Evaluation of the TRMM multi-satellite precipitation analysis (TMPA) and its utility in hydrologic prediction in La Plata basin

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Reliable hydrologic prediction depends on the availability of accurate precipitation inputs. One of the limiting factors in hydrologic predictions in La Plata basin is the lack of a high spatial density gauge network over portions of the basin. La Plata River has three large tributaries (the Paraná, Paraguay and Uruguay), and drains parts of five South American countries. Accurate estimates of future flow as it might be affected by land cover and climate change are critical to water resources, energy production, agriculture, and transportation of the region. The scarce and uneven distribution of rain gauge stations hampers the effective use of hydrology models in support of reliable flood and drought diagnosis and prediction over the basin. The TRMM Multi-satellite Precipitation Analysis (TMPA) at 3-hourly time-step and $0.25° \times 0.25°$ spatial resolution could be useful as an alternative (or supplement to) gage-based products for hydrologic prediction in La Plata basin. We therefore performed a two-year evaluation of the new TMPA research product V.6 3B42 in comparison with available rain gauge measurements in La Plata basin; assessed the effectiveness of the TMPA 3B42 estimates in hydrological modeling by forcing the Variable Infiltration Capicaty (VIC) hydrology model with both gauged and remotely sensed rainfall data. This initial hydrologic effectiveness assessment of TMPA products for La Plata Basin provides useful insights into the potential utility of the planned Global Precipitation Measurement (GPM) mission, and is a first step in development of an empirical framework for future implementation of satellite-based precipitation observations in other river basins where in situ data are sparse.