
California is getting hit
with even more rain.
March 2017


Florida's been dealing with a months-long drought.
June 2017

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By John Upton on Apr 22, 2013

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Extreme droughts and floods will be California's future — is the state ready?

California is in dam trouble

By Rachel Becker | @RA_Becks | Feb 22, 2017, 2:30pm EST

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inside climate news

California Faces a Future of Droughts Alternating with Floods

A warming climate coupled with more intense El Niño and La Niña events could cause twice as many droughts and three times as many floods in California.

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Wilder Weather Swings in California's Future Could Spell Disaster

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Los Angeles Times

From extreme drought to record rain: Why California's drought-to-deluge cycle is getting worse

By RONG-GONG LIN II and PAIGE ST. JOHN

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STAR June 11, 2018

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Drought to flood and back again: Cycle that haunts Kenya yearly

Apr. 20, 2018, 9:00 am | By STEPHEN RUTTO @sk_rutto

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THE TEXAS TRIBUNE OUR PICKS

Drought returns to Texas just months after Hurricane Harvey floods state

Just five months after the monster storm gave Texas its wettest month in history, much of the state is now in a drought — including areas that saw historic flooding.

BY PAUL COBLER JAN. 24, 2018 12 AM

NOAA-CREST CENTER FOR EARTH SYSTEM SCIENCES AND REMOTE SENSING TECHNOLOGIES

CUNY THE GREATEST URBAN UNIVERSITY IN THE WORLD

The City College of New York

Back-to-Back Floods and Droughts

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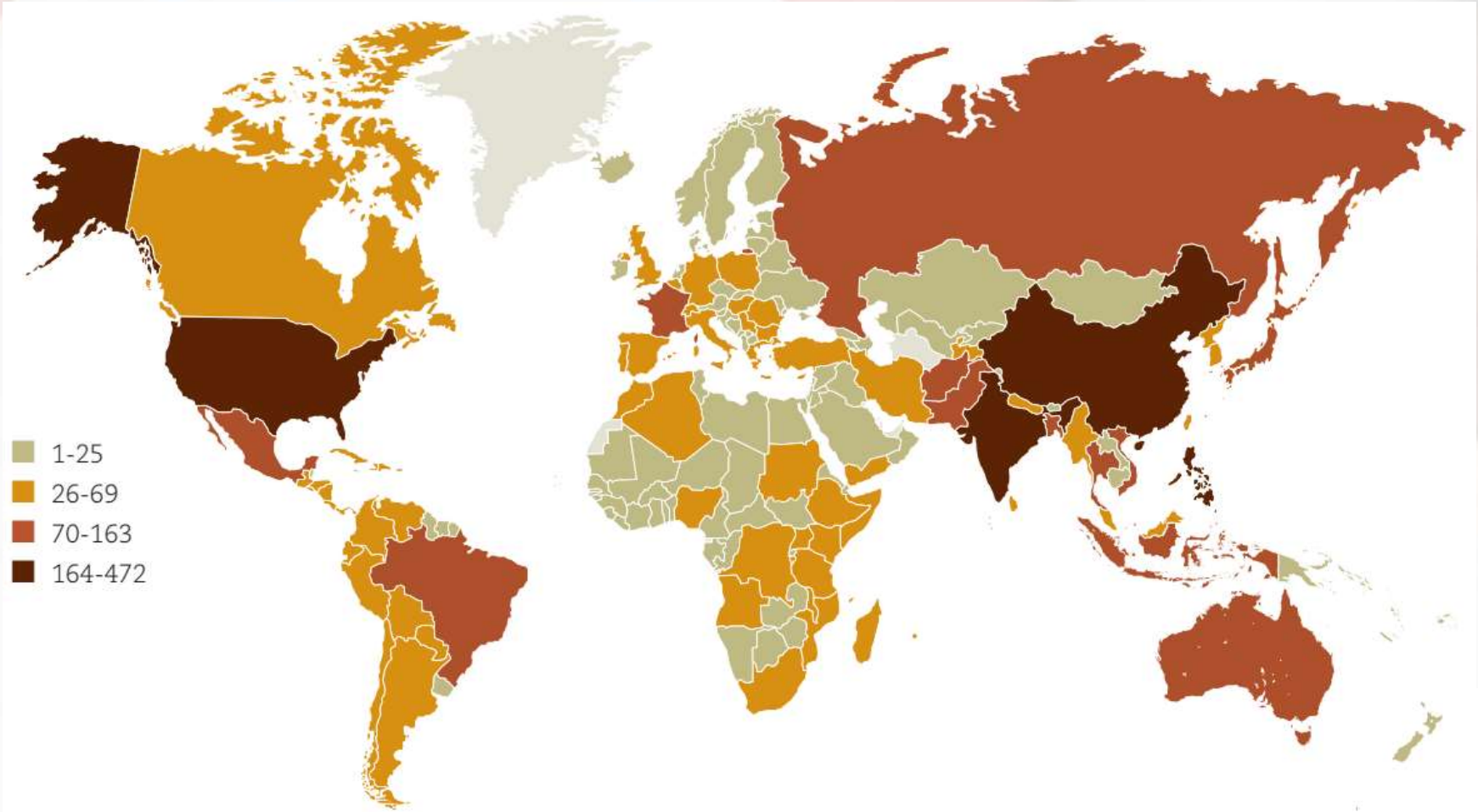
NSF REU/CREST HIRES SUMMER BRIDGE (Summer 2018)

