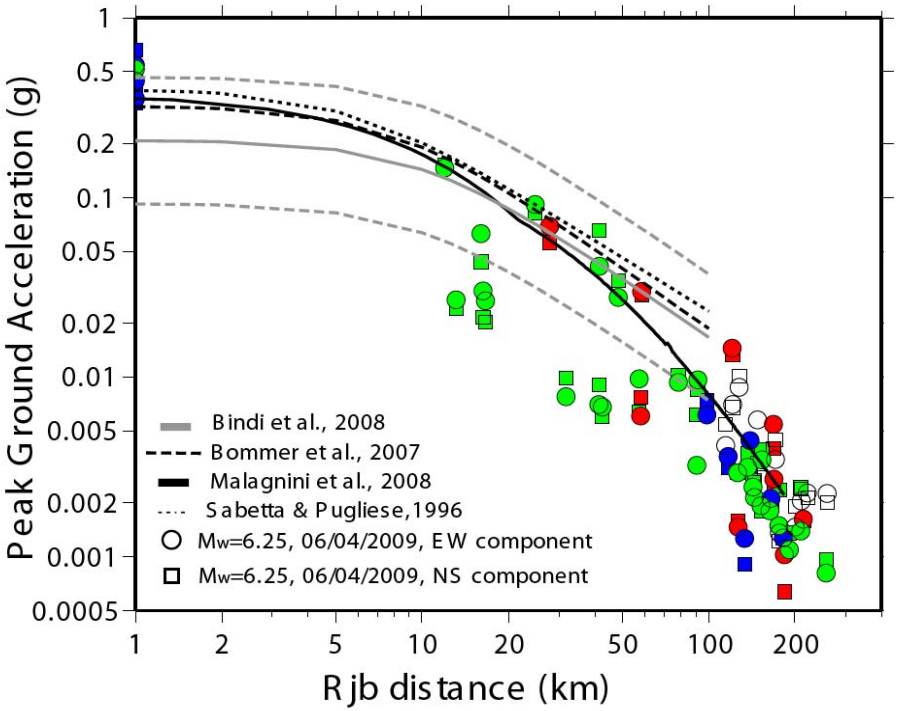


Site Corrections

- **Site Condition Map**: based on geology and shear wave velocity in the top 30 meters. The geology units have been gathered into five classes, according to the EuroCode8 provision. For the classification, lithological and age criteria has been used.



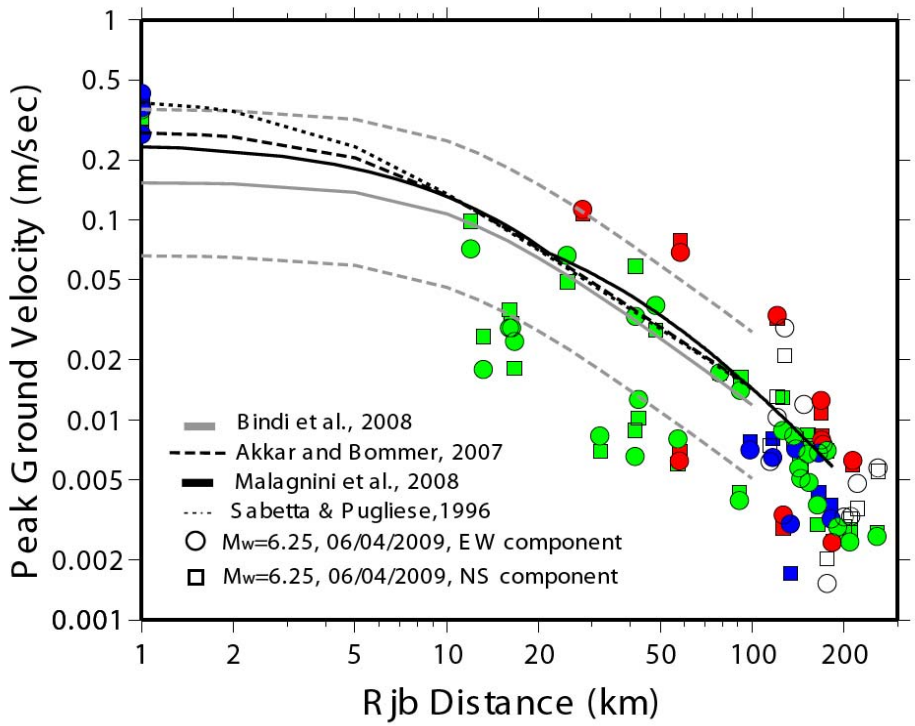
Horizontal peak accelerations and velocities from processed data have been compared with some of the empirical ground motion prediction equations (GMPE) developed based on both strong and weak motion data: Sabetta and Pugliese 1996 (SP96);Bommer et al., 2007 (BM07); Akkar and Bommer 2007 (AB07); Bindi et al. 08 (ITA08), and Malagnini et al., 2008 (MAL08)



