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Earth and Environmental Sciences for Future Generations

IAGA (Aeronomy,  
Geomagnetism)

**A09/A05 Open Symposium on Paleomagnetism and Rock Magnetism (Div. I) / Paleomagnetic reference models, Apparent Polar Wander Paths, and their use in Global and Regional Tectonics (Div. I)**



25-Jun-2015, 16:30 - 18:00

Abstract content:

**Absolute plate motion reconstruction from paleomagnetism: methodology and the Matlab toolbox 'PMTec'**

The application of paleomagnetism for absolute plate motion reconstructions remains underutilized because of the longstanding challenge of extracting paleolongitude from paleomagnetism. In quest of the potential solution, Wu and Kravchinsky [2014] present a synthesized method to derive paleo-longitude from paleomagnetic data through the geometrical parametrization of apparent polar wander paths (APWP). To make the technique easily operational for the general community, we develop a MATLAB graphical users interface PMTec which allows 1) the construction of APWP from paleomagnetic poles, 2) APWP geometric parametrization (i.e. APWPGP) and 3) the absolute plate motion restoration using stage or finite rotation poles. Two standard methods, running mean and spherical spline paths, are provided in PMTec for the construction of APWP. The highlight functionalities of PMTec are to perform both great and small circle modelling to the identified APWP tracks to calculate the paleomagnetic Euler parameters (stage rotations), and the absolute plate motion reconstructions after a paleomagnetic colatitude correction to correct for the discrepancies between the fitted circles and the actual APWP tracks. The uncertainty ellipses for paleomagnetic Euler poles and the resulting reconstructions are estimated from the parametric Fisherian bootstrap dataset. Using PMTec, the dispersion history of East Gondwana since 140 Ma is restored which is comparable with the reconstructions from other methods. The objective of PMTec is to make the absolute plate motion calculations from paleomagnetism easily approachable both for research and education purposes.

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Keywords:

apparent polar wander paths absolute plate motion reconstructions Matlab toolbox paleomagnetism plate tectonics

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