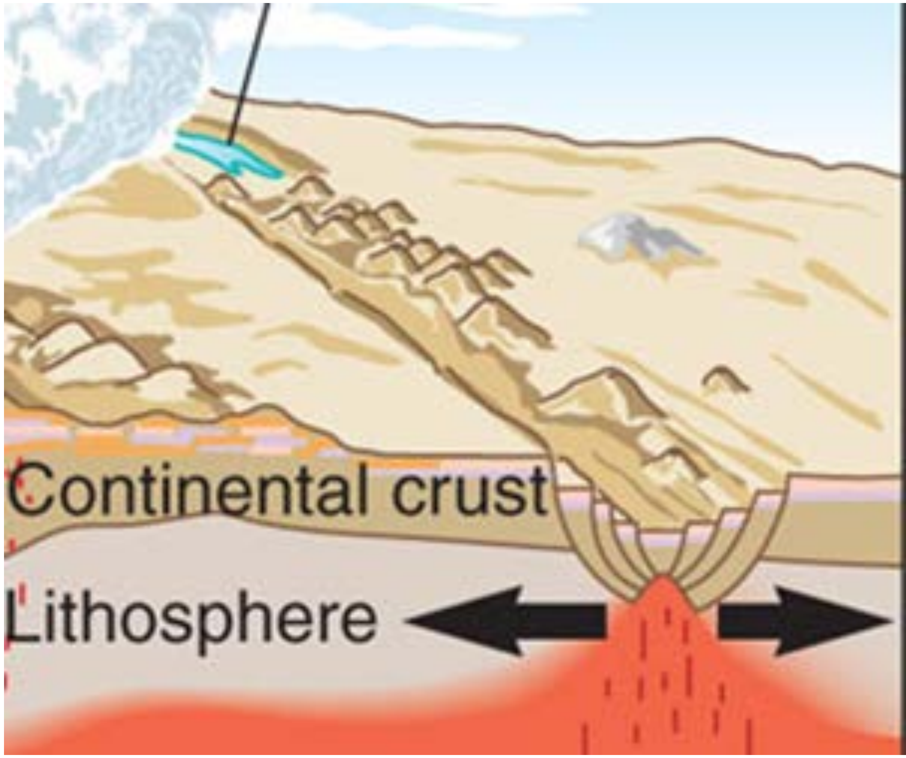
- How do fundamental rifting processes (such as tectonics, magmatism, and erosion, transport, and sedimentation), and the feedbacks between them, evolve in time and space?
  - What is relationship between deformation and magmatism at all levels in the lithosphere?
  - What controls the evolution of segmentation and along-strike variations in extensional style and magmatism in rifts?
  - What is relative importance of deiscrete rifting events versus continuous deformation in accounting for plate divergence?
  - How do erosion, sediment transport, and deposition vary with climatic and tectonic forcing in rifts?

  - Compelling science?
  - Achievability
  - Highest priority for sequestered funds
  - What requires Primary sites?
  - What specific experiments?

Sub questions

- What are the relative roles of magmatism and pre-existing structures in rift initiation?
- How do border fault segments form, and how is strain distributed throughout the lithosphere beneath and along early rift stage border faults?



