

Memorial Day 2021 Flash Flood

The holiday weekend over the Midland/Odessa area was fairly active with numerous severe thunderstorms near the NWS Midland population centers, but a majority of the higher impact storms remained away from the city limits. On the morning of May 31st, 2021, an outflow boundary stemming from a cluster of thunderstorms that occurred the previous day over Southern Lea County in New Mexico to Andrews County, slipped southward toward the I-20 corridor, bisecting the Midland/Odessa area around 930 AM CDT. To the north, a cold front over Southwest Oklahoma continued to slide south into what would be a favorable environment for rapidly developing thunderstorms along and just ahead of the front. In addition to the potential for severe weather, there was some concern for areas of localized flooding/flash flooding due to the very moist environment out ahead of the cold front¹. In fact, the precipitable water value (measure of moisture in the atmosphere above) from the morning KMAF weather balloon sounding was above the 90th percentile looking back at climatological data for the time period (One of the highest values recorded for that time frame; See Figure 1).

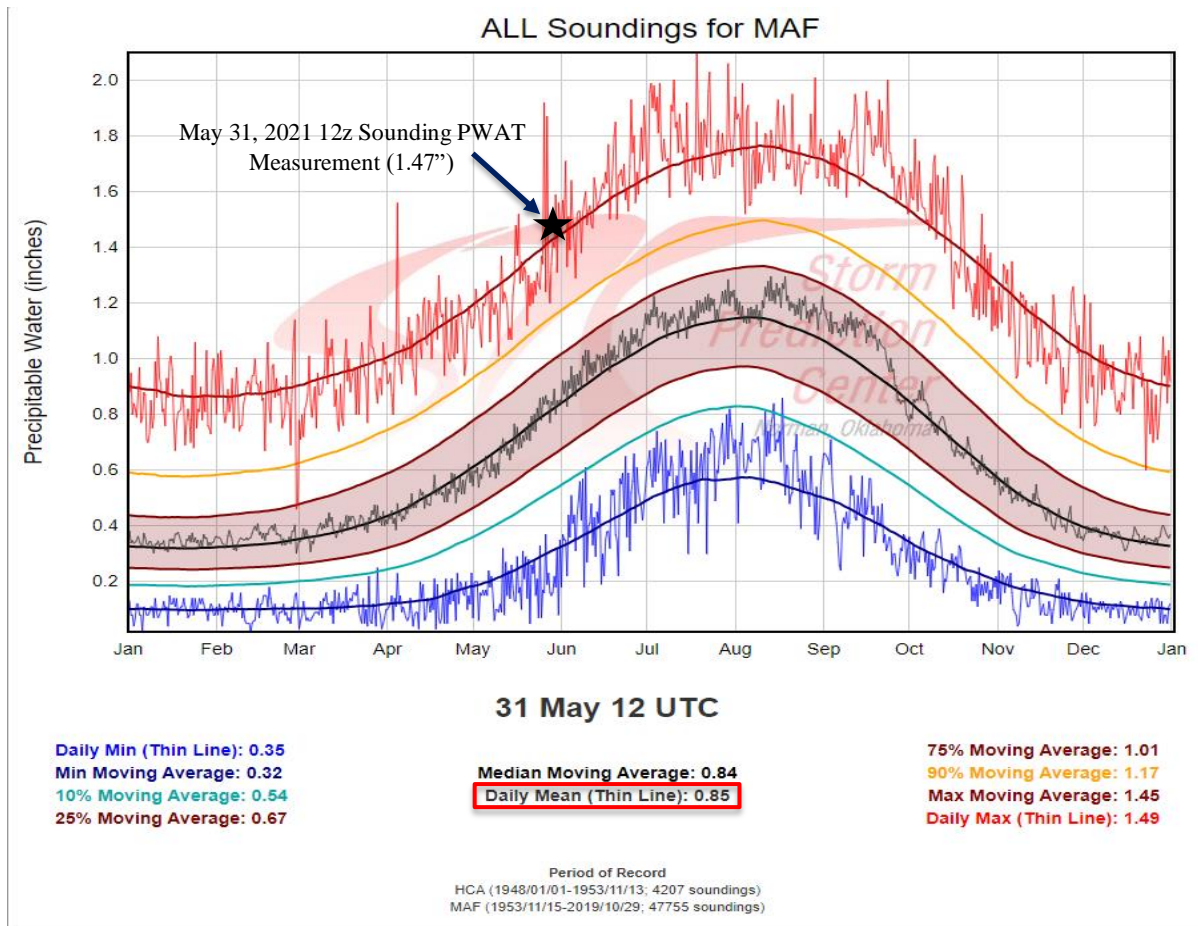


Figure 1: NWS Midland/Odessa forecast sounding climatology for all precipitable water values (PWAT) measured for all observed weather balloon soundings. **Black star** indicates the observed sounding for 5-31-21 12z. The location is within 0.02” of the observed record for the date, which is well-above normal for the day (Average in **red box**)

