

# Climate and Weather Patterns Associated with Wind Erosion

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# A few key conditions for wind erosion

- Dry soils
  - time since last precipitation
  - time of day
- Lack or loss of vegetative cover
  - density and type of cover
- Erodeability of surface
  - particle size
  - disturbance level
  - fraction of area crusted
- Sufficient winds to lift particles and sustain them



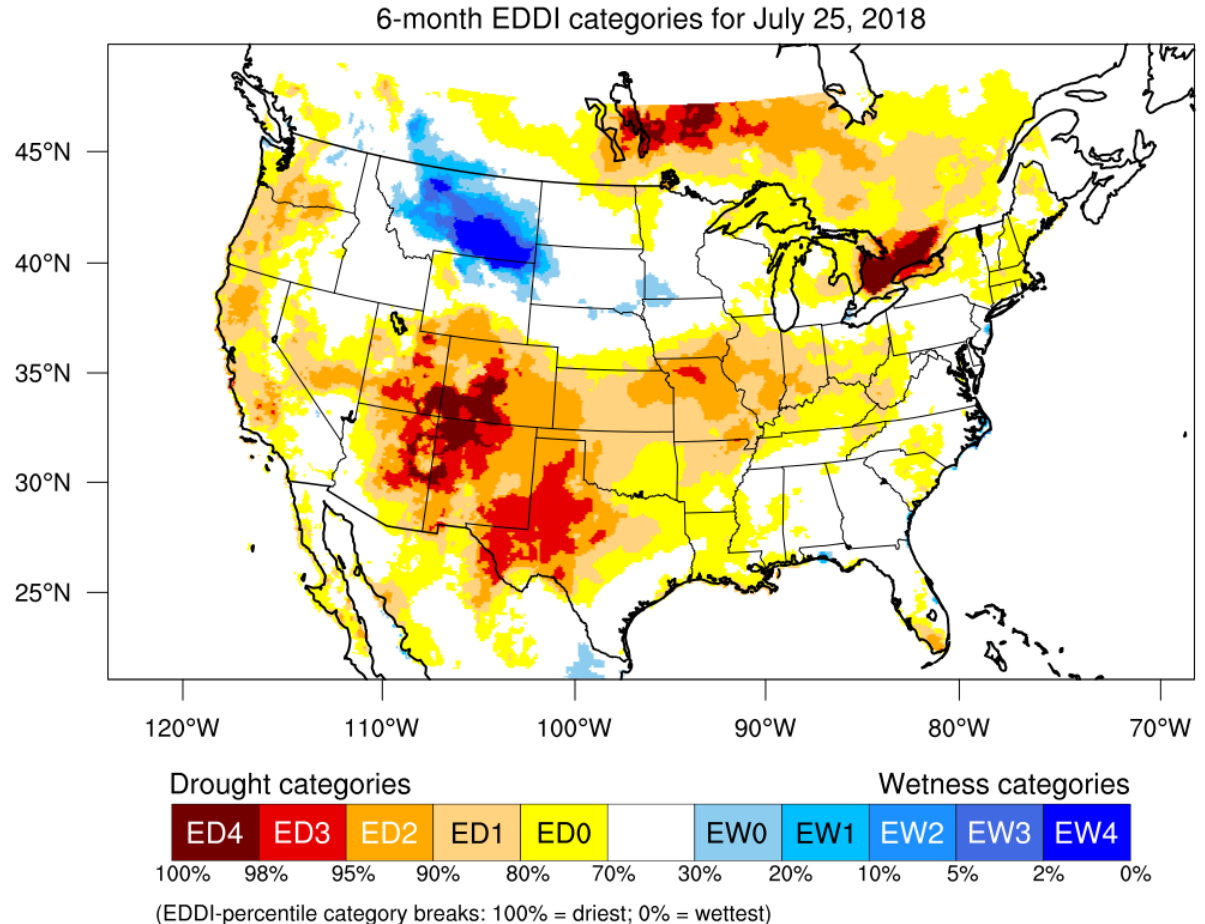


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# Role of drought and vegetation

- Recent drought was not only dry but enveloped in record warmth
- Evaporative demand is high, delayed green-up, increase in plant mortality, loss of plant cover over time



Generated by NOAA/ESRL/Physical Sciences Division





# Main Types of Wind Erosion Events

- Dust devils
- Dust channels
- Thunderstorm microburst
- Thunderstorm gust front
- Convective outflow
- Synoptic or frontal

