The upper crustal geological and structural setting in the area of the 2016-2018 Central Apennines seismic sequence. From subsurface modeling to seismotectonics.

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Central Apennines (Italy) is a young and tectonically active mountain chain characterized by a high structural complexity where structures related to various tectonic phases are interacting with each other leading to the reactivation of inherited structures and/or to the segmentation of newly formed ones with a strong impact on the current seismotectonics of the area.

In this context, the surface geological and coseismic observations cannot always be extrapolated straightforward to depth and need to be interpreted in the context of the general upper crustal deformation history.

These considerations apply also to the area struck by the 2016-2018 Central Apennines seismic sequence where the activation of both single faults and complex fault systems has been observed.

In the framework of the RETRACE-3D project, we present a comprehensive 3D geological model derived from the interpretation of a large set of underground data acquired for hydrocarbons explorations and we discuss the implication of this geological reconstruction for the seismotectonics of the area by comparing our results with the coseismic observation.

Our results primarily show that, although the area is currently affected by an extensional tectonic regime, the main architecture of this portion of the chain is still dominated by previous compressional large-scale structures with widespread evidence of segmentation, reactivation and even inversion of various sets of inherited faults.

These results pose new points of discussion on information and input data needed to understand
the seismogenesis in young and complex mountain chains, such as the Central Apennines, and strongly impact on the consequent seismic hazard assessment study.