



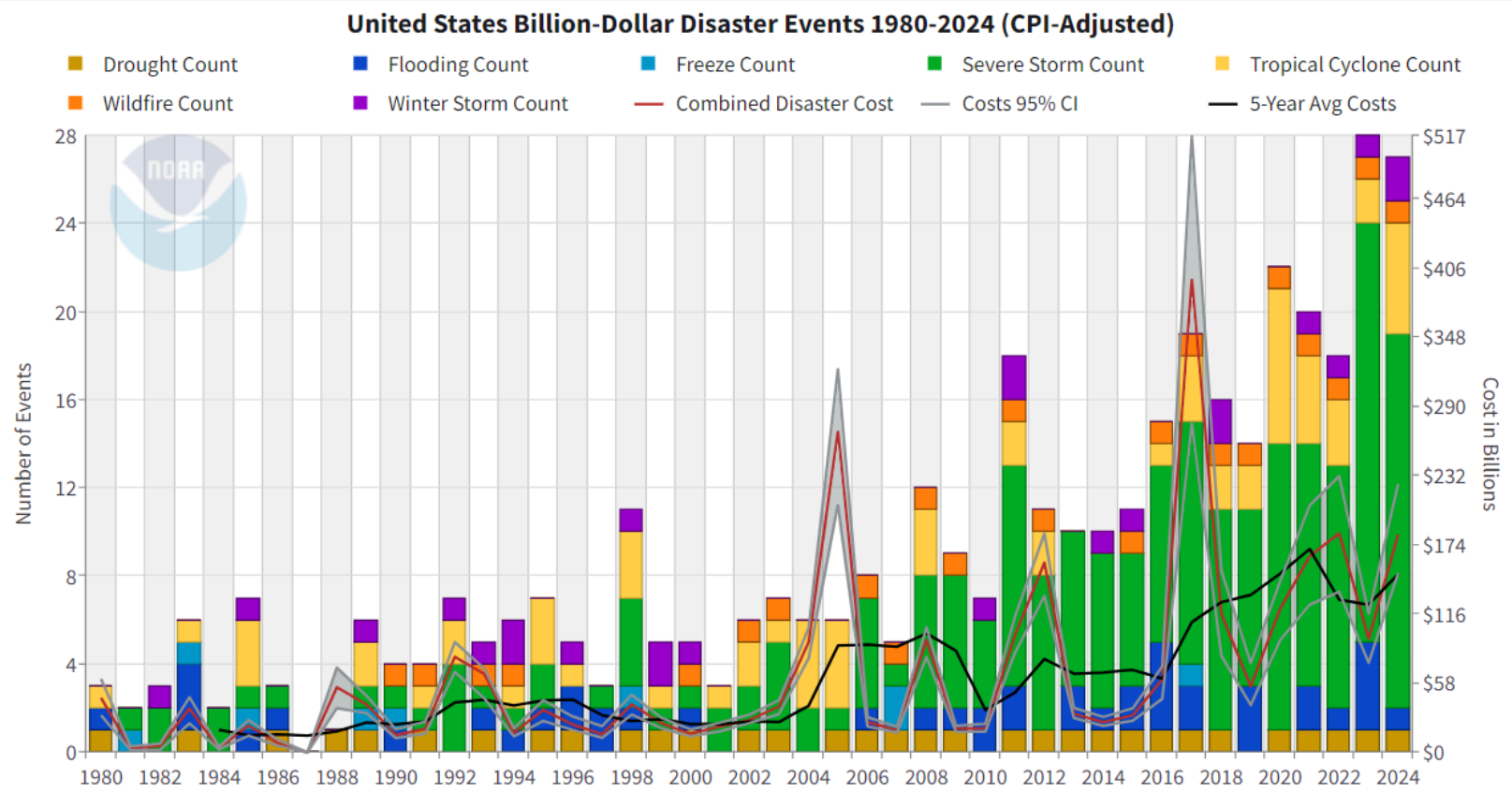
WELCOME TO CEVE 543

James Doss-Gollin

CEVE 543

2026-08-24

BILLION-DOLLAR DISASTERS, 1980 TO 2024



NOAA NCEI Billion-dollar Disasters

WHO YOU ARE

- Name
- Field of study
- One thing you want to learn

Example questions

Fundamental limitations

HOW BIG DOES THIS CULVERT NEED TO BE?



Houston, TX

[illegible]

6

HOW HIGH SHOULD THIS SURGE GATE BE?



The Maeslantkering (Bert Knottenbeld on Flickr, CC BY-SA 2.0)

WHAT PREMIUM TO CHARGE?