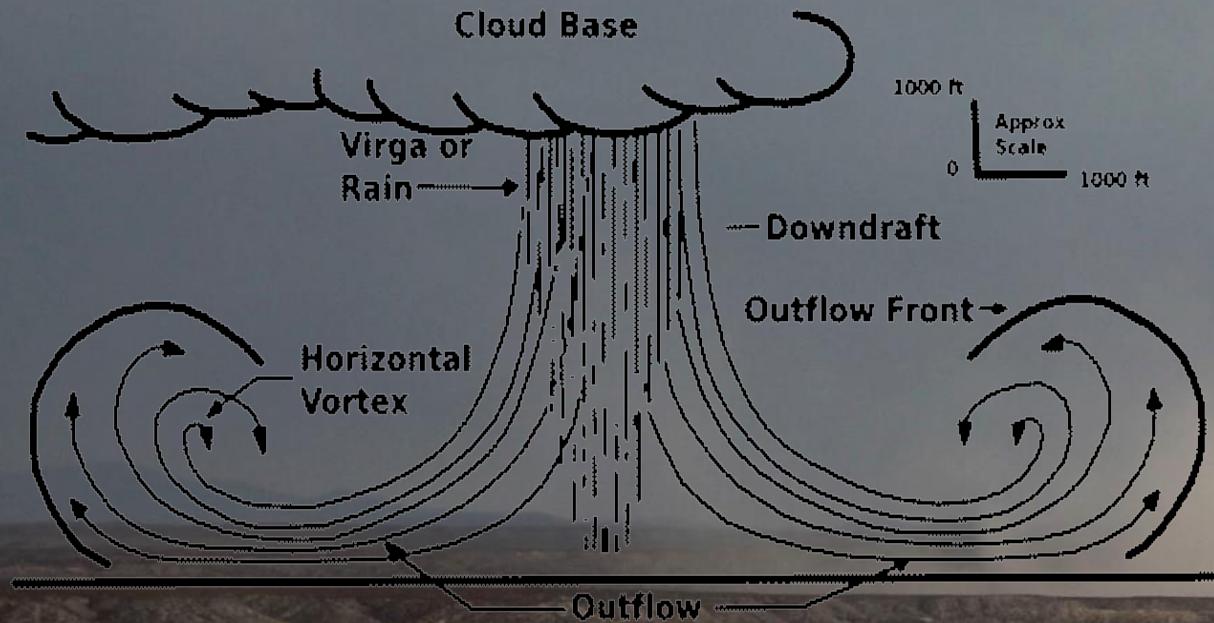


# Dust Devil Events



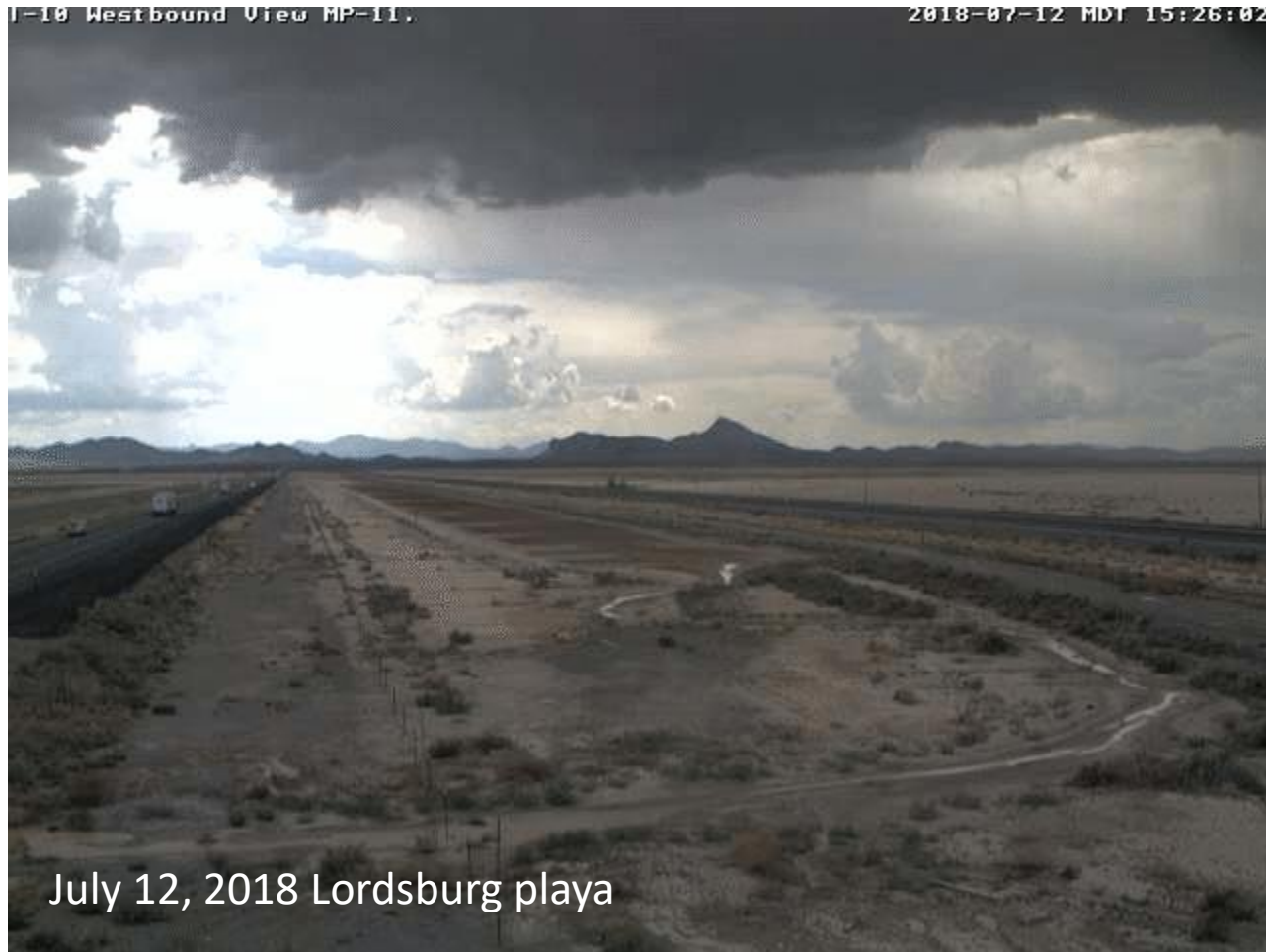
# Microburst

Size < 4km, duration 2 to 5 minutes

