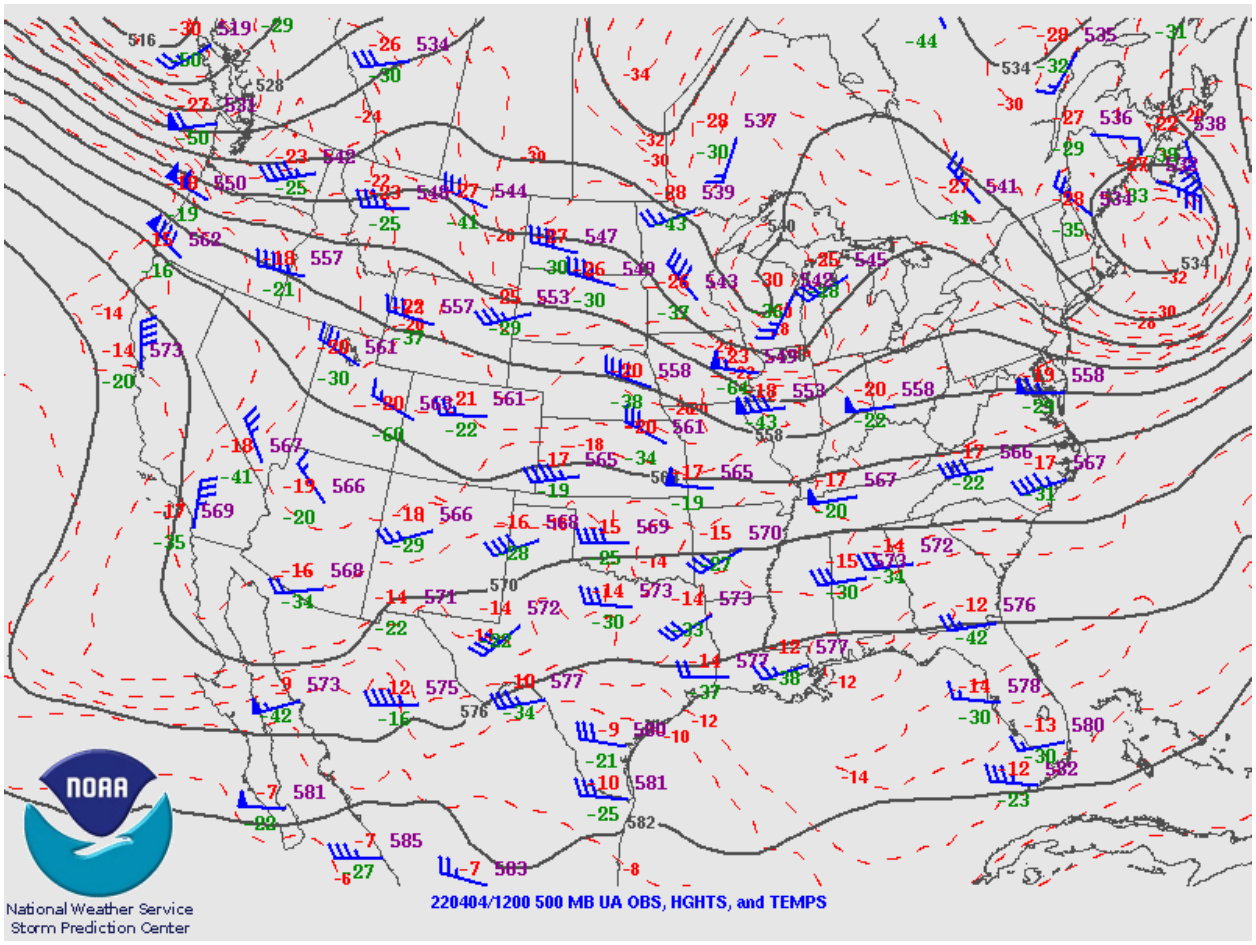
April 04, 2022 Hail Storm

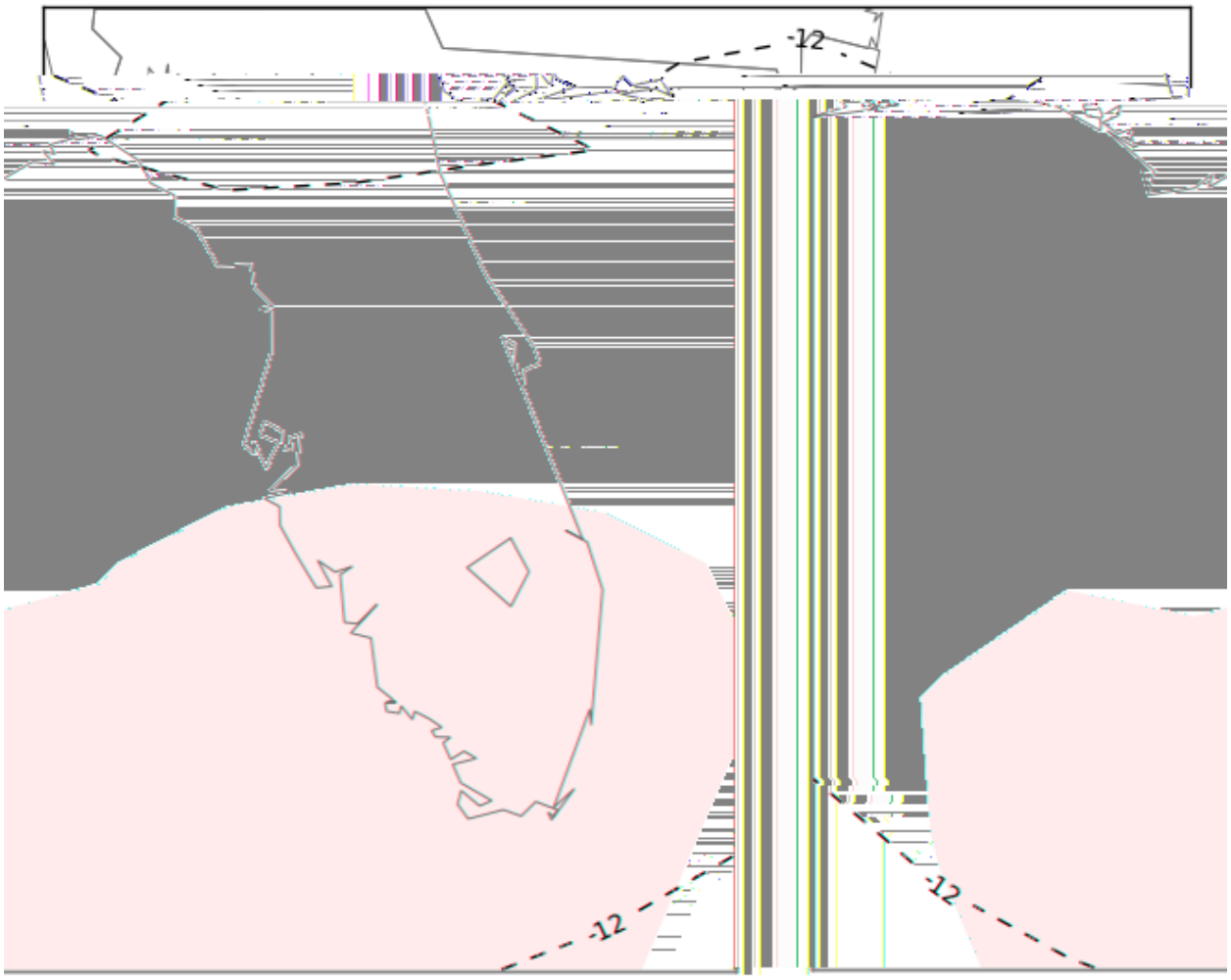
On April 04, 2022, a significant hail event occurred in Highlands County, Florida in association with afternoon thunderstorms that developed across the Florida peninsula. Take a look at the events that unfolded, and what caused the occurrence of such a storm.

At 12Z on the 4th of April, the atmosphere did not have a particularly impressive look to it. At 500 mb, the flow was light and zonal in nature, suggesting no organized weather systems were present in the vicinity of the Florida peninsula and there wouldn't be much support for long-lived, organized convection. While some subtle hints of a shortwave trough axis were present to the west, what is most notable in the 500mb analysis is the temperature; -13°C to -14°C.

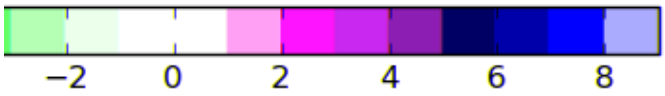


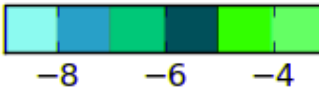
A quick glance at the North American Ensemble Forecast System (NAEFS) standardized anomaly for temps at 500mb shows a subtle hint of *slightly* cooler temperatures than normal. However, the NAEFS only shows a mean 500mb temperature of -12°C over portions of Florida. With the actual temperatures of -13°C to -14°C, the atmosphere was more anomalously cold than the NAEFS analysis suggested. So while a signal was present to suggest cooler than normal temperatures were possible during the afternoon hours, the signal was not quite as strong as the actual conditions that materialized.

