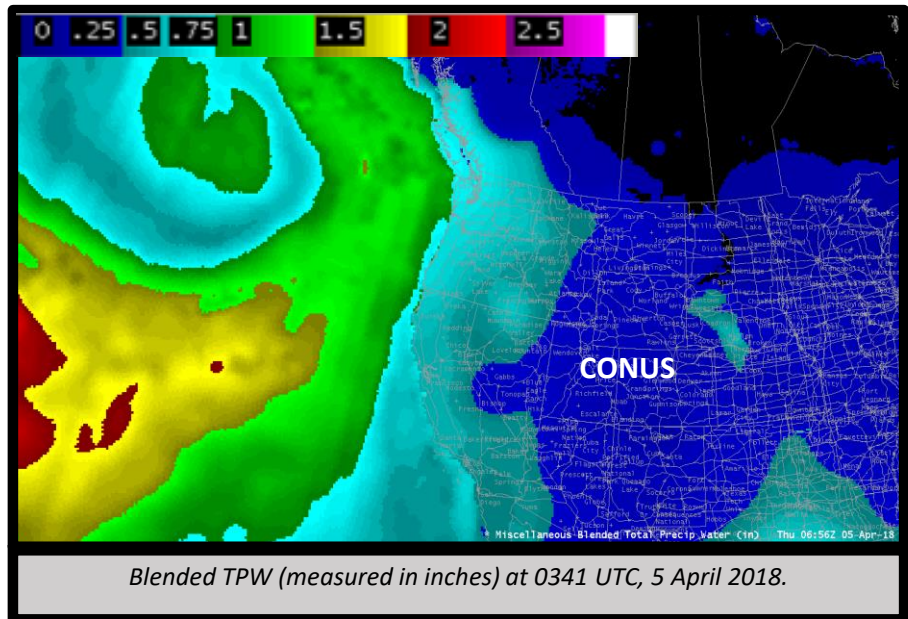


Why is the Blended Total Precipitable Water (TPW) Important?

Total precipitable water represents the liquid water equivalent if all the water vapor within a column of the atmosphere were condensed. The Blended TPW product is derived from microwave data sources over water and Global Positioning System (GPS) and geostationary data sources over land. It is important in identifying areas of high moisture that can lead to heavy precipitation and flooding events, such as those associated with atmospheric rivers.



What are the data sources and resolutions of Blended TPW?

Data Sources for TPW Over Land and Water	Data Range and Resolutions
<ul style="list-style-type: none"> • TPW from the NOAA Microwave Integrated Retrieval System (MiRS) from polar and low earth orbiting satellites • Surface-based Global Positioning System (GPS) TPW • GOES-15 TPW; GOES-16 / 17 to be added in the future 	<ul style="list-style-type: none"> • Range: 0-3 inches • Spatial resolution: 16 km • Temporal resolution: 1 h • Near-global coverage (71°N to 71°S)

Impact on Operations

Primary Application

Atmospheric Rivers:

Identify rich moisture plumes and monitor for potential heavy precipitation and flooding events.



Severe Weather Applications: Can identify the magnitude of moisture gradients (plumes) for severe weather forecasting.

Fire Weather: Assess areas that have low amounts of Blended TPW to assist with determining regions that have increased risk of fire weather potential.

