Review for 'The Cryosphere', Jul 2016.
Paper tc-2015-185, "*Improved measurement of ice layer density in seasonal snowpacks*", by Watts et al.

General comments

The paper in its revised form as a brief communication reads very well and nicely introduces this new method to measure the density of ice layers.

However, the authors ought to be extremely careful in introducing an 'effective porosity' that they too often abbreviate by porosity alone. The latter is ambiguous and misleading.
On p. 5, lines 151- 157, you need to make clear that you are after that volume on the edges of your broken samples that is wetted after submersion, correct? This may be loosely related to "effective porosity" that is more commonly defined as, "That portion of porosity which is readily accessible to a fluid moving through the porous medium". In that sense I understand that 'effective porosity' can increase, but not porosity itself. You definitely have to make a clear distinction between these two terms and call your parameter 'effective porosity' throughout the paper.
Note that it is not before p. 6, lines 171-172, that I start to understand why you use the term "effective porosity" even though it is hardly aligned with definitions found in literature.

I recommend accepting the paper after the authors addressed the porosity issue and do some minor revisions as suggested below.

Minor comments

- abstract, line 3: "… on 87 **samples taken from 4 ice layers, both natural and artificial,** in …"
- p. 1, line 14: "*ice crust*" I guess these layers involved some melting followed by refreezing. Today these layers would more properly be noted as melt-freeze crusts. Thus the term "*ice crust*" sounds ambiguous to me in the context of your paper and I'd suggest you make a note on this here.
- p. 2, line 50: "*and that repeat images*" wording unclear to me. Is there something missing in that sentence?.
- p. 6, lines 179-180 : Use Φ_{eff} instead of Φ.
- p. 7, line 204: No doubt the ice layers were porous. The question about permeability remains open though.

Figures

Figure 3: Replace "*porosity*" by **effective porosity** in the caption.

Figure 5: Here you are showing 'Effective porosity of sample (1)' vs 'Density (kg m^{-3})', not the contrary.
Replace "*porosity*" by **effective porosity** in the caption.

Tables

Table 1: Caption, line 271: replace "*diameter*" with **bubble diameter**.
The overall numbers for both Layer Thickness and Density are not consistent with the sum of the above columns.
Replace all "0" with dashes

Davos, 2016-07-04, Charles Fierz