

A Comparison of AIRS/AQUA Total Precipitable Water and Radiosonde observations

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Water is an indispensable element for life on planet Earth and is one of the most important meteorological variables. This study aims to validate values of total precipitable water (TPW) for several cities located in South America in order to determine the satellites retrieval accuracy and explore their information applicability. In this study, we use values of precipitable water from radiosonde (00 and 12 UTC) and from AIRS/AQUA retrieval (05 and 17 UTC). The satellite precipitable water is based on IMAPP retrieval scheme, and the period used for the analysis was six months from January to June 2009. During this period, 1505 coincident pairs of radiosonde observations and AIRS retrievals were used in the analysis. Preliminary results show that the diurnal cycle of precipitable water change abruptly when occurred convective activity. This is clearly notice when 17 UTC satellite retrievals show wetter conditions, in which TPW is double when compared to radiosonde at 12 UTC. This occurred mainly over summer when there is a humidity convergence during afternoon that is responsible to trigger the convection. Effect of moisture convergence has been studying in order to better understand the satellite retrieval and evaluated the retrieval scheme performance. For autumn and winter, the difference between radiosonde and AIRS/AQUA change slightly. The statistical analysis shows that the correlation coefficient between radiosonde and AIRS/AQUA retrieval is around 0.74, average bias of -6.69 mm and the mean square error of 12.91 mm. Other comparative studies of total precipitable water are being conducted involving other sensor and retrieval schemes (MODIS/TERRA , ATOVS/NOAA) and data from ground based Global Positioning System and Microwave Radiometers.

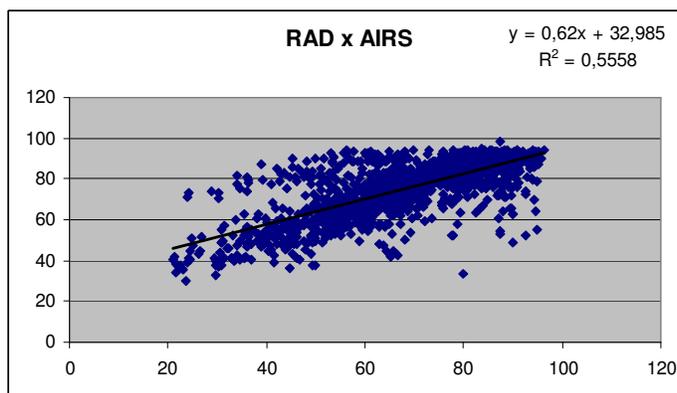


Figure1- Scatter plot of total precipitable water from AIRS and Radiosonde.