We're meteorologists Tim Heller (ABC 13 Houston) and John Morales (NBC 6 Miami). Ask us anything about "bomb cyclones", "superstorms", and how we try to best communicate the science behind the forecast, AMA!

AmMeteorologicalSoc [1] and r/Science AMAs[1]

[1]Affiliation not available

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Abstract

It seems that every time a significant weather event is forecast, there's a race to hype its impacts and severity on social media in order to catch eyeballs. But what was once limited to competitive TV stations in a broadcast market has spilled over to social media, especially Twitter and Facebook, where people can freely share "doomsday" forecasts, regardless of where they come from. After all, the ECMWF is the best model in the world, so its 10-day forecast of a 4 foot snowfall must be reliable, right? How are meteorologists trying to cut through this noise and provide the public with the best, most relevant and actionable information possible? We've invited several expert weather communicators who served the public during life-threatening situations in this past year to help shed some light on this problem by sharing personal stories on what challenges they faced and what steps they're taking - and that the broader public should be aware of - to better inform the public in the age of information overload. Panelist Info: John Morales is the Chief Meteorologist for the NBC station in Miami. He's the longest tenured weather presenter in South Florida, having spent 27 years on both Spanish and English language stations, and covering many-a-#bombcyclone like Hurricanes Andrew, Wilma, Matthew and Irma. Yet he's known as a non-alarmist. Could he keep cool even when record-setting hurricanes were threatening in 2017, or did he give in to the hype? Tim Heller is an AMS Certified Broadcast Meteorologist with 34 years on-air experience. He is currently the Chief Meteorologist at KTRK ABC13 in Houston. When Hurricane Harvey dumped torrential rain over the course of several days and homes filled with water, Heller used social media and on-air broadcasts to keep the public informed on the progress of the storm. Heller believes the key to successful communication on social media is to build a trusting relationship with followers over time, avoid using headline grabbing phrases like "Bomb Cyclone" and limiting the use of exclamation points. 4:10 (CST) - We're live! Join us on twitter, too - @HellerWeather and @JohnMoralesNBC6 5:05 (CST) - Alrighty /r/science, we think we got to everyone who asked a question! Thanks for all of your interesting comments and questions - we're going to jump back into the American Meteorological Society Annual Meeting, but please feel free to continue the discussion with us on Twitter!

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REDDIT

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CORRESPONDENCE:

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I understand the "bomb cyclone" weather pattern is actually pretty common. Is that correct? If so, why had I never heard the term "bomb cyclone" before?

recentfish

JohnMorales: The bombing out of an non-tropical cyclone is a relatively rare event ... 13% of those storms deepen explosively and therefore "bomb out". The reason you hadn't heard it before ... assuming you're not a meteorologist ... is because media hadn't latched on to it like they did for the Blizzard of 2018. The origin of the term dates back to a 1980 peer reviewed paper on rapidly strengthening extra tropical cyclones

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Who came up with the name bomb cyclone? Why not just call it a winter hurricane? In this age of terrorism the last thing we need is another bomb word!

snuzet

Tim Heller: Personally, I hate the term "Bomb Cyclone" and did not use it on the air. I know it's a real term, but it comes across as hype. Furthermore, what do we call the next big storm?

Hey there, I read that there is a connection between those hard blizzards in north america and the global warming. Do you see this connection too, if so, can you explain? Thx :)

kaelteidiotie

JohnMorales: The science on the connection between global warming and deep dips in the jet stream is not quite settled science yet. You can read some of the work from Rutgers U's Jennifer Francis, who hypothesizes that the rapidly warming Arctic has led to smaller differences in temperatures between the pole and the mid latitudes, therefore weakening the jet stream which allows it to meander more ... to become wavier. A wavy jet stream can potentially open up the door to frigid air masses diving down from high latitudes into North America or other continents. Deep troughs in the jet stream can also lead to strong low pressure systems at the surface and therefore strong storms. However, there's other peer reviewed literature that proposes that these periods of wavy jet streams are all part of a natural cycle and therefore not a permanent climate-change-induced pattern.

What do you think is the best approach for getting your viewers to take action? Are there ways to encourage them to take life-saving actions without coming across as hyperbolic or alarmist?

counters

Tim Heller: I think the best approach is to be honest and heartfelt. During our coverage of Hurricane Harvey, I turned away from the weather maps and said, "Look. It's 2 AM. I know you're tired. But you can't go to bed yet. We're expecting several more inches of rain and the flooding could only get worse while you sleep. You need to stay up with me." I pray that worked.

Hi John and Tim, thanks for doing the AMA. Couple of questions:

1. Do meteorologists use pictures and videos (assuming they are real) from social media to inform their analysis of significant weather events? I imagine there is possibly some good citizen science that can be done but the noise of social media can be overwhelming.
2. What do you think are the positive and negative effects of a competitive media coverage of significant weather events on the accuracy of reporting?

edwinksl

Tim Heller: I think user generated (viewer) photos provide an eyewitness report to the weather that we can't get from radar and satellite. And in case you're wondering, yes I approve the pictures before I show them after doing a reverse Google search to make sure the image is legit. Regarding competitive media coverage, I think some of that is good in that it forces us to do the best we can. I know that you can change the channel at anytime for any reason. I try and make sure I'm providing the best information to keep you watching. I tell my weather team that we don't need to hype the weather. The

weather itself is dramatic enough.

