

COUNT
ON
EMC
LOYAL
TEAMWORK
STABILITY
COMMITMENT
SERVICE
STRENGTH
RESPECT
INTEGRITY
HONESTY
100 YEARS OF HISTORY
PROFESSIONALISM
INTEGRITY
RESPECT
INTEGRITY
HONESTY
100 YEARS OF HISTORY
PROFESSIONALISM

Central States Actuarial Forum

Storm activity - Is there evidence of a long term trend?

September 27, 2012

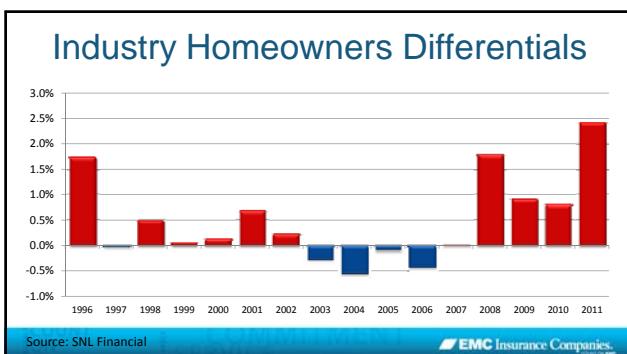
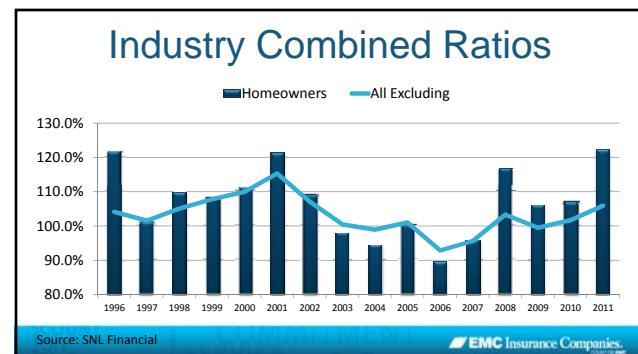
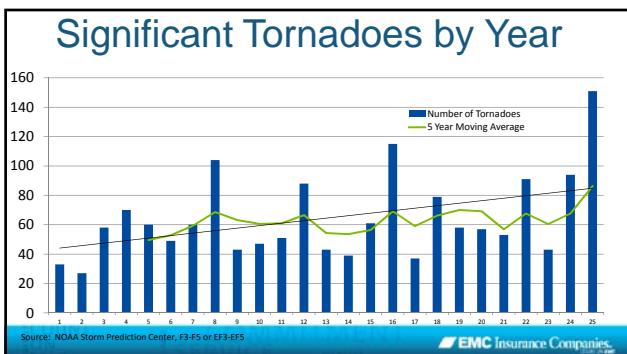
Scott Jean

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Session Objectives

- Objectively review weather data for insurance relevancy and evaluate usefulness of observed trends
- Avoid political discussion of global warming or climate change
- Recognize human nature to have a short-term memory

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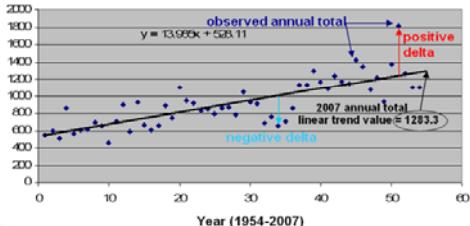
Convective Storms

Tornadoes

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Number of Tornadoes Reported

Tornadoes per year and linear trend

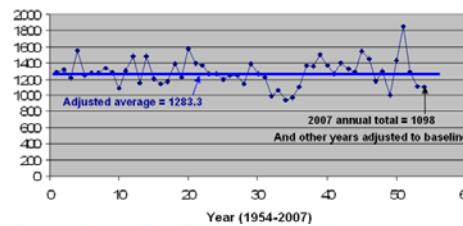


Source: NOAA Storm Prediction Center: <http://www.spc.noaa.gov/wcm/adj.html>

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Adjusted Tornadoes Reported

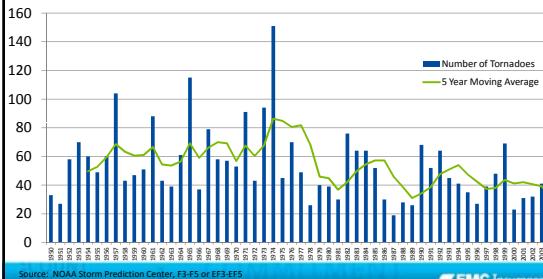
Tornadoes per year adjusted to baseline (2007)



