CATHERINE RIIHIMAKI: It's conventional wisdom. Individual weather events cannot be tied to climate change.

PRESIDENT BARACK OBAMA: We can’t attribute any particular weather event to climate change. What we do know is, the temperature around the globe is increasing.

CATHERINE RIIHIMAKI: That was Former President Barack Obama articulating that conventional wisdom in 2012. But was the conventional wisdom right, and is it still right today? Take an event like Hurricane Sandy, which battered the US from Florida to Maine in that year.

NEWSCASTER: This is an impressive, incredible cloud canopy. It is one of the largest, if not the largest we’ve ever seen in the Atlantic hurricane basin.

CATHERINE RIIHIMAKI: Would it have been as destructive if greenhouse gas levels in the atmosphere were lower? And, what about everyday weather, not just the most extreme events?

NEWSCASTER: Welcome back. Well, the heat’s going to stay on, feeling more like August than September.

NEWSCASTER: Hi, everybody. We’re still focusing on this winter weather advisory in effect for Northern Connecticut.

NEWSCASTER: Our warmup continues as we head into the weekend. In fact, it's going to be the first weekend of the year in the 90s, and we’re tracking the warmest temperatures we’ve seen so far this year.

CATHERINE RIIHIMAKI: My name is Catherine Riihimaki, and my guest today works to update conventional wisdom with state-of-the-art climate data. Ben Strauss is the CEO and Chief Scientist for Climate Central, a nonpartisan organization that conducts climate research and informs the public about key findings. Ben, thanks for joining me on All For Earth.

BEN STRAUSS: Thanks, Catherine. Thanks so much for having me.

CATHERINE RIIHIMAKI: You’re welcome. Let’s start with that connection between weather and climate. Climate Central has done a lot of targeted work at meteorologists. Can you describe that program and what its motivations are?

BEN STRAUSS: Sure thing. We work with, now, around 800 of the nation’s TV meteorologists, we call them mets for short, that’s about a third of the nation’s total, to help them integrate climate change
into their regular daily weather forecasts and information. We send them, every week, graphics which they can use on their broadcasts, and we give them guidance on the climate science behind them. We feel that telling a local story is a critical part of being an effective climate communicator. And, working with a local and trusted messenger is another important part. So, through this program, we’re achieving both of those goals.

>> CATHERINE RIIHIMAKI: So, can you talk a little bit about that relationship between climate and weather, and if that understanding of the relationship has changed through time?

>> BEN STRAUSS: I think it’s something that people have an easy time confusing.

>> CATHERINE RIIHIMAKI: Yeah.

>> BEN STRAUSS: Weather happens day to day. Weather is how a baseball batter performs today and tomorrow and the next day. Climate is his batting average over the whole season, and people do get confused. They say, “Hey, look, it was cold yesterday. There must not be climate change.” But even the greatest hitter sometimes strikes out. That’s the weather. Climate means that overall we’re getting warmer and warmer and warmer as we pour more greenhouse gases into the atmosphere.

>> CATHERINE RIIHIMAKI: It’s kind of, paradoxically, they’re different but they’re clearly related to each other, and so it’s understandable how there can be that confusion. So, what is the research that you guys do, trying to kind of differentiate but connect the two?

>> BEN STRAUSS: So, we draw on research from the whole scientific community that shows all of the ways that climate is influencing the weather, and sometimes you have even an individual weather event, an extreme event where you can make a connection. Imagine a baseball player on steroids. He hits more home runs, and then one time, he hits a home run where the ball travels farther in the air than any home run before has ever traveled. We can link his use of steroids, perhaps, to the fact that his overall number of home runs has gone up, just in the way we can link climate change to the fact that overall we’re seeing more hot days, but that individual home run may also be linkable to steroids because it was so extraordinary, individually. And, in the same way, there are some extreme weather events that science can now tie to climate change and say, “Climate has made this significantly more likely.” And in a few rare instances, like marine heat waves killing the Great Barrier Reef off of Australia, this event could not have happened without climate change.

>> CATHERINE RIIHIMAKI: And so, really kind of what you guys are doing is using climate models to figure out, you know, in the absence of climate change, the steroids in this metaphor, right, that a particular heat wave would have been this much cooler or maybe this much less likely to have happened, if not for that background warming that has happened.

