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Mapping the **distribution of strain** along multiple strike-slip faults in the Chaman fault system from InSAR

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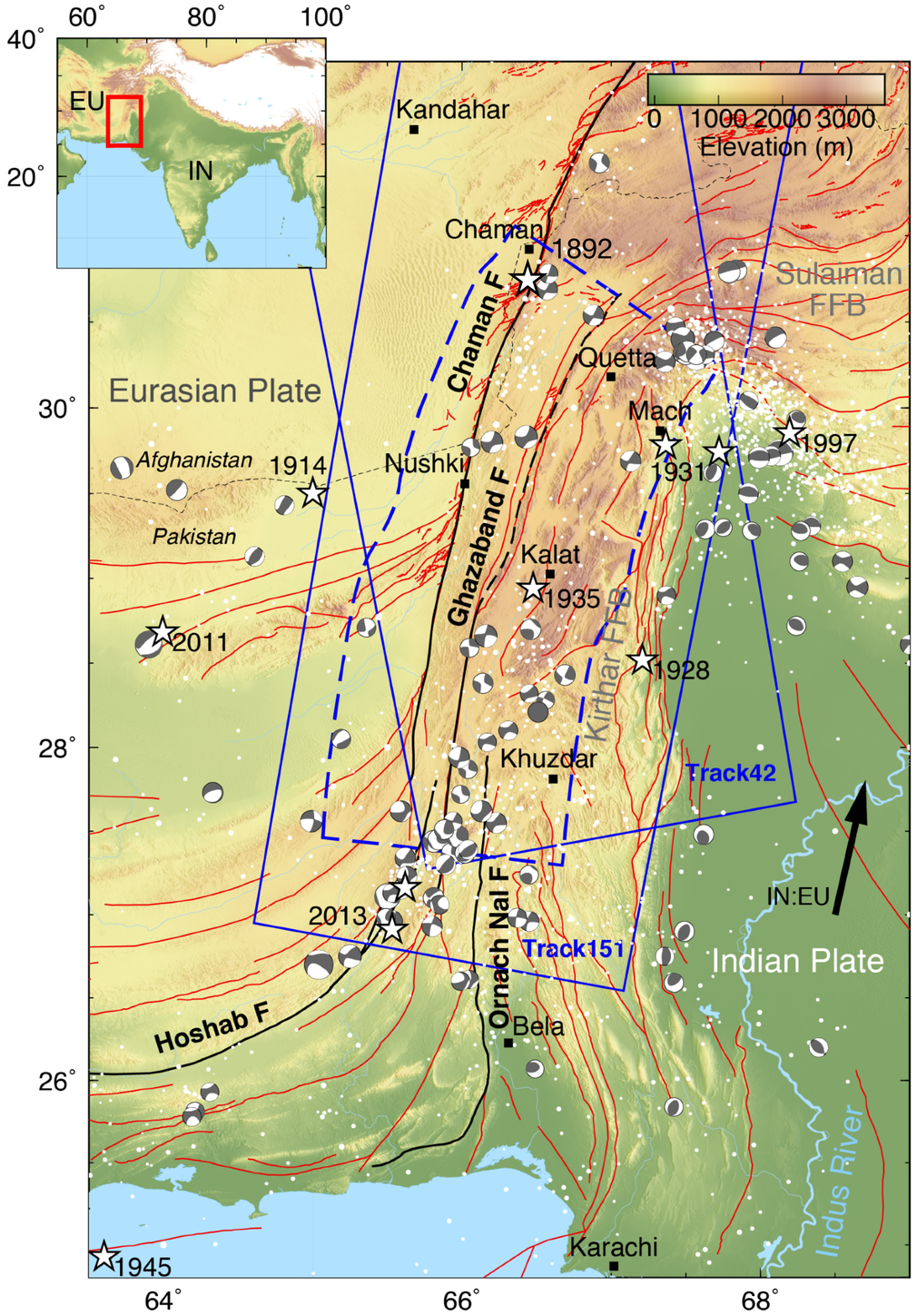
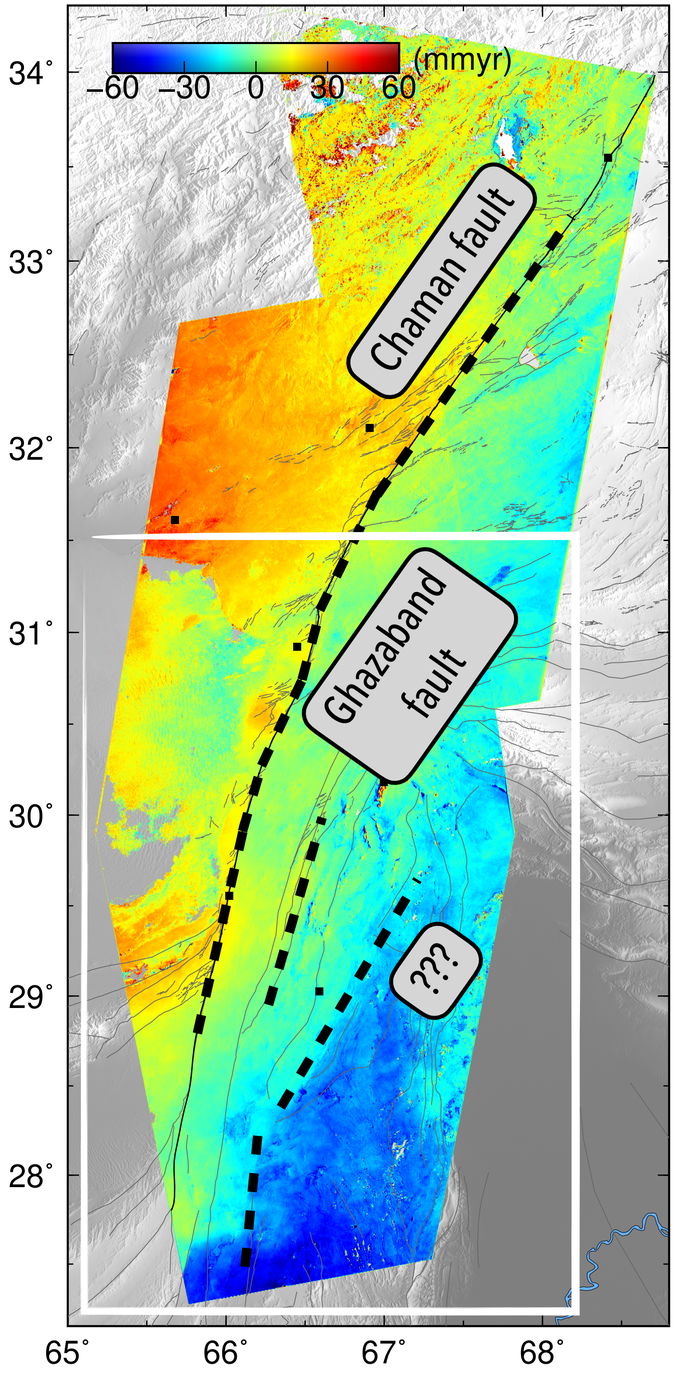


