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Group: DATA – ASU Capstone Project

Sponsored By: <u>Yanbor LLC</u>

## Website: OUReport.com

# Tornadoes in 2023 in the U.S

### URL:

https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Tornado&beginDate\_mm=01&beginDate\_dd=0 1&beginDate\_yyyy=2023&endDate\_mm=12&endDate\_dd=31&endDate\_yyyy=2023&hailfilter=0.00&tornfilter=0&windfilte r=000&sort=DT&submitbutton=Search&statefips=-999%2CALL

## Introduction:

Tornadoes are formidable and unpredictable forces of nature. They have always held a significant place in the environmental landscape of the United States. Throughout 2023, the nation has witnessed a remarkable pattern of tornado activity,

particularly notable for its concentration in specific regions. This report provides an in-depth analysis of tornado activities from January 1, 2023, to the present, focusing on their frequency, intensity, and geographic distribution in central and eastern U.S.

The study of tornadoes is crucial, not just for academic interest but for practical, life-saving purposes. These natural phenomena, characterized by their high wind speeds and potential for destruction, pose serious risks to life, property, and the broader environment. Understanding where and why tornadoes occur, their paths, and their impacts is vital for the safety and preparedness of communities, particularly in the most affected regions.

In this report, we employ advanced mapping and data analysis tools provided by Google Maps and Google Earth Pro, in conjunction with OUreport.com, to offer a comprehensive view of the tornado landscape in 2023. Our goal is to analyze and present data on tornado occurrences in a manner that is both informative and accessible, providing valuable insights for emergency response teams, policymakers, researchers, and the general public.

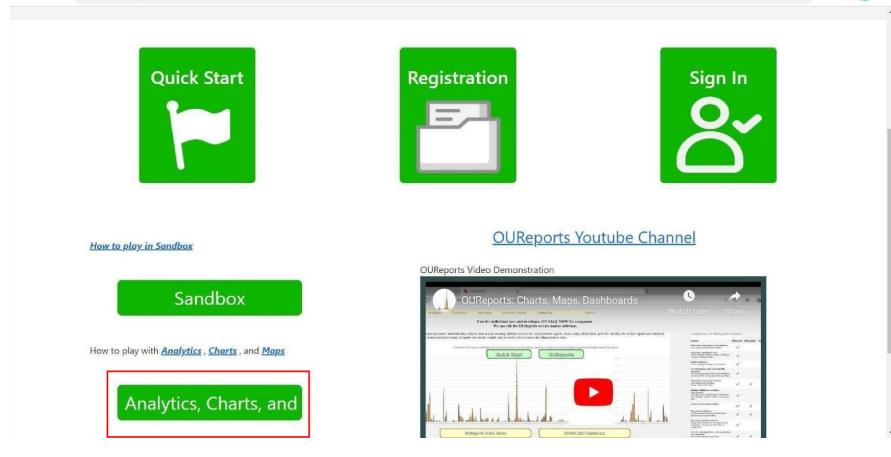
We organize the report into several key sections, starting with this introduction to set the stage and underscore the importance of understanding tornado activity in the United States. The following sections will delve into detailed statistical analyses,

examine the regional impacts of these tornadoes, and conclude with a synthesis of our findings, highlighting their implications for future preparedness and response strategies. **Reports and maps:** 

First, we are using OURepotrs and the integrated Google maps and Google Earth pro to generate maps that show all the earthquakes last month:

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In the provided picture, you can observe a list of reports on OUReports.com. You can import your own data by clicking on the "Import data" button. However, I have selected the "Map" option for the "Data imported into Tornadoes\_in\_2023" report. After choosing the "Map" option, you will be directed to the "Map Format" page. Initially, you can choose the map type as shown in the first picture below. After that, you must configure the longitude and latitude settings to generate the map. Since it is "Path" type, so there are begin latitude, end latitude, begin longitude and end latitude.

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Export Report to PDF     See Crystal Report     Show Analytics     See Data Overall Statistics	Open Google Map	Chart Report	Make simplified kml file and open it in Google Map	Make and download kml file to open it with Google Earth Pro (To install the	Google Earth Pro app click: <u>here</u> )	
See Data Overall Statistics     Export Overall Statistics to Excel     See Groups Statistics	To save KML definition add	the comments for histor	y:	and click: Save Map definition for future use		
<ul> <li>See Groups statistics</li> <li>See Fields Correlation</li> <li>Matrix Balancing</li> </ul>						

After choosing the "path" type, the end longitude and end latitude will appear in the format page as shown in the picture.

below:

◇ Log Off;	Map Report Definition Data imported into tornado_in_2023	on 11-14-2023 12-37-21 AM	Help
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Export Report to PDF			
<ul> <li>See Crystal Report</li> <li>Show Analytics</li> </ul>	Add Placemark Geolocation		
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See Data Overall Statistics     Export Overall Statistics to Excel	Key Fields for additional records from data table :		
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Online Data Analytics and	Reporting					
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Online Data Analytics and	l Reporting	
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Once you have selected "Latitude," click on "Placemark Latitude," and it will appear in the "Fields selected" box. Similarly, you should follow the same steps for "Longitude."

