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Interactive comment on "High-resolution elevation mapping of the McMurdo Dry Valleys, Antarctica and surrounding regions" *by* Andrew G. Fountain et al.

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(note: This review pertains to the version of the paper labeled "Published: 5 January 2017". I see that the authors have responded to comments posted by "RC1", but I do not see an updated version of the paper that incorporates these changes. Thus, several of my minor comments may have already been addressed by the authors)

Title: High-resolution elevation mapping of the McMurdo Dry Valleys, Antarctica and surrounding regions Authors: Fountain et al. Reviewer: Jay Dickson (jdickson@caltech.edu)

This paper describes the acquisition and post-processing of an airborne LiDAR survey

of the McMurdo Dry Valleys performed during the 2014-2015 field season, in addition to the scientific motivation for the project. This is an essential document as these data will be used extensively by the scientific community and any potential errors in the final products must be known to prevent over-interpretation. The paper's strength lies in its detailed descriptions of potential errors inherent to the product, as that is well written and clear to a general scientific audience. I only have a few substantial suggestions that I hope will help the authors maximize the potential impact of the significant amount of work that went into producing this spectacular data set.

Major issues:

- The authors articulate in their introduction that this project is an opportunity to quantitatively evaluate surface change (particularly in the Coastal Thaw Zone) since the last airborne LiDAR survey of the region, conducted during the 2001-2002 season. Unfortunately, despite excellent descriptions of how the precise location for each point was determined during this mission, there is never any assessment of how well-aligned the data are with the 2001-2002 data. Fortunately, my first-order comparison shows that the alignment is fantastic, by comparing meter-scale boulders on valley floors that are unlikely to have shifted during the last two decades. Thus, I suggest adding some discussion and one or two figures that evaluate how well-aligned the data are.

- There are discrepancies between the description of the final data products that are being released compared to what is currently available for download. As of this writing (May 10, 2017), data have not been posted to the PGC, so I am only evaluating what is available on opentopo.sdsc.edu, through the bulk download option. The paper states that the DEMs are provided as ESRI ArcGIS .flt floating point format (line 313) and shaded relief maps as ESRI ArcGIS .adf files (line 314). These are quite obscure raster formats and are not read by most other GIS or raster-editing software, and ArcGIS is extremely expensive for users without an institutional license. I would strongly recommend offering raster data in GeoTIFF format, which is universally read by all GIS software. The data currently available for bulk download through opentopo are in Tiff

format (I didn't see any .flt or .adf files), but they lack geo tags so they do not read into GIS software immediately. Once I defined the proper projection they all worked perfectly, but it would be very helpful for the authors to provide them as GeoTIFFs natively, to ensure that those with minimal technical expertise can easily use the data. I'm more than happy to collaborate with the authors to accomplish this.

The authors state that the point cloud data are provided as .LAS files, though they are currently available through opentopo via bulk download as .laz files, which is not a significant change, just two sides of the same coin. While this format is optimal for technicians, it is unusual for the scientific community, so I would suggest posting them in a more universal tabular file format that does not require special software (I used LAStools to convert them). Typically data like these are shared as comma-delimited files (.csv) or as shapefiles (.shp), though the volume is such that shapefiles would be rather inefficient. The queryable site within opentopo allows for the generation of ASCII files, which would be good for the bulk download site as well.

- Scientifically, I hope that the authors mention that the 2001-2002 LiDAR data were acquired at multiple dates during the most dramatic flood year on record, as the authors are all well aware. While some of the LiDAR passes were acquired before peak flood conditions, some were conducted during these events, based on analysis of ride-along CAMBOT imagery during that project. There's obviously nothing that the authors of this study can do about that, but I do think that it is worth a brief discussion, as the authors clearly state that evaluation of surface modification in the Coastal Thaw Zone is the primary scientific objective of this project. Novice users may not be aware of the unusual conditions under which the 2001-2002 data were collected. Additionally, I hope the authors consider making the point that this current study provides a robust new benchmark for future investigations of surface modification in the Dry Valleys, amplifying the long-term value of the project.

Minor Issues:

- Line 54 and elsewhere. Is there a reason that meters are used with negative exponents as opposed to just using centimeters (in this case) or millimeters for smaller values? 1 mm seems far more intuitive to me compared to 10ˆ-3 m.

- Line 144. "flight days vs deployment days" is unclear here. I would either expand up on this or delete if unnecessary.

- Line 227. When I converted the .laz files to text files using las2txt within LAStools on the .laz files available in the bulk download section of opentopo, values for x, y and z were returned. There were no values for intensity. Not sure if this is an issue with the data files or how they are converted to text files.

- Line 269. This is the first time that RMSE is used, so should probably be spelled out as root-mean-square error.

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