



# From a Pyrocumululus to a Severe Thunderstorm: An Environmental Analysis of an Anomalous Southern Plains Wildfire



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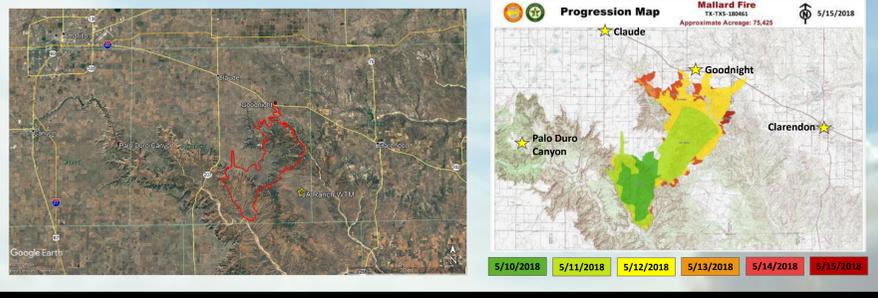


## Definitions

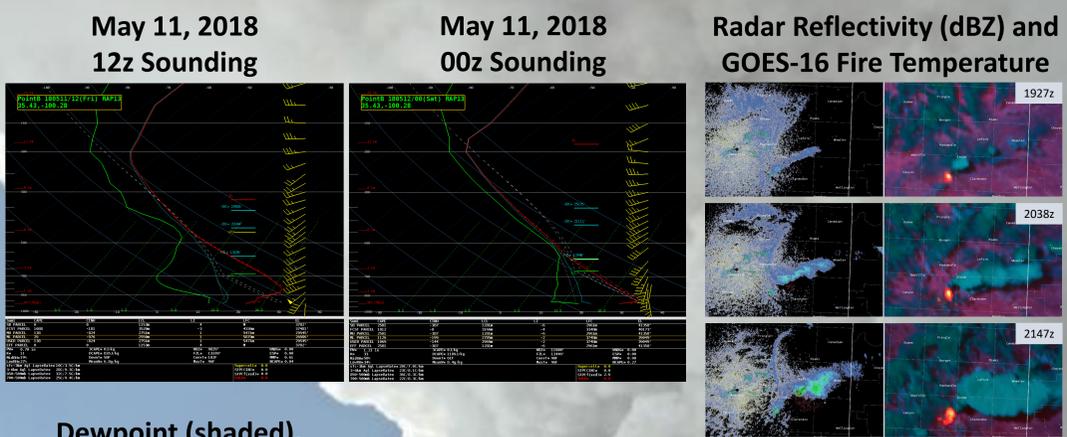
- Pyrocumululus (pyroCu):** A cumulus formed by a rising thermal from a fire, or enhanced by buoyant plume emissions from an industrial combustion process
  - Pyrocumulonimbus (pyroCb):** An extreme manifestation of a pyrocumululus cloud, generated by the heat of a wildfire, that often rises to the upper troposphere or lower stratosphere
- **Characteristics:** Lightning, thunder, hail or a fibrous or diffuse upper portion

## Overview of the Mallard Fire

- May 8, 2018 to May 29, 2018:** Initiation of fire to containment
- Size: 30,566 hectares (75,530 acres)**
- May 11, 2018:** Fire produced pyroCb, which later became a severe thunderstorm



