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Interactive comment on "Regional modeling of the Shirase Drainage Basin, East Antarctica: Full-Stokes vs. shallow-ice dynamics" *by* Hakime Seddik et al.

Anonymous Referee #2

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The manuscript provides a valuable examination of the ice sheet volume change for an East-Antarctic basin under selected scenarios from the SeaRISE effort, using two formulation for ice dynamics: Full-Stokes (FS) versus Shallow Ice (SIA).

General comments:

The strength of the study is that it attempts to maximize the similarities between the numerical simulations: the mesh is the same, same distribution of basal friction coefficient, same model (Elmer/Ice) etc in order to allow a clean comparison between the FS and SIA solutions. The major finding is a confirmation that the choice of ice dynamic will impact the ice volume evolution. Although this is not ground breaking, the value in the work is that it is a step towards understanding the sources of uncertainty in ice

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Discussion paper

sheet evolution and hence sea level projections.

The manuscript is very well written and has a clear structure. The discussion and conclusion addressed many of the questions that came to my mind when I was reading the results. The tables and figures used are necessary and well prepared (apart from what is noted in the minor comments).

My major criticism is that the study would have been more interesting/complete/valuable if additional solver that seems to be available within the Elmer/Ice toolkit had been used too. In particular since it is recognized in the community that SIA is not ideal for capturing Antarctic ice sheet dynamics. Nonetheless the authors do acknowledge this limitation and the point is raised in the discussion as further work.

Minor comments:

P8, L10: Could you add an explanation of the need to set a minimum thickness of 10 m?

Figure 1: You have space in the figure to write “Fuji” in full.

Figure 4 caption: can you improve the caption for the readers that like to look at figures & caption without having to dig in the text for understanding? Ie: the main text explains what the axis are but the caption by itself is not very meaningful.

Figure 6: either in the figure or in the caption: can you define what the slip ratio is? It is defined in the introduction, but a reader may have forgotten about this.

Interactive comment on The Cryosphere Discuss., doi:10.5194/tc-2016-243, 2016.