Validation of satellite and model estimates of precipitation: results from the International Precipitation Working Group

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The measurement of precipitation on a global scale is only truly possible from satellite instrumentation. Measurements of rainfall and snowfall are conventionally made by gauges or radars, but even over the land masses there are still large areas where such measurements are sparse or non-existent: over the oceans few measurements exist. Satellite measurements use a range of instruments which observe the Earth's atmosphere. These include visible and/or infrared systems that measurement reflected or emitted radiation from the tops of clouds (whether precipitating or not) and passive microwave instruments that measure upwelling radiation from the Earth's surface the atmosphere. Many techniques have been devised to utilise these measurements and subsequently derive precipitation estimates. In addition to satellite estimates, numerical models routinely produce precipitation estimates from their calculations. Both the satellite and model estimates of precipitation require validation.

As part of the International Precipitation Working Group, a number of intercomparison sites have been established to evaluate the performance of the numerous precipitation estimates now available. The sites currently include the United States of America, Australia and Europe. This paper outlines the range of precipitation estimates used in the intercomparison, the methodology and the on-going generation of results, with the regional and seasonal performance of the products examined. Finally, future directions in the intercomparisons are presented, such as the Pilot Evaluation of High Resolution Precipitation Products (PEHRPP) project.