Chaman plate boundary

- India-Eurasia left-lateral motion of 25-35 mm/yr
- Numerous active faults are mapped
- Very few historical earthquakes
- **Where strain focuses and what are the associated active faults likely to rupture during large earthquakes ?**

☆ Mw > 6.5



2014-2020
fault-parallel velocity

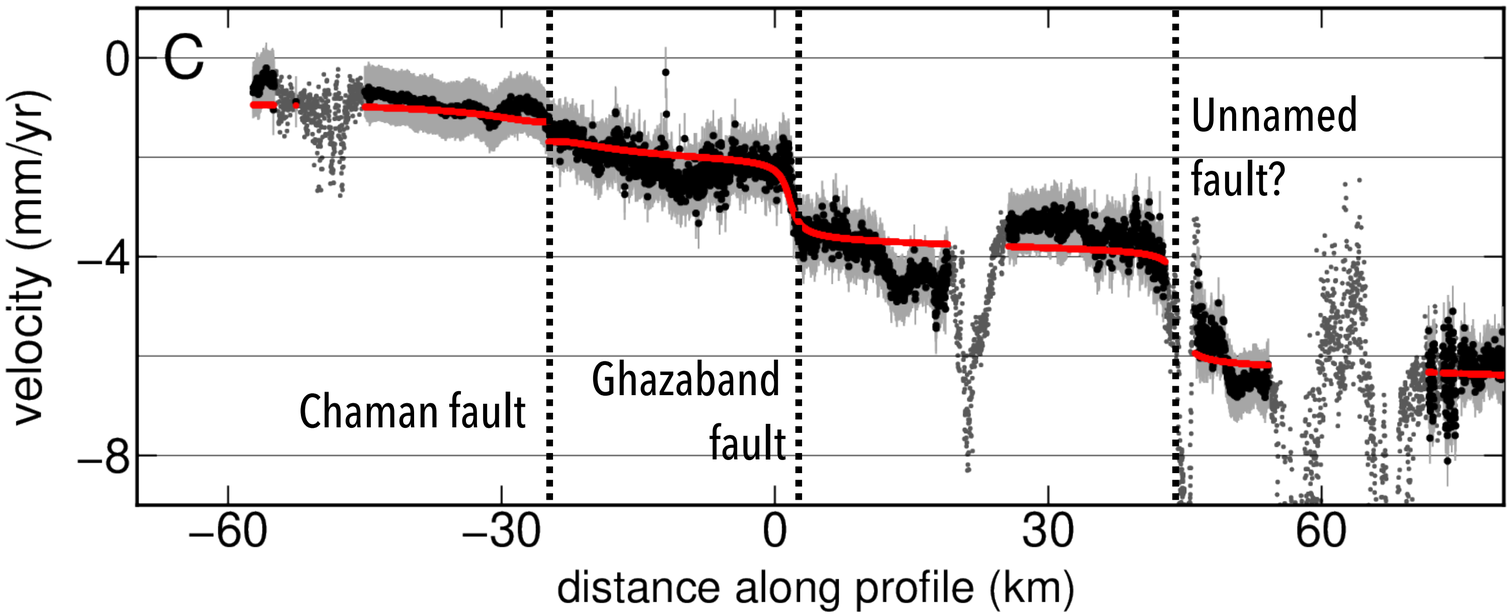
Dalaison et al (2021)

InSAR velocity

5-15 mm/yr on the Chaman fault
≈ 30% of relative plate motion

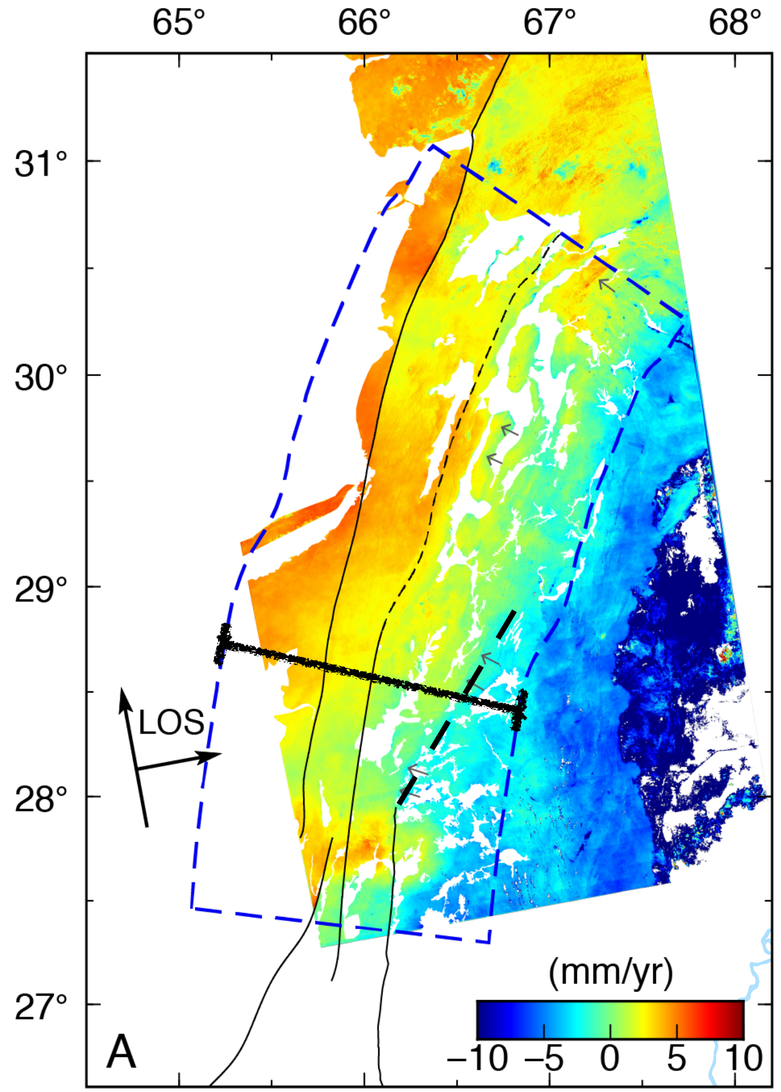
Where is the missing strain rate?

