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Discussions

Interactive comment on "Coastal Sea Level rise at Senetosa (Corsica) during the Jason altimetry missions" *by* Yvan Gouzenes et al.

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Responses to Reviewer 2's Comments

Comments: Jason-1&2 satellite altimetry data, reprocessed (with ALES and X-TRACK) to give fineresolution along-track sea level time series, including closer to the coast and spanning July 2002 to June 2016, are used to compute coastal sea level trends, specifically where the Jason track crosses Senetosa, southern Corsica. The estimated rate of sea level rise increases in the last 4-5 km to the coast, compared with further offshore; it amounts to about 10 cm extra rise near the coast over the 14 years. Potential altimetry errors are considered. I am not expert in these but the manuscript consideration is convincing. An extra 10 cm rise in such a short distance near the coast appears a lot

to attribute to error, despite the extra near-coast trend being absent from coastal tide gauges. The possible contribution of wave set up is also convincingly assessed as too small. The remaining identified possibilities are: the sea-state bias correction degrades somewhat near the coast – certainly SLA difference (near-coast minus 15 km offshore) is correlated with SWH; an effect of coastal currents suggested by distribution of winter currents but no mechanism is proposed and the possibility is left for further investigation. It is rather disappointing that resolution of the origin of the extra near-coast trend is left to further work. It occurs to me to speculate that the nearshore flow might be affecting the surface waves which could give a systematic effect since it is suggested that both occur more strongly in winter, i.e. they are correlated. Even then, there would need to be a trend in intensity of waves and/or current to produce the differential trend in altimetric signal. The authors might have considered the momentum equation to look at what might cause a trend in differential sea level. My "back of envelope" calculation for geostrophic balance across a flow of strength 0.2 m/s and width 5 km (rather more than considered in the manuscript) gives a difference of only 1 cm. The very narrow shelf suggests that wind-forced set-up will be very small. Ultimately, there is a question still unanswered but thereby needing publicity in order to make scientific progress, especially as there might yet be serious implications for near-coast altimetry. In general the work is well presented and the intended meaning is expressed clearly.

Response: We thank reviewer 2 for his/her comments. Indeed the main purpose of this study was to assess all sources of potential errors of the data processing able to explain the sea level trend increase as the distance to the coast decreases. From the numerous tests performed in this study, none is able to explain the reported trend behavior. We further examined the wave set up mechanism but this process occurs too close to the coast to explain our results. We made the hypothesis that trends in coastal currents could be the process we are looking for. Unfortunately, there is a crucial lack of small scale coastal data, especially in this region, to go farther. Thus we decided to leave the process assessment for further studies, either by our team or by other scientists from the coastal oceanography community. High resolution hydrodynamical

models -if available- may provide some answer.

Comment: On this count, one “technical” matter concerns lines 111-112; Senetosa is “southern Corsica” rather than “south of Corsica” and nearer 9E ? Some explanation of the different colours of the sea in figure 2 might be useful.

Response: Corrected

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