Hi and thanks for joining us today!

Do you feel Americans are adequately prepared for this increasingly extreme weather?

PHealthy

JohnMorales: The most vulnerable folks to extreme weather are generally those with the fewest resources. Said another way, natural disasters generally impact the less fortunate the hardest. America, as a first world country, can likely weather extreme conditions better than populations in developing countries. That said, America's infrastructure is quickly deteriorating or outdated. Many municipalities are quite vulnerable to more extreme events simply because, for example, their drainage and sewer systems are antiquated and can't handle the higher rates of precipitation that are already being observed across the U.S., which leads to more severe flooding and impacts.

Hi and thanks for joining us today!

Do you feel Americans are adequately prepared for this increasingly extreme weather?

PHealthy

Tim Heller: No.

I live in Miami and became a big fan of yours, John, before and during Irma.

Going beyond communicating the science behind everything, what's your view on sending reporters into the field during hurricanes to provide live shots of what's going on outside? I've heard some give reasons like "we're here so you don't have to be" but do you think the risk of being out in extreme weather is worth the story being told?

PhinsPhan89

Having been in media for 27 years, I can tell you that generally speaking the reporters take extreme care to not put their lives at danger. Oftentimes the assignment desk is asking us for recommendations of where they can cover the story and still be safe. And, to be factual, more deaths have tragically come from professional storm chasers going after tornadoes than reporters going after different types of severe weather. Thanks for your loyalty!

The older generation tells us that enters like this were normal 30-40 years ago. Is this attributed to weather cycles or global warming?

J26S31

While there is peer reviewed scientific literature that shows increasing frequency of many dangerous weather events such as flooding rains or deadly heat waves, there are some aspects of long-term changes that are harder to quantify and capture. One good example is in the area of tropical cyclones: because prior to 1960 we had to rely on ship or "hurricane hunter aircraft" or an report from an island outpost to confirm the presence of a hurricane, today that is immediately observable via satellite. Scientists like Chris Landsea and Sandy Delgado at the National Hurricane Center have work diligently to reconstruct pre-satellite era seasons, but there are still questions regarding whether we're seeing

more or less hurricanes across the Atlantic basin (or elsewhere in the world).

How frustrated did you become having to correct people referring to bomb cyclones as winter hurricanes?

adenovato

It was very frustrating for me. News is becoming clickbait world.

I have a "science behind the forecast" question: what determines a percent chance of precipitation? What makes a 10 versus 50 percent chance of rain or snow? How much faith should I put in the percentages?

096

JohnMorales: The calculation of the probability of precipitation has two factors. One is what is the chance that it will rain *somewhere* over your forecast area. The second factor is, if it rains, what percentage of that area will receive 0.01" of precipitation. So, a scenario: the forecaster is 80% sure that a cold front will bring showers to part of his forecast area. If it rains, he believes 50% of the area will get 0.01" or more. The chance of rain in his/her forecast would be 40%.

Tim! It's Ashton (that crazy guy paranoid of tornadoes that's been bugging your entire staff for like the last few years lol.) Thanks for watching over us all this time, I literally tune into every stream when the weather even seems inclement, and I really appreciate you not over-hyping things. I got a 2-part question for you though, and it's not the "bomb cyclone" or "superstorms".

I recently had moved [From Spring to The Woodlands] and other than how awesome it is, one thing I noticed was the significantly lower volume (and frequency) of lightning in the area. Now, I was near IAH, so maybe that had something to do with it. But there seems to be more concrete here than in Spring, so I was wondering if you knew why the air seems more stable in The Woodlands rather than in Spring, considering the distance is so slight.

Second part, why does The Woodlands seem so much less likely to have a tornado than spring (based on just frequency since 1980)? It's more north, I assumed it would've created more probability. Is this at all related to the reason lightning seems weaker here? Or is it just circumstantial / we're possibly missing tornadoes that happened?

0x41_0x48

Tim Heller: Hi Ashton. Thanks for joining me on Reddit. I haven't noticed a decreased frequency in lightning around the Woodlands. I'm wondering if it just might be your perception that there's less lightning. With all the trees in the Woodlands you have limited visibility and might not see all the distant lightning you could have seen in Spring. Just a guess. If anything, I would expect the lightning frequency to be higher because of all the trees. I haven't noticed a distribution difference in the number of tornadoes either. But now that you've mentioned it, I'll look into it a little more.

TV meteorologists hold an important role as the primary, and trusted, purveyors of climate science to many of their viewers (Maibach et al., 2016, Stenhouse et al., 2014). Given your many years of experience in this field, did you notice a gradual addition of this responsibility as climate science became politically charged?

seis-matters

John Morales: Speaking for myself, I've been talking about climate science on the air for the majority of my 27 year TV career. I did not ask for permission. I simply started to do it, waited for a slap on the hand or negative audience reaction, and never got it. Therefore I expanded my climate change presentations, taking opportunities of extremes or the King Tide salt water inundation to discuss on TV. Climate Central has called me the most prolific climate change communicator on broadcast television. Others are doing so to. But it is definitely more challenging in some TV markets and/or if your a "junior" meteorologist on your station's staff.

