Response to the Revision of "Comparison of CryoSat-2 and ENVISAT radar freeboard over Arctic sea-ice: Toward and improved Envisat freeboard retrieval", by Geurreiro et al.

I believe the revised manuscript is much improved, and I appreciate the authors' efforts to respond to the points brought up by the reviewers.

Regarding the interpretation of the freeboard differences as being due to different responses to surface roughness. I am familiar with this phenomenon, of course, however I hadn't heard of it referred to as 'surface diffusion' in the cryospheric altimetry literature. I do appreciate your point better in the revised manuscript, as the arguments are much better presented. If we forget for a moment the static offset due to only using the one retracker, and assume the error is in the Envisat data, do you think the spatial variability of the freeboard difference is driven by an underestimation of the Envisat range over FYI, or an overestimation of the Envisat range over MYI, or a combination of both? Is there any evidence from the literature (e.g., the sea state bias in oceanography studies) to expect the difference to be in this direction? Whilst I understand how biases can arise due to this effect, it is not clear why you might expect the bias to be in this direction, and some discussion might be worthwhile.

Figure 6 – is there a reason that you only show results from the 2010/11 growth season? For completeness, I think you should also include the 2011/12 growth season in the final version.

Figure 4 caption "the November 2010-March 2012 period" – is this figure an average of the two growth seasons, or is this a typo? I think it would be better to show both growth seasons separately.

Page 7, line 1-3, and elsewhere. "High vs. low delta(Fb)." When you say "High delta(Fb) over FYI" you are actually referring to the smallest differences in freeboard. I find this quite confusing, and I think contributed to some misunderstanding in my previous review. Consider changing the use of high/low delta(Fb) – perhaps the smallest/greatest difference in freeboard or something similar.

Do you have a reason for fitting y(PP) to both years of data together, rather than each year separately? If your argument about the effects of surface roughness are correct then you might expect y(PP) to vary from year to year, and inspecting Figure 5, it does seem that there is a difference – the relationship seems more linear in the 2011/12 season. Either way, you should provide more of a justification for fitting both years together, and also a discussion of interannual variability when you extend the Envisat time series using the means values, particularly as the amount of MYI seen by Envisat will be larger in previous years.

Page 11, line 31 – I don't think something can be "quasi-identical", it is either identical or not. Should read "similar mean/modal values".