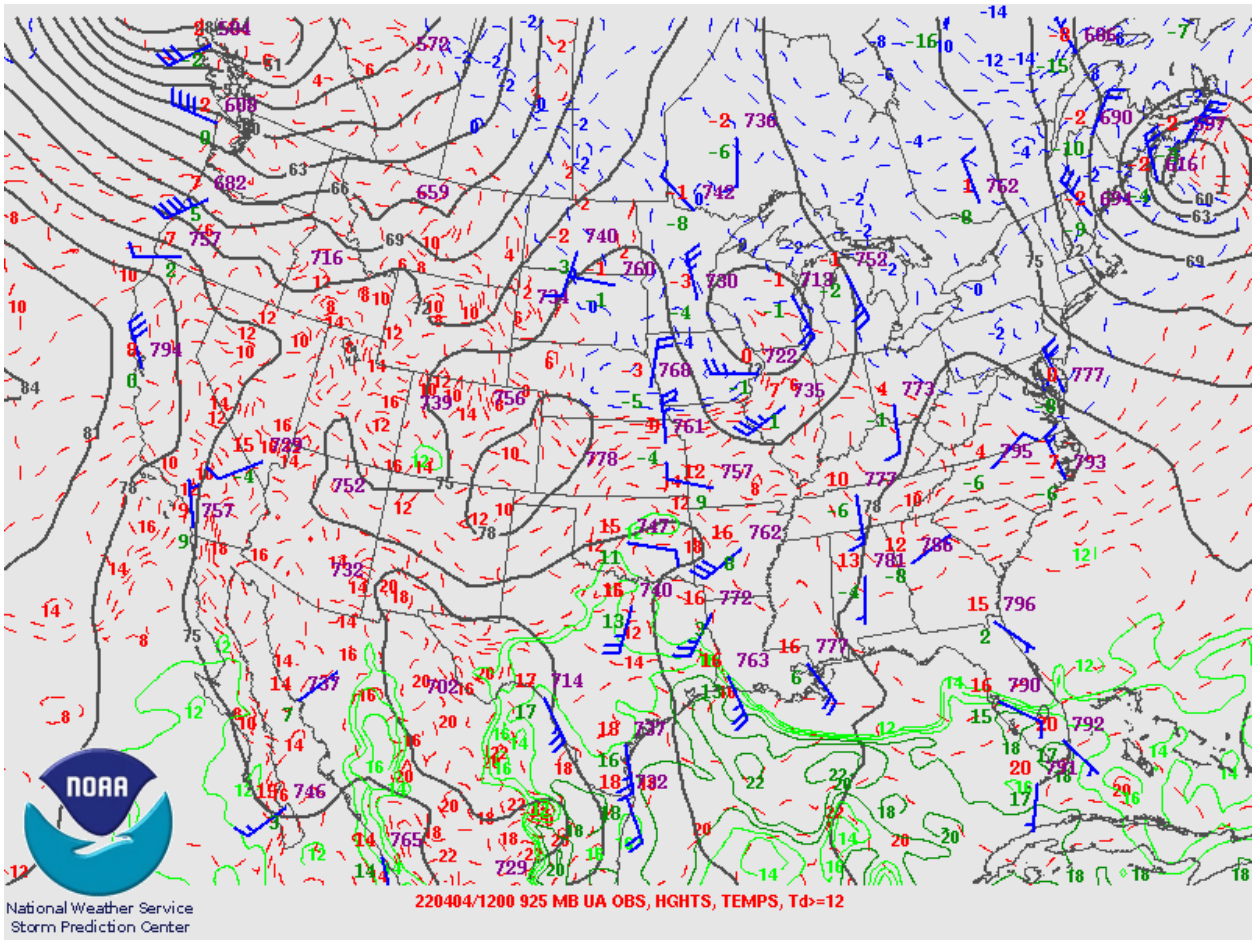
NAEFS Mean 500-hPa Temperature (C) and Standardized Anomaly
HOUR 006 - VALID 18:00 UTC Mon Apr 04 2022



