



# From Deep-time to the future: unlocking the next generation of plate models

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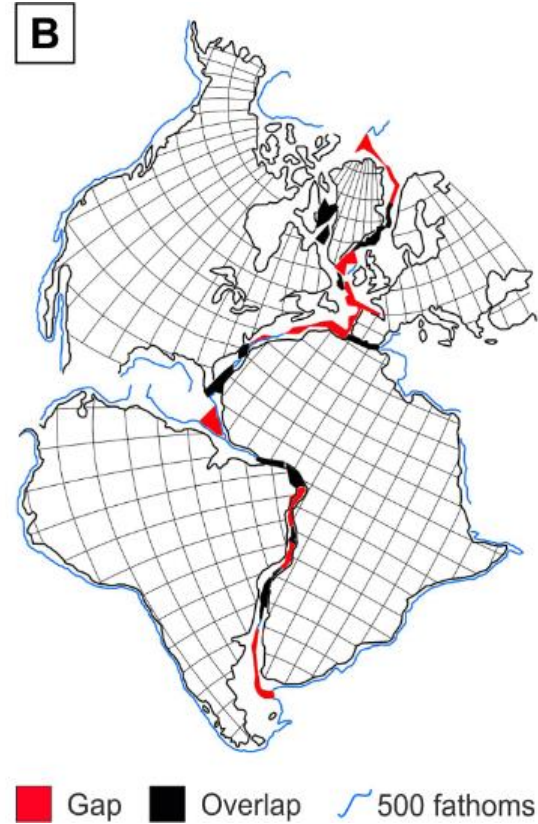


# 50+ years of plate models

From hand-drawn reconstructions to highly sophisticated multi-scale models



Sketches of Snider-Pellegrini (1858)



Bullard et al. (1965)



