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Building an EPS-SG Microwave Imager Retrieval Suite: Level-1 Proxy Data Record

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Following the success of MetOp, EUMETSAT Polar System Second Generation (EPS-SG) will provide satellite observations from polar orbit to support Numerical Weather Prediction and climate monitoring in the 2024 to mid-2040's timeframe. Designed to fly on board the EPS-SG satellite-B series and cover 19-183 GHz frequency range, Microwave Imager (MWI) is expected to deliver high-quality measurements of radiometric properties relevant to precipitation, clouds, near-surface ocean winds and snow/ice cover. With a goal to build an enterprise MWI retrieval in support to NOAA operational Environmental Data Records (EDRs) production, a development of new and adaptation of the existing microwave imager algorithm procedures are underway at University of Maryland. As part of this effort and to ensure timely delivery of day-1 retrievals, we simulate MWI level-1 data over prolonged periods of time (up to 12 months) using radiative transfer techniques. Two datasets will be presented. The first, oriented towards precipitation retrieval development, relies on Global Precipitation Measurement (GPM) Dual-frequency Precipitation Radar (DPR) observations to construct a state vector in radiative transfer calculations. The second dataset relies exclusively on ERA5 parameters. Two radiative transfer models have been considered in the production of simulated MWI brightness temperatures: a) Community Radiative Transfer Model (CRTM) and b) Edington model. Each model uses MWI observation geometry, following DPR and GCOM-W1 AMSR2 sampling, respectively. To deliver the product, CRTM has been updated by, for this purpose derived, MWI coefficients using an idealized Spectral Response Function at each of the 26 channels. When compared to the common channels of AMSR2 sensor, the simulations reflect exceptionally high accuracy. In addition to the methodology and proxy data sets, preliminary results for MWI precipitation EDR retrieval will be presented.