



WOODS HOLE
OCEANOGRAPHIC
INSTITUTION

HOW MUCH? HOW FAST?

The science of sea level rise

A person wearing dark waders and a blue tarp is walking through shallow water, creating splashes. In the background, there are orange and red buoys. The image is used as a background for a title card.

Christopher Piecuch

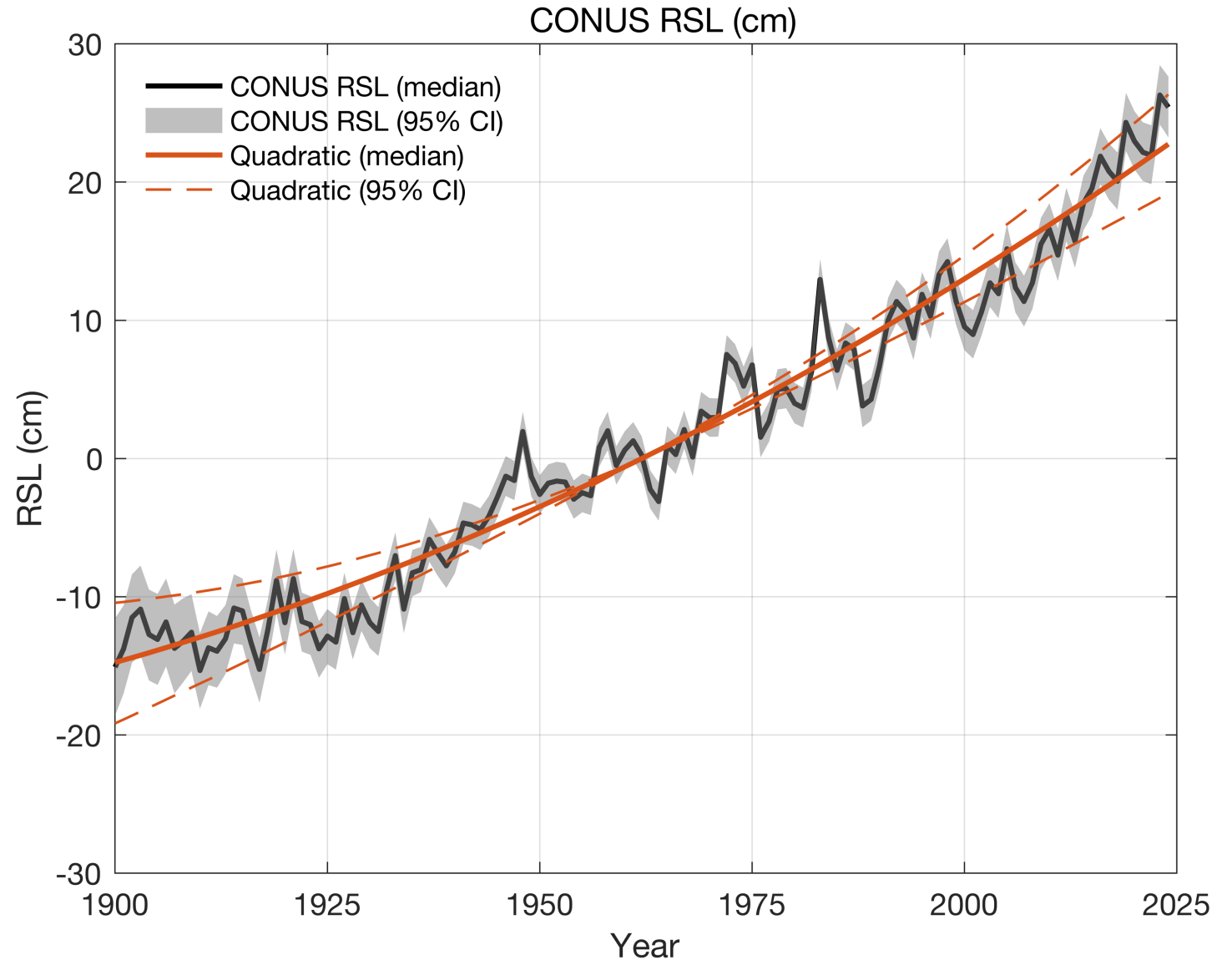
WHOI sea-level scientist
and physical oceanographer





