



Hurricanes and Their Past Destructiveness Compared to the Recent Past

Benjamin Gurch,
Beacon Hill Middle School; Decatur, GA



ABSTRACT

Hurricanes have been a destructive form of storm for a very long time, but recently, storms such as Hurricane Ian and Hurricane Fiona have proven to cause massive amounts of damage, both humanitarily and economically. There seems to be a correlation between the amount of damage caused and the recentness of the hurricanes, but despite this, the hurricane categories don't seem to be changing as much as you'd expect, so perhaps the overall intensity and size of the storms have been increased. And upon observing an interesting comparison between Hurricane Charlie and Hurricane Ian, respectively of 2004 and 2022, where Hurricane Ian was much larger despite the hurricanes being of the same/similar category, we decided to observe whether hurricanes of the same category, of the same landfall, were bigger or larger in terms of both actual size and in terms of effects outside of wind speed. We will be comparing Hurricane Ian and Irma, due to their landfall location and status as category 4 hurricanes at landfall or near landfall by using several resources and ABI bands.

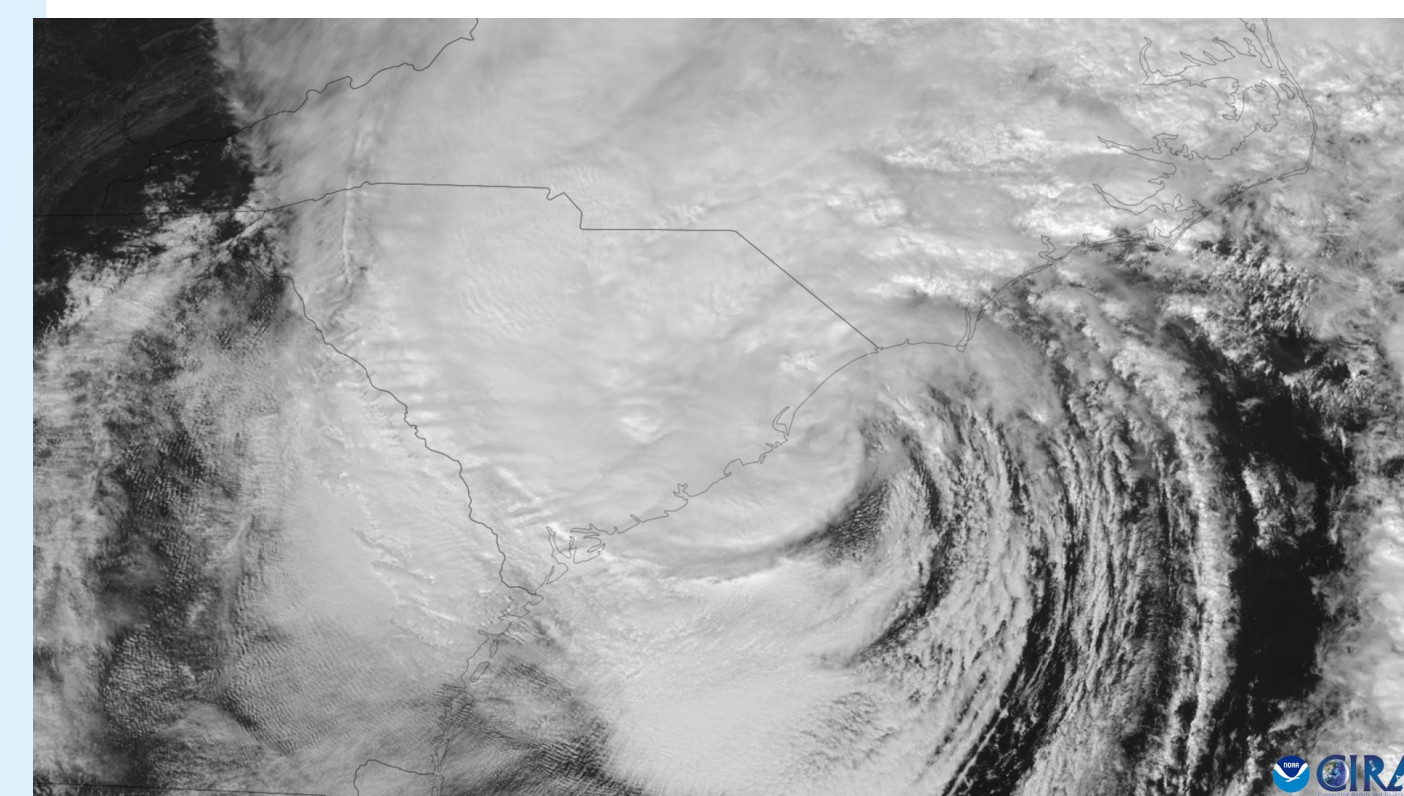
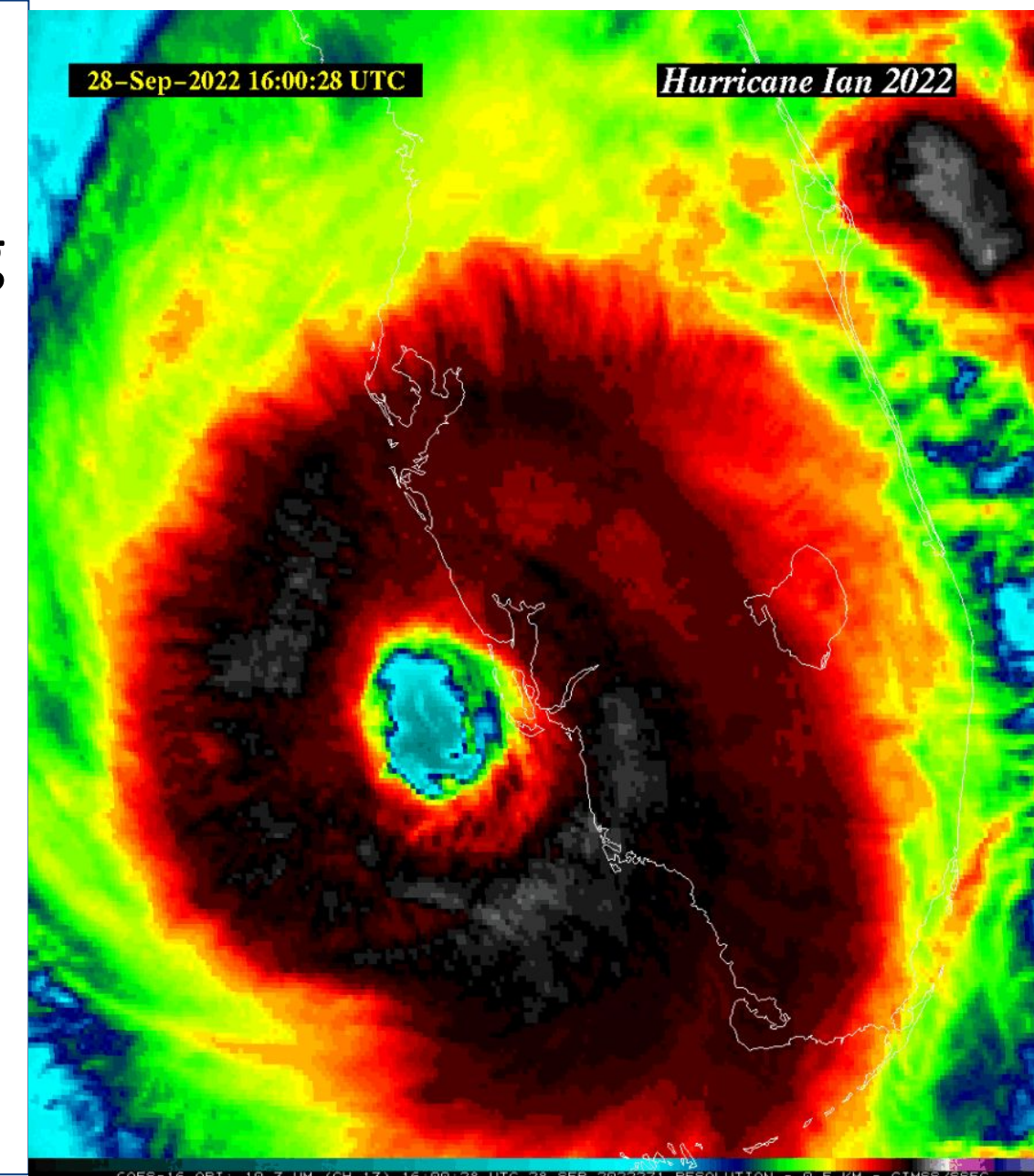
HYPOTHESIS

If a hurricane of the same month and region makes landfall now, then its devastation will be greater than that of other past hurricanes of the same month and region, due to climate change's impact on hurricanes and other forms of storms.

