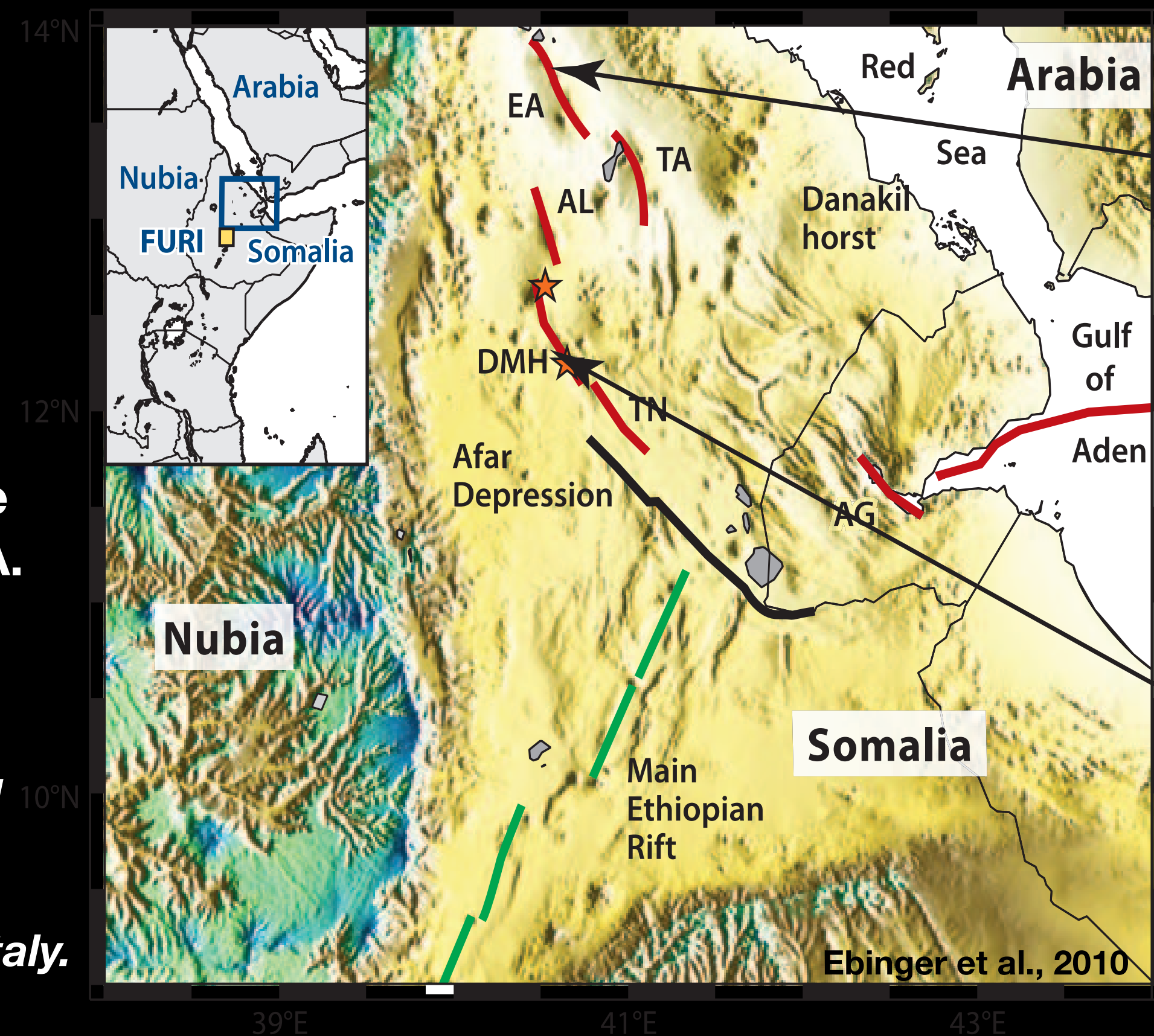


Complex strain accommodation mechanisms during rift linkage: an example from the central Afar, East Africa

A. Muluneh (1,2); S. Brune (2); T. Kidane (3); C. Pagli (4), D. Keir (5), G. Corti (6), A. La Rosa (4)

1- Addis Ababa University, Ethiopia; 2-GFZ Potsdam, Germany; 3-University of KwaZulu Natal, South Africa; 4. University of Pisa, Italy; 5- University of Southampton, UK; 6- CNR, Italy.



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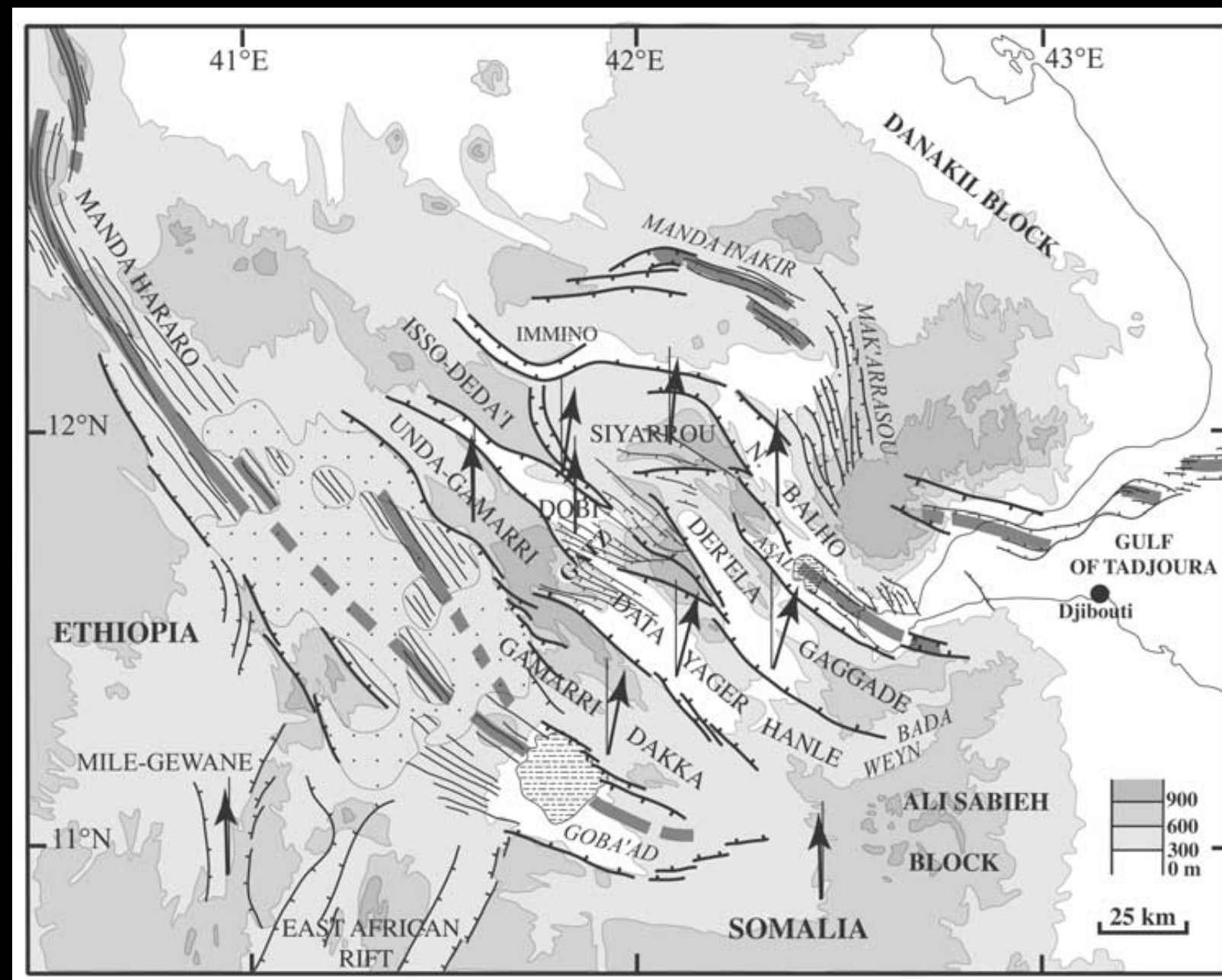


