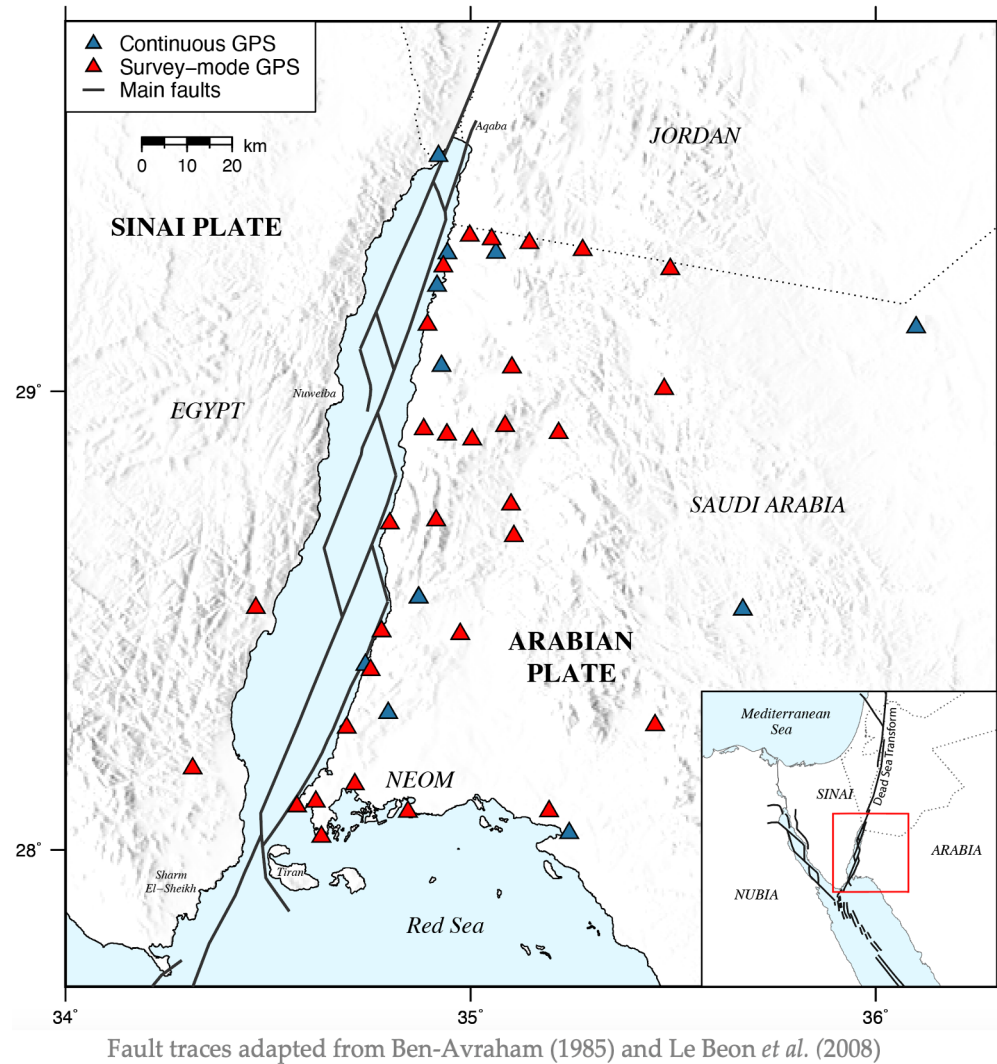


Interseismic Deformation in the Gulf of Aqaba Inferred from GPS Measurements

Motivation



- The most significant earthquake hazard in Saudi Arabia is along the Gulf of Aqaba coast.
- Planned NEOM megacity adjacent to the gulf and King Salman Bridge across it to Egypt.
- 30 GPS markers added in 2014 significantly increased the geodetic coverage in the area.
- We aim to address two fundamental questions:
 1. Can slip rates and locking depths on major fault segments within the gulf be estimated using the new GPS data?
 2. How fast is geodetic moment accumulating on the fault system in the gulf?