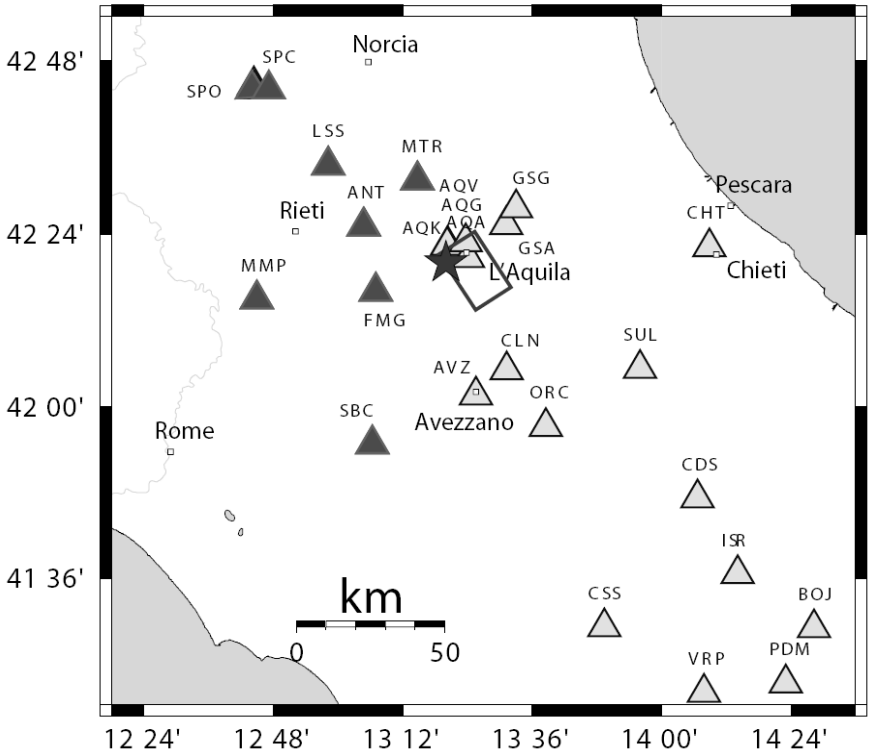
GREEN COLOR SITE A

BLUE COLOR SITE B

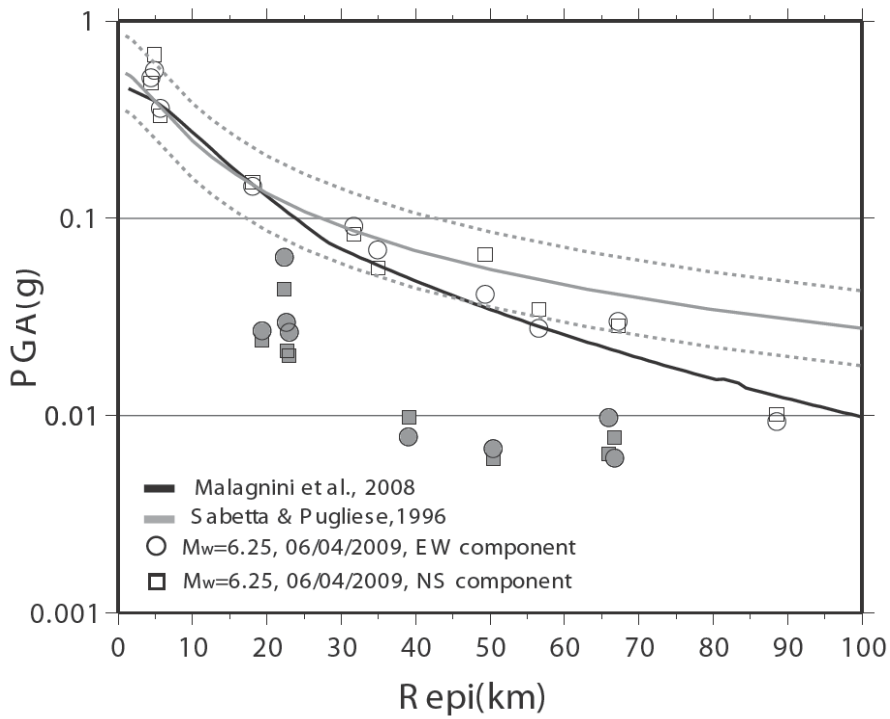
RED COLOR SITE C



From Akinci, A., Malagnini, L. and Sabetta, F. , 2009. Strong Ground Motion Characteristics from the 6 April 2009 L'Aquila earthquake, Italy.(in preperation).