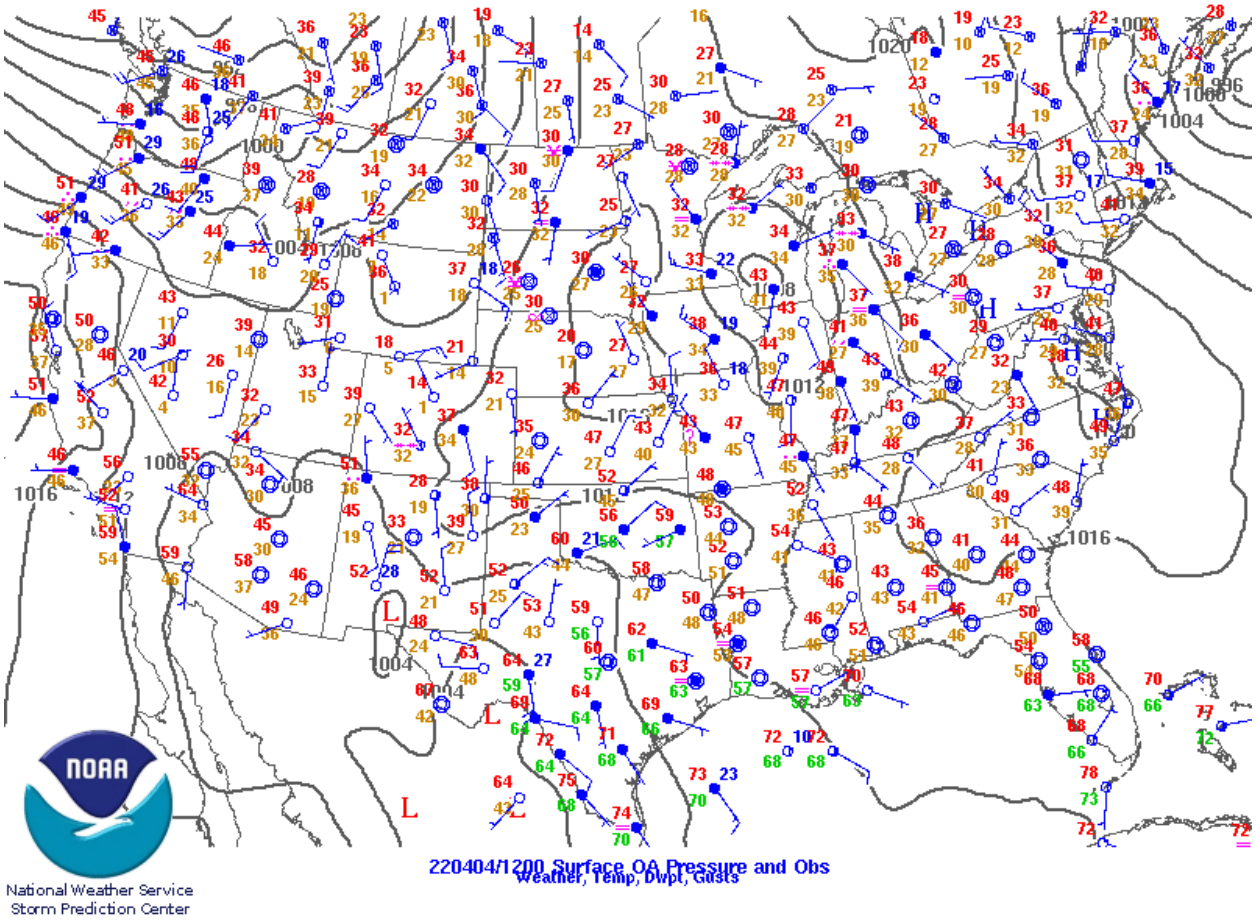
ar to 15-Apr 1979-2009 CFSR climatology Relative to the 25-Ma





