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## Rupture analysis of the 2020 Petrinja earthquake based on seismological observations

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Here, I use seismological observations (~70 broadband stations at distances between 100 and 400 km from the source) to characterize the rupture properties of the Petrinja mainshock (Mw 6.4). First, I perform a spectral analysis of the P-waves to compute the corner frequency. In order to remove the wave propagation effects and isolate the source properties, I use the largest foreshocks and aftershocks (Mw>4) as empirical Green's functions (EGFs). Assuming a Brune's source model, the obtained stress drop is ~20 MPa. This rather large value is in agreement with the short rupture length of ~8 km inferred by InSAR data (Ganas et al. 2021). In addition, the weak azimuthal variations of the corner frequencies indicates a bilateral rupture, that is a rupture nucleating close to the fault center. Second, I compute the apparent source time functions (i.e. the source time functions "seen" from any station) using an EGF deconvolution approach. The results indicate an average rupture duration of 5-6 s with weak azimuthal variation of the apparent rupture duration, in agreement with the spectral analysis. Finally, I perform a Bayesian inversion of the apparent source function, in order to obtain a kinematic model of the rupture propagation (slip distribution, rupture velocity). The preliminary results reveal a slow velocity of the rupture propagation. Such a slow rupture velocity associated with a large stress drop has been observed on other faults with slow slip rates (e.g. Causse et al. 2017). This work provides insight on the rupture process of this major event on a poorly documented fault. I am fully open for collaborations to further develop and enrich this study.

### References

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