

Sea Level Rise 101 & Beyond

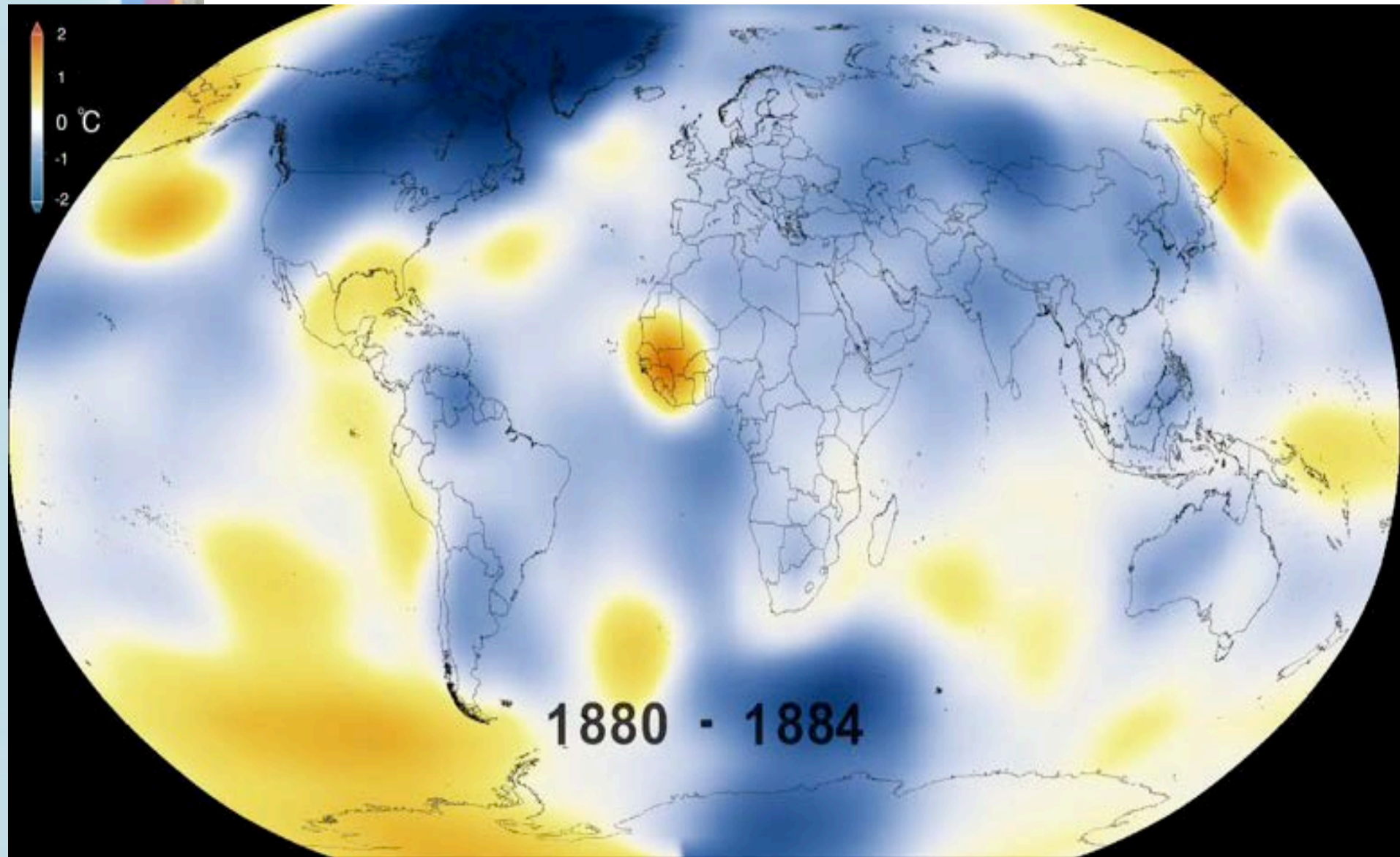


Juliette Finzi Hart, Ph.D.
Director of Outreach, USGS

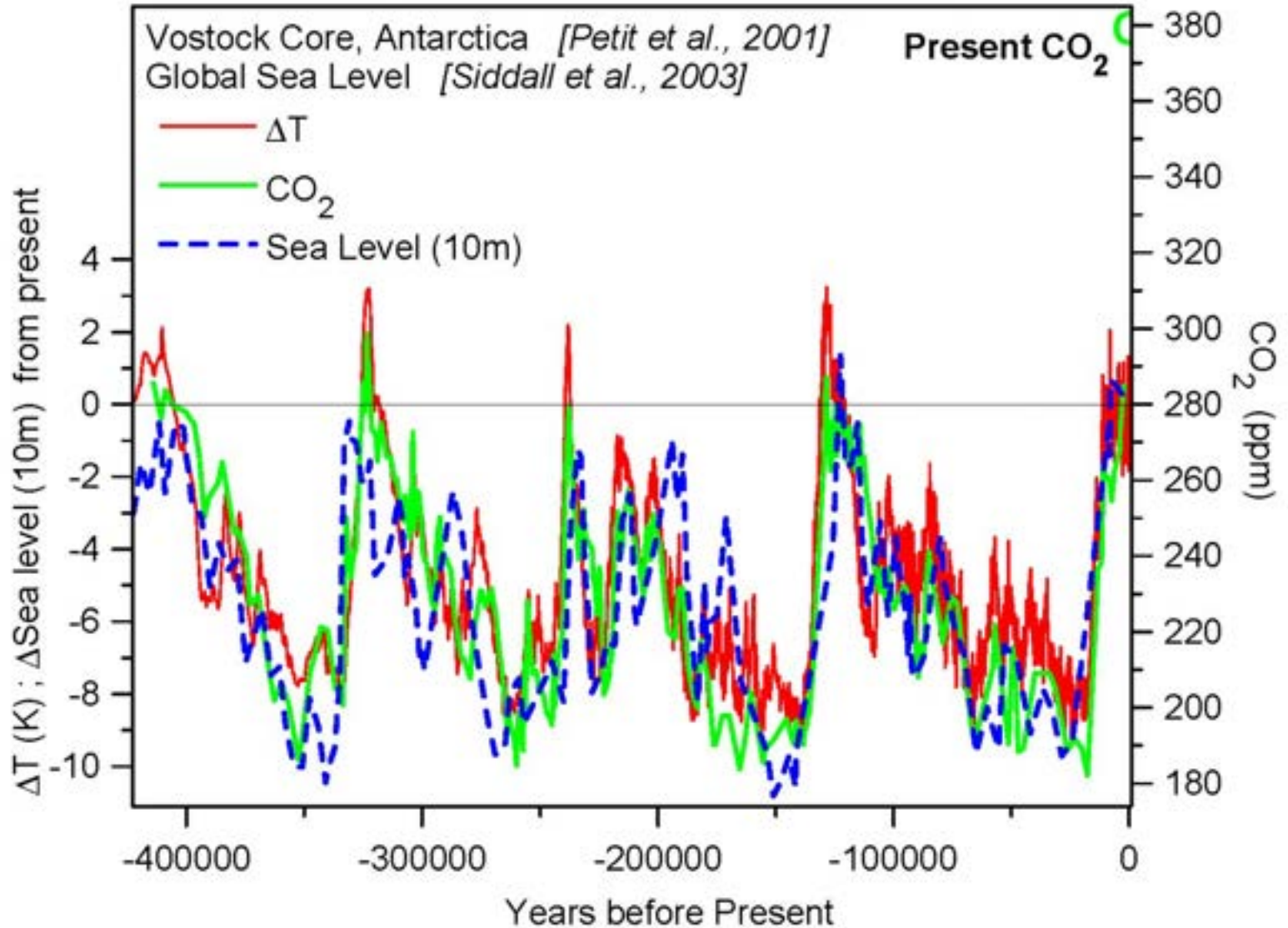


understanding the science

