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Hydrology and Earth System Sciences
Discussions

Interactive comment on "On the skill of high frequency precipitation analyses" *by* A. Kann et al.

A. Kann et al.

alexander.kann@zamg.ac.at

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Dear Editor and first Referee,

We would like to thank the first referee for his contribution to improve the quality of this manuscript. The minor remarks are commented by the authors as follows:

RC: The distances of the WegenerNet to the two nearest radars should be clearly indicated, as well as the lowest unhidden elevation angle or measuring height of the radars at the WegenerNet. – I suppose, the long distances and limited visibility explain a part of the bad correspondence between the radar derived precipitation amount and the WegenerNet measurements.

AC: A radar visibility map and a detailed discussion of the radar visibility and possible difficulties in precipitation measurement at the region of interest are added in Section

2.1.

RC: The way how precipitation intensity is derived from the radar data should be explained in more detail. The "maxcappi approach" is not a common way to derive QPE (it preserves (e.g.) all problems with a bright band). Why and how is it applied?

AC: A detailed description of the radar data processing and the calculation of the "max-CAPPI" is included in Section 2.1.

RC: (page 11606, line 21ff:) "In climate research, precipitation re-analyses . . . are employed . . . and are therefore of high . . . relevance." The fact that something is done is no proof that is of any relevance. Further, climate precipitation reanalyses are not familiar with "high frequency precipitation analyses".

AC: In fact, this sentence misleads the reader. It is rewritten in a more neutral way.

RC: The radar data are scaled by monthly precipitation sums. Nevertheless, there is a bias of 80 % underestimation compared to WegenerNet on a 6 month basis. Should not the scaling of the radar data remove (or minimize) this bias?

AC: It is true, that the scaling of the radar data decreases the bias. However, the climatological scaling is based on TAWES data and only two of them have a larger impact on the scaling factors within the WegenerNet area. The WegenerNet data are only used for validation, not for scaling.

RC: (Equation 1) Instead of $\leq$ it should be $\geq$.

AC: Corrected.

RC: The authors propose to use a different interpolation method on the rain gauge measurements for convective events. The reason is, that the TAWES rain gauges do not represent small scale features in a proper way. I doubt that a different interpolation method can help here. Missing information due to a coarse spatial resolution is not remedied by a different interpolation method but only by additional measurements. It

might be true, that precipitation overestimation can be reduced by limiting the impact of a rain gauge to a smaller area. Nevertheless, a missed convective cell will result in precipitation underestimation as long as it is not detected by the rain gauge network.

AC: The authors agree to the referee's comment that a different interpolation method does not remedy missing information. However, by applying a higher order inverse distance weighting it is possible to reduce the impact of non-representative stations, favouring the radar data in-between the stations.

RC: I would add a linefeed in page 11616 line 4 and in page 11618 line 8.

AC: A linefeed is inserted in the manuscript.

RC: Figure 2: please mark the area of the WegenerNet.

AC: The figure is redesigned and now includes the WegenerNet.

RC: Figure 3: Why is the figure not centered above Austria? The figure shows more Bavaria than Austria, but in Bavaria there are no TAWES stations.

AC: The Figure is replotted. The updated Figure shows the entire rapid INCA domain. Additionally, a difference plot (rINCA-Radar) is included.

RC: Figure 4: The "small black rectangle" indicating WegenerNet is invisible on my printout.

AC: Figure 4 is updated (zoom+general optimization of the image).

RC: Figure 5: Why are all precipitation amounts beyond 1 mm/5 min indicated in red? They are hardly distinguishable. (Corresponding question for Figures 3 and 4.)

AC: The colorscale as used in this paper has been widely used by the authors also on other occasions. The darkening of the red colors with increasing precipitation rate usually evokes a feeling of increased threat/awareness. As (rapid) INCA precipitation products are often used in civil protection and for other end users, such behaviour is

often desired.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 11605, 2014.