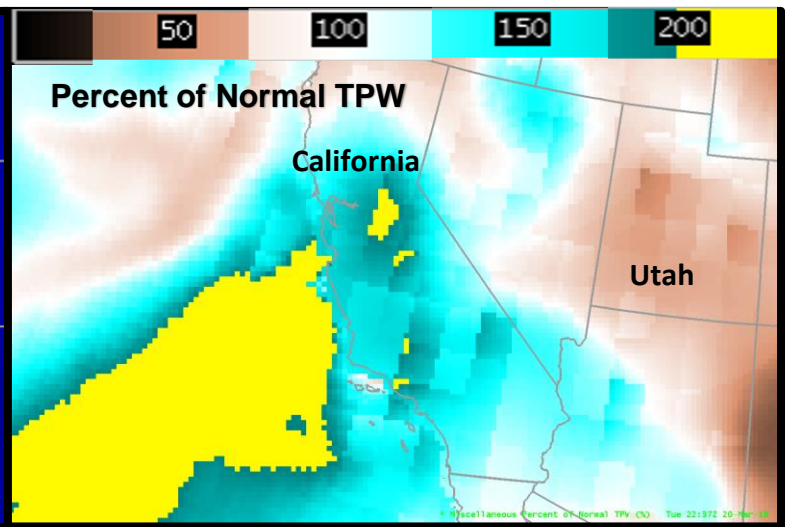
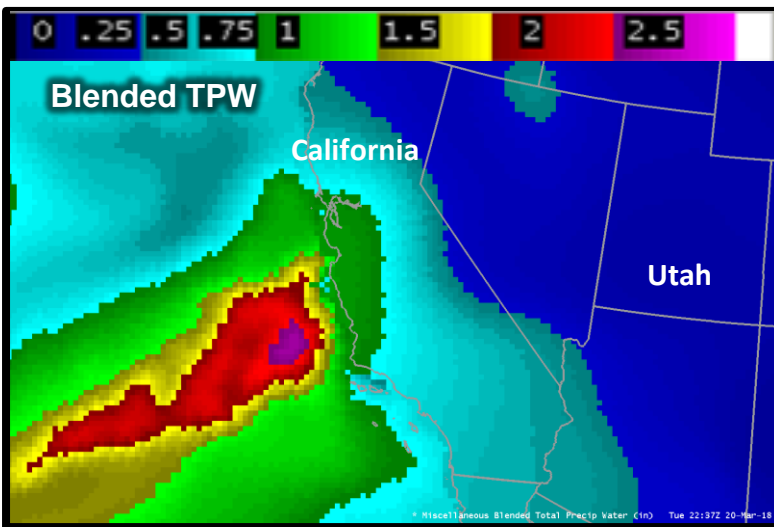
Limitations

Where are we in the atmosphere?: Product only determines 'total' TPW throughout the atmosphere and does not differentiate how much TPW exists in certain layers within the atmosphere (e.g. sfc-850).

Winds: Blended TPW is a non-advected product. Model winds are not currently utilized to advect the moisture.

Precipitation: Microwave retrievals are sensed in clear-sky and cloudy conditions. Retrievals are not performed within regions of precipitation.

Data sampling: Due to several satellite data sources within the algorithm, the time-stamp for each image does not represent the time that 'all' data are sampled. Polar and low-earth microwave data are updated irregularly due to differing orbits. Land GPS data is updated once every hour.



Atmospheric River Event: Blended TPW and Percent of Normal TPW

Blended TPW shows the moisture plume at 2237 UTC, 20 March 2018. Areas that exhibit high TPW values (yellow, red, purple), are predominately off the west coast of California. Note the lower TPW values (navy blue and aqua) east of California. All values are expressed in inches.

The corresponding **Percent of Normal TPW** is based on 1988-1999 NASA NVAP climatology. It is utilized to highlight the significance of atmospheric moisture in the region, expressing near-climatological normal (white), above normal (aqua, yellow) and below normal (brown) TPW values. The majority of California was above normal at the time, and experienced extensive flooding from the event.

Resources

CIRA/VISIT Training Session
[Blended TPW Product](#)

CIRA/VISIT Quick Brief
[GOES-16 TPW](#)

Hyperlinks not available when viewing material in AIR Tool

Comparison to GOES-16 TPW: Comparison of Blended TPW and GOES-16 TPW at 1834 UTC, 27 February 2018 shows how the products are complementary and can be used to identify an elongated moisture plume along southeast Texas. GOES-16 TPW has better temporal and spatial resolution (10 km), but can only be utilized in clear-sky environments. Blended TPW is available in both clear-sky and cloudy conditions, but is less frequent.