Alexander von Humboldt
Stiftung/Foundation



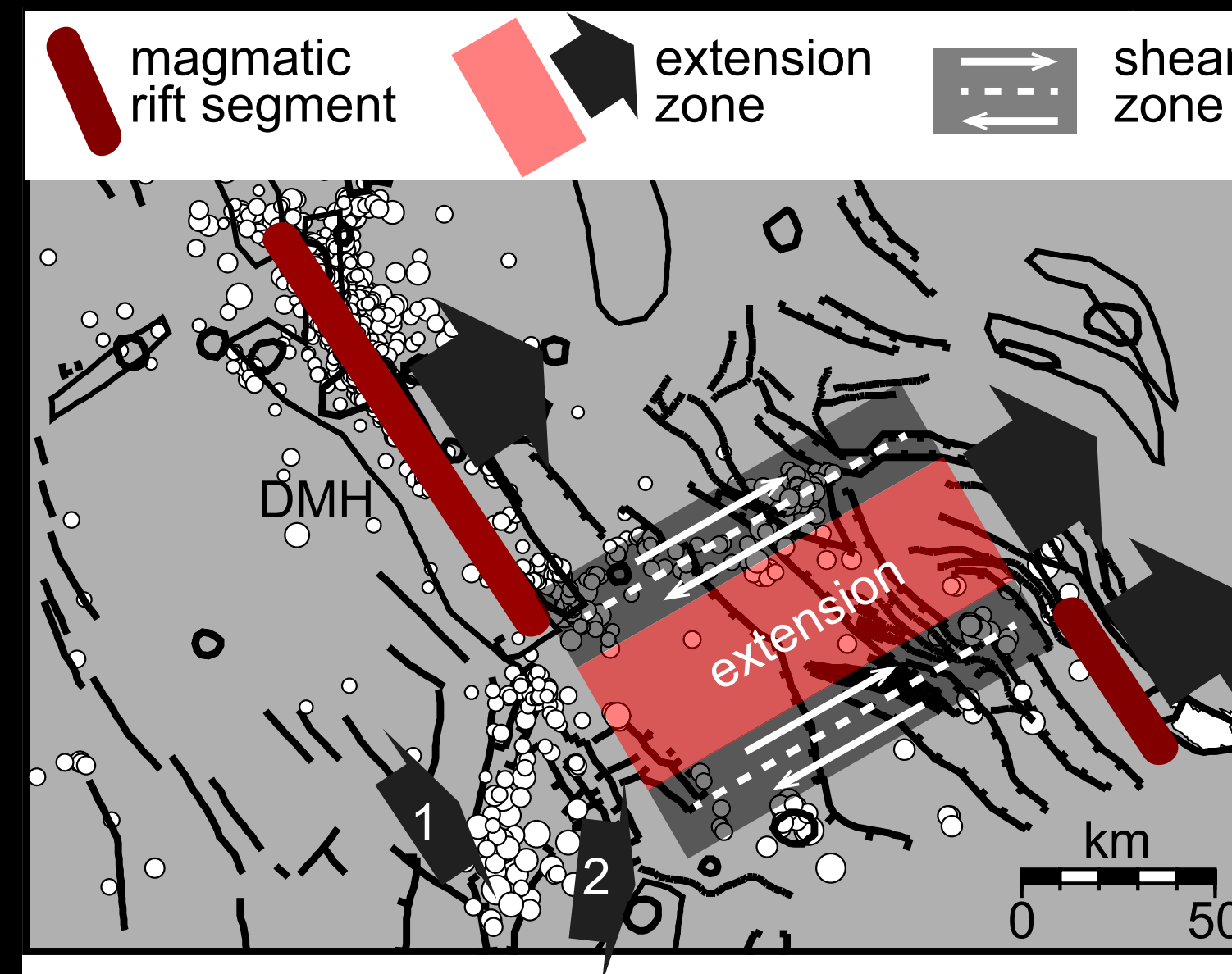
Rift interaction in central Afar : models

