Impact Analysis of Assimilation of Integrated Water Vapor Estimates from AIRS/AMSU over Amazonian Region

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The Amazonian region is one of the most humid of the planet [Integrated Water Vapor (IWV) median values are in the order of 50 kg m-2] and it is also characterized by large space-time variability in the humidity fields. The cause of this large variability is the intense convective activity associated with the great humidity potential generated by high temperatures. Consequently, in the Numerical Weather Prediction the usage of initial conditions with errors in characterizing humidity over Amazonian region can generate erroneous precipitation forecast in the some areas over South American continent. In this aspect, there are two important points. The first point is the most realistic atmospheric state depends significantly on available data, and the second one is the low density of conventional information in the Amazonian region. Data from Atmospheric InfraRed Sounder/Advanced Microwave Sounding Unit (AIRS/AMSU) incorporate the most recent inversion procedure, which are able to produce IWV values of good quality over continental areas. Nowadays, this sensor is one of the most important sources of humidity over Amazonian region. Within this context, the present study investigates the impact on humidity forecast over Amazonian region with the inclusion of IWV estimate from AIRS/AMSU in the CPTEC data assimilation system: Physical-space Statistical Analysis System (PSAS). Two different cyclic processes using Atmospheric Global Circulation Model CPTEC/COLA were carried. In the first cyclic process all available data were assimilated, such as geopotential height from temperature profiles measured by NOAA/ATOVS [Advanced TIROS Vertical Operational Sounder]; derived surface winds from Quik Scatterometer; Cloud Track Wind from geostationary satellites; conventional data (SYNOP, BUOY SHIP, radiosonde, aircraft, pilot balloons); and IWV values over ocean region from the SSMI/DMSP (Defense Meteorological Satellite Program). In the other cyclic process the same data set was assimilated with the IWV values from AIRS/AMSU. The results obtained applying factor separation show that the inclusion of IWV-AIRS values present a significant impact in the IWV values from initial conditions over Amazonian region, the which is also observed in the short-range predictions of humidity. Some studies are being carried out using rainfall data from TRMM Passive Microwave Sensor to evaluate this impact on precipitation forecast.