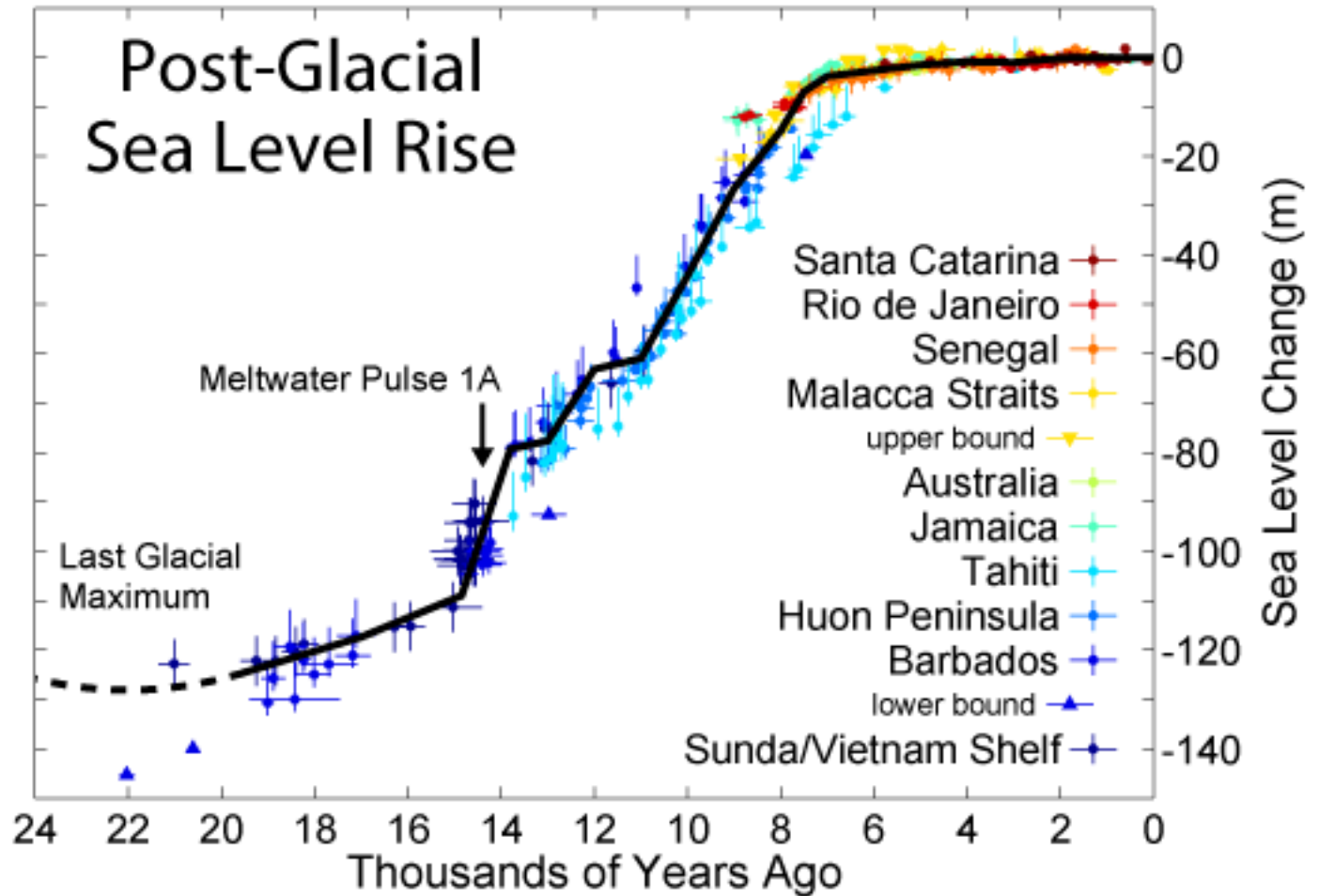
The earth is warming...



Sea Level Ups & Downs

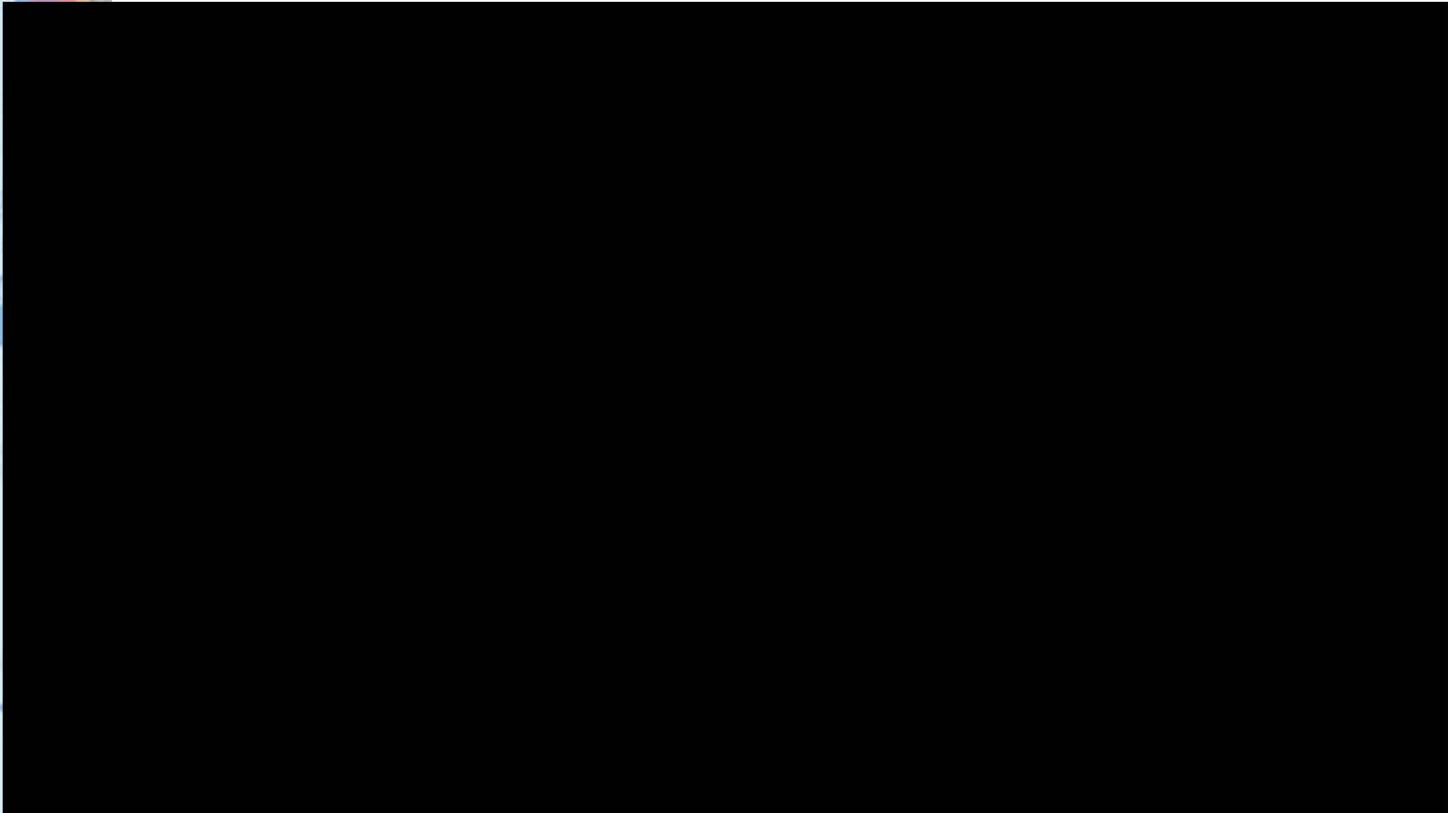


Sea Level Ups & Downs



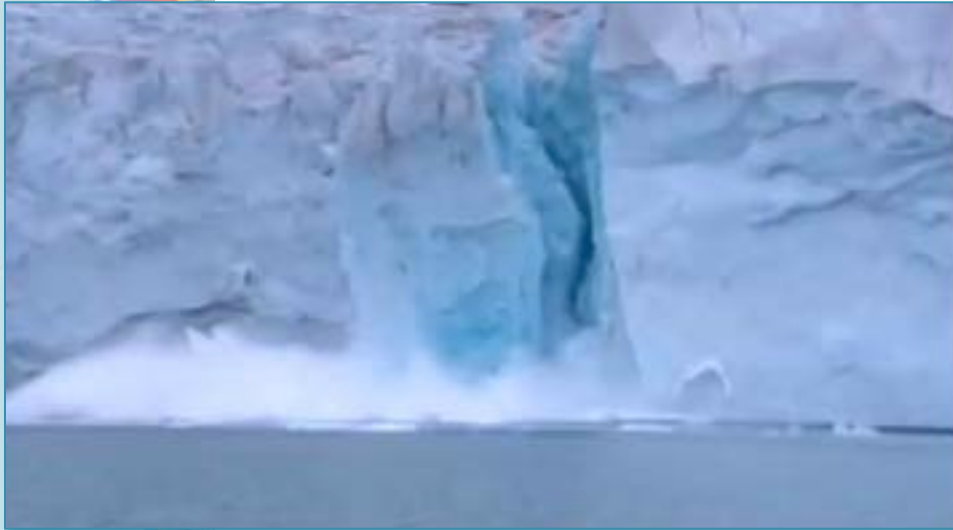
Stanford et al. (2011)

