

Interactive comment on “5 year radar-based rainfall statistics: disturbances analysis and development of a post-correction scheme for the German radar composite” by A. Wagner et al.

Anonymous Referee #2

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General remarks:

The paper is written in good English and presents a topic which will attract more attention in the future when more years of radar data become available.

The paper highlights the temporally changing data quality where "old" data have been produced on a different level of knowledge than the "new" data closer to the current state of knowledge and technology. Work on many years of data will have to consider these effects and will have to generate efforts to produce results in the most consistent way possible.

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A drawback of the paper is the holistic methodology, i.e. where summary effects of impacts on radar measurements are attempted to be solved on a yearly basis although more detailed information is available.

Another methodological problem is the use of the PX product which is not representative for the RX data: (1) observed was a different time period - most radars were non Doppler until 2004, so the results cannot be transferred. It would be required to have identical time intervals for single and composite data for a consistent approach (2) different value resolution: PX is 6 classes, RX is 0.5 dBZ steps (3) PX already is a single radar cartesian product, RX becomes only cartesian when compositing and is based on the DX polar product => DX product would be the logical choice for an analysis of the compositing effects

Doubtful, but partly due to the data situation in Germany with degraded data products in the beginning of data availability, is the use of cartesian data for single radar quality analysis. At least since COST 717 (Michelson et al., 2005), such efforts should be obvious to be not up to date any more.

Therefore, an appreciation of the presented work in in the light of international work would be useful. Else, the presented paper which consists of a large amount of work would be difficult to be put into an international perspective which is one main focus of an international journal.

Specific remarks:

p 1771 line 9: which range: 128, 150 or 250 km?

p 1772 Derivation of rain amounts from PX is somewhat coarse

p 1773 spokes are much easier to detect and verify on polar data. the same is true - although to a lesser degree - for distance related characteristics

p 1775 last line. the statement is trivial - what about the relative amount of values?

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p 1776 another effect of DWD clutter removal is empty pixels - this is severely disturbing further data use but not mentioned here

p 1778 Fig 5: what are the red spokes?

p 1782 the altitude effect is different in winter and in summer - in winter also due to overshooting of shallow precipitation. A uniform correction of sums neglects the use of better information and better correction possibilities

p 1782 did you degrade the RX pixel information to the PX levels for this?

p 1783 the spoke correction is applied to which unit? dBZ, mm/h or frequency? Did you also consider an additive correction instead of multiplicative?

p 1783 did you post-control gauge data before adjustment?

p 1784 can you elaborate on the density effect - what density gave how much reliability?

p 1785 the internal module is not clear: do you give weights for each source pixel according to their distance to their radar (e.g. 30% radar1, 50% radar2, 20% radar3) and add them on each target pixel?

p 1787 why did you choose 3 non-connected years for setting up the system? what are the results for single years - is there a temporal development visible?

p 1790 didn't DWD already postprocess the RX data 2001 - 2013 for their RADOLAN climatology?

Recommendation:

As mentioned above, the PX product may shed a lot of light on the behaviour of products from single radar. However, for a rigorous analysis of the compositing effects towards the German RX composite, the basic DX product should be used in order to avoid side effects from the comparison of unrelated data products.

Therefore, I am afraid that I have to recommend a major revision based on a consistent

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time interval between single and composite data and on the analysis of single radar data on the DX data product used to later produce the radar composite. I know that this recommendation represents a high work burden, but I see this as requirement for a consistent and transferrable methodological work.

References: Michelson D., Einfalt T., Holleman I., Gjertsen U., Friedrich K., Haase G., Lindskog M., Jurczyk A., 2005: Weather radar data quality in Europe quality control and characterisation. Review, COST Action 717 - Use of radar observations in hydrological and NWP models, Luxembourg.

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