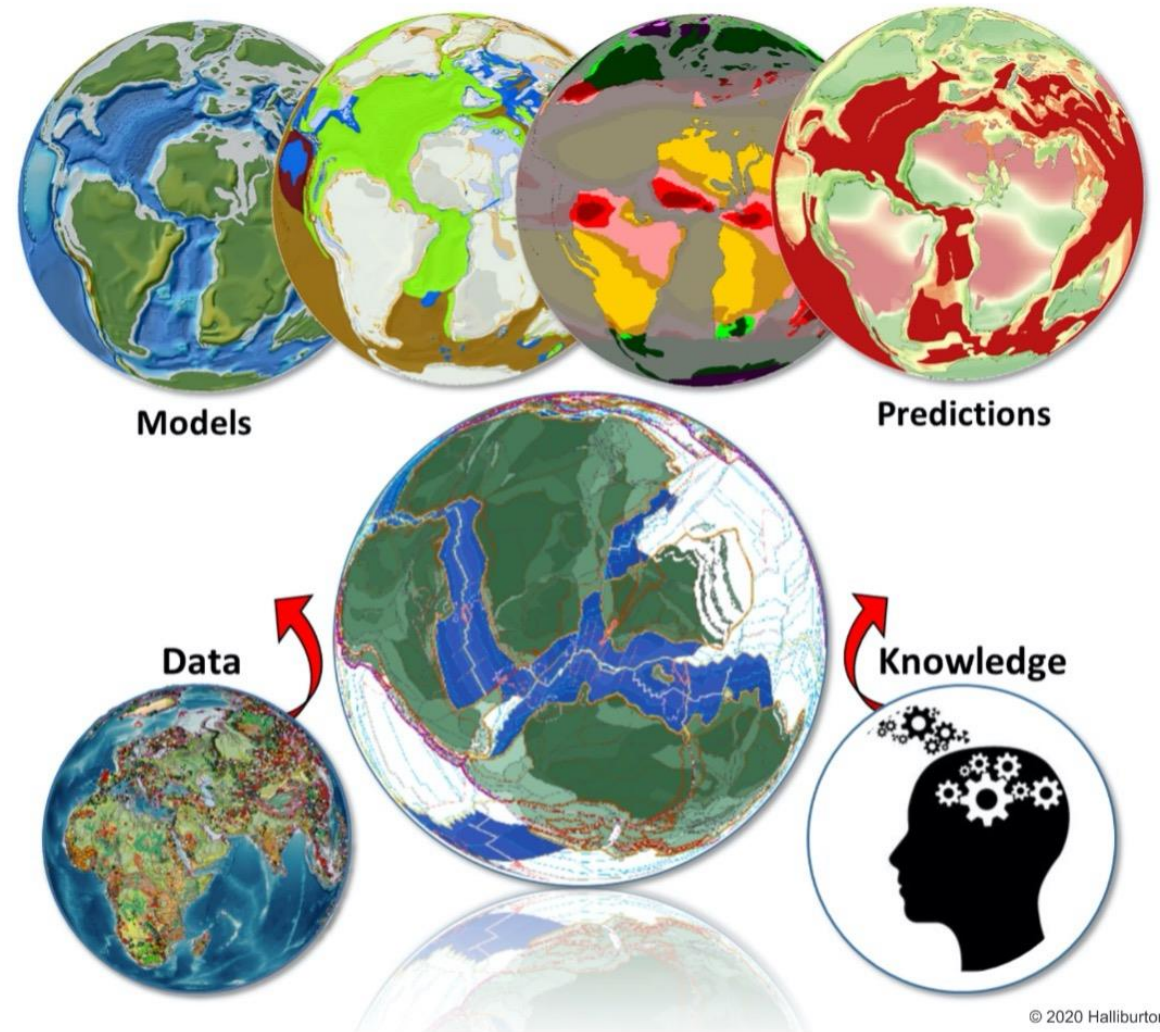
Neftex® Plate Model

# 50+ years of plate models

Building a robust plate tectonic model from data and regional knowledge is just the starting point for understanding the wider Earth system, enabling advanced predictions of tectonics, sedimentation, climate and the occurrence of natural resources through time and space.  
(Lang et al., 2020).

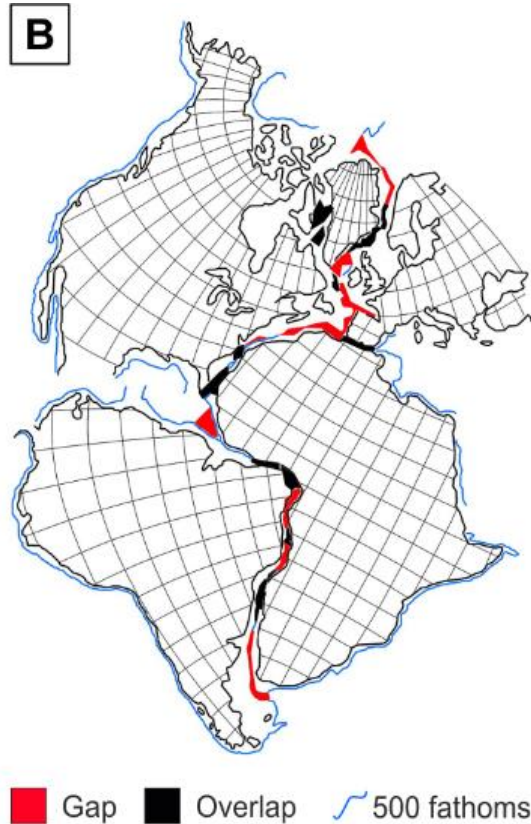
Plate models today provide:

- A framework within which to put geological data into context through time and space
- Context for interpreting geological histories
- Constraints for further models and simulations
- Clues about some of the most fundamental questions in Earth Science

