

We thank Frank Gekat for these questions.

*Please mention how range gates with  $\rho_{\text{hv}} < 0.8$  are treated. Are they completely discarded (no data)?*

Yes, they are completely discarded: they are removed from the  $Z_{\text{H}}$ ,  $\Phi_{\text{DP}}$ , and  $K_{\text{DP}}$  fields before any further processing.

However, while checking this, we noticed that the manuscript omits a texture criterion applied in the same step: gates where the standard deviation of  $Z_{\text{H}}$  over 11 consecutive range gates (0.825 km) exceeds 8 dB are discarded in the same way. Both the window length and the threshold were set by visual inspection, and we will add this criterion to Sect. 2.2.

The conclusions of the paper are not sensitive to this texture filter, as we have verified on a sample of scans covering all precipitation regimes by replacing the  $Z_{\text{H}}$  texture with a  $\Phi_{\text{DP}}$  texture criterion, as used by Pejic et al. (2022).

*Please provide more details about this filter, maybe a citation providing a description. How was it tuned to the RF interference? How complete was the removal?*

First, describing these echoes as “interference artifacts” was imprecise on our part: we have not verified that they are caused by RF interference. What we do know is that they are not precipitation, since they have low  $\rho_{\text{hv}}$  and appear as narrow radial spikes, one to a few rays wide, that start at the radar and rarely extend beyond about 15 km. Accordingly, we will remove the reference to interference in the revised manuscript.

Regarding the filter itself, the  $\rho_{\text{hv}}$  and texture filter removes most of the spikes, but some

