

Determining a Relationship between Gravity Roughness, Spreading Rate, and Relative Crustal Thickness of Transitional Crust

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What we know:

- Basement roughness is inversely proportional to spreading rate in oceanic crust (Malinverno 1991)
- Gravity roughness is inversely proportional to spreading rate in oceanic crust (Sandwell 1992, Whittaker, 2008)
- Mid-ocean ridge morphology is also influenced by magmatic productivity (measured as crustal thickness) (Malinverno, 1993)

What we have determined:

- Gravity roughness can be a proxy for basement roughness
- Satellite gravity data can be used to measure gravity roughness
- Gravity roughness in transitional crust has an inverse relationship with spreading rate and crustal thickness that is weaker than in oceanic crust
- There is a weak correlation between gravity roughness and crustal thickness in transitional crust

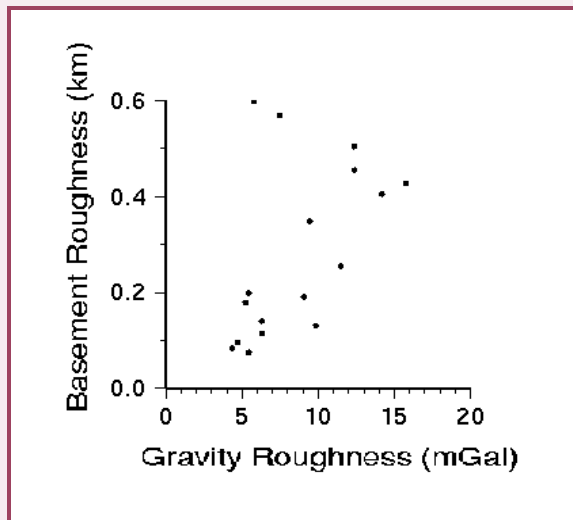


Figure 1. Basement Roughness v. Gravity Roughness of transitional crust. The dots represent each of the profiles.

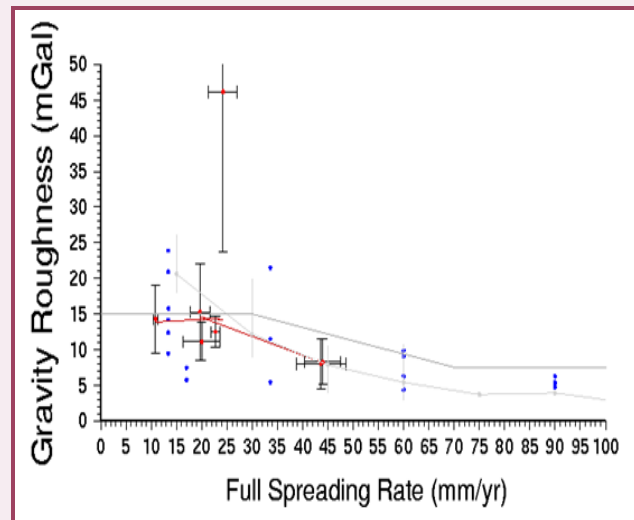


Figure 2. Gravity roughness v. Full Spreading rate of transitional crust. The red dots represent the North Atlantic regions, the blue dots represent the profiles across transitional crust from around the world, the dark gray line is taken from Sandwell, 1992 and the light gray line is taken from Whittaker, 2008

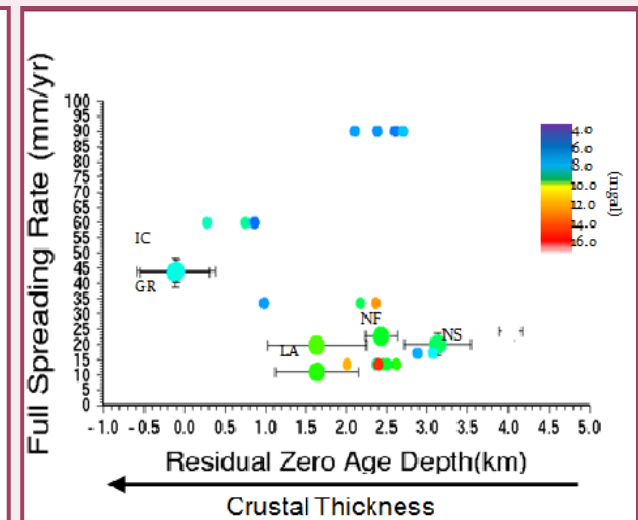


Figure 3. Full Spreading Rate v. Residual Zero-Age Depth. The large dots represent the North Atlantic Regions and the small dots represent the profiles. The different colors represent the range of gravity roughness.