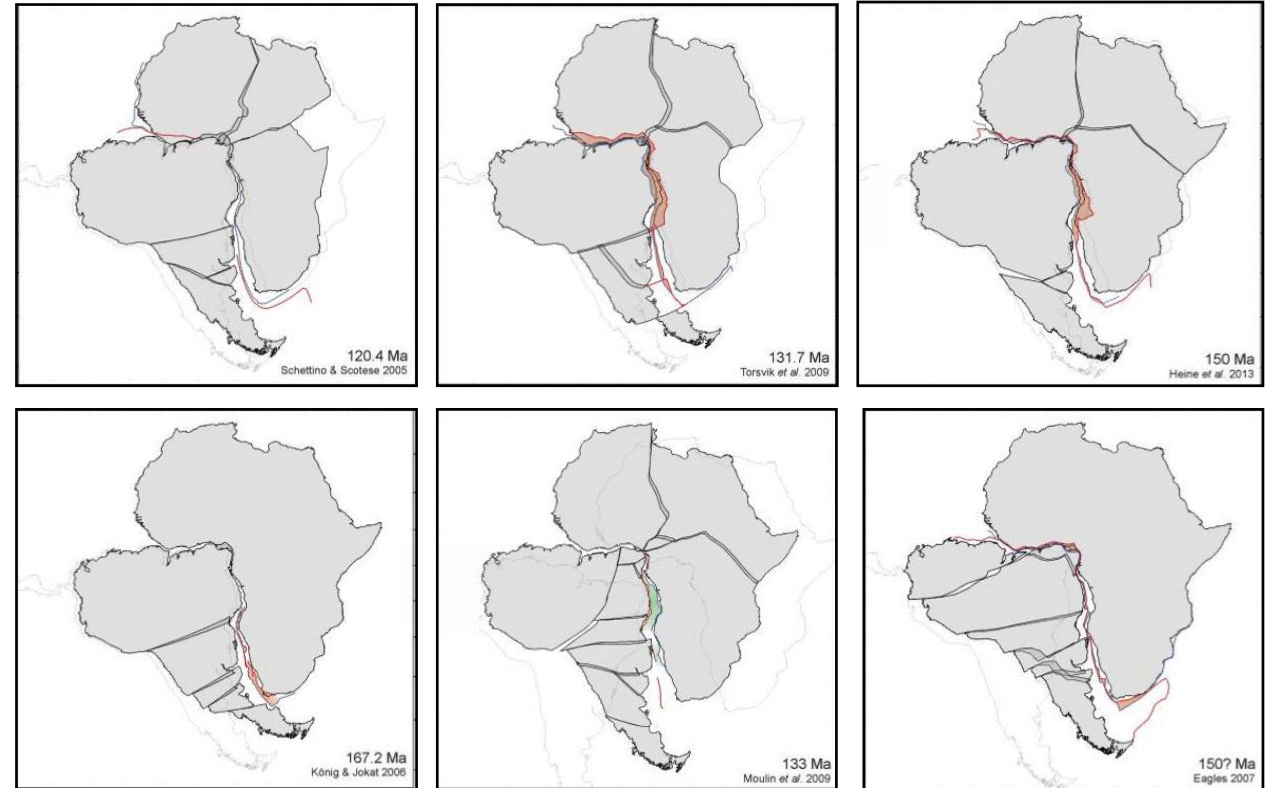




# One problem...too many solutions?

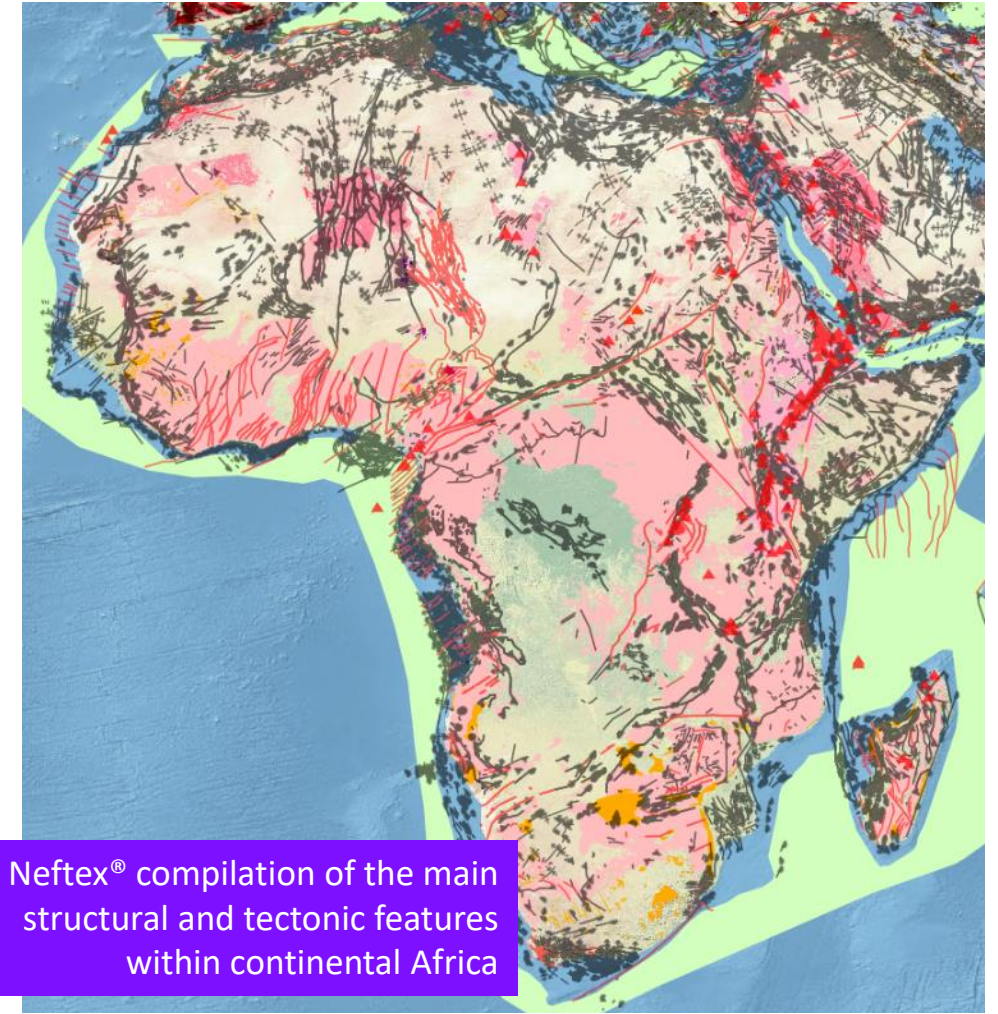


Ground-breaking computer-assisted reconstruction of the Atlantic by *Bullard et al.* (1965)



