Geophysical Research Abstracts
Vol. 12, EGU2010-9824, 2010
EGU General Assembly 2010

Regional performance of quantitative precipitation estimates from satellite observations

Chris Kidd (1), Beth Ebert (2), John Janowiak (3), and Daniel Vila (4)

(1) University of Birmingham, School of Geography, Earth and Environmental Sciences, Birmingham, United Kingdom (C.Kidd@bham.ac.uk, +44 121 414 5528), (2) Centre for Australian Weather and Climate Research (CAWCR), Bureau of Meteorology, Melbourne, Australia (e.ebert@bom.gov.au), (3) ESSIC/Cooperative Institute for Climate and Satellites, University of Maryland, College Park, MD (johnj@essic.umd.edu), (4) ESSIC/Cooperative Institute for Climate and Satellites, University of Maryland, College Park, MD (dvila@essic.umd.edu)

The estimation of rainfall has been a major focus for research and operational activities at both regional and global scales. The retrieval of precipitation (rainfall and snowfall) has exploited a large number of Earth Observation missions with a range of sensors spanning the visible, infrared and microwave regions of the spectrum. Methodologies have included empirical and physical techniques, utilising data from single and multi-sensor observations. These have not only improved our understanding of the precipitation processes within the atmosphere, but also the occurrence, distribution and accumulation of precipitation across the globe.

The retrieval of precipitation from satellite observations over the tropical regions has undergone significant development due to the advanced observational capabilities provided by the Tropical Rainfall Measuring Mission suite of sensors. However, retrievals of precipitation at mid and high latitudes are more problematic: cloud-rainfall relationships that form the basis of visible/infrared techniques are poor, while passive microwave retrievals are hindered by snow and shallow precipitation. Some advances in retrieval techniques are being facilitated through the use of satellite radar measurements (i.e. CLOUDSAT), although these are of limited coverage, both spatially and temporally. Furthermore the sensitivity to low-level and light precipitation remains a major problem: low intensity precipitation contributes an increasingly large amount at these latitudes with significant underestimation by both passive and active microwave retrievals.

This paper provides an overview of the progress in global satellite precipitation estimation to date. The results of the International Precipitation Working Group will be highlighted from a number of regional validation sites used for the evaluation of daily 0.25x0.25 degree precipitation products. Results generally show that the satellite estimates perform best during the warm season, but perform less well in the cold season. These results are, in part, due to the precipitation processes and the inability of techniques to usefully retrieve data over cold surface background. Regional variations in performance are also noticeable: these may be attributable to the sensitivity of individual techniques to light-intensity precipitation.