

A global reconstruction of lost plates

building self-closing polygons in GPLates software

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Project description

Reconstructing the motions of tectonic plates that are currently at the Earth's surface is relatively straightforward and has been done for decades. But throughout the geological past, plates have been subducting into the mantle, and what their history and configuration was is much more challenging to reconstruct. In my research group, we have built such reconstructions using deformed and incomplete geological rock records that were derived from those subducted plates. The reconstructions are detailed and take deformation into account, and could form the basis for global modeling of both geodynamics, climate, and biological evolution. However, to that end, they need to be transformed into a global plate model.

A global plate model contains only two elements that cover the entire earth: rigid plate that moves along discrete faults, or deforming zones that internally change area. Revolutionary GPLates software that was developed in the last decade, and is now widely used in the modeling community, has options to make such reconstructions, with 'self-closing' plate polygon methodology. This software is free, user friendly, and easy to learn. In this Bright-Mind project, a student will build such a self-closing plate model using the reconstructions of mountain belt deformation and lost-plate motions that we developed in the last decade.

Job requirements

A basic understanding of programming, and having followed the 3rd year Geodynamics course of our BSc is a pre. An interest in large-scale tectonics and deformation and basic understanding of plate tectonics is a must.