

Interactive comment on “Spatiotemporal variations in the surface velocities of Antarctic Peninsula glaciers” by J. Chen et al.

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Unfortunately, there are a number of issues with this manuscript, and I think the best solution is to ask the authors to withdraw the paper and resubmit a new work with many changes.

MODIS is a tricky tool to use for glacier velocity mapping, because of its coarse resolution. The large pixels (250 m) tend to smooth over many of the features used for image correlation-based feature tracking in finer-resolution sensors like Landsat or ASTER or SPOT. On grounded ice, features associated with the bedrock structure begin to dominate the content of the image chips used. These do not move with ice flow. This is likely why the Peninsula itself is mapped as having generally slow flow of 100 - 150 m year (Figure 6), when in fact several large east-flowing, and smaller west-flowing

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glaciers have previously been shown to have flow rates of up to a few meters per day.

However MODIS has been used successfully to map flow speed on ice shelves. On ice shelves, there are no bedrock-resting features, so all surface features here too, however, caution is needed near the edges of the shelf. Near the edges, stationary features like the grounding line and bedrock outcrops force the correlation to match those nearly motionless parts of the scene. Figure 6 appears to suffer from this.

The method used, image cross-correlation, and the software, COSI-Corr, have a long history, and so the Method section does not need to be so long or detailed.

There are other issues with the understanding of glaciology and English usage.

Suggestion: consider only the floating ice areas larger than 10 km by 10 km; mask out the grounded areas. Use more images by going through the MODIS archive more thoroughly and look for clear images of the shelf surface (there are many tens of such images).

Compare the results to the several published maps of ice shelf flow speed, e.g. Rignot et al, 2011, Haug et al., 2010 in more detail. There are very large differences here.

See a paper by Rott et al., in Geophysical Research Letters, 2014 on ice flow speeds of some glaciers in the northern AP.

Interactive comment on The Cryosphere Discuss., 8, 5875, 2014.