Using textual measures of single-pol reflectivity as surrogates for polarimetric parameters in rainfall estimates

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Regions of stratiform precipitation are associated with weaker updrafts and downdrafts than those associated with convective precipitation. In accordance with mass continuity, changes in vertical motions must be accompanied by changes in the horizontal mass field. Thus, convective regions are characterized by greater horizontal gradients in observed microwave radiances in comparison to stratiform regions. This is the principle behind the "texture" method in discriminating convective and stratiform precipitation that is being used in standard passive microwave radiometer rain algorithms. In essence, there are relationships between the microphysical and the macrophysical, hence morphological, properties of precipitating clouds. Using a well established polarimetric retrieval method to train our texture-based algorithm on a quarter of the total available data, it is found that the textual measures derived from single-pol reflectivity field serve as very effective surrogates to the polarimetric parameters and our texture-based algorithm consistently out performs standard Z-R relationships in estimating rain rates.