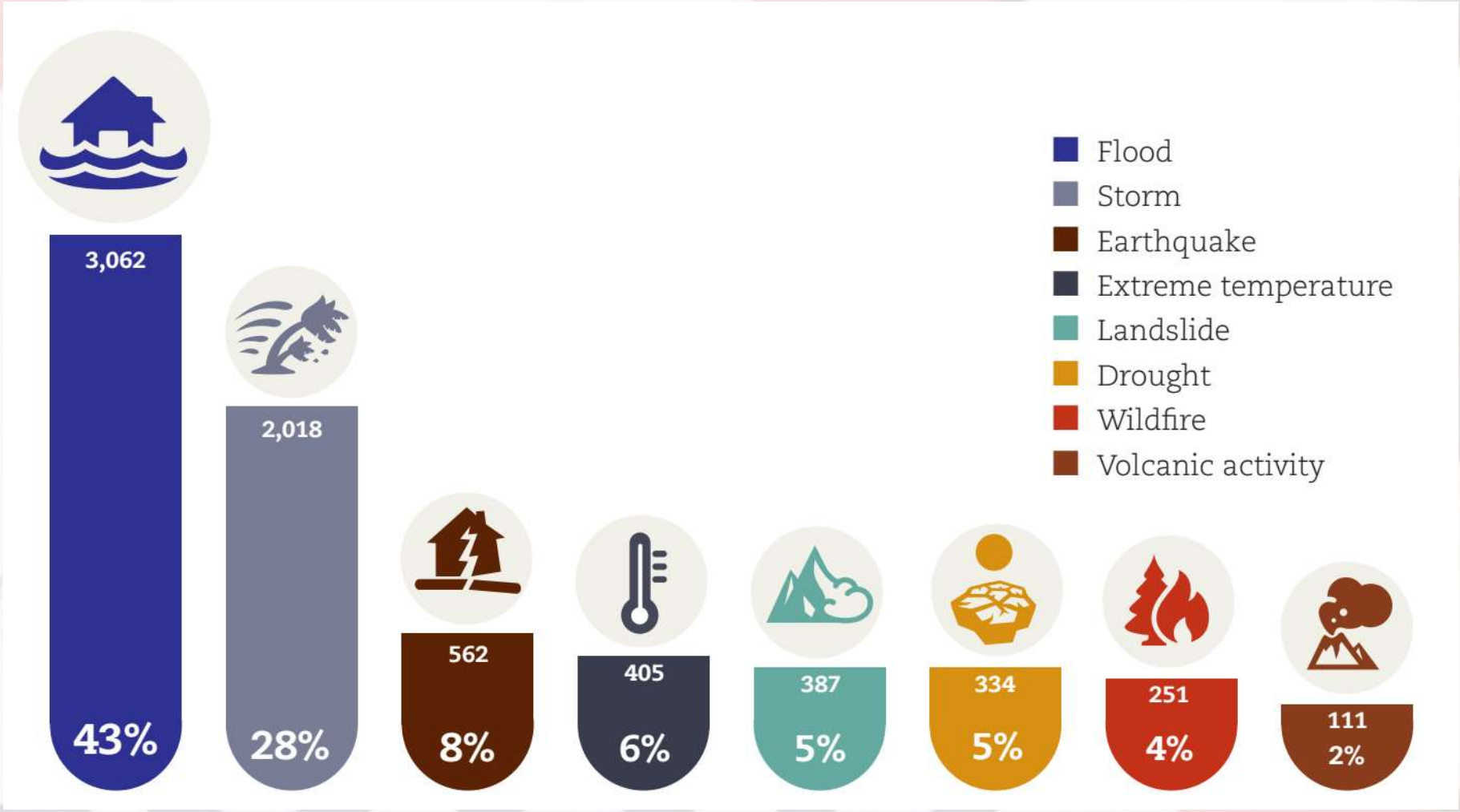
Weather-related Disasters…

- Number of weather-related disasters reported per country (1995-2015)