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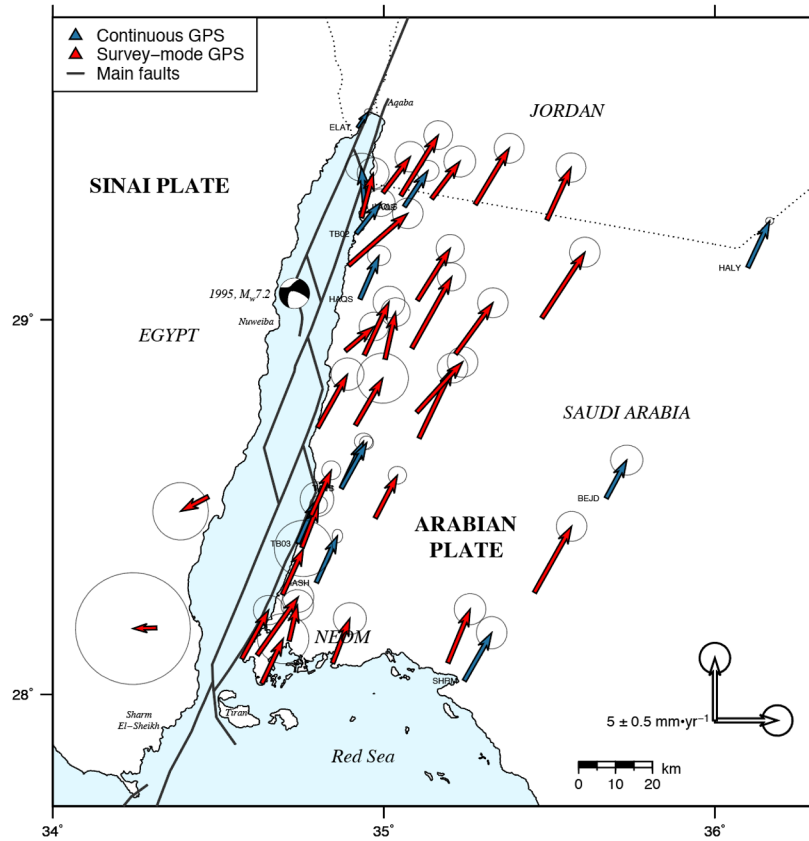
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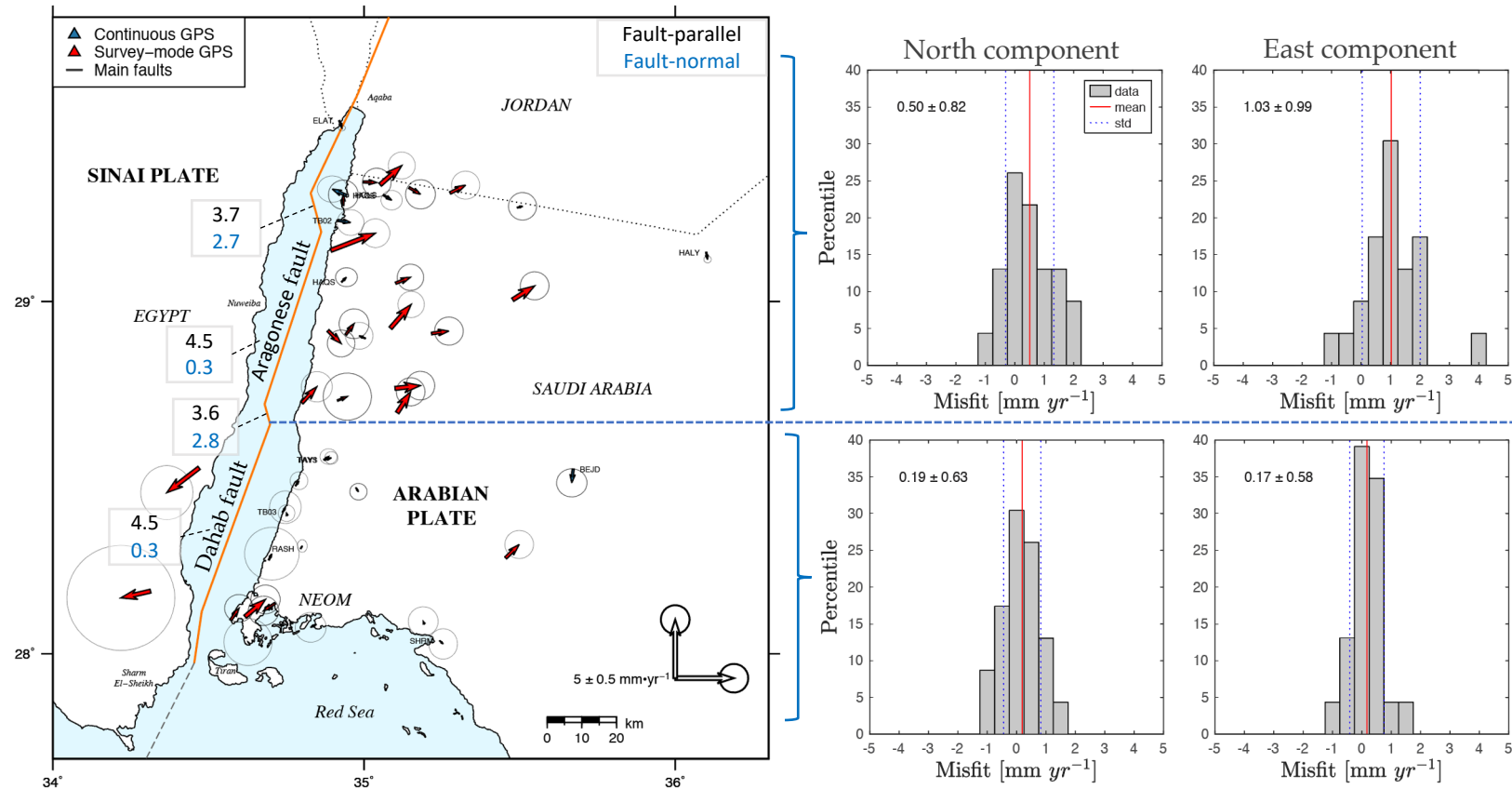
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GPS velocities relative to Sinai



Focal mechanism of the 1995 M_w 7.2 Nuweiba earthquake retrieved from the Global CMT catalogue (<http://www.globalcmt.org>)

Back-slip model residuals (observed-modelled)



- Left-lateral slip rate $\sim 4.5 \text{ mm/yr}$
- Contrast between the residuals of stations in the North (east of Aragonese fault) and South (east of Dahab fault)
- Small ($\sim 1 \text{ mm/yr}$) but systematic residual motion directed towards the NE in Arabia and towards the SW on the Sinai Peninsula.

- Left-lateral slip rate of ~ 4.5 mm/yr on the main fault segments in the Gulf of Aqaba.
- Elastic dislocation models cannot provide a reasonable constraint on fault locking depths due to limited near-fault measurements.
- Our results suggest the existence of a residual left-lateral motion across the gulf that cannot be explained by block rotations and strain accumulation alone.
- Postseismic transient motions caused by the 1995 Nuweiba earthquake (M_w 7.2) could potentially explain the residual signal.