Overlap



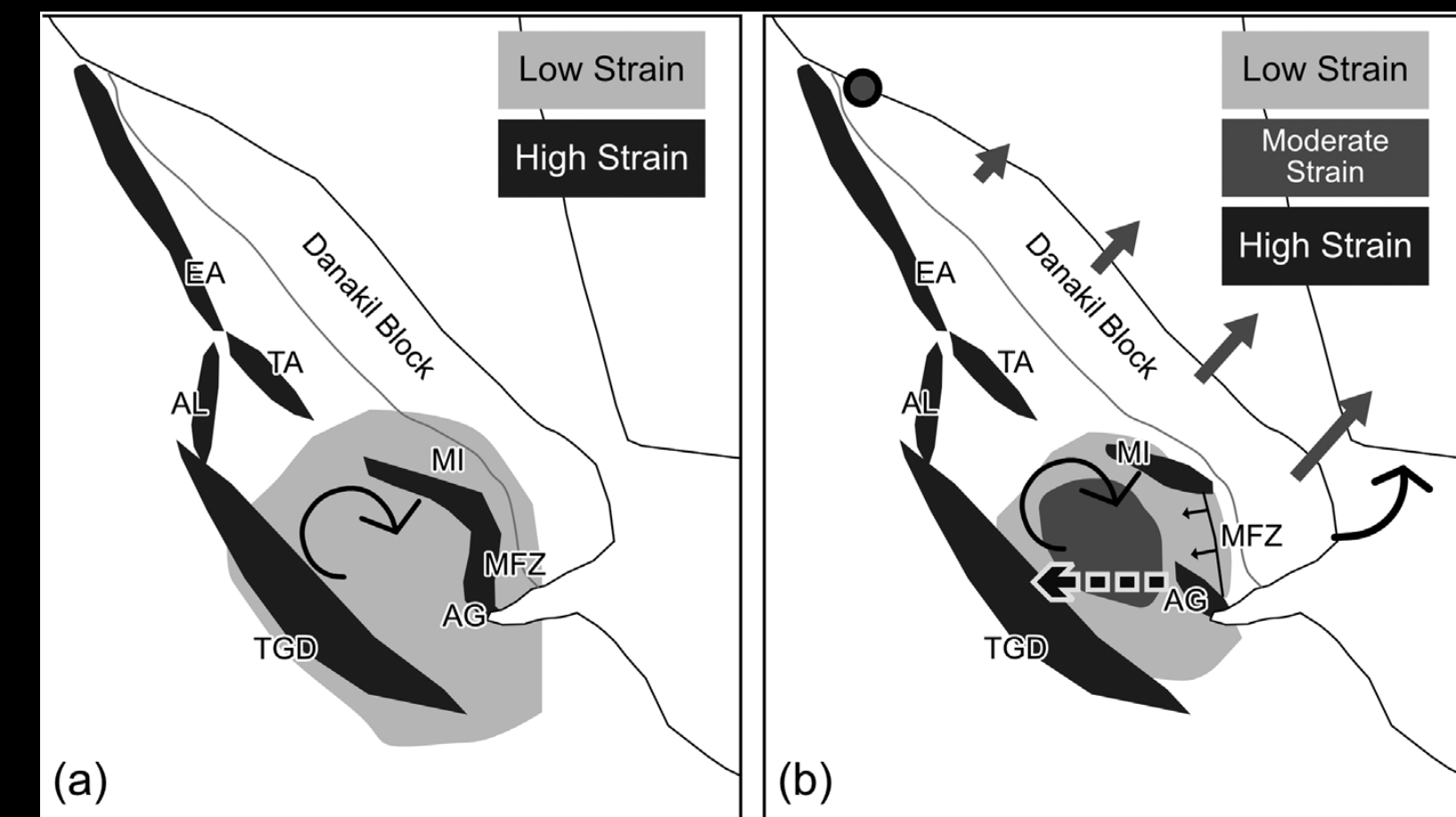
Kidane et al., 2003 JGR

Transform linkage (?)



