

First evaluation of GPROF V7 and the neural network based GPROF-NN retrievals against gauge corrected radar measurements

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The Goddard Profiling Algorithm (GPROF) is the operational precipitation and hydrometeor retrieval for observations from the passive microwave observations of the constellation of the Global Precipitation Measurement (GPM) mission. Its most recent update, GPROF V7, constitutes the second major algorithm update of the GPM era. Simultaneously, two experimental neural network based retrievals have been developed: The GPROF-NN 1D retrieval, which is identical to GPROF but based on a fully-connected neural network, and the GPROF-NN 3D retrieval, which incorporates spatial information into the retrieval by means of a convolutional neural network.

This work presents a first evaluation of the new algorithms against independent validation data using ground radar measurements over the continental United States and the Kwajalein atoll. The focus of the evaluation is three-fold: To (1) characterize the evolution of the GPROF algorithm with respect to the currently operational GPROF V5 across different sensors of the GPM constellation, (2) investigate the extent to which upgrades were able to improve the representation of regional and seasonal precipitation characteristics across different climate zones, and (3) assess the effective resolution of the retrievals.

These results will provide a first overview over retrieval enhancements that users can expect from the GPROF V7 upgrade. In addition to this, they will provide an independent assessment of the potential improvements that can be achieved by upgrading GPROF to a neural network based retrieval algorithm.