Why is the Total Precipitable Water (TPW) product important?

The TPW product is useful for following rapidly evolving events (i.e., convective) since it is available at high time resolution. Monitoring moisture gradients and time trends in clear sky regions.

How is the TPW product made?

Radiance values from GOES-16 ABI bands 8-16 provide temperature and moisture data. GFS used as first guess due to limited vertical resolution from ABI IR measurements. Regression provides relationship between observations and GFS first guess.

Applications:
- Convective events
- Flood events
- Atmospheric Rivers
- Mesoscale analysis:
  - Surface boundaries / frontal zones
  - Areas of enhanced moisture
- Verify model moisture fields
- Identify moisture gradients between RAOB sites, use in conjunction with RAOB data

Impact on Operations

Missing data in cloudy regions: Retrievals are only made in clear sky conditions. Cloudy regions will have missing data.

Limitations

Generally speaking, this product is better for short fuse / mesoscale events while TPW products that make use of polar orbiting satellites are better for long fuse / synoptic scale events.

Contributors: Dan Bikos and Ed Szoke, CIRA, Fort Collins, CO

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Since the TPW product cannot make retrievals through clouds we end up with imagery that appears in the upper right panel above (missing values over clouds). An alternative display is to combine TPW with either the visible band during daytime (upper left) or the Cloud Top Height baseline product (lower left) anytime. These image combinations provide information on where clouds are so you’re not looking at missing data TPW values. Experiment with the alpha values to bias the TPW imagery with the combined images for optimal display. A linear color table is applied to the cloud top height product and then adjusted towards brighter gray and white colors to make low clouds appear brighter than the default color table.