**The Rate of U.S. Coastal
Sea-Level Rise Doubled
during the Past Century**

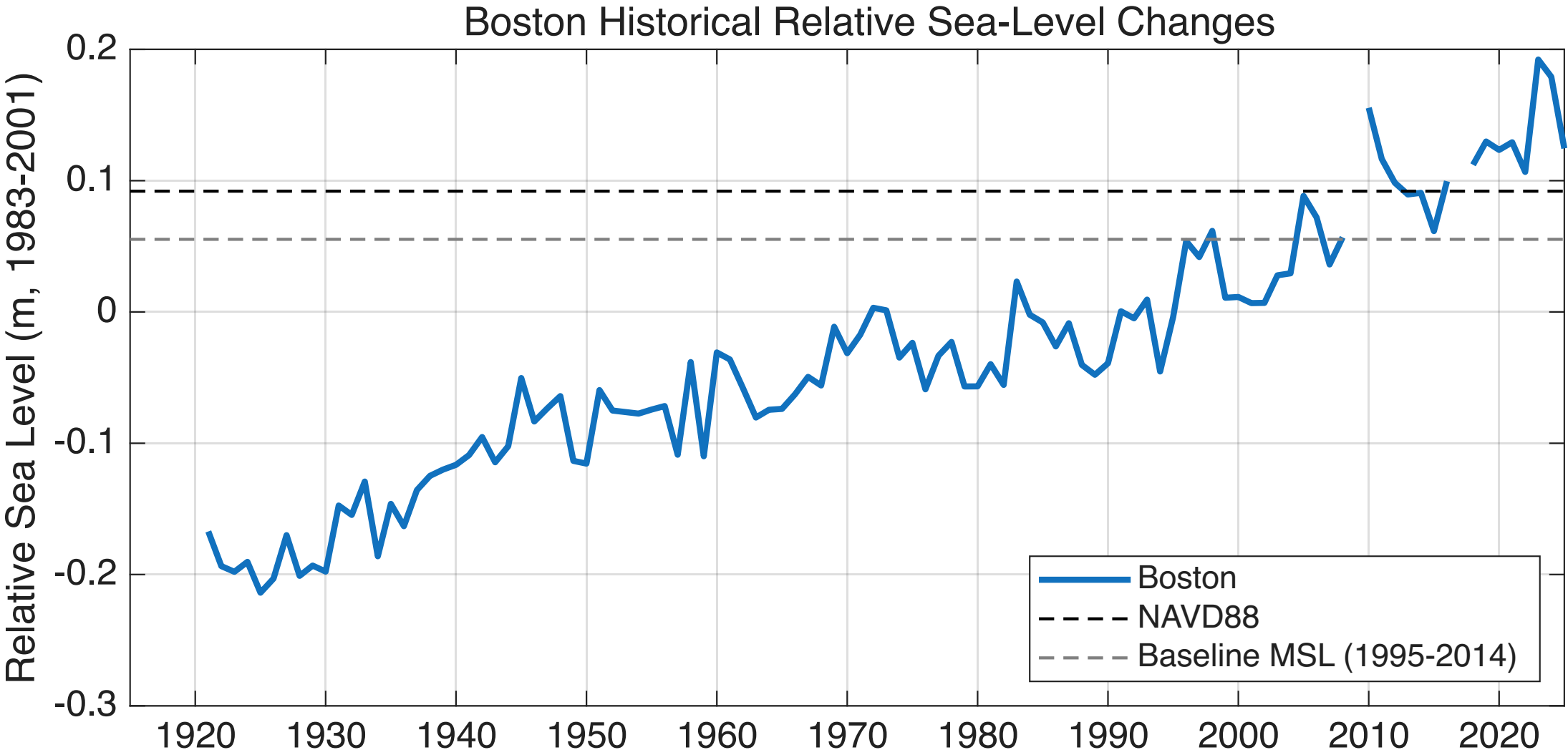
**Coastal sea level
accelerated in
the U.S. during
the past century**



How do we **know** that
sea level changed in the past
and is changing now?