¹ Mesoscale Precipitation Discussion issued by the Weather Prediction Center on the morning of May 31st: https://www.wpc.ncep.noaa.gov/metwatch/metwatch_mpd_multi.php?md=0255&yr=2021

By 1030 AM CDT, showers and thunderstorms were already developing along I-20 with rapid growth, including a few severe thunderstorms that would drop quarter sized hail on the east side of Odessa. Very heavy rainfall was reported by local gauges and observing stations within the span of 15-20 minutes. A lot of this development was due to the convergence of the two boundaries mentioned above; the outflow boundary that was stationary over I-20 and the cold front. The rapid development of thunderstorms coupled with the perfect environment in place for very heavy rainfall resulting in the potential for flash flooding issues within a more urbanized corridor (areas with lots of concrete structures where runoff is more likely to occur). As such, by 11 AM CDT, the entire stretch from West Odessa to Central Midland was being inundated with copious amounts of rainfall, and would shortly lead to numerous areas flash flooding across the area.

Initial reports received included rapid flooding of some of the busier roads/streets and intersections in the city of Odessa due to the prolific rainfall that was occurring. Radar estimates of two to four inches of rain per hour were actually a common occurrence over a large chunk of Odessa as the strongest thunderstorm slowly moved between the section from US 385 on the north side of town down to the I-20 corridor, and over to the southeast limits of Odessa (Figure 2). This is where some of the worst areas of flooding occurred with areas like Dixie Blvd, 42nd Ave, and

encompassing areas becoming submerged under at least a foot of water. Pictures provided via social media platforms shed even more light on the localized impact with some of the side street areas off the main thoroughfares indicating water creeping up to the front of resident door steps and cars/trucks stranded in very high water (Figures 3&4). In addition, the Odessa Fire Department

reported that approximately 27 high water rescues occurred during this evening. The heavy rain was impacting portions of Midland as well with the areas on the west side of town receiving up to two inches of rainfall in 30 minutes (between 11 AM and Noon CDT), creating some significant flash flooding issues (Figure 5). By 1230-1 PM CDT, the heaviest rainfall moved

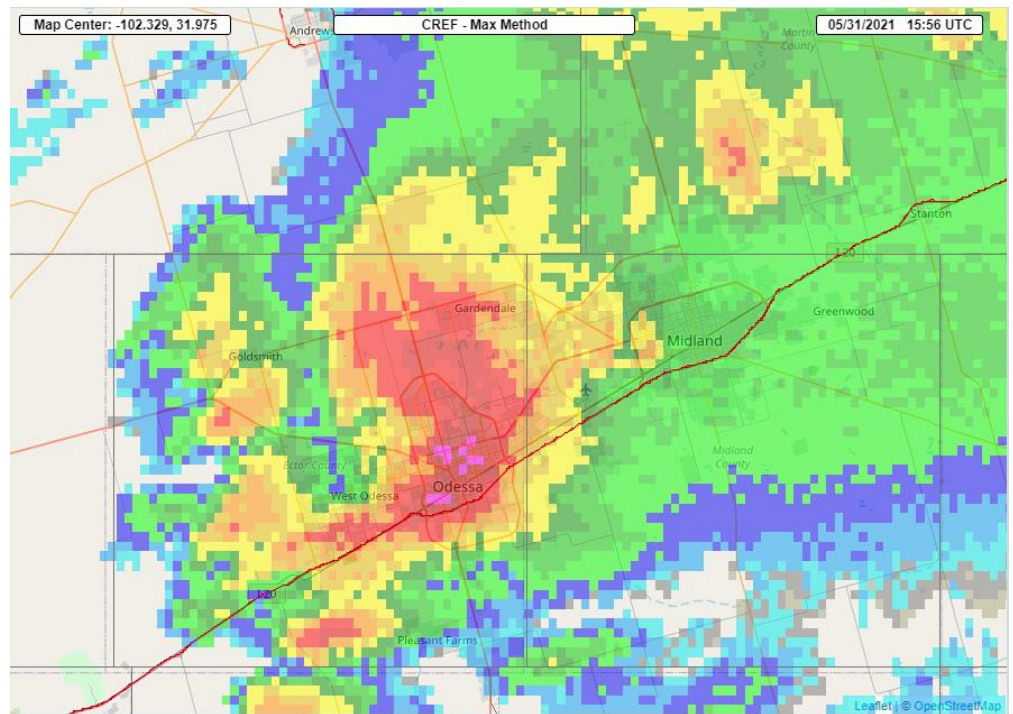


Figure 2: Radar image of 10:56 AM CDT for the Midland/Odessa area on 5-31-21. Odessa at this hour was experiencing very heavy rainfall rates with localized flooding reported by the public and local Emergency Managers.

farther to the south and east, away from the urban corridors, into the southern half of the Permian Basin.