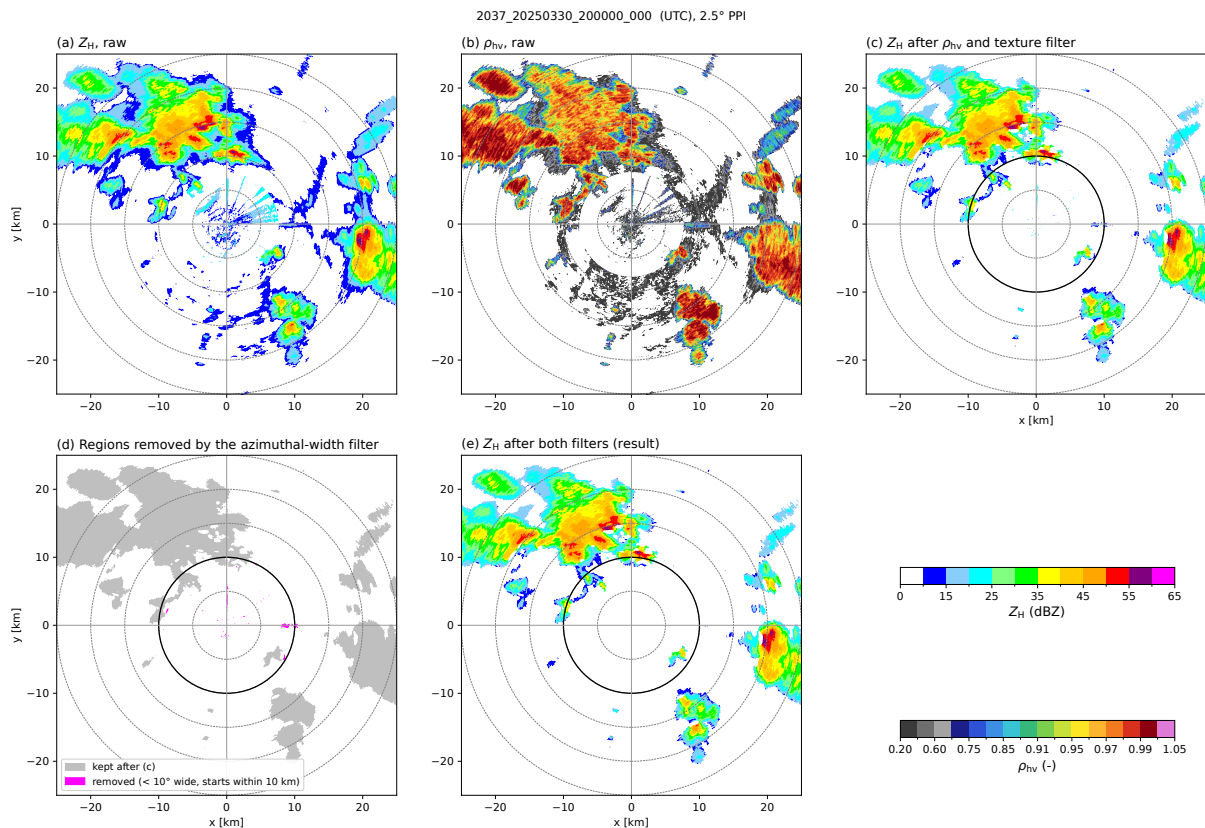


**Figure R1:** 2.5° PPI of 30 March 2025, 20:00 UTC, within 25 km of the radar: (a) raw  $Z_{\text{H}}$ , (b) raw  $\rho_{\text{hv}}$ , (c)  $Z_{\text{H}}$  after the  $\rho_{\text{hv}}$  and texture filter, (d) regions removed by the azimuthal-width filter (magenta), (e)  $Z_{\text{H}}$  after both filters. The black circle marks 10 km.

remnants persist. For this reason, a second filter, an azimuthal-width filter, is applied to remove them: it discards any contiguous echo region that is narrower than  $10^\circ$  in azimuth (20 rays, about four beamwidths) and whose nearest gate lies within 10 km of the radar. This filter is our own design, and its parameters were set by visual inspection. Similar geometry-based approaches to removing radial spike echoes have been used by Peura (2002) and Ośródką and Szturc (2022). We will describe this filter in the revised Sect. 2.2.

Nevertheless, the removal is not complete: a fragment connected to a wider precipitation region is retained and may, in some cases, affect the retrieval. As explained below, however, such fragments are not the source of the streaks in the attenuation-based retrievals.

*In particular the strong “spokes” look like RF interference. Please explain why you are sure that these spokes are not residuals from your RF interference filtering.*

We are confident that the spokes come from the attenuation-based retrieval and not from the input data, for two reasons:

1. In the scan of Fig. 6,  $R(Z_H, K_{DP})$  and  $R(Z_H, A_H)_{BASE}$  use exactly the same valid gates, yet the spokes appear only in  $R(Z_H, A_H)_{BASE}$  (Fig. R2; coh = 0.004 vs. 0.52). Likewise, panels a, c, and d of Fig. 6 use the same gates and differ only in how  $\Delta\Phi_{DP}$  is selected, yet their streaks differ. If the spokes originated in the input data, they would appear in all of them.
2. Since the rain covers the radar in the scan of Fig. 6, spikes, if present, could not be separated from the rain there. We therefore repeated the comparison on the scan of Fig. R1, where the spikes are clearly visible. Even after the filters have removed the spikes, the streaks still appear in  $R(Z_H, A_H)_{BASE}$  but not in the control (coh = 0.49 vs. 0.02; Fig. R3). Moreover, they appear on cells in sectors with no spikes at all, for example on the cell west-north-west of the radar. The artifact therefore does not depend on the spikes.

Finally, note that  $L'$  is designed to make these offsets visible, while in the rain rate itself they are much less conspicuous (Fig. R2, left). Furthermore, over the full period, the control remains at the noise floor (median coh 0.043–0.060), whereas all attenuation-based variants are contaminated (Sect. 7.3).

