We thanks again the reviewer and provide below a complement to our first reponse. While reviewing the final version of the manuscript, we decided to improve our response to the two comments below.

I don't understand why only the y component of the velocity is plotted, when this likely isn't the only direction in which the ice is flowing. This is also inconsistent with the earlier velocity plots, in which the absolute magnitude is plotted.

We added a new section in the method part to better explain this point:

Note that the seasonal amplitudes of velocity magnitude are not estimated by applying this approach directly on the velocity magnitude time series. The latest follows a Rice distribution which could lead to an overestimation of the seasonal bias (Dehecq et al., 2019). To mitigate this effect, we estimate the seasonal amplitude of the velocity magnitude as:

$$A_{magnitude} = \sqrt{A_{E/W}^2 + A_{N/S}^2} \quad (1)$$

with $A_{E/W}$ and $A_{N/S}$ the seasonal amplitudes estimated on the east/west and north/south velocity components, respectively. Seasonal peak timings are computed on the velocity magnitude because the sign of velocity components depends on the direction of the velocity vector.

We modified Fig. 6, 8, 9 and 10 to display this more robust estimation of the seasonal amplitude of velocity magnitudes. This does not change the observed trends, but seems more relevant.

L307: this is a weird way to start a paragraph. Does the first sentence connect to the previous paragraph? The second sentence says that you propose something, but I can't tell whether you actually implement this.

To improve the clarity of this section, we wrote a new section in the Method part :

« In order to mitigate the effect of seasonal biases, we implement a strategy to identify their location and amplitude.

First, we propose automatically mapping areas affected by shadow casting. We consider a given pixel to be significantly affected by shadow casting if it is more than 30 days under shadow edges simulated as explained in Section 3.3.1.

Second, we estimate the expected seasonal biases over glacier areas. For this, we rely on the derived seasonal amplitude over static areas (Section 3.2). We compute the median of the distribution for each quadrant (northwest, northeast, southwest, southeast) for bins of 30° slope, to minimize the effect of an inaccurate DEM. The estimated amplitude is then interpolated for all glacier surfaces based on the corresponding slope and aspect of each pixel. Note that we could use the POA irradiance for this estimation, but this would take more computation time. »