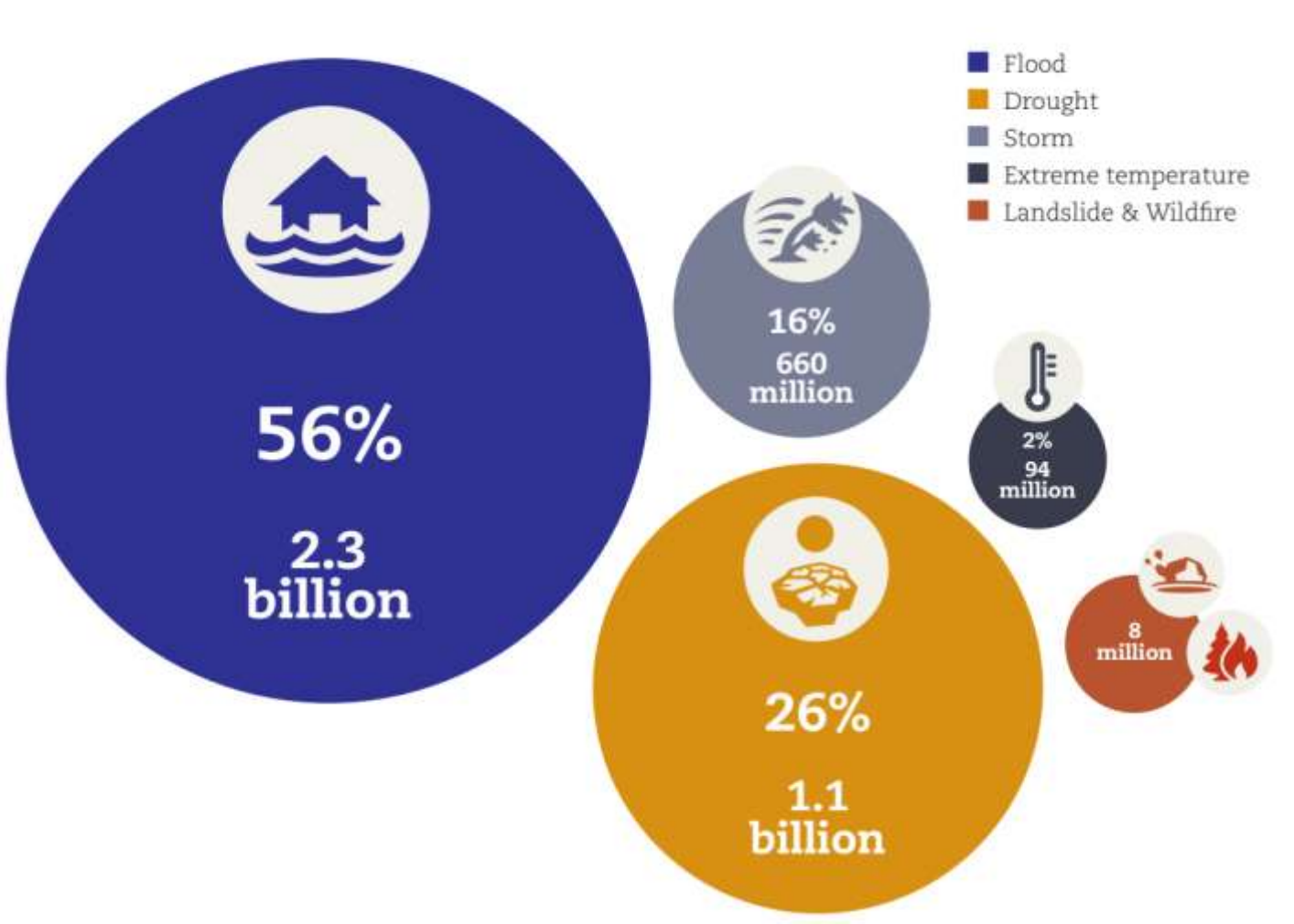
Flood and Drought…

- Percentage of occurrences of natural disasters by disaster type (1995-2015)



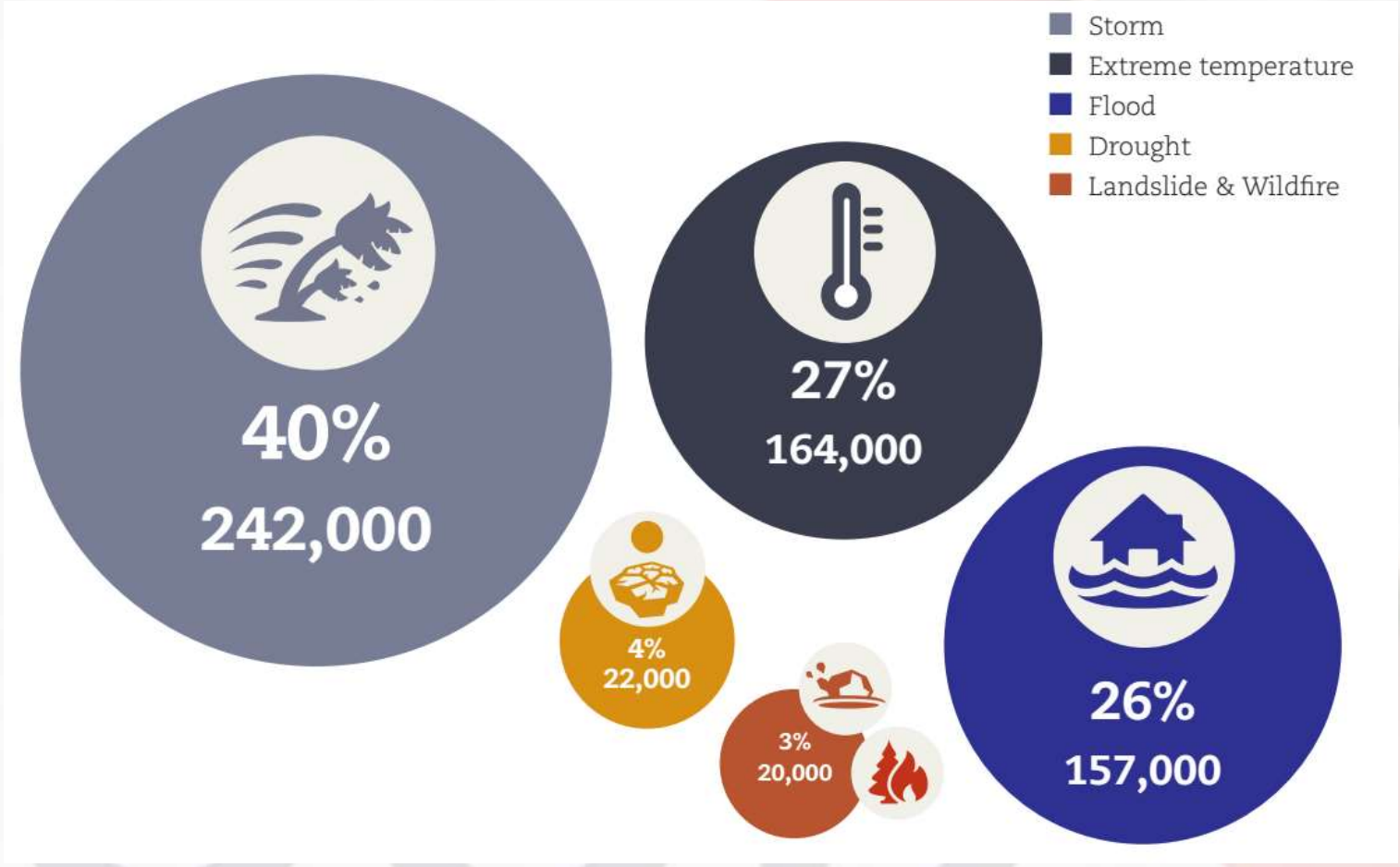
Flood and Drought…

- Numbers of people affected by weather-related disasters (1995-2015)



