A Comparison of the Summer 2011 Heat Wave and Drought on the Southern High Plains To Previous Extreme Years

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INTRODUCTION

- The summer of 2011 (June – August) was the warmest on record for much of the southern High Plains including all of Oklahoma and Texas
- The entire period of 2011 was the driest year on record for the South Plains in West Texas
- Exceptionally dry conditions led to the most extreme wildfire season on record for the state of Texas with West Texas at the epicenter. The dryness led to numerous days of dust storms
- Numerous heat records were set at Lubbock including number of days of 100°F and 90°F or higher, number of days of minimum temperatures of 75°F or higher, and consecutive days with 90°F or higher
- Goal of the study is to determine if any atmospheric or ground measurements stand out during warm, dry, wet or cool years as compared to the summer of 2011

Number of 100°F days or higher	48 (1st)
Number of 90°F days or higher	131 (1st)
Number of days with minimum temperature ≥ 75°F	27 (1st)
Consecutive days with 90°F or higher	100 (1st)
Consecutive days with 100°F or higher	9 (4th)

Chart depicting selected temperature statistics and rankings recorded at Lubbock International Airport

Warmest	Coolest	Driest	Wettest
86.0 (2011)	73.2 (1920)	0.39” (2011)	15.98” (1914)
82.6 (1980)	73.8 (1915)	2.10” (2001)	15.24” (1972)
82.0 (1934)	74.5 (1919)	2.18” (2001)	11.95” (1967)
81.9 (2001)	74.7 (1968)	2.42” (1978)	11.88” (1928)
81.8 (1994)	75.7 (1967)	2.52” (1983)	11.69” (1966)

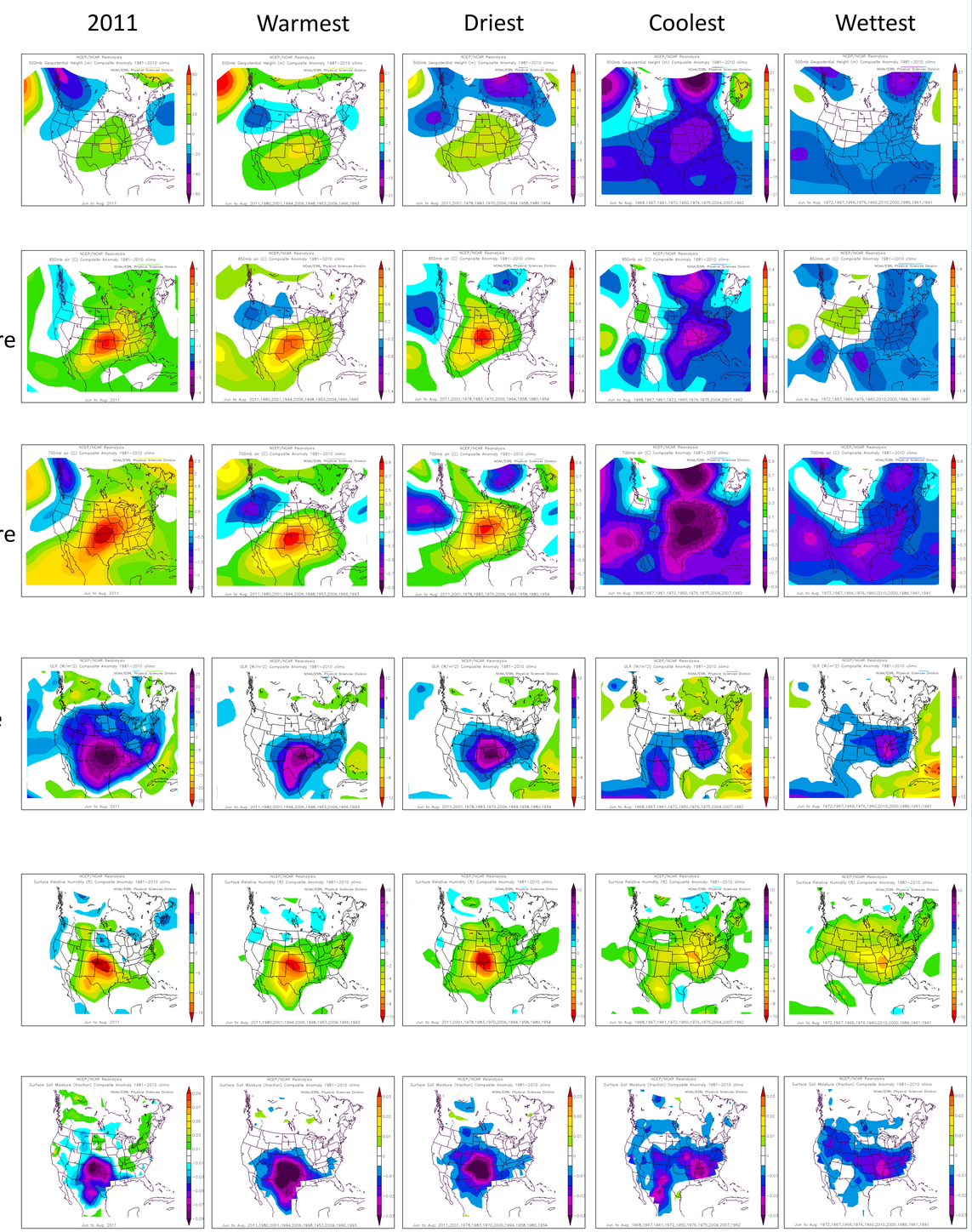
Chart depicting the top five warmest, coolest, driest and wettest summer months (June – August) recorded at Lubbock International Airport

METHODS AND DATA

- 2011 anomalies were compared to the 85th percentile of wettest and warmest years, and 15th percentile of driest and coolest years
- Anomaly composite data was obtained from the Earth System Research Laboratory (ESRL) Physical Sciences Division using NCEP/NCAR reanalysis data available from the following website: http://www.esrl.noaa.gov/psd/

Note: Percentiles were taken using the first available years in the composite data. The earliest composite data is available for the year 1948. Scale for 2011 is different than other charts depicted.

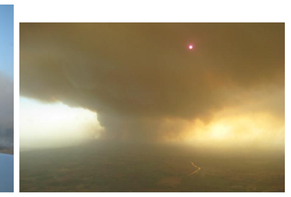
ANOMALY COMPOSITE ANALYSIS



LOCAL IMPACTS

Left – Photograph of a haboob approaching WFO Lubbock (Courtesy John Holsenbeck)

Bottom photos – Swenson fire that burned for 15 days in three counties and 122,500 acres (Courtesy Texas Forest Service)



Pictures taken of Palo Duro Canyon in July 2010 (left) and July 2011 (right) (Courtesy Todd Lindley)

- Total agricultural economic losses were estimated at $2.4 billion for the South Plains and Rolling Plains of West Texas and over $8 billion for the entire state of Texas
- Total of 613,425 acres burned across the NWS Lubbock forecast area and four million across the state of Texas

SUMMARY

- Composites for 2011 were all similar to those of the most extreme warmest and driest years
- The exceptionally dry weather of 2011 contributed to the remarkably large temperature anomalies observed through the summer months
- Coolest and wettest years tended to exhibit lower 500 hPa heights and lower 850/750 hPa temperatures compared to 2011 and the warmest and driest years
- OLR, surface relative humidity and soil moisture anomalies were also negative for the coolest and wettest years but were not as extreme as observed for 2011 and the warmest and driest years

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