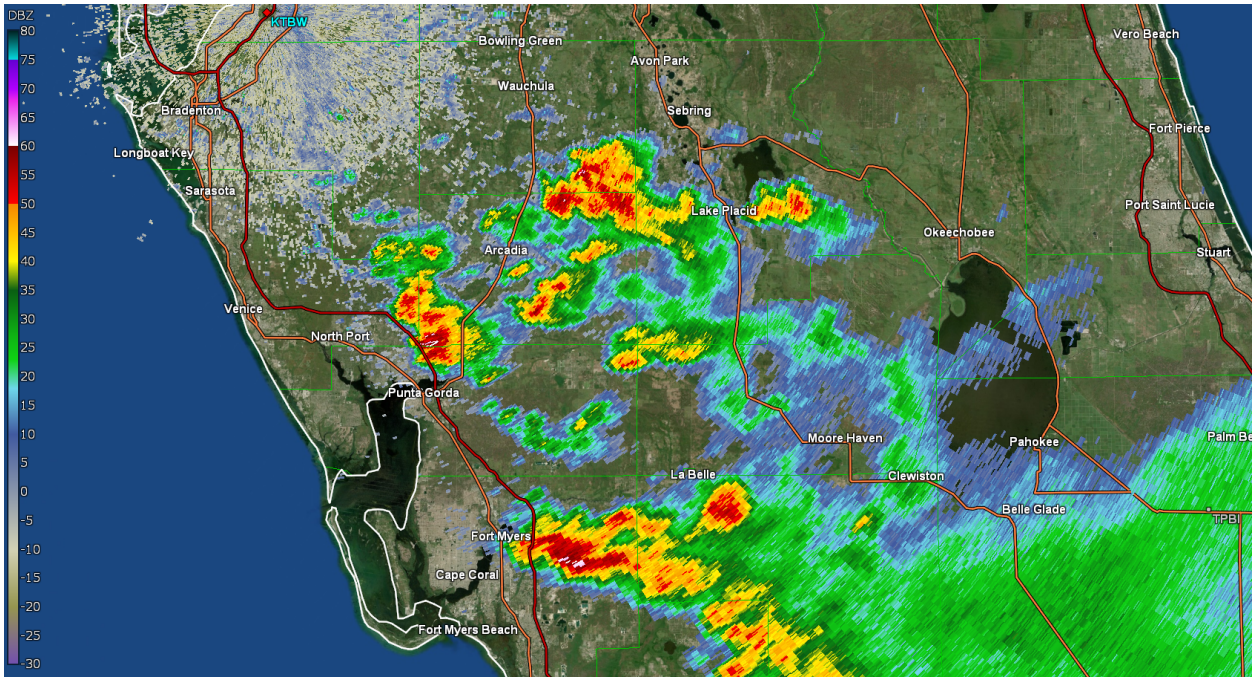


While light, the 925mb flow showed a return of moisture across the central peninsula. This additional moisture advection, coupled with daytime heating, suggested conditions might be favorable for convection during the afternoon hours.