Global Causes of SLR



<https://www.youtube.com/watch?v=VEuEqgdJXHg>

Global SLR – Video Recap



Two main causes:

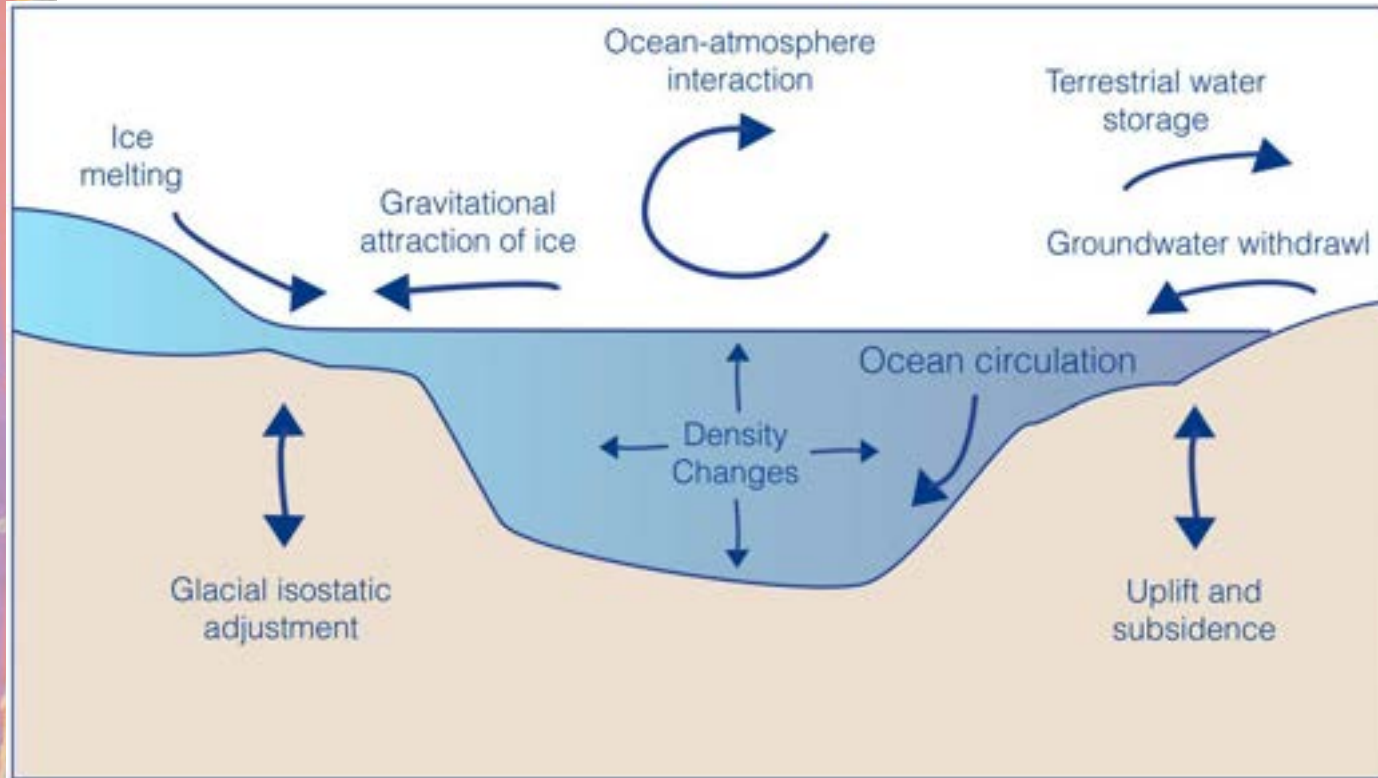
- Thermal expansion
- Melting of glaciers & ice sheets

Uncertainty in:

- Rate of melting
- How this will affect SLR

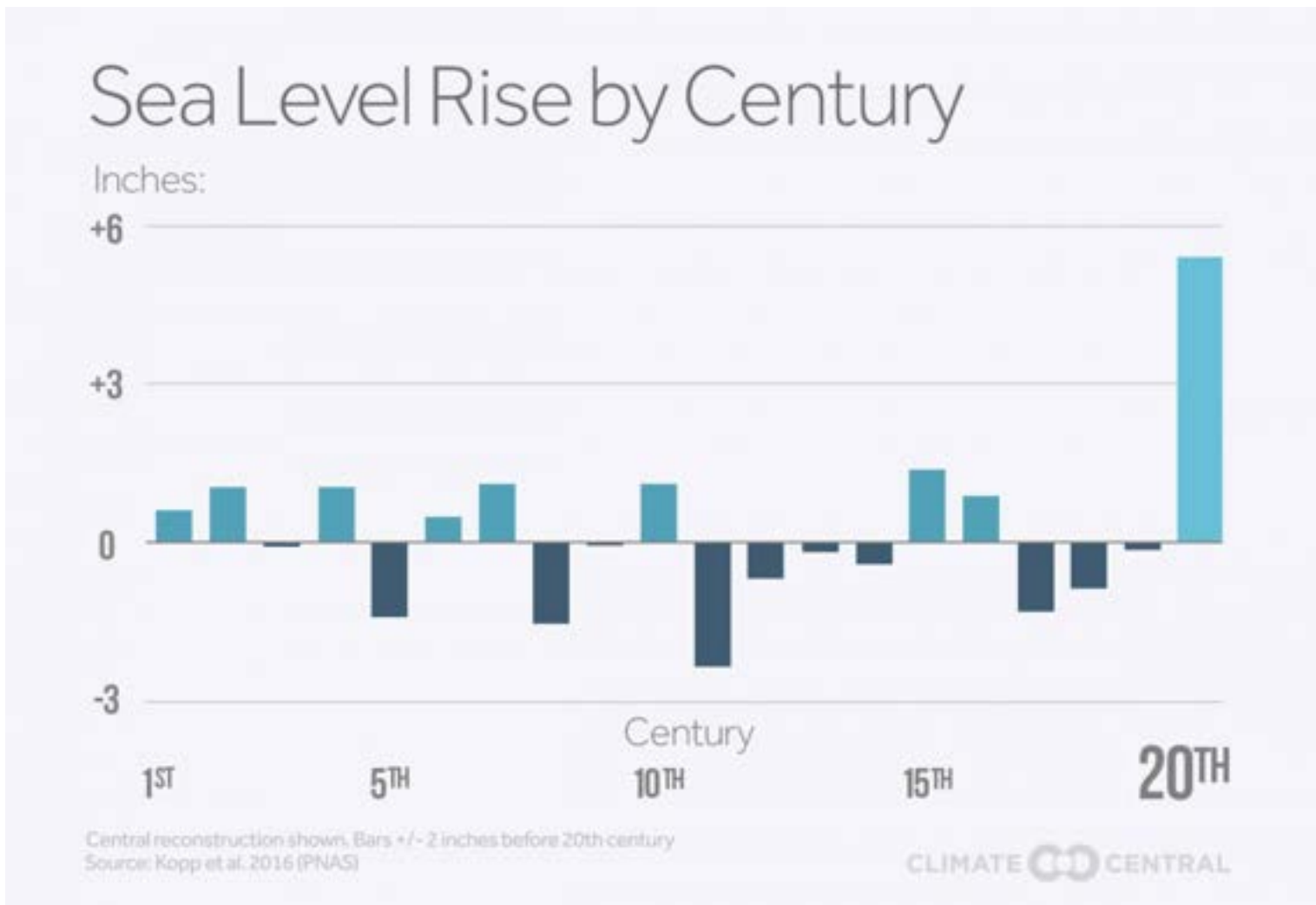
<https://www.youtube.com/watch?v=VEuEqgdJXHg>