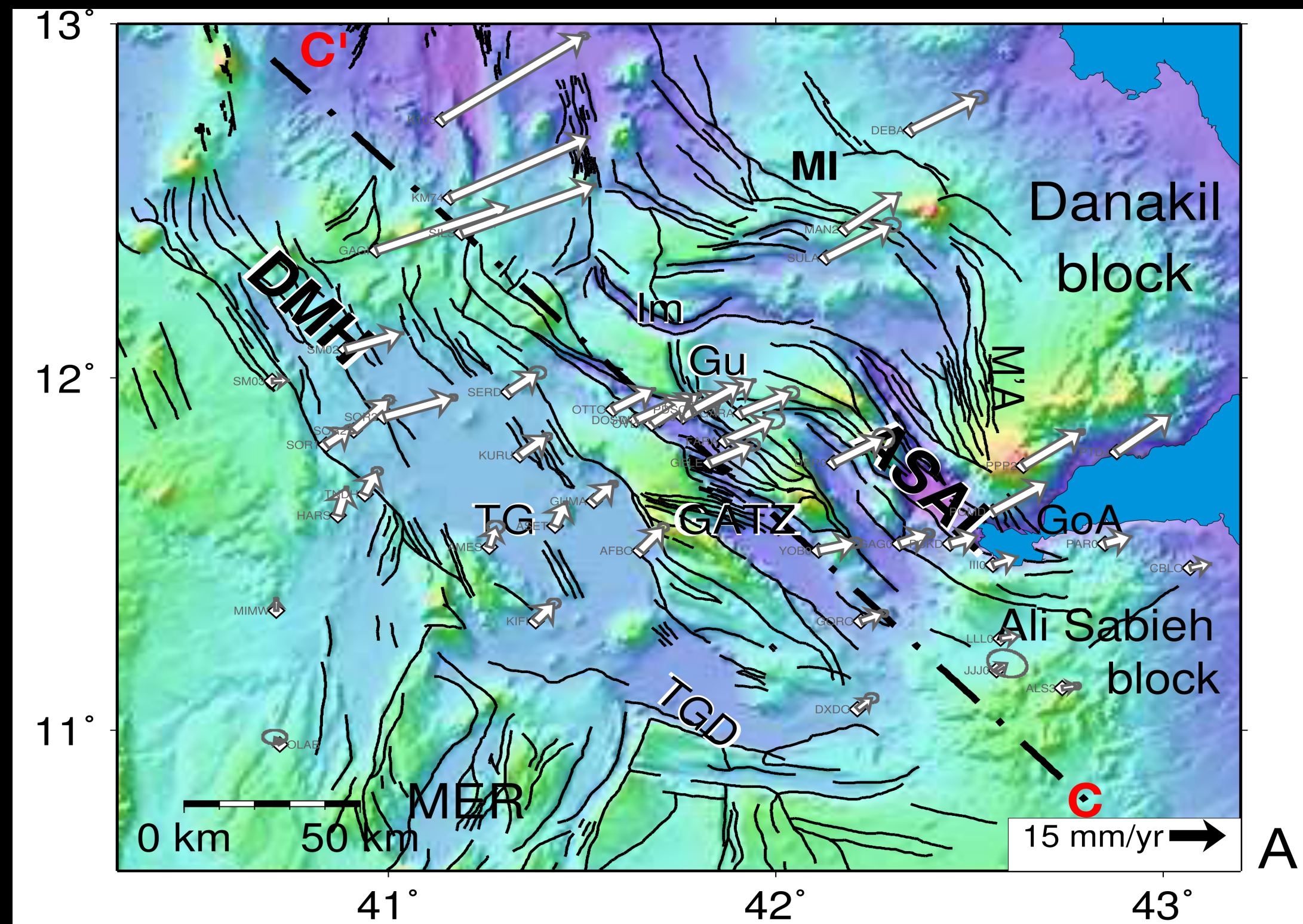
Pagli et al., 2019 Geology

Direct linkage

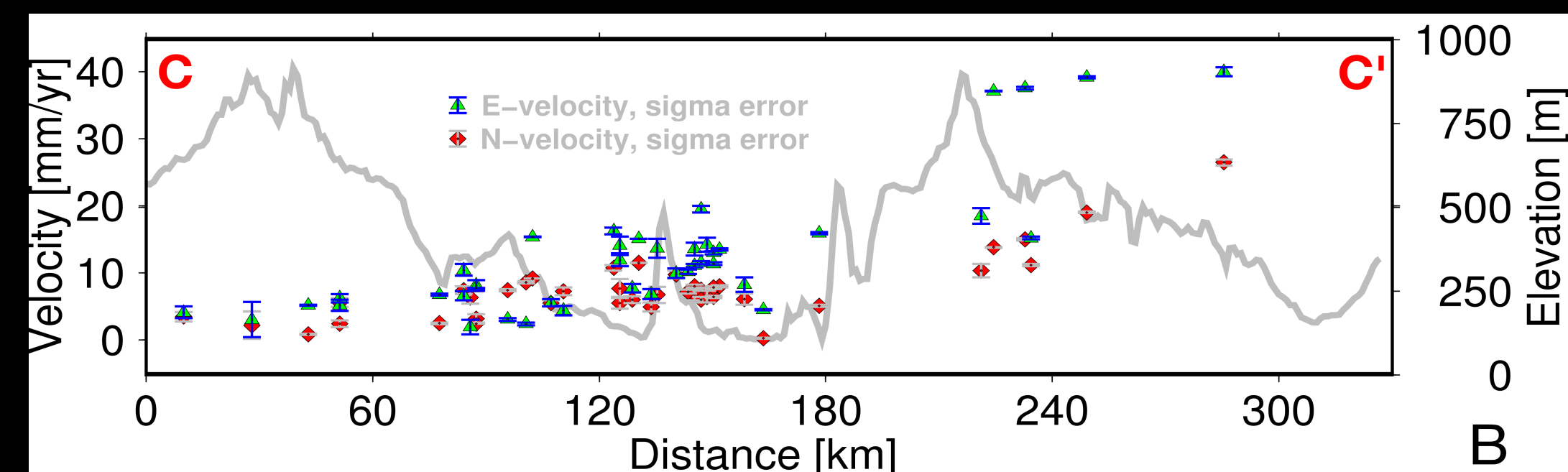


Polun et al., 2019 JSG

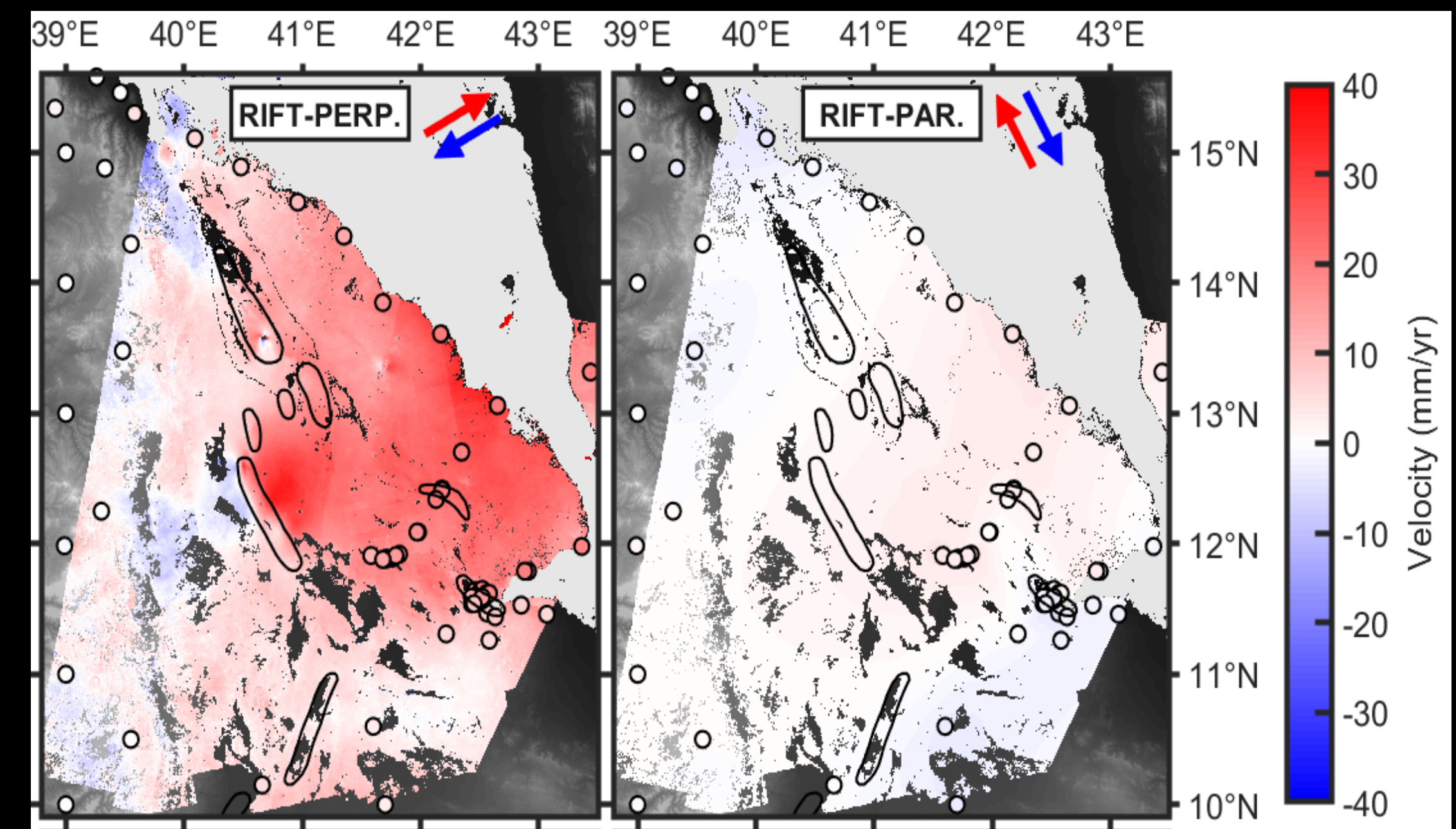
GPS velocity data



Dobre et al., 2017, GJI (1999-2014)

