

Interactive comment on “Holocene and Common Era sea level changes in the Makassar Strait, Indonesia” by Maren Bender et al.

Anonymous Referee #2

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This paper presents interesting new mid-late Holocene coral microatoll data from the Makassar Strait and produces a new regional RSL curve which is compared to GIA models. Although there is a good quantity of new data and the presentation of this data is generally good the broader implications for understanding past and future eustasy, or regional RSL are not well made. Each section of the discussion either falls short of making important new insights or reiterates statements from other papers (e.g. Mann et al, in review). As it stands this paper does not provide convincing reasons for the study taking place other than to document local RSL during the mid-late Holocene. Discussion – section 5.1. Absence of evidence for high RSL (over 1 m above MSL) does not categorically rule out the fact that RSL could have been higher in the Holocene, particularly at the start of the high stand when you have fewer index points. Your data

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is not continuous, and in all cases has clustered SL index points from individual islands with millennial-scale time gaps. It is highly unlikely that the earlier (De Clerk/Tija) data is in situ but you cannot categorically rule out a slightly higher high stand earlier in the Holocene. You should therefore be slightly more cautious in describing your data. You also state that the re-analysis of the earlier work was largely undertaken in Mann et al. (in review) and therefore this discussion surely just repeats this analysis? How is section 5.1 in this paper different to what is discussed in Mann et al., in review? As that paper is in review I am not able to look at it for information. Discussion – section 5.2. Can you be clearer about what the Antarctic fluctuation during the Holocene is, that is causing the ANICE model to better fit your data? Does this model fit better elsewhere in this region? What larger implications of the model-data fit can you make using this dataset? I feel as if the broader significance of this section is not well explained, but this data-model fit may not be region-wide, so it may have no significance at all. If it is not this raises more serious questions about your data. Discussion – section 5.4 Is there a chance that the elevation data is incorrect for Barrang Lombo rather than there being subsidence on this island? If you are arguing that subsidence of ~ 0.8 m has occurred since the mid-Holocene on this island only, is there any other geomorphological evidence of subsidence (lower elevation reef flat compared to other islands, or tilting of the reef flat surface?). Surely if water extraction and buildings are causing this subsidence it should be ongoing and therefore should be seen in the surface morphology of modern microatolls (or is the rate too small)? You should make more comment about this as a theory. Why is it significant that the modern microatolls are ‘a few hundred meters away from the island’? Where were the fossil microatolls that were sampled in relation to the island? Are you arguing that the modern microatolls are not affected by subsidence because they are located further from the centre of the island? If you are indeed suggesting subsidence you need to substantiate this with other evidence beyond that derived from the microatoll data. Discussion – section 5.5 I don’t think it is sensible to compare single-dated microatolls to the Common Era SL curve from Kopp et al (2016). Two SLIPs don’t fit with the curve and there is no explanation for why this

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might be. Why are these data not corrected for GIA? Given the large error terms on the SLIPs and the lack of explanation for why some data fits and some does not, is this kind of data suitable for assessing Common Era RSL in this region? I'm not really clear where this discussion is going or its value to the manuscript. Tables 2 and 3 – be clear that Age and RSL uncertainties are +/- errors. As you plot the data from De Klerk (1982) and Tija (1972) on Fig 6 it would be helpful to include the data for these index points in a table, probably table 3. Also please include the raw 14C data and lab codes for all dated index points so that they can be recalibrated in future if/when new calibration curves are developed. Fig 3 – why have present to the L of these plots? I would like to see present on the R of these plots. It would make sense to me to have the X axis scale the same for each one, even though it will squeeze the datapoints on some of the graphs. Fig 6 – marine limiting data points would normally have the horizontal bar at the top of the vertical distribution, not at the base. Your terrestrial limiting data point should be drawn with the horizontal line at the base of the vertical distribution. It would help if these data were included in table 3 so it is clear how you have plotted them. Why is tidal range not stated for each island location? This would help in interpreting the modern HLC data. I am not clear why you have used a constant erosion variable where erosion has occurred, as this is likely to vary over time.

Minor typographic corrections: Line 72 – of 'the' Holocene, insert extra 'the'. Line 80 – can span from MLW 'to' LAT not 'and'. Line 81 – 'reach' not 'reached'. Line 154 – 'second' not 'seconds'. Line 244 – is the elevation in m MSL? This isn't clear in the text. Line 308 – 'for which concerns' – rephrase, perhaps to 'Concerning. ...'. Line 373 – 'sites' not 'sited'. Line 430 – 'few main conclusions that concern' rather than 'few main conclusions for which concerns'.

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