Parametric model of deformation gradients

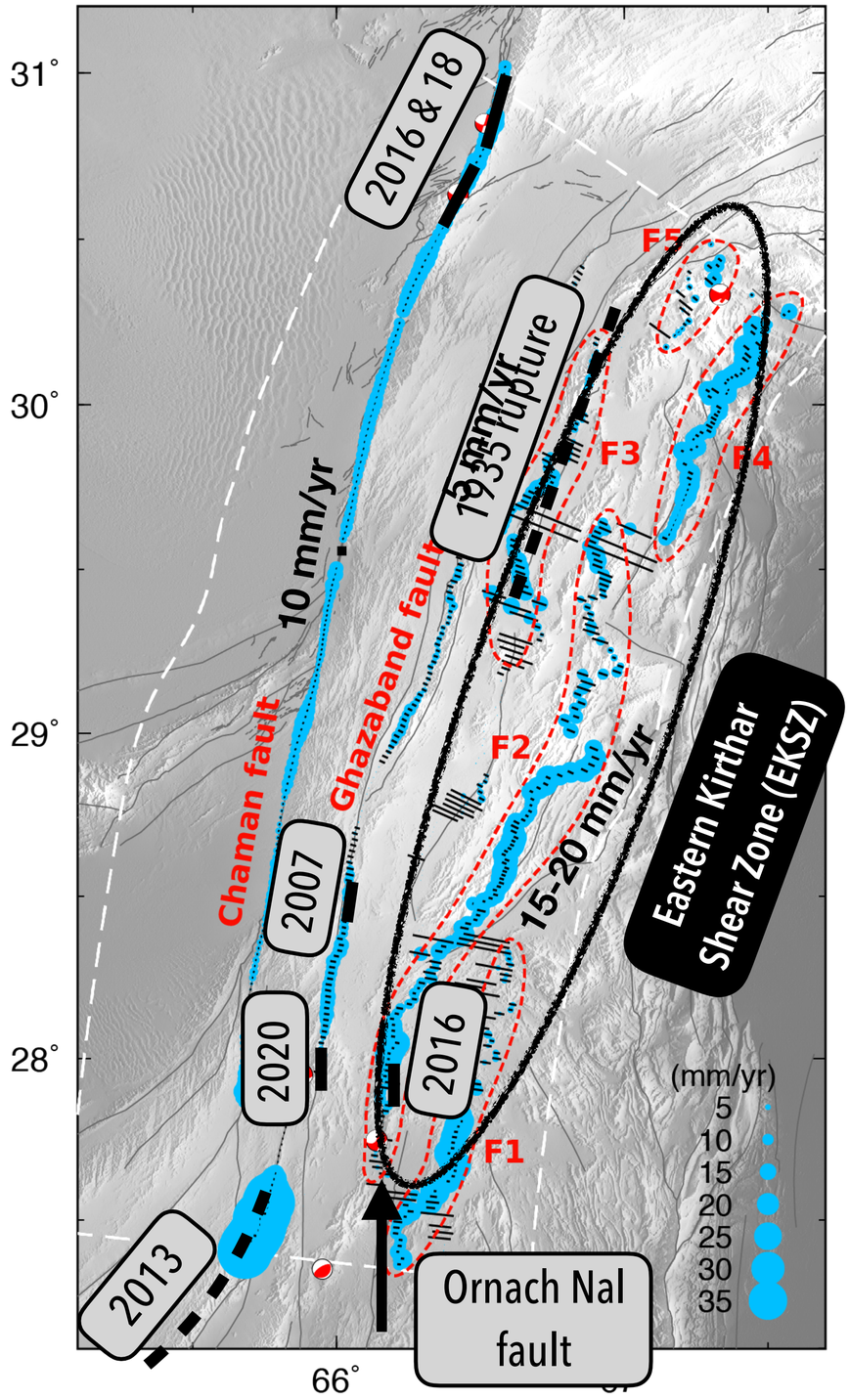


4 to 5 vertical strike-slip faults modelled as screw dislocations in a elastic half-space (Savage & Budford,1973)

Where are the faults exactly and how fast are they loaded ?

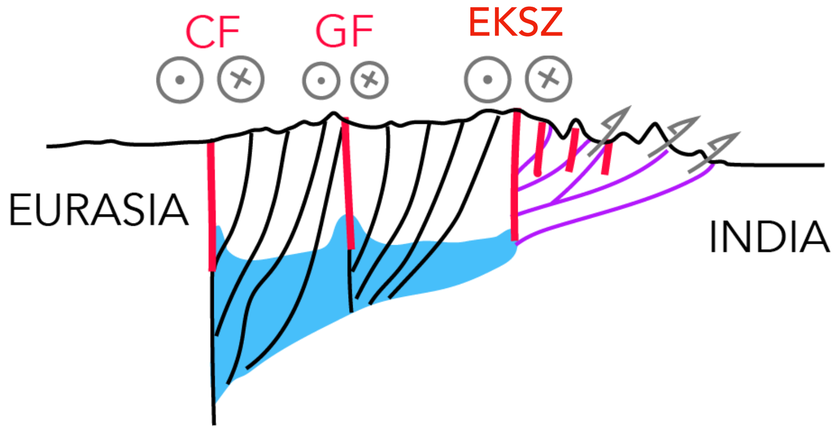


ascending velocity



Results : strain localization

- A diffuse & segmented zone host strain rates of about 20 mm/yr east of the Ghazaband fault
- Location in the continuation of the Ornach Nal fault and along the Quetta-Kalat axis
- **We close the plate boundary strain budget with the identification of the Eastern Kirthar shear zone**



Conclusion

- From InSAR velocities, we localise strain deformation and estimate **partitioning along a portion** of the **plate boundary between India and Eurasia**.

- Most of the plate boundary strain is accommodated on **structures east of the Chaman fault**, notably in the continuity of the Ornach Nal fault.


JGR Solid Earth

RESEARCH ARTICLE
10.1029/2019JB019150

Key Points:
- Our data assimilation method for InSAR time series analysis allows for

