# New steps towards estimating the driving and resistive forces on the Eurasian plate

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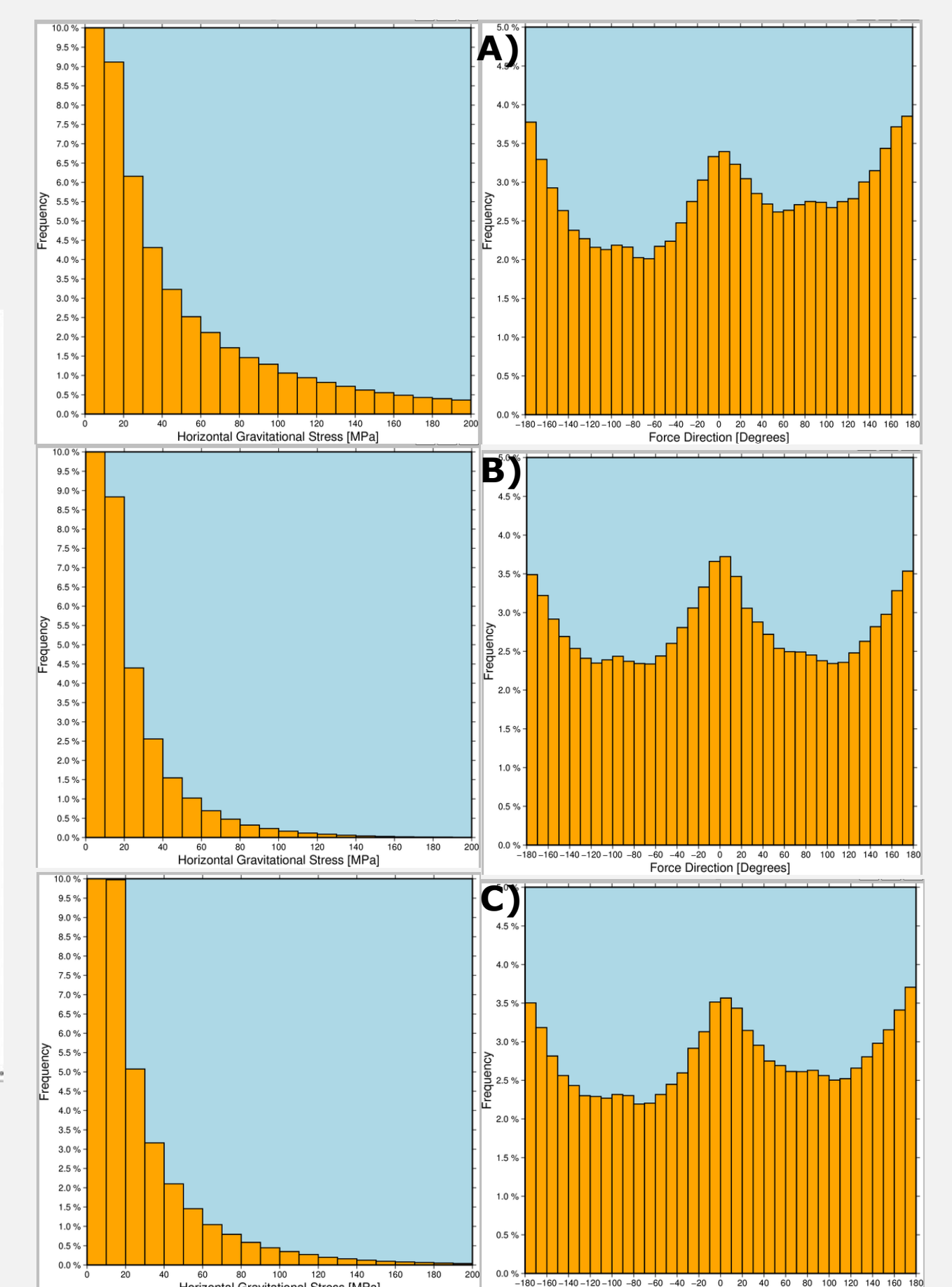
## Horizontal gravitational stresses (HGS)