>> BEN STRAUSS: That’s right. Climate change is making extreme heat more likely. There are multiple methods, multiple lines of research that show that, and we find it’s the case with extreme
heat. We find it’s the case with extreme precipitation. For example, the precipitation that Hurricane Harvey dumped on Houston was three times more likely because of climate change, in our analysis. The year before, the rainfall that flooded Baton Rouge, Louisiana, in 2016, I think it was, was significantly more likely because of climate change. And there was analysis showing that Hurricane Florence, its precipitation that caused so much trouble in North Carolina, more likely because of climate change. Same analysis applies to the heat waves that have been hitting Europe one after the other, and so forth and so on. So, it’s really becoming commonplace that we can link extreme weather to climate change.

>> CATHERINE RIIHIMAKI: What is Climate Central’s role in all of this work, because you’re one of many nongovernmental organizations that are in sort of the climate change field, so what do you guys do beyond just interacting with mets and sending them graphics?

>> BEN STRAUSS: So, we launched an effort a number of years ago called World Weather Attribution that began to take this science of extreme weather attribution to climate change and run analyses very rapidly so that within a few weeks or months of the extreme weather event we could turn around and go to the media and public and say, “There was a link between climate change and Hurricane Harvey,” instead of waiting the normal academic cycle of a year or two when everyone forgot about it. We did that for a number of years. Through that work, the National Academy of Sciences did a special report that basically confirmed that you can do this sort of attribution analysis. Independent scientists without our involvement started doing attribution of extreme events and doing it rapidly. And so, after a number of years, we actually stopped that coordination because we had achieved our goal of changing the narrative from the then-president of the United States, changing the narrative in leading media, like the Times and the Post and The Economist. And stimulating the broader scientific community to engage in the same exercise. Now, we’ve become more interested in making the same kinds of linkages between climate change, but instead of looking at these extreme, extreme events, looking more at your everyday extremes, unusually warm days at different times of year, a localized downpour, but not on the scale of Harvey or Florence, things like that. And we’re also continuing research in maybe the most rock solid of all areas in attribution, which is the influence of sea level rise on the damage caused by coastal flooding. So, for example, you go to Sandy, but frankly, any storm causing a coastal flood. That flood is deeper and more damaging because of human-caused sea level rise. It’s as simple as that, and you run a simulation of the storm as it occurred, and you run a simulation subtracting the roughly six inches of human-caused sea level rise at the time that the storm occurred.

>> CATHERINE RIIHIMAKI: Right. You’re a scientist by training. I’m a scientist by training. And I think what you’re saying is sort of interesting, a message about communication, which is that you are not directly communicating the science to the public, but you’re using that intermediary, and mets, aside from being trained in science, are also trained, obviously, in communication, because they’re on TV. Has your understanding of what effective communication changed over your career, as you’ve gotten involved in this work through Climate Central?

>> BEN STRAUSS: It absolutely has. At the start, I thought that effective science communications meant scientists learning how to give good interviews, give good speeches, yet be good on TV or write well.
CATHERINE RIIHIMAKI: Speak louder and slower.

BEN STRAUSS: Speak louder and slower with simpler words. And look, all of that’s great. It’s terrific. The more scientists we have who dedicate themselves to communicating in ways that are more accessible the better. But that is not the whole of science communications. Most scientists didn’t get into science because they were interested or skilled in communications, and that’s fine, but they can still make major contributions by supplying the right science to the right people who, in turn, can communicate that science. And so, one of the things I’ve learned is the importance of the messenger.

CATHERINE RIIHIMAKI: Yeah.

BEN STRAUSS: And so, most of our work is actually finding the right messengers, not being great communicators as scientists, but getting the right science to the right messengers. And I would say another piece for scientists is, often the research that we do for our peers and to publish in journals goes 90% of the way to what you need for powerful public communications or effective communications to policymakers. Often, there’s just one more calculation, one more figure, one more table that, if it were included, would make a paper a much more powerful basis for reaching out. So, that’s some of the work we do, as well, trying to connect with scientists and help them to understand in their current research what piece more can I do that would make this paper an effective and powerful basis for reaching out to broad audiences?