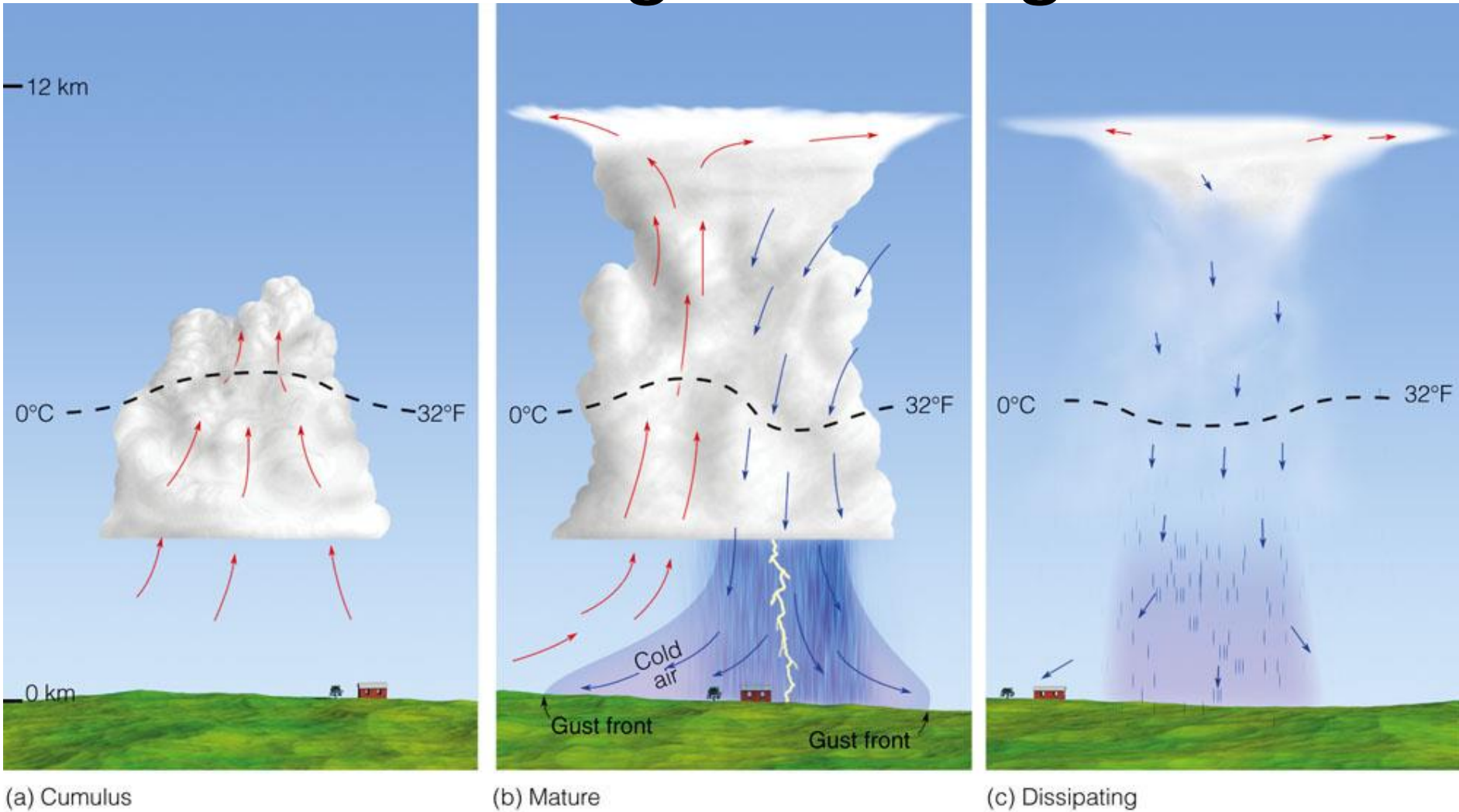




# Dust ahead of wet microburst



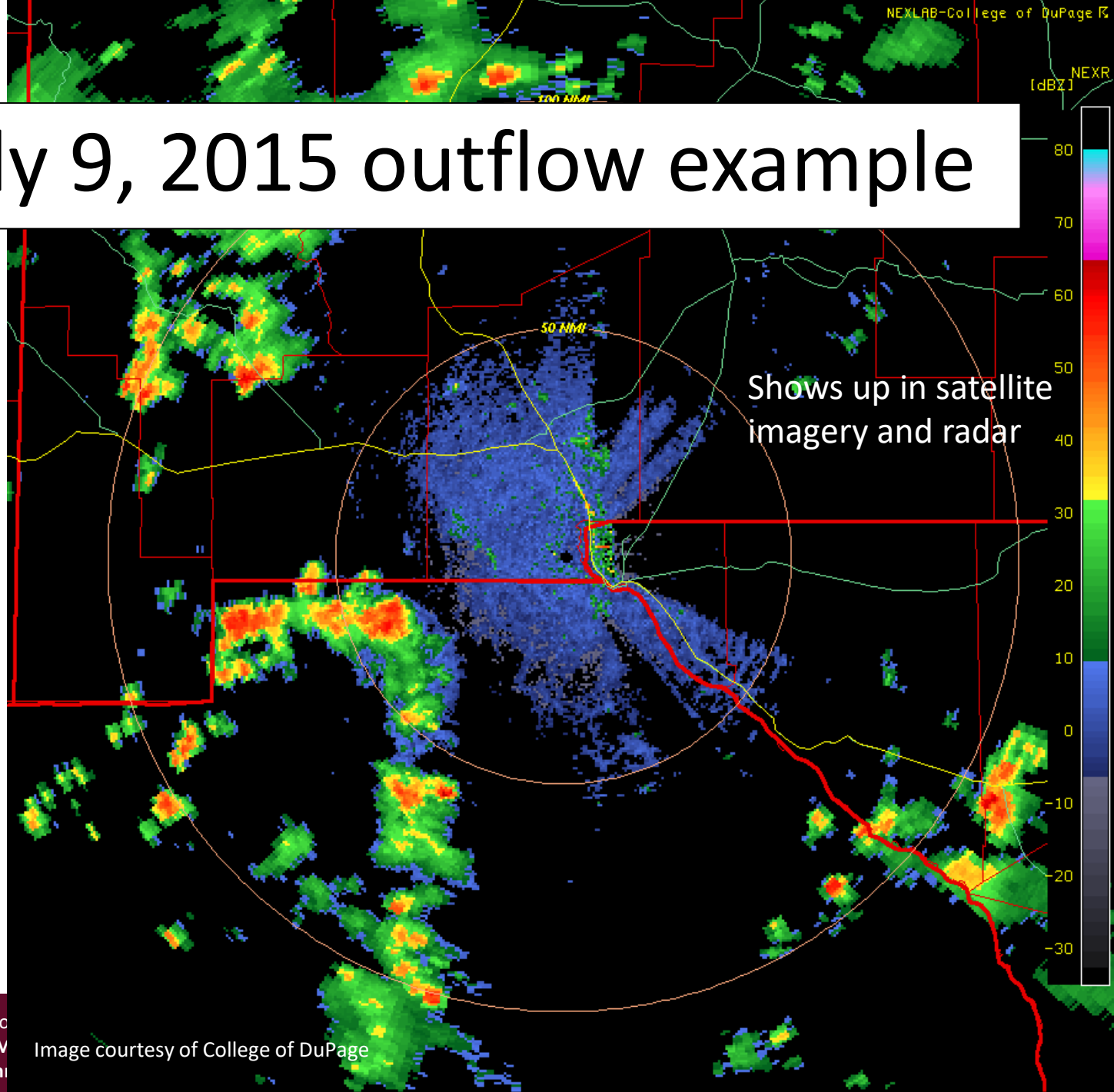