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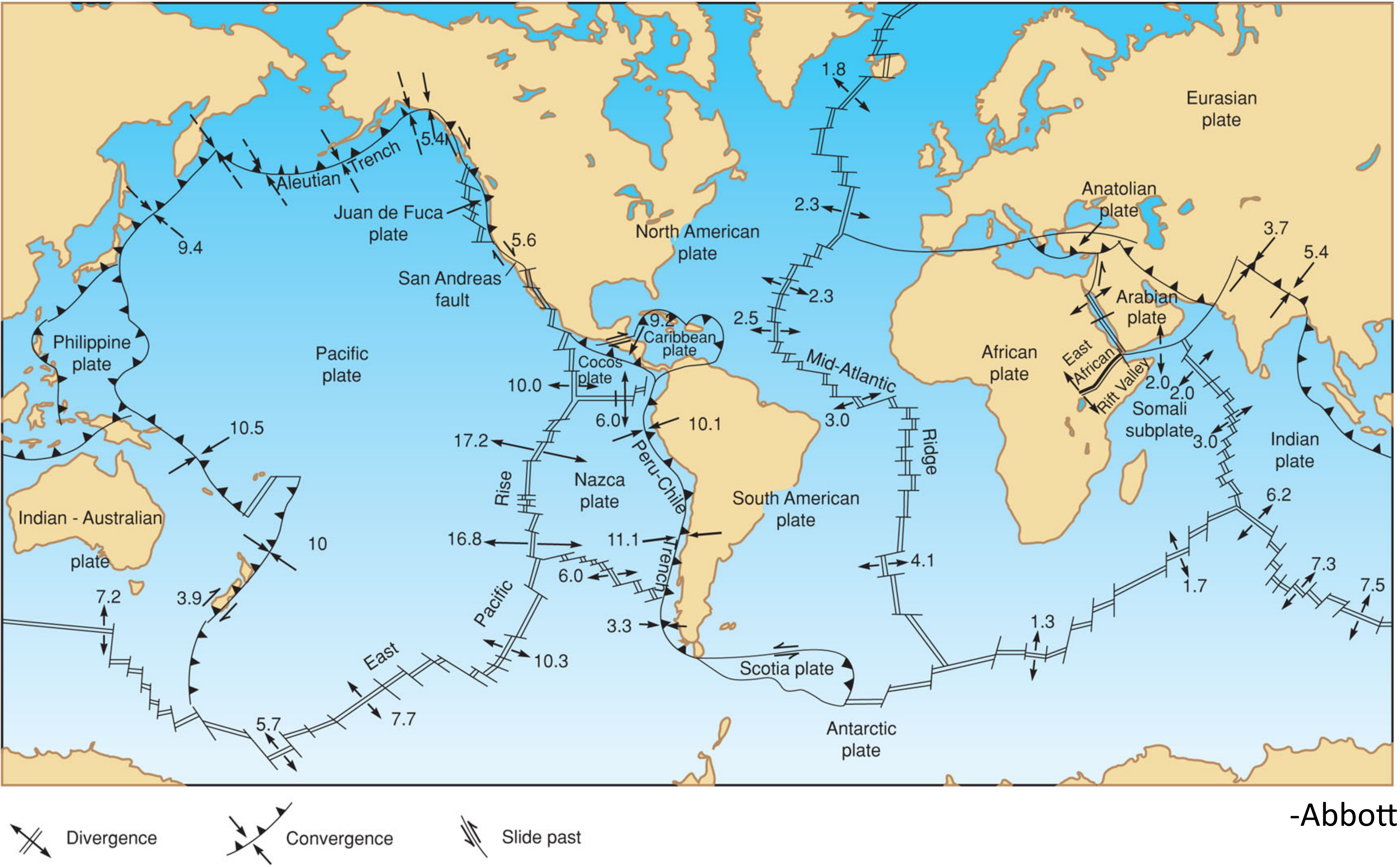
What are the relative roles of magmatism and pre-existing structures in rift initiation?



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<u>What are the relative roles of magmatism and pre-existing structures in rift initiation?</u>

