

EGU21-9434, updated on 05 Jul 2022

<https://doi.org/10.5194/egusphere-egu21-9434>

EGU General Assembly 2021

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## **Petrinja M6.2 earthquake (Croatia) on 29/12/2020 occurred on the intersection of the two regional active faults at the transition between Dinarides and Pannonian basin**

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Devastating M6.2 earthquake (1) hit Petrinja epicentral area (2) on 2020-12-29. M5.0 foreshock on 2020-12-28 (1) caused moderate damage on buildings and forced many inhabitants to move out from their homes. Thus, the foreshock was a kind of lucky event that saved many human lives.

Considering the shallow focal depth (1) and QMTS that show clear strike-slip focal mechanisms (3, 4), surface failures were expected after the mainshock. Immediate reports in media allowed quick online research of surface failures indicating that linear infrastructure damages appear along ~30 km long portion of sinistral NE-SW striking Sisak-Petrinja-Glina-Topusko Fault. Quick field inspection revealed that fresh fault planes in the bedrock appear mostly along longitudinal NW-SE striking (Dinaric strike) Pokupsko-Kostajnica-Banja Luka Fault, and show clear dextral co-seismic strike-slip displacements. The map view time-lapse animation of the seismic sequence (5) revealed that ~20 km long portion of the Pokupsko Fault was (re)activated. The two subvertical mutually perpendicular faults intersect near the epicenters. The historically important Pokupsko earthquake occurred in the vicinity (6), and was used by a famous Croatian geophysicist Andrija Mohorovičić to discover the MOHO discontinuity.

The fault system is textbook example of major failure in the upper crust along the pre-existing fault net (7) at the critical moment of centennial release of generally north-south oriented compressional strain that is accumulating in the crust because of continuous northward movement of the Adriatic microplate (Adria). Up to 10 mm/yr Adria GPS velocities measured in the Adriatic foreland are mostly accommodating along major External Dinarides active faults, since the Internal Dinarides GPS velocities are only 1-2 mm/yr, while the velocities in the Pannonian basin are near zero (8). The dextral Pokupsko-Banja Luka Fault could be one of the main inherited active faults between the crustal segments of the Adria, while sinistral Petrinja fault could represent reactivated Mesozoic transform fault bordering the crustal fragments (9) of once greater Adria (10).

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