Local Influences on SLR



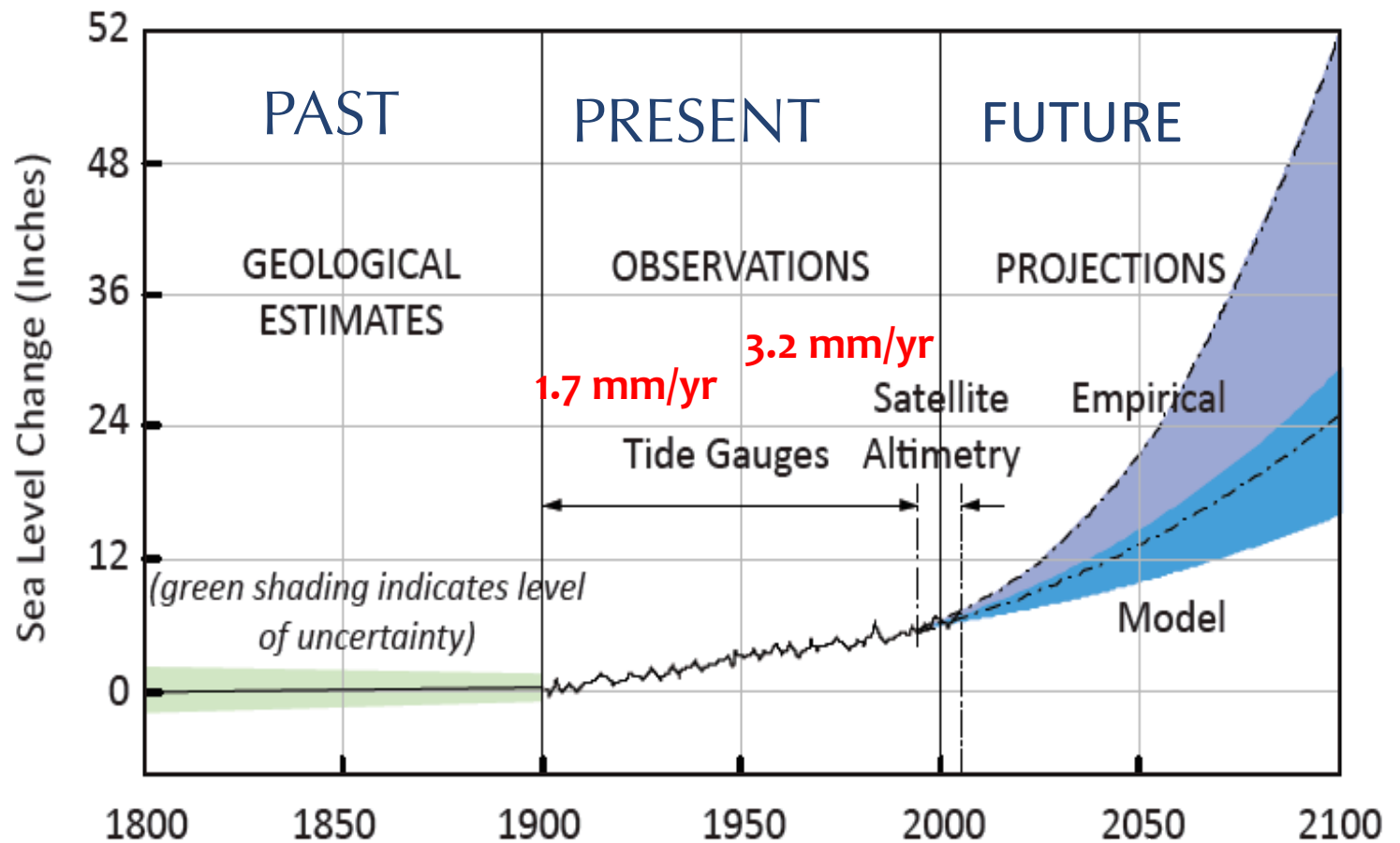
- Thermal expansion
- Melting of Glaciers & Ice Sheets
- Terrestrial Water Storage
- Tectonic Activity

Sea Level Ups & Downs



Kopp et al. (2016)

Measuring SLR in the Anthropocene



Sea level rise (SLR) in California

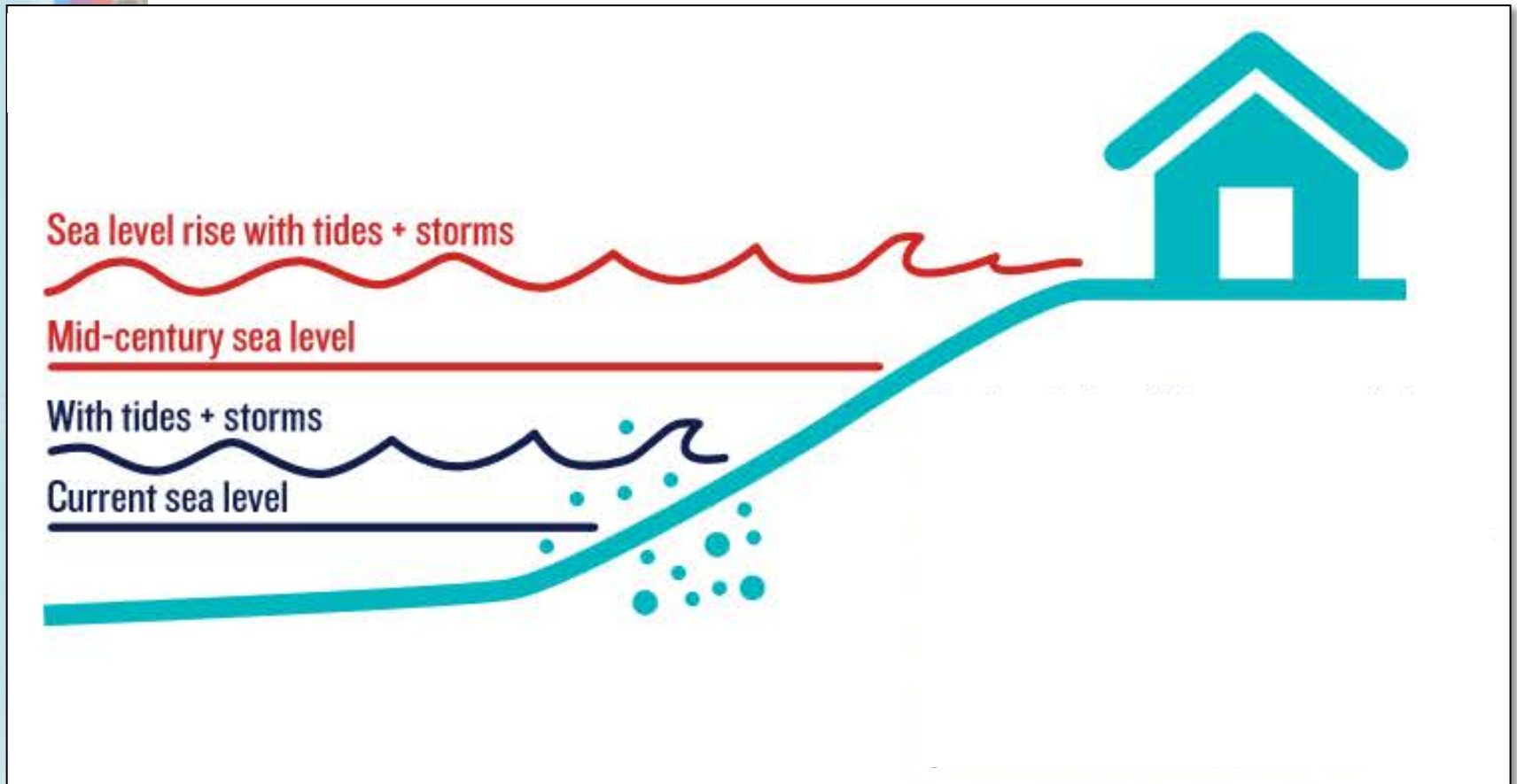


Time Period	“Low”	“Mid”	“High”
2000 – 2030	2 inches	6 in (0.5 ft)	12 in (1 ft)
2000 – 2050	5 in (0.4 ft)	11 in (1 ft)	24 in (2 ft)
2000 – 2100	17 in (1.5 ft)	37 in (3 ft)	66 in (5.5 ft)