Horizontal gravitational stresses (HGS) arise from lateral variations in geopotential energy (GPE) of the lithosphere, which is caused by lateral variations in the topography and (vertical) density structure of the lithosphere. The net horizontal force (HGS) generated by lateral density variations is the horizontal gradient of the GPE. In **Figure 1**, Horizontal gravitational stresses (HGS) from the lithospheric model of WINTERC-G (Fullea et al., 2021) are shown for compensation depths of: A) 300 km, B) Crustal 68 km, C) 100 km
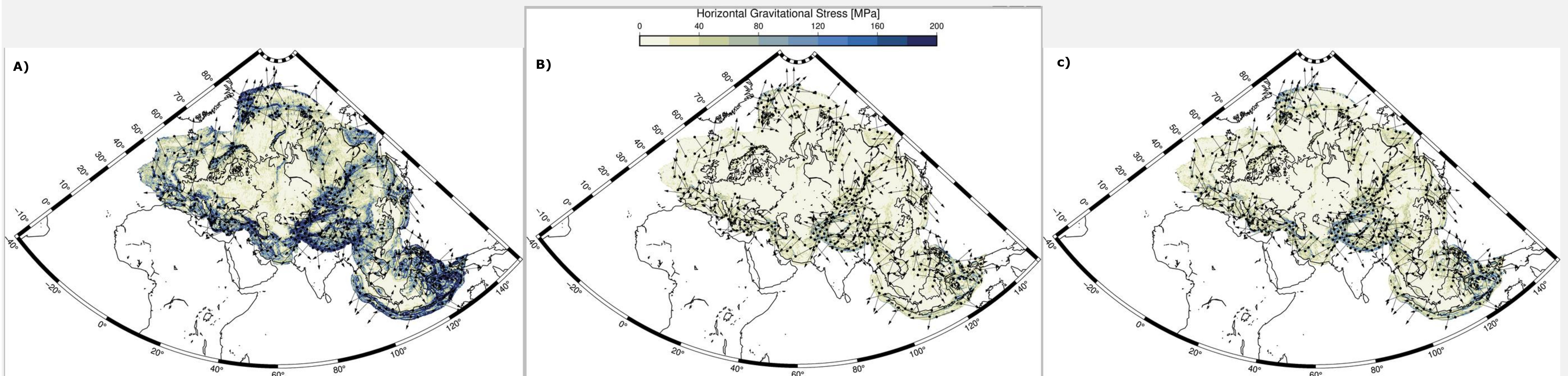


**Figure 1:** Horizontal gravitational stresses (HGS) for compensation depths of: A) 300 km, B) Crustal 68 km, C) 100 km
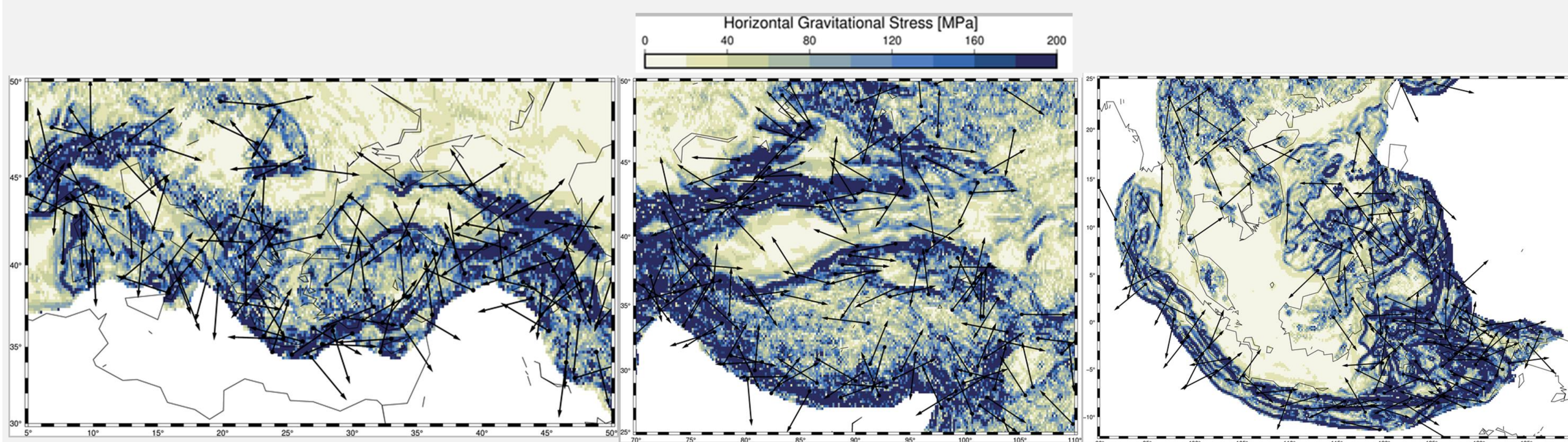