Source: NOAA Storm Prediction Center: <http://www.spc.noaa.gov/wcm/adj.html>

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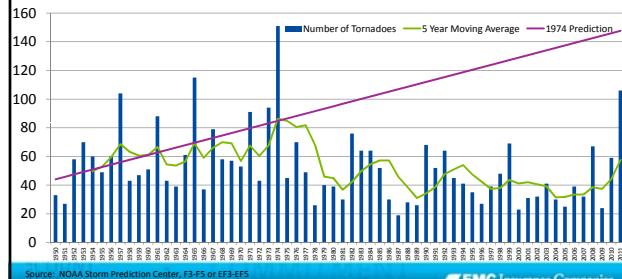
Significant Tornadoes by Year



Source: NOAA Storm Prediction Center, F3-F5 or EF3-EF5

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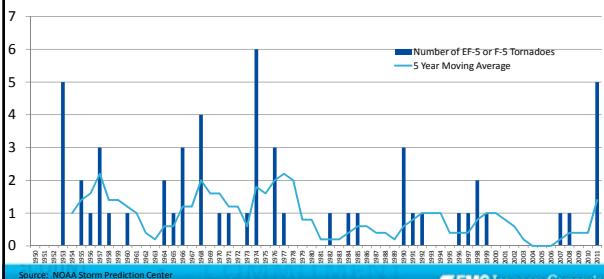
Significant Tornadoes by Year



Source: NOAA Storm Prediction Center, F3-F5 or EF3-EF5

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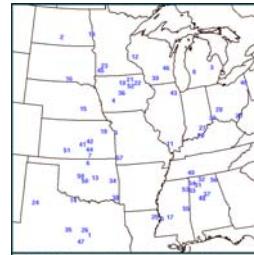
EF5 or F5 Tornadoes Reported by Year



Source: NOAA Storm Prediction Center

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EF5 or F5 Tornadoes since 1950



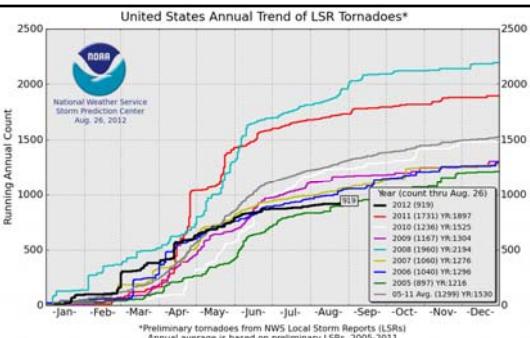
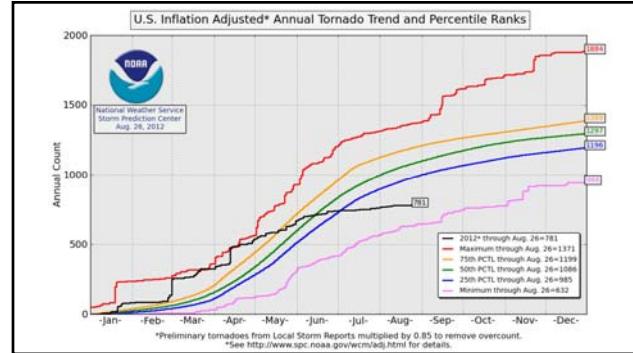
F5 / EF5 Tornadoes in the United States 1950 - Present

