Multi-disciplinary studies on the characteristic properties of creeping along the Hazar-Palu Segment of the East Anatolian Fault (Turkey)

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In the complex tectonic frame of the Eastern Mediterranean, the Anatolian Block displays a westward extrusion with relative to Eurasia. This motion is mainly accommodated along its northern and eastern boundaries, the North and East Anatolian Faults. Although there is the increasing number of studies for the Northern member, relatively there is the limited number of studies for the East Anatolian Fault, especially in terms of its spatio-temporal behaviour within and between the earthquake cycles.

In our previous studies, we have documented aseismic creep for the 100 km-long Palu Segment in the Elazıg-Bingöl seismic gap by using InSAR, GNSS, and creepmeters where the bedrock is mainly composed of accretionary complexes of the Tethyan oceans. The surface creep rate varies along the fault locally attaining the far field plate velocity (~ 10 mm/yr), which simply suggests that significant portion of the elastic strain is being released aseismically and the fault may be creeping from the surface to the entire seismogenic crust. We started multi-disciplinary studies in order not only to document the spatial distribution of this creep motion but also to have a better understanding of its temporal behaviour. Thus, we aim to study important parameters such as the mechanical properties of fault rocks, the paleoseismic behaviour of the Hazar-Palu and the adjacent segments in addition to ongoing continuous deformation monitoring. We will also implement deformation analysis by using the optical correlation of historical aerial photography for the same section of the fault. Our results will not only contribute to increasing our knowledge on the creeping process but also will provide information on the earthquake behaviour of the EAF, which has been poorly constrained.

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