# Thunderstorm growth stages



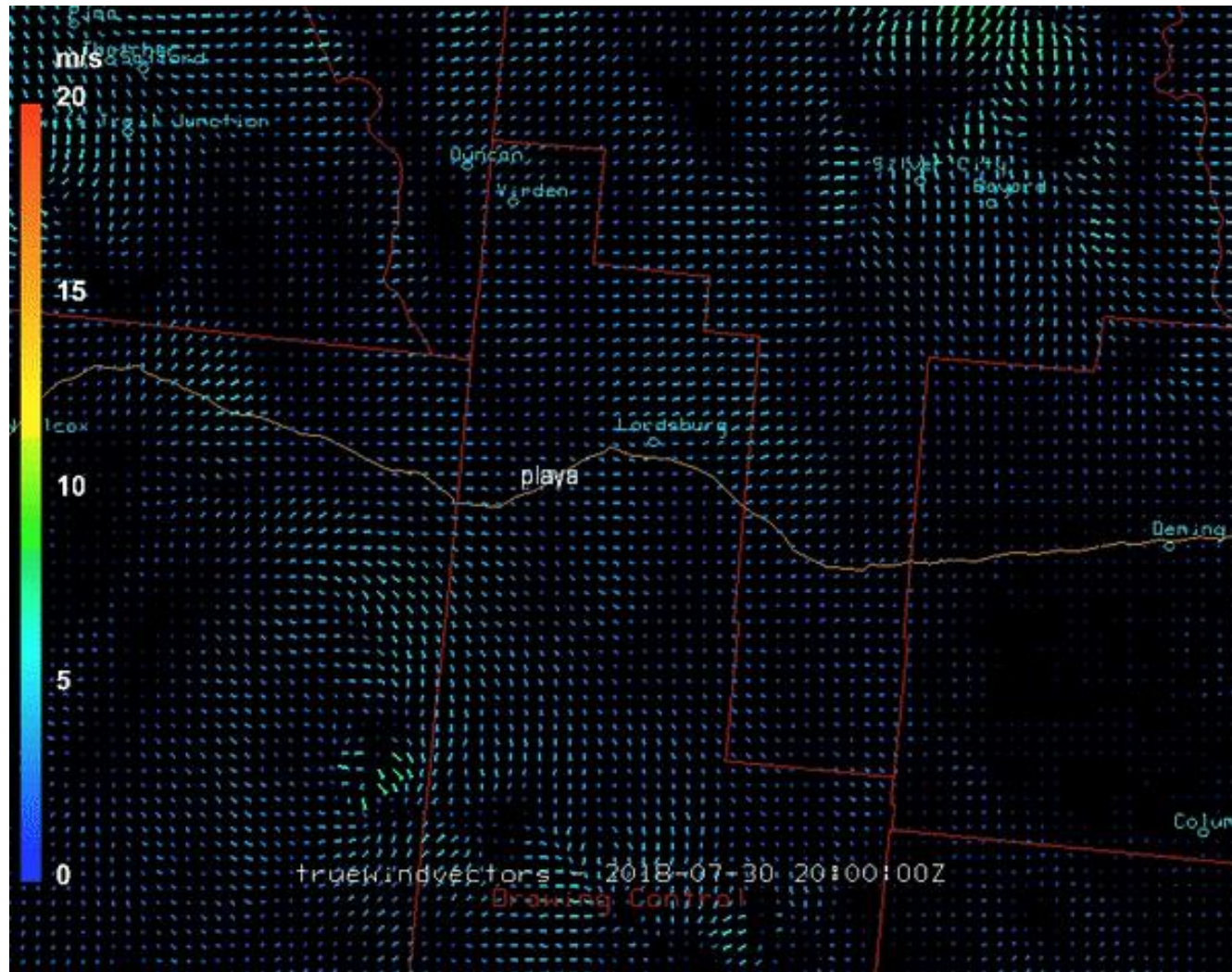
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# July 9, 2015 outflow example