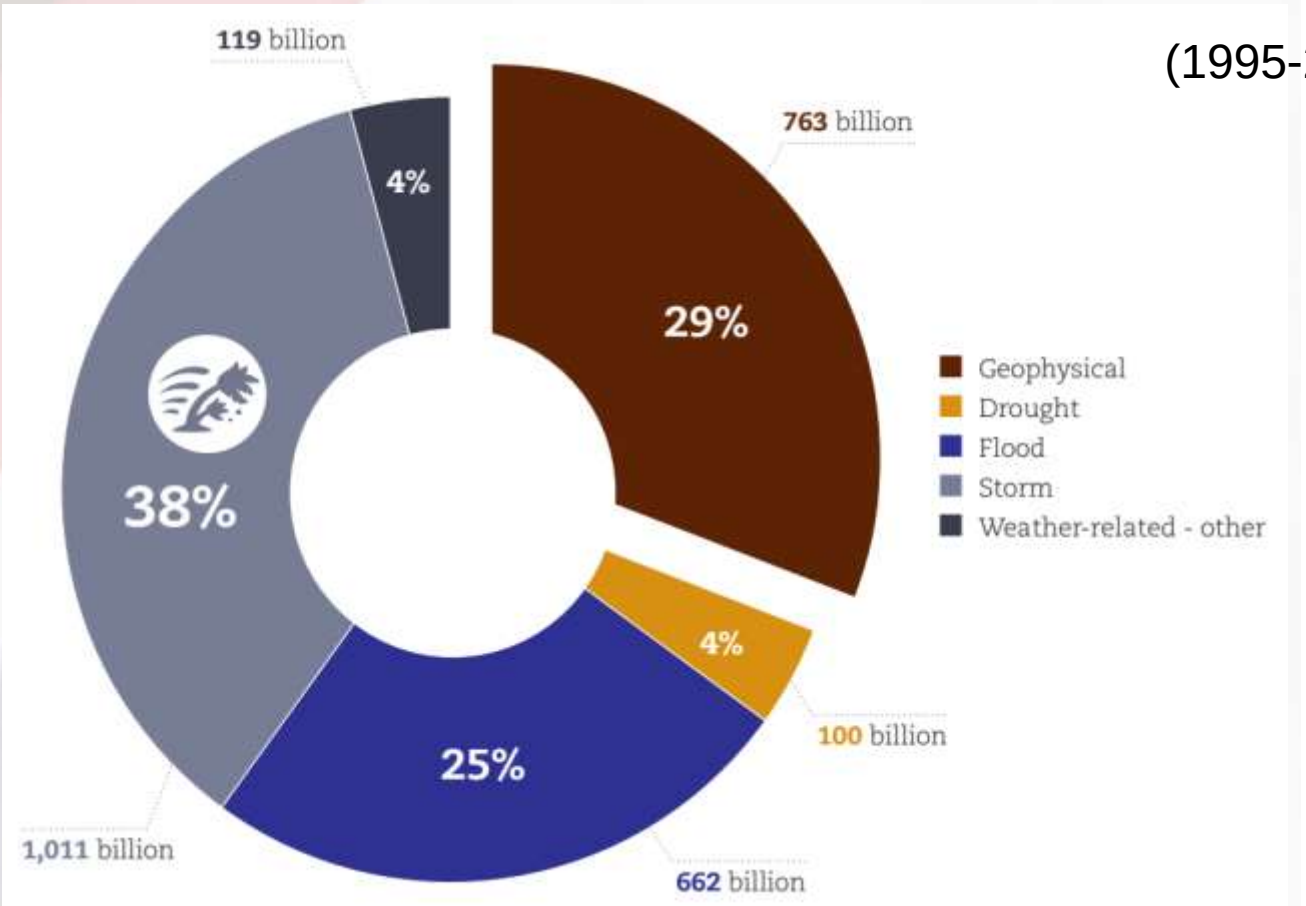
Flood and Drought…

- Numbers of people killed by disaster type (1995-2015)



