

Examining Climatologies for ASOS Sites in the Path of the 2024 Total Solar Eclipse: a Road trip from Texas to Maine

Introduction

On 8 April, 2024, several states in the United States will get to witness a Total Solar Eclipse. Data on average cloud cover is available, however there are no corresponding, readily available climatologies for other meteorological variables such as temperature, precipitation, snowfall, and snow depth. The weather conditions will impact how viewers prepare for the eclipse, so this project seeks to fill in the gap.



Photo by Brian Brettschneider The image above is a product of the research conducted by Brian Brettschneider to develop a cloud climatology across the United States for the purpose of fitting its results to the path of totality of the Total Solar Eclipse anticipated on 8 April, 2024. The results of this climatology show considerable variability in cloud cover across the expected path of totality which pays compliment to the equally variable weather conditions that are climatologically plausible across the cities the path intersects during this timeframe.



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Motivation

The motive for this research is to provide a climatology of typical weather conditions, including temperatures and precipitation, for all National Weather Service climate sites in the path of totality for the 8 April, 2024 solar eclipse. Having readily available and easy to read data will allow the National Weather Service its emergency management partners to better inform travelers from across the country of possible weather conditions for various sites in the path of totality. This will also help emergency management officials to better plan and prepare for this rare event in a way that maximizes public safety.

NOAA student MSI/EPP Program

ASOS climatological data was obtained using xmACIS2. Locations in the path of totality were identified using NASA data combined with the list of NOAA ASOS sites. Microsoft Excel was used to create box and whisker plots of maximum, minimum, and average high temperature, low temperature, liquid precipitation, snowfall, and snow depth for the various climate sites of eclipse totality path.



Methodology

Conclusions

There is a large degree of variability in possible weather conditions for the various sites in the path of totality, especially for variables such as temperature and snow depth for the climate sites in northeastern U.S. With such a high degree of variability, simply planning for the "average" climatological conditions is not enough. The New York State office of Emergency management has formed a task force that has already hosted several preparation meetings, and has used the results of this climatology to plan for the possible weather and subsequent travel conditions for the eclipse. The corresponding climatologies will also be passed along to all other NWS offices in the path of totality and to their respective emergency management partners.