Dear Prof. Gagliardini,

Thank you again for your remarks. We answer to your concerns in the following sentences.
We revised Figs. 2, 3, 4 and 5.

I think there is still an issue with the definition of the reference coordinate system you are using for expressing both the components of the stress and strain-rate tensors and plotting the fabric. It should be mentioned in a consistent way, where x, y and z are first introduced (i.e. for the strain-rate, line 96 of the tracked changes version) how x and y are defined (line 166 it is mentioned that z is pointing upward, should be mentioned vertical, also).

We clarified this in the respective sentences. Please refer to the track changes file.

But is x or y pointing to the geographical north should be specified. Also I am wondering if the results would not be more readable if x was defined as the main flow direction? At least, in term of stress and strain-rate, it would be easier to interpret.

Since we prefer to have stereo plots and maps in a proper geographic system (North=up), we would like to keep the plots as they are, but we added a pictogram in Fig. 2,3 and 5 that indicates the x and y direction (155/65° N). Since the glacier changes its flow direction every few hundred metres from SW to SE and back to SW, such a geographic system seems to be better here, especially when comparing results with further work on that glacier.

Moreover, line 232, in the discussion about the stress, \sigma_{xx} is referred as the longitudinal stress, which would suppose that x is aligned with the main flow direction (if not, then \sigma_{xx} is not the longitudinal stress).

We checked this and we are sure that we always kept our reference system: x is defined as in-flow and y is the coordinate perpendicular to the flow. Therefore x is the longitudinal and y the transversal component as requested by Ms. Pettit.

At the end, I am not sure that you have a consistent definition of the coordinate system all along the manuscript. If you are using different ones (which I think is not a good idea), then different notations should be used.

Actually, when referring to the components, we should have a consistent coordinate system with x=longitudinal and y=transversal component and z=vertically upwards (Table 2). We double-checked this. Only in line 195/Table 1 we do not refer to the glacier flow system (x,y,z) but to geographic azimuths. However, here, we compare the glacier flow direction and the position of the clusters and need to use an independent reference frame. Otherwise could not find any issues anymore. However, we had to revise Fig. 4 and the respective text as we think this section was too difficult to understand. Now, we first rotate all thin sections to the global coordinate system (x,y,z) instead of only to the system of the horizontal thin sections and then add the azimuthal angle (155°) so that the plot fits onto a proper northwards pointing stereo net. Before we just bypassed this step by immediately rotating from the system of horizontal thin sections to N.

In short, you should clearly define the reference frame (x,y,z) at the beginning of the paper and express all components (stress and strain-rates) in this reference frame, as well as plot the stereo plots in the same frame (instead of N-S plot if the reference frame is not linked to the North).

Although we understand your point of view with the stereo plots, we prefer to keep N-oriented Schmidt nets, which is rather common in earth sciences. The pictograms added to the various plots clarify any potential confusions concerning the coordinate system.

The color scale of Fig. 3 should better reflect sign changes (important for \epsilon_{yy}). In particular, is the sign change of \epsilon_{yy} aligned with the main flow direction should be highlighted, by either assuming a reference frame aligned with the main flow direction or by indicating on this plot the main flow direction.

We adjusted the colour bar in a way that 0 is white, positive values are red and negative values are blue. An exception is \epsilon_{xx} as it only contains negative values. Here we use a slightly different colour bar with cold colours to enhance the constrast. We also added the actual glacier flow coordinate system in the lower right corner of each image.
As this is a map view, we would like to keep geographic North pointing upwards.
Then, Fig. 2a, Fig. 3, and the stereo plots in Figs. 5, 6 and 8 are congruent with the map in Fig. 1.

Kind regards,

Sebastian Hellmann and the Co-Authors