

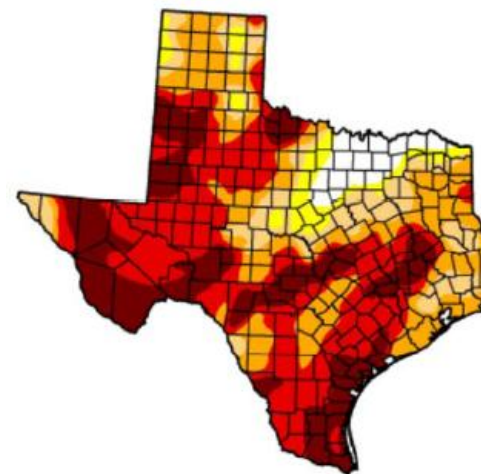
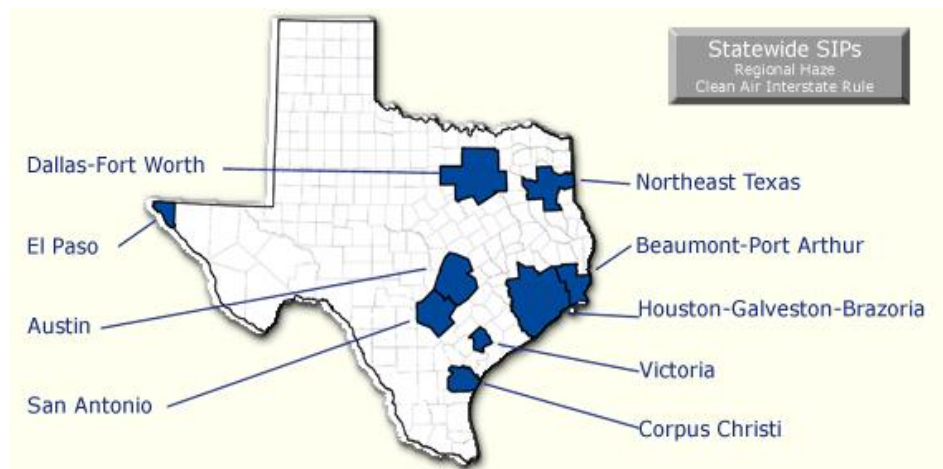
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Rich Tinker, Climate Prediction Center/NCEP/NWS/NOAA

# Drought and regional air quality

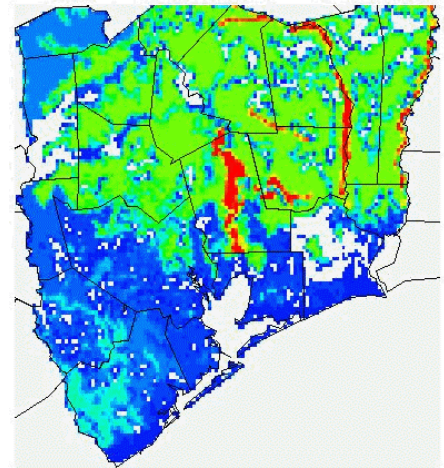
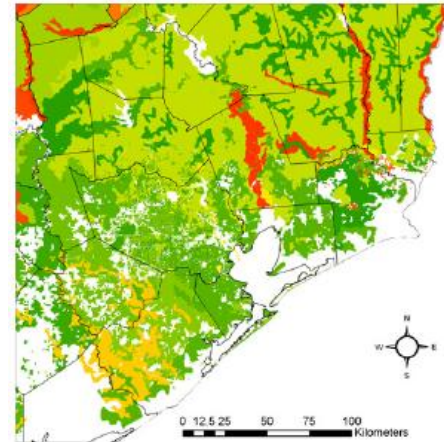
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# Drought influences air quality impacting State Implementation Plans for attaining National Ambient Air Quality Standards



