



Lightning: Jamaica's Experience

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Meteorological Service of Jamaica

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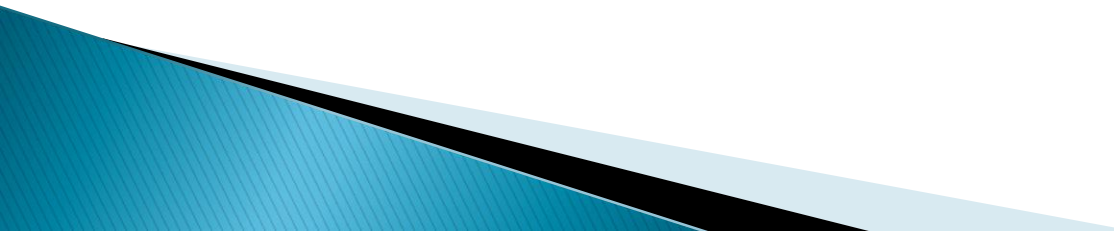
What is lightning?

- ▶ Lightning is an electrical discharge caused by imbalances between storm clouds and the ground, or within the clouds themselves.


Source: The National Geographic website



Limitations to the study of lightning in Jamaica

- ▶ Lightning is one of the most frequently occurring geophysical phenomena.
 - ▶ The frequent occurrences of lightning in Jamaica are not currently being tracked by local scientists as there are simply not enough data for scientists to work with.
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Limitations of the study of lightning in Jamaica

- ▶ The UWI Climate Studies Group Mona, CSGM, completed a study on lightning strikes over Jamaica in 2019 with data supplied by the Meteorological Service.
 - ▶ Prior to this study only one recorded study was done by Coy in 2001.
 - ▶ Lightning strikes do not receive as much publicity as other natural hazards such as hurricanes and earthquakes.
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Data used

Research conducted by Climate Studies Group U.W.I,
Mona on lightning strikes across Jamaica.

Lightning data and Radiosonde data for:

- September 1998 to December 1998
- May 1999 to November 1999
- November 2004 to October 2005

Authors: [C. C. Farquharson](#)