http://www.nap.edu/catalog.php?record_id=13389

Beyond SLR...storms & tides



Beyond SLR...storms & tides



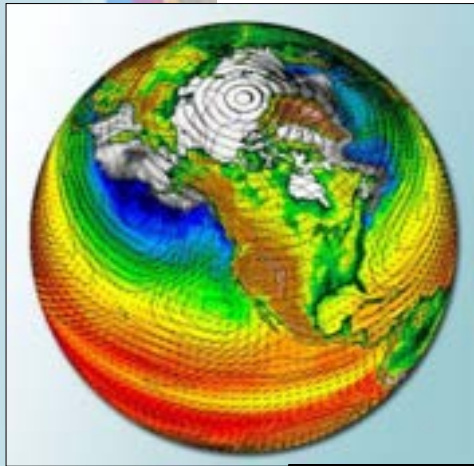
Hurricane Marie
September 2014

Expected Impacts from SLR and Storms

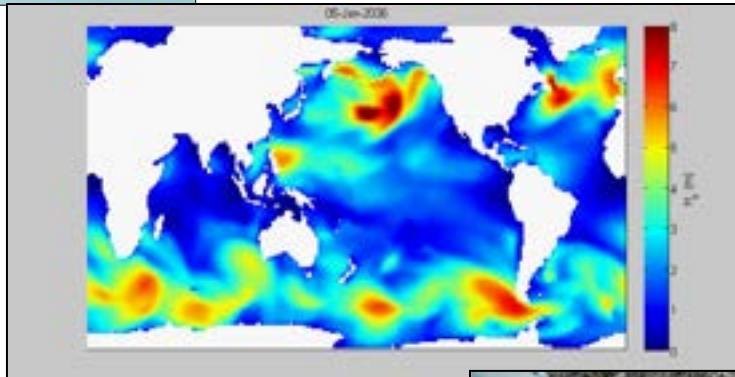
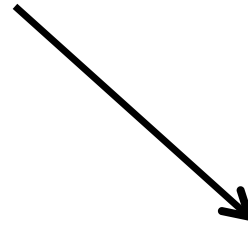


- Accelerated beach erosion rates
- Greater incidence of cliff failures
- Landwards translation of coastal flooding & inundation
- Beach/shore safety compromised
- Saltwater intrusion into coastal aquifers
- Impacts to navigation conditions

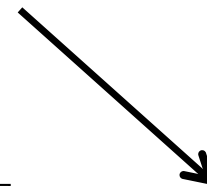
USGS Coastal Storm Modeling System (CoSMoS)



1. Global forcing using the latest climate models



2. Drives global and regional wind/wave models

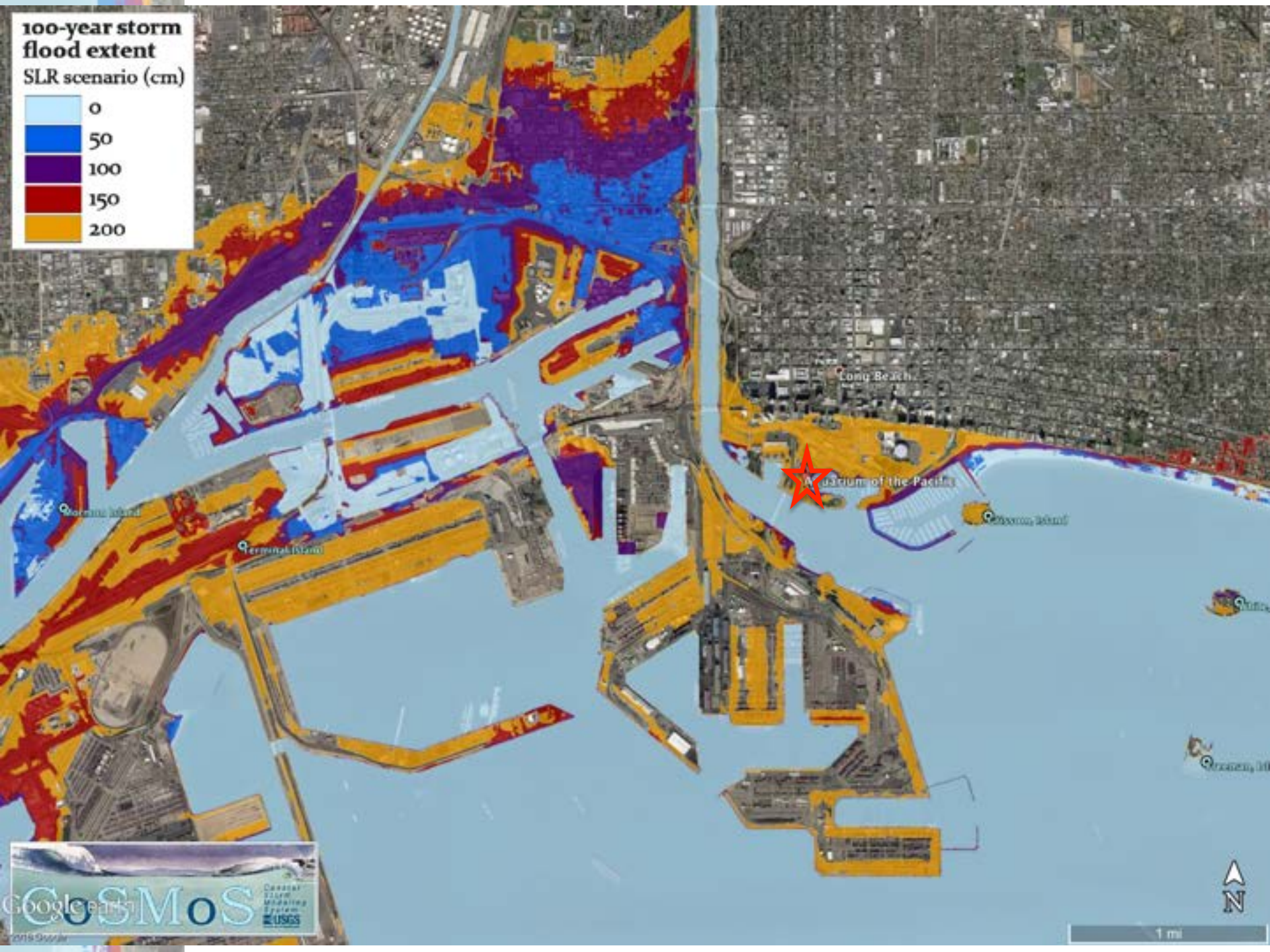
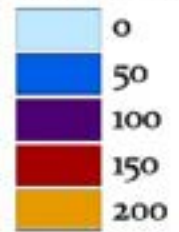


