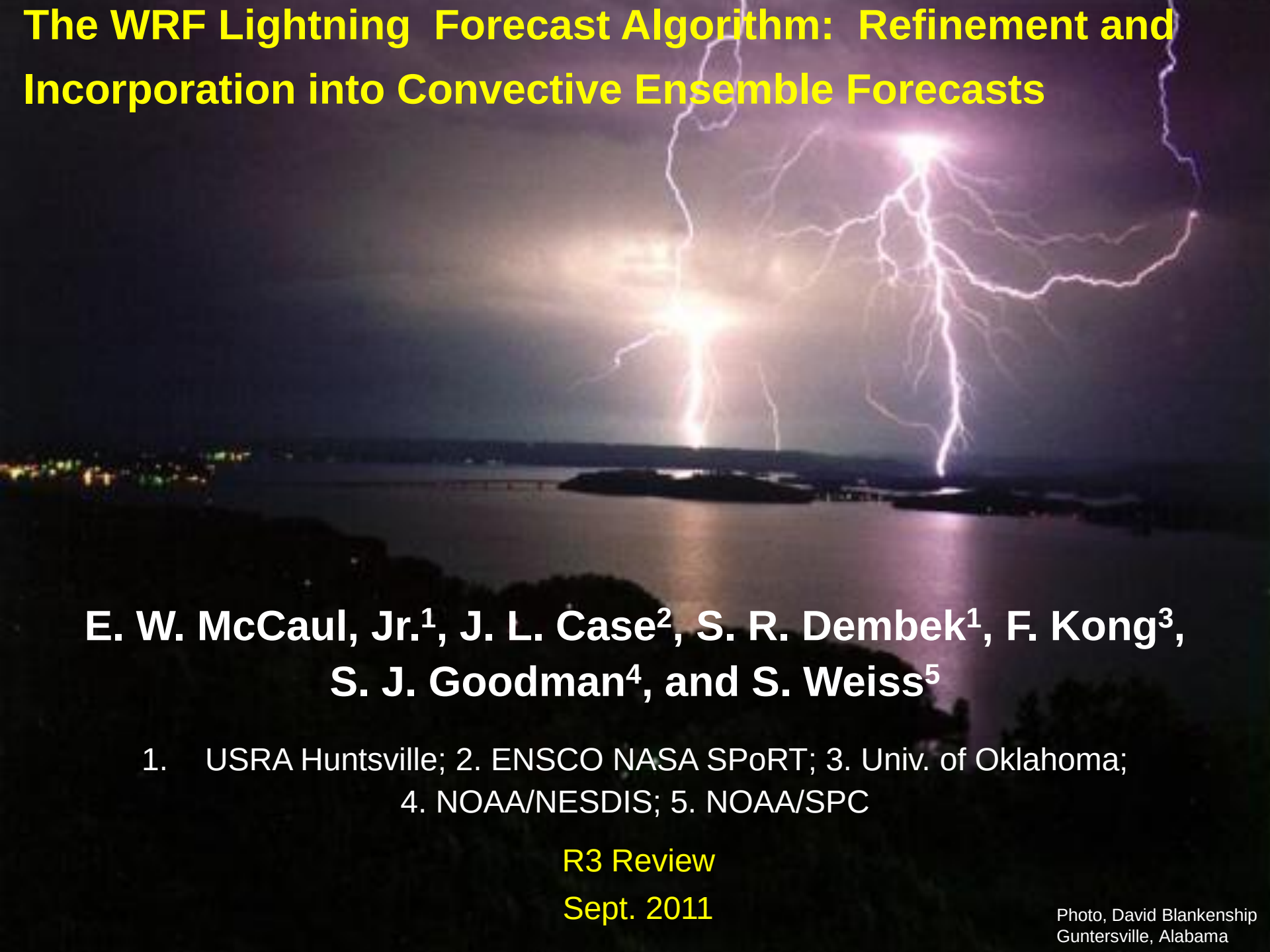
The WRF Lightning Forecast Algorithm: Refinement and Incorporation into Convective Ensemble Forecasts