RESEARCH with Satellite Images & ABI Bands

<https://cimss.ssc.wisc.edu/satellite-blog/archives/48379>

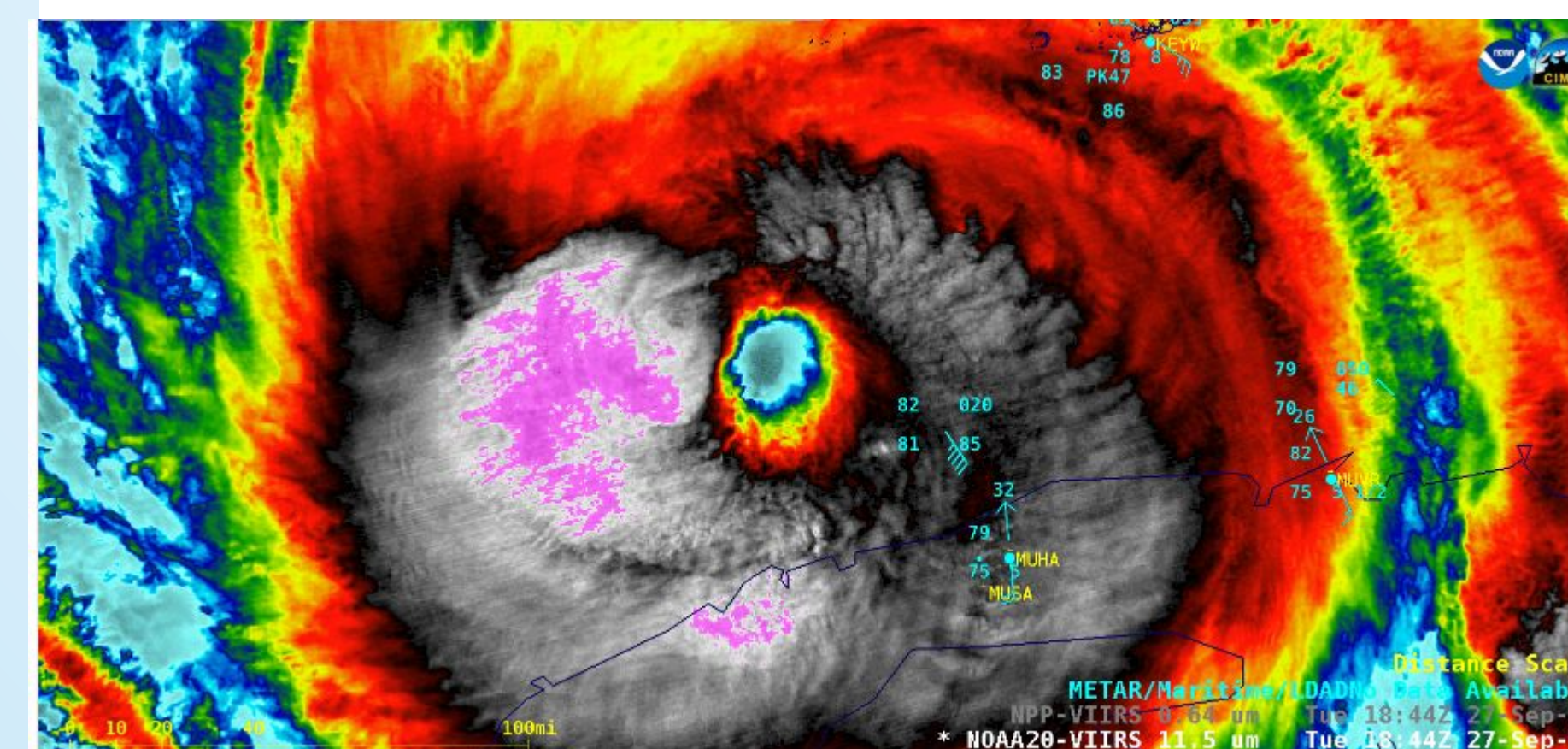
An image using ABI band 13 to indicate the brightness temperature of Ian, showing the intensity of the storm.



