

Preliminary GNSS results from the 6 February 2023 Kahramanmaraş, Turkiye, earthquake sequence

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We present GNSS results from before and immediately after the 6 February 2023 Kahramanmaraş, Turkiye, earthquake doublet. GNSS data, specifically from continuous sites, are critical contributions to the study of these earthquake given that satellite radar and optical imagery is not able to distinguish between the two main earthquakes' displacement fields and immediate aftermath due to data acquisition schedules. We show a combined GNSS velocity solution and derived strain rates for the eastern Anatolia region, to demonstrate the geodetically observed deformation prior to these earthquakes. We also present three types of displacement solution based on data from the TUSAGA-Aktif network of continuous sites: (1) A set static displacements derived from standard processing before, between and after the earthquakes; (2) A kinematic solution showing the limits of our ability to measure the finer details of rapid deformation over the first hours and days after the earthquakes; and (3) dynamic displacements from high-rate GNSS data, and their ground velocity and ground acceleration derivatives.

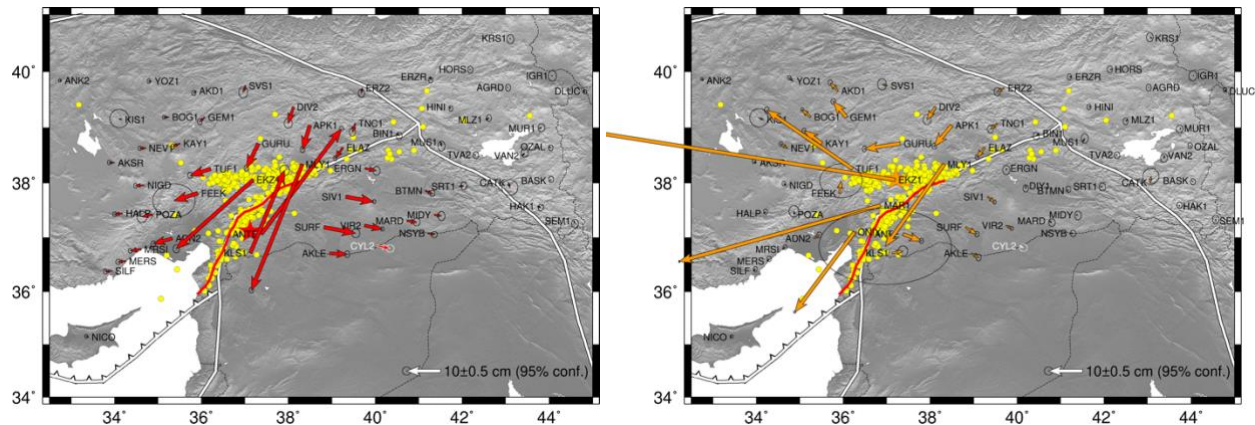


Figure 1: (Left) GNSS site displacements from the first, M7.8 earthquake, whose epicenter is marked by the red star. (Right) GNSS site displacements from the second, M7.5 earthquake, whose epicenter is marked by the orange star. In both figures, all sites use a combined GPS-and-Galileo solution, except CYL2 (outlined in white), which is Galileo only due to GPS tracking issues. Yellow circles show aftershocks from the first two days from the KOERI earthquake catalog.