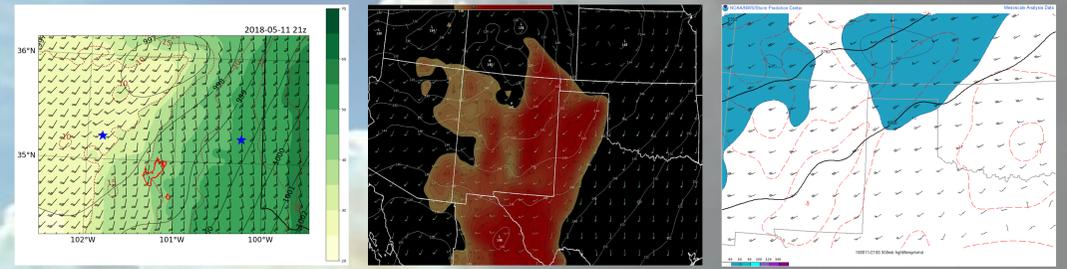
## Synoptic Setup



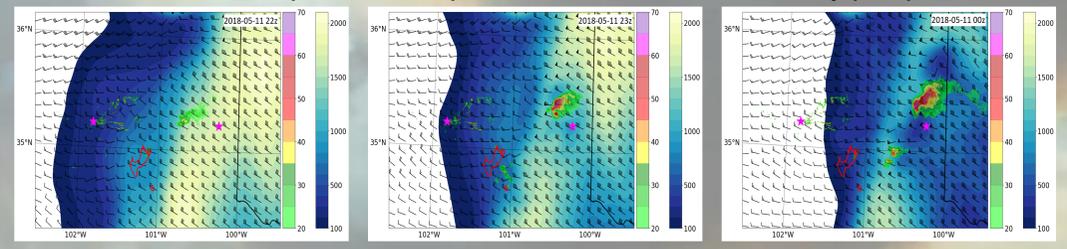
**Dewpoint (shaded), Surface Pressure (black contour), and Surface Relative Humidity (brown dashed contour)**

**850mb Heights (white contour), 850mb Temps (shaded) and Winds (green barbs)**

**500mb Heights (black contour), 500mb Temps (red dashed) and Winds (barbs and shaded)**



**Mixed Layer Convective Available Potential Energy (MLCAPE) (shaded, J/kg), 0-6 km Shear (barbs, knots), and Level II Radar Reflectivity (dBZ)**



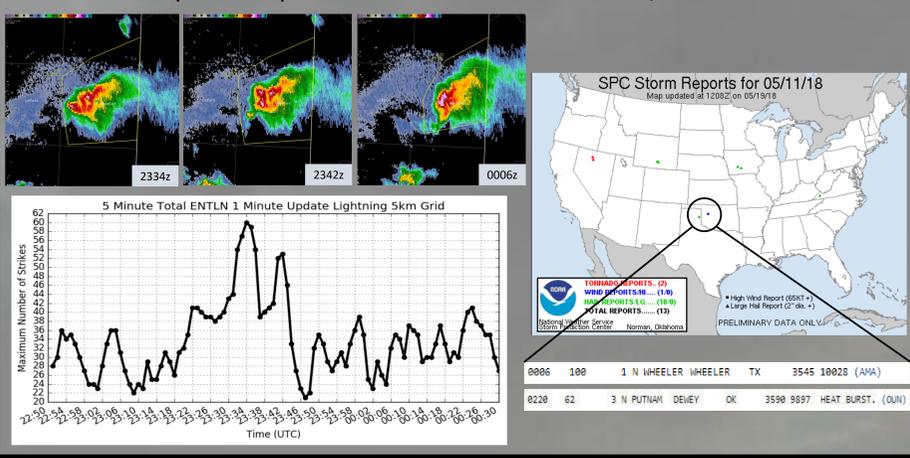
**0700z SPC Fire Outlook**

**1430z SPC Categorical Outlooks**

**SPC Mesoscale Discussion**

## Results

- Lightning Jumps:**
  - 60 total Earth Networks Total Lightning Network (ENTLN) flashes at 2334Z
  - 53 total ENTLN flashes at 2342Z
- Storm Reports:**
  - Quarter size (1 inch) hail one mile north of Wheeler, Texas at 0006Z
  - 62 mph wind speed three miles north of Putnam, Oklahoma at 0220Z



## Pictures



## National Weather Service Messaging

**Hot Spot Notification Messaging**

**Amarillo NWS Chatroom May 11, 2018**

**Critical Fire Weather Today**

**Amarillo NWS Chatroom May 12, 2018**

**Amarillo NWS Chatroom May 13, 2018**