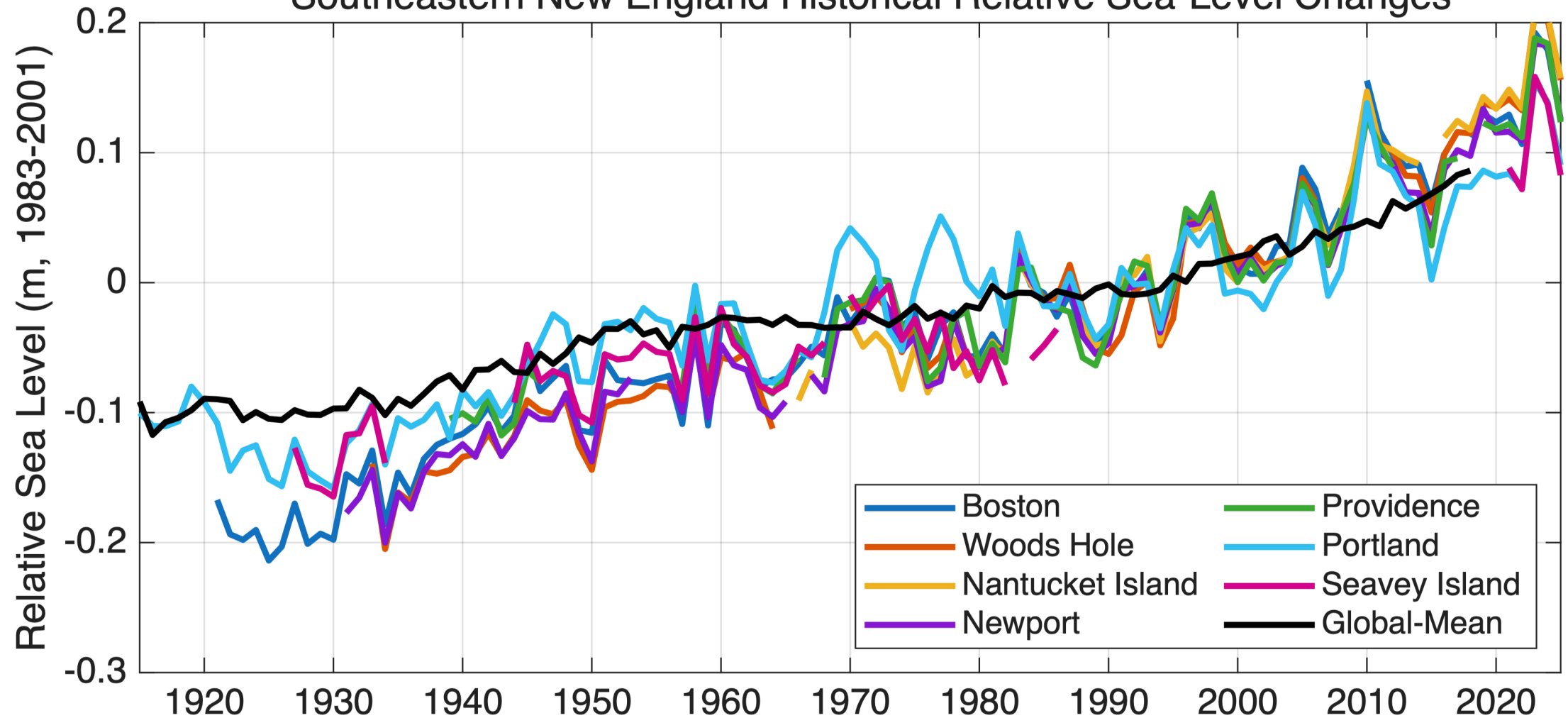


Observed Sea-Level Rise in New England

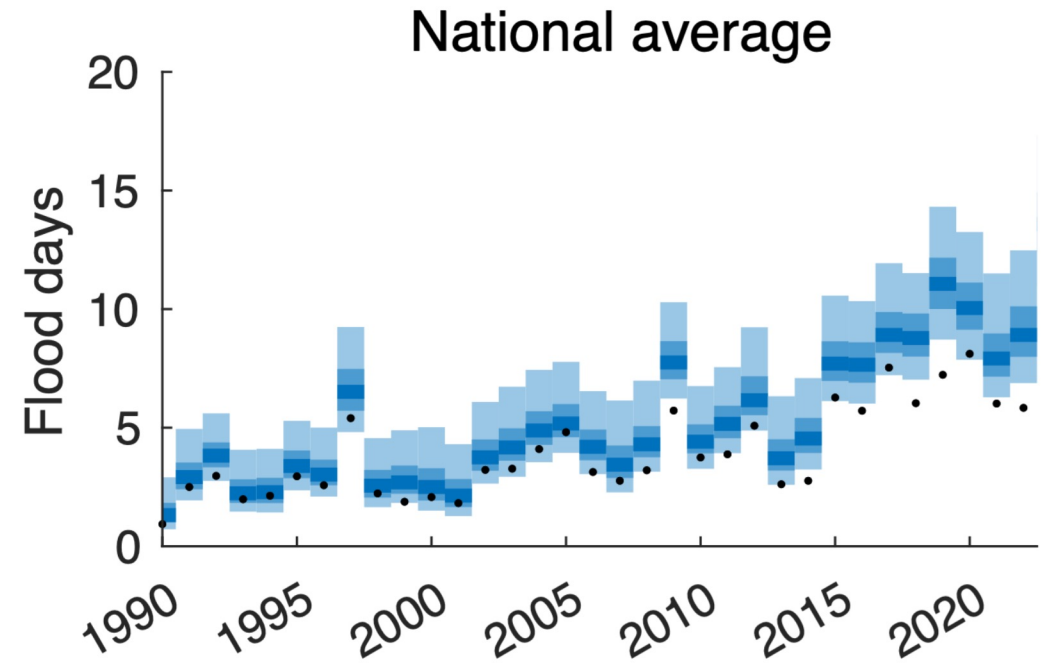
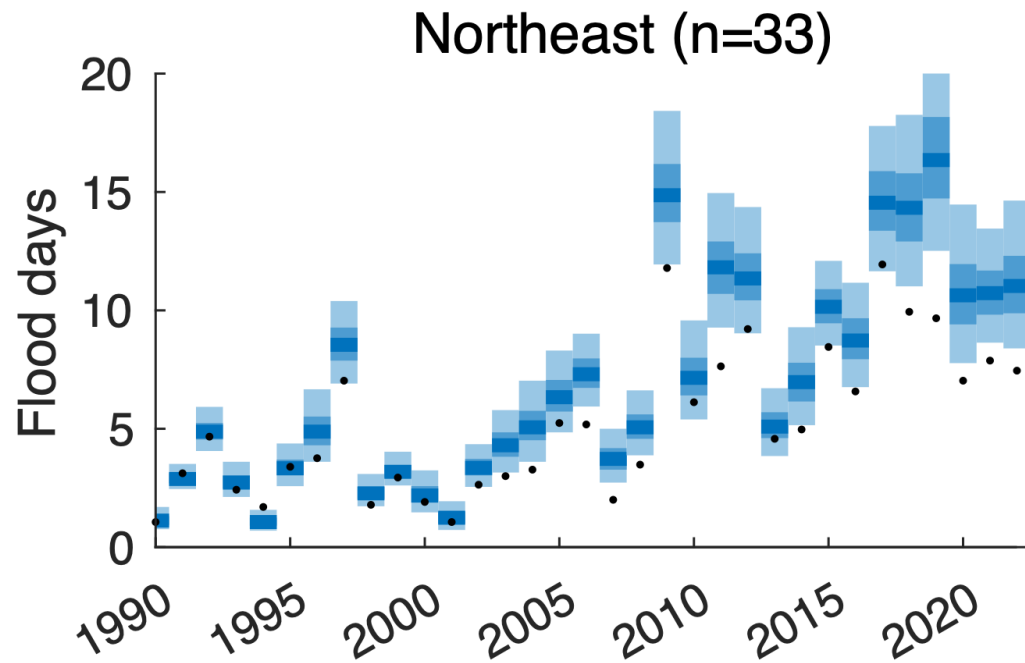


