



Geological interpretation of seismic reflection profiles across the area interested by the Norcia Mw 6.5 mainshock (Central Italy)

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We provide a novel reconstruction of the subsurface geology of the area close to the Norcia Mw 6.5 mainshock (30 October 2016), based on previously unpublished seismic reflection profiles and available geological data. Though the surface expression of the complex system of NNW-SSE trending, seismogenic normal faults is well known at the surface, the subsurface setting of the area and the relationships between the seismicity and the geological structures is poorly explored.

The interpreted data-set has been synthesized along a 47 km long, WSW-ENE trending geological cross section, interpreted down to a depth of 12 km. We find that the seismicity is confined within the sedimentary sequence and does not penetrate the underlying basement. The basement has been constrained at depths of 8 to 11 km and coincides with the cut-off of the seismicity. The mainshocks are located within the Triassic evaporites, close to the bottom of the seismogenic layer. A sub-horizontal cut-off of seismicity is well recognized at the top of the basement, whereas only a few and low magnitude events are able to penetrate the substrate at depths higher than 12 km. The subsurface image of the main active seismogenic faults clearly shows that they are steeper than the pre-existing thrusts. However, we observe that the normal faults progressively diminish their dip from about 60° - 70° , at surface (where the coseismic ruptures were observed), to $<50^{\circ}$ at depth in accordance with both the mainshocks focal mechanisms and the aftershocks distribution.

The results of this study may be useful for a better understanding the rheological properties of the seismogenic rock volume, as well as the co-seismic deformations of the topographic surface observed by geodetic techniques and field mapping.