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Petrinja Seismogenic Source and its 2020-2021 Earthquake Sequence (central Croatia)

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The ongoing Petrinja earthquake sequence interests a structurally complex area characterized by the transition between the Dinarides and the Pannonian Basin structural units. The sequence mainshock (December 29, 2020; Mw = 6.4) struck in the vicinity of the Petrinja town and caused significant damage in the human and in the natural environments. The preliminary seismological and geodetic analyses indicated a dextral strike-slip NW-SE oriented fault as the event source. Numerous geologic surface deformation patterns have been identified in the aftermath of the main event, including collapsed sinkholes, liquefaction, different forms of landslides, and surface fractures which nature and causative process require further detailed studies.

The aim of our contribution is to apply a multitude of different geophysical, geodetic and geologic methodologies to decipher the Petrinja seismogenic fault geometry in the light of its ongoing earthquake sequence. We will show how the different datasets converge in delineating the fault geometry and discuss their diverging aspects and implications. Our preliminary analyses on the geometric and kinematic characteristics of the mainshock (as well as those of the foreshocks and aftershocks) point to an important structural complexity. This aspect helps us to better understand the seismotectonic framework of the Petrinja seismogenic fault and other regional seismogenic faults of similar geologic and geodynamic setting.