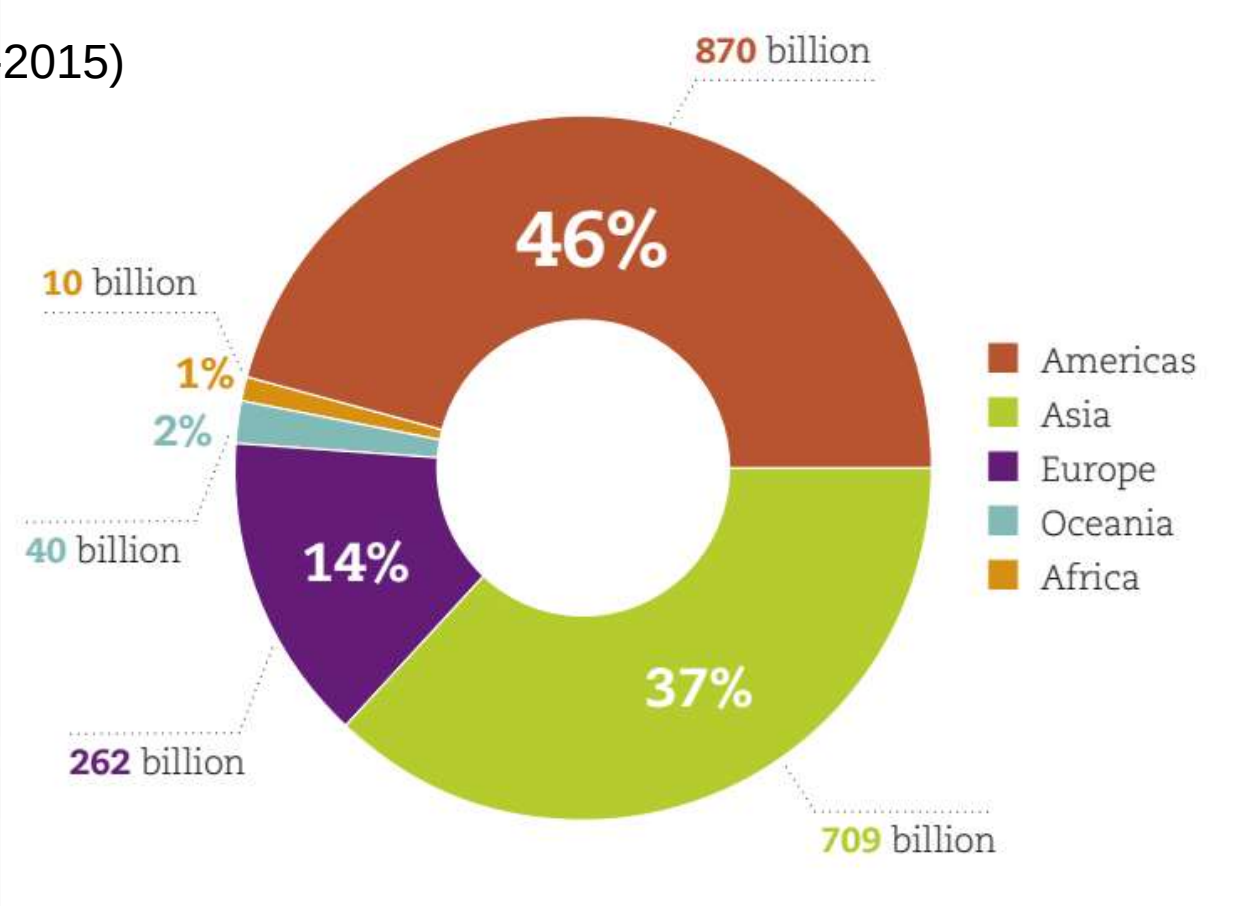
Flood and Drought…

- Breakdown of recorded economic damage (US$) by disaster type



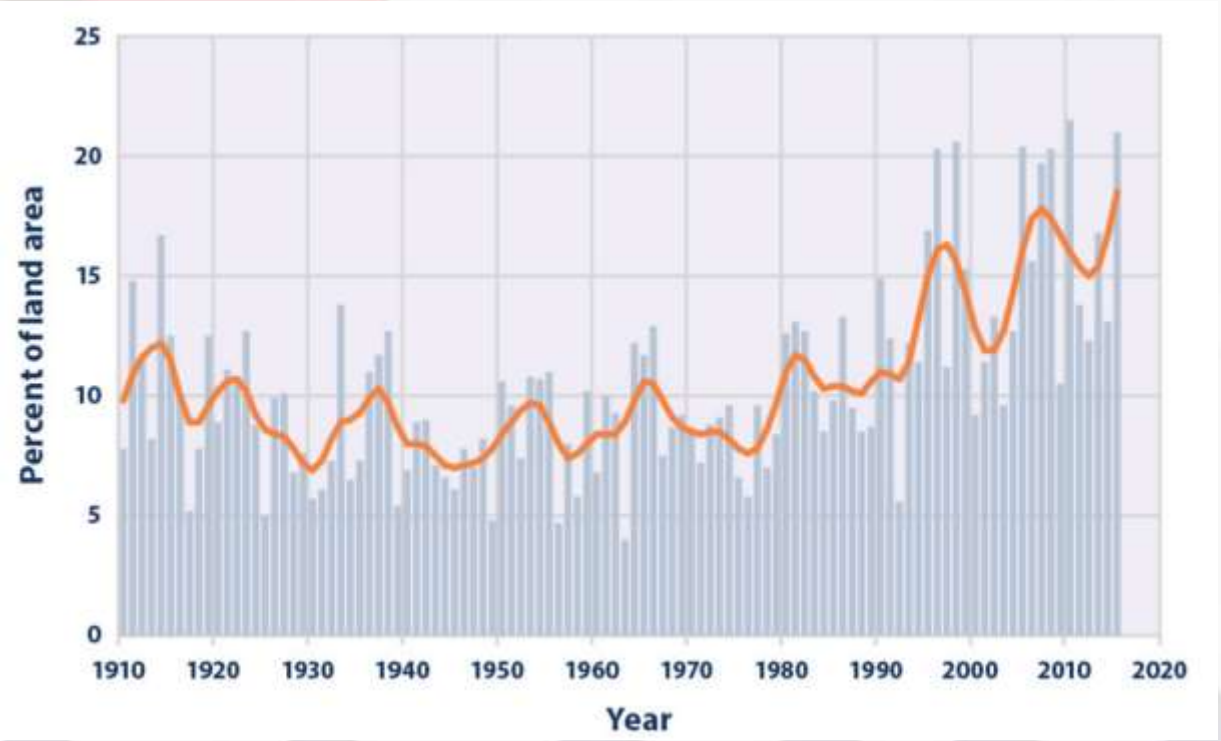
(1995-2015)

