INTRODUCTION

- The grasslands of the southern Great Plains are vulnerable to widespread outbreaks of destructive wind-driven wildfires.
- Since 2005, a total of 18 southern Great Plains wildfire outbreaks (SGPWOs) have cumulatively burned 3.9 million acres (1.6 million ha), killed 27 people and injured more than 200.
- The Texas A&M Forest Service has referred to these outbreaks as “a force of nature” and “a perfect storm for extreme fire,” and has termed the most violent outbreaks “firestorms”.
- This study utilizes the seasonal climatic variability and its associated response within the southern Great Plains grass-dominated fuel regime observed prior to the historic 2011 Texas fire season and meteorological analyses of the 27 February 2011 “firestorm” to dissect the biophysical and atmospheric anatomy of a SGPWO.

SEASONAL VARIABILITY

July 2010 precipitation totals were 200-400% of normal over the Great Plains of southeastern New Mexico, west Texas, and western Oklahoma, but the same areas received <25% of normal precipitation in January 2011.

RESPONSE IN VEGETATIVE FUELS

OUTBREAK CONCEPTUAL MODEL

Metereological composite based on the 2100 UTC peak burn period of ten SGPWOs which occurred between 2005 and 2009.

CONCLUSIONS

- Seasonal variability on the southern Great Plains prior to the 2011 “firestorms” was characterized by 200-400% of normal precipitation in July, followed by <25% of normal precipitation by January.
- The resultant enhanced vegetative growth cured as drought deepened. ERCs reached sustained values in excess of 70% to 90% percentile rankings by late February and persisted through spring.
- On 27 February 2011 a violent “firestorm” accompanied the passage of a mid latitude cyclone. Wildfires burned along a sharp low-level thermal ridge beneath an overspreading wind maximum aloft. The 27 February 2011 “firestorms” was the first of eight SGPWOs which occurred during the historic 2011 fire season.
- The fire events of 2011 were consistent with pre-existing conceptual models and serve as the ideal example of a dangerous wildfire fire environment on the southern Great Plains.

T. Todd Lindley
NOAA/National Weather Service – Amarillo, Texas

Gregory P. Murdoch
NOAA/National Weather Service – Midland, Texas

Bradley R. Smith
Texas A&M Forest Service – Longview, Texas

The Anatomy of a Southern Great Plains Wildfire Outbreak

“The wind hit and the prairie exploded in fire...an unnatural wind that blew shrapnel-like debris on the windows. I didn’t think it was that close when actually, it was everywhere”
Linda Roy ~ Matador, Texas ~ 27 February 2011