Now, you can assign text to each field under "Text for Description in Balloon" and "Fields for Description in Balloon," as

shown in the picture below, and this information will appear in the "Fields Selected" box.

◊ Log Off;	Map Report Definition Data imported into tornado_in_2023	on 11-14-2023 12-37-21 AM	Help
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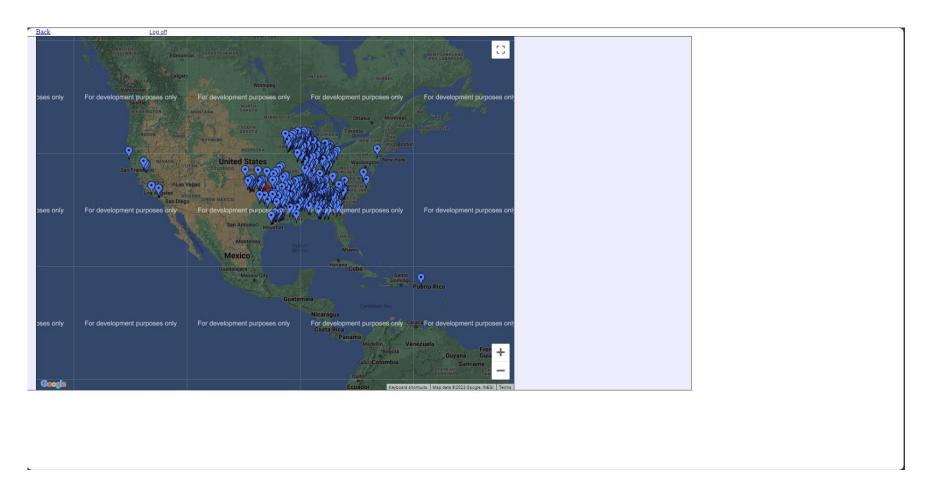
Also, we can use the color density feature as shown below, I chose the color for the Damage property field as shown below:

Online Data Analytics and	l Reporting			
◊ Log Off;	Мар Repo	rt Definition Data imported into tornado_in_2023 o	on 11-14-2023 12-37-21 AM	Help
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Columns, Expressions     Groups, Total		emark Geolocation End	Highest density color: saved	
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<ul> <li>See Data Overall Statistics</li> </ul>				
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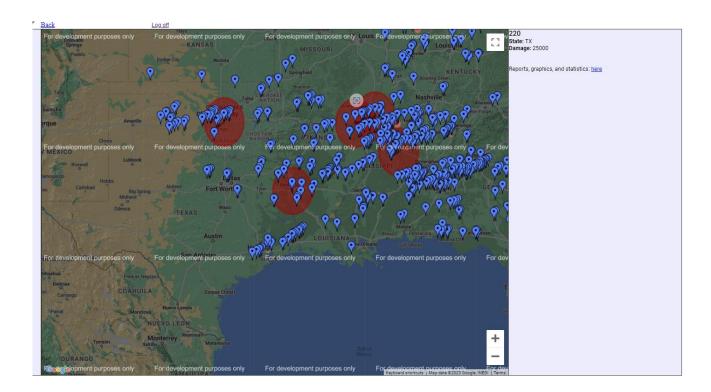
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Once you have determined what information you want to display, you can click on the "Make simplified kml file and open it in Google map" button:

List of Reports	Map type: Paths V Maps: Data imported into tornado_in_2023 on 11-14-2023 12-37-21	IAM ▼ Map Name: Data imported into tornado_in_2023 on 11-14-2023 12-37-2	add del	
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Here we can see all the options that we have selected, paths, pins, and circles around pins. In addition, once we click on any pin the fields and the descriptions will be appeared in the light of the page as shown below:



