

Interactive comment on “Re-evaluation of the Mentelle Basin, a polyphase rifted margin basin, offshore south-west Australia: new insights from integrated regional seismic datasets” by D. Maloney et al.

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We very much welcomed the comments of the two reviewers that have helped us identify aspects of the paper that needed improving and clarification. We have addressed all the reviewer's comments for the proposed revision of the text and Figures. Specific responses to reviewers comments are detailed below.

Steven Cande's comments

The discussion section will be ammended to state that the onset of fast spreading

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between Australia and Antarctica occurred at the end of rapid northward migration of India

Gary Wilson's comments

We have significantly expanded Figure 2 and improved Figure 1 in response to referee Wilson's comment that: "A more comprehensive geological map in Figure 2 would help to understand the discussion in the geological setting section". We have separated Figure 2 into two geological maps so we now include a structural elements map of the Mentelle Basin region, which contains the structural features mentioned in the text that were not previously marked on a Figure. We have removed features from Figure 1 that were not mentioned in the text and have added Perth AP, the Wallaby-Zenith FZ (=WZFZ) and the Leeuwin FZ (=LFZ). We will also add the location of the seismic lines shown in the Figures 4, 5 and 6 to Figure 2.

We are agreeable to the suggestion of separating Section 4.2 into acquisition and processing.

With regards to constructing a synthetic seismogram unfortunately no wire-line logging was done at borehole DSDP-258. Some sonic values were measured from cores on the ship's deck and so were not in situ (loss of pressure and a consequently loss of pore-fluids), which if used would give an unrepresentative depth profile if used for depth conversion.

"Discussion of the Valanginian unconformity – section 5.5 and Figures 4 & 5 – the position varies between 4.5 and 6 s TWT." This will be corrected to Figures 4 and 6.

We have considered the possibility of a volcanic interpretation for the moundal structures that lie upon the Valanginian unconformity and for the loss of seismic reflectivity beneath them; however, we have also proposed the interpretation of carbonate build-ups (section 6.1, page 81). We put forward a case for both interpretations allowing the reader to keep an open mind and to come to their own conclusion.

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We will rephrase the opening section sentence in section 6.1. We are addressing the fact that the high resolution of our data, attained through reprocessing and acquisition, has allowed the Mentelle basin's structural history to be interpreted with increased precision. We are not saying previous studies are inaccurate or imprecise based on the data they had available.

“Page 83, line 23 – ‘black clays’ in the text but ‘black shales’ in Figure 3.” This will be corrected to ‘black clays’ in the caption for Figure 3.

“Page 84, line 2 – ‘DSDP-264’ in text but ‘DSDP 258’ in Figure 3.” Will be corrected to DSDP 258.

“Section 7.1 – this is a conclusion of DSDP-258 – what is the extent/volume of carbonate in the basin and its significance?” No, this is not a conclusion of DSDP-258 this section relates to the possibility that the kilometre-scale moundal structures upon the Valanginian breakup unconformity are of carbonate origin rather than volcanic. As indeed if such structures are later proven to be carbonate build-ups then their presence at high palaeolatitude would provide significant insights into the conditions during rifting.

Reference list will be corrected

Again we thank the reviewers for their comments and recommendations and have paid careful consideration to all the point the reviewers made.

Yours faithfully,

Dominic Maloney, Colin Sargent, Nick Direen, Richard Hobbs and Daren Gröcke

Interactive comment on Solid Earth Discuss., 3, 65, 2011.