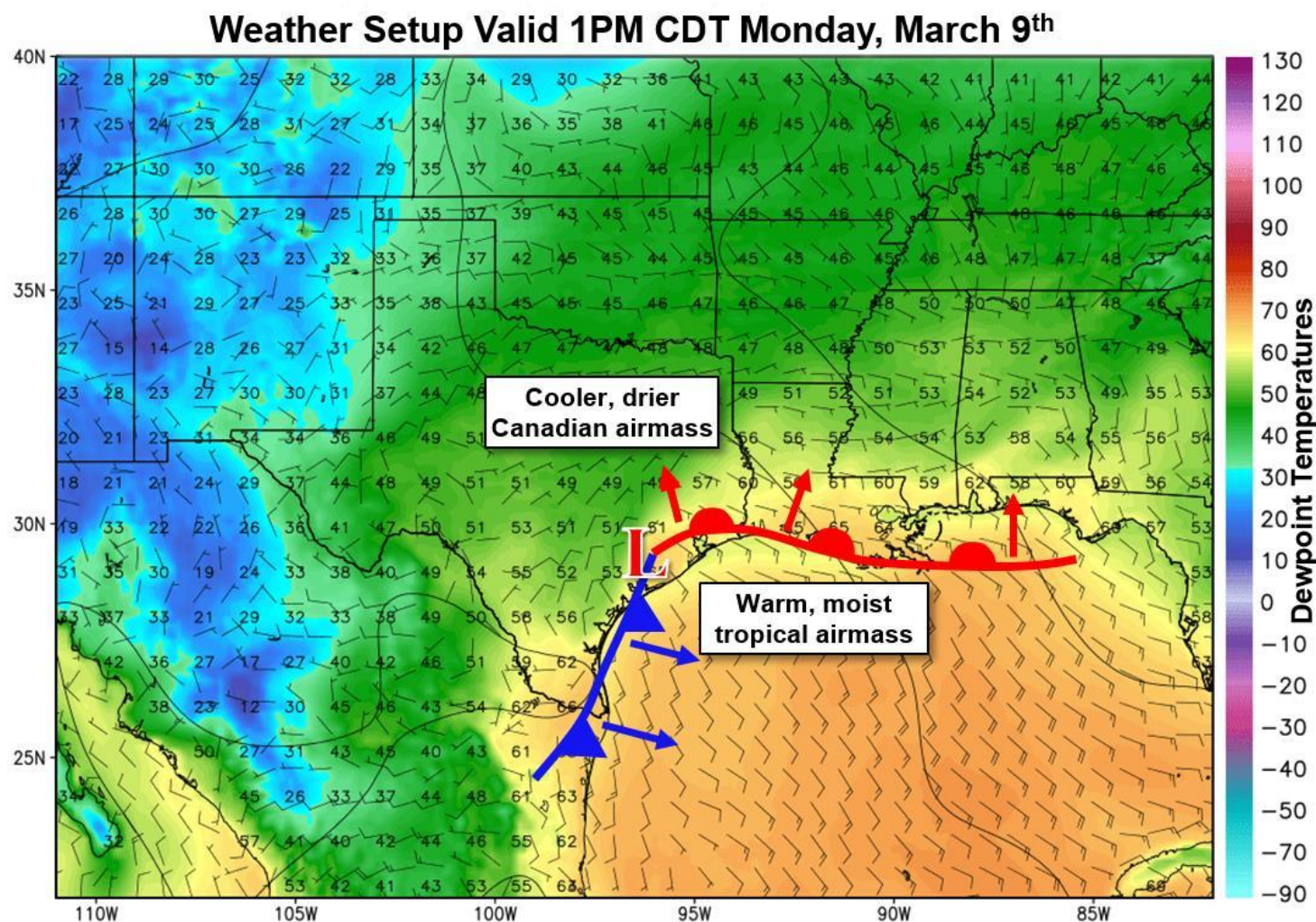


Fog Event of Monday, March 9th, 2015

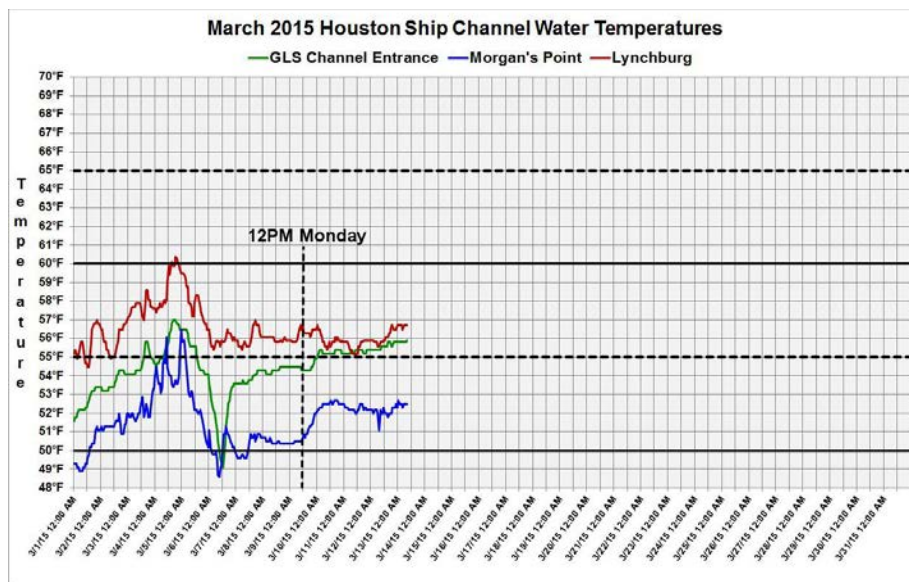
The fog event across the Houston Ship Channel was the result of warm, moist air off the Gulf of Mexico moving over very cool coastal water. This is called marine advection fog or simply marine fog. There are several ways this type of fog can develop. Typically, marine fog forms slowly as winds begin to blow off the Gulf of Mexico during the winter. The wind will slowly shift from east to southeast to south over a period of 24 hours. This leads to a gradually increasing moist layer over the chilled near shore water, which becomes a fog deck with time.

Monday's fog event was produced by a different mechanism than we've typically seen over the past few years. A low pressure center developed along a stationary frontal boundary off the Texas coast on Sunday night. This counter-clockwise rotating low center drove a wedge of warm, moist air off the central Gulf of Mexico rapidly inland into the upper Texas coast by late Monday morning. The rapid northward advance of the warm, moist Gulf of Mexico airmass led to a more rapid development of coastal marine fog than with a typical (and slower) return-flow setup.

The graphic below is a model representation of the positions of the low center, the cold front and the warm front valid at 1pm CDT on Monday. The color contours are dewpoints, a measure of the amount of moisture in the air. The map shows air with dewpoints into the lower 60s moving into the upper Texas coast.

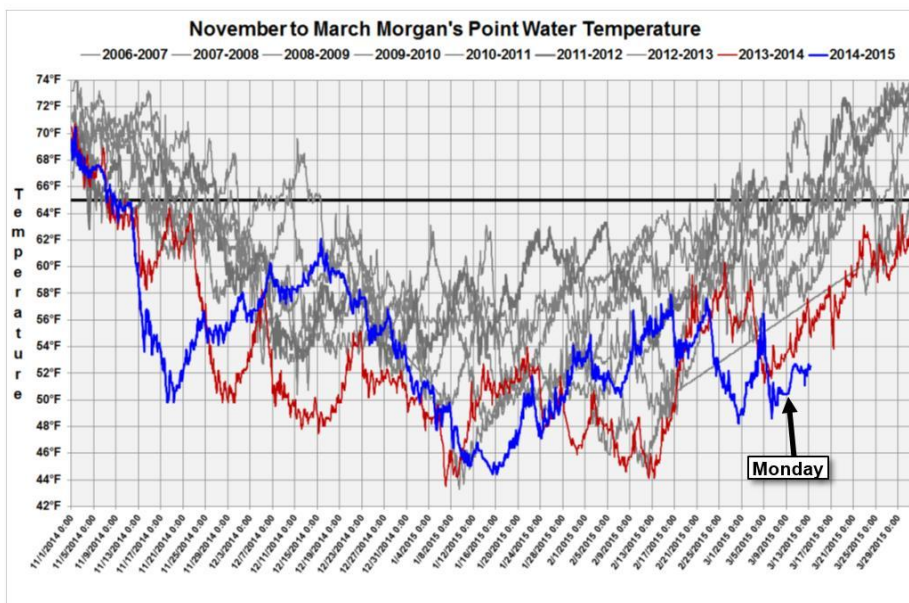