CATHERINE RIIHIMAKI: Yeah, so let’s talk about some of those graphics, which is a little awkward to do on a podcast, admittedly. But, even in the description, I think people can get the sense of how compelling these are. So, among them, for example, you have comparisons of different cities that the climate of, let’s say, Princeton, New Jersey, is going to be like this southern city in 50 years or 100 years. Can you talk a little bit about kind of what the graphics, the most compelling graphics you feel have been created and why that really resonates with people?

BEN STRAUSS: Yeah, graphics are a huge part of what we do, first because we work so much with TV, and by the way, a plurality of Americans still get their weather forecasts from their local TV weather forecaster, as hard as that is for some of us to believe. But humans are a very visual species. About 30% of the volume of our brain is for vision and visual processing. It’s harder to know, but we think around 10% is for language and logic. So, we’ve always felt that if we can express something with a picture, we’ll go much farther in communicating the challenge of climate change. And so, one of the areas that’s been most effective visually has been showing projections of sea level rise, because that’s so dramatic, to see a flood, to see that visual. But there’s a wide range of other things we do, and honestly, even if it’s putting up pictures of mosquitoes or poison ivy or changing colors of leaves, that helps to embed for people that this is a real thing. We’re talking about a tangible, local thing that they’ve experienced. It’s not just a bunch of words or an abstraction.

CATHERINE RIIHIMAKI: Right. So, let’s talk about sea level rise, because that’s really where your science originally was based, and you, maybe before becoming the CEO of Climate Central, as one of the scientists, really worked hard on those sea-level visualizations. What is it about sea level rise that has captivated your attention and how do you try to get other people engaged in that story?
>> BEN STRAUSS: Yeah. I’ve always felt that it’s a great irony that I ended up getting into sea level rise, because I am a mountain person in my soul and in my background, and I also, in my scientific training, I was much more focused on biodiversity in relatively wild and remote places. And here I am focusing on sea level rise and low, flat, coastal, urban places. Quite the opposite, but I got there because I came to feel that this is a highly strategic pathway for reaching a large public on climate change. One of our core principles of climate communication is that the more local and personal you can make the story, the more it’s going to reach people and the more it’s going to cut across political tribes, because in the quiet of your study or your office, no matter what you’re supposed to say in public, if you’re reading that the water is getting higher and higher on that stick in the ground next to the shore, you have to take that seriously. The safety, longevity, and value of your home or your business depends on getting this right, so you have to put down your political stuff and get into the practical. So, being very local is one of our core principles, and sea level rise is, in my view, the most localizable of all climate impacts, because I can literally say something different about the risk faced by two different houses on the same block. It’s also highly visual, and we’ve created photorealistic imagery of different sea-level projections in different iconic places around the world that 100 million people have seen. We’ve had more than 100 million page views on those, rather. Also, there’s a very simple mental model to sea level rise. I think people understand that if it gets warmer, ice melts and the sea level rises. Very simple to understand, and it feels like a one-way process. It basically is. Of course, it does wiggle around up and down a little bit, just like the tides rise and fall and waves rise and fall, there are also currents and things which change sea level on a annual or decadal basis. But basically, sea level is just rising, but temperatures are much more variable. You have a hot year, a cold year, it bounces all around. It’s much harder to pick up the signal in the noise, and sea level rise is an existential threat. I think you tell people more heat waves are coming, more downpours are coming, they think, “Well, that’s alarming, and it poses a challenge, but I’m going to weather it. It will come, it will go.”

>> CATHERINE RIIHIMAKI: I have air conditioning, I have umbrellas.

>> BEN STRAUSS: Exactly.

>> CATHERINE RIIHIMAKI: Yeah.

>> BEN STRAUSS: But, you know, my house is below the high-tide line, not so much. Either my community is building a sea wall or a levee, or else I’m gone, and it’s easy to imagine communities being gone. So, this combination of local, visual, simple mental model, existential, it’s a real collection that has made sea level rise one of the principal ways through which people understand the threat of climate change.

