Shallow slow slip event on the Southern San Andreas Fault triggered by the 2017 Chiapas (Mexico) earthquake

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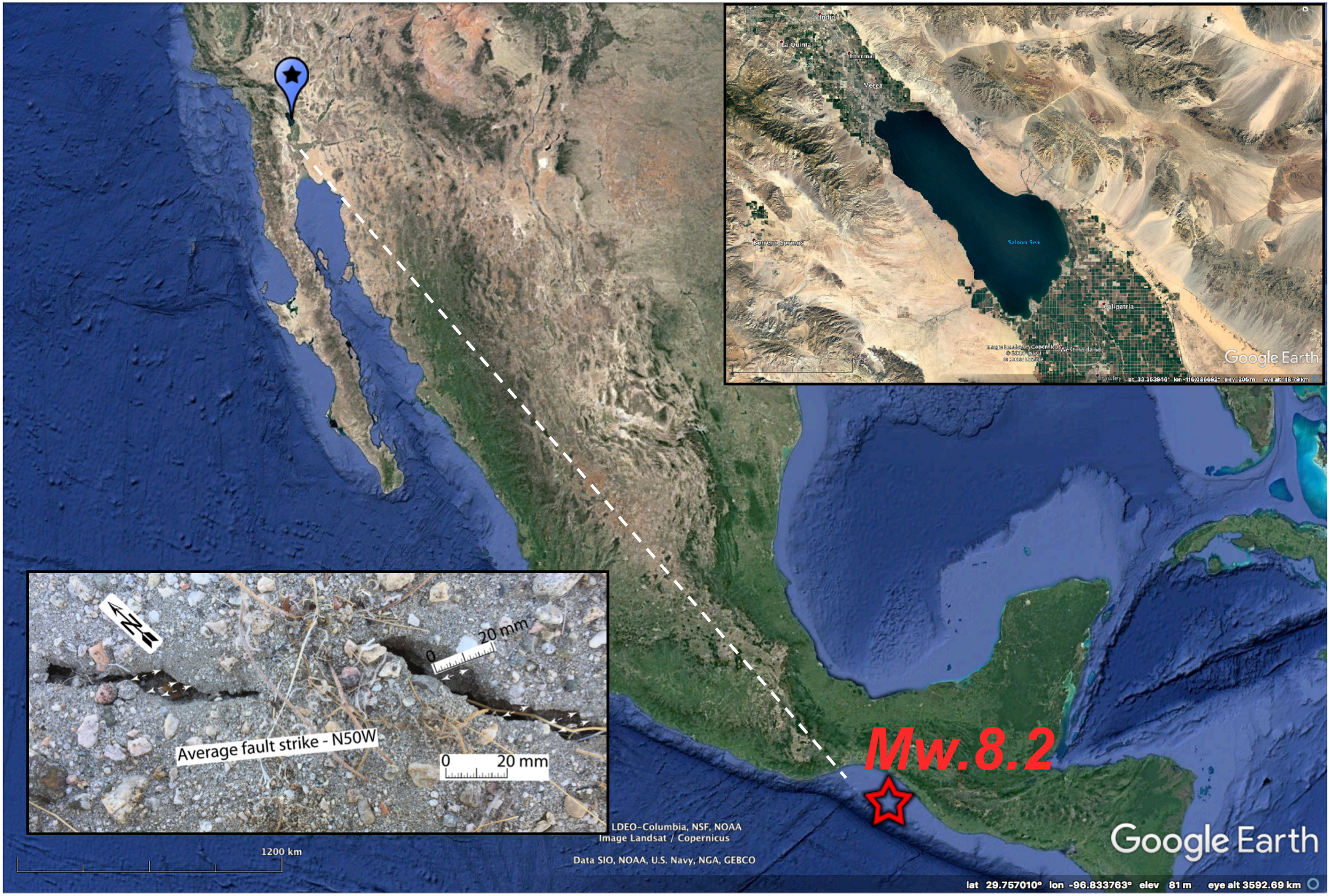
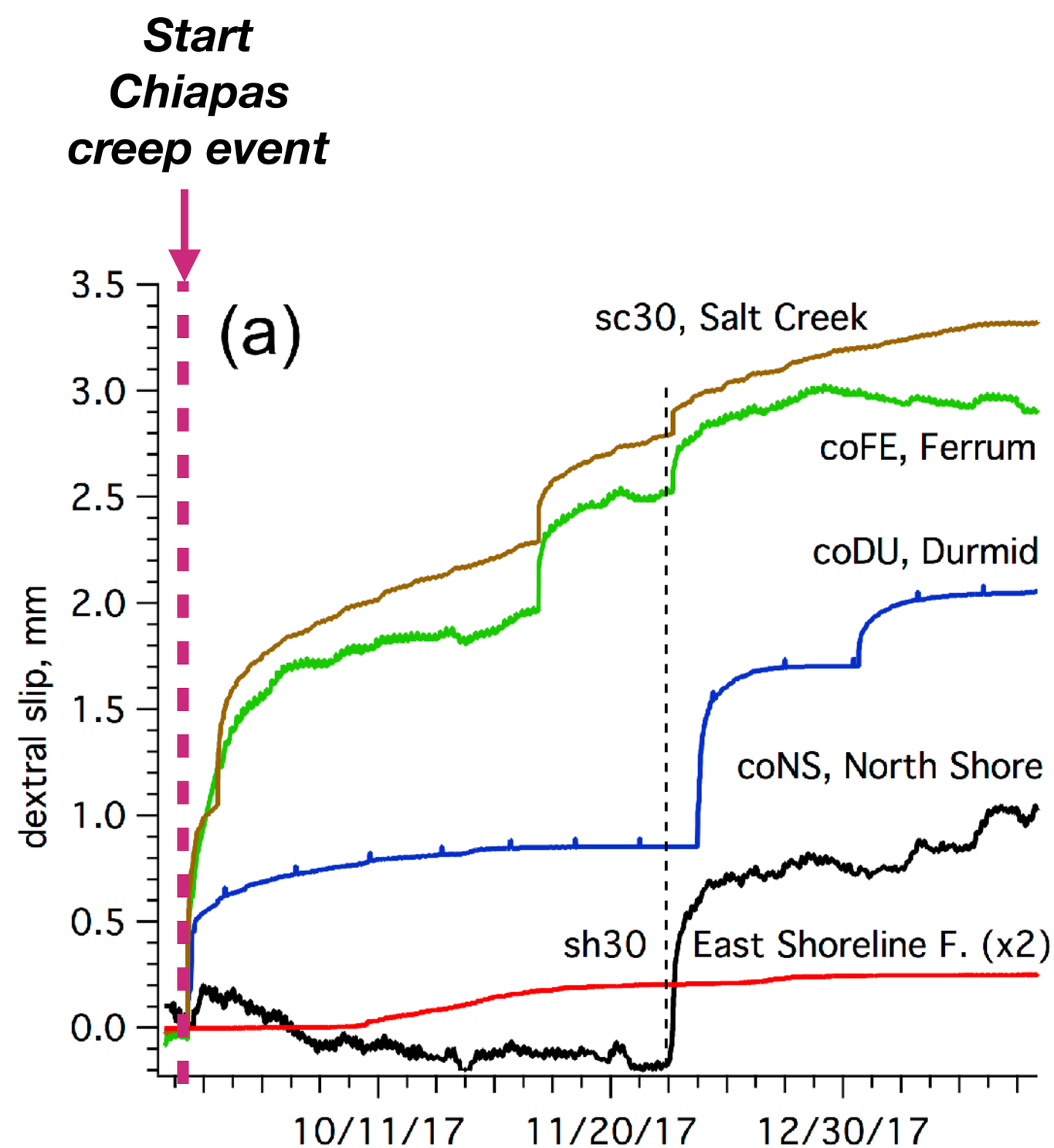
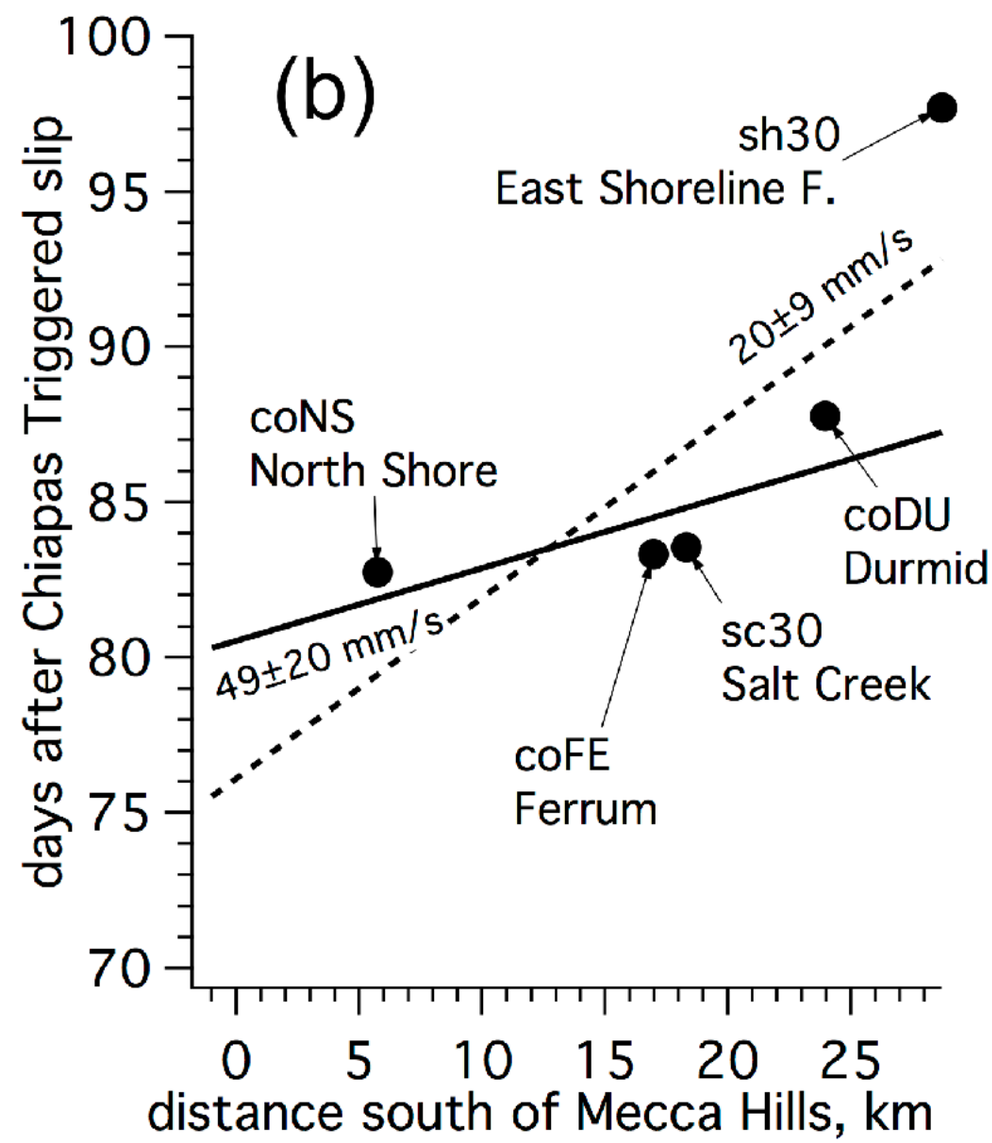
Sponsorship to present this work at the 2018 Fall Meeting of the American Geophysical Union was provided the Jet Propulsion Laboratory, California Institute of Technology, under contract to NASA, the National Aeronautics and Space Administration.