58 May 24, 2011 El Reno/Piedmont OK 57 May 22, 2011 Joplin MO 56 April 27, 2011 Rainsville/Sylvania AL 55 April 27, 2011 Preston MS 54 April 27, 2008 Hackleburg/Phil Campbell AL 53 April 27, 2011 Smithville MS 52 May 25, 2008 Paducah KY 51 April 27, 2008 Tuscaloosa AL 50 April 27, 2011 Moore Creek/Moore OK 49 April 27, 1998 Waycross GA 48 April 8, 1998 Pleasant Grove AL 47 May 27, 1997 Jarrell TX 46 July 18, 1998 Gafford WI 45 June 16, 1993 Waukesha WI 44 April 27, 1998 El Reno OK 43 April 27, 1998 El Reno/Wellfield IL 42 March 13, 1990 Geeson KS 41 March 13, 1990 Houston KS 40 May 31, 1985 Niles OH 39 June 7, 1984 Barneveld WI 38 April 2, 1982 Broken Bow OK 37 April 27, 1981 El Reno OK 36 April 27, 1981 El Reno OK 35 April 27, 1979 Brownwood TX 34 April 26, 1976 Spino OK 33 April 3, 1979 Gun A. 32 April 3, 1974 Tanner AL 31 April 3, 1974 M. Hogue A. 30 April 3, 1974 Saylor Park OH 29 April 3, 1974 El Reno OK 28 April 3, 1974 El Reno OK 27 April 3, 1974 Daisy Hill IN 26 May 6, 1973 Valley Mills TX 25 February 21, 1971 Delhi LA 24 May 11, 1970 Lubbock TX 23 June 13, 1968 Tracy MN 22 May 15, 1968 Mayfield CO 21 May 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 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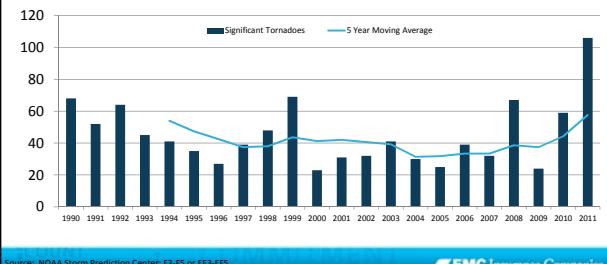
Top 5 April Tornado Outbreaks

