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A STATISTICAL MODEL OF INTER-ANNUAL AND INTRA-ANNUAL LIGHTNING DEATHS

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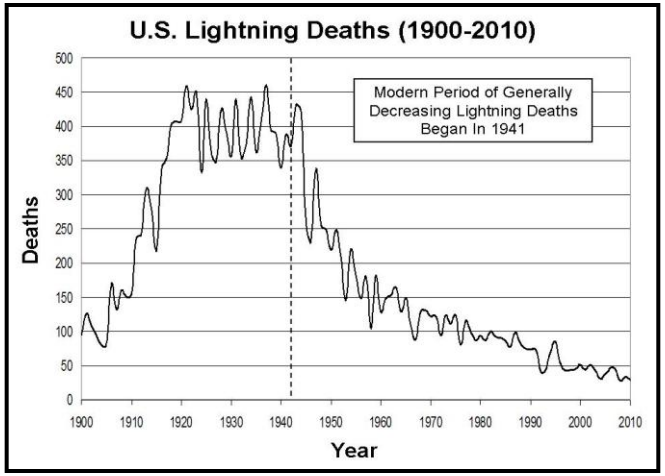
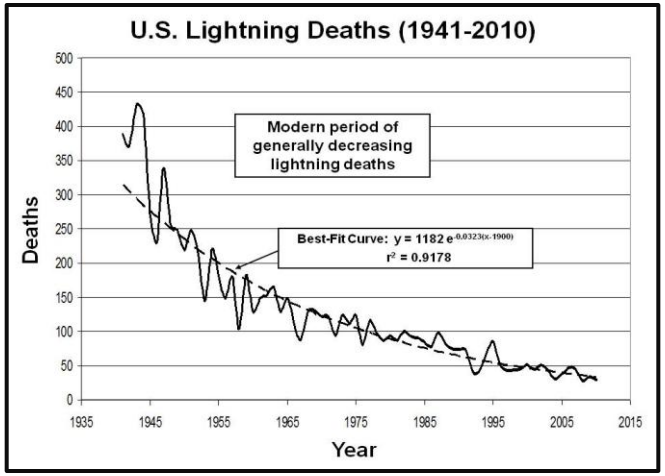
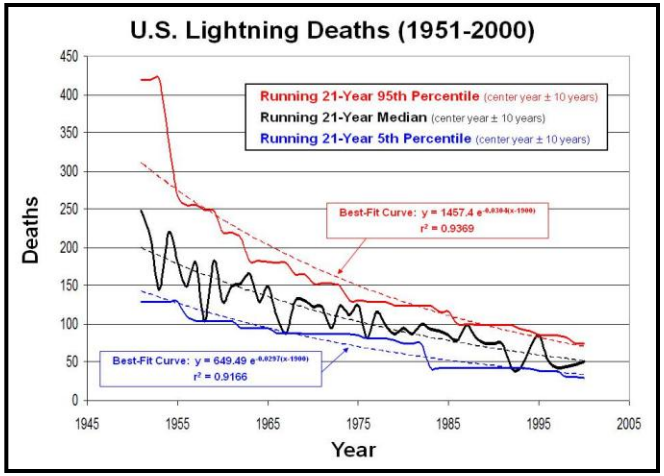
U.S. Lightning Deaths Are Declining, Making It Difficult To Determine If Any Year Is Significantly Atypical

Curve Fitting Of Past Annual Lightning Deaths And Past Percentiles Can Help Solve The Challenge







U.S. LIGHTNING DEATHS		
Period Of Record	**Metric**	**Best-Fit Curve**
1941-2010	Number of Lightning Deaths	$y = 1182.00e^{-0.0323(x-1900)}$ $r^2 = 0.9178$
1951-2000	95th Percentile *	$y = 1457.40e^{-0.0304(x-1900)}$ $r^2 = 0.9369$
1951-2000	75th Percentile *	$y = 986.35e^{-0.0277(x-1900)}$ $r^2 = 0.9647$
1951-2000	Median *	$y = 878.88e^{-0.0285(x-1900)}$ $r^2 = 0.9580$
1951-2000	25th Percentile *	$y = 767.46e^{-0.0290(x-1900)}$ $r^2 = 0.9568$
1951-2000	5th Percentile *	$y = 649.49e^{-0.0297(x-1900)}$ $r^2 = 0.9166$

*** Percentiles and median are estimated from running 21-year measurements, center-year ± 10 years**

FUTURE WORK:

- **Apply Percentile Regression to Annual Lightning Deaths**
- **Determine Distribution of Percentiles for Lightning Deaths by Day-of-Year**
  - **Could infer if any day in a year is significantly ahead or behind expected lightning deaths**
  - **Need to combine with expected annual lightning deaths for that year**

NOTES:

- **2011: 32.8 deaths (24.0, 49.9)** (5th, 95th Percentiles)
- **2008 had record low number lightning deaths (28), but was not statistically significant, barely, since 5th percentile = 27.1**
  (95% significance, one-tail hypothesis test)