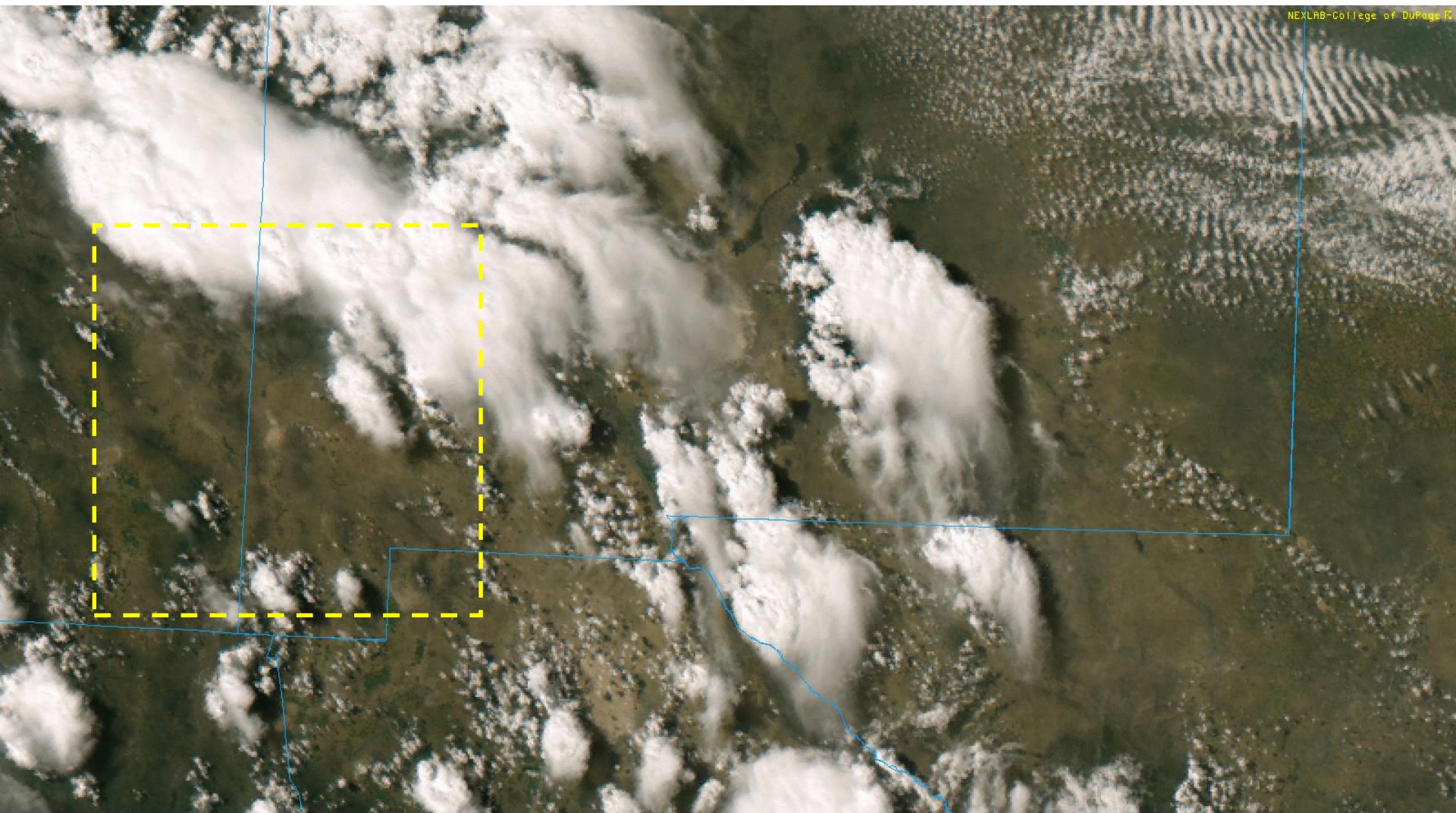


# Thunderstorm outflow during monsoon





# View from satellite



NEXLAB-College of DuPage

GOES-16 "RGB-TRUE COLOR" 1.0 KM | VALID 30 JUL 18 21:27:21 UTC



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# Gust front horizontal winds



PLOTWATCHER PRO

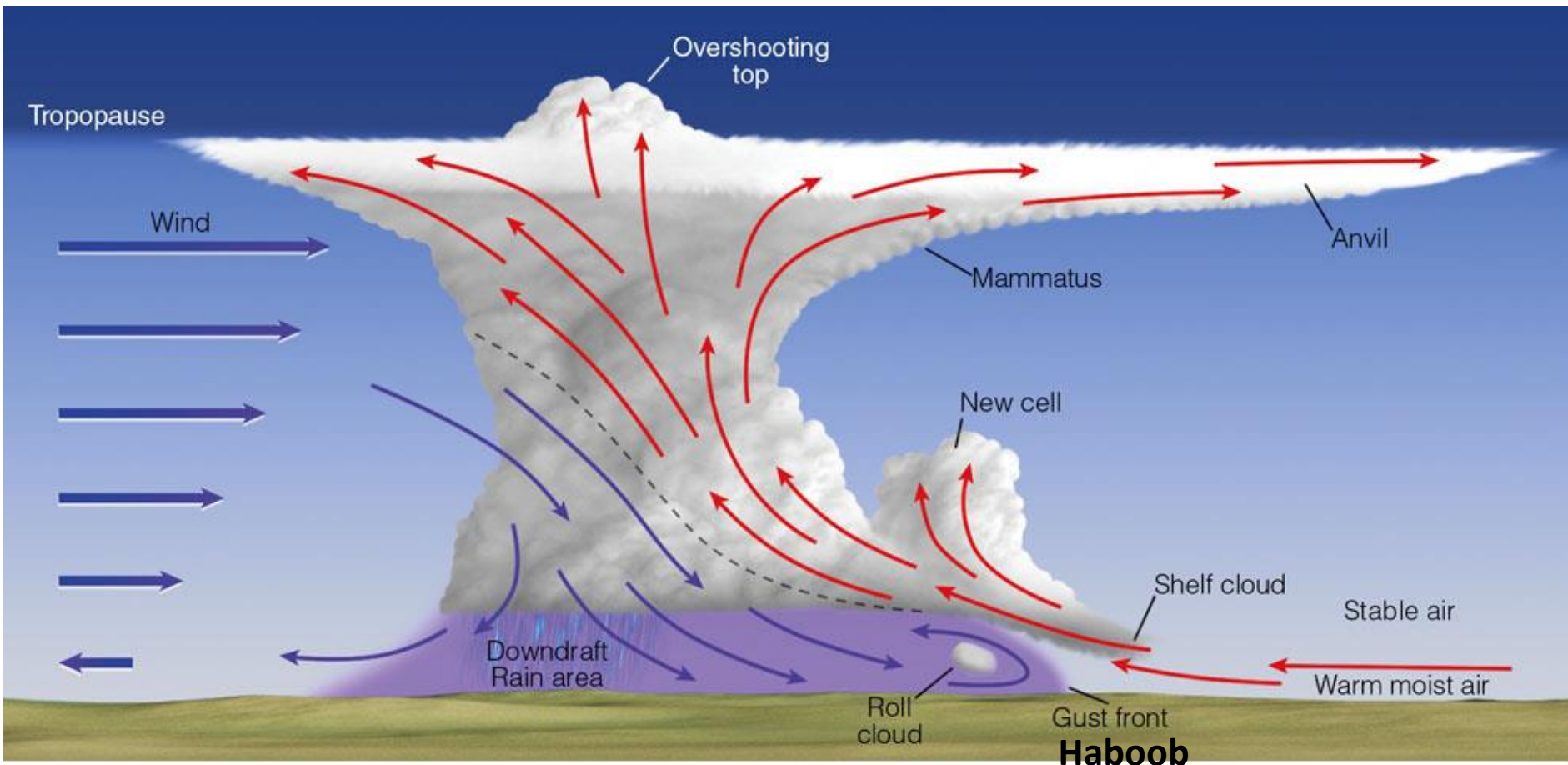
06/09/2015 04:59:05PM 65% 98F



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# Haboob



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Cold air from the downdraft undercutting warm air

