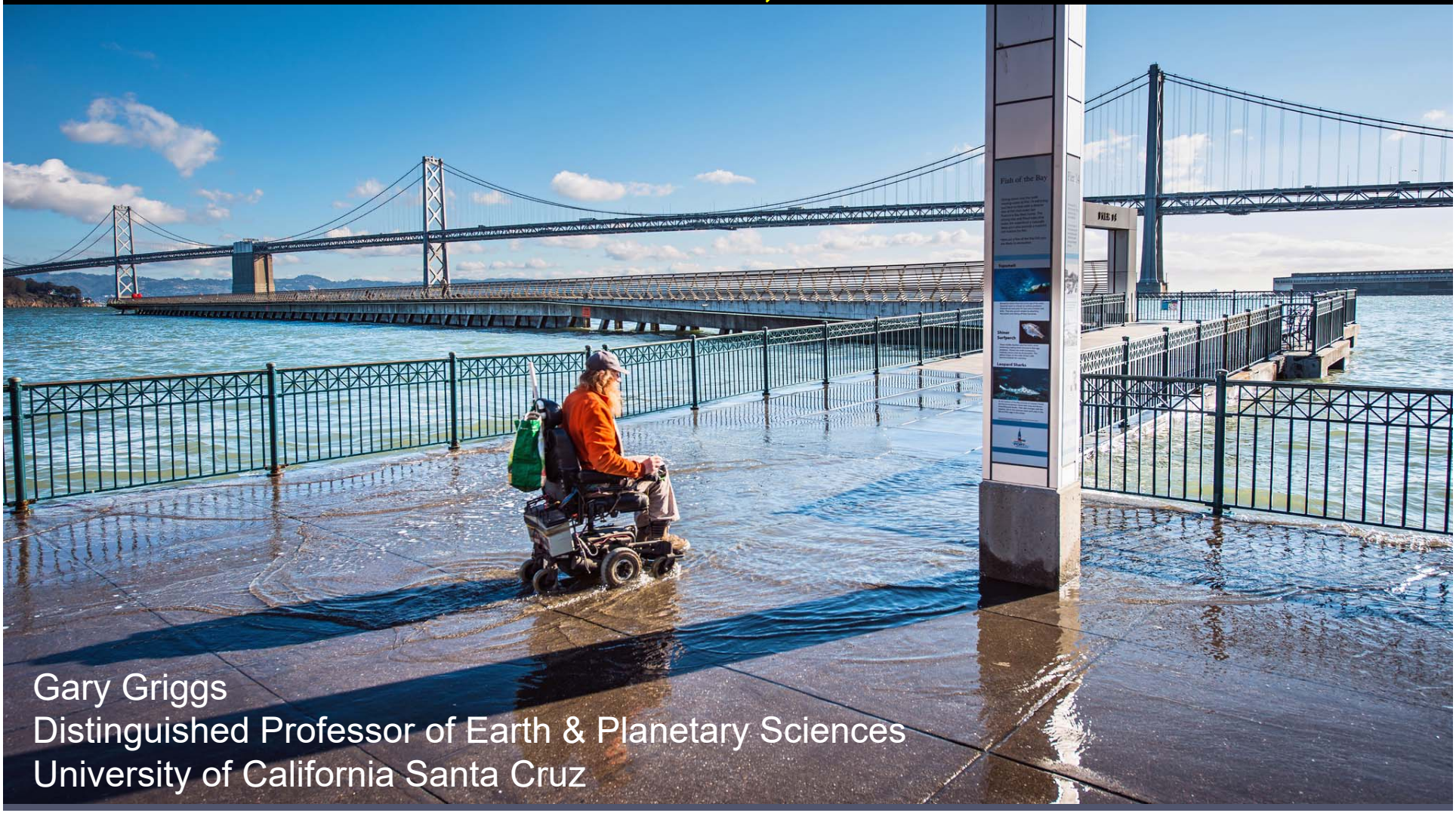
EXHIBIT 7

SEA-LEVEL RISE AND THE SAN FRANCISCO BAY SHORELINE