Observed Sea-Level Rise in New England

Southeastern New England Historical Relative Sea-Level Changes

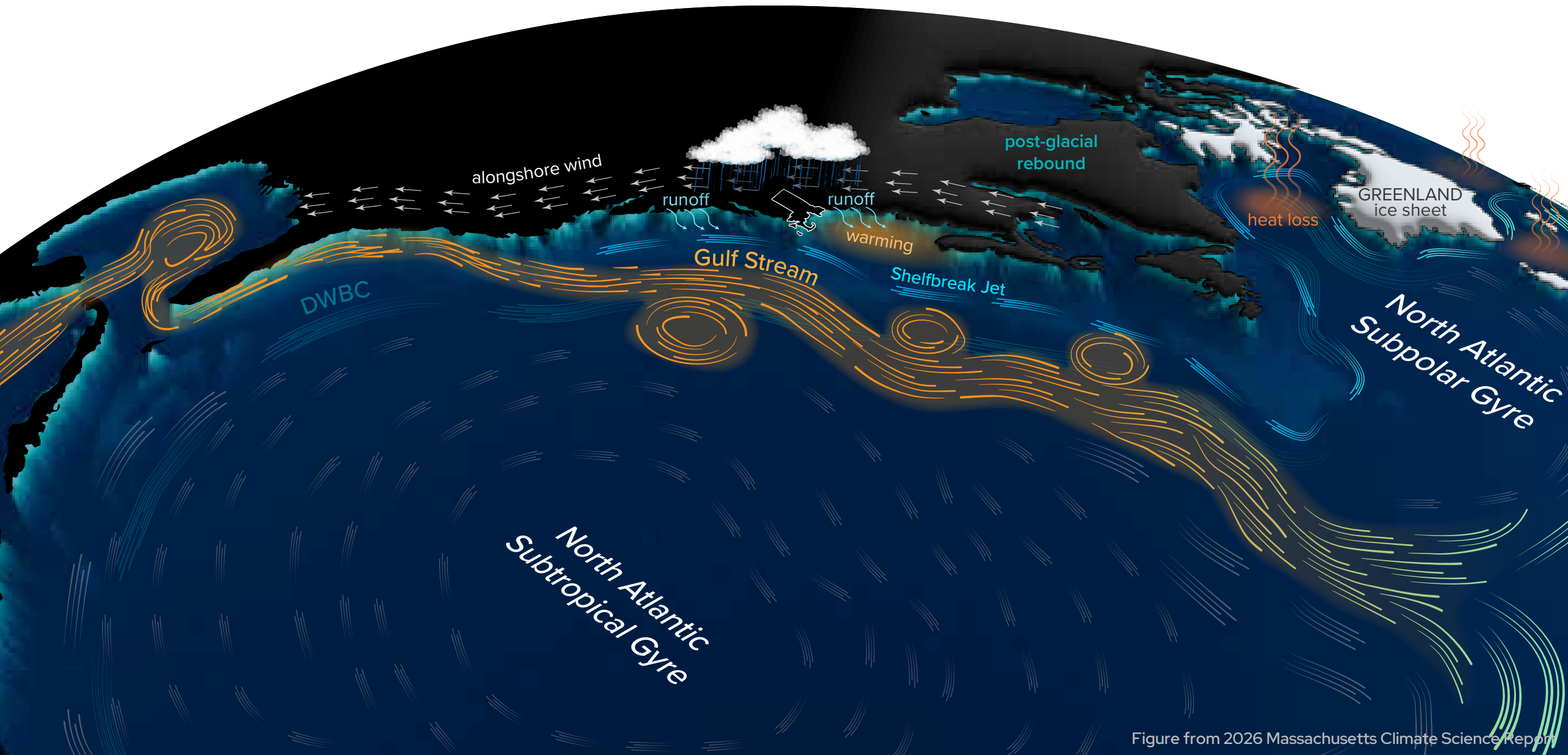