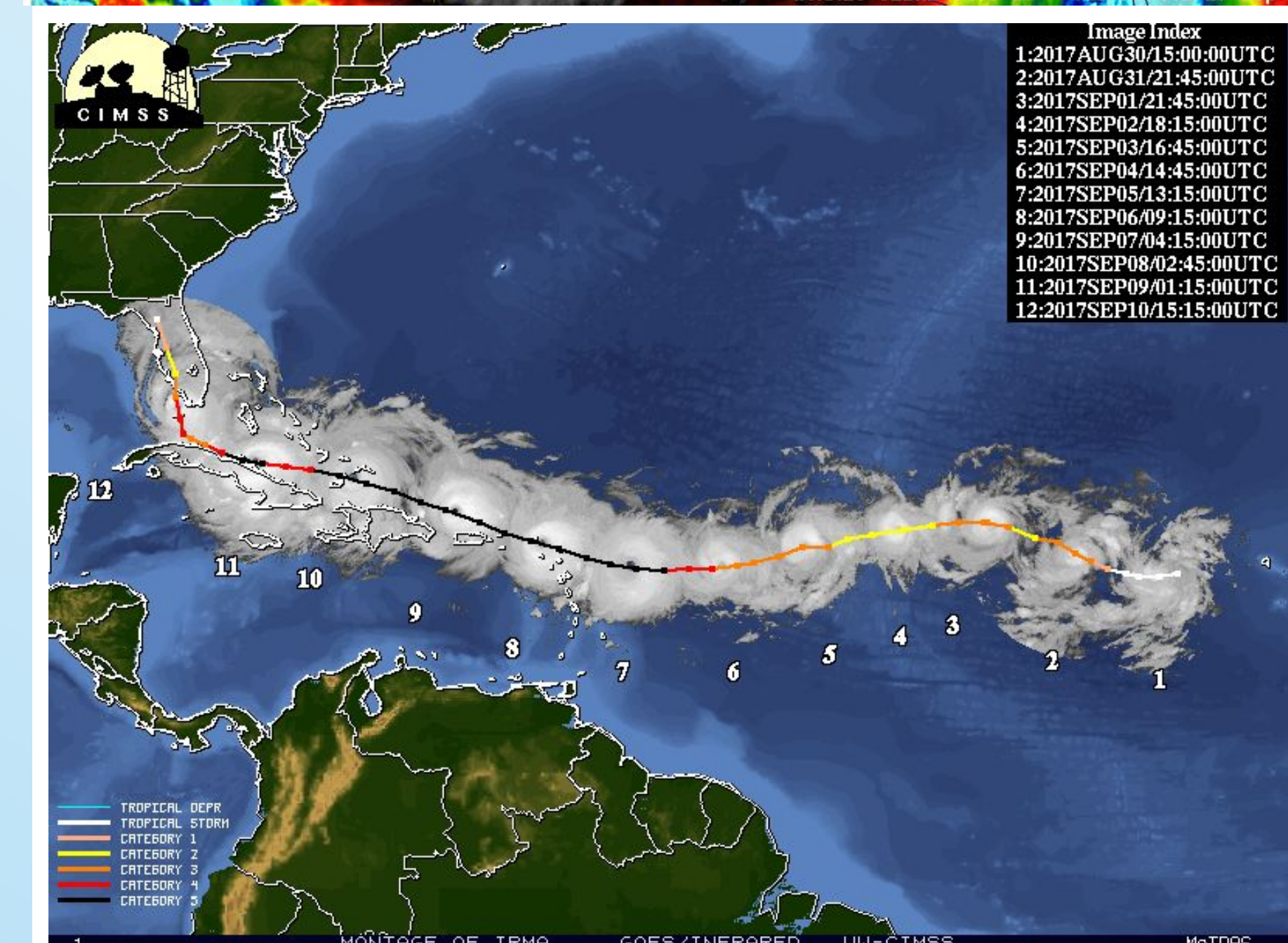
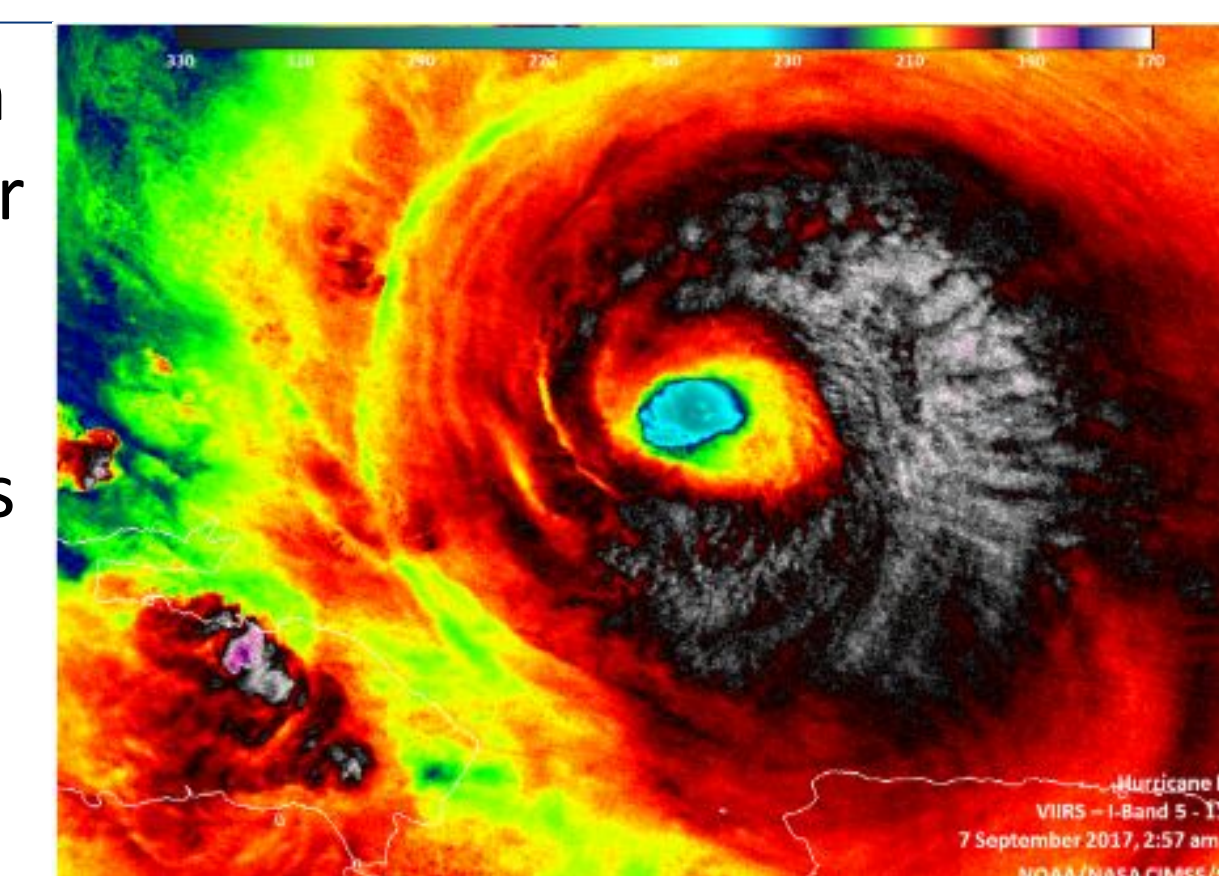
This image shows Hurricane Ian using ABI band 2 to find the cloud coverage of the hurricane for the same reasons as hurricane Irma.



