

# **Path Averaged Rainfall as a Single Point: Unfulfilled Potential or a Good Enough Convention?**

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## **Abstract:**

Accurate retrieval of rain fields is of high importance, conventionally utilizing rain gauges. In the last decade, Commercial Microwave Links (CMLs) as opportunistic near-ground rain sensors have become an alternative, and retrieval of near-ground rain fields has already been successfully demonstrated in several countries. In spite of the path integration, most studies represent the rainfall measured by a CML as a single Virtual Rain Gauge (VRG) in the center of the CML path. Here, we compare the 2-D rain retrieval performances of Inverse Distance Weighting based spatial interpolation methods, where CMLs are represented either by one or multiple VRGs. An iterative algorithm, utilizing neighboring samples for assessing rain distribution along a CML, was also compared. A synthetic rain field was produced, simplified to a single rain cell, sampled by a synthetic CML network, built according to statistics of actual CMLs. The main finding of a Monte-Carlo simulation study is that if the size of a rain-cell is sufficiently larger than the average length of the CMLs, representing a CML by more than a single VRG, negligibly improves the mapping performance. However, if the rain-cell dimensions are of the order of the length of the CMLs, using several VRG with the iterative algorithm significantly improves retrieval performance.