September 7, 2017



Creepmeter measurements





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Field mapping of surface offsets

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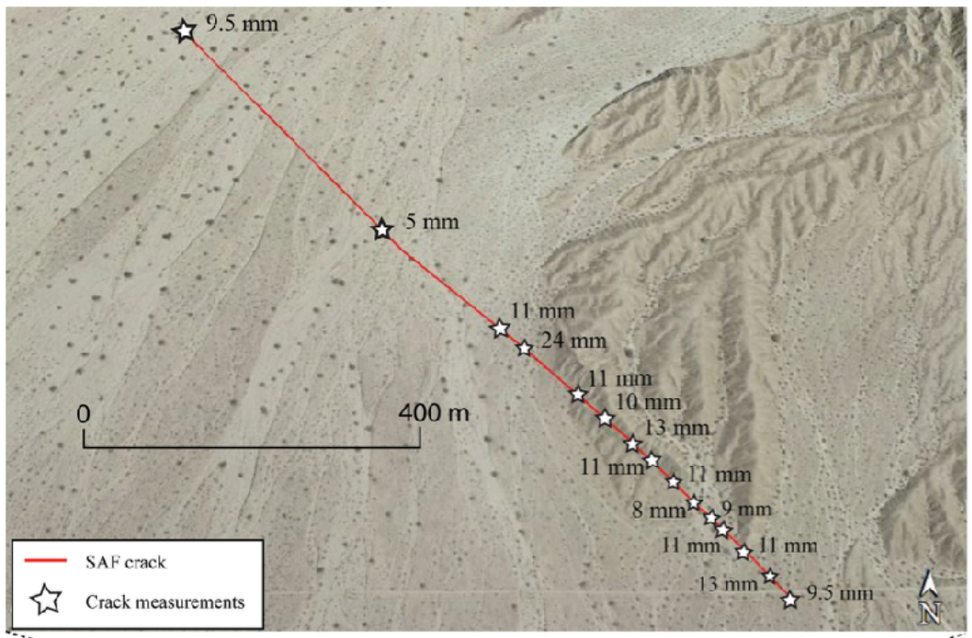
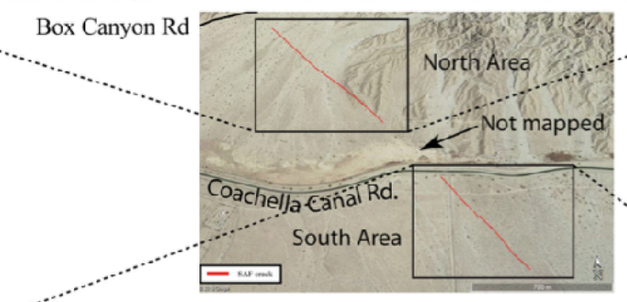
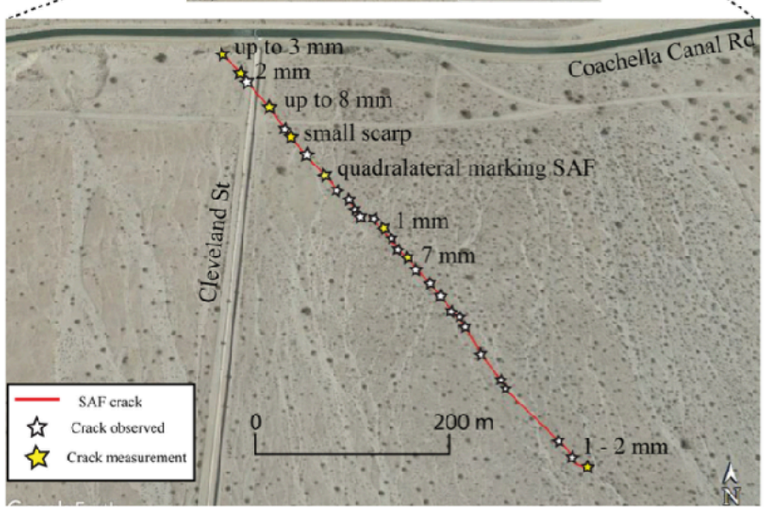
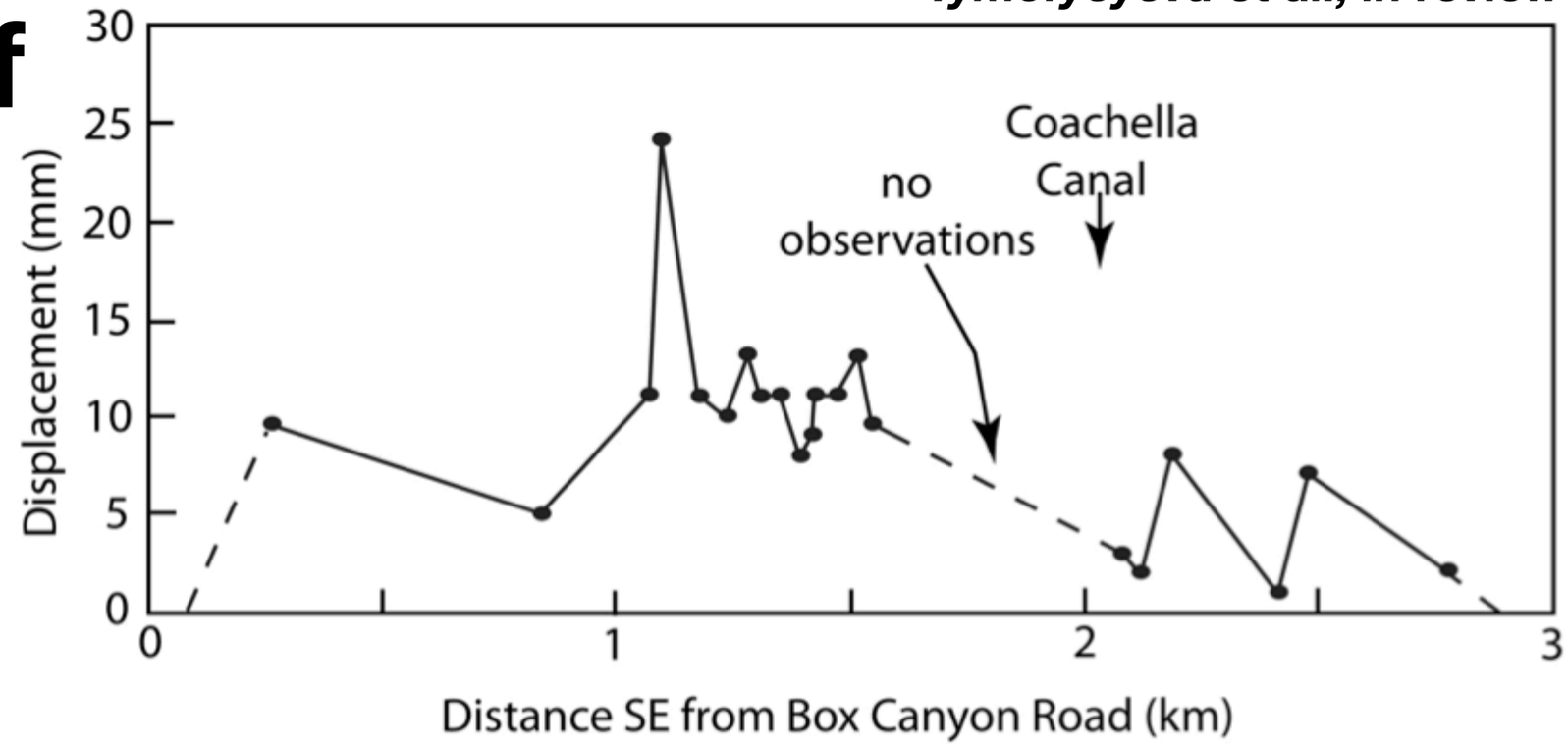
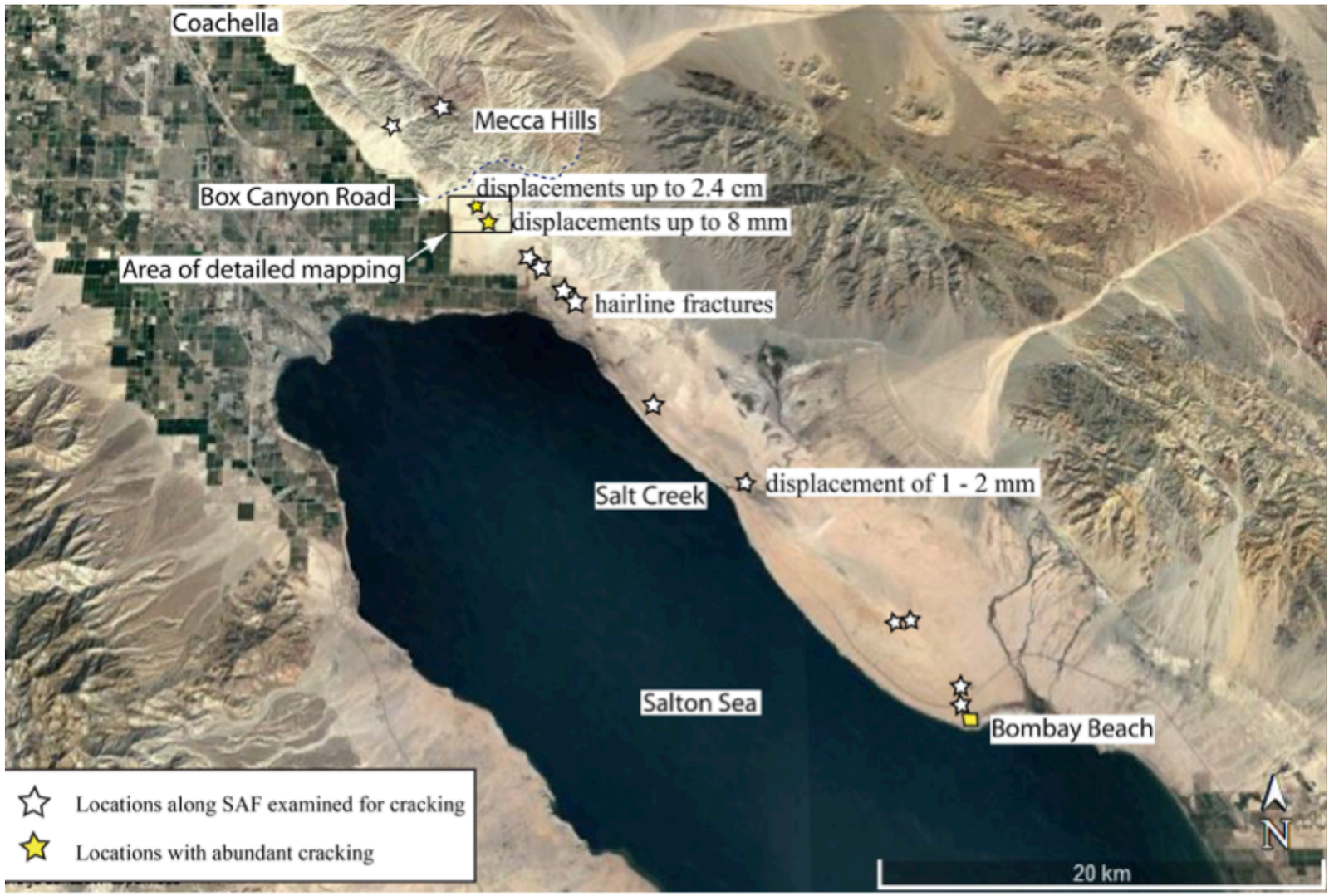