A. Coy

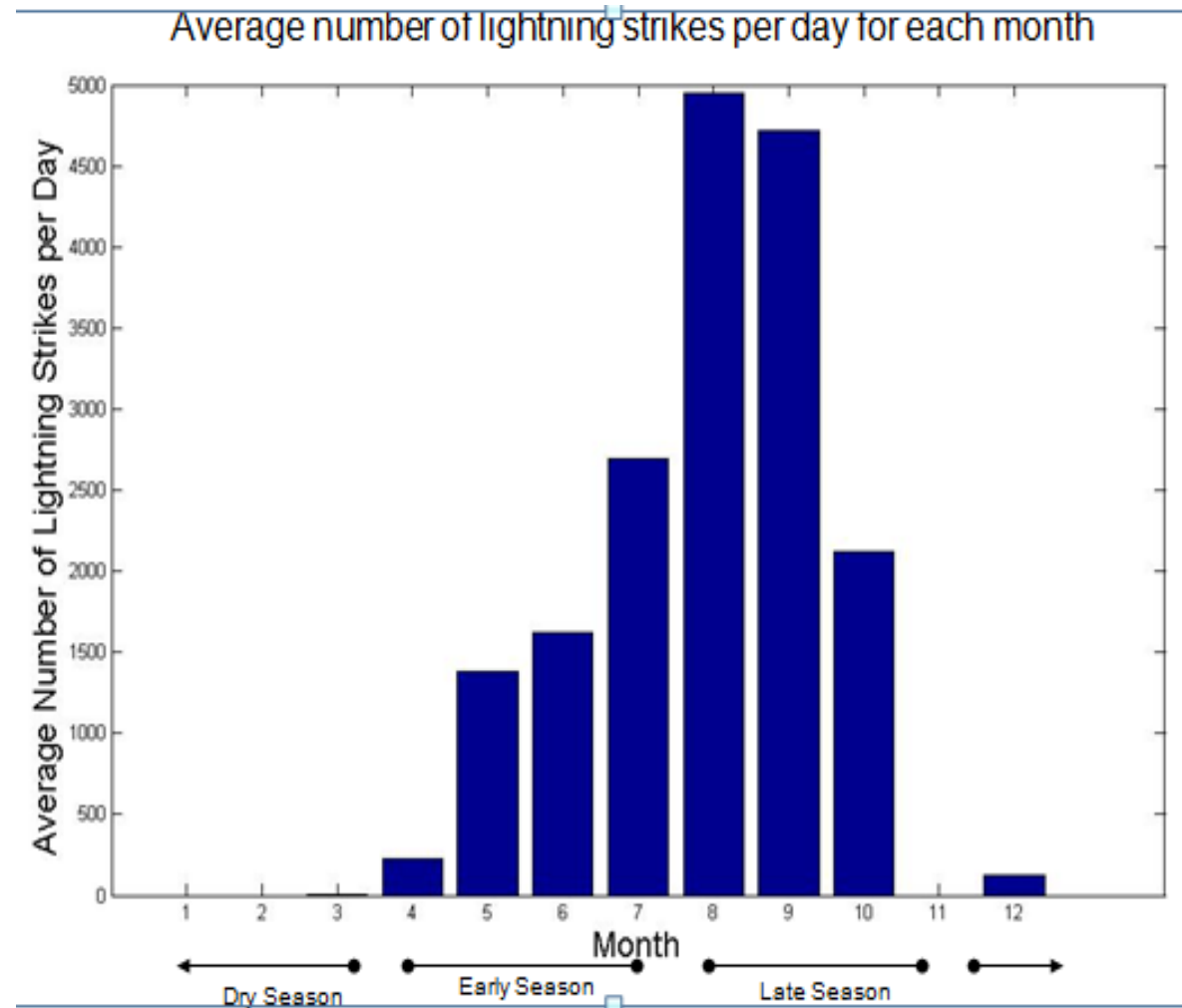
M. A. Taylor

D. Walwyn

T.s. Stephenson

Findings

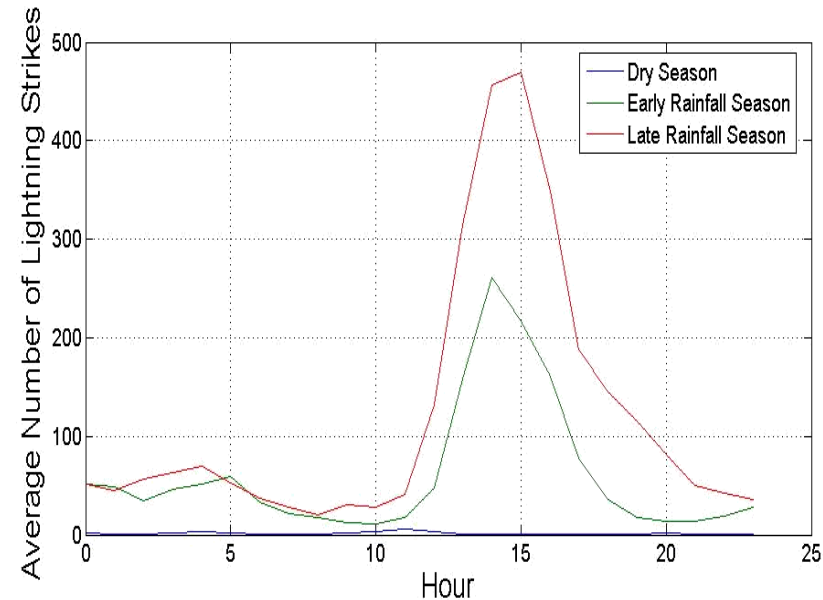
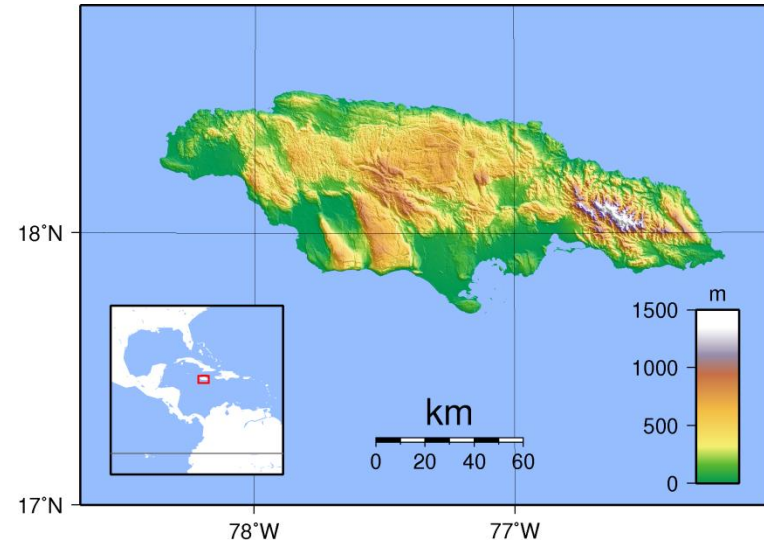
Lightning is most frequent during summer months