Year	Tornadoes
2011	758
1974	291
2006	258
2009	226
1957	219

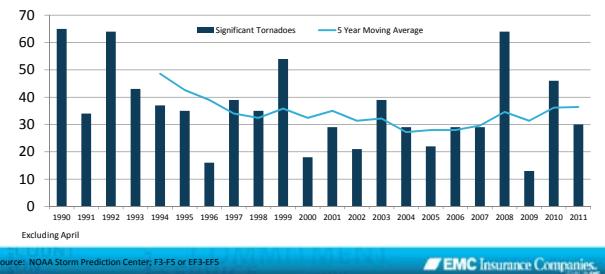
EMC Insurance Companies



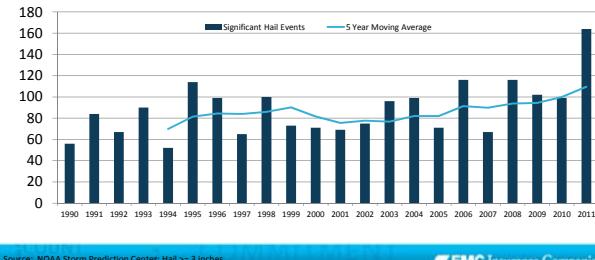
Significant Tornadoes by Year



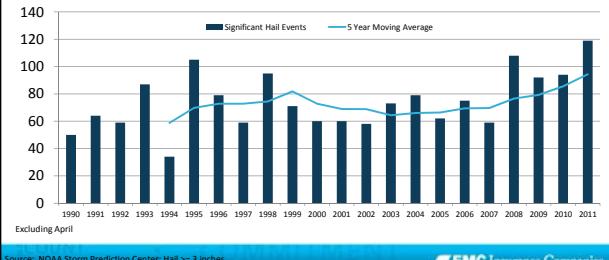
Significant Tornadoes by Year



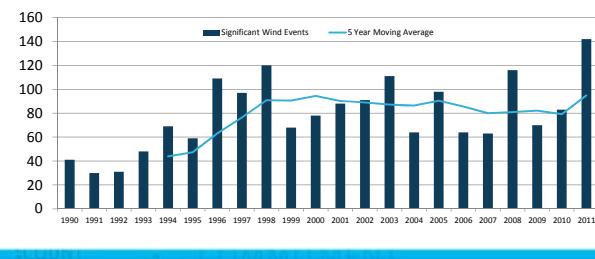
Significant Hail Events by Year



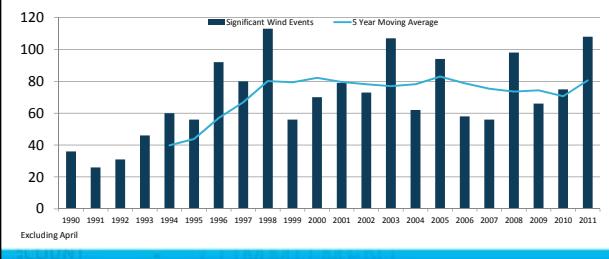
Significant Hail Events by Year



Significant Wind Events by Year



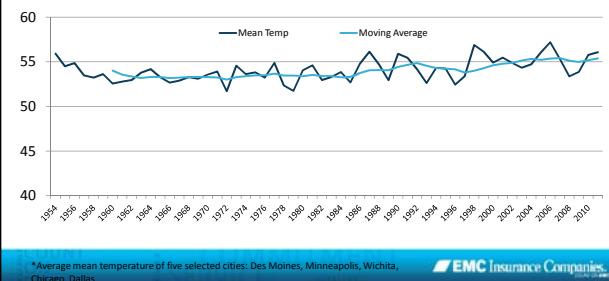
Significant Wind Events by Year

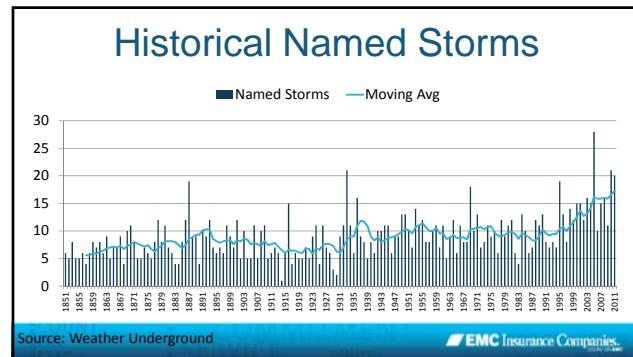
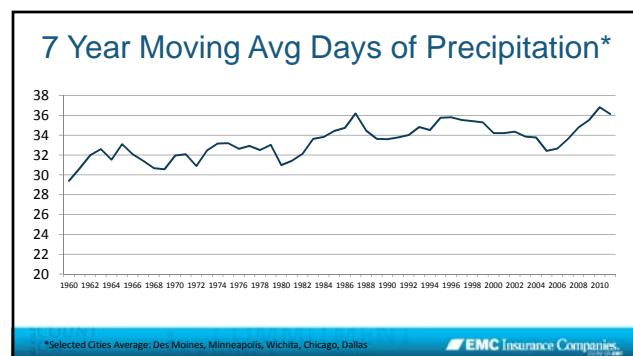
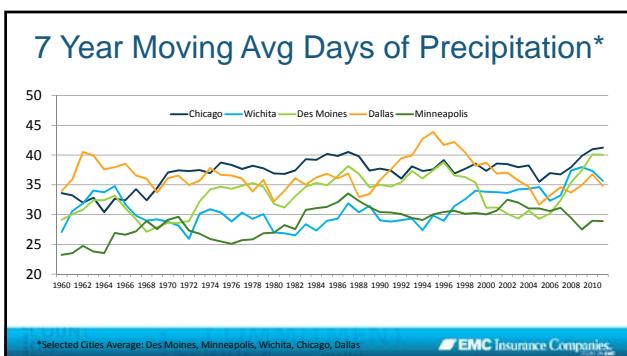
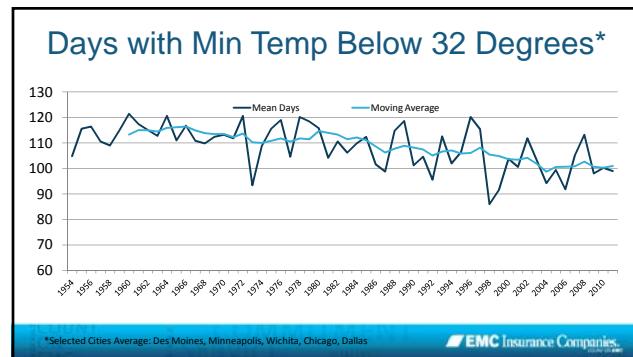
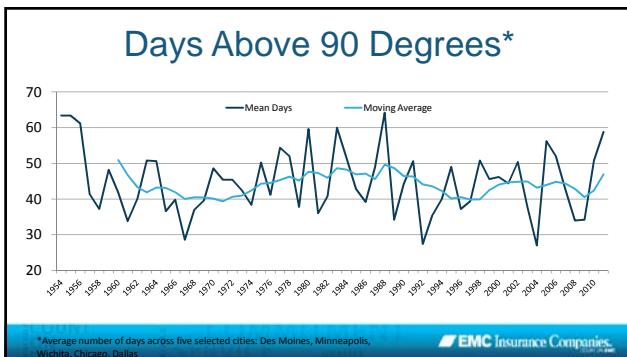