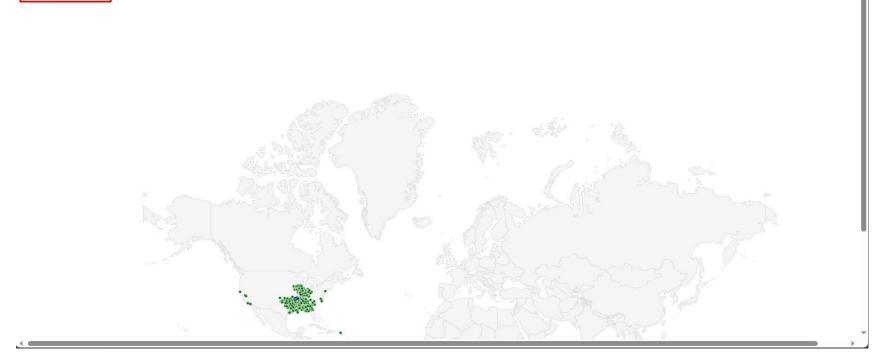
We can use another option to generate the map using google map, we can click on "Open Google Chart Report" button:

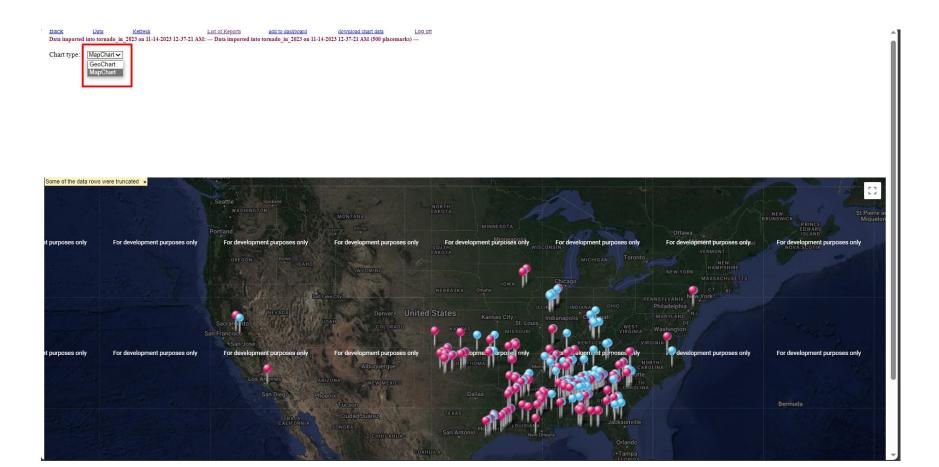
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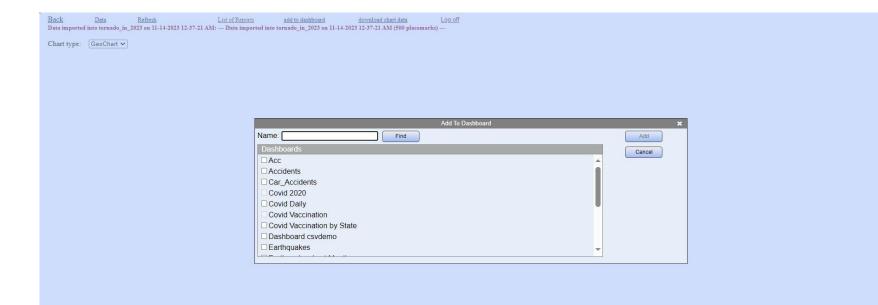
After clicking on it, you will be directed to the page shown in the first picture below. You'll notice two "Chart Type" options, and you can add them to a dashboard by clicking on "Add to Dashboard." This action will reveal the options depicted in the third picture, allowing you to select where you want to add them. You can choose a dashboard from the list of available dashboards, or you can create your own dashboard by entering its name and clicking on the "Find" button. Once you do this, it will be added to the list, and then you can select the dashboard and click on "Add."

Back Data Refresh List of Reports add to dashboard download chart data Log off Data imported into tornado\_in\_2023 on 11-14-2023 12-37-21 AM (500 placemarks) ---

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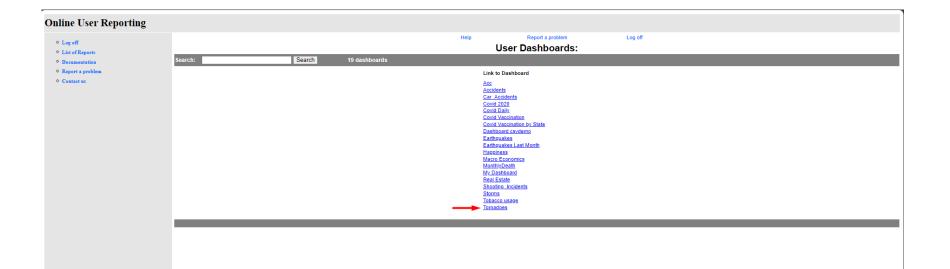