Farquharson et al (2019)

Findings

- In Jamaica, lightning tends to strike over mountainous areas
- **Peaks 2–4 pm local time**
- In mountain terrain even an indirect lightning strike that extends into a shock-wave, or that causes abrupt muscle contraction, can lead to severe injuries secondary to a fall or stumble (Stohe et al , 2018) .



Farquharson et al (2019)

Frequency of lightning

- ▶ Based on media reports and observations, the frequency of lightning strikes has seemingly increased over the past several years.
- ▶ Research is required to determine if there has been a spike in lightning strikes in Jamaica

The image is a screenshot of a news article from the Jamaica Observer. The article title is "Expect More Lightning Strikes With Rising Temperatures, Warn Experts". The author is Judana Murphy/Gleaner Writer, and it was published on Tuesday, October 8, 2019, at 12:06 AM. The article features a large image of a dark, stormy sky with multiple bright lightning strikes over a body of water. On the left side of the article, there is a blue sidebar with a purple circle containing the text "400 DAYS" and a yellow box below it that says "Activate your 5-day plan today!". Below that, in white text on a blue background, it says "UNLIMITED DATA FOR YOUTUBE? ONE." and "Unlimited data for YouTube & more". On the right side, there is a sidebar for "Air Testing Laboratory" with a list of services: VOCs, Formaldehyde, Metals, Odors, PCBs, Aldehydes & Other Chemicals, and an "OPEN" button. Below that, there is a "More Stories" section with a link to "50m reasons why - Reid, Pincock, three others charged in ministry, CMU fraud" and another link to "Rains flood businesses on Spanish Town Road". At the bottom of the article, there is a quote from Evan Thompson, Director of the Meteorological Service of Jamaica, stating that while there are instruments to record lightning activity, the evidence is anecdotal and suggests a spike in lightning in recent weeks. The Windows taskbar is visible at the bottom of the screenshot.

Frequency of lightning continued

- ▶ Director of the Meteorological Service of Jamaica, Evan Thompson, indicated that there are no instruments locally to record lightning activity but from anecdotal evidence, there has been more lightning in recent weeks.
- ▶ Dr André Coy, lecturer in the Department of Physics at The University of the West Indies, Mona, said that without analysis of the strike rates, lightning activity cannot be thoroughly assessed.
- ▶ (Source: Gleaner October 8, 2019)

Frequency of lightning continued

- ▶ The Jamaica Civil Aviation Authority (JCAA) will not forget the disruption in services and closure of airspace associated with lightning strikes a few years ago. (September and October 2017)
 - ▶ For the second time in three weeks a lightning strike has affected crucial operations at the Jamaica Civil Aviation Authority (JCAA). (September and October 2017)
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Frequency of lightning continued

