



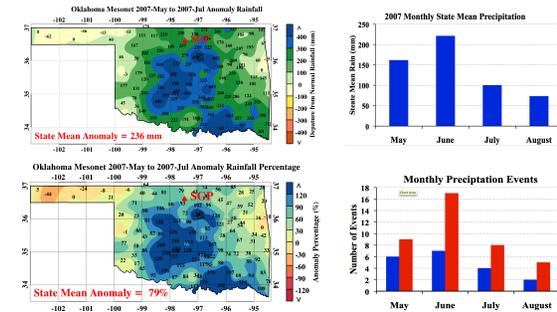
Precipitation Characteristics in Summer 2007 Oklahoma Extreme Events Observed by NEXRAD and MESONET

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Introduction and Objective

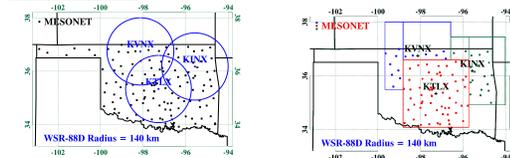
Summer 2007 (May-July in this study) in Oklahoma ranks 2nd wettest season statewide in history, with a total precipitation of **408 mm (168% of normal)**. Major precipitation events are in May – July, with multiple organized convective events (i.e., QLCS) in May and June. Our goal is to characterize all the major events using NEXRAD radar and Mesonet network.



Data

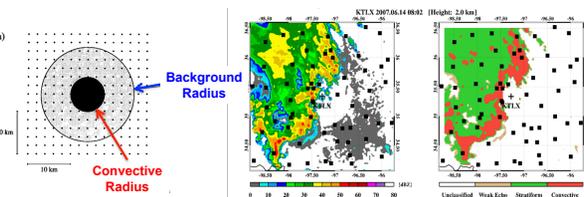
3 NEXRAD radar in Oklahoma: KTLX, KVNX, KINX

Oklahoma Mesonet: Data provided by Oklahoma Mesonet Program through ARM "site license"

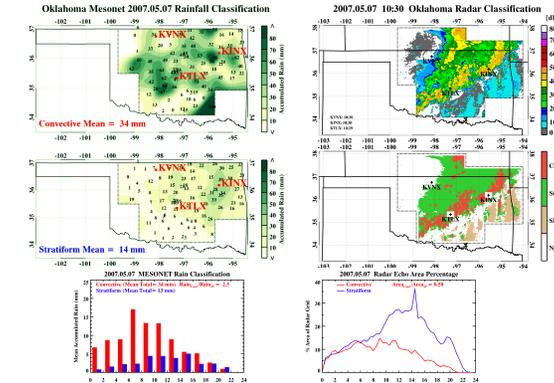


Methods

- (1) Radar data is classified into convective and stratiform using Steiner et al. (1995) method
- (2) Classification parameters are tuned to fit mid-latitude continental convection
- (3) ARM Millimeter Cloud Radar is involved in validating the classification
- (4) Mesonet stations are divided into 3 regions, each assigned with a NEXRAD radar
- (5) Each station gets assigned a class with a radar scan in each time step, and the recorded rainfall is then separated into convective and stratiform

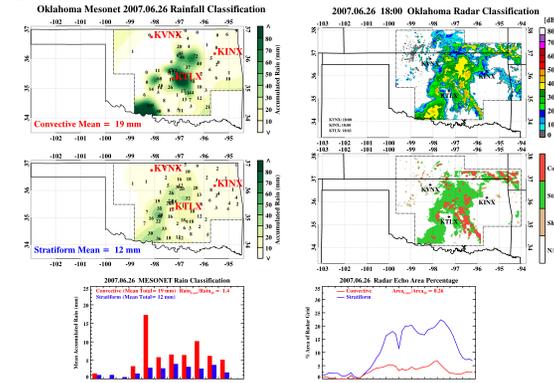


Quasi-Linear Convective Systems (QLCS)



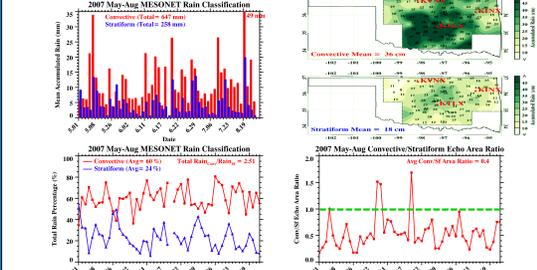
- (a) NEXRADs show several scatter storms merged into organized QLCS, convection lasted for ~14 hrs
- (b) Separation shows different peak time for precipitation and echo coverage
- (c) Integrated Convective core area coverage is 0.5 of Stratiform area
- (d) Convective rainfall intensity is 2.5 times of Stratiform rainfall

Localized Scatter Storms



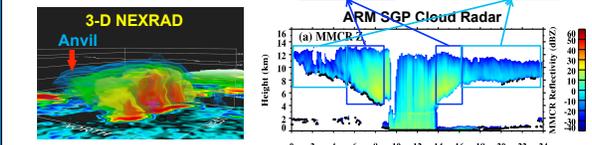
- (a) Most intense precipitation produced by small convective cells, but stratiform also contribute to significant amount of rain fall
- (b) Integrated Convective core area coverage is 0.26 of Stratiform area
- (c) Convective rainfall intensity is 1.4 times of Stratiform rainfall

Summer 2007 Statistics

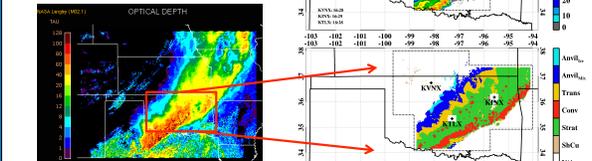


- Convective rain dominates the total precipitation in most events
- Percentage of total rain: **60% convective vs. 24% stratiform**
- Convective to stratiform precipitation ratio: **2.5**, area cover ratio: **0.4**

Anvil Classification



- Frederick and Courtney (2008) added anvil classification
- Our improved version include multi-level cloud base-top height estimation
- Added transition, mix anvil, ice anvil
- Currently fine tuning the algorithm for NEXRAD using ARM Cloud Radar



Future Work

- 1) All data available, we look forward to providing these data for collaborating with modeling group.
- 2) Developing classification using ARM Cloud Radar, to fine tuned the NEXRAD anvil classification
- 3) Classification technique potentially useful for satellite cloud property retrieval applications. ~140 NEXRAD available in Continental U.S.

Acknowledgements

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