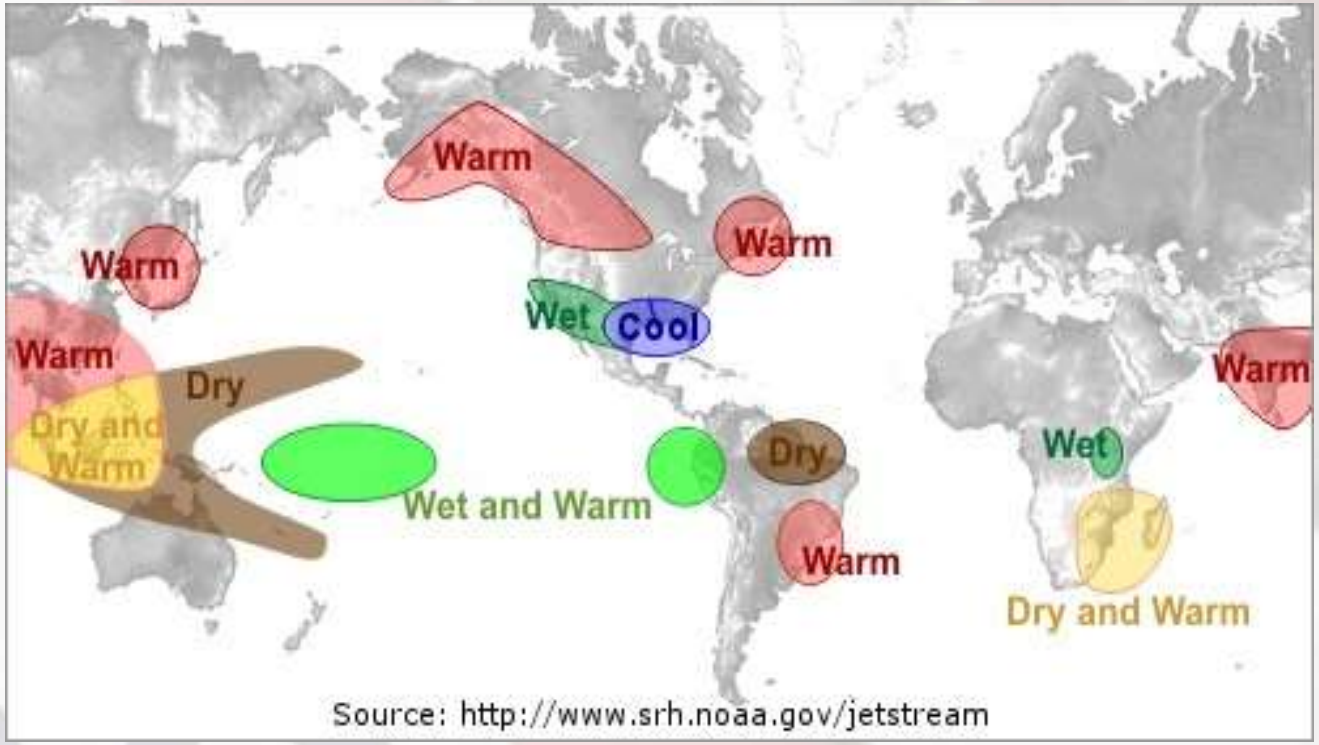
- Absolute losses by continent (US$)



Flood and Drought…

- Extreme One-Day Precipitation Events in the Contiguous 48 States (1910–2015)



