

## ***Interactive comment on “Evaluation of arctic broadband surface radiation measurements” by N. Matsui et al.***

**Anonymous Referee #2**

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General comments:

The paper addresses scientifically relevant issues regarding surface radiation measurements in polar regions. Particularly, quality reducing effects are pictured and discussed. However, all presented concepts of diminishing erroneous measurements are principally known. The data illustrating the issues has mostly not been published to the reviewer's knowledge, while some presented records are available via the BSRN. The descriptions and calculations are sufficient for traceability of results. If data is supplied by the authors, traceability of results is viable. The conclusions reached are adequately deduced, scientifically significant and correct, however not new (specific comments 5, 7, 8). Some interpretations do not seem comprehensible to the reviewer (specific com-

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ments 1 - 4, 6). The title of the manuscript reflects the contents of the paper and the abstract provides a concise and complete summary. Overall presentation is well structured and clear. The language is fluent and mostly clear (specific comments 2, 6) and mathematical formulae, symbols, abbreviations, and units are correctly defined and used.

Specific comments:

1. P. 4913, l. 6: The motivation for “more extensive research on the Arctic surface radiation budget” should be more profound here.
2. P. 4917, l. 17: The term “harsh weather conditions” is misleading in this context. The cosine error mentioned is not related to weather conditions and the thermal offset error is more pronounced in clear sky conditions, which are typically not so “harsh”.
3. P. 4918, l. 22: The difference between global and the component sum prior to 20:30 UTC is up to 50 Wm<sup>-2</sup>. The term “slightly greater” seems not appropriate in this context.
4. P. 4919, l. 1: The improved agreement after cleaning should be quantified here.
5. P. 4923, l. 24- P.4924, l. 2: The need for addressing riming issues and minimising them by heating and ventilation has been reported by McArthur (2004, pp. 32) and Lanconelli (2010).
6. P. 2924, l. 2: The term “multi-variable radiometer” appears vague and misleading to the reviewer. Redundancy and quality control do not benefit particularly from sensors measuring multiple parameter but from redundant measurements itself.
7. P.4924, l. 3: The vantage of redundancy has also been reported by McArthur (2004).
8. P. 4924, l. 4-6: These are all known issues for BSRN measurements, not only in the Arctic.