What is your opinion of the validity and/or accuracy of the LRC? (Lezak Recurring Cycle)

snark_billy

Tim Heller: I know Gary has done a lot of research on the cycle and he presented a paper at AMS a few years ago. It's not something he just discovered once, but something that has occurred with some regularity and probably deserves more study.

As a broadcaster and scientist (if), how do you balance uncertainty with the need to get people to take action during big storms like the hurricanes that hit the US this year?

wxgamer17

Tim Heller: We're having this discussion at the American Meteorological Society Annual Meeting. And there was discussion in a session today about this very thing. Getting away from saying "here's what you can expect?" and saying more "here's what's possible" or "here's what might happen." My question for you: would you accept a range of possible weather scenarios or do you want a deterministic forecast?

This is the way I understand the recent bomb cyclone: A high pressure system was sitting over the West coast forcing unusually warm air far north into Alaska and Canada. This northern shift forced a deep correction in the jet stream bringing Arctic air far Southeast through the central us and nearly to Florida causing some of the extreme cold temperatures seen by the North East. The cold Arctic air hitting the warm Waters of the Atlantic caused the spinning storm system.

Is this an accurate representation? How does the such a contrast of cold air cause a storm like this if it's not similar to a hurricane formation?

wkresic

John Morales: I think the most important thing that people need to realize about the Blizzard of 2018 is that it is primarily a weather event, much like you describe. There have been explosive nor'easters like this in the past too, like the 1993 "Superstorm". And there will be in the future. At the time of the blizzard, North America was the coldest place (in relation to average) on the planet. Everyone else was experiencing mild to warm (in relation to average) conditions.

What is the worst disaster either of you have experienced first hand? Are storms getting that much more powerful?

Ragingparrot

Tim Heller: Being the Chief Meteorologist in Houston, the worst disaster is the flooding from Hurricane Harvey in late late August. I've never seen forecast models put out +25" rainfall forecasts. And we ended up with 56" in Friendswood, just southeast of Houston. I've been a broadcast meteorologist for over 30 years and never dreamed I'd have to tell people in the middle of the city to get on their roof if their homes filled with water so they could be evacuated.

1) Can you explain more about what is wrong with Frederick Sanders and John Gyakum's logic that a rapidly intensifying cyclone should have a scary name because it is scary and people should be scared of it?

2) What steps can you propose to steer the scientific community in the right direction in coming up with names for new phenonema, given that many of these terms are invented by individual scientists in peer-reviewed publications with little to no input from science communicators?

3) What are you thoughts on expanding the Saffir-Simpson scale beyond Category 5 to more accurately portray extremely strong storms like Irma (or god forbid, an even stronger storm).

aClimateScientist

JohnMorales: Answering question (3) - If you read the Saffir Simpson scale, you'll see that there is very little difference in the consequences of a Cat 4 or Cat 5 hurricane. Both speak of catastrophic damage, with "power being out for weeks to months". In Puerto Rico, where the unbelievable damage has led to many on the island "questioning" the classification of Maria as a Cat 4, I'm constantly telling people that it really doesn't make a difference whether it made landfall as a Cat 4 or a Cat 5. Based on that logic, I don't believe a Cat 6 or greater would really mean much in terms of real impacts. A catastrophe is a catastrophe is a catastrophe.

Can we expect these bomb cyclones tip become a more common occurrence? What advice do you have for individual townships at risk if being affected to help prepare to minimize the impact of storms like this on their residents?

Breakingindigo

Tim Heller: I think communities need to have some serious discussion about building resilient neighborhoods. It's been shown time again that mitigation costs less than restoration. For example, there's debate in the Houston area right now about the cost of building a large "Ike Dike" along the coast to protect us from storm surge. I don't have the numbers in front of me, but it's not cheap. However, it's cheaper than rebuilding communities every 10-20 years from hurricanes.

What is a common hype during a superstorm that should be avoided on social media?

j94982

Tim Heller: It's not uncommon for social "media-rologists" to publish their own forecasts during big weather events, often with extreme headlines. I don't think that's going to change. It's clickbait. And unfortunately, it usually works. I encourage you and everyone to find trusted sources that you can rely on during severe weather.

Why are you making up terms like bomb cyclone to scare people and get them hyped up into watching the news? Its not appreciated by many people I've talked to

jollyjimmyjohnson

John Morales: It wasn't me. It wasn't any of us broadcast meteorologists. Please realize that we are scientists that happen to be working in a newsroom environment. From my viewpoint, I was extremely annoyed to see how media latched on to the term. It's nothing but clickbait, in my opinion. The reality of what the Blizzard of 2018 was -- a nor'easter with explosively strong development.

Would you ever have a debate with Dane Wigington?

SugarsuiT

Tim Heller: I'm not sure we'd change either of our positions.