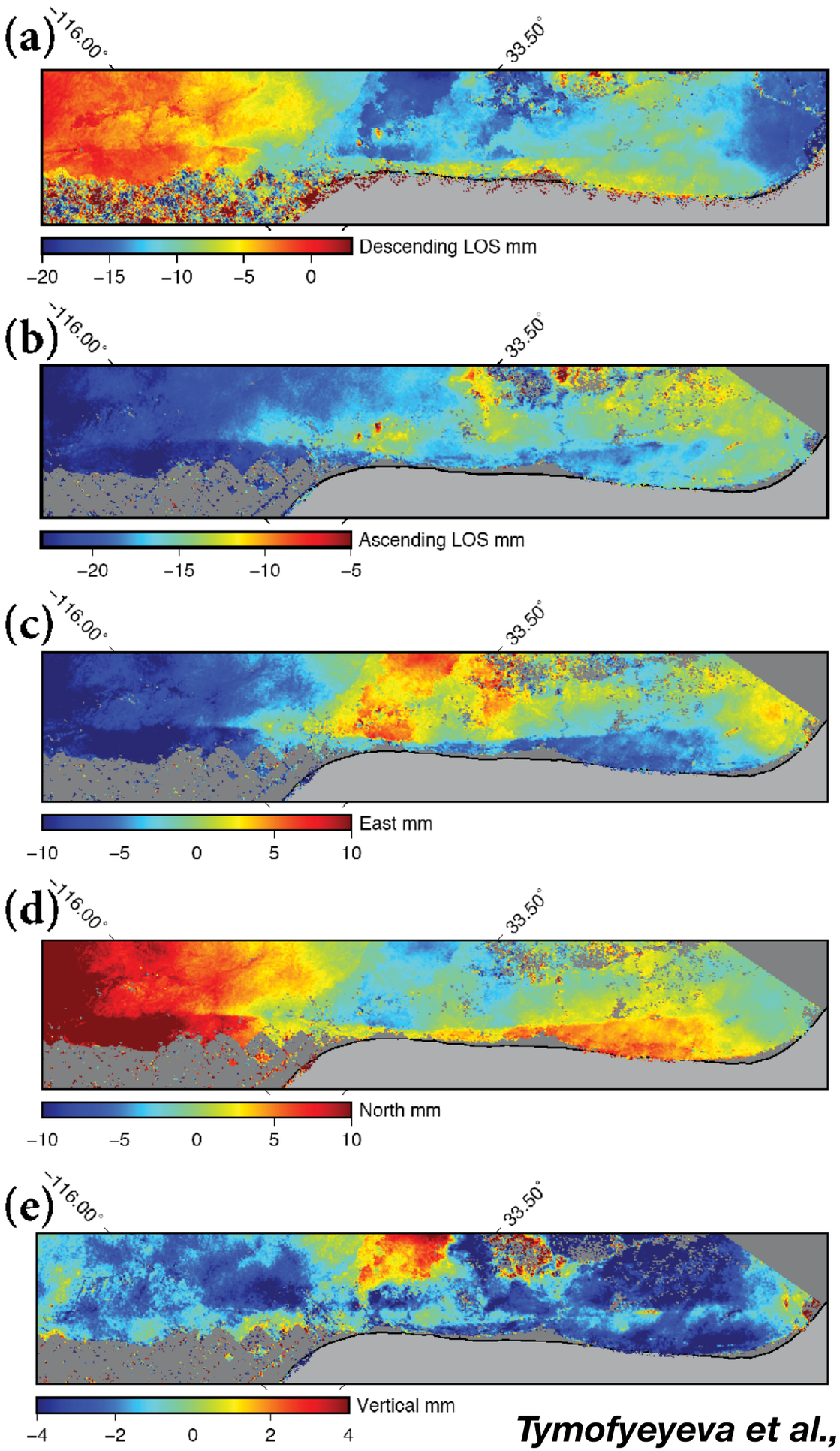


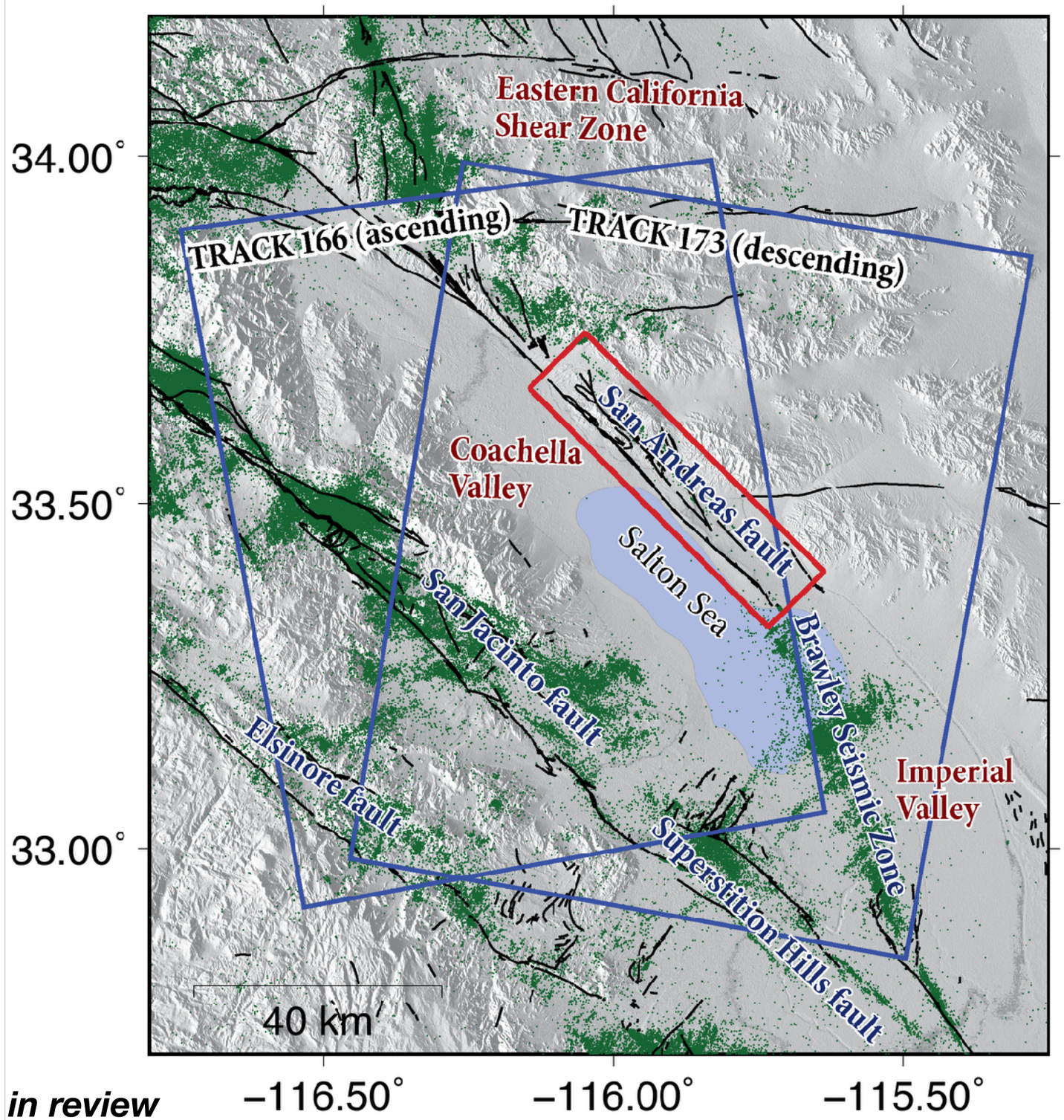






InSAR measurements





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