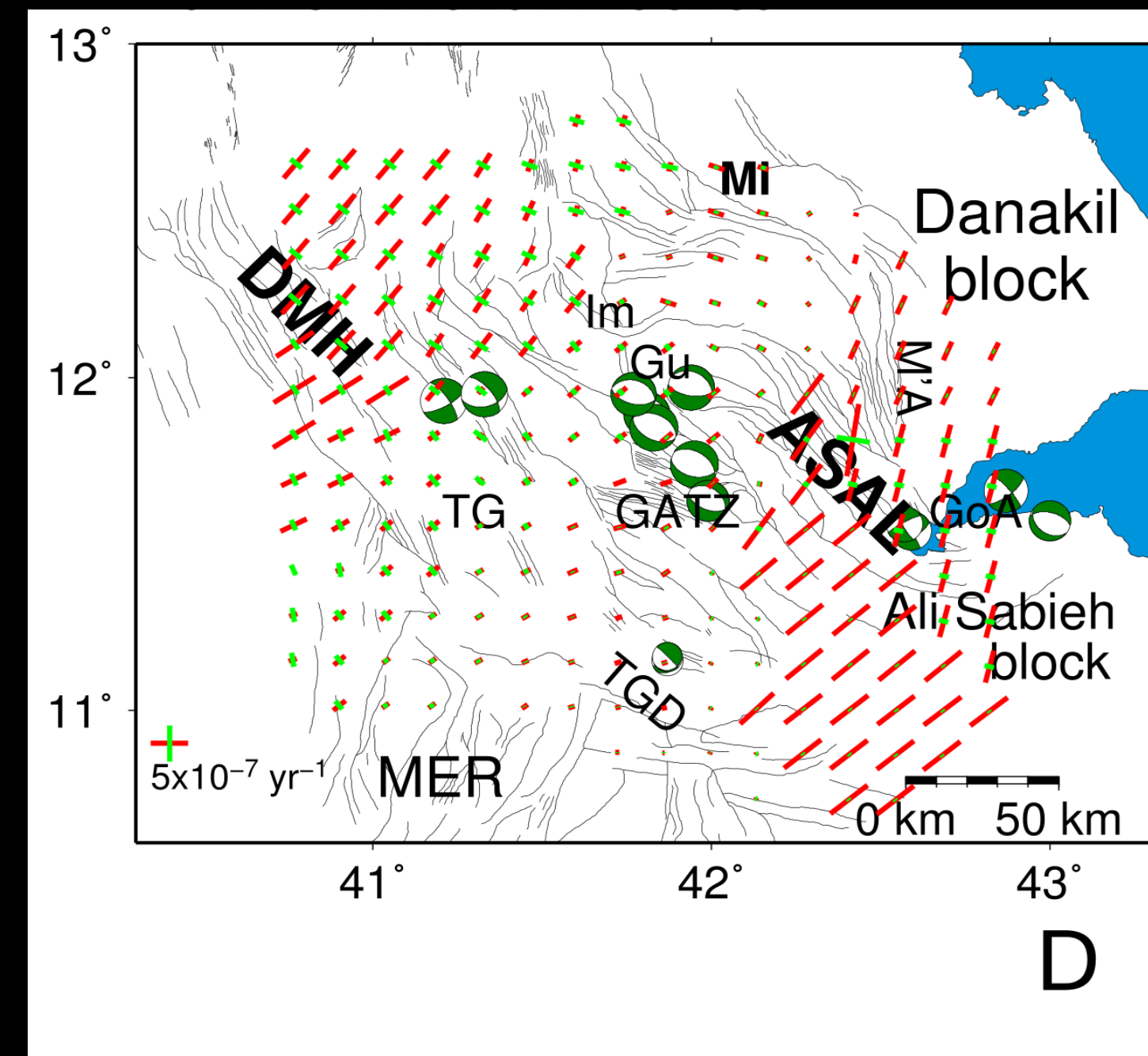
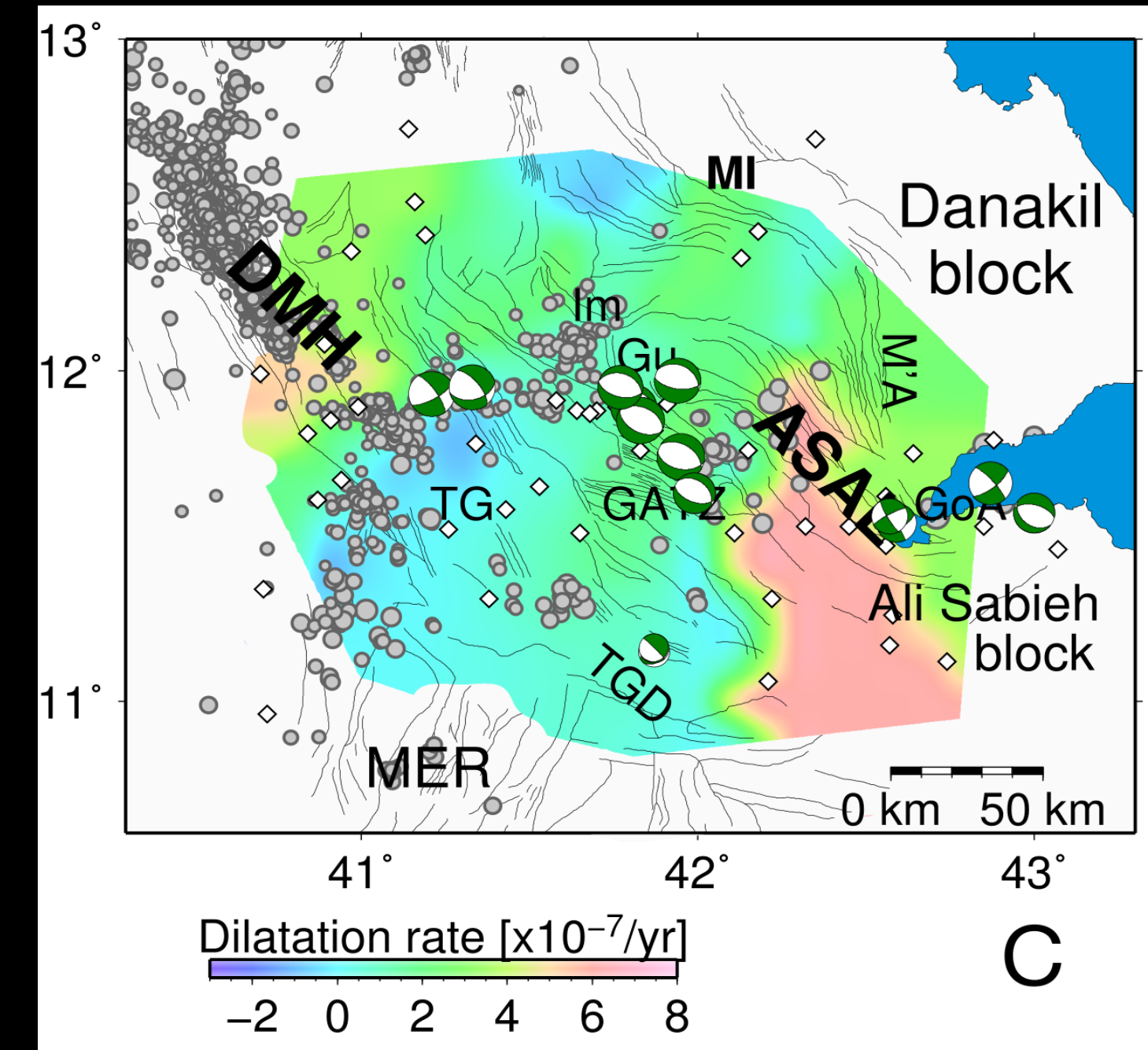
