Satellite Rainfall Validation Activities over South America

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Abstract

This research will describe the validation efforts of different groups to evaluate the performance of different satellite rainfall algorithms over South America and its possible application for hydrological modeling. The first part of this presentation is focused on the performance of daily estimates for different algorithms using high spatial resolution raingauge networks and characterizes the error considering different climatic regions and seasons on the region south of 20○ S. Different kind of algorithms were tested from IR-based techniques (Hydroestimator) to blended models (using microwave & infrared channels and also gauge adjustments). Preliminary results show that the inclusion of surface observations, as in the case of CoSch and 3B42 (v6 and v7), improves the performance of the algorithms over the studied regions and show an error dependence with seasons and event types (lower skill associated with not-convective precipitation events).

In such framework, the use of a multidimensional satellite rainfall error models are very important to evaluate the impact of these errors on the sensitivity of the stream flow data estimates trough hydrological models. In the second part of this presentation, a multidimensional stochastic error model named SREM2D (A Two-Dimensional Satellite Rainfall Error) will be applied to create rainfall ensembles to be used as input data to the Model of Large Basin of the National Institute for Space Research (INPE-MGB) developed to Brazilian basins. Preliminary results on the implementation of SREM2D will be presented.
A third avenue of the validation activities in South America is related with the impact of deforestation on precipitation behavior in the Legal Amazon. Several precipitation products, based on raingauge interpolated data (CPC) and satellite rainfall estimations (3B42_V6, CMOPRH and GPCP_1DD), were compared during the period from 1998 to 2009. the analysis focuses on four areas (2.5○ latitude x 2.5○ longitude) presenting a combination of forest cover and regions with a high deforestation rate. The daily totals were organized from the weakest to the most intense events, separated into 10 frequency classes (each 10%) by year and season and over each study area and their trends were calculated using the Mann-Kendall test and Sen's method. Despite clear signs of variability over the years of the study, the greatest contrasts in trends in accumulated precipitation were found over the eastern part of the Legal Amazon, greatly affected by deforestation.

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