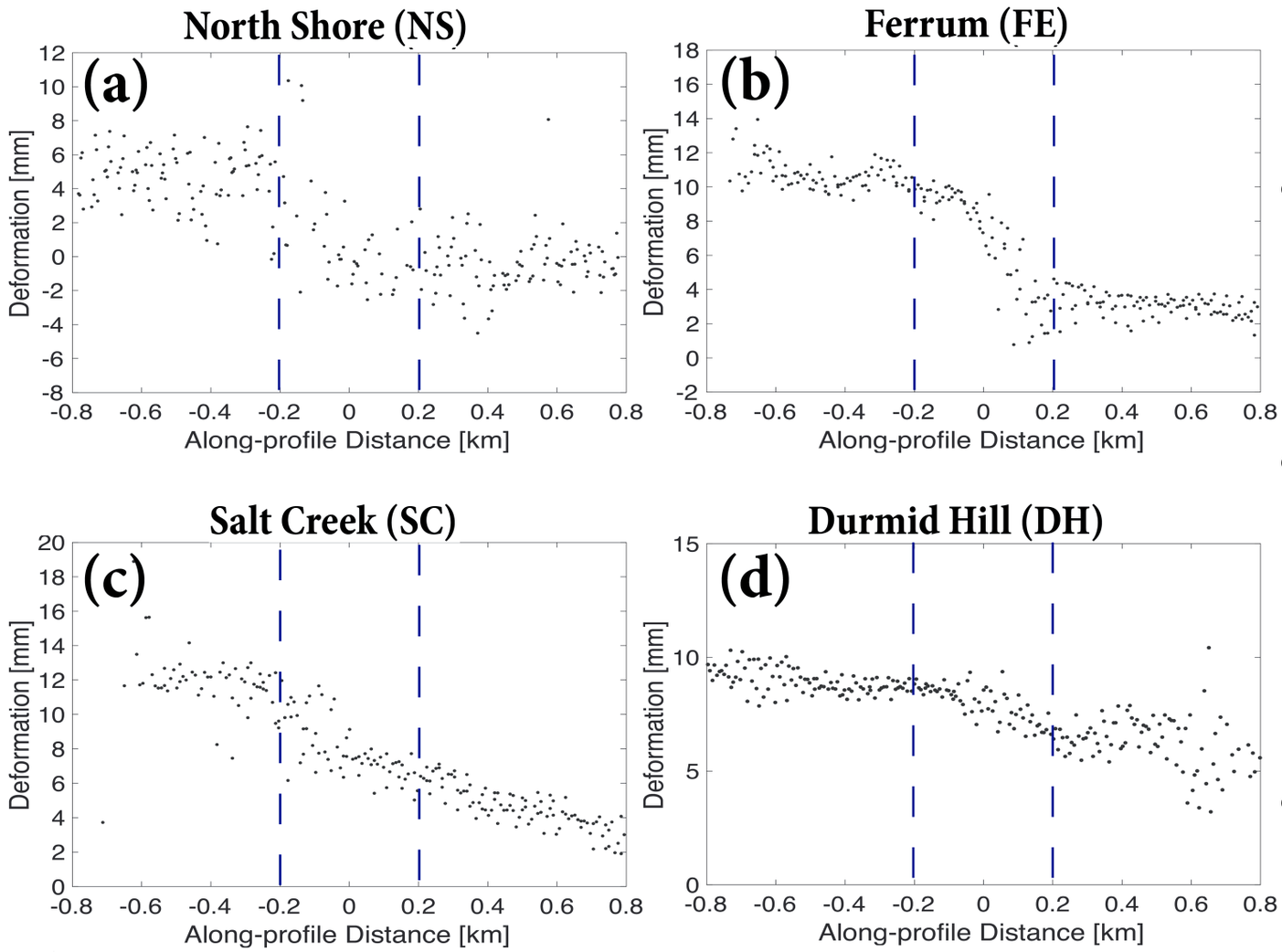
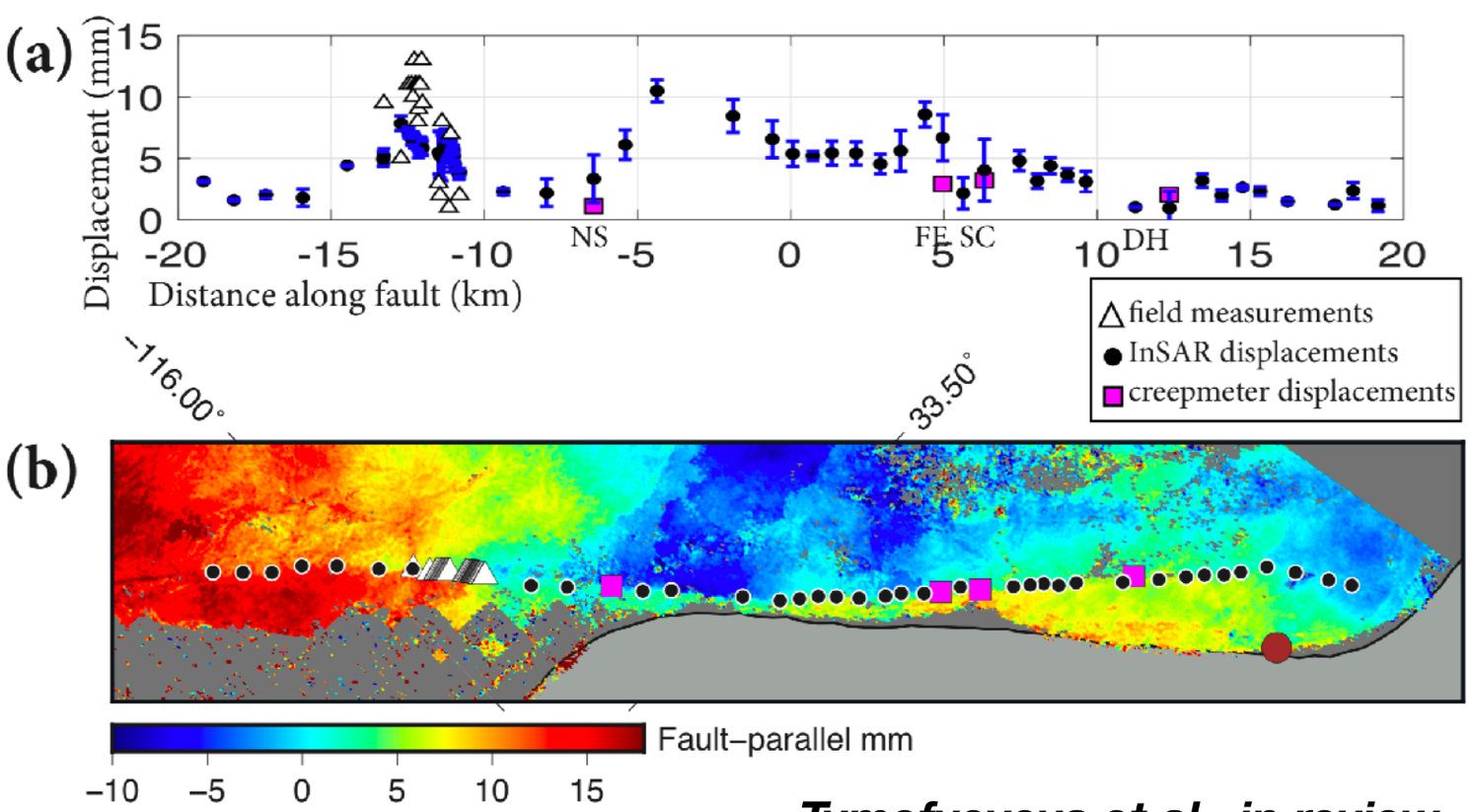
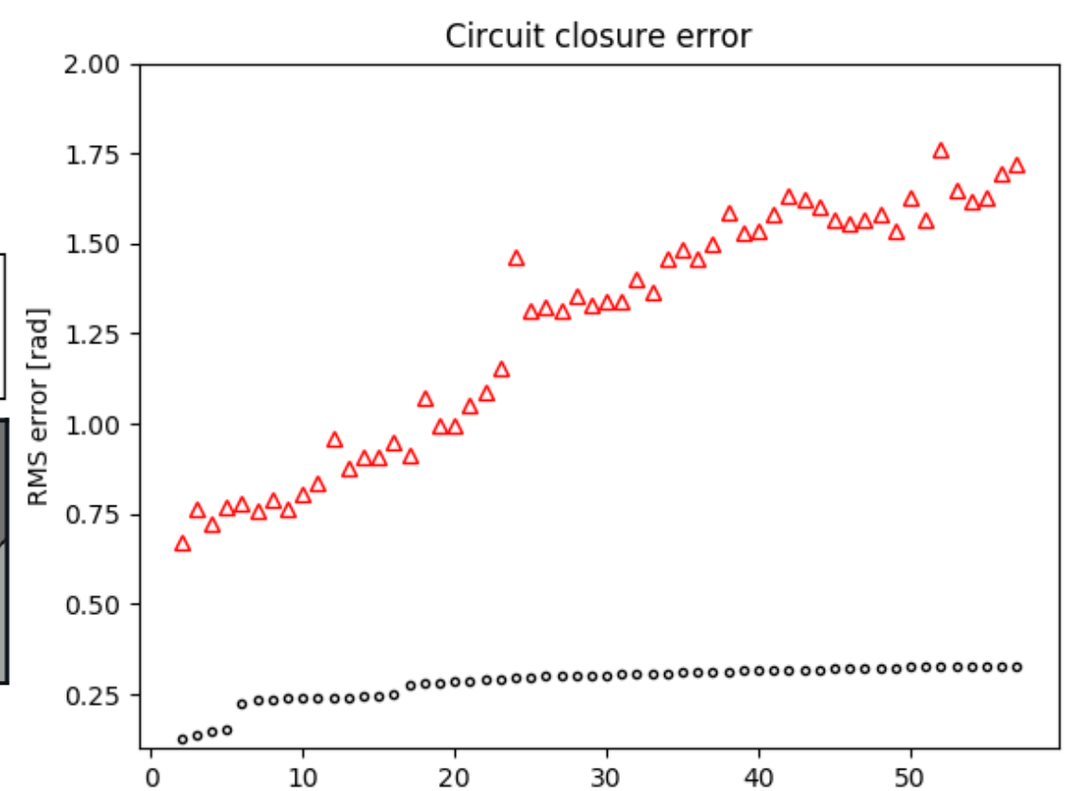
InSAR measurements