New York MTA targets \$125m parametric MetroCat Re 2017-1 cat bond

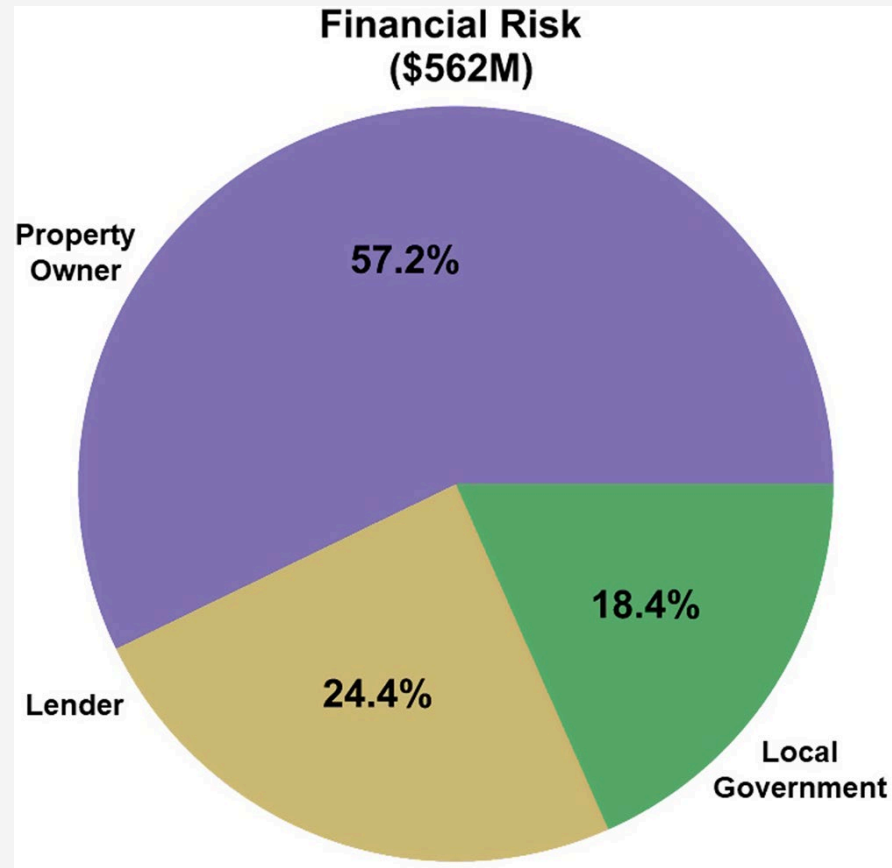
 2ND MAY 2017 - AUTHOR: ARTEMIS

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Artemis.bm

A parametric catastrophe bond is an insurance policy that pays out based on specified weather-related triggers, not on damages.

WILL THESE THIRTY-YEAR MORTGAGES BE REPAYED?



Thomson et al. (2023), fig. 12

When property owners experience uninsured damages that exceed the equity on their house, lenders and local governments can lose money.

The financial sector is just starting to grapple with *physical risk* (Condon, 2021)

HOW TO COMBINE GREEN/GRAY INFRASTRUCTURE ACROSS A CITY?

i Note

Figure shown in class: A permeable park in a Chinese sponge city, built to hold and infiltrate stormwater instead of piping it away (Mu Yu/Xinhua via Getty Images)

KEY INSIGHT

With *probabilistic* estimates of hydroclimate hazard, *and associated uncertainties / limitations*, we can support decisions across sectors and scales.

Example questions

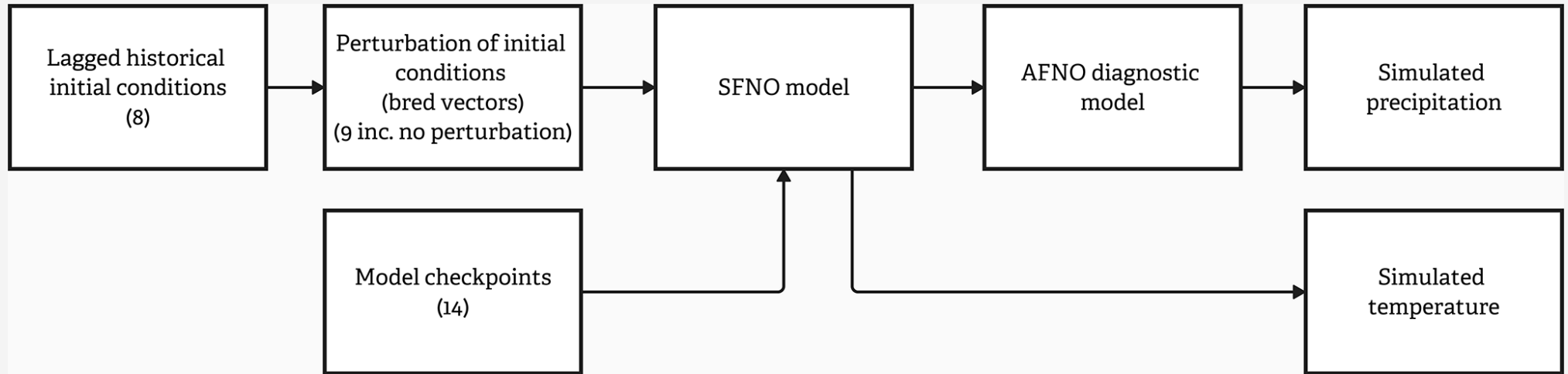
Fundamental limitations

HOW TO ANALYZE RECORDS WITH FEW EXTREMES?

i Note

Figure shown in class: Historical major hurricane tracks near Tallahassee beside stochastic tracks from the same coastal box (O'Rourke & Burdick, 2025)

HOW DO WE LEVERAGE EVOLVING AI METHODS?



Lagged historical initial conditions are perturbed, run through a machine-learning weather model, and turned into simulated precipitation and temperature (Ashcroft et al., 2026, fig. 1)

HOW WOULD WE KNOW IF IT IS RIGHT?

Set your Poll Everywhere screen name to your Rice NetID so your answers are recorded.



[PollEV.com/jdossgollin](https://www.poll-everywhere.com/jdossgollin)