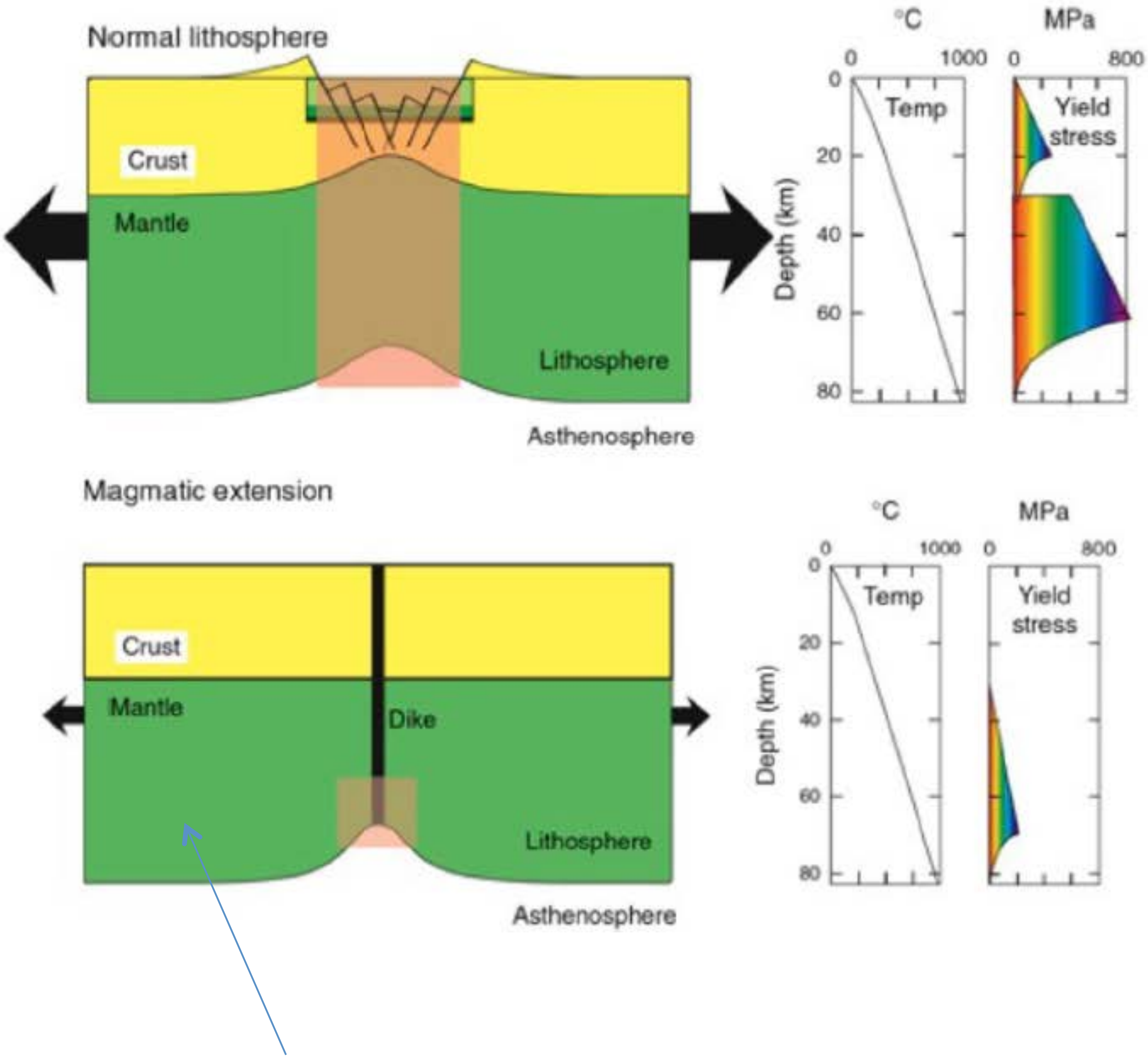

Figure 5.2. The strength of normal lithosphere is hypothesized to exceed plate motion forces available for rifting (top), but dike intrusion can significantly decrease lithospheric strength (bottom), thus focusing the initiation of rifting [Buck, 2004].

Magma, fluids, diking contribute to weakening, but the surrounding volume's heterogeneity must contribute to rift geometry and influence processes

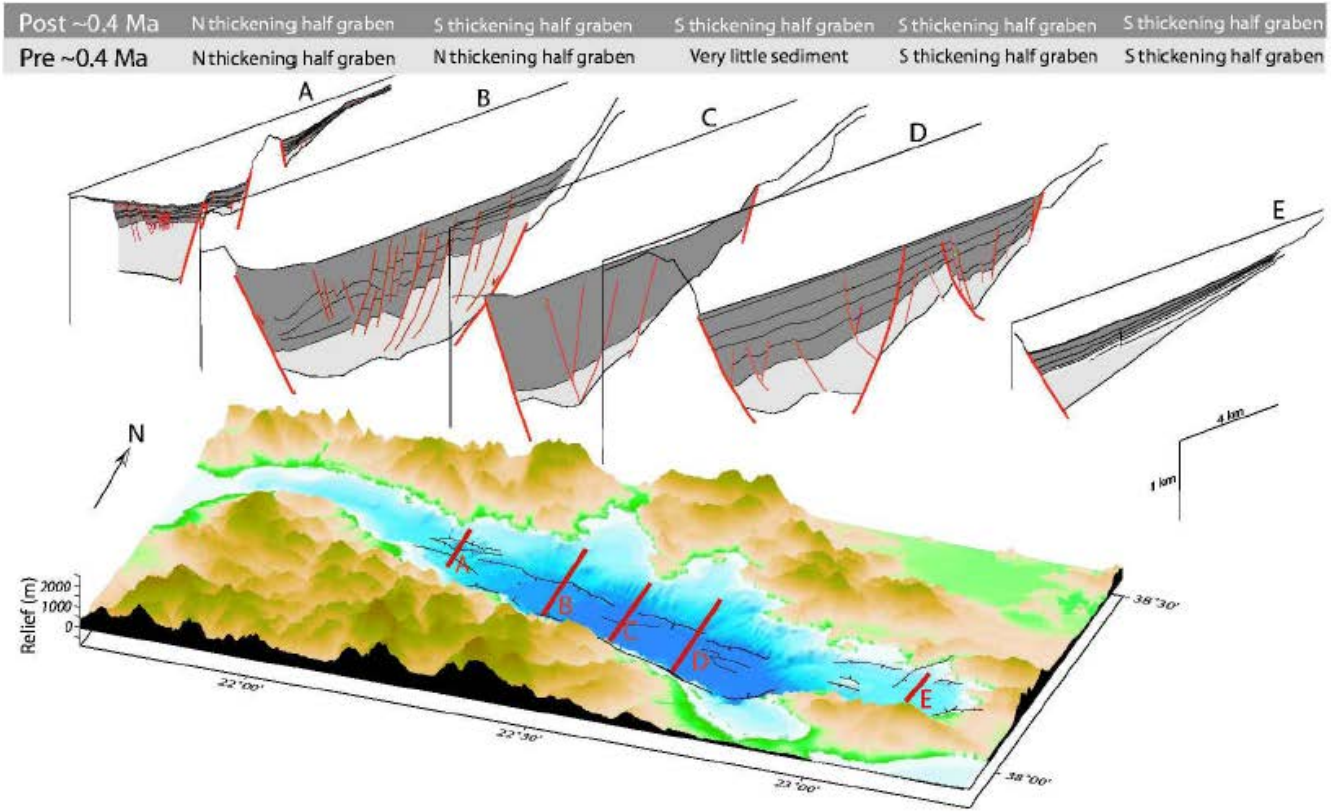

Figure 5.3. Temporal and spatial changes in faulting and basin geometry during early-stage continental rifting in the Gulf of Corinth imaged with seismic reflection data [after Bell et al., 2009].

Good views of early stages in upper crust. What happens to the faults with depth, especially below the brittle-ductile transition?

How do border fault segments form, and how is strain distributed throughout the lithosphere beneath and along early rift stage border faults?