3. Scaled down to local hazards projections



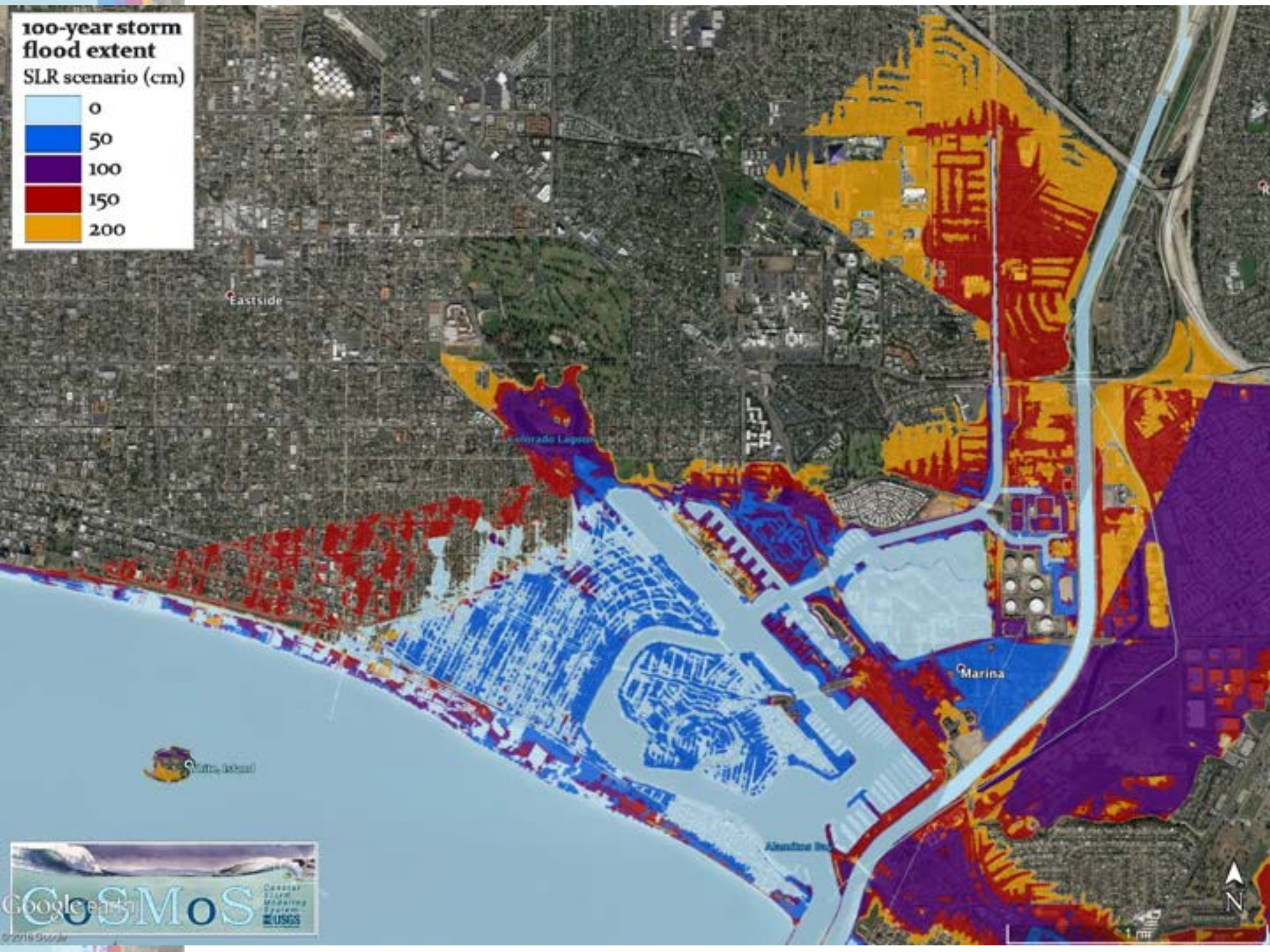
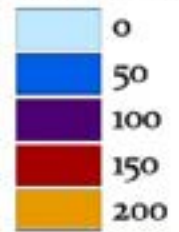
100-year storm flood extent

SLR scenario (cm)



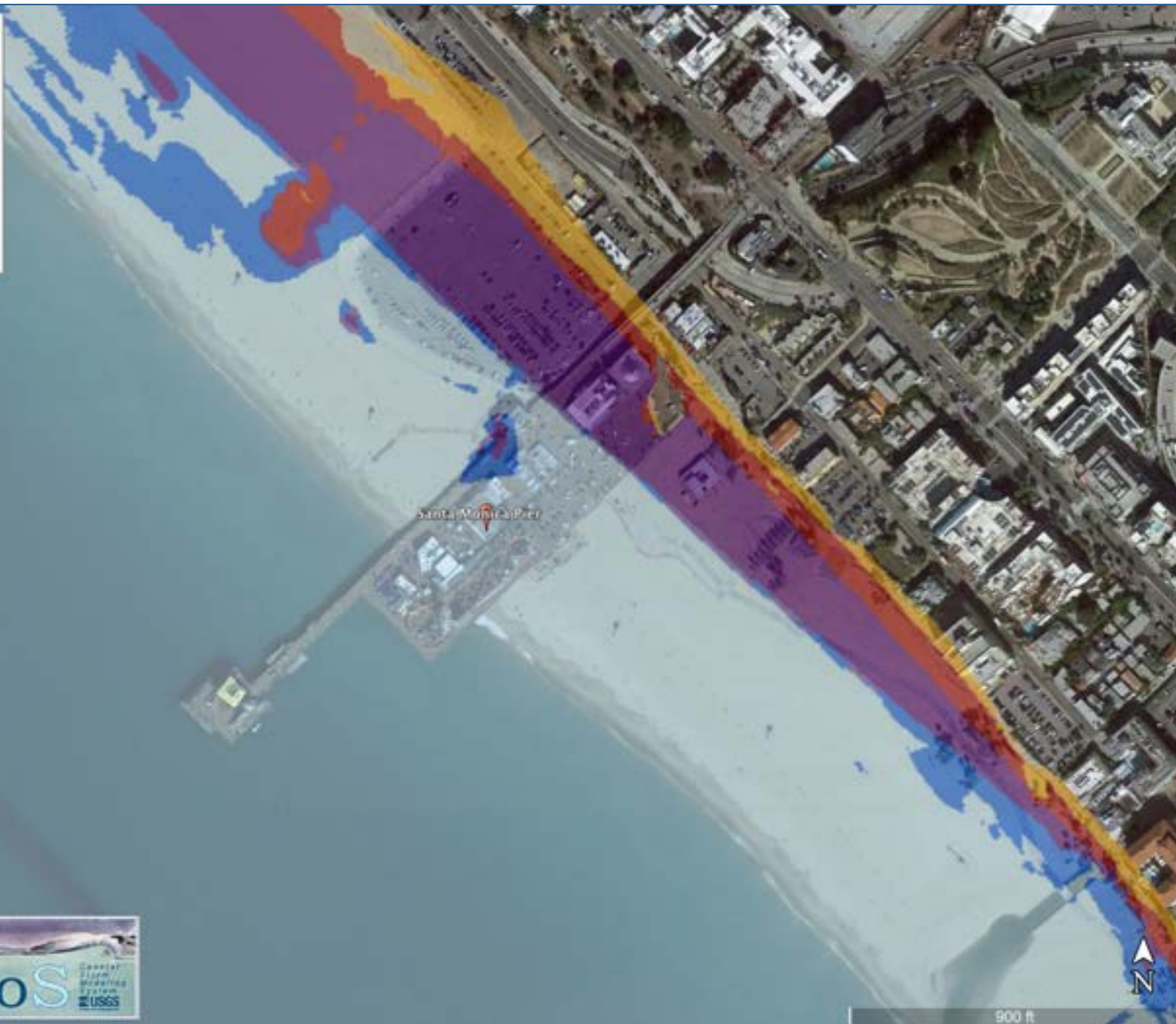
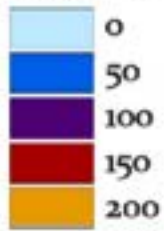
100-year storm flood extent

SLR scenario (cm)



100-year storm flood extent

SLR scenario (cm)



