



Comment on **essd-2021-106**

Guoqing Zhang (Referee)

Referee comment on "Global time series and temporal mosaics of glacier surface velocities derived from Sentinel-1 data" by Peter Friedl et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-106-RC2>, 2021

The global time series glacier surface velocities were derived from Sentinel-1 data. Scene-pair velocity, as well as monthly and annually averaged velocity mosaics products at 200 m resolution acquired by this study could be easily accessed in the <http://retreat.geographie.uni-erlangen.de> with rich quality parameters. Due to the independent of weather conditions, season and daylight of SAR images, the product acquired by this study was a great supplement with improvements in cloud covered regions relative to ITS_LIVE and GoLIVE using optical images. And this product would be of great use for studies in response of glaciers to climate change and ice thickness inversion and so on. I have only one mainly comment, glaciers in Svalbard are selected to demonstrate the quality of the studies, and shown large superiority in accuracy and temporal resolutions; but the superiority of SAR images independently from weather conditions were not fully analyzed at present. For example, the mountain glaciers on the South-east Tibet were seriously affect by the cloud, both ITS_LIVE and GoLIVE shown weakness in this area. Improvements in like these issues should be fourthly analyzed. And I also noted that glaciers in the south-east Tibet shown in the website are only partly covered by the red polygons? why?

Line 14, "glaciated" means area covered by glacier ice in the past, but not at present. "glacierized" is better.

Cogley, J. G., R. Hock, L. Rasmussen, A. Arendt, A. Bauder, R. Braithwaite, P. Jansson, G. Kaser, M. Möller, and L. Nicholson (2011), Glossary of glacier mass balance and related terms, IHP-VII technical documents in hydrology, 86

Line 70, A flowchart about your process chains and mosaic of different products would be better

Line 84, Considering the differences of sensitivity of HH or VV polarizations to glaciers surface with different water contents, any velocity differences detected by these two polarization channels.

Line 121, therefore, the velocity of glaciers in the accumulation area would still suffer from

problems due to their low contrast?

Line 140 Is it possible a higher resolution product could be produced, which is of great help for studies focused on local scale.

Line 155, $w=3$ for all the other regions shown in Figure 1?

Line 174, add glacier outlines to distinguish the glacier and non-glacier region in Fig.2.4.6.8.9

Line 278, Though color code of points in Figure 5 was shown in Fig.4, but it's hardly to know the location relative to glaciers (i.e., which point is at high elevation)

Line 427 how about the accuracy of your annual mosaic products relative to ITS_LIVE product?

Line 730, location of your example areas should be denoted.

Line 770, add some general statistics of the difference