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Comment

## ***Interactive comment on “Snow density retrieval using SAR data: algorithm validation and applications in part of North Western Himalaya” by P. K. Thakur et al.***

**P. K. Thakur et al.**

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Author response on TCD paper “Snow density retrieval using SAR data: algorithm validation and applications in part of North Western Himalaya”

A) Author response 1 for Anonymous Referee #1: 1) Reviewer has pointed to giving only the formulaes in used snow density approaches, without going in physics of these methods. If editor allows submission of revised manuscript, Authors will add all the details of related physical principles on which these methods are based on. 2) Reviewer has pointed out lack insufficient and well distributed ground data, which makes the “validation” part of this work as weak. At this point I have only this ground data, but I have

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requested my co-authors to provide me more ground data at different locations so that full range of snow density values can be validated using this model. 3) Reviewer has pointed out that in section 1.1 pages 1929 and 1930 some confusion about surface and other terms. Authors will revise this entire section 1.1 as per reviewer's suggestion, but here it is important to mention that we are only discussing about snowpack scattering characteristics at L and C-band SAR frequencies. This will be mentioned separately in revised manuscript along with other points. 4) The section 2.3 will be modified as per suggestion of reviewer such as reporting accuracy and errors of used algorithms in previous studies and removing redundant lines. The number of SAR image (4 images, 3 ASAR and one PALSAR) used in this study is given in table 2. The other optical data dates will be added with dates in revised text. 5) The masking is applied at end of chain so as to reduce ease of retrieval, else 'nodata' or 'zero' values gives errors in MATLAB or Mathematica based retrieval algorithms. 6) Authors will take care to improve English in first sections and all other sections of this paper in revised text.

B) Author response 2 for Dr. R. Kelly Referee #2 and Editor: 1) Reviewer and editor have appreciated the paper but my previous work of Geocarto International (GI) has been cited for self-citing some parts of this TCD paper. This is an honest mistake on my part as my study area and main approach was same, but if editor gives chance to submit revised text, I will improve these sections (1, 1.1, 1.2 and 1.3 and all other sections where text is same) with focus only on snow density and its validation. 2) Reviewer has self-cited my paper for fig. 6. As answered in reviewer 1 response, at the time of submission of this paper in TCD I had only 9 points for ground validation of SAR based snow density results, so same points are used in both papers. But I and co-authors are making all efforts to get more ground data to get the clearer figure on accuracy of this model in Northwest Himalaya in revised text. 3) Authors kindly request editor to give us permission to submit the revised manuscript which will incorporate all the points raised by the reviewers.

Overall as there is legacy of SAR data C-band in last 20 years and also PALSAR and

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JERS data in L-band, and also current Indian RISAT-1, in future ESA's Sentinel missions are in C-band and PALSAR-2 in L-band will also be available next year, therefore this work becomes important along with other works (in Ku and X-band for SWE) going on in the field of snowpack parameter retrieval using SAR data. Authors again kindly request editor to give permission to submit the revised manuscript.

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Interactive comment on The Cryosphere Discuss., 7, 1927, 2013.

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7, C1420–C1422, 2013

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