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Studying Creep Behavior in the Earthquake Cycle with InSAR Phase Gradient: Case of the North Anatolian Fault and East Anatolian Fault

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Shallow creep, as a widespread phenomenon in the earthquake cycle, plays an important role in understanding the behavior of faults and seismic hazards. InSAR has been widely used to measure the interseismic deformation of strike-slip faults. In the previous study, we used the phase gradient stacking method to obtain the strain rate maps along the North Anatolian Fault (NAF) and found that the spatial distribution of the shallow creep and the coseismic slip has a close relationship. However, the large earthquakes on the NAF occurred before the Sentinel-1 satellite started acquiring data, and we wanted to investigate the fault creep characteristic before the earthquake, so we utilized several recent large earthquakes on the East Anatolian Fault (EAF). The EAF was recently ruptured by the 2020 Mw6.8 Elazig, and 2023 Mw7.8/Mw7.6 Kahramanmaras earthquake sequence, providing a unique opportunity to investigate the relation between shallow creep and earthquakes along strike-slip fault. It will provide a better understanding of the creep behavior during the seismic cycle and combine the coseismic slip distributions with an assessment of the seismic hazard of the seismic gap on the EAF.

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