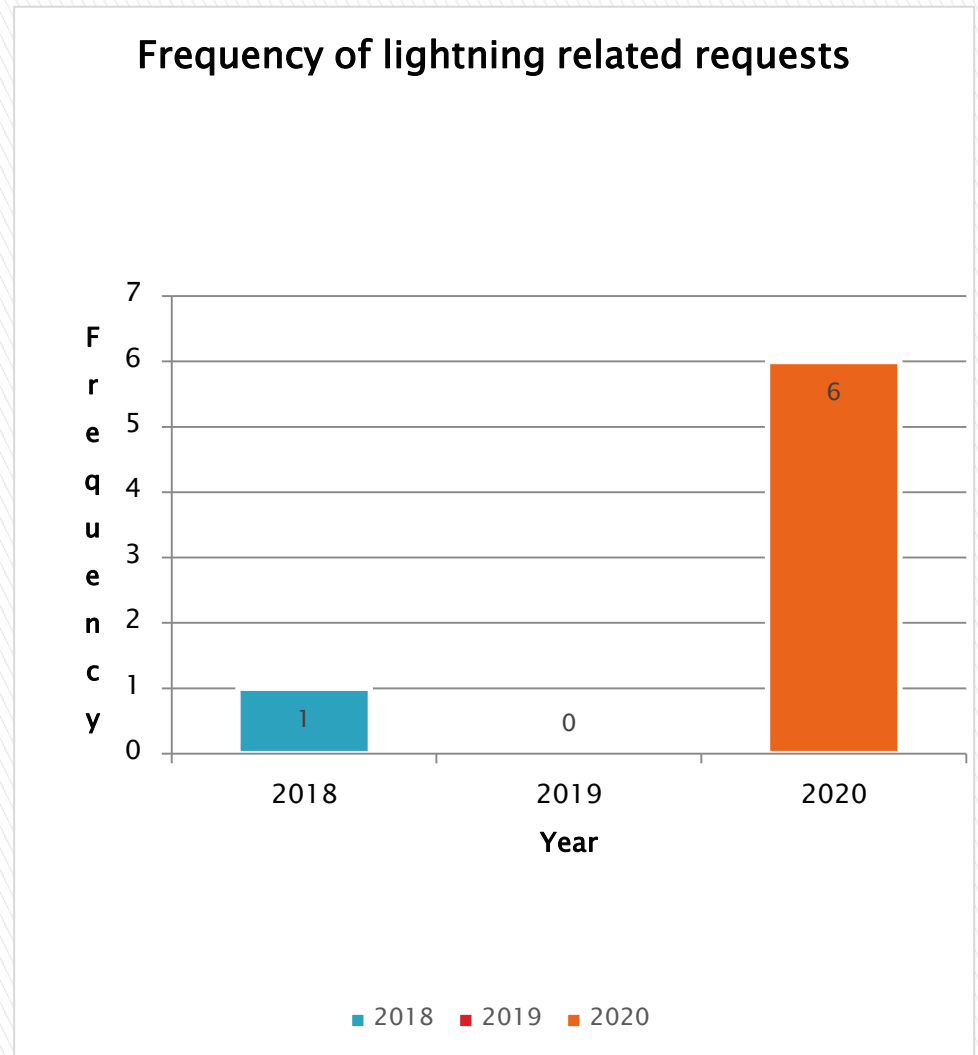
- ▶ As recently as 2019, several schoolboy footballers were struck by lightning
- ▶ Since then, there have been a number of other occurrences, some of which resulted in death.
- ▶ Actual number of casualties may be higher as many injuries and deaths often go unreported.



