The Cryosphere Discuss., 8, C48–C51, 2014
www.the-cryosphere-discuss.net/8/C48/2014/

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Discussions
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Interactive comment on "Fabric measurement along the NEEM ice core, Greenland, and comparison with GRIP and NGRIP ice cores" *by* M. Montagnat et al.

Anonymous Referee #1

Received and published: 18 February 2014

Nice general description of the fabric at NEEM, and simple comparison with the two other ice cores. The paper could be shortened a bit, f.exs. simplifying the strain rate section, and orientation tensor chapter. Little unclear discussion about small scale variations.

Title Would it not make more sense to talk about "Fabric along the NEEM ice core, . . .", since the comparison is made on the fabric, not the measurement methods.

Abstract Is it common to talk about fabric profile, isn't enough to talk about fabric along the depth?

". . . is presented in this work." - not needed.

Line 7. "A sharp increase in the fabric strengthening . . ." - perhaps add "rate", that is, there is a change in the rate of strengthening, since the fabric been evolving - strengthening - throughout the depth.

The jump at the Holocene-Wisconsin boundary is not discussed much in the paper - compared to weight in abstract.

Introduction L24. ". . . are highly necessary to access conditions and perturbations of deformation along ice cores." The wording here needs some work.

Strain that determines the fabric, except perhaps during recrystallization, which is not the issue here. Of course the strain develops as a function of the stress applied, but strictly speaking the fabric evolves as a function of strain.

P310, L24. Clear example about the jump in fabric across the Holocene-Wisconsin transition in f.exs. Thorsteinsson et al. (1999) JG 45(150), 338-345.

P311, L1. ". . . is located (Figure 1) downstream on . . ." - put reference to Fig. 1 there, and skip ". . . 1993)[, see Figure 1]." - delete within []

P311, L3-5. Description a little confusing.

L17-21. This part could be reworded. Like "The discussion part, Sect. 4, will provide analyses of the results, and in . . ."

2 Fabric measurements Much of the material here could just be referenced to original papers and other papers that use the orientation tensor and eigenvalues method.

3 Results Generally starting a sentence with "Figure . . ." is not the best way. Need to explain why fabric shown with delta values.

P314, L17+. Discussion about number of grains and error bars to long, equation (6) shows that clearly.

L23. "The variability at a depth resolution higher than . . ." - wording confusing.

P315, L1. What is the purpose of Figure 3 - the text gives no clues.

3.2 Comparison with the GRIP and NorthGRIP ice cores Used NGRIP in title? These are quite basic assumptions about the strain rate, does it need that long a section?

Figures 4 and 5. Arrows and labels inside the figure do not simplify it!

P315, L10. "[The main characteristics . . . in Table 1.]" - can take out.

L14. ". . . actual . . ." - what does that even mean for calculated strain rate.

L16. ". . . thickness H [given in] (Table 1)." - add "(" and ")" around Table 1.

L19. ". . . NEEM sites by (Gillet-Chaulet et al., 2011), . . .".

L22. "[In Fig. 6]we . . . decrease to 0 (Figure 6)."

P316, L5. Why not cite Glen or Nye ?

3.3 High resolution depth variability in the fabric data Figures should show something you are describing, not other way around :-)

P320, L8. ". . . the latter few millennia . . ." - "latter" kind of strange wording.

Figures Figure 1. Zoom out a little, or move frame a little south. Label says NGRIP, text NorthGRIP. Flow line could be a little thicker for clarity.

Figure 2. In general, do the error bar add much ? Except for a few deep points, they don't really seem to make much of a difference. Scatter between points on the same order of magnitude or larger.

Figure 3. What is the color in the point plots (pole figures)? Not explained in caption.

Figure 4 and 5. Why not a and b, same type of figure. The labels and arrows do not help. Dashed line through vertically for H-W. Legend for symbols.

Figure 6. Label y-axis "0, 2, . . ." - cut at 0? Is this figure - and corresponding description in a whole section - really needed. Depth on y-axis would make more sense.

Figure 7. Depth as y-axis. How much new information is here compared to Figure 2? How different from the observed variability between adjacent depths there?

Figure 8. Color map for pole figures? What is it?

Interactive comment on The Cryosphere Discuss., 8, 307, 2014.