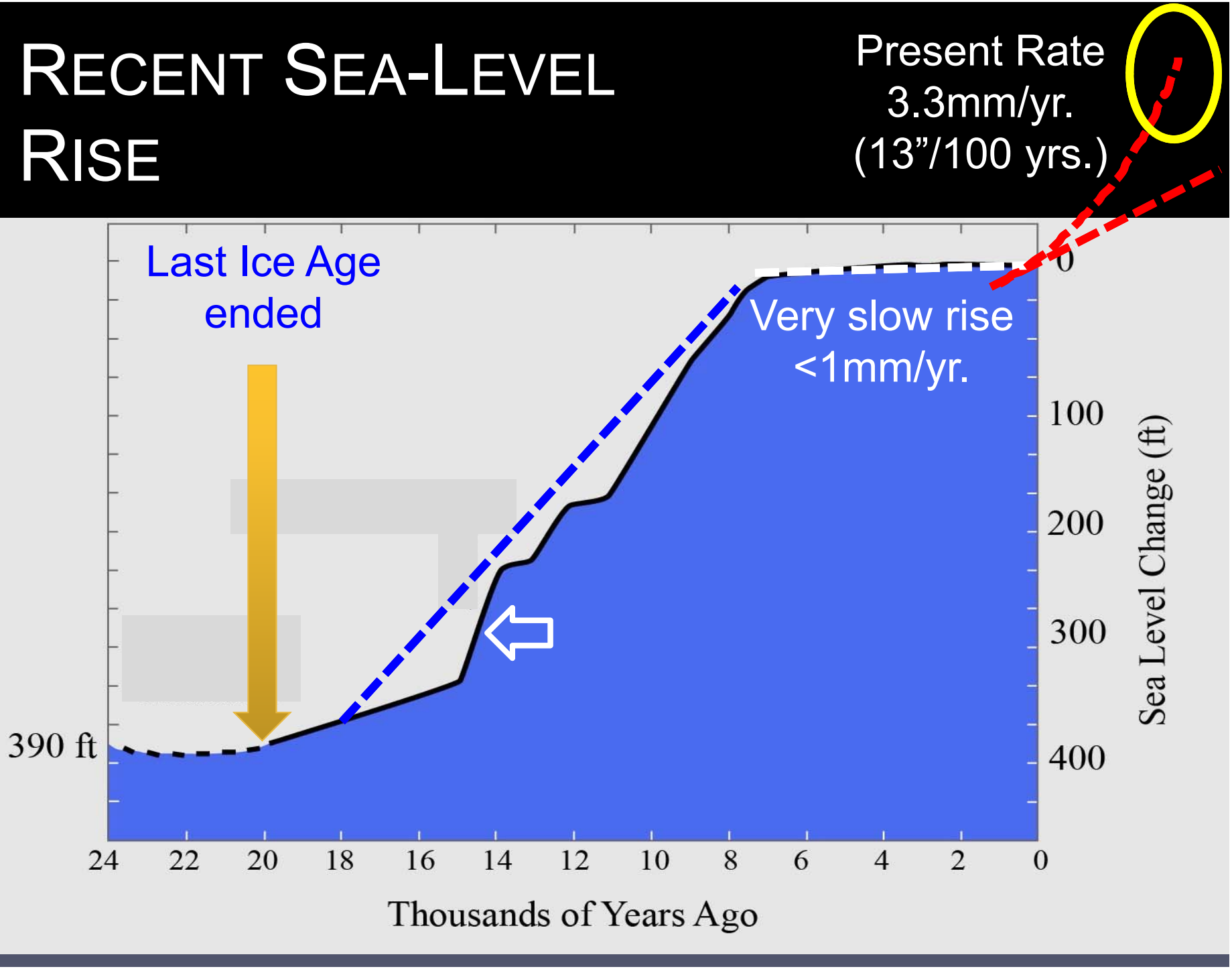
U.S. District Court – Judge William H. Alsup

