Geophysical Research Abstracts
Vol. 18, EGU2016-16312, 2016
EGU General Assembly 2016

Geomorphic evidence of active faults growth in the Norcia seismic area (central Apennines, Italy)

Marco Materazzi (1), Domenico Aringoli (1), Piero Farabollini (1), Marco Giacopetti (1), Gilberto Pambianchi (1), Emanuele Tondi (1), and Francesco Troiani (2)

(1) School of Science and Technology, University of Camerino - Italy (marco.materazzi@unicam.it), (2) Earth Science Department, University of Rome "La Sapienza" - Italy

Fault-growth by segment linkage is one of the fundamental processes controlling the evolution, in both time and the space, of fault systems. In fact, step-like trajectories shown by length-displacement diagrams for individual fault arrays suggest that the development of evolved structures result by the linkage of single fault segments. The type of interaction between faults and the rate at which faults reactivate not only control the long term tectonic evolution of an area, but also influence the seismic hazard, as earthquake recurrence intervals tend to decrease as fault slip rate increase.
The use of Geomorphological investigations represents an important tool to constrain the latest history of active faults. In this case, attention has to be given to recognize morphostructural, historical, environmental features at the surface, since they record the long-term seismic behavior due to the fault growth processes (Tondi and Cello, 2003).
The aim of this work is to investigate the long term morphotectonic evolution of a well know seismic area in the central Apennines: the Norcia intramontane basin (Aringoli et al., 2005). The activity of the Norcia seismic area is characterized by moderate events and by strong earthquakes with maximum intensities of X-XI degrees MCS and equivalent magnitudes around 6.5±7.0 (CPTI, 2004).
Based on the morphostructural features as well as on the historical seismicity of the area, we may divide the Norcia seismic area into three minor basins roughly NW-SE oriented: the Preci sub-basin in the north; the S. Scolastica and the Castel S. Maria sub-basins in the south. The wider basin (S. Scolastica) is separated from the other two by ridges transversally oriented with respect the basins themselves; they are the geomorphological response to the tectonic deformation which characterizes the whole area. Other geomorphological evidences of tectonic activity are represented by deformation of old summit erosional surfaces, hydrographic network diversion, faulted deposits, deep-seated gravitational slope deformations and large landslides. Moreover the sub-basins represent the surface evidence of traits belonging to the Norcia seismogenic structure, which have repeatedly caused earthquakes in the past, thus determining similar geological, structural and morphostructural features within the wider Norcia area, without causing the whole structure to rupture. The size of these sub-basins and, thus, the size of the relevant seismogenic segments, allows to calculate a maximum magnitude for the three sub-basins and for the seismogenic area as a whole.

References

Aringoli D., Cavitolo P., Farabollini P., Galindo-Zaldivar J., Gentili B., Giano S.I., Lòpez-Garrido A.C.,. Materazzi M, Nibbi L., Pedrera A., Pambianchi G., Ruano P., Ruiz-Constàn A., Sanz de Galdeano C., Savelli D., Tondi E., Troiani F. 2014. Morphotectonic characterization of the quaternary intermontane basins in the Umbria-Marche Apennines (Italy). Rend. Fis. Acc. Lincei 25 (Suppl 2), S111–S128. DOI 10.1007/s12210-014-0330-0
CPTI, Working Group, 2004. Catalogo Parametrico Terremoti Italiani, ING, GNDT, SGA, SSN, 92 pp., Bologna.
Tondi, E., Cello, G. 2003. Spatiotemporal Evolution of the Central Apennines Fault System (Italy). Journal of Geodynamics, 36, 113-128