September 17, 2019

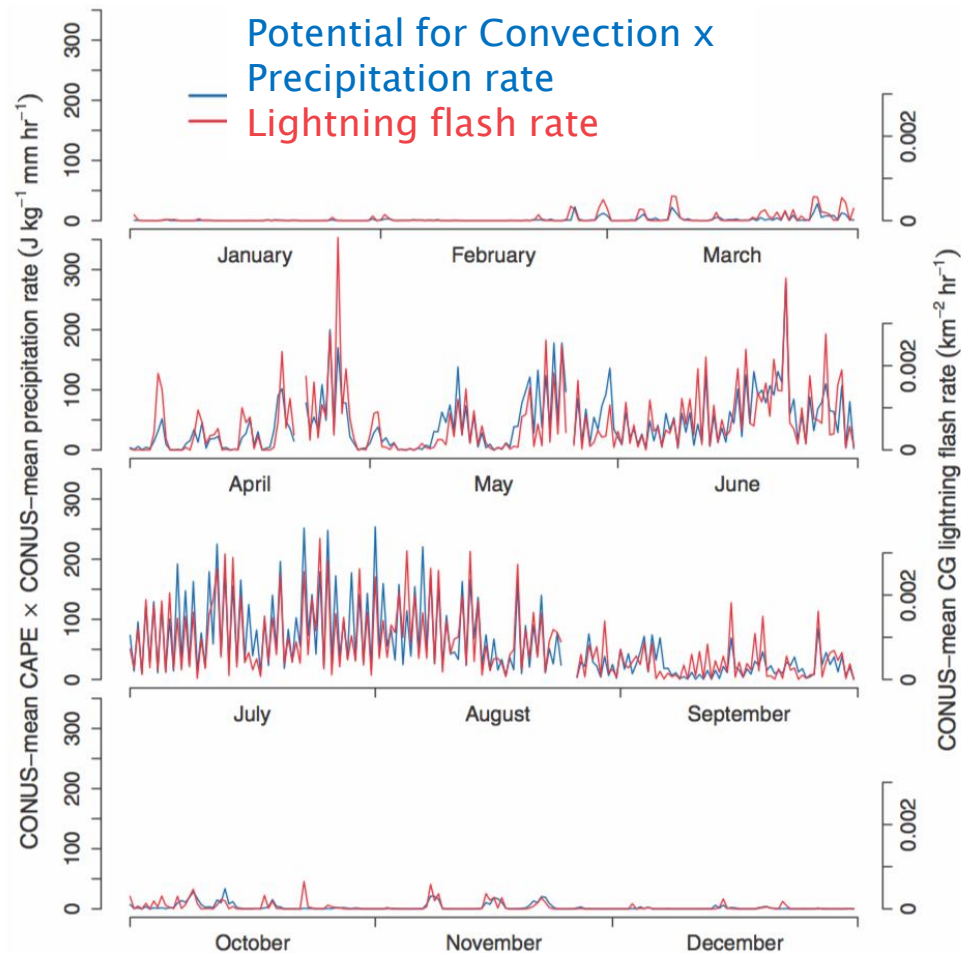
Increase in the number of lightning related requests

- ▶ Examples of Requests for confirmation of lightning activity on September 8, 2017 in Kingston, associated with Hurricane Irma.
- ▶ Request for weather data to investigate possible lightning strike in Coopers Hill, St. Andrew.




Climate change impact

- ▶ Climate models support a positive correlation between lightning and global temperatures
- ▶ Romps et al. (2014) modelled frequency of lightning strikes across Continental USA and predicted that lightning strike rates will increase significantly due to increases in global average air temperature




Romps et al (Science, 2014)