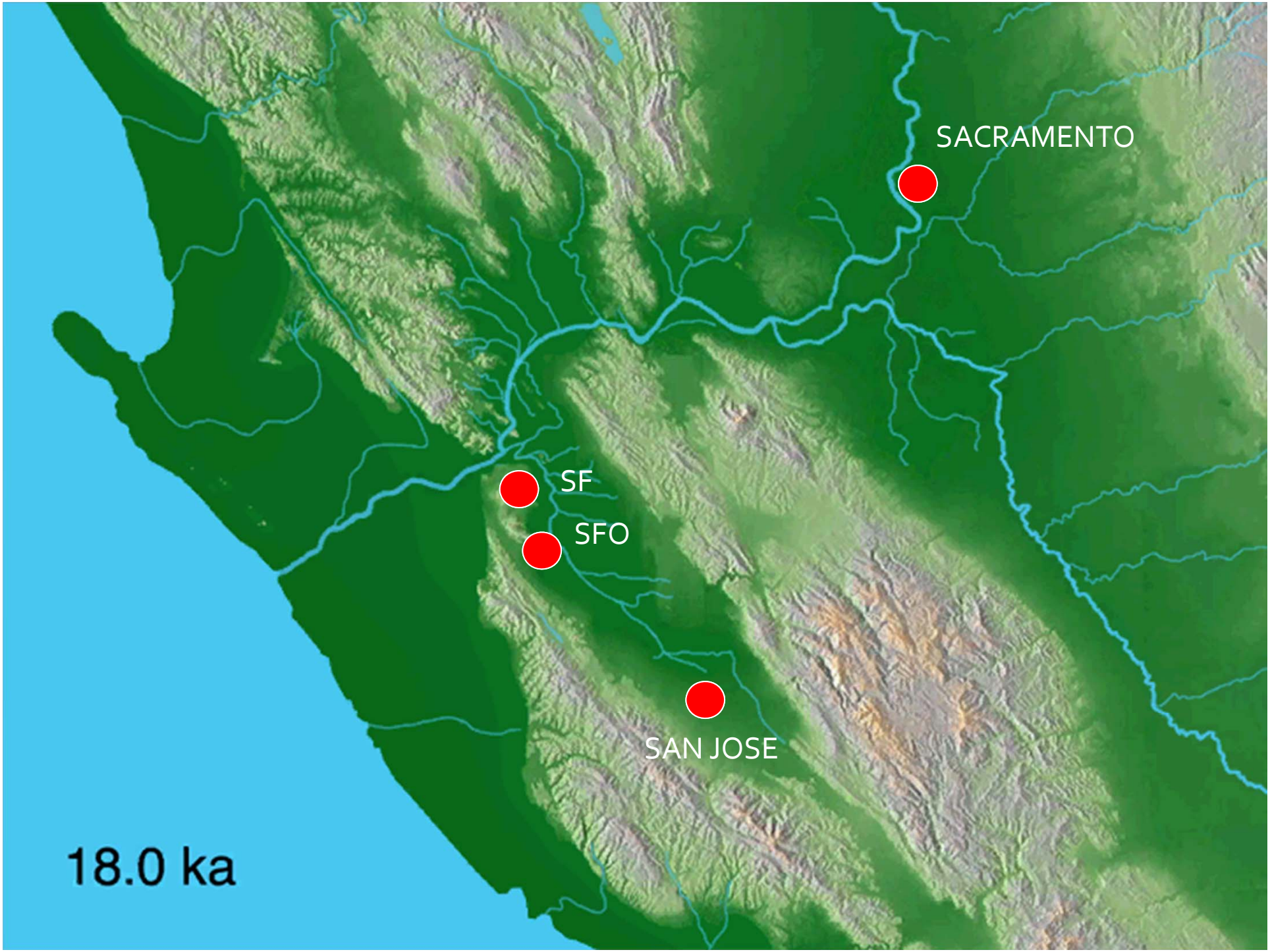
March 21, 2018



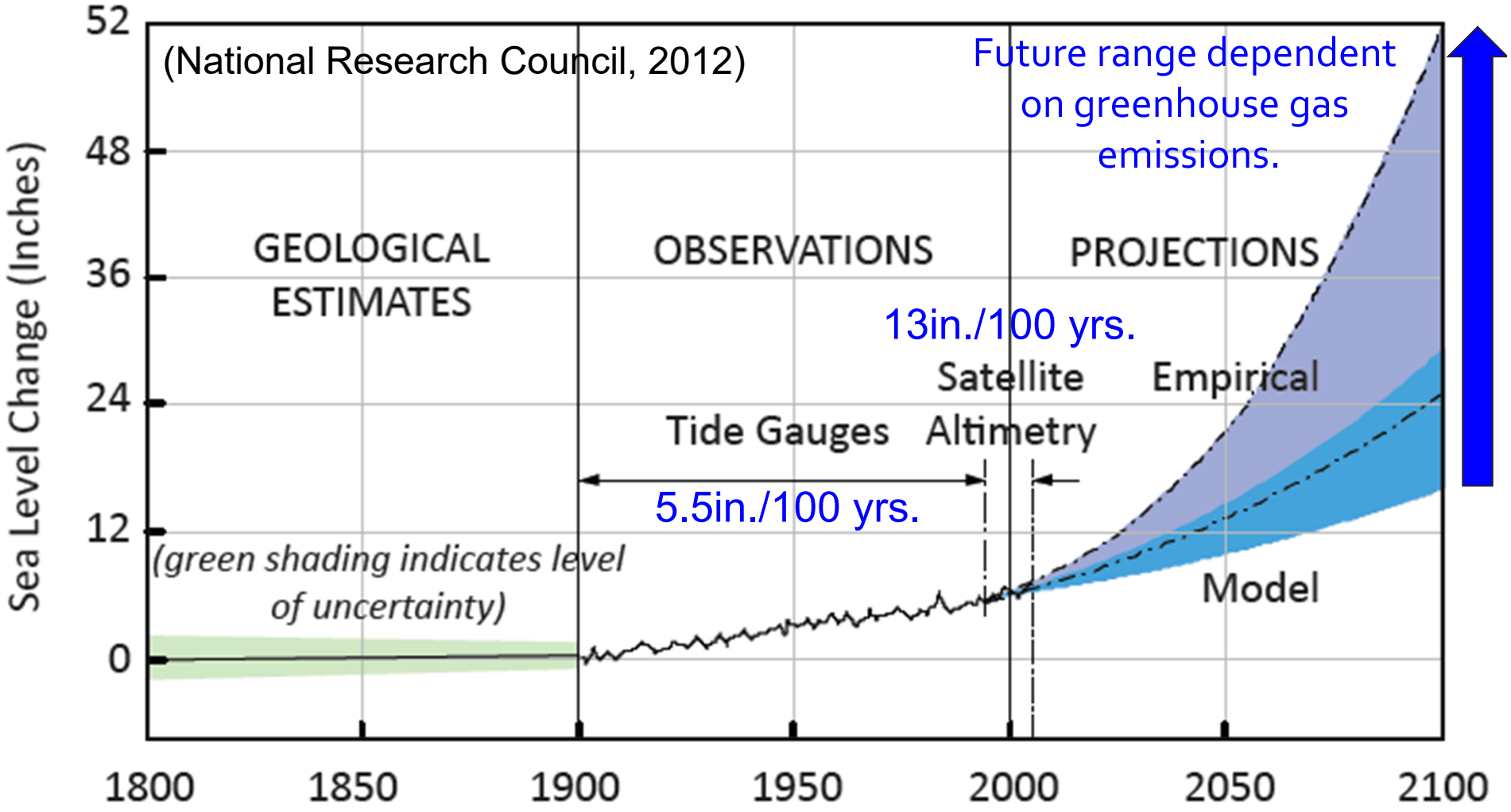
Gary Griggs
