Review of ERUO: a spectral processing routine for the MRR-PRO

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November 23, 2021

1 Short description

In this paper, the authors introduce an alternative spectral processing system (ERUO) for processing the raw data produced by the new Micro Rain Radar (MRR-Pro). Using ERUO, the authors aim to minimize the effect of interference lines and other issues that affect the MRR-Pro. The comparison between the output from the original software and ERUO shows that ERUO reduced the interference line effects and improved the sensitivity.

The processing system (ERUO) is a good contribution to the radar community, especially for those who work with the MMR-Pro and experienced similar problems. I, therefore, recommend this paper for publication at AMT, but I ask the authors to address the minor issues listed below.

2 Python package comments

ERUO is the core of this publication, and it is intended to be publicly available. In order to make it accessible to other users, its documentation needs improvements. In addition to the python scripts (available at: https://github.com/alfonso-ferrone/ERUO), the authors should provide a sample of test files alongside a tutorial where any potential user could be able to test ERUO.

3 Text comments

1. section 2.2, line 112:
   "... a vertically-pointing W-band (94 GHz) Doppler cloud radar, thereafter referred to as WProf, was also deployed at the airport of La Chaux-de-Fonds, a few meters away from the MRR-PRO. ..."

   How far are a few meters away? Was it less than 10, 20 or 50 meters?

2. section 2.3, line 122:
" ...The last radar playing a role in this study is an X-band scanning Doppler dual-polarization weather radar (MXPol) ... "

   What is the frequency of the X-band radar?

3. section 3.1, line 169:
"Two examples of the main category are visible in Figure 2 ..."

   What are the panels in Figure 2?

4. section 3.1.1, line 182:
"Examples of both quantities for the MRR-PRO 06 dataset are shown in Figure 2. "

   What are the panels in Figure 2?

5. section 3.1.1, line 189:
" More precisely, the beginning of this second part of the profile is moved to the first n in which $\nabla_n \tilde{\mathbf{S}}(n)$ reaches the median value of all negative $\nabla_n \tilde{\mathbf{S}}(n)$. "

   Why did you use the median value of all negative $\nabla_n \tilde{\mathbf{S}}(n)$ to identify n_{up}? What would happen if a fixed number of range gates above the point where $\nabla_n \tilde{\mathbf{S}}(n)$ becomes negative was used to define n_{up}? (for example, the first range gate where $\nabla_n \tilde{\mathbf{S}}(n)$ becomes negative)

6. section 3.1.1, line 191:

   "... how the gradient does not reach its typical negative value ..."

   What do you mean by typical negative value?

7. section 3.1.1, line 198:

   " ... constant is set by default to 3, a value that gives satisfactory results for our datasets. "

   What are satisfactory results? How much of the spurious peaks are removed (30%, 50% or 90%)?

8. section 4.1.1, line 408:

   "The effects of interference lines on a dataset is clearly visible in both panels,..."

   What are the panels?

9. section 4.2, line 656:

   "Panel b shows that the ERUO products have a significantly smaller median difference from $\mathbf{V}^W(t,n)$."

   Panel b from figure 11 does not show the median difference from $\mathbf{V}^W(t,n)$. It shows the IQR calculated from Ze. Should it be panel d instead?

4 Figure issues

1. Figure 2 Panel e :
   The horizontal soft red lines are really difficult to see in the PDF and in the printed version. This figure needs an improvement of the contrast.

2. Figure 5 Panels b and e:
   What are S and SS on top of those panels?

3. Figure 6:
   On top of panels b and d, What is = 0 01? Something is missing On top of panels c and d, what is the meaning of S?

4. Figure 8:
   First column: what are the units of Z_{ea}? Second column: What is the radar variable? Check the units Third column: Check the units

5. Figure 9:
   What are S and SS on top of panel b?

6. Figure 10:
   What are S and SS on top of panel d?

7. Figure 11:
   First column: what are the units of Z_{ea}? Second column: What is the radar variable? Check the units

8. Figure 12:
   The caption says, "The name of the dataset from which each panel has been derived is displayed in its title..." The name of the dataset is not indicated (See the titles).

9. Figure 14:
   First column: what are the units of Z_{ea}? Second column: What is the radar variable? Check the units Third column: Check the units

5 Typos

1. Section 3.1.1, line 191:
   "of n_{up} for for (repeated for) the MRR-PRO 06"

2. Section 4.1.2, line 571:
   " coefficient in panels g,h (missing space) and i. "

3. section 4.2, line 645:
   "attenuation at W-band compared to k-band (K for consistency)."