- Profiles across the fault at creepmeter locations show variations in slip magnitude.
- Slip distribution along the fault estimated from InSAR data is consistent with field and creepmeter measurements.
- Filtering of the radar phase causes phase inconsistency, as well as smoothing over the shear zone.





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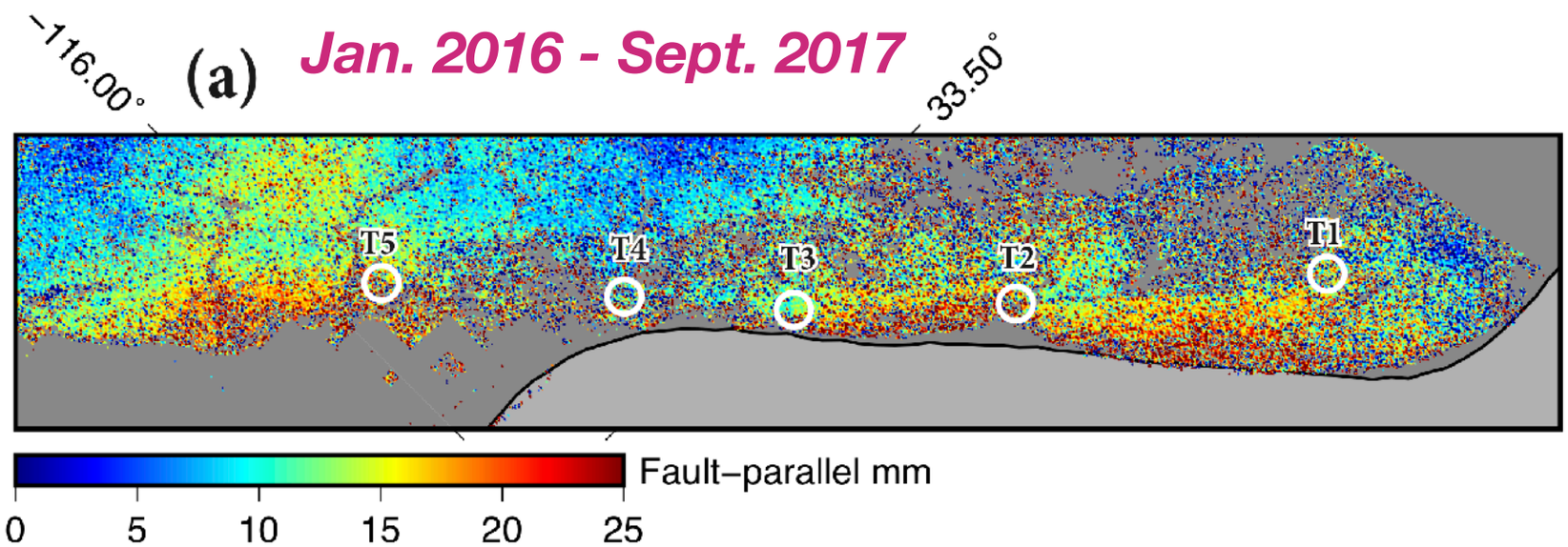
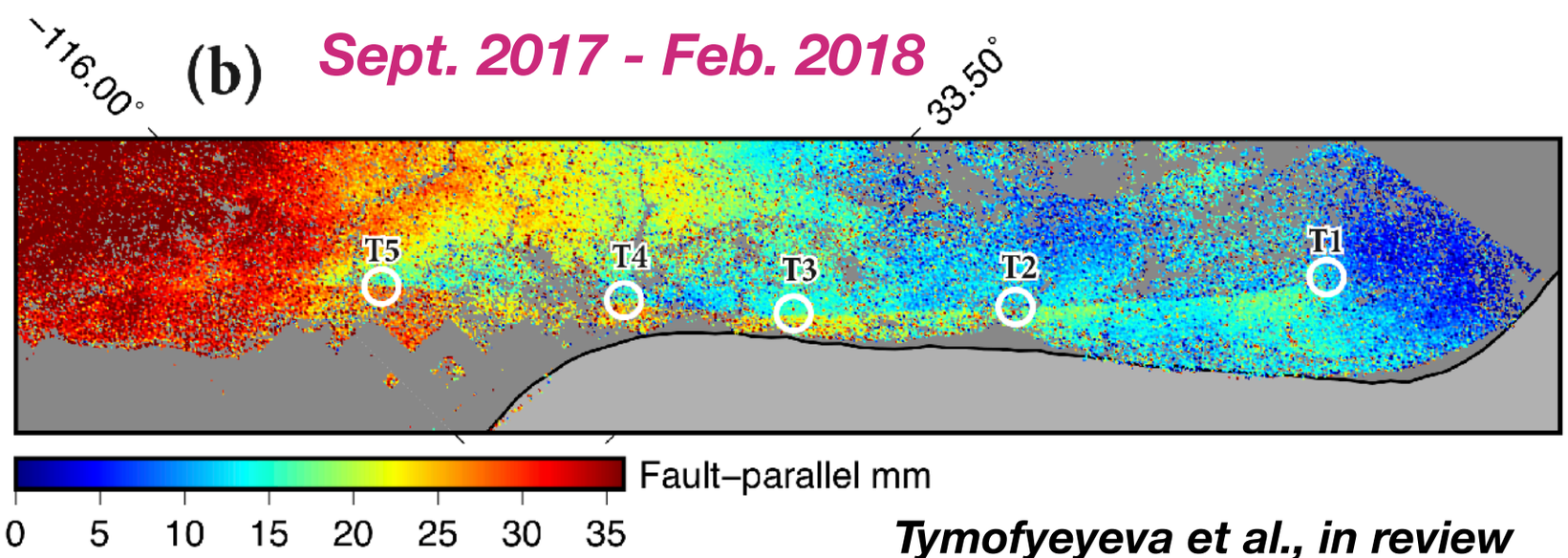
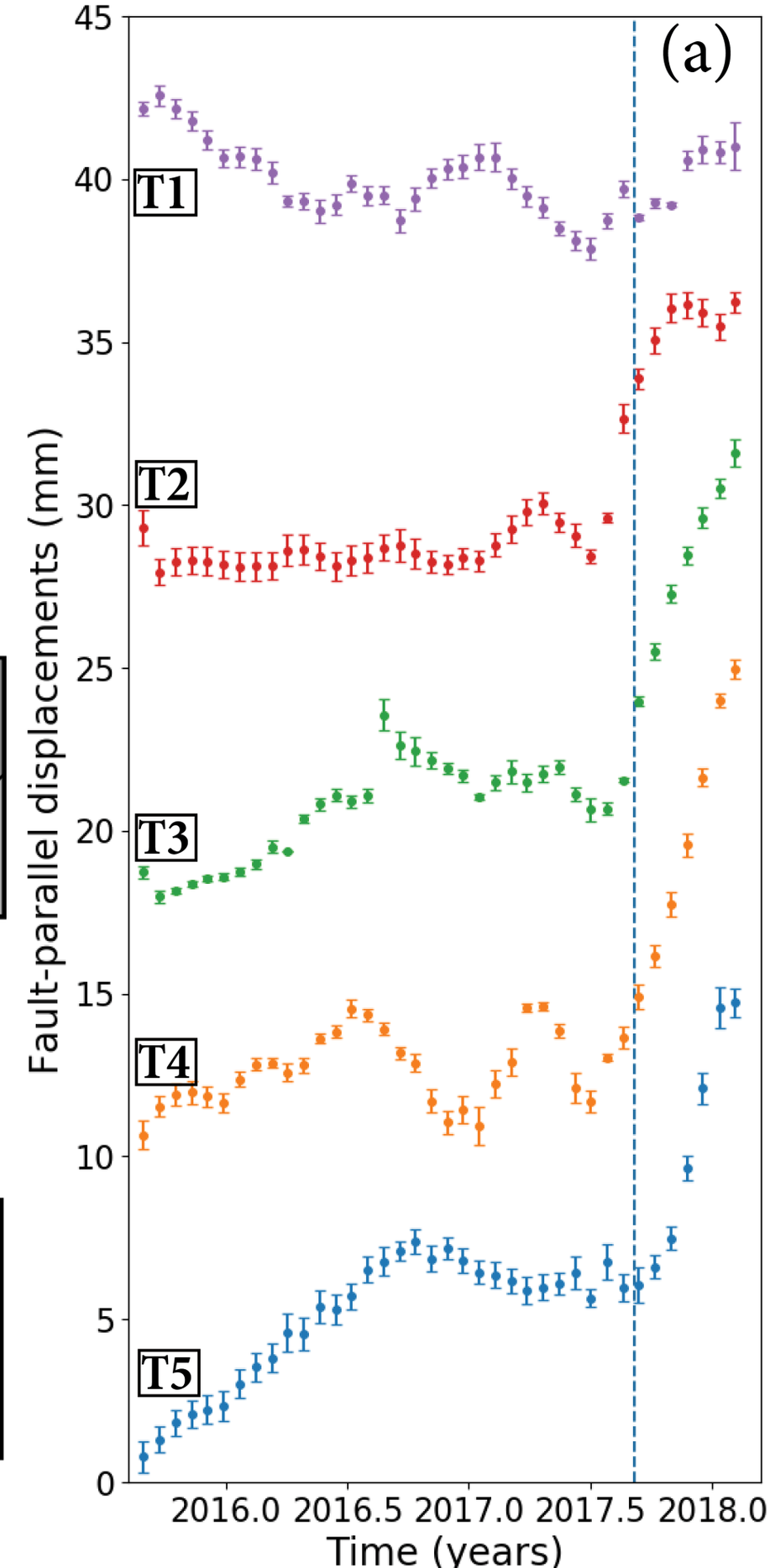
Unfiltered InSAR time series

- Prior to the Sept. 2017 event, creep signal is almost nonexistent.
- Unfiltered phase resolves a sharper stepover across the fault.







