Some shapes of plate tectonics to come
Van der Meer et al. (2009)
The geodynamics enhancer
Torvik et al. (2008)
Bionic plate tectonics
Non-rigid plates
\[ U_X, U_Y, \frac{\partial U_Y}{\partial x}, \frac{\partial s}{\partial y} = 0 \]

\[ U_X, U_Y, \frac{\partial s}{\partial y} = 0 \]

\[ U_X, U_Y = 0 \]

\[ U_Y = f(x) \]

\[ s = S_0 \text{ or } \frac{\partial s}{\partial y} = 0 \]


Gerya (2013)
Dynamic feedback between lithosphere and mantle
Plate Tectonics and Convection in the Earth's Mantle: Toward Numerical Simulation

Numerical models of mantle convection are starting to reproduce many of the essential features of continental drift and plate tectonics. To achieve this goal, one must understand how to incorporate a wide variety of geophysical and geological phenomena.

Ron Trompert* & Ulrich Hansen

1. Faculty of Earth Sciences, Utrecht University, PO Box 80021, NL-3508 LA Utrecht, Netherlands

Simple Model of Plate Generation from Mantle Flow

Richard M. Bercovici

Department of Geology & Geophysics
University of Hawaii, Honolulu, Hawaii

SUMMARY

A simple model of non-Newtonian creeping flow is used to evaluate the influence of viscous mantle flow on the generation of plates. The model describes a motion driven by sources and sinks. The sources represent spreading centers in the mantle, and sinks also produce the surface flow field. The toroidal (strike-slip) component of the solution of the Stokes equation with non-Newtonian rheology and the model, the horizontal divergence from the two-dimensional model, is used for the source-sink field. The fluid flow reproduces the rectangular plate model to estimate the influence of the various parameters on the flow field.

PLATE TECTONICS AND CONVECTION IN THE EARTH'S MANTLE: TOWARD NUMERICAL SIMULATION

Numerical models of mantle convection are starting to reproduce many of the essential features of continental drift and plate tectonics. To achieve this goal, one must understand how to incorporate a wide variety of geophysical and geological phenomena.

Ron Trompert* & Ulrich Hansen

1. Faculty of Earth Sciences, Utrecht University, PO Box 80021, NL-3508 LA Utrecht, Netherlands

Simple Model of Plate Generation from Mantle Flow

Richard M. Bercovici

Department of Geology & Geophysics
University of Hawaii, Honolulu, Hawaii

SUMMARY

A simple model of non-Newtonian creeping flow is used to evaluate the influence of viscous mantle flow on the generation of plates. The model describes a motion driven by sources and sinks. The sources represent spreading centers in the mantle, and sinks also produce the surface flow field. The toroidal (strike-slip) component of the solution of the Stokes equation with non-Newtonian rheology and the model, the horizontal divergence from the two-dimensional model, is used for the source-sink field. The fluid flow reproduces the rectangular plate model to estimate the influence of the various parameters on the flow field.
Some shapes of plate tectonics to come
Fig. 6. The locations of the boundaries of the six blocks used in the computations. The numbers next to the vectors of differential movement refer to Table 5. Note that the boundaries where the rate of shortening or slippage exceeds about 2 cm/yr account for most of the world earthquake activity.
DID THIS REALLY HAPPEN?

CATEGORY: STRIPS

PRETTY FACE

06/04/2018
1 Comment

Unlike previous studies, our result shows significant predictability over this region.
Seafloor age distribution

Coltice et al. (2012, 2013)
Plate size distribution

Mallard et al. (2016, 2017)
Continental drift

Rolf, Coltice & Tackley (2014)