**Figure 2:** Horizontal gravitational stresses (HGS) for compensation depths of 300 km



**Figure 3:** Horizontal gravitational stresses (HGS) magnitudes and directions for compensation depths of: 300 km

## Deformation zones, faults, and plate boundaries of Eurasia

Hasterok et al. (2022) is the starting point to update faults, and plate boundaries of our Eurasian model.
High and low deformation zones for our Eurasian model
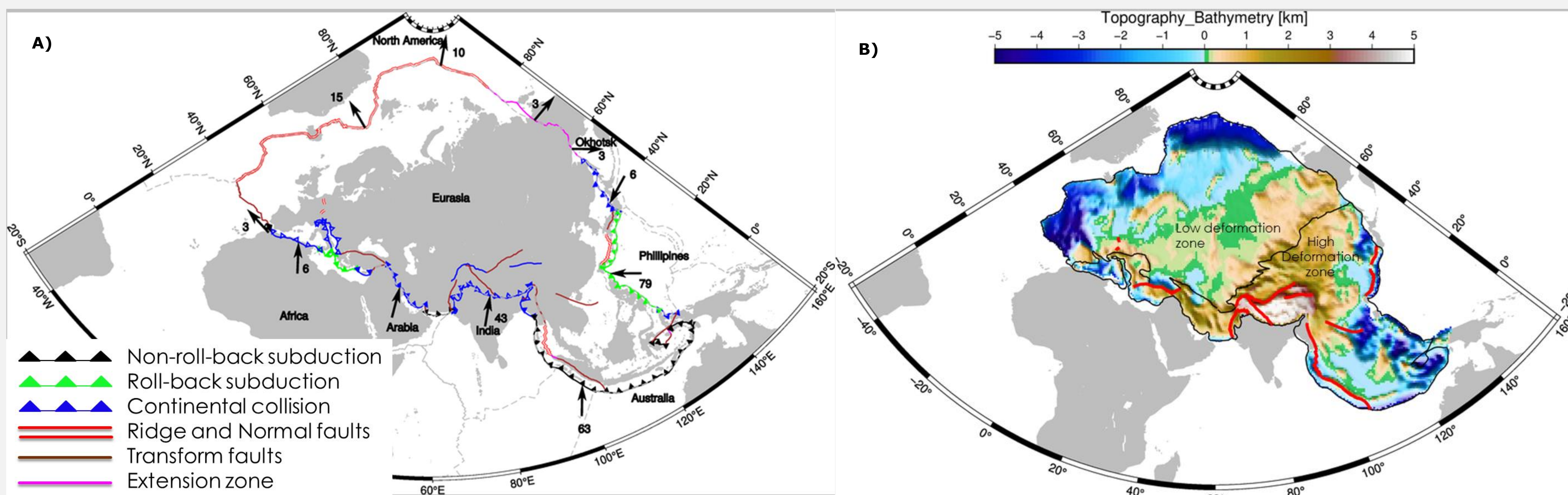


**Figure 4: A)** Deformation zones, faults, and plate boundaries of Eurasia. **B)** High and low deformation zones for our Eurasian model

### References

- Fullea, J., Lebedev, S., Martinec, Z., & Celli, N. L. (2021). WINTERC-G: Mapping the upper mantle thermochemical heterogeneity from coupled geophysical–petrological inversion of seismic waveforms, heat flow, surface elevation and gravity satellite data. Geophysical Journal International, 226(1), 146–191.
- Hasterok, D., Halpin, J. A., Collins, A. S., Hand, M., Kreemer, C., Gard, M. G., & Glorie, S. (2022). New Maps of Global Geological Provinces and Tectonic Plates. In Earth-Science Reviews (Vol. 231). Elsevier B.V. https://doi.org/10.1016/j.earscirev.2022.104069

### Acknowledgments