Historical Weather Data

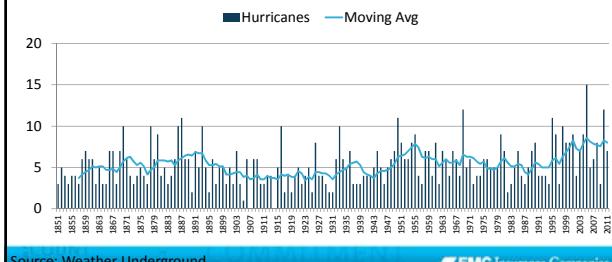
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Mean Average Temperature*





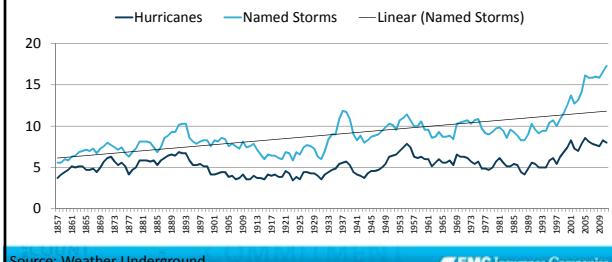
Historical Hurricanes



Source: Weather Underground

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7 Year Moving Averages

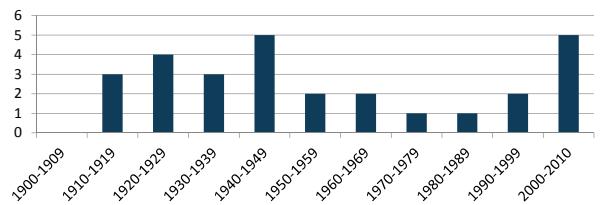


Source: Weather Underground

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Florida Hurricane Strikes

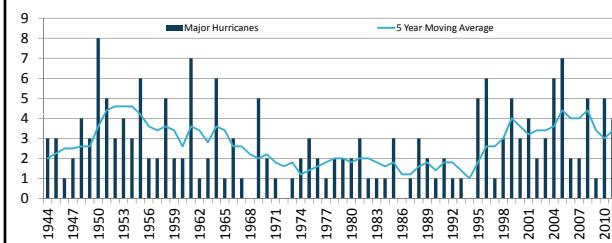
Category 3, 4, or 5 Hurricane Strikes in Florida by Decade



Source: Chris Landsea NOAA @ Aon Benfield Conference

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Major Atlantic Hurricanes



Source: Chris Landsea NOAA @ Aon Benfield Conference and Wikipedia

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Why Increases in Insured Losses?

- Recent active weather period
- Population changes
- Economy
- Stormchasers
- The new norm?

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Key Points for Actuaries

- Have a long-term memory
- Stay abreast of the ever-changing marketplace and modify product offerings as necessary
- Use caution when using historical data to forecast the future

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