

Interactive comment on “Kinematics of the South Atlantic rift” by C. Heine et al.

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Editorial comments on Heine et al's Kinematics of the South Atlantic rift”

Dear Dr. Heine,

I have received two reviews of your paper submitted to Solid Earth, both recommending Major Revision and re-review.

The reviewers agree that the topic of your study is important and deserves publication. The comments of the reviewers mainly concern the clarity of the paper: The methodology as well as the choices you made concerning the kinematics is not sufficiently clear to them. In several cases, the reviewers would like to see more discussion and justification of the choices you made.

I think you may improve the clarity by a modest reorganization of the paper. You give a

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very general methodology (we define blocks, and assign Euler poles to two neighboring blocks, etc), after which you launch into a detailed description of intracontinental fault zones and passive margins. In those descriptions, you list a large set of numbers, indicate uncertainties, discussions, etc., and although all the information you use for the reconstructions is in there, it is difficult to gain an overview of the kinematic data that you use in the end. Reviewer 1 for instance, noticed that you use 10 margin sections across 14000 km of margin, and wonders whether such small sample set is sufficient for the detailed conclusions you draw.

After data presentation, you give a discussion of progressive time steps of your reconstruction, starting old and going younger. Although this brings the interpreted opening history of the South Atlantic across clearly, it is insufficiently possible for the reader what interpretation steps you took to arrive at this history. Presumably, you built the reconstruction that the other way around, starting today and step-by-step and region-by-region working your way backward. It may help the reader if you provide a table in which you list the quantitative information you used (fault zone X, or restored passive margin Y / xx km / compression or strike-slip or extension / 143-130 Ma / reference). In addition, it may increase the clarity if you show per major block or passive margin the current and restored configuration (if necessary in time-steps per region) before you go into a whole-ocean reconstruction. This way, the reader sees how the pieces of the puzzle are made, and in the overall discussion, you only have to show what choices you had to make to fit those pieces together.

In addition to the comments of the reviewers, I have two minor comments:

Please place references in geochronological order;

Please check throughout the text your nomenclature for Lower vs Early and Upper vs Late: Lower and Upper refer to stratigraphic position, whereas Early and Late refer to time. Hence: Lower Jurassic sediments were formed during the Early Jurassic. Almost everywhere, you describe Early (e.g., Cretaceous) sediments, which should be

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Lower. In addition, capitalization is only used when dealing with defined stages of the timescale (e.g. Upper Cretaceous, but upper Maastrichtian)

I encourage you to submit a revised version according to the two reviews, after which the reviewers will provide another round of comments.

With best regards, Douwe van Hinsbergen Topical Editor of Solid Earth

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