Advanced TOVS (ATOVS) Cloud Products
Using HIRS/3 and AMSU-A Measurements

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The National Oceanic and Atmospheric Administration (NOAA), National Environmental Satellite Data and Information Service (NESDIS) currently produces a suite of operational quality cloud products from the Advanced TIROS Operational Vertical Sounder (ATOVS) system using the High-resolution Infrared Radiometer Sounder (HIRS/3) and Advanced-Microwave Sounding Unit (AMSU-A) instruments onboard the NOAA polar orbiting satellites. These global products include Cloud Top Temperature, Cloud Top Pressure and Cloud Amount, in support of NESDIS commitment to improve Short Term Warnings and Forecasts. The ATOVS cloud products are dependent upon the generation of accurate temperature and moisture retrievals for both the generation of a correction for the attenuation of radiances above the cloud tops as well as the determination of cloud top pressure.

The ATOVS cloud products are generated using the CO₂ Slicing technique, at each HIRS/3 Field-of-View (FOV). These products are also output to 1 X 1 degree gridded fields, for ascending and descending orbital passes and separated into Total, High, Medium and Low pressure layers, where the parameters are calculated as a function of the Effective Cloud Fraction. The ATOVS cloud products, at the sounding location are being archived and distributed via AWIPS, to NWS field forecast offices. Two cloud product statistical tables are generated globally and updated daily on the NESDIS web site, for comparison with other cloud product systems as well as assessing the performance of the ATOVS cloud product system.

The ATOVS cloud products have been undergoing extensive evaluation by NESDIS and National Weather Service (NWS) personnel for possible use in regional and global Numerical Weather Prediction (NWP) forecasts. Comparisons of the ATOVS Cloud products with several other cloud product generation systems such as the ATOVS temperature retrieval Cloud Mask; the AVHRR/3 based CLAVR-x and UK Meteorological Office’s Clear Fraction; GOES and the USAF RTNEPH, have resulted in substantial improvement in the coverage of retrieved marine stratus plus providing for an independent quantitative verification of the ATOVS cloud parameter values. This paper describes the algorithms for deriving these cloud products as well as the scientific and system upgrades which have resulted in significant increases in both cloud product accuracy and coverage.