

Interactive comment on “Initial results from geophysical surveys and shallow coring of the Northeast Greenland Ice Stream (NEGIS)” by P. Vallelonga et al.

Anonymous Referee #1

Received and published: 7 February 2014

General comments

The paper “Initial results from geophysical surveys and shallow coring of the Northeast Greenland Ice Stream” by Vallelonga et al. presents an interesting overview of new results on the glaciological conditions in the headlands of the NEGIS ice stream, Northeast Greenland, and will be an important reference for any future geophysical or ice cores studies to be carried out in this area. Accordingly, I support publication of this paper in “The Cryosphere”. In this context it should be considered, that a companion paper (Christianson et al., 2014) is currently under review in EPSL. As I have no access to this paper, I cannot judge in how far the two papers are redundant or complement each other. I suggest that the editor could check this before acceptance of the paper.

C31

Overall the paper is well written and easy to follow. In some instances I would have hoped for a more detailed and more quantitative discussion of the results. Along this line the authors state in the abstract that “Tracing of RES layers from the NGRIP ice core site shows that the ice at NEGIS preserves a climatic record of at least the past 51 kyr”, however, the internal layering is not really discussed in the text. Furtheron, they state that they “demonstrate that a deep ice core drilling in this location can provide a reliable Holocene and late-glacial climate record, as well as helping to constrain the past dynamics and ice-lithosphere interactions of the Greenland ice Sheet.”

To fulfill these promises some more detailed discussion of

- the isochrone distribution in the study area and their use to pick a potential deep ice core drill site
- the flow speed distribution upstream of the ice coring site and its potential impact on the age of the ice, the accumulation rate, and the chemical and isotopic parameters in the ice core

would strengthen the paper. At the moment I feel that the reader is somewhat left alone with his/her own interpretation of the plots.

Specific comments:

p694, l14: unclear what is meant in the parentheses, please explain in more detail

p694, l22: there is something wrong with this sentence

p695, l13: I think, there is some short paragraph missing to bridge between the introduction of fast ice streams and ice core drillings.

p697, l2: there is something wrong with this sentence

section 2.3: there is very little detail given on the CFA analysis compared to all the other measurements. A high-resolution example plot showing the quality of the data, especially with respect to layer counting, would be helpful here.

C32

p698, l24: -427.5

section 3.1: I assume the example plot suggested above would also help to illustrate the seasonal phasing discussed in the text

p700, l22-25: I assume the authors mean that in the 20th century there are less large NH4 peaks than in previous centuries? Please clarify the wording.

p701, l9-13: one example, where a more in-depths discussion would be helpful. Please explain in detail how this effect on d18O through changes in layer thickness comes about.

section 3.3.1: based on the very small figures provided in TCD, this is really hard to see. A section profile across and one along the ice stream of surface topography, ice velocity, ice thickness and internal layering would be helpful.

section 4.1: another example, where more discussion would strengthen the paper. While the hypothesis that the accumulation variations are due to upstream effects induced by changes in topography and ice velocity makes perfect sense, the paper would benefit from a more quantitative approach using the geophysical data at hand.

p706, l15-29: this sounds a little bit already like "Conclusions" to me

Interactive comment on The Cryosphere Discuss., 8, 691, 2014.