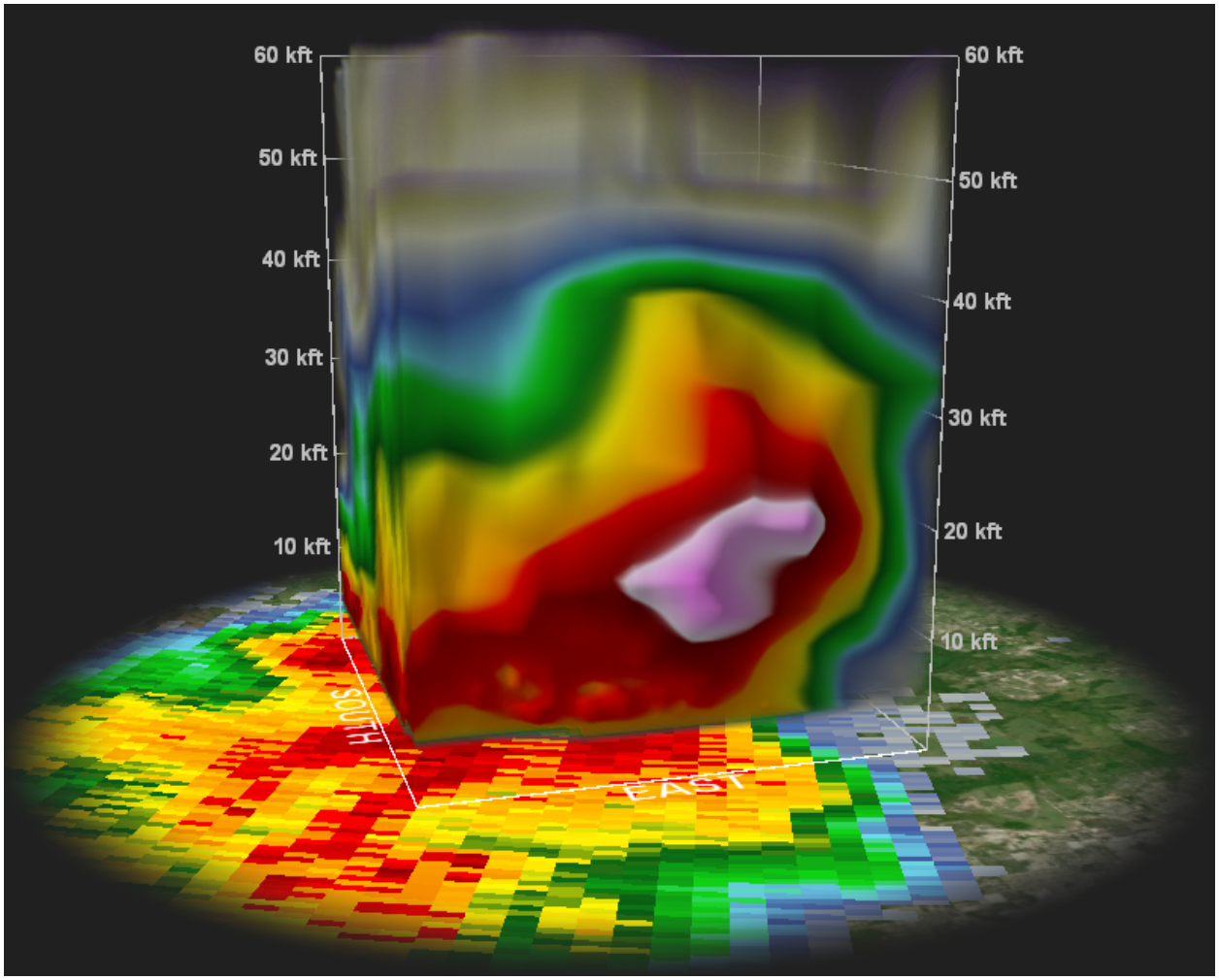


The surface analysis shows surface high pressure dominating, with the center of the feature over the Mid-Atlantic. Light surface flow over the Florida peninsula favored sea breeze development, the necessary catalyst needed to force air parcels to rise into an atmosphere that was becoming increasingly favorable for pulse convection. Surface dew points were also increasing, with dew points increasing from the upper 50s to lower 60s into the upper 60s. Given all these favorable parameters, conditions were not only favorable for convection, but this state also supported updrafts strong enough to produce hail.

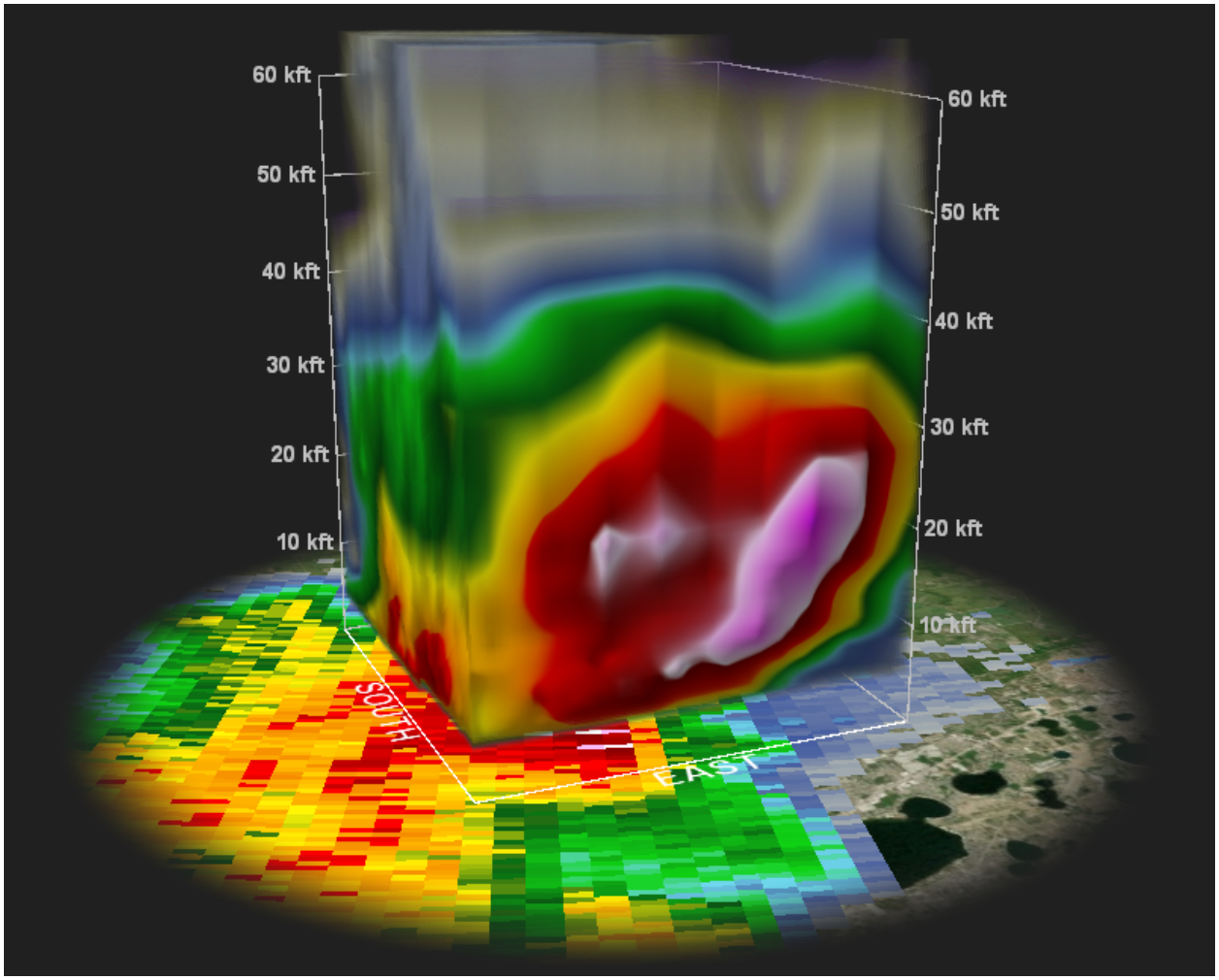
By late afternoon/early evening, thunderstorms had developed across SWFL and were spreading north and east into central Florida, riding the axis of deeper moisture and instability. Early storms had produced some small hail across the region, as expected.