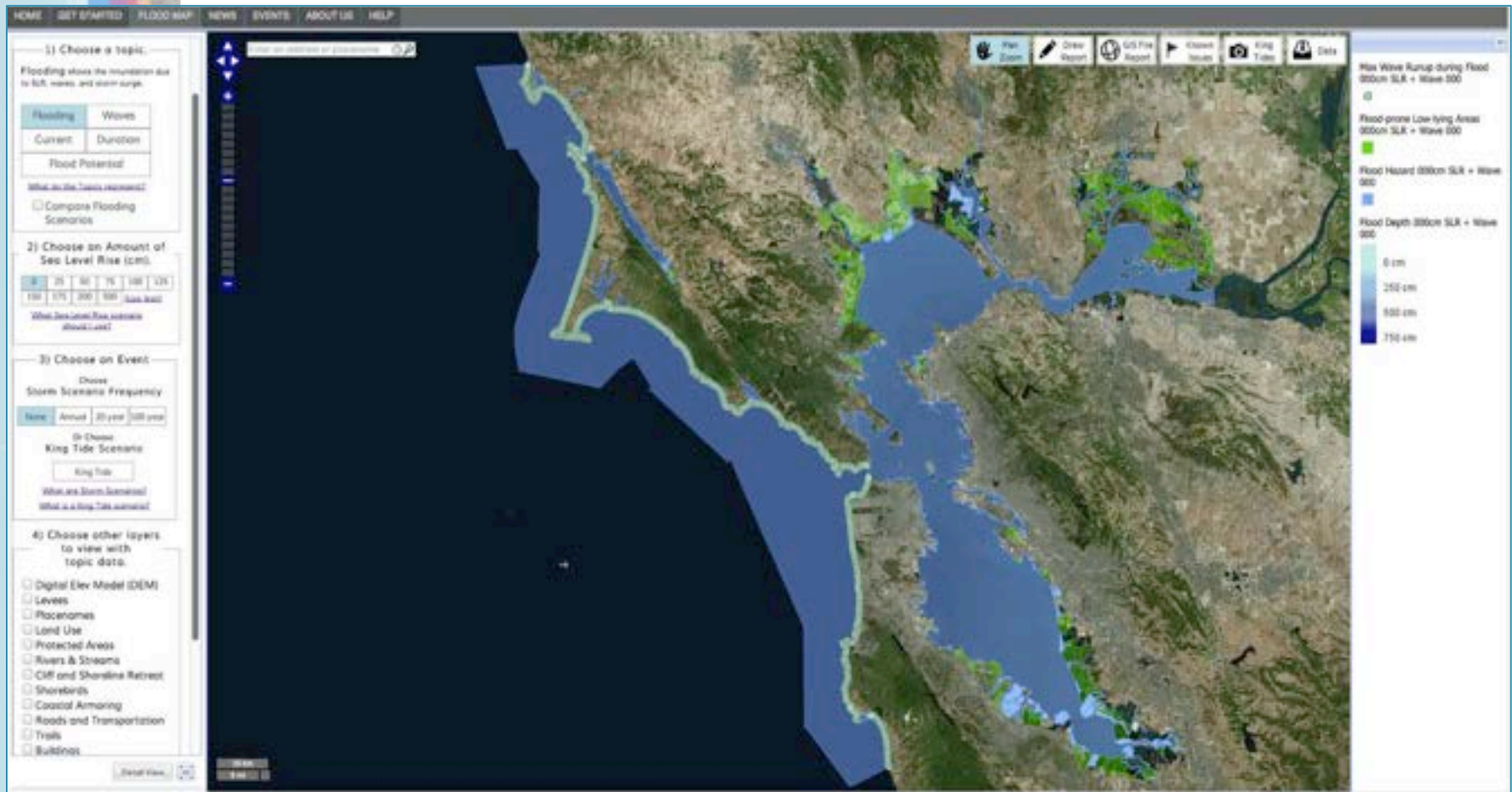
900 ft





visualizing the science

Our Coast, Our Future



<http://ourcoastourfuture.org>

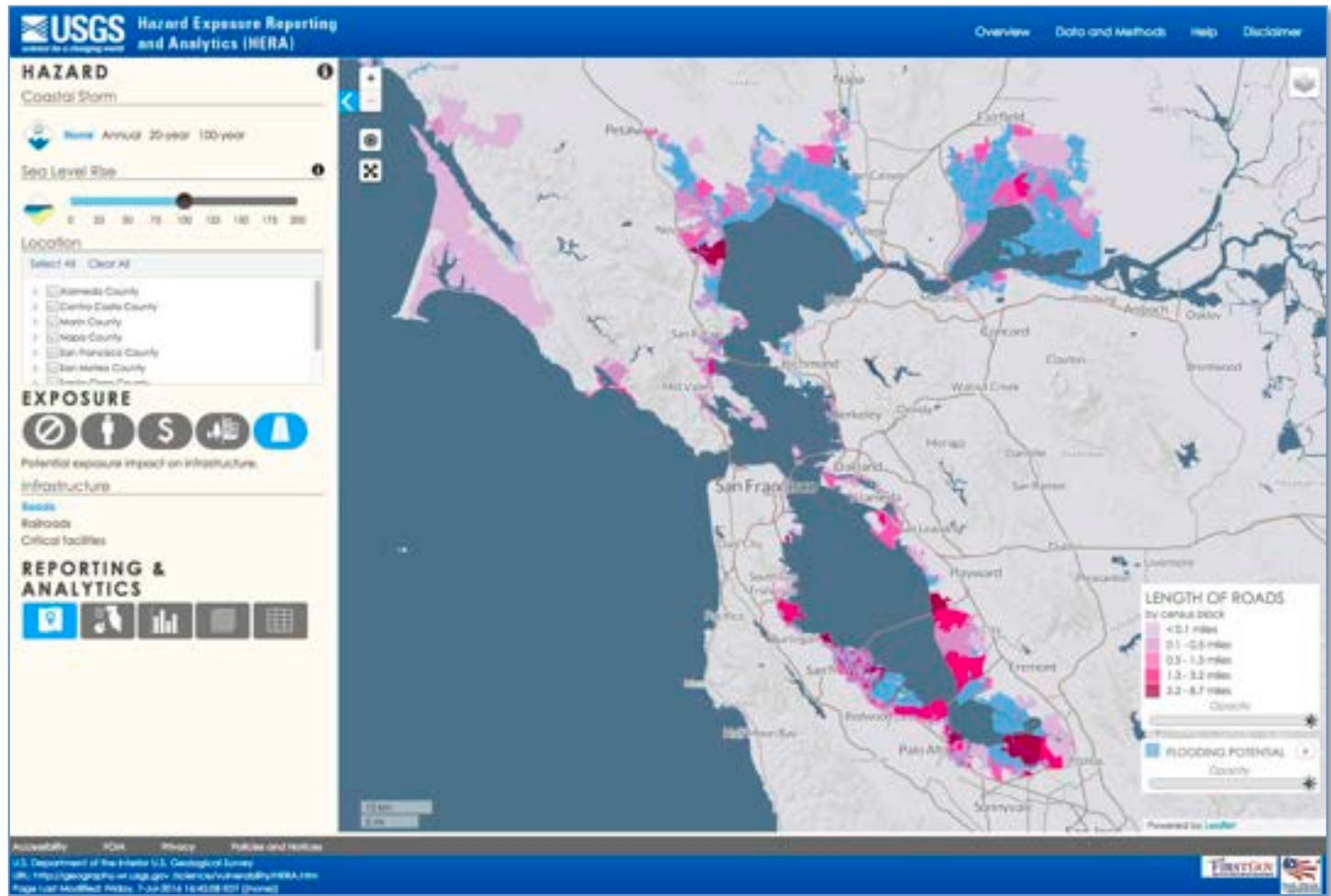
Our Coast, Our Future



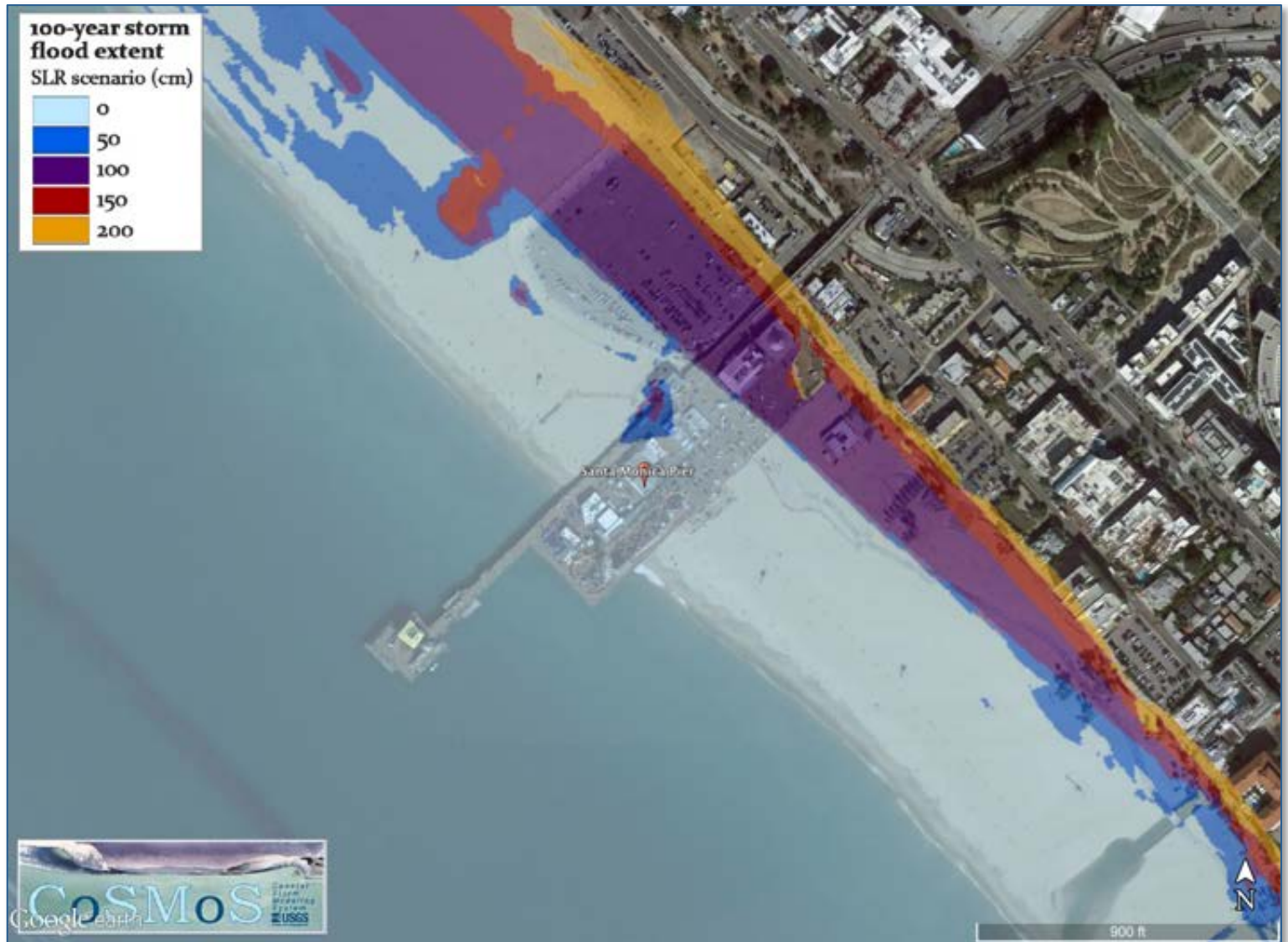
<http://ourcoastourfuture.org>

Socio-Economic Information

Led by Dr. Nathan Wood, USGS



Santa Monica Pier





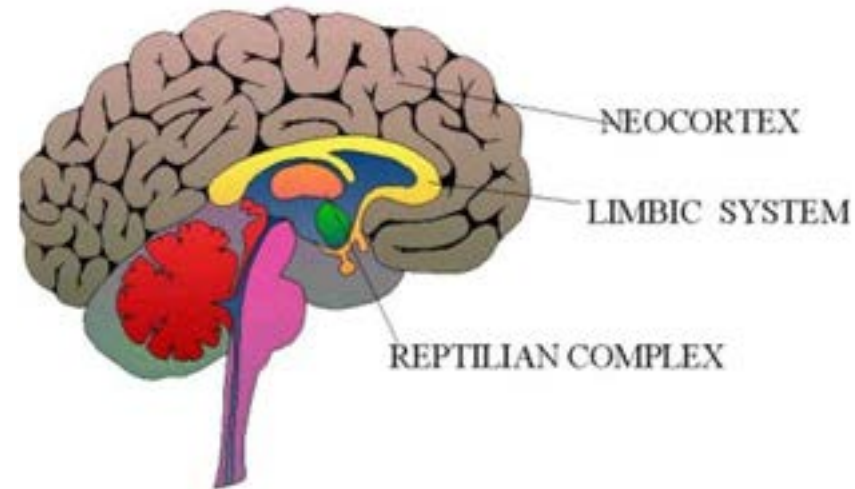
Virtual Reality & Behavior Change



- Research conducted by Jeremy Bailenson, Stanford University (Virtual Human Interaction Lab)

VR Presence & Behavior Change

- Reptilian
 - Heart rate, breathing, body temperature & balance
- Limbic (“old mammalian”)
 - Records memories of positive or negative – e.g. memories
 - Value judgments
- Neocortex (“new mammalian”)
 - Human language, abstract thought, learning abilities



Santa Monica Owl



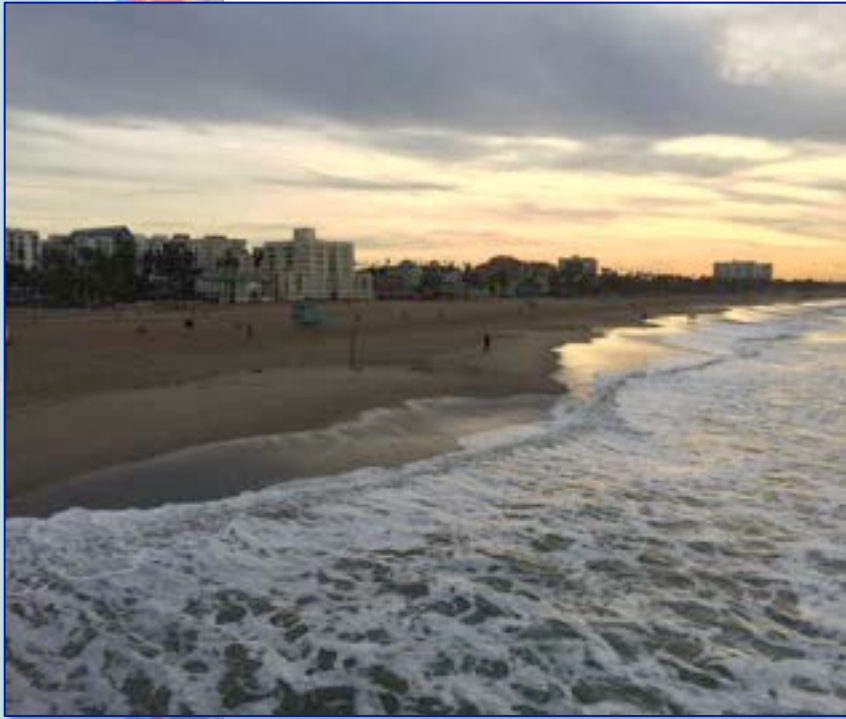
On Santa Monica Pier – next week!