A Kalman Filter Time Series Analysis Method for InSAR

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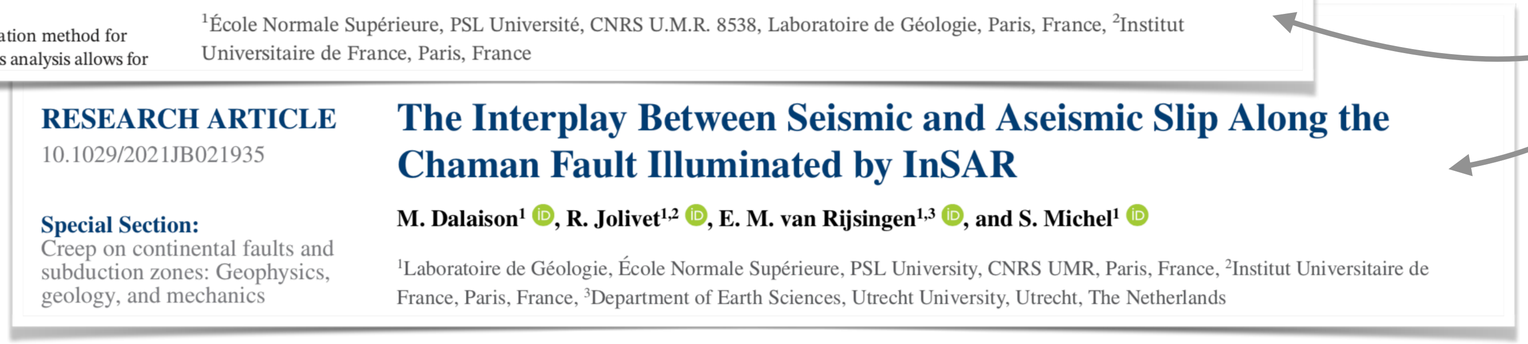
RESEARCH ARTICLE
10.1029/2021JB021935

Special Section:
Creep on continental faults and subduction zones: Geophysics, geology, and mechanics

The Interplay Between Seismic and Aseismic Slip Along the Chaman Fault Illuminated by InSAR

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- For more informations about the method and the Chaman fault.

