

Global Warming: Is the Annual Lightning Strike Maximum Migrating to Higher Latitudes?

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IN THEIR REPORT "Projected increase in lightning strikes in the United States due to global warming" (*Science*, 14 November 2014, p. 851), D. Romps et al. estimate the lightning rate increase over the contiguous United States (CONUS) in this century. On the basis of climate models they predict an increase of 12 +/- 5% per degree Celsius of global warming and about 50% over this century. They omit where this increase might occur, but lightning data from the last 25 years can provide insight.

We have a record of lightning ground strikes in the United States from 1989 to the present from data obtained by the National Lightning Detection Network (NLDN) (1,2). We see in the attached figure that the latitude of maximum flash density has increased from 28 degrees in 1989 to approximately 33 degrees in 2013 with significant variation in recent years. The increase of latitude actually represents a northerly shift in the storm track in the eastern United States.

Individual annual variations, such as 1993, have been well documented by the heavy rains in the upper Midwest (3) and are not part of the general shift that we are observing.

REFERENCES AND NOTES

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2. R. E. Orville, G. R. Huffines, *Mon. Weather Rev.* **129**, 1179-1193 (2001)
3. D. H. Josephson, "The Great Midwest Flood of 1993," Natural Disaster Survey Report, Department of Commerce, NOAA, National Weather Service, Silver Spring, Maryland, (1994).

Year	Latitude
1989	27.9
1990	28.3
1991	28.5
1992	28.5
1993	39.5
1994	28.1
1995	30.7
1996	26.9
1997	28.1
1998	28.1
1999	27.9
2000	28.1
2001	28.7
2002	28.1
2003	26.5
2004	28.7
2005	27.9
2006	36.3
2007	26.9
2008	34.3
2009	37.5
2010	30.7
2011	34.7
2012	30.1
2013	35.5