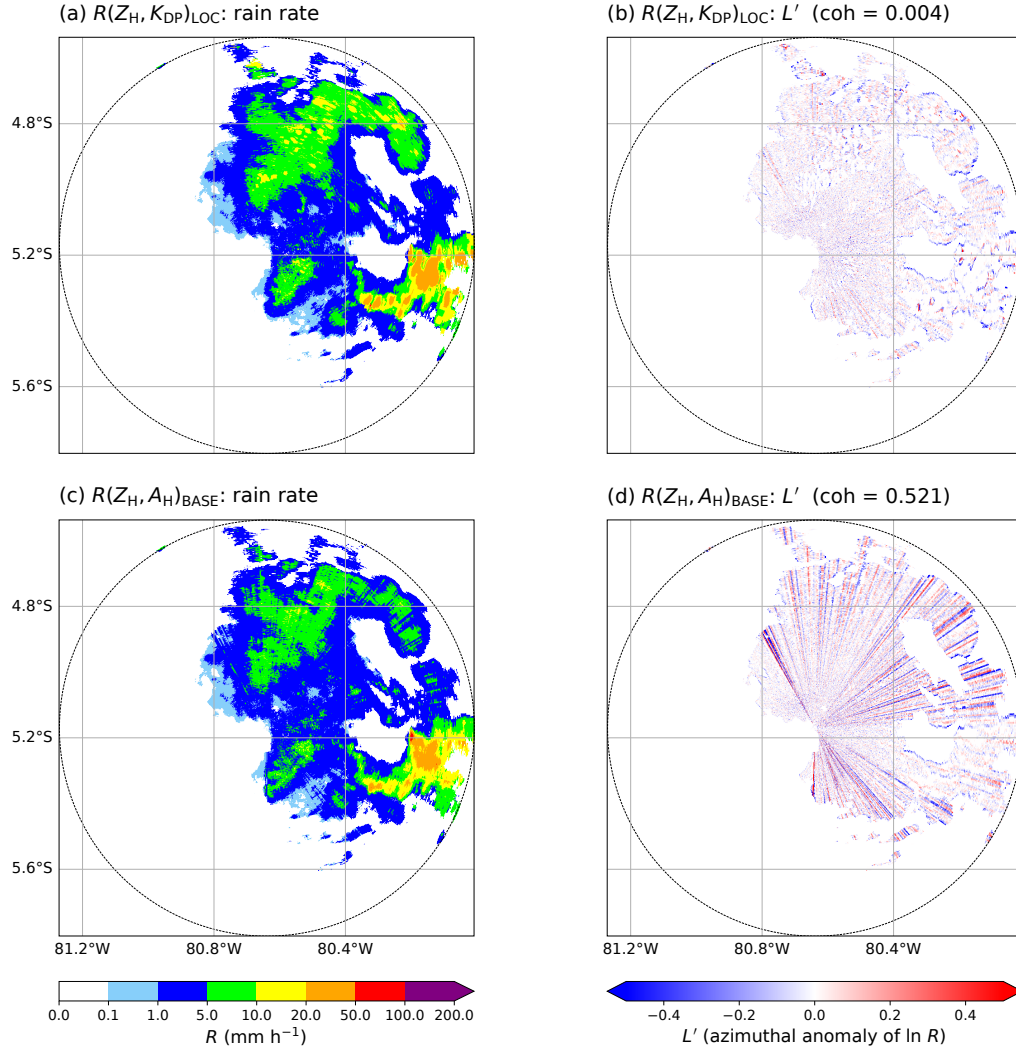


**Figure R2:** Scan of Fig. 6 (26 February 2025, 20:10 local time): rain rate (left) and  $L'$  (right) for  $R(Z_H, K_{DP})$  (top) and  $R(Z_H, A_H)_{BASE}$  (bottom), on the same valid gates.