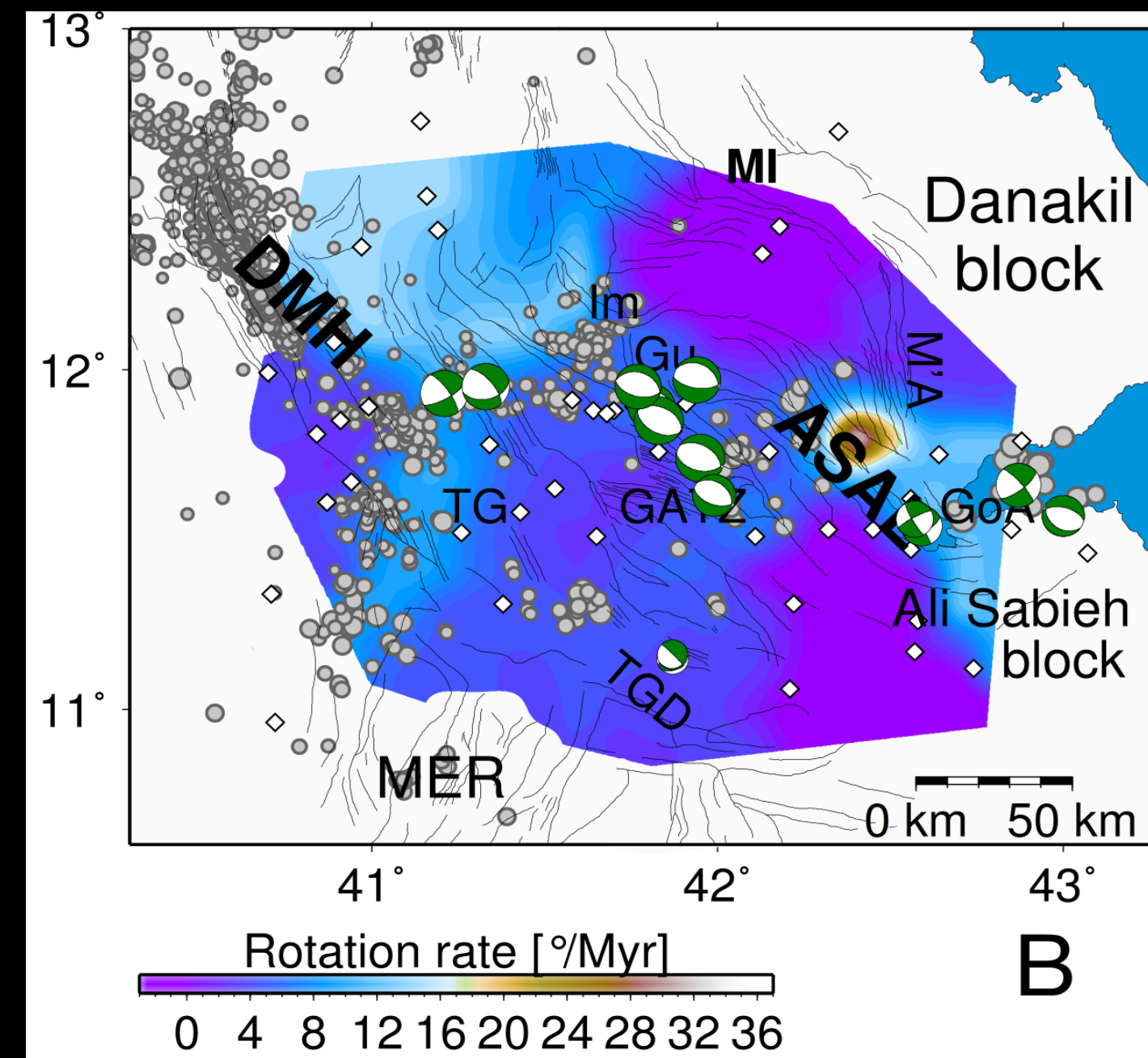
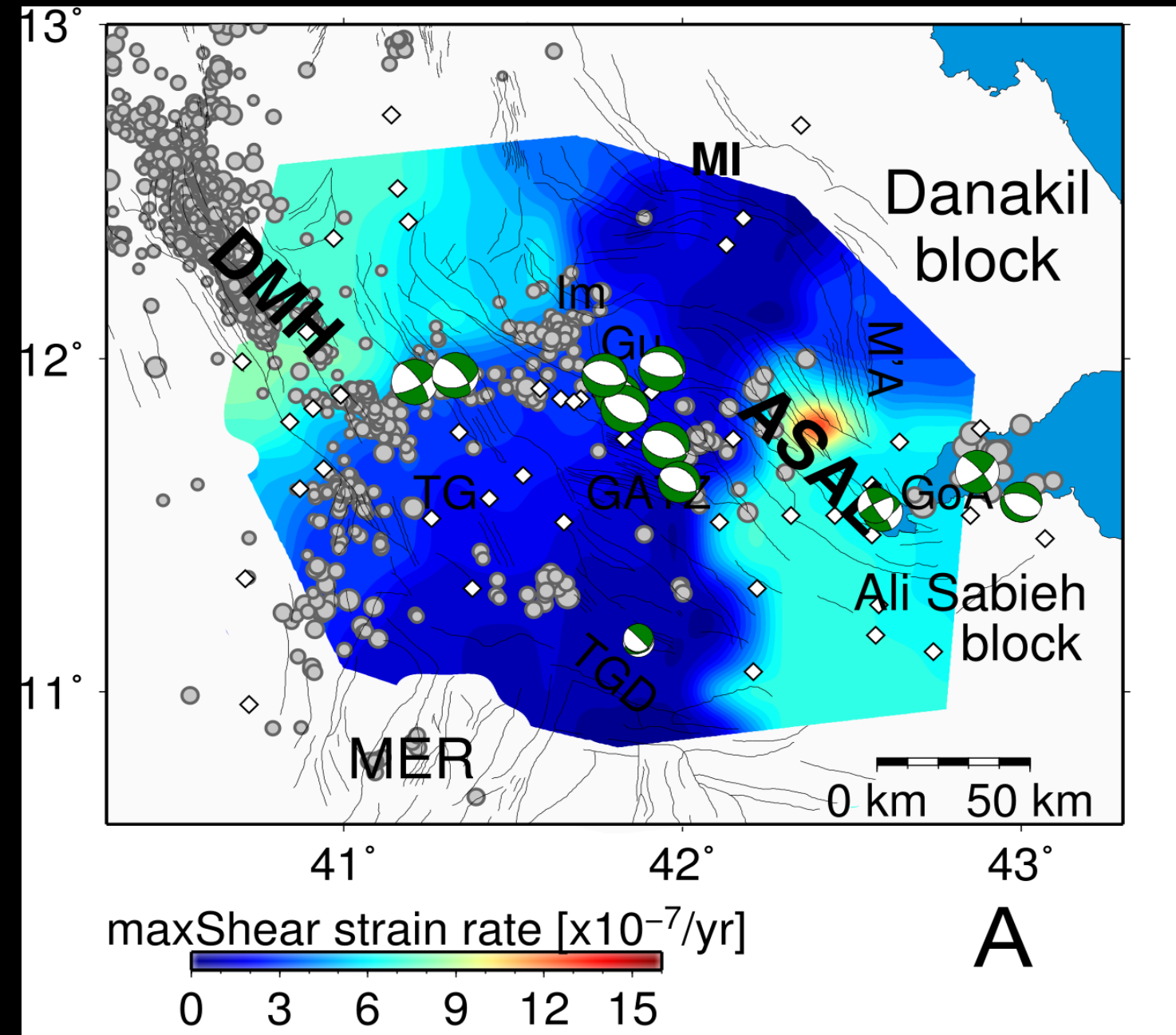


