Interactive comment on "Impact of spatial resolution on the modelling of the Greenland ice sheet surface mass balance between 1990–2010, using the regional climate model MAR" by B. Franco et al.

Anonymous Referee #1
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Supplement to the first response.

In our first response, we did not answer the following question:
a) which model resolution is needed to resolve an ice sheet (section) with a typical topographic length scale X?

We agree that we have to answer this question. Therefore, we have investigated the slopes of the ice sheet topography from Bamber et al. (2001), at 5 km resolution and interpolated at 10-50 km (see Fig. F below). The distribution of the fall line angle suggests that most of the 5 km GrIS topography can be reproduced at lower resolution, but a resolution of at least 10-15 km is required to resolve the steep 5 km slopes in the vicinity of the ice sheet margin where the slopes are the highest (cosine of slope between 0.1 and 0.0). This figure and the related comment have been added to the manuscript.

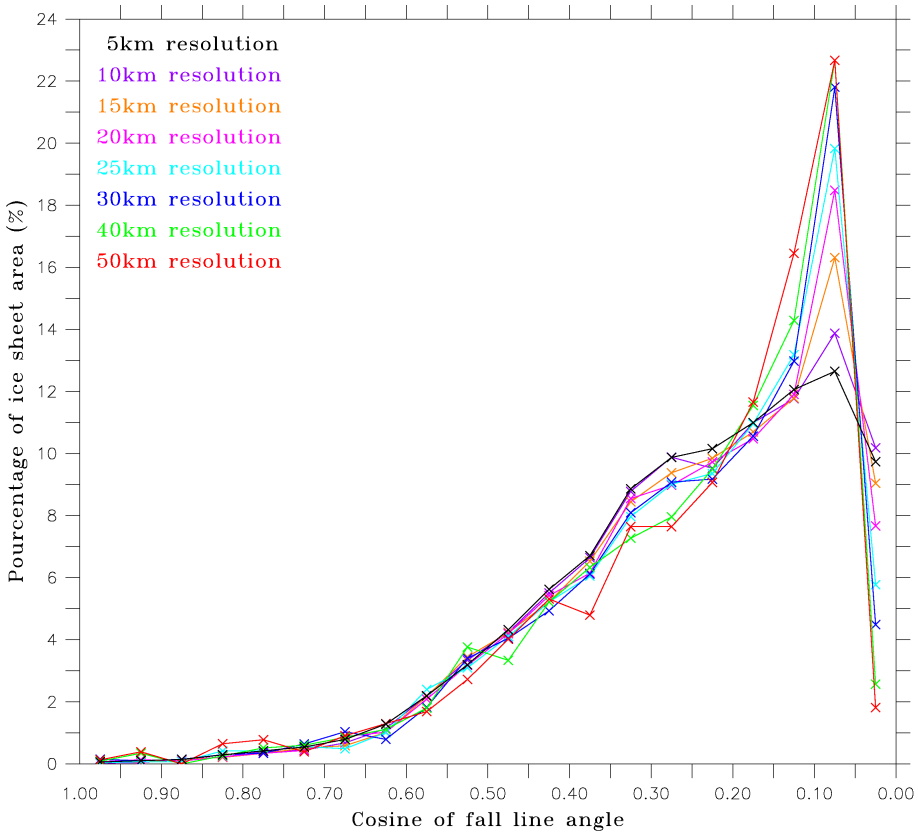

Fig. F: Distribution (in pourcentage of the ice sheet area) of the cosine of fall line angle of the 5 km ice sheet topography of Bamber et al. (2001), interpolated at 10-50 km resolutions.