

Paleomagnetism.org - An online multi-platform and open source environment for paleomagnetic analysis.

Mathijs Koymans, Cor Langereis, Daniel Pastor-Galán, and Douwe van Hinsbergen
Department of Earth Sciences, Utrecht University, Utrecht, The Netherlands

This contribution gives an overview of Paleomagnetism.org (Koymans et al., 2016), an online environment for paleomagnetic analysis. The application is developed in JavaScript and is fully open-sourced. It presents an interactive website in which paleomagnetic data can be interpreted, evaluated, visualized, and shared with others. The application has been available from late 2015 and since then has evolved with the addition of a magnetostratigraphic tool, additional input formats, and features that emphasize on the link between geomagnetism and tectonics.

In the interpretation portal, principle component analysis (Kirschvink et al., 1981) can be applied on visualized demagnetization data (Zijderveld, 1967). Interpreted directions and great circles are combined using the iterative procedure described by (McFadden and McElhinny, 1988). The resulting directions can be further used in the statistics portal or exported as raw tabulated data and high-quality figures.

The available tools in the statistics portal cover standard Fisher statistics for directional data and virtual geomagnetic poles (Fisher, 1953; Butler, 1992; Deenen et al., 2011). Other tools include the eigenvector approach foldtest (Tauxe and Watson, 1994), a bootstrapped reversal test (Tauxe et al., 2009), and the classical reversal test (McFadden and McElhinny, 1990). An implementation exists for the detection and correction of inclination shallowing in sediments (Tauxe and Kent, 2004; Tauxe et al., 2008), and a module to visualize apparent polar wander paths (Torsvik et al., 2012; Kent and Irving, 2010; Besse and Courtillot, 2002) for large continent-bearing plates.

A miscellaneous portal exists for a set of tools that include a bootstrapped oroclinal test (Pastor-Galán et al., 2016) for assessing possible linear relationships between strike and declination. Another tool that is available completes a net tectonic rotation analysis (after Morris et al., 1999) that restores a dyke to its paleo-vertical and can be used in determining paleo-spreading directions fundamental to plate reconstructions.

Paleomagnetism.org provides an integrated approach for researchers to export and share paleomagnetic data through a common interface. The portals create a custom exportable file that can be distributed and included in public databases. With a publication, this file can be appended and would contain all paleomagnetic data discussed in the publication. The appended file can then be imported to the application by other researchers for reviewing. The accessibility and simplicity through which paleomagnetic data can be interpreted, analyzed, visualized, and shared should make Paleomagnetism.org of interest to the paleomagnetic and tectonic communities.