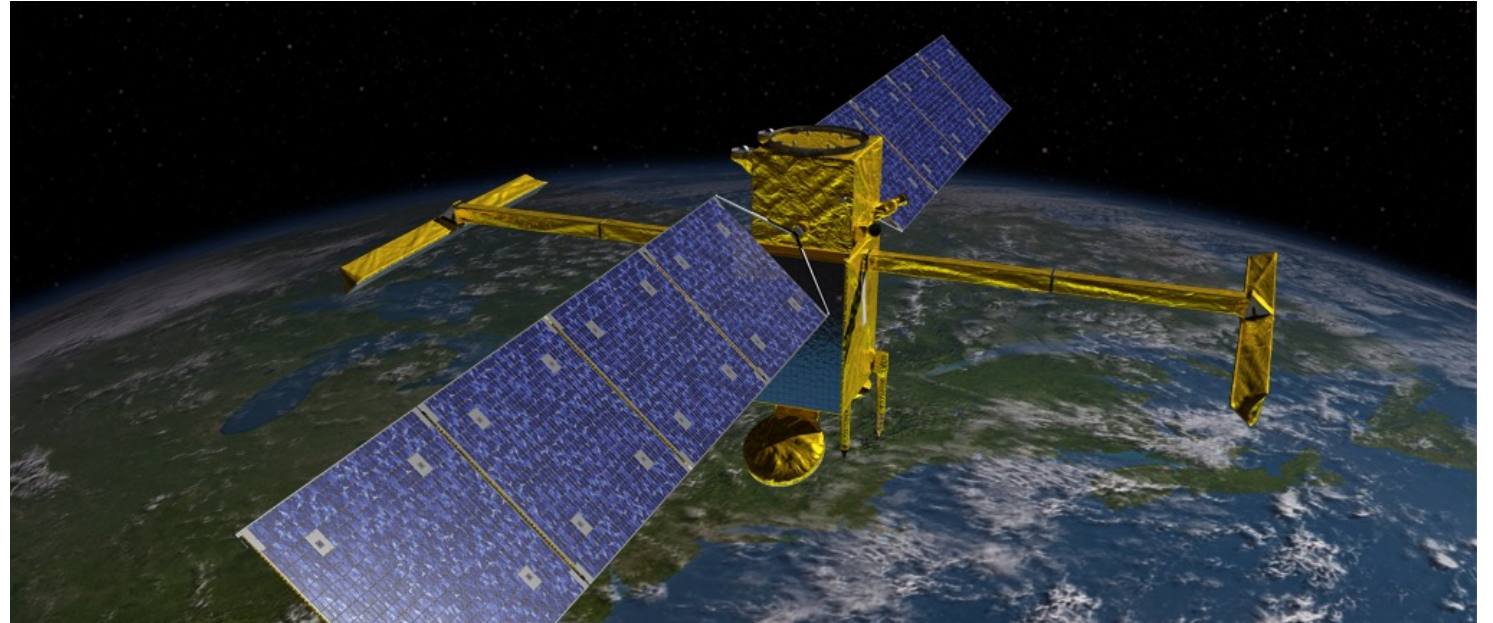
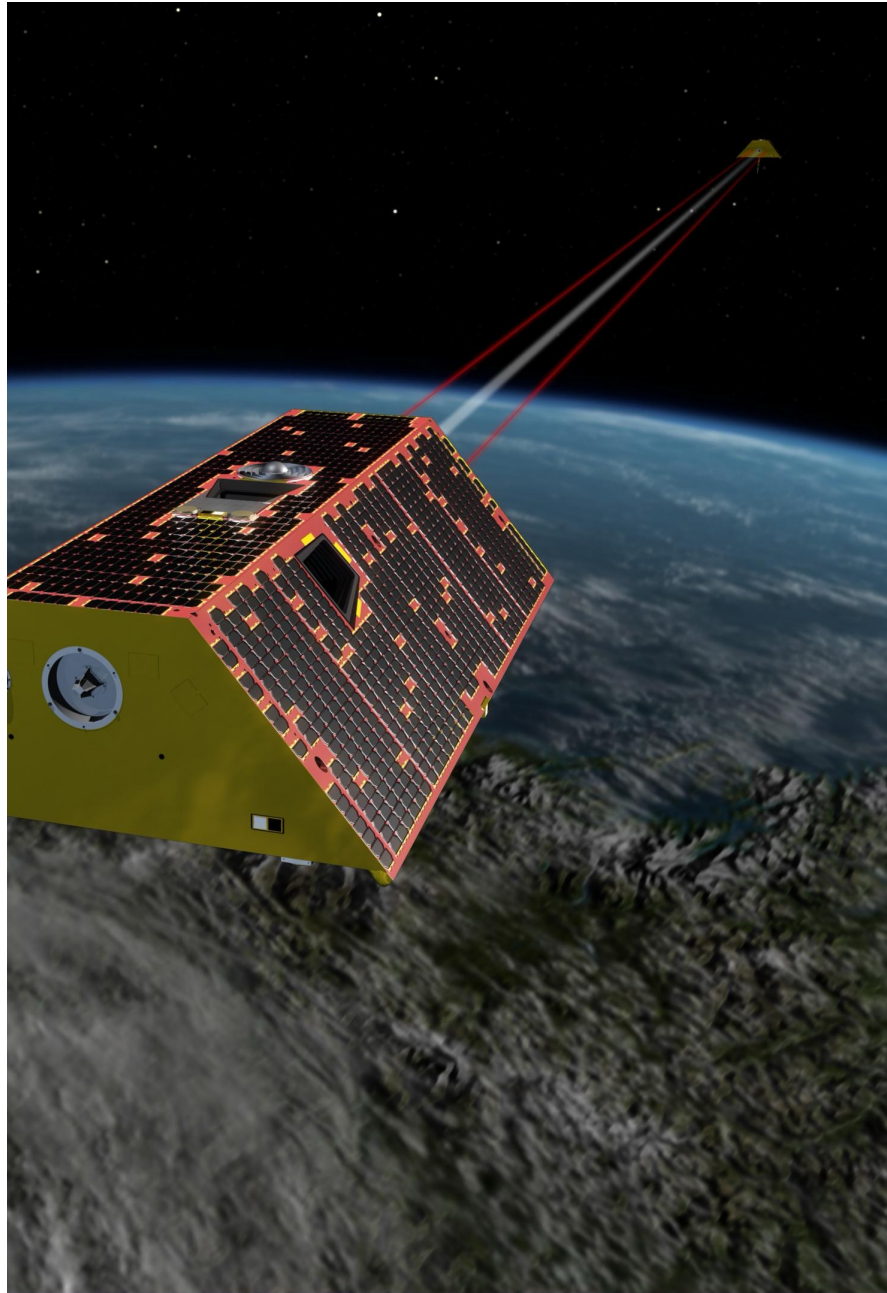
Observed High-Tide Flooding Nationwide