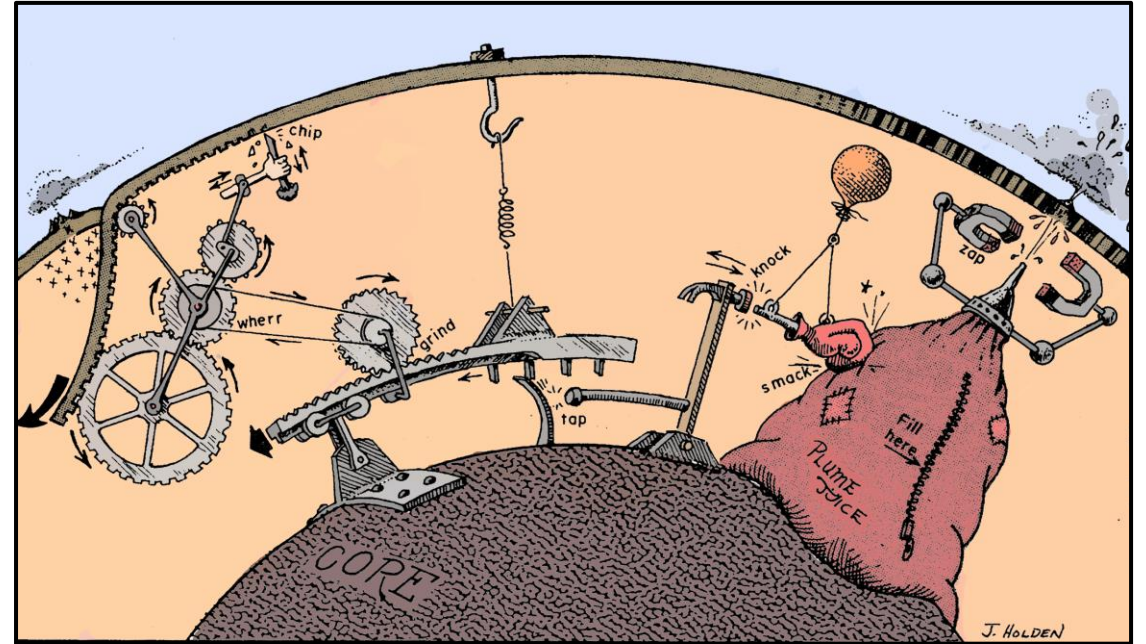
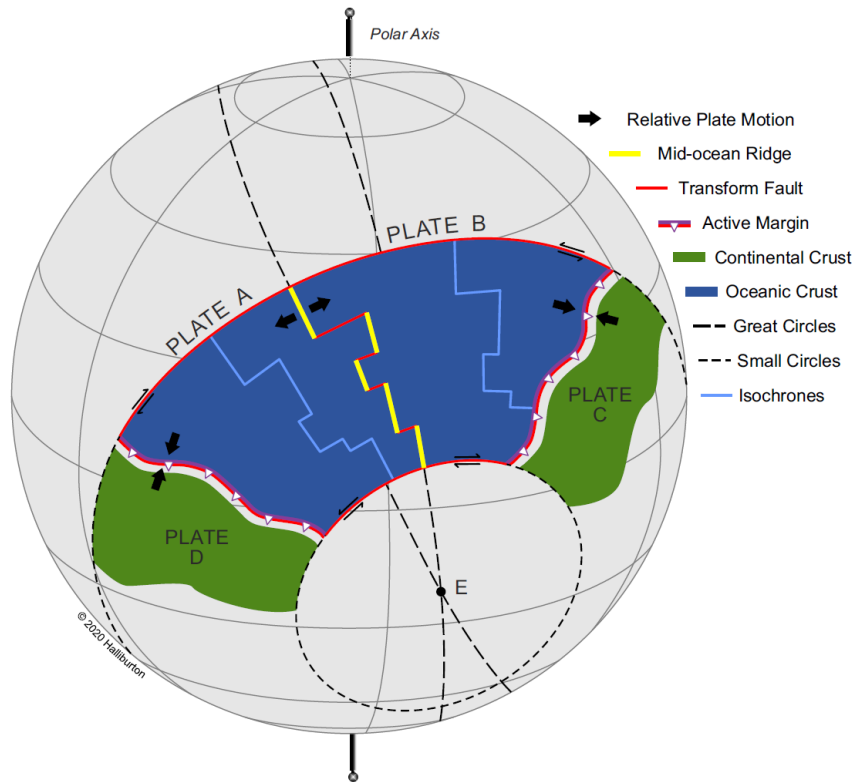
Six alternative interpretations of the early stages of continental breakup leading to the opening of the South Atlantic, published in the 21st century

# Big data or Better data?



# Back to basics

Model predictions must be consistent with the rules of terrestrial geodynamics!



