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The neural network algorithm for the retrieval of precipitation from AMSU sensors within the EU FLASH project and the instantaneous rain field propagation using the MW-IR Precipitation Evolving Technique (PET)

Francesco Di Paola, Daniele Casella, Stefano Dietrich, Marco Formenton, Alberto Mugnai, and Paolo Sanò
Istituto di Scienze dell'Atmosfera e del Clima (ISAC), Consiglio Nazionale delle Ricerche (CNR), Roma, Italy
(francesco.dipaola@artov.isac.cnr.it / Phone: +39 06 4993.4274)

Within the EU FLASH project, instantaneous precipitation maps are generated also from MW images taken by cross-track scanners on operational satellites in sun-synchronous orbits, for each satellite pass. Before undertaking retrieval, the AMSU-A data are regridded at AMSU-B/MHS resolution using bilinear interpolation. The retrieval algorithm is based on a neural network trained by a pre-computed cloud-radiation database built from meteorological situations simulated by a cloud resolving model followed by a radiative transfer model.
To fill the large temporal gaps between consecutive MW snapshots several combined microwave-infrared (MW-IR) algorithms have been proposed in the past. Their aim is the generation of High Resolution Precipitation Products (HRPP) using the IR measurements from geostationary satellites to enhance the spatial resolution and the temporal sampling of the intermittent rain fields estimated from passive MW sensors aboard low earth orbiting (LEO) satellites.
The Precipitation Evolving Technique (PET) produces a quasi real time HRPP. PET drives the evolution (shape and intensity) of the last available MW-estimated rain field using iterative and statistical multi-scale pattern recognition procedure computed over two consecutives IR images. This allows effectively recognizing homogeneous cloud structures and their movements in the system by combining together the displacements occurring at each spatial scale. Since such an approach is spatially limited by the extension of the last MW swath coverage and it does not solve extinction and/or generation of precipitating cloud structures, so ad hoc calibration procedure completes the algorithm.
In this paper, we show the results of the application of our latest version of PET to the analysis of some European severe storms.