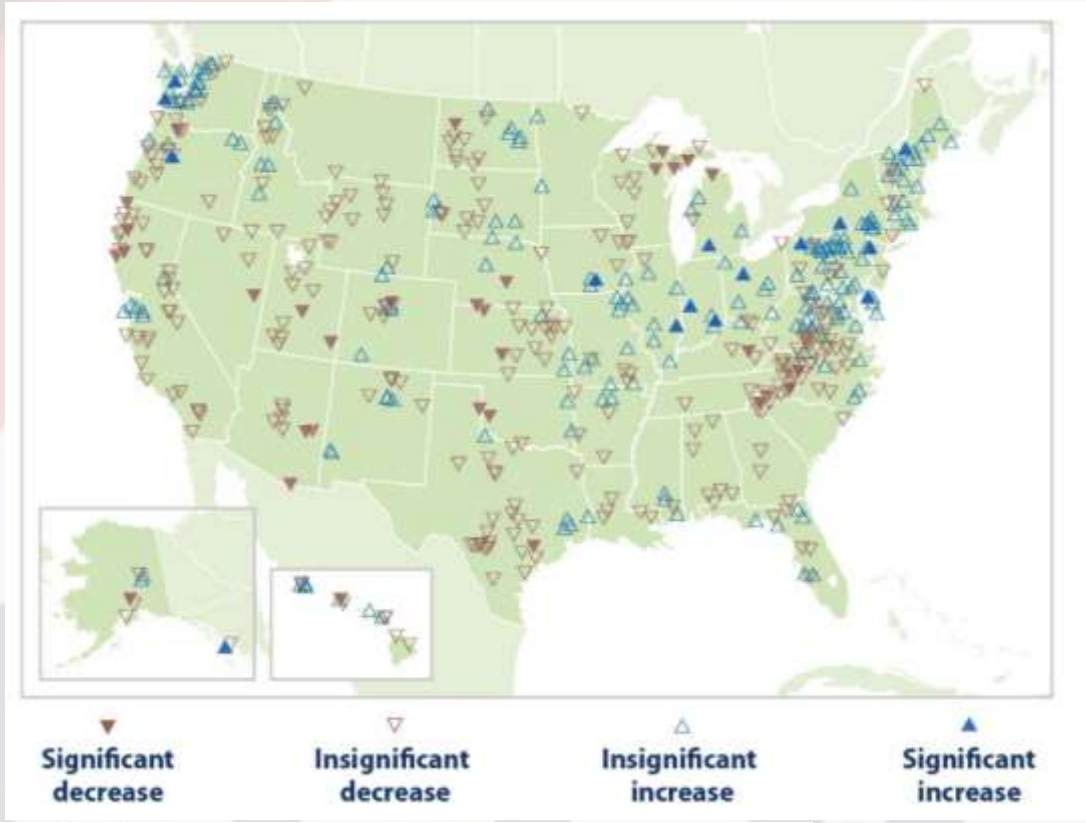


EPA

Climate Change Indicators in the United States: Heavy Precipitation
www.epa.gov/climate-indicators - Updated August 2016

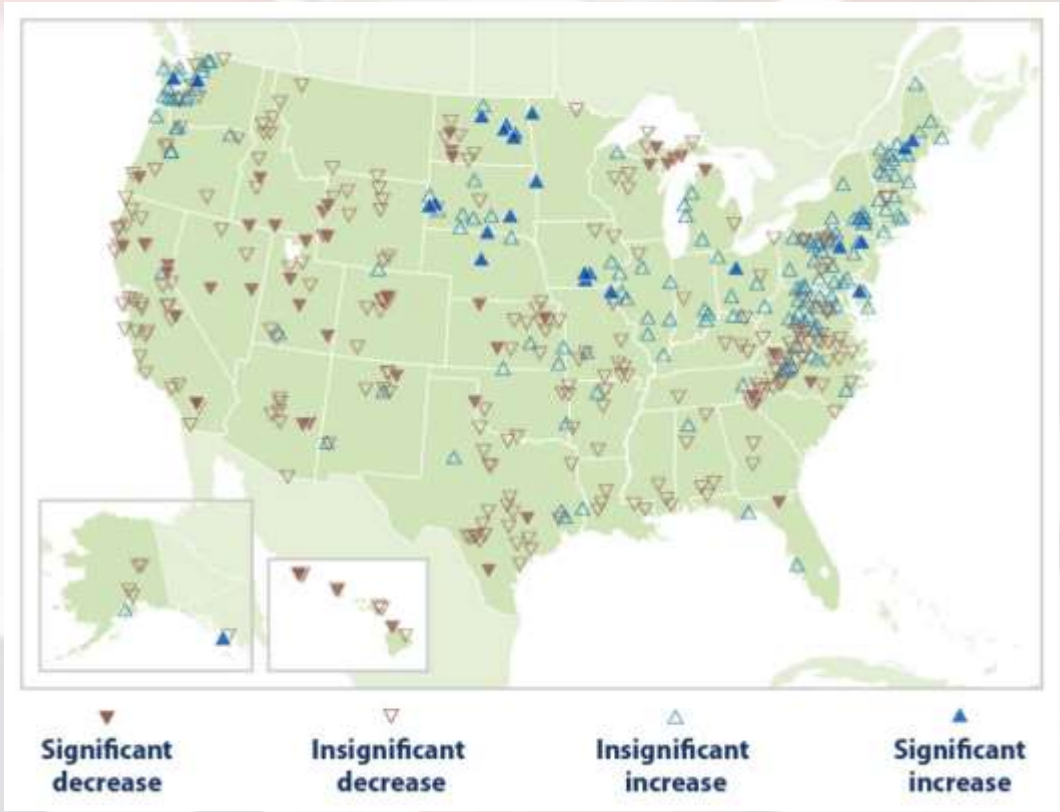
Flood…

- Change in the Magnitude of River Flooding in the U.S. (1965–2015)



