Geophysical Research Abstracts
Vol. 14, EGU2012-6896, 2012
EGU General Assembly 2012

Testing the kinematics and timing of the opening of the Amerasia Basin through a new coupled plate kinematic and mantle convection model

G. Shephard, R.D. Müller, and C. Heine
School of Geosciences, University of Sydney, Australia (grace.shephard@sydney.edu.au)

One of the most elusive aspects in the evolution of the Arctic is the origin and timing of the opening of the Amerasia Basin. The Amerasia Basin's central location within the Arctic province makes it a centerpiece in tectonic reconstructions; however its pre-rift configuration and kinematic development remains unclear. To date, several tectonic models have been proposed to explain the evolution of the Amerasia Basin including rotation models, transform and strike slip models incorporating various shear margins and extensional processes. The most widely accepted models suggest that during the Late Jurassic the Arctic Alaska-Chukotka microplate (AACM) underwent counter-clockwise rotation from the Canadian margin due to rifting and seafloor spreading. However many aspects of this model remain debated including the existence and geometry of an intra-Arctic subduction zone and subduction of an ancient ocean basin, the extent and initial geometry of the AACM and whether the Lomonosov Ridge represents a shear, extensional or transform margin. Here, based on a digitized set of tectonic features with time-dependent deformation and rotational histories we aim to test these main conflicting tectonic models. Through the construction of topologically-closed polygons for the Arctic since the Mesozoic with the software GPlates, we can ultimately test the different models in a geodynamic context. We compare predicted mantle structure based on imposed surface kinematics to seismic tomography to discern long-wavelength discrepancies between models and provide a new approach to reconciling Arctic tectonics.