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Comparison of the achievable accuracy of CML based rain-retrieval algorithms based on min/max measurements vs. instantaneous measurements

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Many different algorithms and approaches for the retrieval of rain using CMLs measurements have been presented in the past. In general, these algorithms can be divided into two groups, based on the different type of the available measurements: A) algorithms that make use of the standard network management system 15-minute min/max measurements; B) algorithms that make use of instantaneous measurements (sampled at intervals of seconds to hours).

In this study we show that the maximum attenuation measurements hold more information regarding the rain than a set of instantaneous attenuation measurement sampled at same intervals. That is, a time series of maximum attenuation values per 15-minute intervals can potentially result in more accurate rain estimation than a time series of instantaneous attenuation measurements sampled at the same 15-minute intervals. We show this by presenting a mathematical proof for a general heuristic case, and then, by demonstrating our conjectures on real-world scenarios using actual CMLs.

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