# Haboob



6/16/15

PLOTWATCHER PRO

06/16/2015 05:33:06PM 60% 109F ○

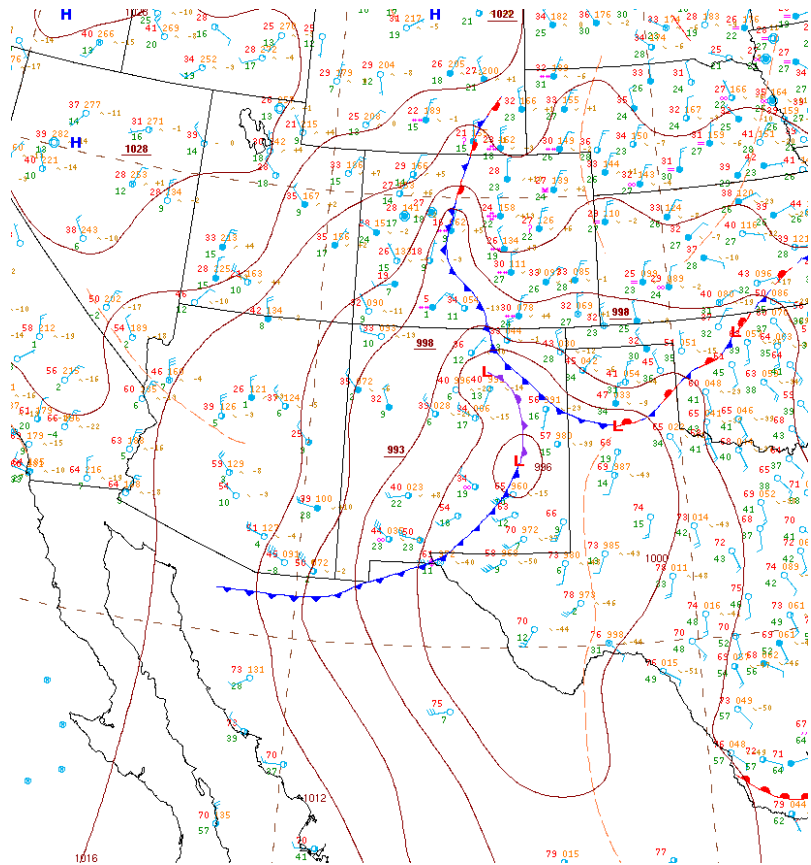




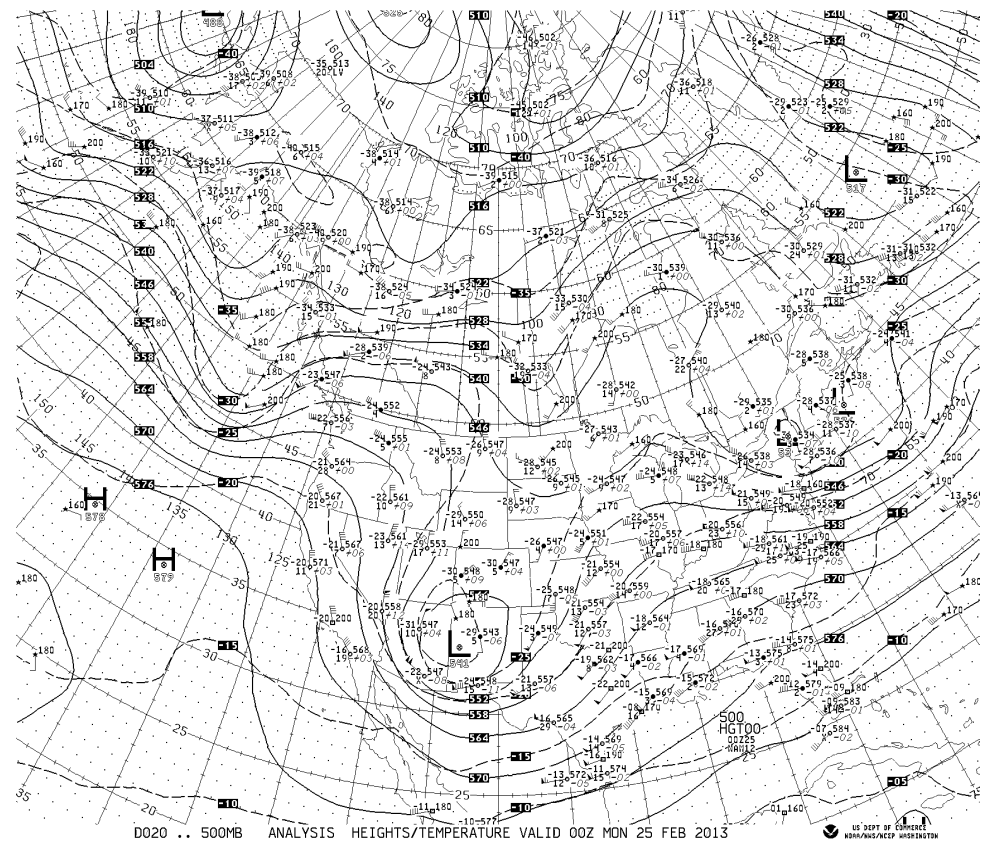
# Typical Synoptic Storm

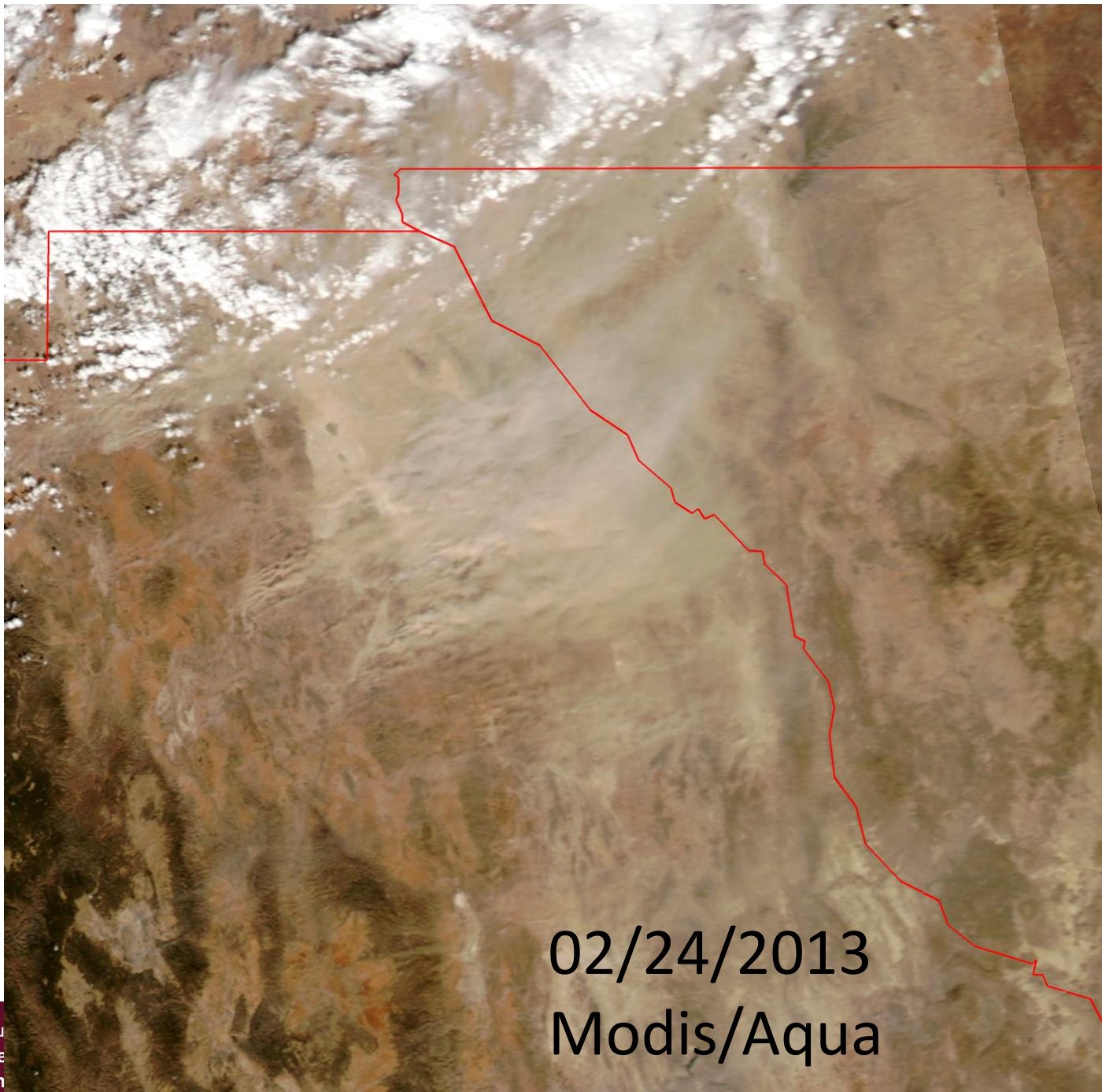
- Surface cold front, upper level trough, 2/24/2013