Moore et al., 2021 JGR (2014-2019) GNSS+InSAR



Deformation rates

- Continuum strain rate modelling



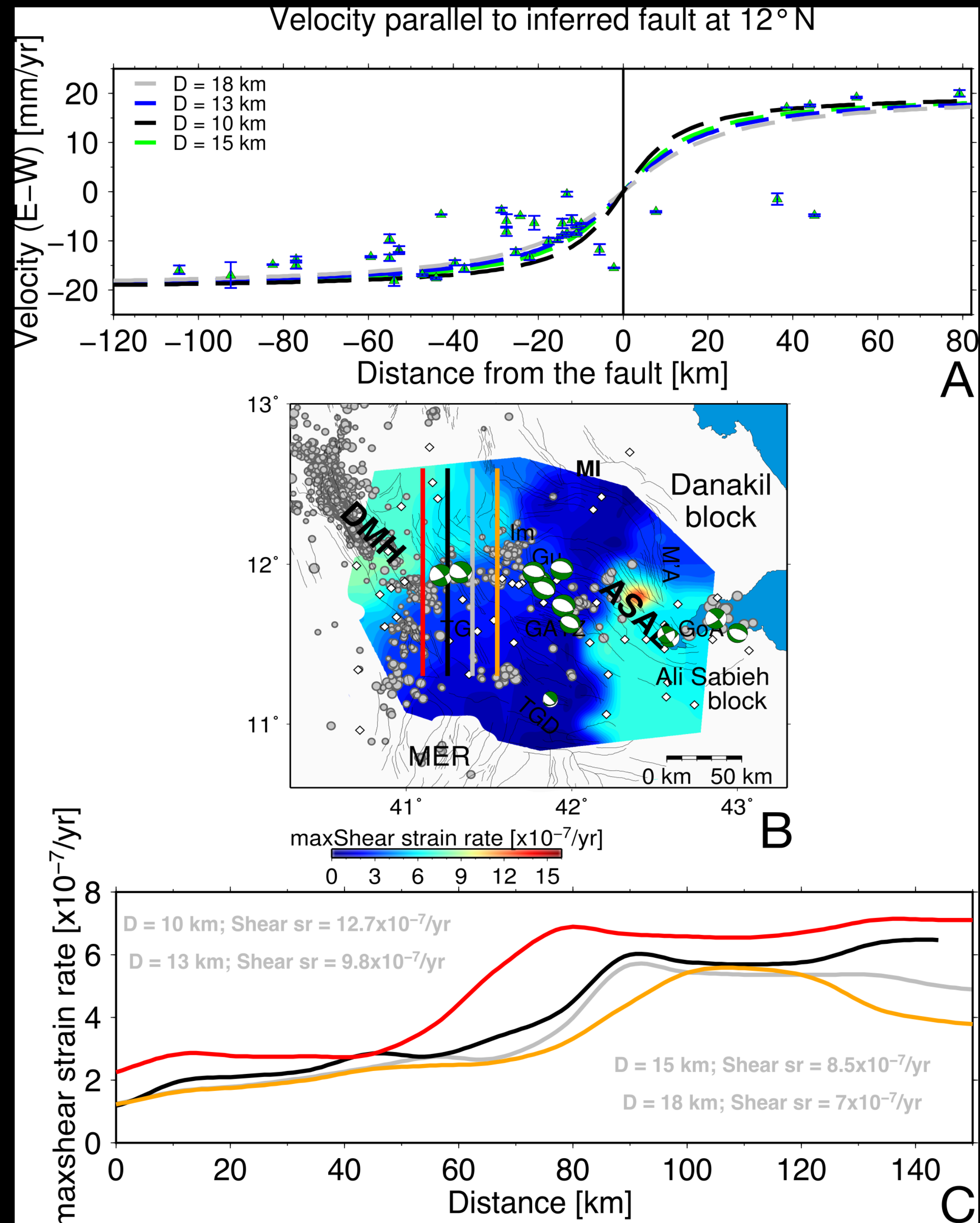
Transform fault

2D elastic dislocation model
(Savage and Burford, 1973)