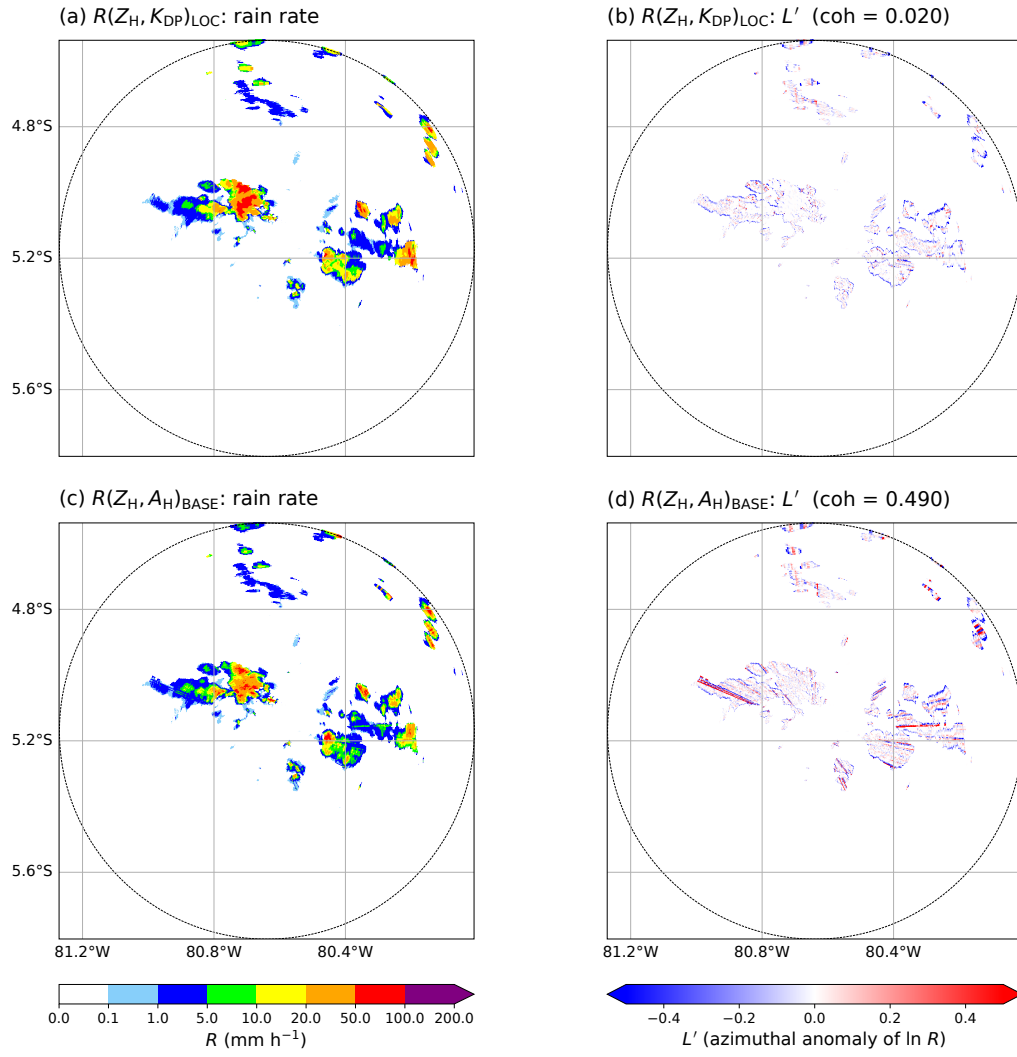


**Figure R3:** As Fig. R2, for the scan of Fig. R1 (30 March 2025, 20:00 UTC), after the spikes have been removed.

## References

- Ośródk, K. and Szturc, J.: Improvement in Algorithms for Quality Control of Weather Radar Data (RADVOL-QC System), *Atmospheric Measurement Techniques*, 15, 261–277, <https://doi.org/10.5194/amt-15-261-2022>, 2022.
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- Peura, M.: Computer Vision Methods for Anomaly Removal, in: *Proceedings of the Second European Conference on Radar in Meteorology and Hydrology (ERAD)*, pp. 312–317, Copernicus GmbH, Delft, The Netherlands, 2002.