Precipitation characteristics and sensitivities of TAPEER 2.0 product using the full GPM Level-2 constellation (imagers and sounders)

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The variety of passive microwave (PMW) radiometers (imagers and sounders) that compose the Global Precipitation Measurement (GPM) constellation enables a great opportunity to exploit and understand spatially and temporally the precipitation characteristics and its associated uncertainties. The Tropical Amount of Precipitation with an Estimate of ERrors (TAPEER) is now evolving to take full advantage of the GPM constellation of PMW imagers and sounders, and benefit from the latest evolution in the Level 2 products. The most recent algorithm implementation is based on the use of a larger amount of instantaneous rain rates retrievals based on the Goddard Profiling algorithm (GPROF) and the Precipitation Retrieval and Profiling Scheme (PRPS) algorithms. GPROF has been enhanced for GPM constellation and its actual version (GPROF2017) is applicable to different PMW radiometers, such as imagers (e.g., SSMI/S, GMI and AMSR-2) and sounders as well (i.e. MHS, NPP). In order to keep the full benefit of the Megha-Tropiques (MT) orbit over the tropics, GPROF PMW retrieval (which does not include SAPHIR) is complemented by PRPS retrieval on SAPHIR. As previously for TAPEER 1.5 algorithm, TAPEER 2.0 combines an estimation of the mean conditional rain rate and of the rainy fraction. TAPEER 2.0 allows to choose the constellation for calculating the daily rain fraction and to compute the conditional rain rate, independently. With this flexible approach, the use of sounders and imagers can thus be optimized according to the retrieval skills on each platform type. Sensitivity tests are currently carried out in order to finalize the choice of parameters in TAPEER 2.0. Our latest work on: evolving the error model for TAPEER and downscaling the rainfall product by combining mechanistic and stochastic approaches, and the expected benefit for hydrological applications will also be discussed.