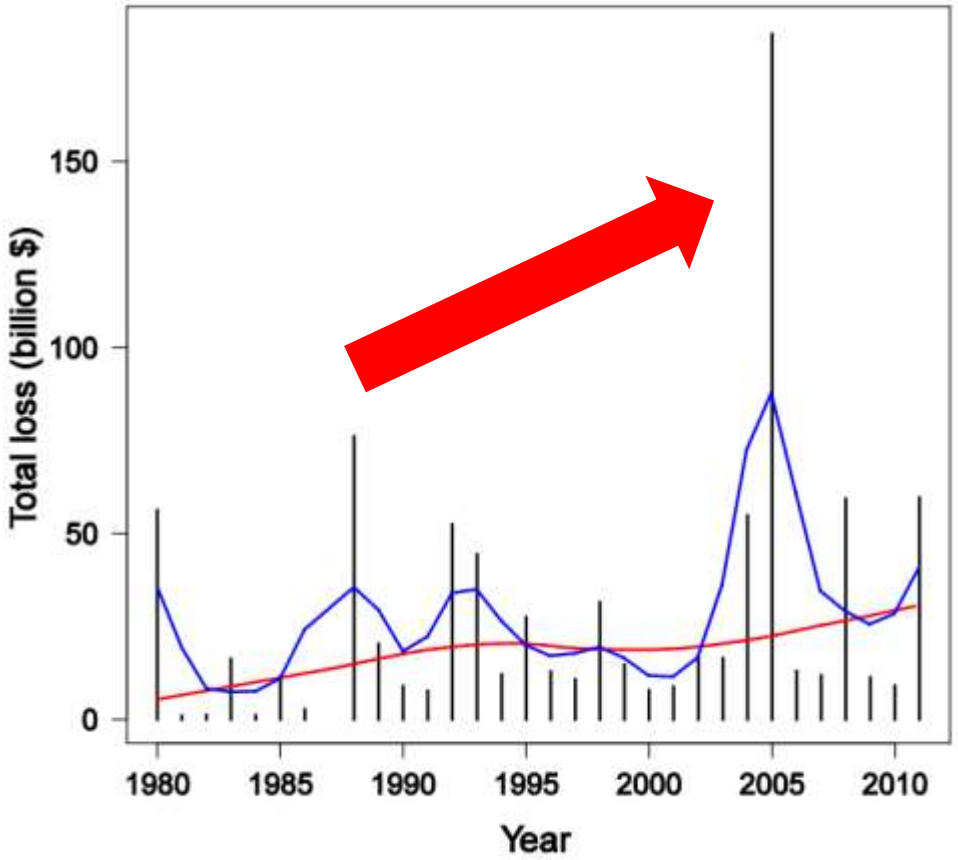
Climate Change Indicators in the United States: River Flooding
www.epa.gov/climate-indicators - August 2016

- Change in the Frequency of River Flooding in the U.S. (1965–2015)

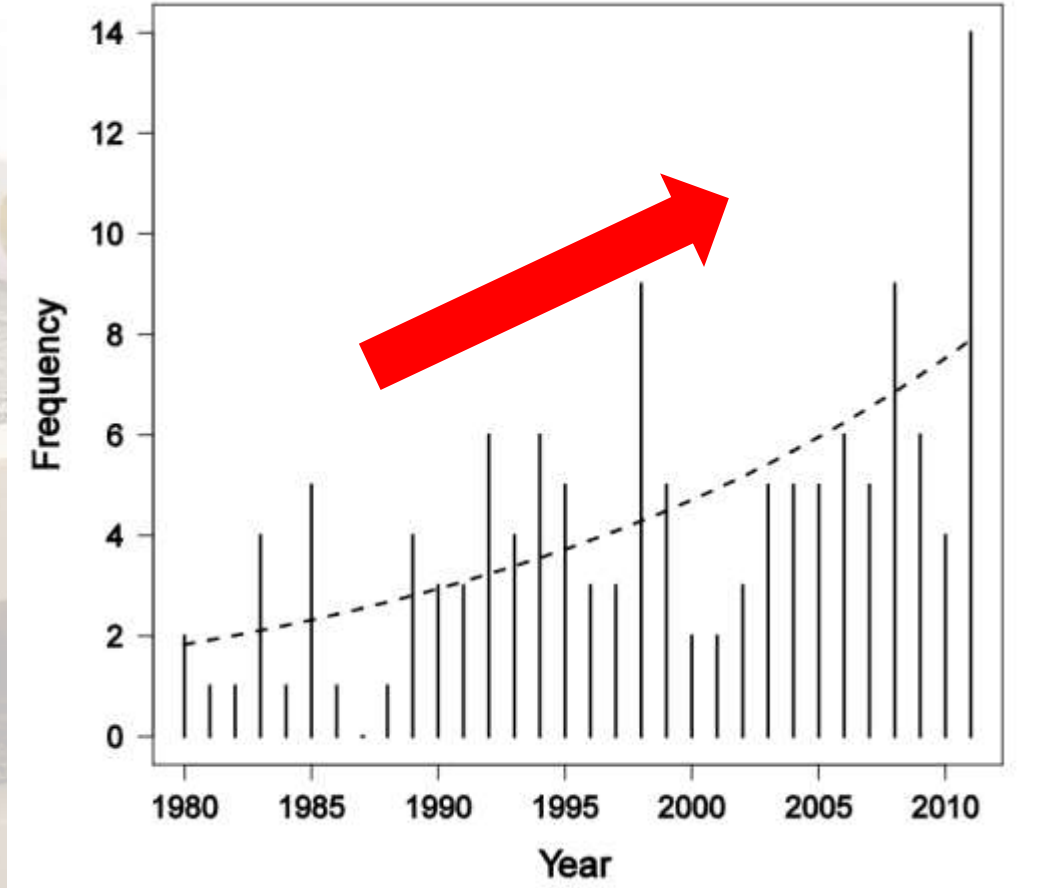


Why is it important?

Billion-Dollar Weather and Climate Disasters!



Aggregate annual loss from billion dollar disasters in the U.S. (constant 2011 dollars, vertical bars)



Annual frequency of billion dollar disasters in the U.S. (vertical bars), along with trend (dashed line)

Buildings

Transportation

What Can We Do?

Industrial

Tasks to do…

1) Develop a geodatabase of floods and droughts at the global scale (e.g., where, when, flood magnitude/ drought severity).

2) Quantify the global links/patterns of back-to-back flood and drought events; cyclic floods; cyclic droughts.

3) Identify the loss damages, and relationship between population and affected people and country-scale economic class.

Tools to use (and practice together)…

1) ArcGIS, MS Excel, MATLAB

2) Statistical Concepts/Methods (e.g., clustering)

3) Explanatory Analysis (e.g., temporal changes/trend)

4) Multi-scale Analysis (i.e., basin-to-country-to-global scales)

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