Figures 3&4: Pictures of flooding in two areas of Odessa.

Right Photo: A dumpster floating in the middle of the intersection of 8th St and Muskingum

Photo Credit: Jessica Florence

Left Photo: Flooding up to the sides of parked vehicles on Walnut St.

Photo Credit: Kristi Wilson

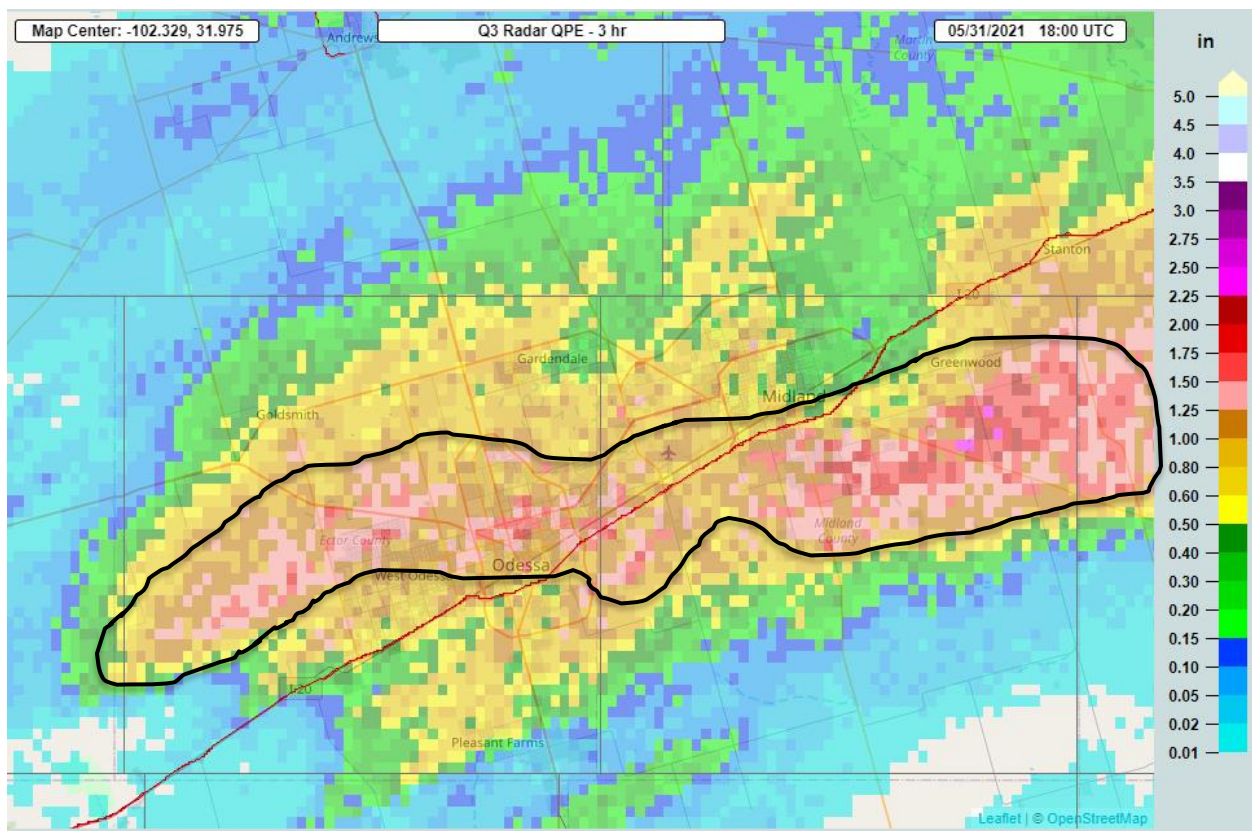


Figure 5: Total estimated precipitation for 5-31-21 by 18z (1 PM CDT). The area outlined in **black** is the documented area of heaviest rainfall. The **dark orange** and **pinkish-red** shadings are between 1-3” of rainfall.

This setup was a perfect example of how the Midland/Odessa area can see some of its worst flooding events with numerous thunderstorms moving over the region in a moisture rich environment. This event ended up lasting just long enough to create a major flooding concern for the area, however if it had lasted one to two hours longer, it would have been considerably worse. We appreciate all the pictures, videos, and information we received from the public, first responders, and Emergency Managers during the event. Another very active day within a very active three-week period of weather for West Texas and Southeast New Mexico.