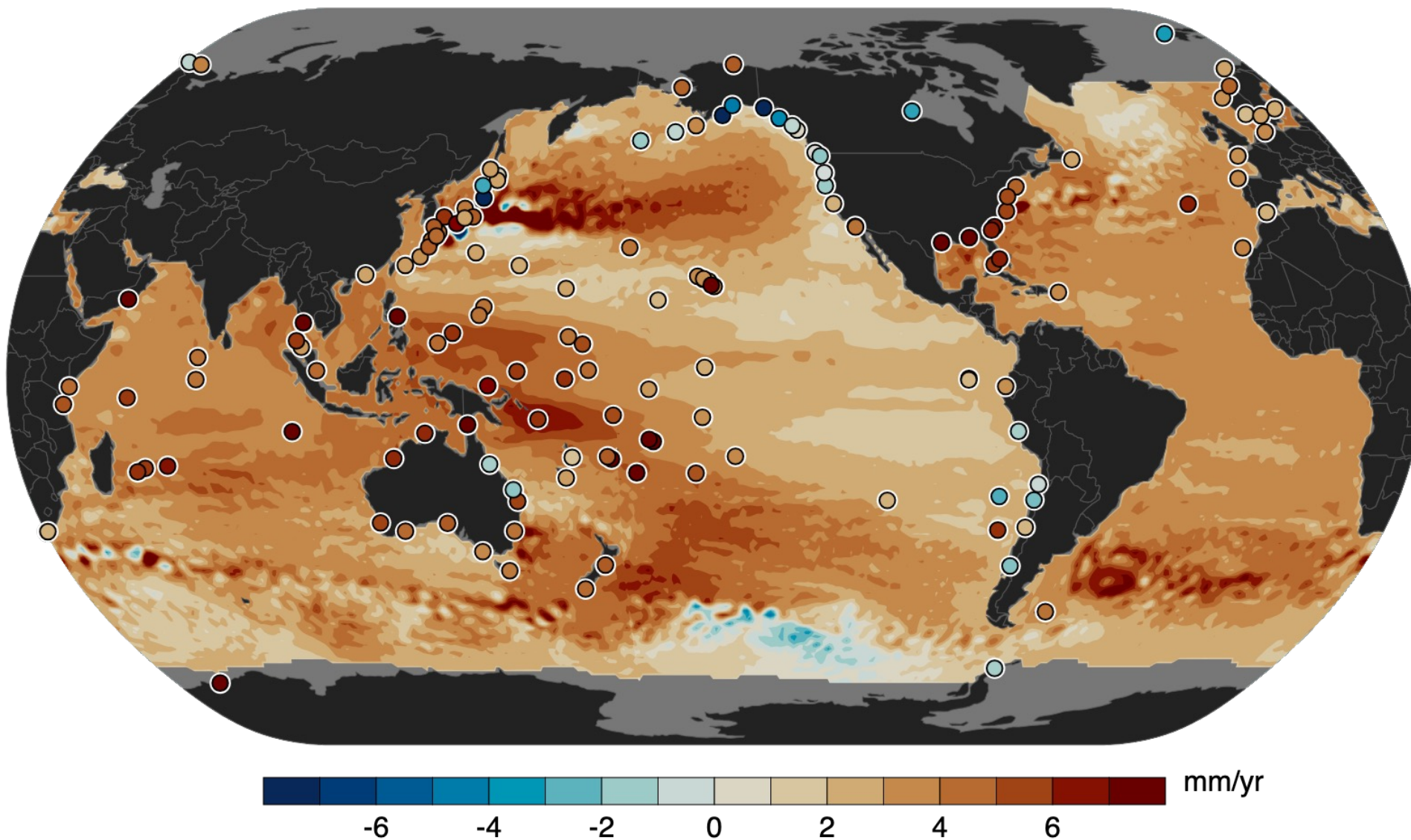
Why is Sea Level Changing?

