Review of *"Tracking slow-moving landslides with PlanetScope data: new perspectives on the satellite's perspective*" by Mueting and Bookhagen

Mueting and Bookhagen evaluate the geometric quality of PlanetScope SuperDove data for mapping ground surface displacement, with a particular focus on slow moving landslides. They also propose strategies to select which data to process for best results, and propose a method to rectify image pairs acquired from different orbits to improve ground displacement mapping results. The evaluation is timely, and will be useful for the community as they use PlanetScope imagery in their applications. The manuscript experiments are generally very sound, and I agree with reviewer 1 that the results should definitely be published.

As reviewer 1 rightly pointed out, the manuscript would benefit from a slight restructure. I understand presenting so many sophisticated and novel results as obtained in this study in a succinct way is challenging, so hopefully the below suggestions will be helpful. I enlist below some major and minor suggestions/questions. Please reach out to me if you have any questions/confusions.

Major points

- I believe early on in the manuscript, it should be mentioned that the analysis is focussing on PlanetScope SuperDove data. Then the authors can potentially consider reducing the information presented on the earlier generation of PS constellation (current section 3.), and condensing the information on previous efforts which have tried to work with older PS data (Section 3.2). Mentioning some of the previous approaches is valuable, but I do not think a detailed description of those is required. More comments related to this point are also provided in other comments below.
- Consider reducing the dense text on the background of the two landslides. I agree the event description is important, but describing the general characteristics of the events and then pointing the users to published papers for more in-depth details will work better here, as the current paper does not focus on the science of landslides perse.
- Section 3.1 is again pretty dense. One option could be to break into 2 separate sections. The first could be renamed as section 3.1: Expected relative geolocation accuracy, which succinctly describes the geolocation accuracy which is expected in Planet data, quoting numbers from the Planet documentation and previous studies. The second section could describe in more detail the spatial pattern of the typical relative geolocation offset, leading up with the figure 3, describing the four main types of errors. I think there are 4 main issues shown in figure 3 are:

    - Error due to **dynamic/outdated topography** in displacement maps obtained from image pairs acquired from different orbits
    - Error due to **stereoscopic affects** in the y-direction (again more for pairs collected from different orbits?)
    - A **general global shift** which can be corrected by removing the median x and y shifts over static surfaces (this could be present in image pairs collected by both the same and different orbits)
    - **Striping effects** in the y-direction due to sub-frame misalignment (will be present in both L1B and L3B data, and potentially for image pairs acquired from both similar and different orbits).

Based on the order you chose to introduce these errors, have small subsections or bullets for these 4 points in the new section. It will then be very clear to the reader that these are the four errors that the authors are going to tackle in the manuscript.

Then, maintain this order when you propose corrections, describe results, and conduct discussions.

There should also be a clear distinction between which correction corrects for what error. So maybe we the corrections are introduced, their section headers could contain information about which of the four errors is being corrected?

Along the same lines, it would be useful to plot the image acquisition geometry skyplot in the third column for each of the two pairs in Figure 3 (as in figure 8), so that it helps us in bringing out the effect of acquisition geometry on some of these errors?

- Current section 4.2 is very long, and the order in which information is presented can be improved. You already talked about how outdated DEM affects displacement mapping in the current section 3.1, ideally the your conceptual figure and text belong there, and not in the methods.
- Similarly, the authors talk about the discussion of using data from a .json file or the scene metadata.xml. All of this is important to consider, but it disrupts the scientific/methodological flow of the paper. Maybe some of this could be transferred from the manuscript to the github repository readme or something?
- DEM generation section have no mention of how accurate the output DEM is? I understand the authors want an update topography, but if the topography is biased by 10 m (or 20 m), will it still be helpful? This is important to consider for flatter sites where the height uncertainty will be high due to the smaller convergence angles of the Planet images.
- When using the optimized, co-incident DEM for orthorectification with the bundle-adjusted L1B image pair, did this not result in removal or atleast some reduction of the *stereoscopic error*? Have the authors evaulated this? Ideally, this should have helped.
- The polynomial fit correction will require a good chunk of non-moving, static terrain distributed throughout the scene, which is important for users to consider on where this method is applied. Suppose a landslide is being studied in a glaciated area. In that case, this will likely be more difficult to apply as the glaciers will move, reducing the amount of static area that can be used for the presented sophisticated global ramp correction.

- How much of this polynomial fit step is required for L3B data from very similar perspectives?
- We should discuss how we are hampered by using just L3B data from common perspectives. What are we gaining from orthorectifying the L1B data from different perspectives using contemporaneous DEMs (i.e., how many new observations are added).

Line by Line comments

- The abstract is written very well, great work!
- Page 2 Line 43-44: This is a bit contradictory to your next sentence where you say that you then “carefully” select pairs from the same view directions, so how do you mitigate topographic errors arising from different view directions? Maybe clearly using bullets to describe the objectives of the study somewhere early on in the manuscript will help? You are doing a lot of cool stuff, and that should get the main space, which is getting lost in the current presentation. Something like:
    - Evaluate the different type of geolocation errors in different versions of **PS-SD** data (L1B, L3B, Basemaps)
    - Facilitate the use of images acquired from different perspectives in ground displacement tracking over dynamic terrain using an updated DEM derived from co-incident Planet imagery
    - Propose a workflow to carefully select L3B data for accurate ground displacement mapping?
    - Propose corrections on final displacement maps using polynomial fits to further reduce geolocation errors?
- Line 60 to 65: This could again be shortened, as the information can be presented better in the hopefully condensed study area section.
- Line 137-140: Maybe the line describing what RPC are and that they are used by Cubesat constellations can be skipped? RPCs are in widespread use now and are used by almost all satellite vendors who provide unrectified data.
- Rename Section 3.2: Again given the focus of the paper on PS2-SD data, do we need this section to be so lengthy? An alternative could be to describe in a sentence each all previous studies with old data (or maybe make a table of that with the sensors considered, the correction type, the number of images and science applications) and then let the readers figure out. The authors can then mention that none of these approaches have been able to correct errors in PS2-SD sensor, which is the main focus of the study.
- Line 234: Instead of going into all of this detail on how the data can be delivered, this could be simplified by saying we use green band due to xyz reasons, which corresponds to band x in PS2-SD data. We are not using products from older sensors, so why mention this granular detail about them?
- Line 477: What is meant by corrected L3B data? Has the polynomial fit been applied to the L3B data here?

- Section 5.3: In this section, I am a bit confused on what pairs where used to conduct this analysis. In Figure 14, was the L3B and L1B data selected for a pair acquired from a different perspective, or the similar perspective?
- Section 6.2.1 is important, thanks for conducting the analysis and sharing your findings!
- Line 530 to 533: could you show through a figure by what is meant by the misalignment in single vs multiple subframes? This is not clear to me in the current form.
- Line 537: What is the marginal lower accuracy (e.g., 1 m, 2 m, 3 m?) which the users should be comfortable with?
- Line 587 to 589: Thanks for conducting this analysis and sharing your results!

Sincerely,
Shashank Bhushan