

Interactive comment on “Estimating supraglacial lake depth in western Greenland using Landsat 8 and comparison with other multispectral methods” by A. Pope et al.

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Thank you to Duncan Quincey for the very positive and constructive review! We have done our best to address the comments that you have raised, and I reply to them individually below:

Voice: Sections 3 4 were re-written to include active voice rather than passive voice.

P3262 lines 5-7: The terms have been so re-ordered.

P3263 lines 8-9: The definition has been removed.

P3263 lines 20-21: An extra paragraph has been added, and we will look out for it in
C1952

later typesetting, too.

P3264 line 8: ‘of’ changed to ‘on’

P3266 line 16: based moved to after the reference

P3267 line 14: “airborne thematic mapper” is capitalized and “lidar” changed to “LiDAR”

P3271 line 6: comma changed to semi-colon

P3272 line 13: included the word “elevation” to finish the sentence

Section 5: Introductory paragraph removed, and 4 subheadings were included: Retrieval Performance Factors, Revisiting Lake Depth Retrievals, Supraglacial Lakes in the Hydrological System, and Sensitivity Analysis.

P3275 line 23: ‘an’ changed to ‘and’

P3279 lines 1-5: This third paragraph attempts to move on from method development to applications, and as such rather than integrate it into the previous two paragraphs, it was expanded. The paragraph has been amended as follows to better address what we found out for SK region and the implications for other regions: “The recommended depth retrieval method was applied to all available Landsat 8 imagery for summer 2014 for the Sermeq Kujalleq (Jakobshavn) region of west Greenland. Seasonal and regional trends in lake depth (deepening and then shallowing), evolution (proceeding inland/up-glacier and northwards through the summer), and distribution (~300 m to ~2100 m a.s.l.) were observed. At most, lakes contain a similar magnitude of water to supraglacial streams, but this may not be true for other parts of Greenland. Both elevation (and relatedly, accumulation / melt forcing) and surface topography play a role in lake formation and extent, behavior that we expect to be modified but observable in other regions. Further work moving forward will need to contextualize Landsat data with other remote sensing imagery, fieldwork, and model outputs.”