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Solid Earth Discussions

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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RE-evaluation of the Mentelle Basin, a polyphase rifted margin basin, offshore south-west Australia: new insights from integrated regional seismic datasets.

Maloney, Sargent, Direen, Hobbs & Grocke

As the title indicates this paper integrates some new high-resolution seismic data with reprocessed earlier data sets. The new data allow identification of seismically defined megasequences related to multiple phases of rifting between Australia and Antarctica.

Not only do the data, when combined with borehole data allow identification of the stratal make-up of the megasequences, but they also enable the process relationship between the packages to be defined and related to tectonic sub-processes within the broader break-up history.

The conclusions are well supported by the data although the presentation could be tidied up in a few places as indicated by the comments below:

Figures 1 & 2 need some attention to the labelling of the features discussed in the text, they have slightly different names in the figure, which is confusing. E.g. Diamantina (fracture) zone. The Perth Abyssal Plain is not shown on Figure 2, nor is the Vlaming Sub-basin or the Enderby Basin.

A more comprehensive geological map in Figure 2 would help to understand the discussion in the geological setting section.

Are references available for the Geoscience Australia Surveys?

Seismic Acquisition and Processing intermingled in section 4.2 could be separated labelled and introduced. Valanginian breakup unconformity needs to be labelled in the figures – figure 3 is probably the best place to illustrate the stratigraphic succession.

Figure 3 is interesting as it compares borehole data in depth domain with seismic data in twt domain. Some depth migration needs to be considered or development of a synthetic seismogram from physical properties or geotechnical data for the DSDP-258 borehole to allow a more considered and less cursory comparison between borehole and seismic data. The facies summary of the borehole is pretty rudimentary.

Discussion of the Valanginian unconformity – section 5.5 and figures 4 & 5 – the position varies between 4.5 and 6 s TWT.

Have you considered the possibility that the seismic blank zone on Figure 12 may represent volcanics?

Just a question – in section 6.1 – do you mean increased accuracy or increased precision? i.e. are previous findings inaccurate or imprecise?

Page 83, line 23 – 'black clays' in the text but 'black shales' in Figure 3.

Page 84, line 2 – 'DSDP-264' in text but 'DSDP 258' in Figure 3.

Section 7.1 – this is a conclusion of DSDP-258 – what is the extent/volume of carbonate in the basin and its significance?

Provide seismic line numbers in figure captions for Figures 4, 5 & 6.

References need checking.

Bradshaw et al. 2002 or 2003? Which? Gradstein et al., 2004 is not in the reference list. Gaina et al., 2003 is not in the reference list. Yilmaz, 2001 not in the reference list Cartwright and Dewhurst 1998 is not referred to in the text Coleman et al., 1982 is not referred to in the text Direen et al., 2007 is not referred to in the text Sayers et al., 2001 is not referred to in the text

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