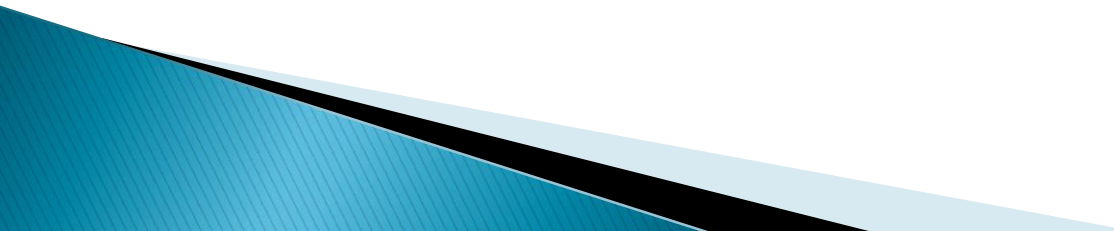
Climate change impact continued

- ▶ These climate change projections are an added concern for developing countries like Jamaica that are already prone to lightning occurrences and severe weather events.
 - ▶ There is uncertainty regarding the expected changes in the spatial distribution of lightning with climate change.
 - ▶ Hence, the need for monitoring and prediction of lightning incidences on a local scale for developing countries like Jamaica.
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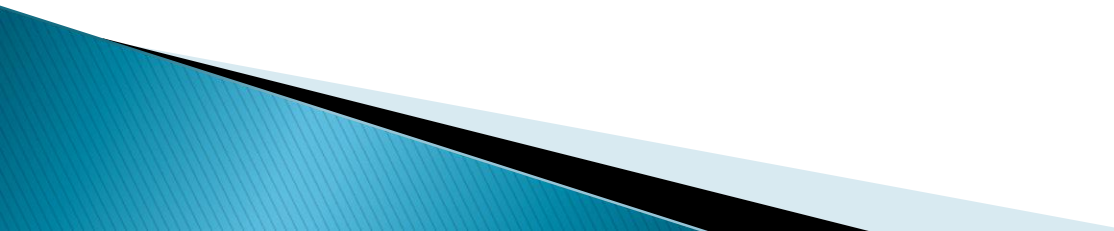
Developing a lightning detection network system for Jamaica

- ▶ A workshop was hosted by the Meteorological Service in 2019, in collaboration with other stakeholders, on building resilience to lightning hazards.
 - ▶ Jamaica is currently upgrading the national weather radar to help in monitoring and detecting severe weather
 - ▶ Secondly, the Meteorological Service is currently in preliminary discussions with stakeholders about the establishment of a lightning detection network on the island.
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Developing a lightning detection network system for Jamaica cont'd

- ▶ Will greatly assist communities in preparing for lightning through risk knowledge and near-real-time early warning systems.
 - ▶ Can be achieved through communication and dissemination of alerts in a timely and comprehensible manner in languages that are understood within specific communities
 - ▶ Rural agricultural communities are especially vulnerable
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Lightning Safety Awareness

- ▶ Also, myths and beliefs remain a challenge to the Meteorological Service.
 - ▶ Finally, Jamaica's community infrastructure, including the national school education and disaster preparedness systems need to include lightning safety .
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Safety Tips shared by Met Service

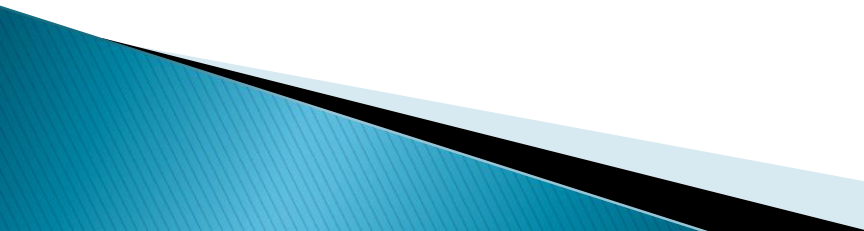
▶ Outdoor

- ▶ Hurry to get inside a building for coverage
- ✓ If in a vehicle refrain from leaning on the doors
- ▶ Immediately get out and away from ponds, lakes and other bodies of water
- ▶ Stay away from objects that conduct electricity (barbed wire fences, power lines, windmills, etc.)


▶ Indoor

- ▶ Avoid the usage of electronic equipment
- ▶ Do stay away from concrete floor or walls
- ▶ Stay away from windows and doors, and stay off porches

Conclusion

- ▶ More research needs to be done on lightning in Jamaica.
 - ▶ Lightning strikes peak in late wet season, primarily between August and September
 - ▶ Lightning strikes occur mainly during the afternoon, typically between 2– 4 p.m.
 - ▶ Lightning strikes have seemingly increased which increases the demand for lightning data.
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Conclusion continued

- Lightning strikes have damaged equipment, disrupted activities and caused fatalities.
 - Studies indicate that climate change will have an impact on the frequency of lightning.
 - The Meteorological Service is currently installing a new Doppler Radar system and working with stakeholders to develop a lightning detection and monitoring system to help Jamaicans to effectively deal with the impact of lightning.
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Thank you!!!