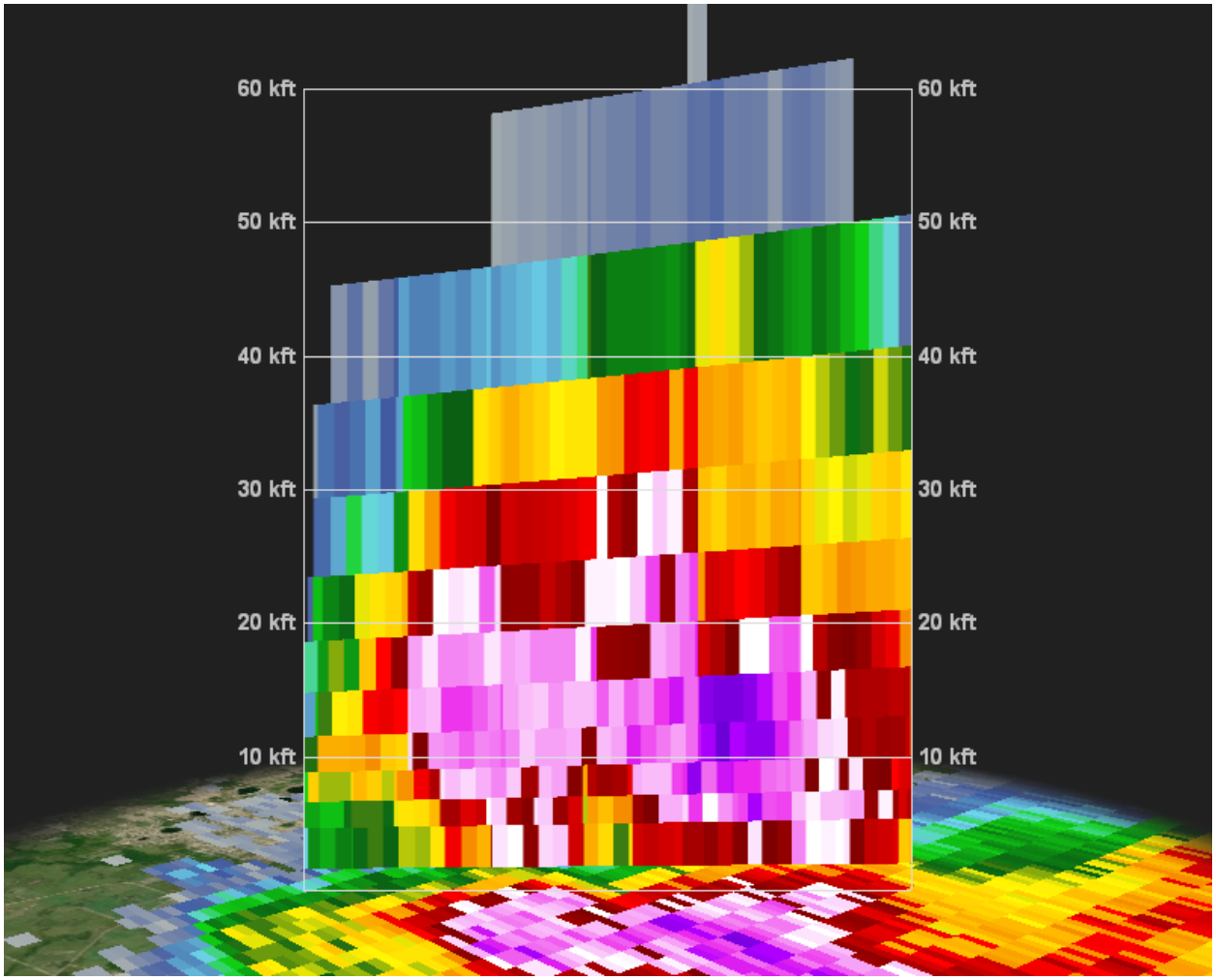
At 6:11PM, a cell to the southwest of Sebring began to show a very strong signal for the development of a hail core aloft, as shown in the 3D volumetric image shown below.