>> CATHERINE RIIHIMAKI: Right. So, you guys have these kind of beautiful map graphics, beautiful aesthetically, not necessarily in terms of the message, but showing with this much temperature rise, these are the flooded areas in, say, Manhattan, as you said, the iconic places. Prior to computer graphics, I mean, are there sea-level stories that have been told through history that kind of illustrate how compelling this particular interaction with humans and climate change is?
>> BEN STRAUSS: Yes. I’ve recently discovered that, in fact, the very oldest stories we have in all of human culture and history are climate change stories, and most of them are sea level rise stories. If you go to Australia, there are at least 21 sites all around the margins of the continent where aboriginal people tell stories about landforms that no longer exist, and in the stories, the ocean rises to cover those landforms. Well, through modern geology we can detect those landforms under the water, and because of our reconstruction of sea level rise since the last ice age 20,000 years ago, sea levels were 400 feet lower than they are today, and we basically had 400 feet of sea level rise between 15,000 years ago and 5000 years ago, and we can chart when each of those landforms was drowned. So, we knew that these stories, told by aborigines, range from 8000 to 13,000 years old. Now, stop to think about that for a moment, because if you Google “world’s oldest story,” you get Gilgamesh, which was written down 4- or 5000 years ago, and it talks about the flood, by the way, which most of us know as Noah’s flood, which probably happened around 8000 years ago, but has been preserved now in writing for 4- or 5000 out of those 8000 years.

>> BEN STRAUSS: Yet, here we have these aboriginal stories that are 10,000 years old and have been preserved only through an oral tradition without writing. How traumatic was the loss of their ancestral land for them to remember it faithfully for 10,000 years?

>> CATHERINE RIIHIMAKI: Yeah.

>> BEN STRAUSS: That tells me that losing our land to climate change, to sea level rise, is one of the most traumatic things that we can ever imagine. It’s the most remembered thing in all of human history. In the old stories, many of those stories basically said, “Humanity did something wrong. We hunted the forbidden fish, we were wicked and we sinned, and then the gods punished us.” But what was happening at that time was, that’s wrong, in fact, it was a completely natural climate change happening at that time, but now, in the present, it’s right. What we’re doing, it’s us who indeed are causing the seas to rise. This time, they’re likely to rise much faster and we have much more to lose, so I think these ancient stories represent a very powerful warning, a very powerful warning about what we’re getting ourselves into now.

>> CATHERINE RIIHIMAKI: Do you worry about having that overwhelmingly negative message? I mean, when I teach about climate change, I feel the overall pulse in the room sort of, oh, or the aura of the room getting really depressed, and you’re trying to communicate this every day, and you’re talking here about that the sea-level message is one of profound loss, 10,000 years’ worth of PTSD on these cultures. How do you manage that, and do you try to find positive spins on the scientific messaging?

>> BEN STRAUSS: Yeah. Well, the good side, here, is that this time it is us, and that means we can do something about it. There’s nothing our ancestors could have done about coming out of the last ice age and the sea level rise that happened then. But now, we are in control, so I see that as a great positive, and when we present maps and images that reflect future projections of sea level rise, particularly the longer-term ones that connect to the legacy that our time will leave to future generations, and how will they remember us? We put side-by-side images of what happens
if we sharply restrict our greenhouse gas emissions and transition to a clean economy versus what happens if we don’t. And when you put those images next to each other, you show that we have power. We have a choice, and our choices can make a difference. I’d also add that in our general work with TV mets, for example, we also provide content on things like solar power and wind power, which is terrific, because really, that’s the weather giving us power. We’re changing the weather, but the weather is giving us power, and it’s a great source for optimism, how rapidly the technology is advancing, and the prices are falling on cleaner sources of energy and many other approaches for reducing emissions or taking carbon back out of the atmosphere. And finally, I’ll say that through most of our communications, and even our sea-level work, when you really localize the problem, you take that big, the whole world is doomed frame off, and you’re framing it as, here is a local challenge. It’s much more digestible that way. People want to roll up their sleeves and do something about it, when you frame it as a local challenge as opposed to an overwhelming global thing.

>> CATHERINE RIIHIMAKI: So, let’s finish there, just talking about kind of what, from your perspective, is needed to have meaningful action on climate change. And it sounds like, from what you’re saying, that we need a critical mass of everyone taking action, rolling up our sleeves, and doing something. Is that kind of the perspective of Climate Central, and how do you make that happen? It’s local stories, it sounds like.