Sea-Level Change is a **Whole Earth Process**





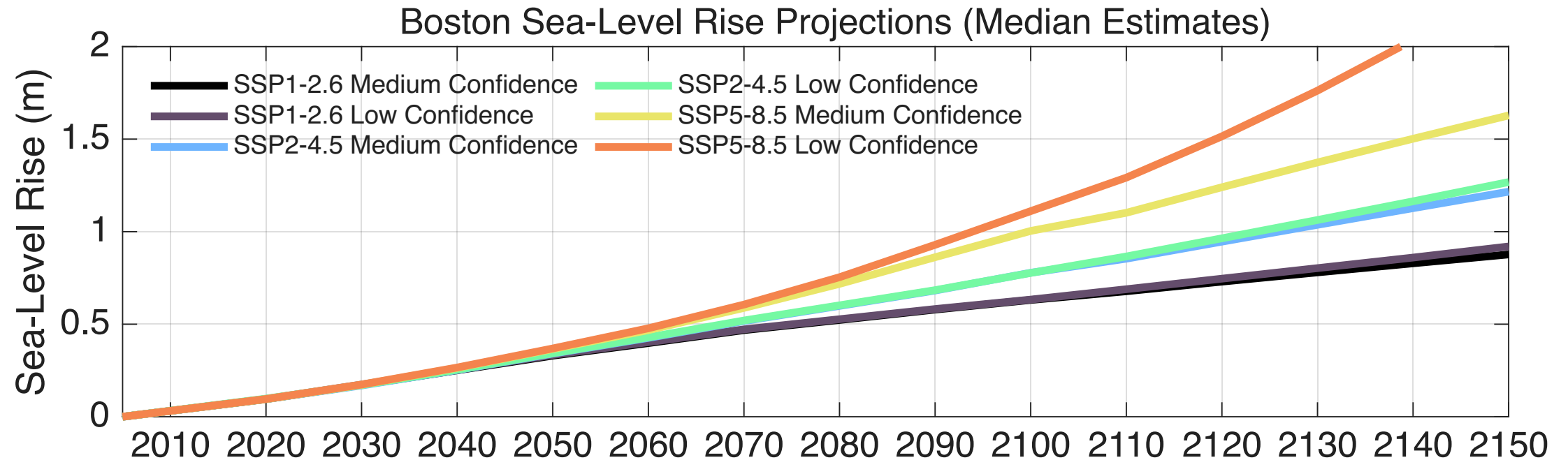
SEA LEVEL TRENDS (1993-2023)