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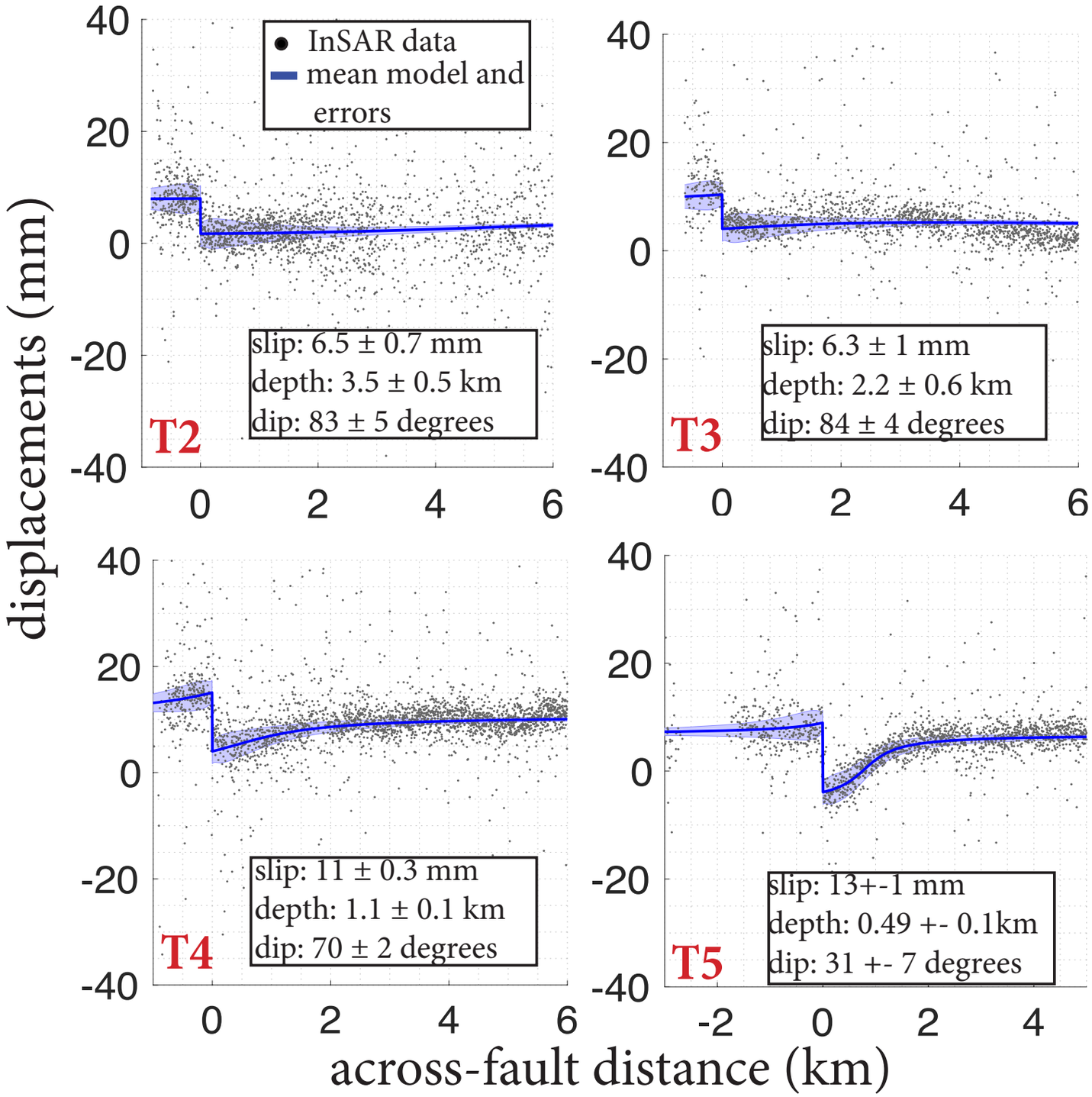
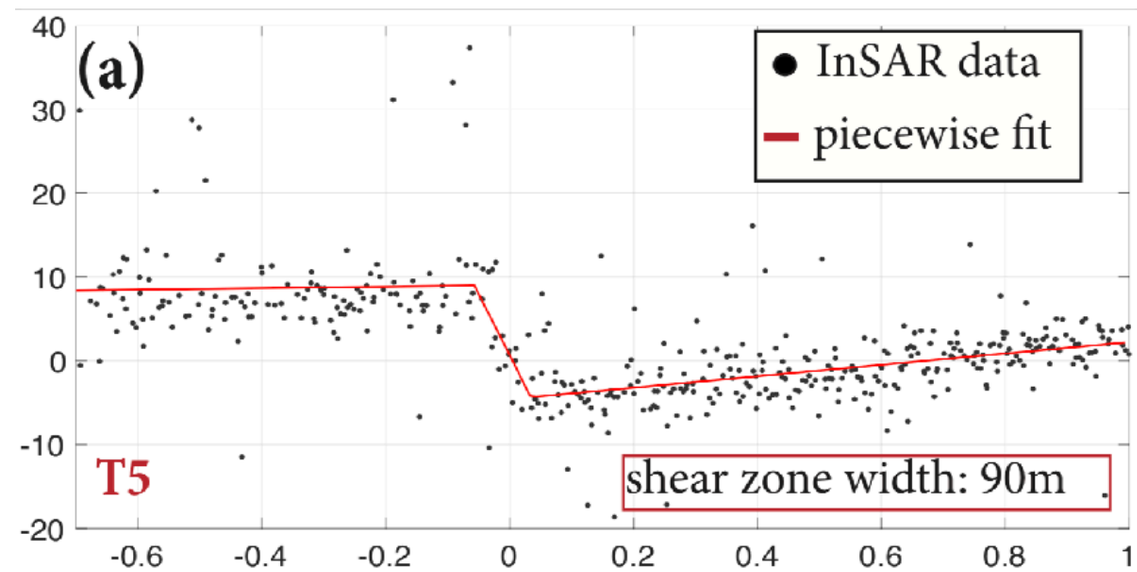
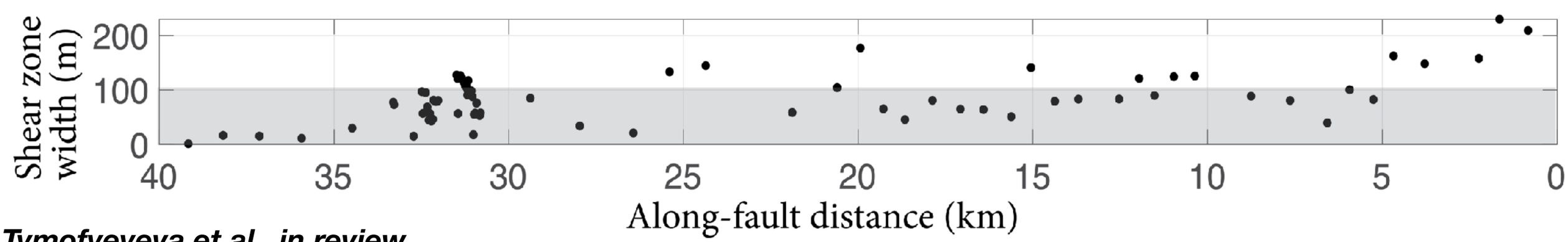
Profiles and modeling

- 1-d models suggest variations in depth extent and fault dip along strike of the SAF.
- Piecewise-linear fit to profiles across the fault zone reveals shear zone width of >100m on some parts of the fault.







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Conclusions

- We use geological field studies, creepmeter measurements, and InSAR data to observe a shallow slow slip event on the southern San Andreas Fault triggered by the 2017 Mw 8.2 Chiapas (Mexico) earthquake.

- The slow slip event produced surface offsets on the order of 4-12mm, with significant variations in slip along-strike. Fault-parallel slip was accompanied by differential vertical motion.

- InSAR data suggest that the width of the surface shear zone associated with surface creep is greater than 100 m at some locations along the fault.

- 1-dimensional modeling of InSAR profiles across the fault confirm a dipping fault geometry and suggest variation in the depth extent of the of the triggered slip alongstrike, ranging from about 500m to 3km.