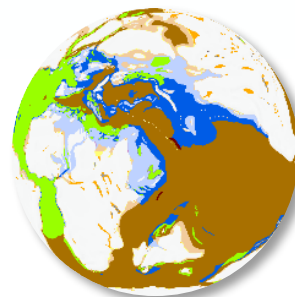
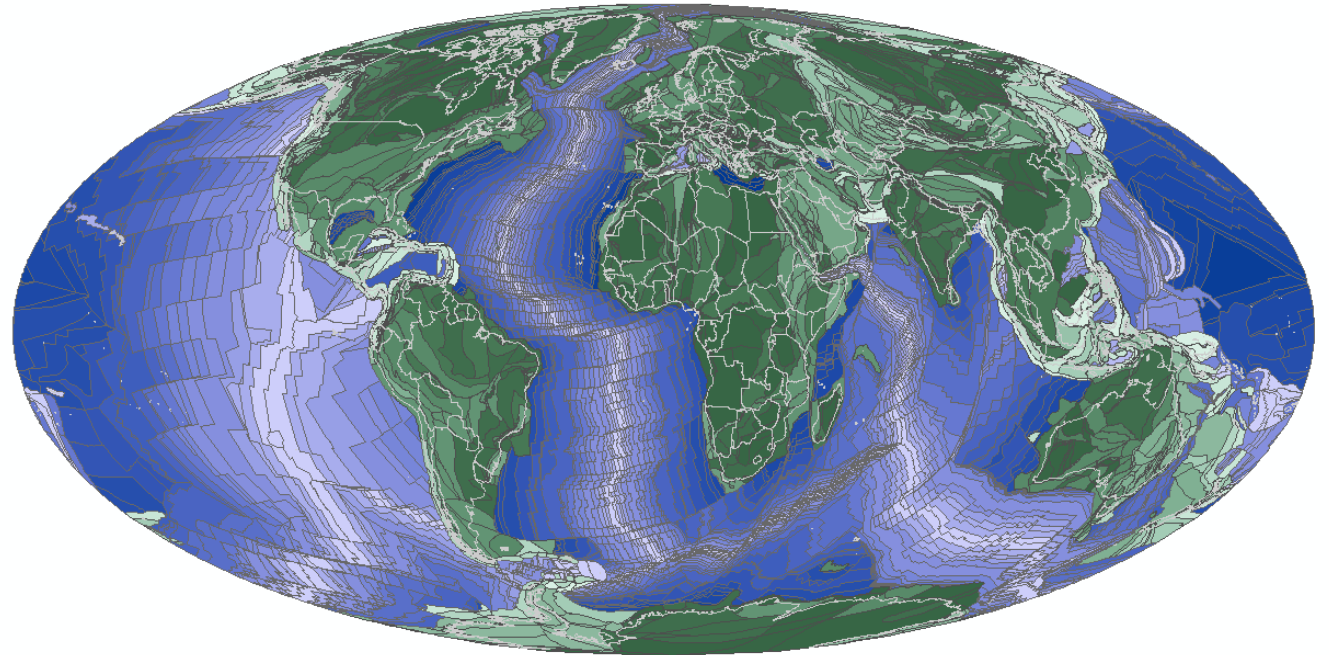
As plates move, plate boundaries evolve. The ways in which they evolve should also be geodynamically sound.

The NefTex® plate model embraces this, through the concepts of 'dynamic plate boundaries' (Stampfli and Borel, 2002; Hochard, 2008) or 'dual control approach' (Vérard, 2018).



# It's a never ending cycle!

- *Plate reconstructions*
  - are used as the foundations for many other models and simulations
  - put geological data into context back through time
- *Building better plate models requires*
  - approaches anchored on the principles of geodynamics
  - global considerations
- *The Neflex® plate model*
  - already makes use of some of these constraints
  - is in constant evolution as a key piece towards enabling our changing needs through the energy transition



Dep. environments



pDEM

Drainage (Source-to-Sink)



Paleoclimate