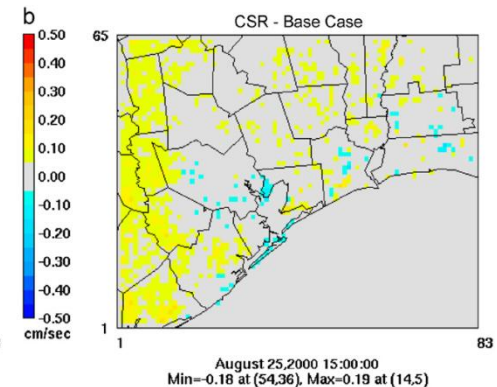
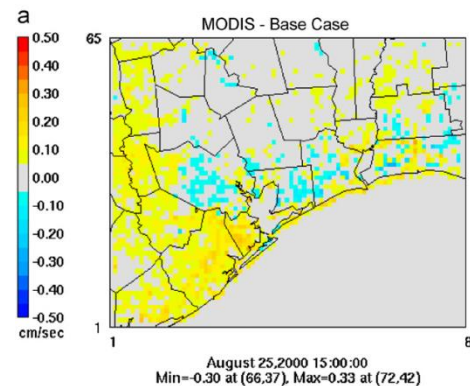
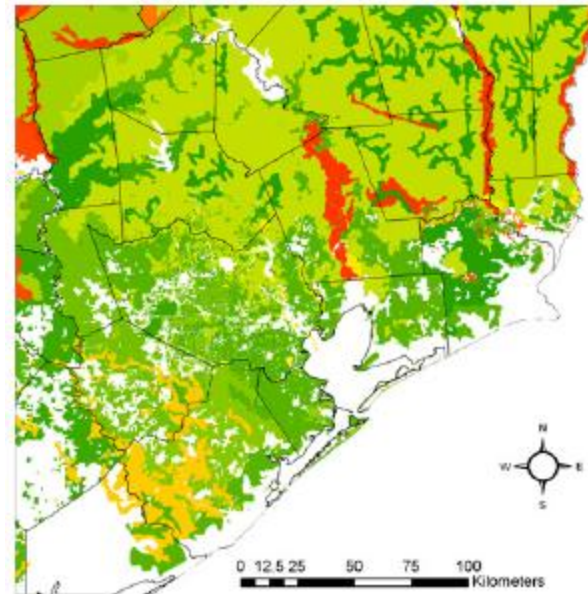
# Mechanisms for drought impacting air quality

- Emissions of isoprene and terpenes from vegetation (trees and crops) has a significant impact on ozone and fine particle formation in Texas
- Drought reduces those emissions, but the quantitative relationship is poorly understood
- Roles of leaf area, water availability and temperature, alone and in combination are poorly understood



# Mechanisms for drought impacting air quality

- Dominant mechanism for air pollutant removal is deposition to surfaces
- Changing leaf areas influence deposition



# Mechanisms for drought impacting air quality

- Dry, clear skies influence the spectrum of light available for driving photochemical reactions





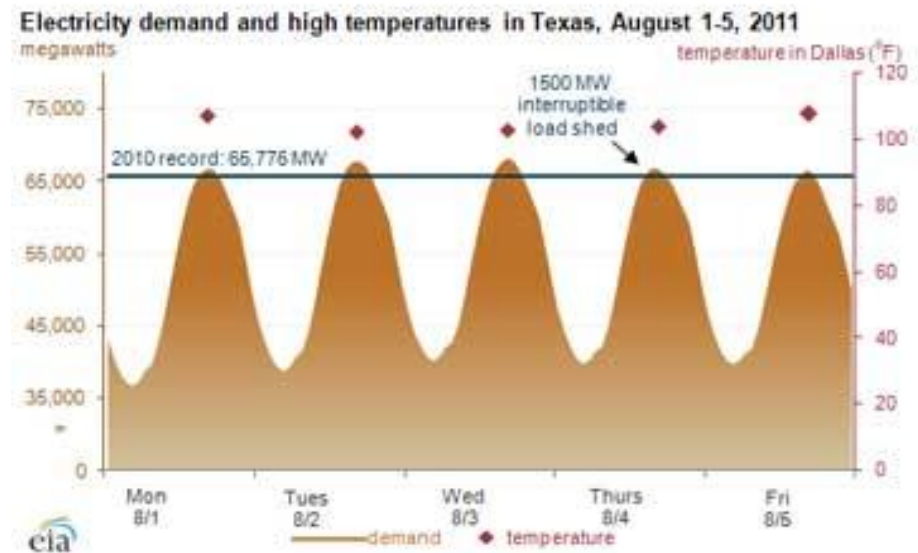
# Mechanisms for drought impacting air quality