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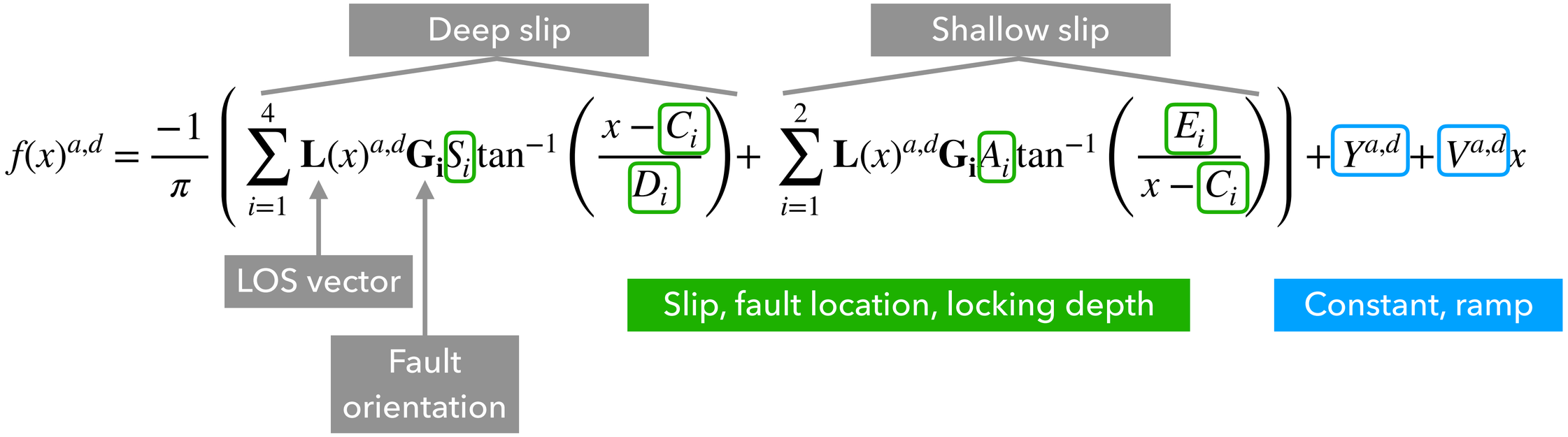
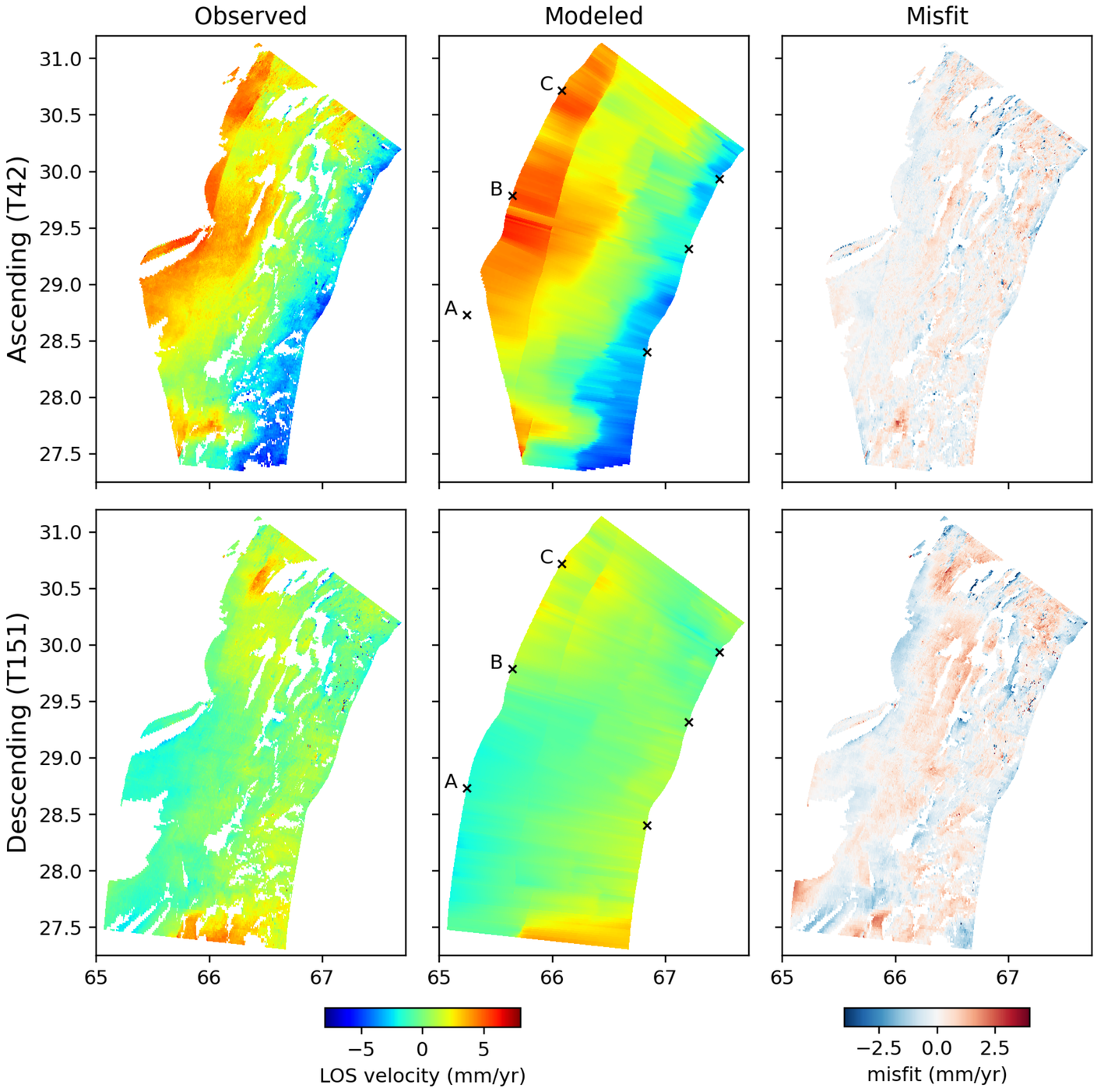
Dislocation model for LOS surface velocity



$$\sum_{i=1}^{N} S_i = 27.5 \pm 2 \ mm/an$$

PyMC3


Observed
Modeled
Misfit
Ascending (T42)
Descending (T151)
31.0
30.5
30.0
29.5
29.0
28.5
28.0
27.5
65
66
67
A
B
C
−5
0
5
LOS velocity (mm/yr)
−2.5
0.0
2.5
misfit (mm/yr)