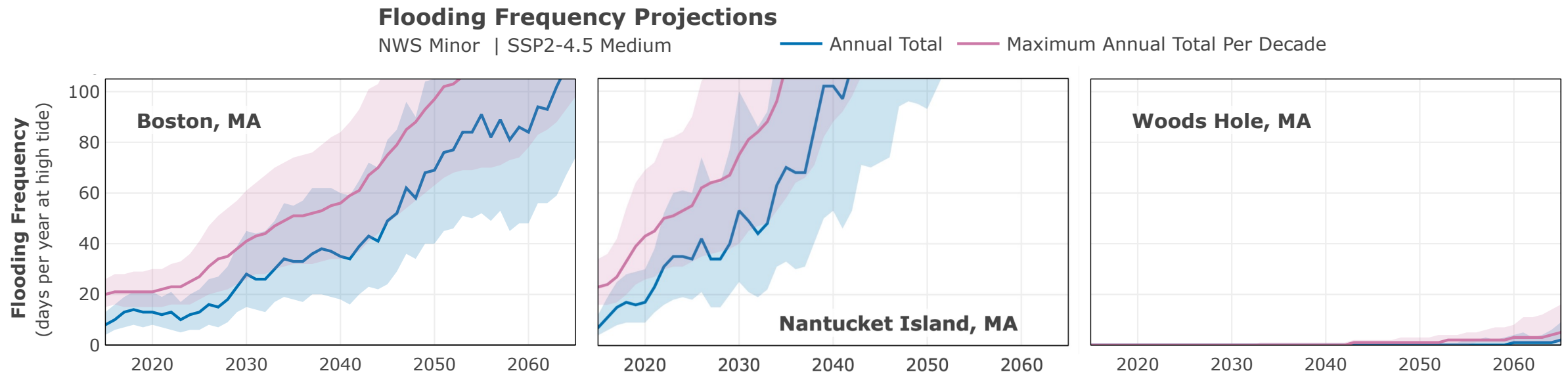
What now?

Future Sea-Level Rise in Massachusetts



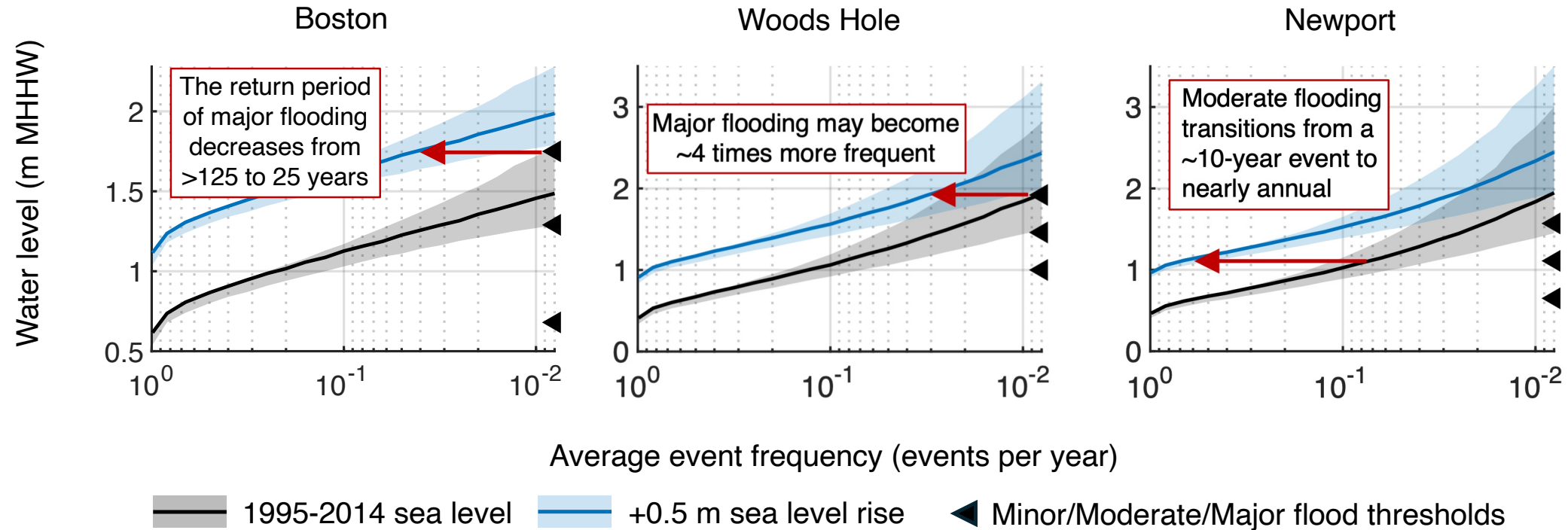
Boston sea level will have risen **31-37 cm (12-15 in) by 2050**
and **55-111 cm (22-44 in) by 2100** compared to the year 2005

Future High-Tide Flooding in Massachusetts



High-tide flooding will grow **more commonplace in Boston and Nantucket** by midcentury but remain **rare in Woods Hole**

Future Sea-Level Extremes in Massachusetts



Sea-level **extreme events will become more frequent** across coastal New England

Summary

- › Massachusetts sea-level rise and high-tide flooding rates are faster than national and global averages
- › During the future, in Massachusetts:
 - › Sea level will rise further
 - › High-tide floods will grow more commonplace
 - › Sea-level extremes will happen more frequently

Summary

- › To support resilience, management, policy, and decision making in the Commonwealth, we need:
 - › More understanding of ice, ocean, and land processes
 - › Expanded network of coastal observations
 - › Deeper, co-produced knowledge of coastal impacts
 - › Coordinated, collaborative, transdisciplinary research

A person wearing a blue jacket and black rubber boots is wading through water. They are carrying a blue bag. Water splashes around their legs. In the background, there are blurred orange and red structures.

Thank you!

Questions?