A plot of water temperatures across the Houston Ship Channel (below) indicates that water temperatures at Morgan's Point (blue line on the graphic) were between 50°F and 51°F on Monday morning. Note the sharp rise in water temperatures that occurred on Monday afternoon/evening. This is indicative of a warm front moving northward over the Houston Ship Channel earlier in the day. Water responds more slowly to heating than the air.



As a comparison to previous fog seasons, water temperatures across the Houston Ship Channel this March (blue line on graphic below) have averaged considerably cooler. Last year's fog season (red line) was rather severe due to the cooler-than-normal water across the Channel and long periods of onshore flow. This year, the water temperatures are even cooler.

Water Temperatures at Morgan's Point Since 2006



What we have found over the years is that the difference between the water temperature and the dewpoints of the air moving over the water is a key factor in marine fog formation. In most cases, the rise in dewpoints is gradual, occurring over a period of 12-24 hours. However on Monday morning, water temperatures were in the low 50s with dewpoints also in the low 50s. When the warm front moved north of the ship channel late on Monday morning, dewpoints rose quickly (within 1-2 hours) into the low 60s. A difference of 10 degrees between the water temperature and air dewpoint temperature is a strong indicator of marine fog potential. When the marine layer moved in quickly behind the warm front, as was the case on Monday, the marine fog developed much more quickly than would be typical.