

Extreme weather: Researchers look at the effects of a changing environment on Maine's marine waterways, croplands and municipalities – Study, Strategize, Prepare & Adapt

Video transcript

Paul Mayewski:

Climate change has always happened. There are natural climate changes and then today, we of course have the dramatically added influence of human activity. Weather in general make, those are the building blocks of climate, so you take the weather over a full year, several years and that gives you an average which is called the climate. How do you get to that average value? Is it because the weather events are just all “get warmer or all get colder,” or is it because there are series of very, very high or very, very low spikes? And those really high or really low spikes are extreme events. And we're seeing more have those extreme events.

Sean Birkel:

Over the past 100 years the climate has warmed, has warmed at the same rate. There've been periods that are a little cooler than normal, warmer than normal, but the overall trend is for warming. In the early 1900s, late 1800s, we know from weather station data, historical records that the climate was cooler, particularly during the winter. The winters were cooler by a few degrees Fahrenheit and the summers were a little cooler but the biggest change in the summer season is that summers now are longer by about two weeks; winters are about two weeks shorter.

Damian Brady:

This is not just a 1950s to now problem, this is changing rapidly and we have this debate in our culture about climate change and is it happening and who's fault is it, but one of the interesting pieces is that farmers have already started to adapt to climate change. I mean, just here in Maine, it's hard to talk to a farmer who doesn't have a story of something they now can grow but they used to not be able to grow. Those practices — whether they begin to farm earlier, whether they're changing their crop mix type — all of that has implications for the downstream receiving water. So you put fertilizer on the land earlier, you apply manure to the land earlier, you plant a crop type that takes up nutrients out of the soil differently based on the soil moisture which is also changing due to climate change.

Paul Mayewski:

We've seen big changes in Maine already. In the Gulf of Maine report, was just released that suggests that Gulf of Maine has warmed faster than any other water body in the northern hemisphere, arguably globally.

Sean Birkel:

Winters in which there is significant ice cover across the bay have not been observed since mid 1930s. This is an image of Carver's Harbor in Vinalhaven, February 1918, showing a typical winter scene in those years — so the bays and harbors frozen over and the ships are locked in sea ice.

Paul Mayewski:

Extreme events are a big deal, because not only massive heat spells but also extreme events in the case of storms.

Mary Jane Perry:

Right now in terms of hurricane forecasting they're pretty good at forecasting what's going to happen the next day, but as you go further out in time the uncertainty increases, and the way to collapse that uncertainty in terms of the trajectory of the storm as well as the intensity of the storm is to have more

spatially distributed data that populates the models so that we can improve the predictions. Neil Pettigrew pioneered the development of making measurements with autonomous platforms and with making measurements for small, cheap, light, deployable buoys that provide data that feed the models.

Mark Neary:

During a storm event, we'll get the call to say there's a hurricane coming, the models look like something is going to develop, and we'll rush out and deploy a storm buoy and this glider. Once this goes out there it can make its way where we need to go and it's going to survey the coastal ocean before, during and after a storm. Every hour the glider will come to the surface and communicate back to home via satellite and all these gliders, the data from each university's glider then gets transferred into a central location and is used by the modelers to populate and help with, kind of hurricane intensity.

Mary Jane Perry:

Predicting extreme weather is a big problem and it has a huge societal impact.

Paul Mayewski:

If you supply people with enough information about how the climate is changing, what is projected to change, what the vulnerabilities are, the people who are actually in the very best position to develop these plans are the people that live in the towns, because it's the individual town or county — they know exactly the part of the forest, the part of the road that ices over first — they are the only ones who come up with the specific examples. That's why it's so critical to be thinking about these at that level.

Damian Brady:

Everyone has a stake in this, and you know, what I really like is the idea that there's coupled human decisions to a natural ecosystem and then back around again, so it's all really connected.