Talking points for Advected Layer Precipitable Water Product training

1. Title
2. Learning Objectives
3. Other products
4. Other products
5. LPW product
6. ALPW product
7. Clock diagram – highlights irregular times of polar orbiting satellite passes
8. Strengths
9. Limitations. Use the product quantitatively, however it's not intended as a replacement for Blended TPW. The ALPW complements and supplements TPW.
10. ALPW domain as of October 2017
11. Comparison of LPW product with Advected LPW product to illustrate improved resolution. There are also fewer data regions in the ALPW since the newer algorithm has more options to fill in precipitating regions with data. This 4 panel layout will be used throughout the training session and it's recommended to come up with a procedure on your AWIPS.
12. The legacy color table is shown on the left, the main limitation of this color table is that it includes colors up to 3", however observed values do not go above about 1.5" therefore any colors from that value upwards will never get used. On the right is the default color table referred to as CIRA LPW, it saturates at the observed limit of about 1.5" and uses a wider range of colors. Feel free to experiment with the color table based on your area and season.
13. 22 January 2017 event
14. ALPW loop of 20 February 2017 AR event
15. 24 November products. First point out Blended TPW and MIMIC TPW products, then compare with the ALPW product. The ALPW product gives the 3D perspective of the moisture that you cannot get from a TPW product.
16. Onset of southwest monsoon in early July. At the start of the loop, abundant mid- and upper level moisture is present over northwest Mexico, but does not exist in the southwest US. As we progress forward in the loop, this mid- and upper-level moisture in Mexico can be seen advecting into the southwest US, signaling the onset of the southwest monsoon as conditions had been extremely hot and dry prior to this time period. Note that the sfc-850 layer does not capture this trend, and even the 850-700 mb layer captures it to an extent until higher elevations in the Rockies distort the signal.
17. ALPW loop for a flood event on the Utah / Arizona border. A plume of moisture at mid- and upper-levels is seen approaching from the south as it moves over Hildale, Utah and contributes to a flood event there. This signal does not show up in the sfc-850 mb layer due to the region of interest being at higher elevation.
18. Sometimes moisture can come from very different directions at different levels in the vertical from a long distance away to contribute to a flood event. This was a flood event for northern Missouri and vicinity. Low-level moisture can be seen moving northward from the Gulf of Mexico towards northern Missouri area on the sfc-850 mb layer. Similar story with the 850-700 mb layer with moisture advecting in from the south and southwest. However, in the 700-500

and 500-300 mb layers we can clearly see a plume of moisture coming from the west with origins associated with a remnant tropical cyclone in the Pacific as well as monsoonal flow from Mexico. These type of evens where moisture plumes become juxtaposed can lead to excessive rainfall events since the moisture is deep, contributing to high precipitation efficiency.

19. AHPS observed precipitation for the event from the previous slide. A large region in northern Missouri received more than 6 inches of rain.
20. This ALPW shows Hurricane Harvey from its development stages in the Gulf of Mexico through the devastating flood event for the Houston region. The PW values for this event were on the high end of what has been observed with sfc-850 mb layer PW values up to 1.3" and 300-500 mb layer PW values up to 0.5". Note that the missing data where precip is flagged near the tropical cyclone do not line up in the vertical. This is because the trajectories have different winds at different levels (typically stronger at higher levels). Since the trajectories may be different at different levels, different satellite data may be included.
21. Remember to use the ALPW product for synoptic and mesoscale scale analyses just as you would water vapor imagery. Troughs, ridges, and shortwaves will be reflected in the ALPW imagery and can provide useful information on where in the vertical these features reside. In this example, a relatively small scale shortwave approaches the San Francisco Bay area. It is readily apparent in the 700-500 mb layer, but not really observed in the other layers. This indicates where in the vertical the shortwave exists. There were mini supercells in the Bay area associated with this shortwave.
22. This ALPW loop covers the blizzard that affected the northeast on 13-15 March 2017. We can see the system in the Midwest moving southeastward, contributing towards cyclogenesis along the eastern Seaboard. The circulation of the sfc low can easily be seen in the sfc-850 mb layer, as it develops the circulation becomes more apparent at higher layers in the vertical, even in the 500-300 mb layer once the system matures. In wintertime storms, troughs, shortwaves and cyclogenesis can be tracked along with the various moisture plumes in the vertical. As you gain experience with this product, you will gain a better understanding of typical magnitudes and areal coverage of moisture at different layers so when an anomalously extreme event comes along, you will recognize it right away.
23. Conclusions
24. Where to view the product