surface



500 mb

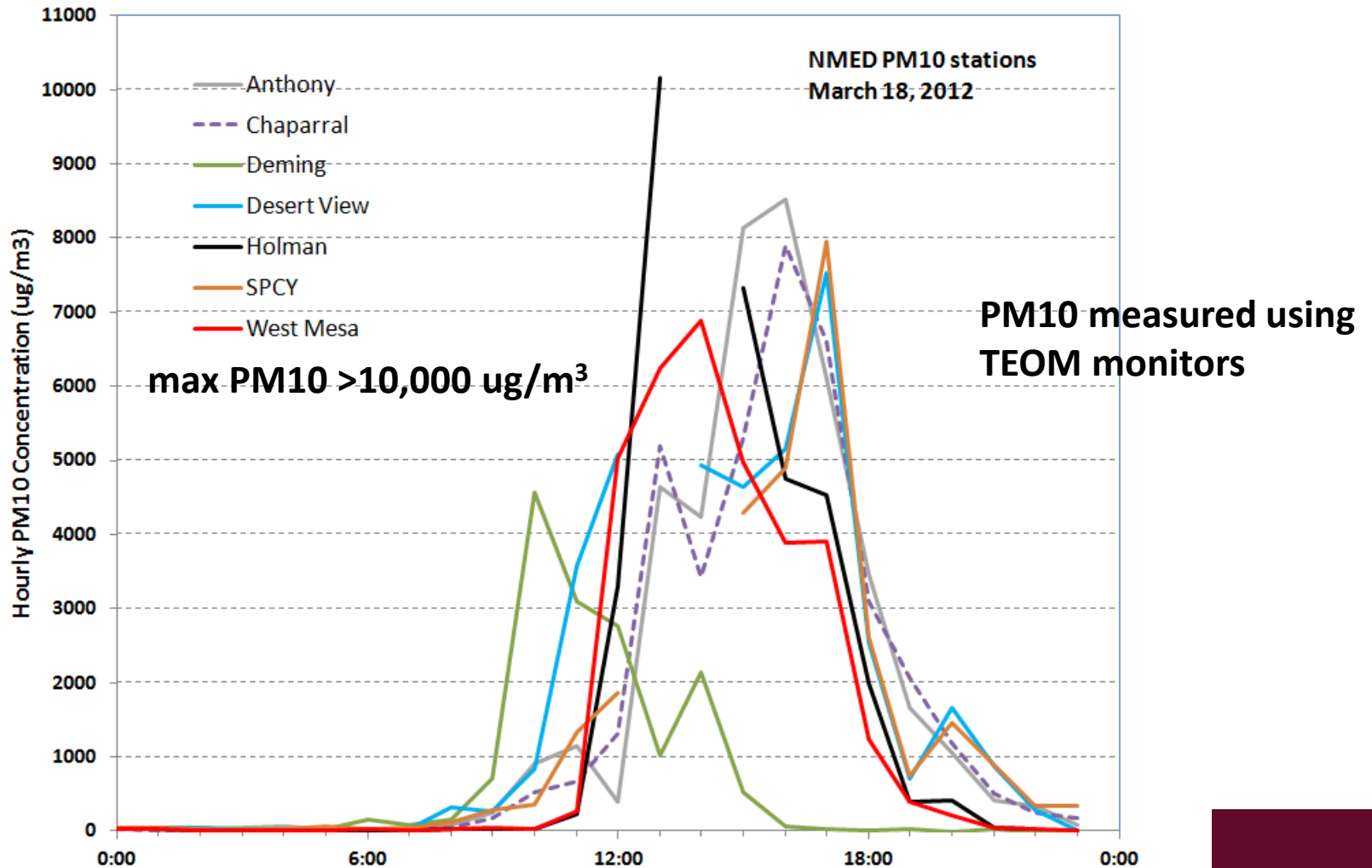




02/24/2013  
Modis/Aqua

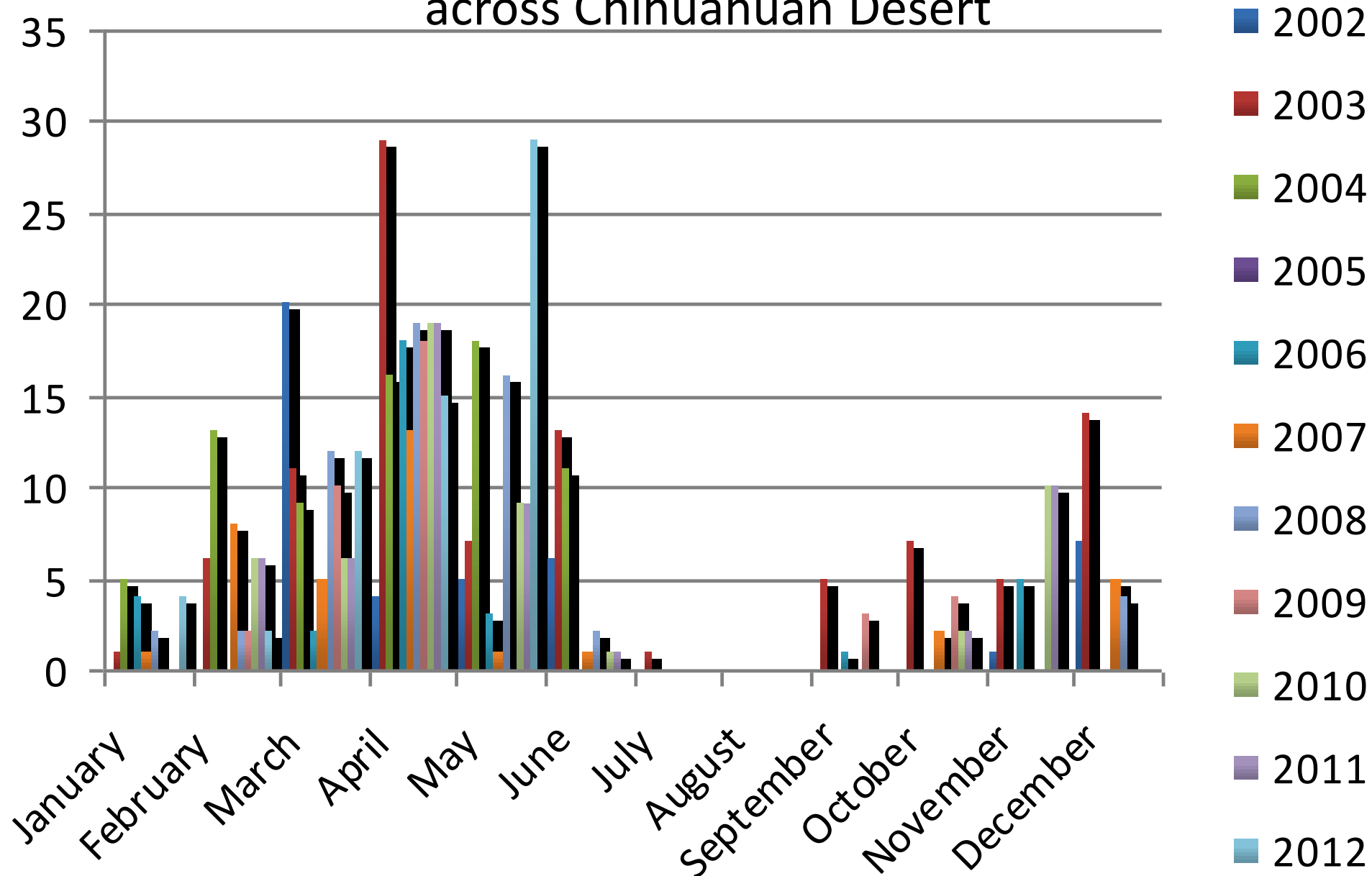
# Impacts from synoptic storm

- Duration: most of day

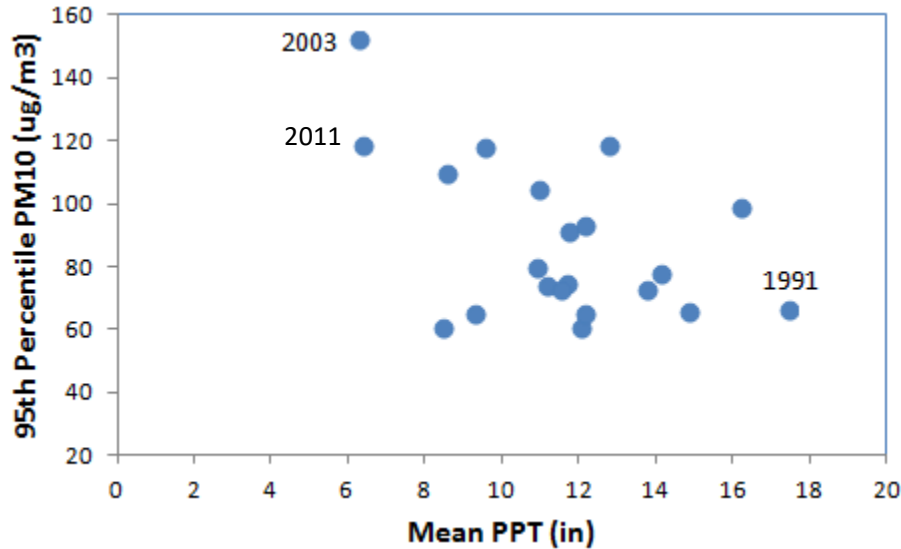




# Synoptic dust storm frequency based on imagery