1. **Title** 3D Near-field Surface Deformation, Stress and Friction of the 2023 Mw 7.8 and Mw 7.6 Kahramanmaras Earthquakes Measured by ALOS-2, Sentinel-1 and Sentinel-2 pixel offsets
2. **Your name and affiliation**

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3. **Abstract text (300 words or fewer)**

The variation of stress on faults is important for our understanding of fault friction and the dynamics of earthquake ruptures. However, we still have little observational constraints on absolute stress magnitudes, or their variations in space and in time over the seismic cycle. Here, we use 3D surface deformation measurements in the near-field of the 2023 Mw 7.8 and Mw 7.6 Kahramanmaras earthquakes to estimate the distribution of 3D slip vectors along both ruptures and invert them for the stress state and frictional properties, using the approach of Milliner et al. (2022). To estimate the 3D coseismic surface deformation we invert azimuthal and range pixel offsets estimated from ascending and descending Sentinel-1 and descending ALOS-2 radar data. Radar were processed using ISCE, and pixel offsets from Sentinel-2 optical imagery estimated using the newly developed COSI-Corr+ software. The coseismic slip magnitude shows a marked decrease of ~3 m along a restraining bend of the Mw 7.8 mainshock rupture. We assume this reflects the quasi-static effect of a decrease in the initial shear stress due to the change of the fault geometry with respect to the ambient stress field. We use this to invert for the static and dynamic friction of the ruptured faults and the absolute stress magnitude and its orientation.

4. **One image**