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Slip Rate Variation Along the East Kunlun Fault (Tibet) From InSAR & GNSS Observations

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The strike-slip faults of the Tibetan Plateau plays a crucial role in understanding the response of the continental lithosphere to the ongoing India-Eurasia collision and associated deformation. However, the slip rate along the East Kunlun Fault, particularly its eastern segment, remains contentious. In this study, we combine ascending and descending Sentinel-1A InSAR data with GNSS measurements to derive a high-resolution velocity field spanning from the Tuosuo Lake segment to the Maqin-Maqu segment of the East Kunlun Fault. We then apply a 2D elastic dislocation model (Savage and Burford, 1973) in conjunction with the Markov Chain Monte Carlo (MCMC) method to invert the fault slip rate. Our results reveal that the slip rate in the Tuosuo Lake segment of the East Kunlun Fault is 6.6–8.1 mm/yr, while in the section extending from Tuosuo Lake to the Anyemaqen Mountain, it ranges from 4.4 to 4.9 mm/yr. In the compressional step-over region at Anyemaqen Mountain, the slip rate decreases to 2.7 mm/yr. Further to the east, the slip rate gradually decreases from 4.7–5.9 mm/yr to 2.7 mm/yr in the Maqin-Maqu segment. The slip rate along the East Kunlun Fault exhibits a non-monotonic decrease from west to east, likely influenced by the uplift of Anyemaqen Mountain and the contribution of secondary faults on the southern flank of the fault system.