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The participation of the ADMIRARI radiometer to the GPM/GV CHUVA Brazilian campaign, tropical precipitating warm clouds observations and early results

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With the launch of the Global Precipitation Mission core satellite expected for 2013, NASA is planning and pursuing an intense ground validation program with campaigns all over the world (Brazil 2010, Finland 2010, Oklahoma 2011, Canada winter campaign 2011-2012) focused on physical validation of microwave-based rainfall algorithms. The ADvanced MIcrowave RAdiometer for Rain Identification (ADMIRARI) exploits its multi-frequency (10.7-21.0-36.5 GHz) polarimetric (H and V channel) capabilities to partition simultaneously rain and cloud water, thereby addressing an open key issue for improving precipitation estimates. This potentiality has already been extensively demonstrated during the field campaigns COPS over Southern Germany and EUCAARI in the Netherlands.

During CHUVA (Cloud processes of tHe main precipitation systems in Brazil: A contribUtion to cloud resolVing modeling and to the GlobAl Precipitation Measurement) ADMIRARI measures together with numerous ancillary instruments co-located at Alcântara observatory in Northern Brazil (e.g. microwave radiometer profiler, polarimetric X-band radar, disdrometers, micro rain radar, lidar, etc.). These measurements are intended to study warm rain convective systems and to create and validate a 3-D cloud processes database for such precipitation regimes.

The operational ADMIRARI retrievals will contribute to the GPM effort in the following areas: 1) Identification of the microphysical cloud properties at the onset of precipitation in warm rain processes; 2) Improved understanding of bright band effects in radiative transfer models for microwave radiometry; 3) Characterization of the microphysical and electromagnetic/radiative properties of ice and mixed-phase precipitating clouds; 4) Partitioning of total liquid water content into cloud and precipitation (rain or snow) water equivalents for different climatological regimes including the validation of cloud resolving and weather forecast models to this respect.

Until now, climatological rain/cloud partitioning statistics represent the major outcome of ADMIRARI measurements and will be presented for different climatological regimes. Moreover, ADMIRARI measurements from the CHUVA campaign and preliminary results regarding the observed cloud/rain partition will be shown, and a first assessment on the retrieval performance for an atmospheric regime not yet observed by ADMIRARI. We hope that these first results will lead to feedback from the GPM international community in order to improve and rearrange the observational strategies in future GPM/GV field campaign where ADMIRARI is scheduled to take part.