Mobile Owl: <http://mobileowl.co/samo/>



contributing to the science



Urban Tides Community Science Initiative

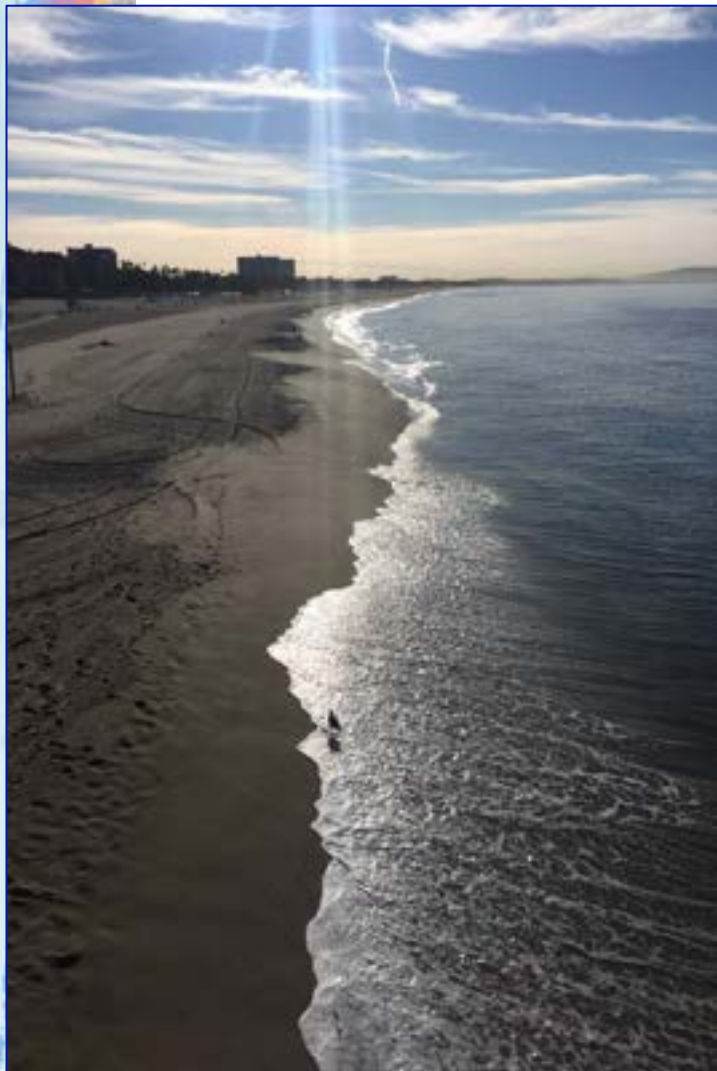


- Collect images to visualize current flooding risks in So Cal
- Images to ground truth and calibrate scientific models
- Engage communities in meaningful science and invite into discussion of how we can adapt to rising seas
- Increase ocean and climate literacy within our communities

<http://dornsife.usc.edu/uscseagrant/urban-tides-initiative/>



Urban Tides Community Science Initiative



- Worked w/USGS modelers and GIS team to develop photo guidance
 - 2 steps landward from water line
 - Take photo parallel to shore

<http://dornsife.usc.edu/uscseagrant/urban-tides-initiative/>



Urban Tides Community Science Initiative

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thank you!



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