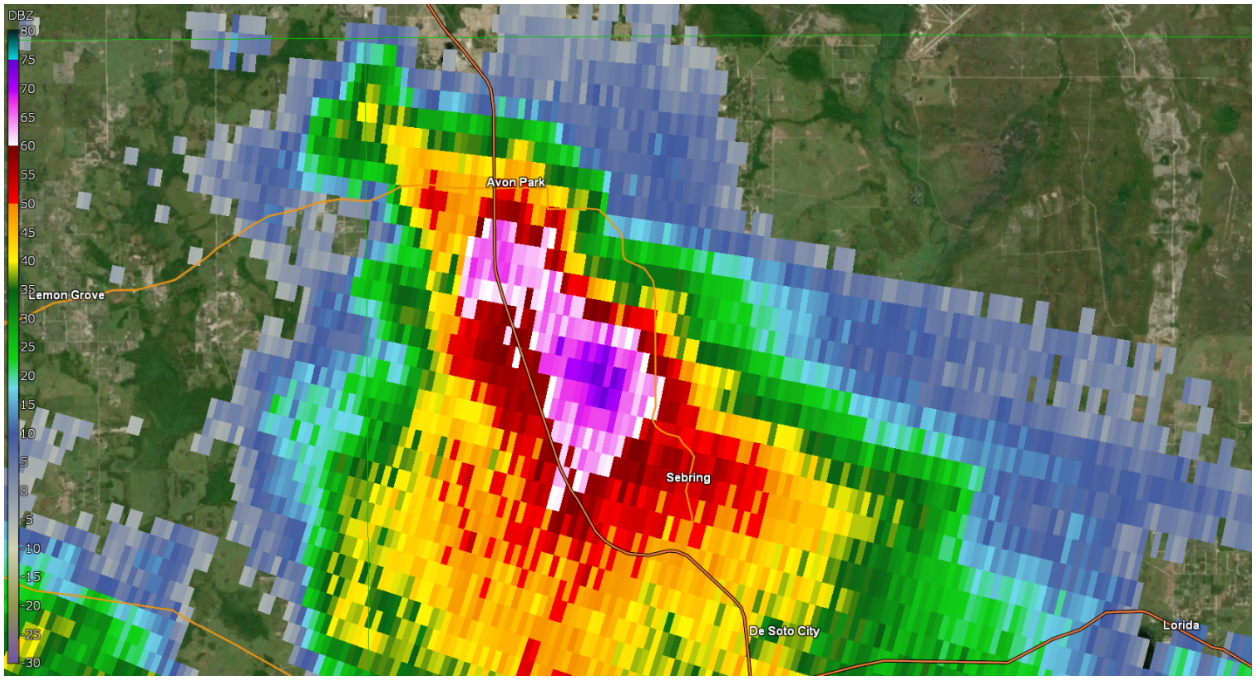
Ten minutes later, at 6:21PM, this core had descended through the column towards the surface. A second core also began to show signs of development aloft. This gave Meteorologists at the National Weather Service enough evidence to suggest that severe hail would be making it to the surface very soon.



At the peak around 6:30PM, this storm had a deep and broad layer of hail extending well up into the storm. The 2D Cross-Section shows indications of hail as high as 30k feet. All this hail would have to come down, and unfortunately would do so over the Sebring and Avon Park area.



Ten minutes later around 6:40PM, as the storm was passing just east of US-27, the largest hail fell out of the storm.



Hail, golf ball size and - on an isolated basis, larger - was reported, causing significant damage. Car windows were destroyed. Roofs and skylights sustained damage as well. This was an exceptionally rare event for West Central and Southwest Florida.