An image of Hurricane Irma using ABI band 2 to demonstrate its size and provide a visual for where it could be found.



I-band 5 for Ian indicates higher convection/temperature. Hurricane Ian is on the left, Irma's on the right.



Hurricane Irma path to show its general movement and size

RESULTS and CONCLUSIONS

Hurricane Irma demonstrated less major, although still extreme, size, wind speed, rainfall, and damage than Hurricane Ian. This was demonstrated by the 9 millibar discrepancy between the two hurricanes, showing a stronger pressure and storm for Hurricane Ian when compared to Hurricane Irma. Adding to this evidence, Hurricane Ian was estimated to cause about 50 billion dollars of damage according to CNBC while Irma was estimated to cause about 42.5 billion dollars in damage, and Hurricane Irma showed slightly less severe wind speeds than Hurricane Ian, both being hurricanes that were extremely strong and made landfall on the West Coast of Florida during Fall. Hurricane Irma did show higher amounts of tornadoes spawned by it compared to Ian, 11 to 21, but this may be due to where the tornadoes were counted and studied. Therefore, Hurricane Ian demonstrated that our hypothesis was correct, as it and Hurricane Irma occurred around the same time and made landfall in the USA on the West Coast of Florida. We used ABI band 7 because you can find low level atmospheric vector winds so it was useful to knowing when Ian and Irma were at their strongest. ABI band 14 and I-band 5 were also useful for finding brightness temperature, and ABI band 2 was useful for seeing the overall difference in size between the two hurricanes and also seeing what the hurricanes looked like from space. And based on these findings, climate change did influence the destructiveness of these hurricanes, as the brightness temperature of Ian was higher than Irma, indicative of higher heat in recent times, and the strength of the hurricanes is closely related to temperature, influencing the amount of energy in their formation. With the correlation of increased brightness temperature and destructive factors in Hurricane Ian, the heat seems to have a correlation with the destructiveness of recent hurricanes, and potentially a causation-based relationship. This shows a relationship of causation between the increased temperatures in Ian's formation and its more intense storm compared to Irma, showing that our hypothesis was correct.

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