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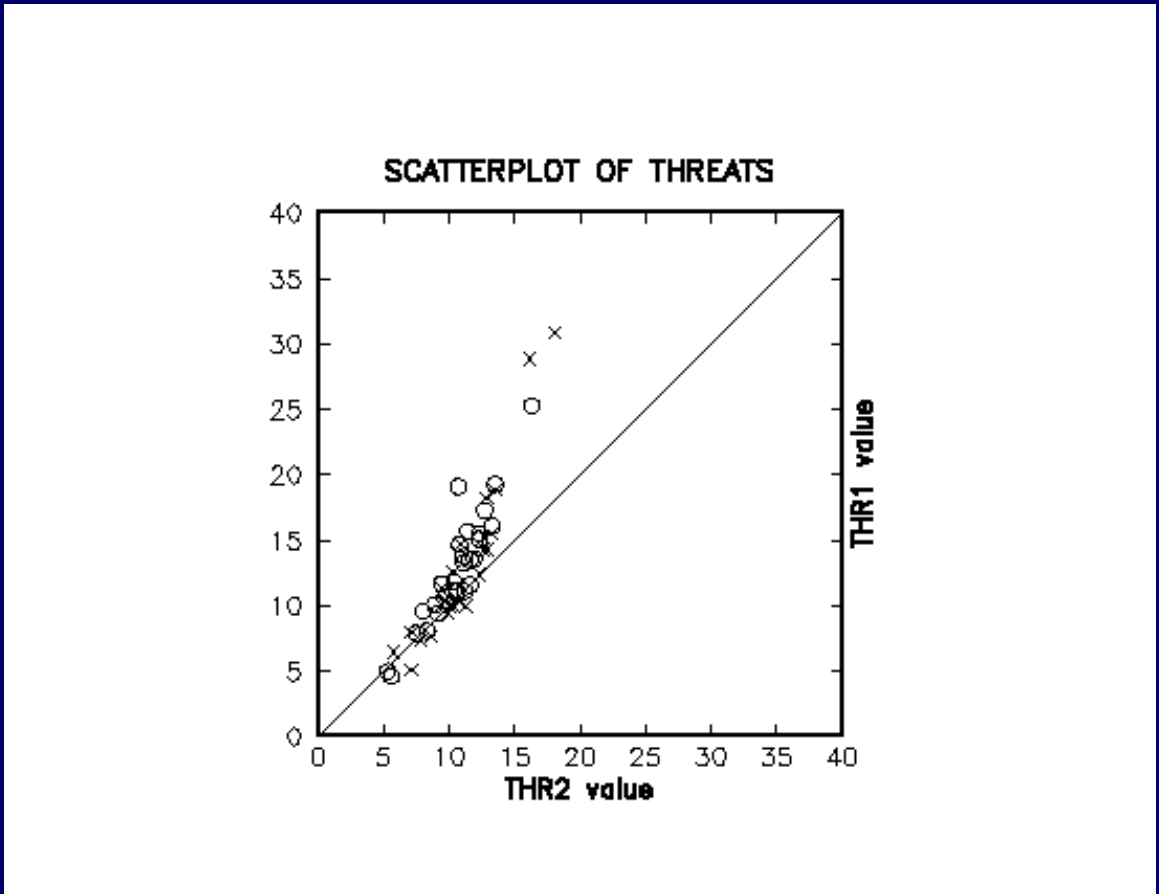
R3 Review

Sept. 2011

Photo, David Blankenship
Guntersville, Alabama

Scatterplot of selected NSSL WRF output for threats 1, 2 (internal consistency check)



Threats 1, 2 should cluster along diagonal; deviation at high flash rates indicates need for recalibration

Recent LFA studies, NSSL WRF, all 2010:

(examined to test robustness in larger sample of model runs)

Studies of *winter* weather

1. Examine regions with LMA data to determine extent of problem with spurious LFA signals in winter precip
2. Determine best method for reducing FAR in winter, without compromising performance in convection
3. First findings, for HUN, ***winter weather 2010-2011***:
   - LFA produces 89 d of winter weather false alarms, mostly from Threat 2, in DJFM (211 d); (0.42 daily FAR in DJFM only)
   - only 46 d of false alarms from Threat 1
   - if require Threat 1>0, could reduce winter FAR days by 48.3%; require Threat 1 > 1.5 could reduce FAR days by 91.0% with little loss of detection of true low-LTG days

Recent LFA studies, NSSL WRF, all 2010:

(examined to test robustness in larger sample of model runs)

Studies of *convective* weather

1. Examine regions with LMA data to check LFA results in very high flash rate convection
2. Discover reasons why LFA threats diverge in such cases
3. Propose algorithm refinements as needed
4. Study LFA sensitivities in CAPS WRF ARW members
5. First findings, for ***convective weather*** in HUN region:
   - WRF predicts convection in HUN for ***all*** days in JJA 2010
   - LFA produces only 2 d of false alarms in JJA (FAR=0.022)
   - LFA produces zero false negative (miss) days (POD=1.00)
   - LFA gives 29 high flash rate cases in JJA 2010
   - NALMA analyses underway to check calibrations
   - CAPS 2011 ensemble output statistics currently being tallied