The authors present here a new interesting chapter of their research which has been focusing since quite some time on the development of sophisticated 3-D GIA models as well as on their validation by means of different types of datasets. After having investigated the regional sensitivity of instrumental observations such as GPS velocities as well as terrestrial and space gravimetry to relevant GIA parameters, the authors make here a step forward by evaluating the sensitivity of geological paleo relative sea-level (rsl) indicators on a global scale. The authors are able to identify specific regions of the world where coastal rsl indicators could actually constrain the ice-sheets chronologies as well as the rheological parameters which drive the solid Earth response. Hence their results serve as a potential guide to search for new rsl indicators. Furthermore, results show that, in addition to the already well known coastal areas, continental (i.e. lakes) as well as deep-sea locations could provide further constraints to the GIA models. This is a very important finding and it might trigger stronger and mutually beneficial cooperations between the GIA modeling community and the deep-sea drilling community.
I believe that this manuscript is very good in terms of scientific significance and also is very clear and well written. I suggest, if possible, to modify the figures 3-8 and make them more clear as the carry some valuable informations.

Principal Criteria	Excellent	Good	Fair	Poor
Scientific Significance		X		
Scientific Quality	X			
Presentation Quality	X			

Individual scientific questions/issues

- Can the authors comment on the potential effect of including the contribution from Earth rotation? Would that significantly alter their findings?

- What is the size of the elements which define the surface mesh of the 3-D Earth model?

- This study confirms that the sensitivity of post-LGM rsl data to the ice-load history dominates over the solid earth parameters. Are we allowed to safely conclude that sophisticated 3-D GIA models with lateral heterogeneities are not necessary when investigating older than late Pleistocene glacial cycles? Or, what should one at least consider? Maybe lithosperic thickness variations?

Technical comments, corrections and questions

Abstract

- Page 2420, Line 5. I suggest to change "global change" with "past and current global sea-level change".
- Page 2420, line 13. "Assuming an accuracy of 2 m ...". I suggest to shortly mention how and why a 2m accuracy was assumed.
- Page 2420, line 24. "...the more recent the data are, the smaller is the area...". I would also add something about the location w.r.t. ice and continents of these areas (i.e. narrower/thicker areas around the ice-sheets margins? narrower/thicker areas around the continent margins?)

1 Introduction

- Page 2412, Line 14. Change "comparing the observation" with "comparing the observations"
- Page 2422, Lines 26-28. Given the historical taste of the sentence, I suggest to add some older but important references as well (i.e. Clark, JGR, 1980; Tushingham and Peltier, 1992,1993)
- Page 2423, Line 20. I suggest to remove the whole following sentence: "We can only use what has survived..."

2 Relative sea-level data

- Page 2425, Line 8. I would remove the following sentence: ", but new data emerge occasionally and are added to existing databases"
- Page 2526, Line10. Is there a formal reference to the RSL database used in this work? Is it maybe Steffen and Wu, 2011? Also, would it be possible to add to Figure 1 a global map showing the RSL locations used in this work?
- Page 2425, Line 13. Is there a Reference to the observed transgression in the North Sea?

3 Modelling

- Page 2427: Sentence at Lines 14-15 is sort of a repetition to sentence at Lines 9-10.
- Page 2427, Line 24. I suggest to remove the whole following sentence: "This is not anticipated..."

4 Results

- Page 2428, Line 15. The colored contour lines in Figure 3 are really hard to interpret. Maybe making larger maps would help the reader. Also, I suggest to add some intermediate-value contour lines (i.e. 50m until 12ka, 25m until 8ka as well as 7ka in Figure 4)

- Page 2429, Line 6: “Comparing the patterns...”. I would rephrase as follows: “Compared to the solid Earth parameters, ice-load history has significantly larger sensitivity”, or something like that.
- Figure 5. It is really hard to spot the green areas (sensitivity to lithospheric thickness variations)

5 Discussion

- Page 2433, Lines 21-24. What does “glaciation” mean in this context? LGM (hence 18ka in the ice-sheet model) or the time span between 18 and 7ka? At the same manner, does “after glaciation” indicates the time between 7ka and present-day?

5 Conclusions

- Page 2434, Line 26. Change “RSL data” with “coastal RSL data”
- Page 2435, Line 25. “...partly significantly” sounds a bit confusing.
- Page 2436, Lines 14-15. Add references to “...more than 14000 RSL data samples have been determined...”
- Page 2436, Line 25. The sentence “...data should be searched around the world” should be rephrased as it is a bit at odds with the previous sentence at Lines 22-24 “... adding hundreds of newly-determined far-field data... may introduce error to such an investigation”.