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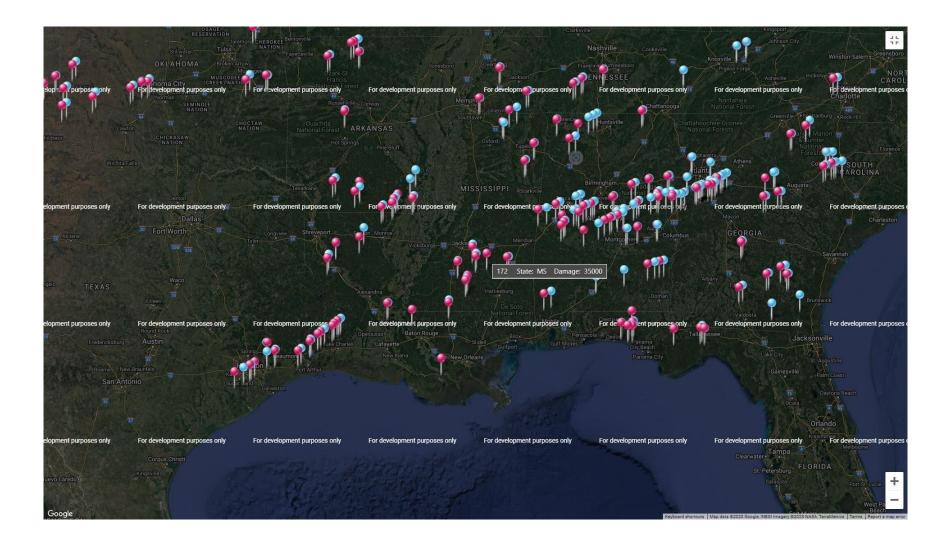
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Send dashboard link to email address: Share

Once you've added the map to the dashboard, you can maximize it and click on any pin on the map to view the associated information.



Additionally, you have the option to display the selected information in "Google Earth Pro." Before doing so, you need to install the Google Earth Pro app. The file has been downloaded and we can open it from Google Earth app.

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You can click on any pin to display its information and the link of the report:

#### Soogle Earth Pro

▼ Search

<u>File Edit View Tools Add Help</u>



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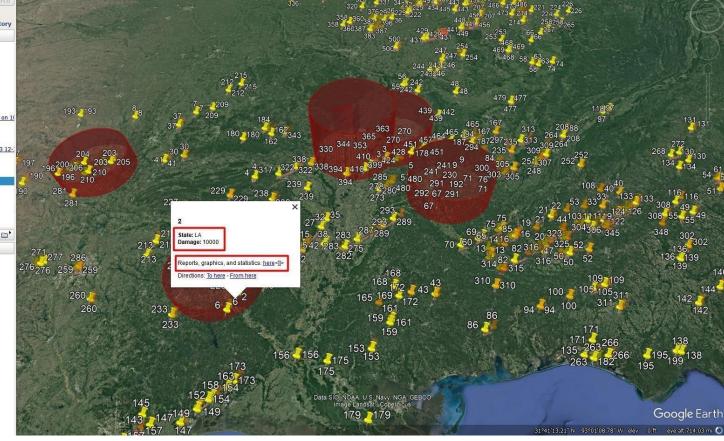
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## **Conclusion:**

In conclusion, our extensive analysis of tornado activity in the United States for the year 2023, utilizing sophisticated data analysis and mapping technologies, has yielded significant insights into the patterns and implications of these severe weather events.

One of the most striking findings of our study is the heightened prevalence of tornadoes in the central and eastern regions of the United States. This pattern underscores the geographical and meteorological factors that make these areas particularly susceptible to tornado occurrences. The central part, often referred to as 'Tornado Alley,' and the eastern regions are characterized by unique climatic conditions that facilitate the formation of tornadoes, reflecting the intricate interplay of topography, temperature variations, and atmospheric dynamics.

Recognizing these areas as hotspots for tornado activity is crucial for emergency management, community planning, and disaster mitigation efforts. This understanding necessitates the implementation of robust building standards, efficient early warning systems, and comprehensive public awareness programs to enhance the safety and resilience of communities in these tornado-prone regions.

The findings and visualizations presented in this report are invaluable tools for informed decision-making, aiding in the development of strategies aimed at mitigating the impact of tornadoes and improving preparedness in the central and eastern United States. This report contributes significantly to the body of knowledge needed to bolster tornado resilience and highlights the importance of prioritizing safety measures in regions frequently affected by these natural disasters.

Ultimately, our analysis lays the groundwork for data-driven initiatives that will lead to safer and more resilient communities in the face of tornado threats, particularly in the central and eastern United States. By reducing the impact

of tornadoes and fostering greater disaster preparedness, this report serves as a cornerstone for future efforts in enhancing safety and resilience against one of nature's most unpredictable and destructive phenomena.