- Changes in soil moisture change the energy balance in the atmosphere, and influence the height to which air pollutants mix in the atmosphere



# Mechanisms for drought impacting air quality

- Heat associated with drought influences electricity demand, changing emissions
- Water availability may limit capacity of some generating units



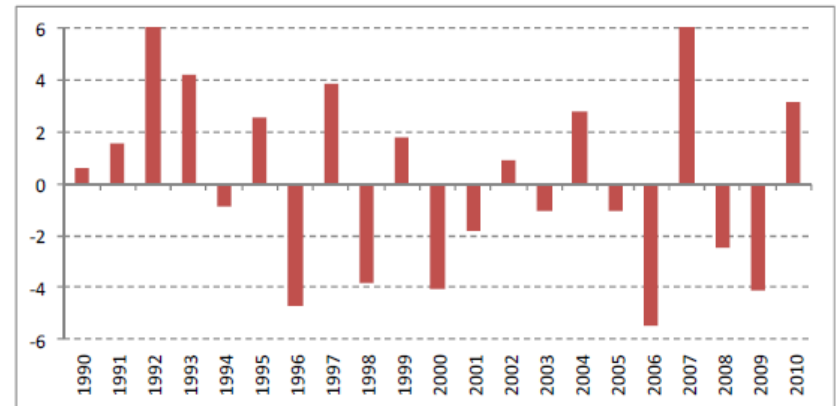
# Synthesis and path forward

- Many competing factors associated with drought influence air quality
- Many factors are understood only qualitatively; synergies between factors poorly understood
- Recent history in Texas provides a series of drought years and relatively wet years for which extensive air quality measurements and modeling frameworks are available



# Work at the University of Texas

- Incorporate new modeling tools into state of the science air quality models used for SIP (regulatory) development
- Test the model predictions against historical data from wet and dry years
- Strong history of work at UT and new EPA-funded 3 year project to specifically address this issue



# Potential policy implications and collaboration with TCEQ

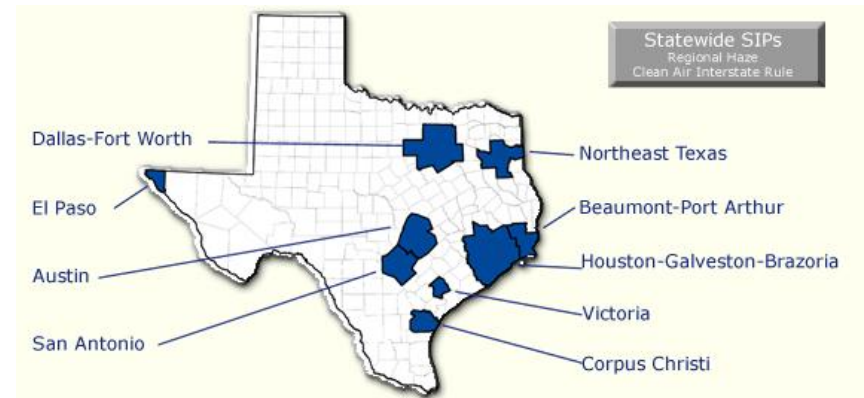
## Questions to be addressed:

Was the severity of air pollution episodes over the past several years severely impacted by drought (affects attainment designations)

Will air pollution levels in future years be exacerbated or mitigated by heat and drought (affects SIP planning)

## Mechanism for collaboration and information transfer:

Development and transfer of modeling tools to the TCEQ



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