>> BEN STRAUSS: Well, first I should say that we are a non-advocacy, non-political organization, so we don’t take a position on a particular policy choice, but, of course we do feel that climate change represents a civilizational threat, and we are hopeful to encourage informed action that is proportional to the threat that climate change represents. We think we reach people most effectively on this local level, but ultimately, the responses that are going to be proportional to the challenge are going to have to happen at the level of whole nations and the globe, in order to control our global emissions. And so, we are certainly hopeful for people to take action in their own local communities, that’s quite appropriate and needed, but in the big picture, we would like to see the public understanding shift as a whole, and we would like to see the priority that the public places on climate change as an issue rise higher, again, up to the point that is appropriate for the gravity of the threat.

>> CATHERINE RIIHIMAKI: And so, let me just draw a connection back to where we talked about for the indirect communicate, right, communicating through mets. I mean, this seems like another example of maybe communicating through an intermediary, which is the general public, right? That you are trying to motivate people who are then going to be the advocacy group, albeit not necessarily organized in that way, but for people to be talking to their members of Congress, to be talking to their local representatives so that action happens on a broader scale. Is that a good way to describe that?

>> BEN STRAUSS: Well, we don’t have any specific strategy targeting any elected representative, but we are trying to make sure that both the public and decision-makers and leaders of all stripes are getting the message that this is a high priority. And one of the things we see in the polling on public opinion around climate change is that, while increasingly more and more Americans recognize climate change, recognize it’s caused by humans, are concerned about it, and strongly support solutions, it remains a relatively low priority. And most people don’t think that it will personally affect them. So, those are the places where we try and inject ourselves, helping people to understand that this personally is going to affect them, the places that they live in, work in, and love, their children. It’s going to affect you, and that’s a pathway to making it a kitchen-table issue.
CATHERINE RIIHIMAKI: And not just that it’s going to, but that it is, now, right, and that events that they have experienced, the weather that they are experiencing today, is affected by climate change.

BEN STRAUSS: That’s right. And we’re moving beyond the past work on extreme weather event attribution to looking at everyday weather. This research is still in the pipeline, but in a very broad sketch, it turns out that on a very regular basis, we experience weather that is made much more likely by climate change. So, there’s a future, maybe within a year from now, where we’ll be able to say, “Yeah, that sticky Tuesday we just had, that was three times as likely, because of climate change.” And help people to understand, yes, this is happening now. It’s happening in the future. It’s affecting your crop yield today. It’s affecting your forest fire risk today.

BEN STRAUSS: There’s a lot of things which are in action today, and so by communicating that message again and again and again through different messengers and pathways, we think we can help to raise the priority, raise the urgency with people, make this a kitchen-table issue that people understand affects them in important ways, just like jobs and education and healthcare on a perennial basis. And I think that’s the level of priority and attention this issue needs for us to mount the truly sustained effort over decades that it’s going to take to reduce the threat to where it is more manageable.

CATHERINE RIIHIMAKI: Well, I think that’s a great place to wrap up our conversation. Ben, thank you so much for being here today. I think it’s really profound, what you guys are working on, and I wish you the best of luck moving forward.

BEN STRAUSS: Thank you so much. Really appreciate it, Catherine. Thanks for having me.

CATHERINE RIIHIMAKI: Ben Strauss is the CEO and Chief Scientist at Climate Central. He is a leading expert on sea level rise and has developed some great visualizations on the Climate Central website. You can learn more about their work at climatecentral.org or on Twitter @climatecentral, or you can see some of their work through your local TV weather forecast. Please subscribe to our podcast feed wherever you get your podcasts. I also hope to see you all in person October 24th and 25th at Princeton University for a celebration of 25 years of the Princeton Environmental Institute. Several of our podcast guests, including Ben Strauss, will be speaking at the forum, and there will be many more leading figures in all aspects of the environment and sustainability. Until then, be well.

All For Earth is a production of the Princeton Environmental Institute and the Princeton University Office of Communications, in collaboration with Princeton’s Council on Science and Technology, and assistance from the Office of Instructional Support Services, and the Office of Information Technology. Our executive producer is Margaret Koval, and our audio engineer and editor is Daniel Kearns. The opinions expressed here represent the views of the individuals involved, and not those of the university. Princeton podcasts are available on all major distribution channels, including Spotify and the Apple and the Google podcast apps.