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Interactive comment on "Temporal and spatial scale and positional effects on rain erosivity derived from contiguous rain data" *by* F. K. Fischer et al.

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We appreciate the encouraging comments by the referee.

Regarding his suggestion to mention microwave links in the Introduction we added to the Discussion.

"...The same is true for using data of commercial microwave links, which recently have been identified as additional source for retrieving precipitation (Chwala et al., 2012; Overeem et al., 2013) and which will require the method effect to be adapted for this particular approach. The approach is based on analysing the signal attenuation that

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depends on rain intensity. These data are especially valuable in regions with sparse coverage by conventional measurement devices like, e.g., in parts of the African continent, but may also improve high resolution precipitation estimates and forecasts in hydrometeorological applications (Chwala et al., 2016)."

Regarding accuracy and potential errors at gauging stations we added to the new Chapter 2.1 Data sets:

"Precipitation measurements of the DWD station network were conducted with Pluvio Ott weighing rain gauges (OTT Hydromet GmbH, Kempten, Germany) with a collector area of 200 cm2, a measurement range of 0-1800 mm/h, and a 1-minute resolution of 0.1 mm/h. The precipitation data passed a quality control system testing for completeness, carrying out climatological tests, checking consistency over time as well as internal and spatial consistency (Spengler, 2002; Kaspar, 2013). The data were neither corrected for wind drift effects nor homogenized. A thorough overview of the precision of rain gauge measurements is given in Monesi et al (2009). Information on the stations' meta data can be found in the Climate Data Center (ftp://ftp-cdc.dwd.de/pub/CDC/observations_germany/climate/hourly/precipitation/historical/) of DWD."

We also expanded the description of the radar data by adding:

"The DWD radar network underwent several upgrades during the analysis period. In the beginning of the considered time period five single-polarization systems (DWSR-88C, AeroBase Group Inc., Manassas, USA) operated without Doppler filter the latter being added between 2001 and 2004. Between 2009 and today, DWD exchanged the network of C-band single-polarization systems of the next generation of type METEOR 360 AC (Gematronik, Neuss, Germany) and DWSR-2501 (Enterprise Electronics Corporation, Enterprise, USA) by modern dual-polarization C-band systems of type DWSR-5001C/SDP-CE (Enterprise Electronics Corporation), all equipped with Doppler filter. During the time of exchange, a portable interim radar system of type DWSR-

5001C was installed at some of sites. Radar data underwent an operational quality control system. They were adjusted to gauge data within a reprocessing suite applying a consistent software version (version 2017.002) and optimized quality control algorithms (Winterrath et al., 2017)."

Regarding the request to give an overview of the data we added at the beginning of chapter 2 a sup-chapter "2.1 Data sets" in which we describe the data and for which question we will use the data. We removed the respective information from the following chapters in order to avoid repetition and increase in manuscript length.

This rearrangement should also have made clearer now that the 16-yr data set and the 4-yr data set are independent data sets. The long-term data were taken from a long-term observation network while the 4-yr data of high spatial resolution (12 recording rain gauges within 1 km^2) stem from a research project that did not last longer. Globally, there are hardly any other rain gauge data of similar density available.

Regarding the description (and justification) of Thiessen polygons in Fig. 1, we now added: "A previous geostatistical analysis of the spatial pattern had shown that erosive rains recorded by the dense network followed near-linear trends between neighboring rain gauges (Fiener and Auerswald 2009; see also Fig. 1b for an example). From this follows that the spatial pattern can be retrieved best by linear interpolation between the rain gauge sites. The spatial average of a linear interpolation is mathematically identical to the well-known Thiessen polygons. We thus used Thiessen polygons for calculation of the spatial average because they are mathematically simpler as they lead to a constant weighting for the different stations irrespective of the recorded amount of rain. They also can easily be illustrated (Fig. 1c)."

A point-to-point reply can be found in the supplement.

Please also note the supplement to this comment:
https://www.hydrol-earth-syst-sci-discuss.net/hess-2018-305/hess-2018-305-AC2-

supplement.pdf

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