across Chihuahuan Desert



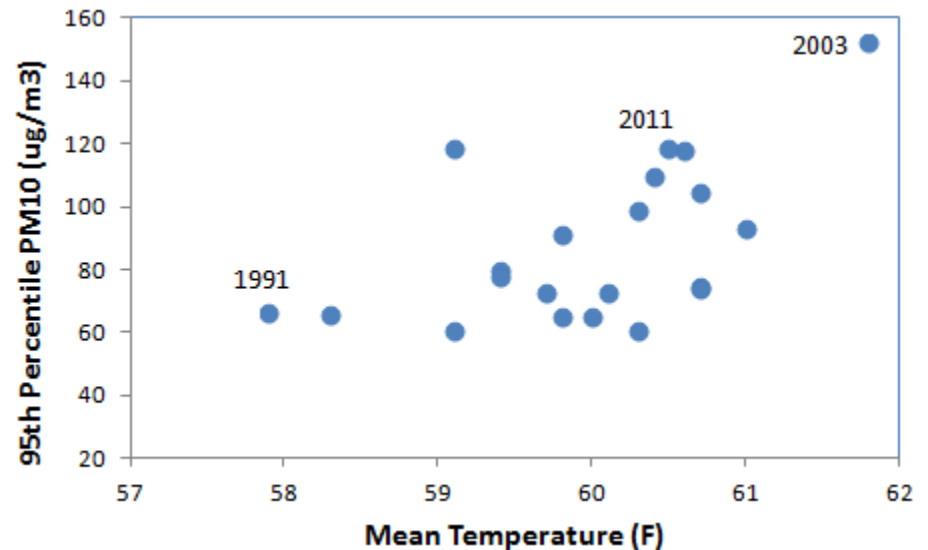
# Climate and Dust Levels




Our highest PM10 occurs during our driest years

...and during our warmest years

*Over 21 years in NM climate division 8*





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