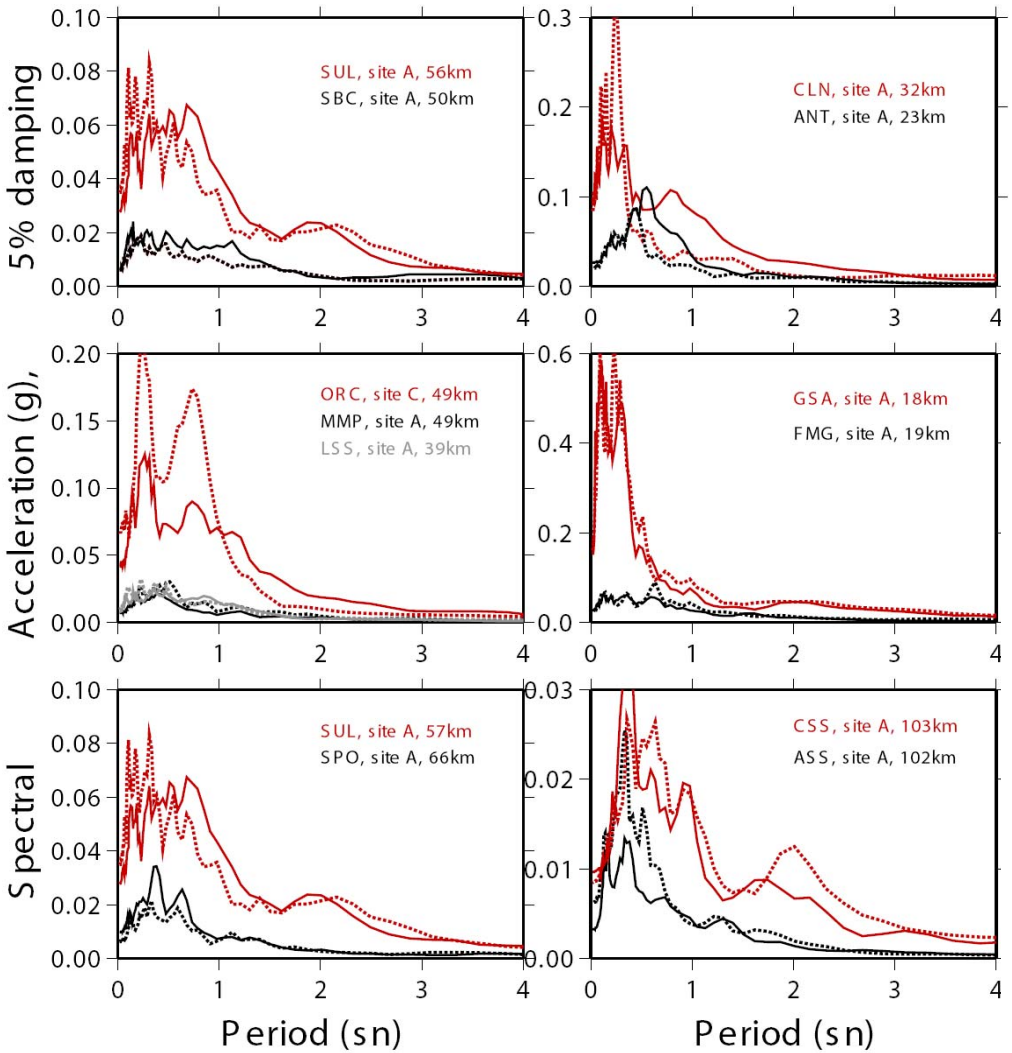


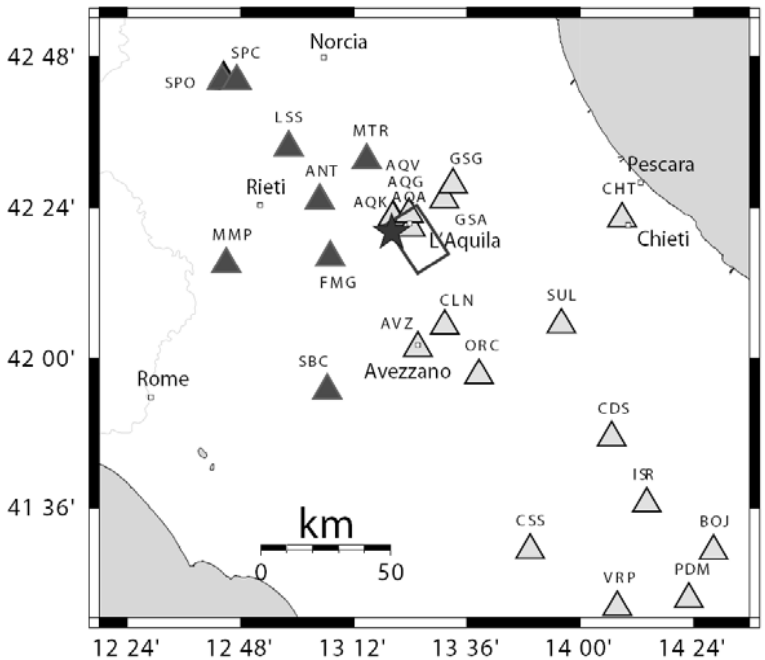
Gray colored stations corresponds to anti-directive positions.
PGA lower than 1 SD for those stations



From Akinci, A., Malagnini, L. and Sabetta, F. , 2009. Strong Ground Motion Characteristics from the 6 April 2009 L'Aquila earthquake, Italy.(in preperation).

Spectrum with black and gray color correspond to the stations in anti-directive relative to nucleation point





From Akinci, A., Malagnini, L. and Sabetta, F. , 2009. Strong Ground Motion Characteristics from the 6 April 2009 L'Aquila earthquake, Italy.(in preperation).