$$b = (V/\pi)\arctan(x/D)$$

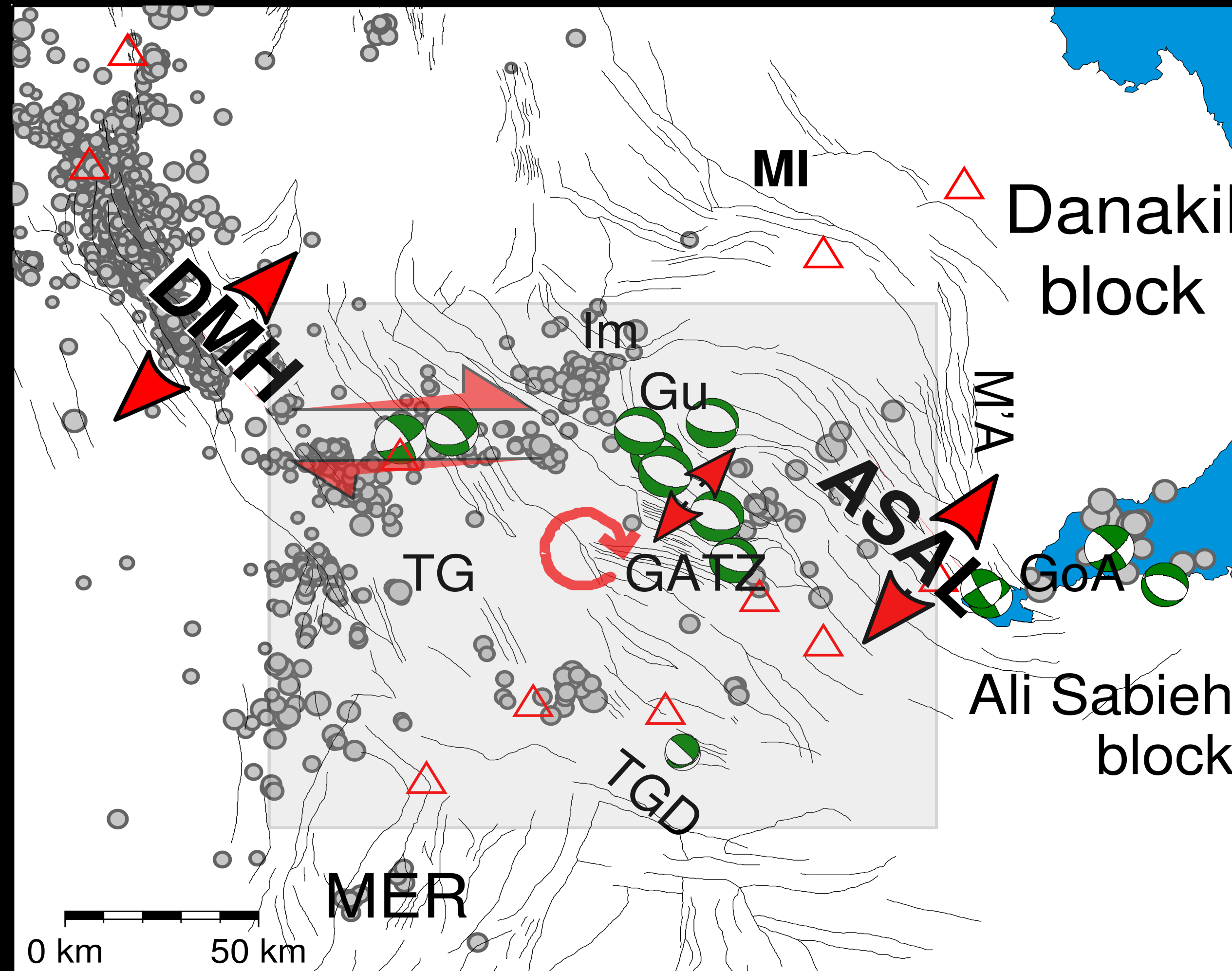
At the location of the fault is given by

$$\text{Maxshear sr} = V/\pi * D$$



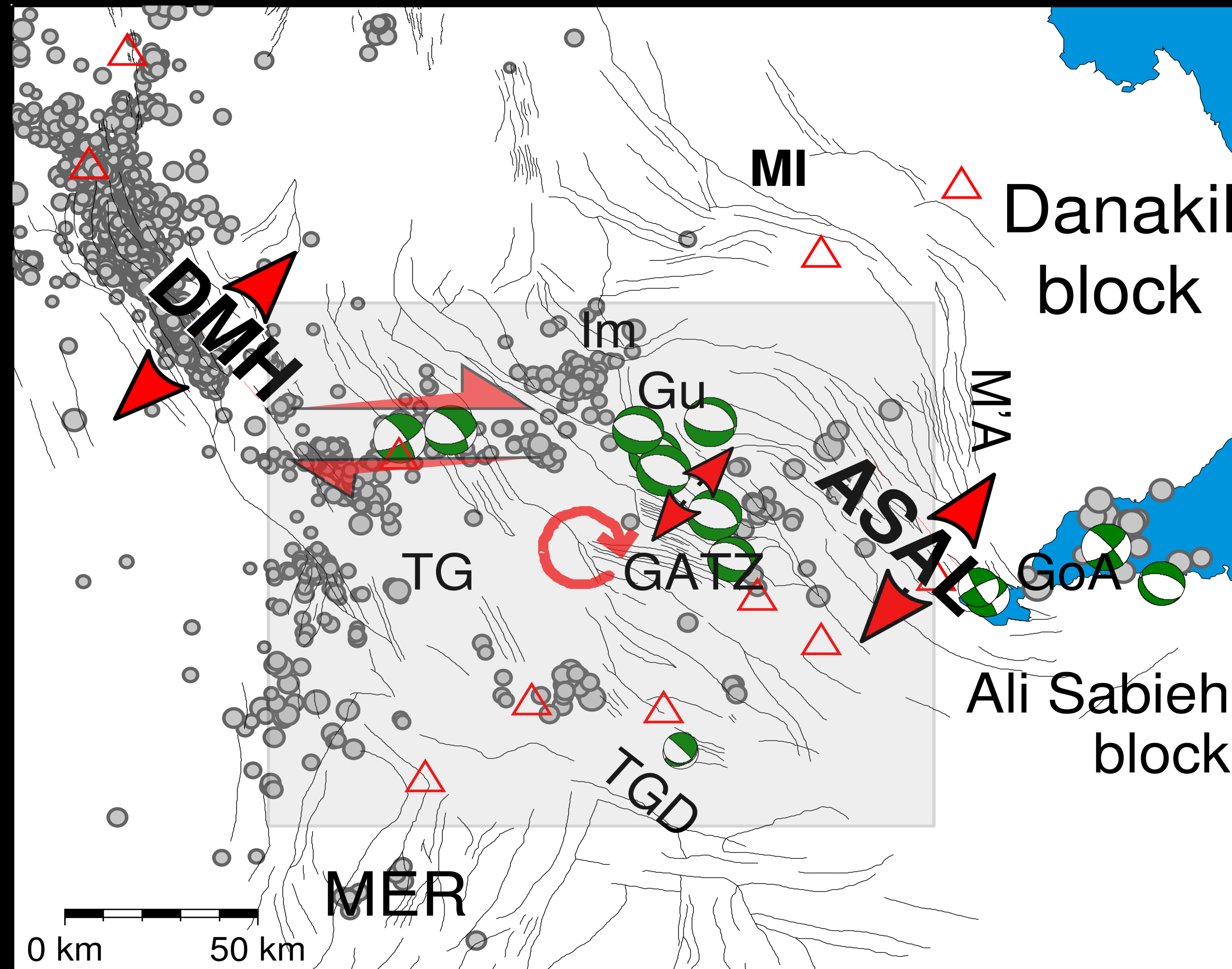
Conclusion

- Deformation in central Afar is accommodated by a combination of mechanisms involving transform fault, block rotation and opening of normal fault bounded grabens.



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THANK YOU!