

We appreciate the constructive comments from two reviewers and the community. Our manuscript will be much improved by their input. We have made changes to our manuscript. In the following responses, we use “**bold**” text for comments, “non-bold” text for our responses, and “*italic*” for changed text in the manuscript.

Community comment (Massimo Frezzotti):

Very interesting paper, the manuscript does not take in account the previous studies on glacier analyzed. To improve the results of their paper I suggest the authors to compare their result with previous ice velocity analysis using satellite image and also with GPS measurements.

For David, Reeves, Priestley several papers and measurements are available since 1998:

Frezzotti M., Capra A. & Vittuari L. (1998) Comparison between glacier ice velocities inferred from GPS and sequential satellite images. *Ann. Glaciology*, 27, 54-60,

Frezzotti M., I. Tabacco and A. Zirizzotti (2000) Ice discharge of eastern Dome C drainage area, Antarctica, determined from airborne radar survey and satellite image analysis. *J. of Glaciology*, Vol 46 (153), 253-273, DOI: 10.3189/172756500781832855

Danesi, S., Dubbini, M., Morelli, A., Vittuari, L., & Bannister, S. (2008). Joint geophysical observations of ice stream dynamics. In *Geodetic and Geophysical Observations in Antarctica* (pp. 281-298). Springer, Berlin, Heidelberg.

Rignot E, Mouginot J, Scheuchl B (2011) Ice flow of the Antarctic Ice Sheet. *Science* 333:1427–1430.

Stearns, L. A. (2011). Dynamics and mass balance of four large East Antarctic outlet glaciers. *Annals of Glaciology*, 52(59), 116-126.

Mouginot J, Rignot E, Scheuchl B, Millan R (2017) Comprehensive annual ice sheet velocity mapping using Landsat-8, Sentinel-1, and RADARSAT-2 data. *Remote Sens* 9:364–1370.

<https://earthdata.nasa.gov/esds/competitive-programs/measures/ice-velocity-mapping-of-the-great-ice-sheets-antarctica>

Moon, J., Cho, Y., & Lee, H. (2021). Flow Velocity Change of David Glacier, East Antarctica, from 2016 to 2020 Observed by Sentinel-1A SAR Offset Tracking Method. *Korean Journal of Remote Sensing*, 37(1), 1-11.

Your Sincerely

Massimo Frezzotti

Response:

Thank you for the comments, well received. We added some of your suggested references in Introduction: “... .., *regional velocity maps at a seasonal or monthly scale have been generated from optical and SAR images (e.g., Landsat and Sentinel; Frezzotti et al., 1998, 2000; Nakamura et al., 2010; Zhou et al., 2014; Greene et al., 2017, 2018, 2020a; Moon et al., 2021).*”

Frezzotti M., Capra A. & Vittuari L. (1998). Comparison between glacier ice velocities inferred from GPS and sequential satellite images. *Ann. Glaciology*, 27, 54-60.

Frezzotti M., I. Tabacco and A. Zirizzotti (2000). Ice discharge of eastern Dome C drainage area, Antarctica, determined from airborne radar survey and satellite image analysis. *J. of Glaciology*, Vol 46 (153), 253-273, DOI: 10.3189/172756500781832855.

Moon, J., Cho, Y., & Lee, H. (2021). Flow Velocity Change of David Glacier, East Antarctica, from 2016 to 2020 Observed by Sentinel-1A SAR Offset Tracking Method. *Korean Journal of Remote Sensing*, 37(1), 1-11.

In *Experiment 2* where the David Glacier region is used for demonstration of the proposed method, we added the following sentences to recognize the previous work and comparative coverages of the velocity maps: “... .. *Velocities in this region from 1988 to 1992 were mapped by using GPS and image feature tracking techniques (Frezzotti et al., 1998, 2000). A new GPS campaign was carried out in the region during 2005-2006 (Danesi et al., 2008). Velocity changes from 2016 to 2020 were detected using Sentinel-1A SAR images (Moon et al., 2021). In this experiment we produced a velocity map of the region from 64 Landsat images collected from 1972 to 1989 (Table A3).....*”