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HESSD

6, C2649–C2652, 2009

Interactive
Comment

Interactive comment on “Performance of high-resolution X-band radar for rainfall measurement in The Netherlands” by C. Z. van de Beek et al.

Anonymous Referee #2

Received and published: 17 November 2009

Performance of high-resolution X-band radar for rainfall measurement in The Netherlands

C.Z. van de Beek, H. Leijnse, J.N.M. Stricker, R. Uijlenhoet, and H.W.J. Russchenberg

Contribution

This manuscript presents a thorough analysis of the performance of a high-resolution (non-polarimetric) X-band radar for rainfall estimation in the dutch climatic context. Calibration, ground clutter identification and filtering, attenuation correction and reflectivity-rain rate conversion are investigated for a range of rain events representative of the

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rainfall climatology in the Netherlands (and regions with a similar temperate oceanic climate). This topic is of interest for HESS.

Evaluation

The paper is well organized and clearly structured, with relevant tables and figures. There are however some issues that must be addressed before this manuscript can be published. I hence recommend major revisions. See the list of general and specific comments below.

General comments

1. Despite the good structure of the manuscript, the scientific objectives are not very clear. The authors should highlight what is new and what is simply the application of existing algorithms or approaches. In the introduction, it is stated "The aim is to find the strengths and weaknesses of X-band radar under conditions typical for the Netherlands and try to deal with the weaknesses in the best way possible". The authors should emphasize which of their results could be transferred to other configuration (with a different radar, in a different regions,...), otherwise this contribution may appear to specific to SOLIDAR and its vicinity.

2. If the proposed methods to calibrate the radar, to correct for ground clutter and attenuation effects are new, they must be evaluated and compared with previously proposed techniques.

3. There is no references to existing methods or techniques from the literature in Section 3.1-2-3! This must be modified, as there is significant work published about radar calibration (e.g., Joss and Lee, JAM, 1995), ground clutter identification and correction (e.g., Cho et al., JTech, 2006) and Z-R relationships derivation (e.g., Battan, 1973), just to give a few examples.

Specific comments

1. p.6036, Abstract, l.17: I would add "what" between "than" and "can".

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2. p.6036, Abstract, l.18-20: the list of sources of error for SOLIDAR should include VPR effects and maybe melting layer also...
3. p.6037, Introduction, l.17: attenuation can be severe even at C-band (e.g., Tabary et al., JAMC, 2009).
4. p.6037, Introduction: polarimetry should be mentioned.
5. p.6040, l.24: insert a space between "rain" and "gauges".
6. p.6041, l.1: I am bit surprised by this threshold of 2 mm/h at 1 min. If one tip corresponds to 0.2 mm, then the first non-zero rain rate value measured by such a rain gauge should be $0.2 \times 60 = 12$ mm/h. Maybe I am wrong...
7. p.6041, l.10: the criteria on which is based the classification in convective/stratiform events should be mentioned.
8. p.6041, l.12: what is the temporal resolution of the collected DSD spectra?
9. p. 6044, l.11-15: in the end, there is a calibration drift, but it is not corrected? This paragraph is a bit confusing...
10. Section 3.2 Ground clutter correction: just out of curiosity, is anaprop frequent and visible in SOLIDAR data?
11. p.6047, l.21: I think it should be "carried out" instead of "carried outperformed".
12. p.6050, l.15: "rain gauges".
13. p.6051, l.8-20: why illustrating the influence of attenuation correction with a rain event for which attenuation is limited?
14. p.6056, l.5: please give the date of this squall line.
15. p.6071, fig.2a: y-axis is rain rate (mm/h) or rain accumulation (mm)?
16. p.6075, fig.6: l.5: one of the 2 "the" should be removed.

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