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A new methodology for the retrieval of heavy precipitation from satellite-borne microwave radiometers: the Cloud Dynamic and Radiative DataBase approach

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Physically-based algorithms for the retrieval of precipitation from microwave observations provided by satellite-borne radiometers – like the Tropical Rainfall Measuring Mission (TRMM) Microwave Imager (TMI), the Special Sensor Microwave Imager (SSM/I) and the Advanced Microwave Scanning Radiometer (AMSR) – make use of Cloud Radiation Databases (CRD's) that are composed by thousands of detailed microphysical cloud profiles, obtained from cloud resolving model simulations, coupled with the corresponding microwave brightness temperatures (TB's) calculated by means of radiative transfer schemes.

Most retrieval algorithms use statistical treatments of the *a-priori* information provided by the CRD's in order to improve the retrieval performance. Nevertheless, it is evident that this goal can be truly reached only by improving the physical information that is contained in the databases.

In this paper, we discuss the potential of a new approach which is based on enlarging the CRD information by including dynamic variables (CDRD – Cloud Dynamic and Radiation Database) – thus, reducing the retrieval uncertainty by increasing the number of retrieval constraints for the algorithms. Besides, by using dynamic variables in addition to the standard CRD TB's, the new approach increases the performance of the

retrieval algorithms due to the high predictability of the dynamical-thermodynamical properties of precipitating systems.