

## ***Interactive comment on “ICESHEET 1.0: A program to produce paleo-ice sheet models with minimal assumptions” by E. J. Gowan et al.***

### **Anonymous Referee #3**

Received and published: 19 February 2016

Review of ICESHEET 1.0 Gowan et al. manuscript

This manuscript describes a simple ice sheet model which can be used to simulate the first order surface elevation of an ice sheet given its extent. The model would be useful to many studies reconstructing past ice sheets from dating the chronology or retreat or using Glacial Isostatic Adjustment modelling. The manuscript is well, written, and concise and is well suited to this journal. I think the manuscript would need a moderate amount of corrections before publication. In particular, the terminology used in the manuscript needs adjusting and the applications to the Greenland and Eurasian ice sheets need some more detail. One important test is the sensitivity to the model resolution. This is done on the Eurasian ice sheet where there is no observational data on ice thickness. The resolution tests should be instead done for the Greenland ice sheet.

C1

Details comments:

- In the manuscript, the model is referred to as “a program” (title, abstract) “a numerical program” (l29) “modelling software” (l41) and “program” and “software” in the conclusion. “model” is used here to describe an ice sheet “simulation” or “reconstruction” I think that this terminology is confusing. It should be described as a “numerical model”. You could also use the word “simulator” which some statisticians use to differentiate physical models from statistical models. If you have good reasons to stick to the terminology, please clarify the definitions you use.
- Similarly I would replace “modelling procedure” with “algorithm” or equivalent terminology
- Please indicate how this model compares with other similar models, not only in terms of the equations, but also in the solving procedure.
- Replace “sample model” in titles 3 and 4 with “Example” or “application”
- Section 3.1 how does the basal shear stress compare with other modelling studies of the Greenland ice sheet ? How much does it affect the results? This is important since the goal here is to compare the model results to observations.
- Section 3.2: Please compare the difference in ice sheet volume modelled vs estimates from observations.
- Please include resolution tests for the Greenland ice sheet.
- line 274 add “3D topographical” before “models of palaeo-ice sheets”
- line 282: “those parameters” : rephrase to make it clear what parameters you are talking about.
- In your conclusion, please mention the main results from the sensitivity tests presented here.

C2