Distinguished Professor of Earth & Planetary Sciences
University of California Santa Cruz

Recent Sea-Level Rise

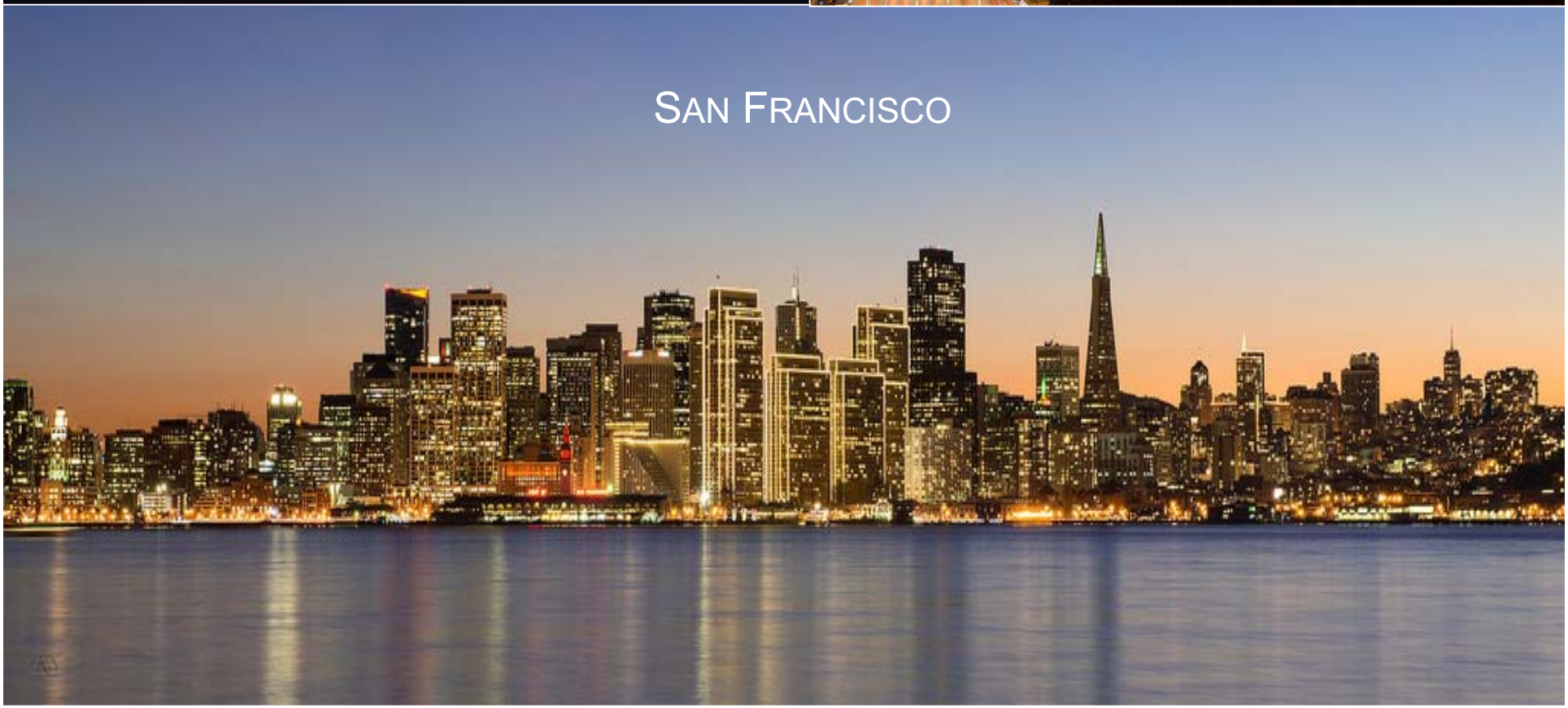



SACRAMENTO
SF
SFO
SAN JOSE
18.0 ka

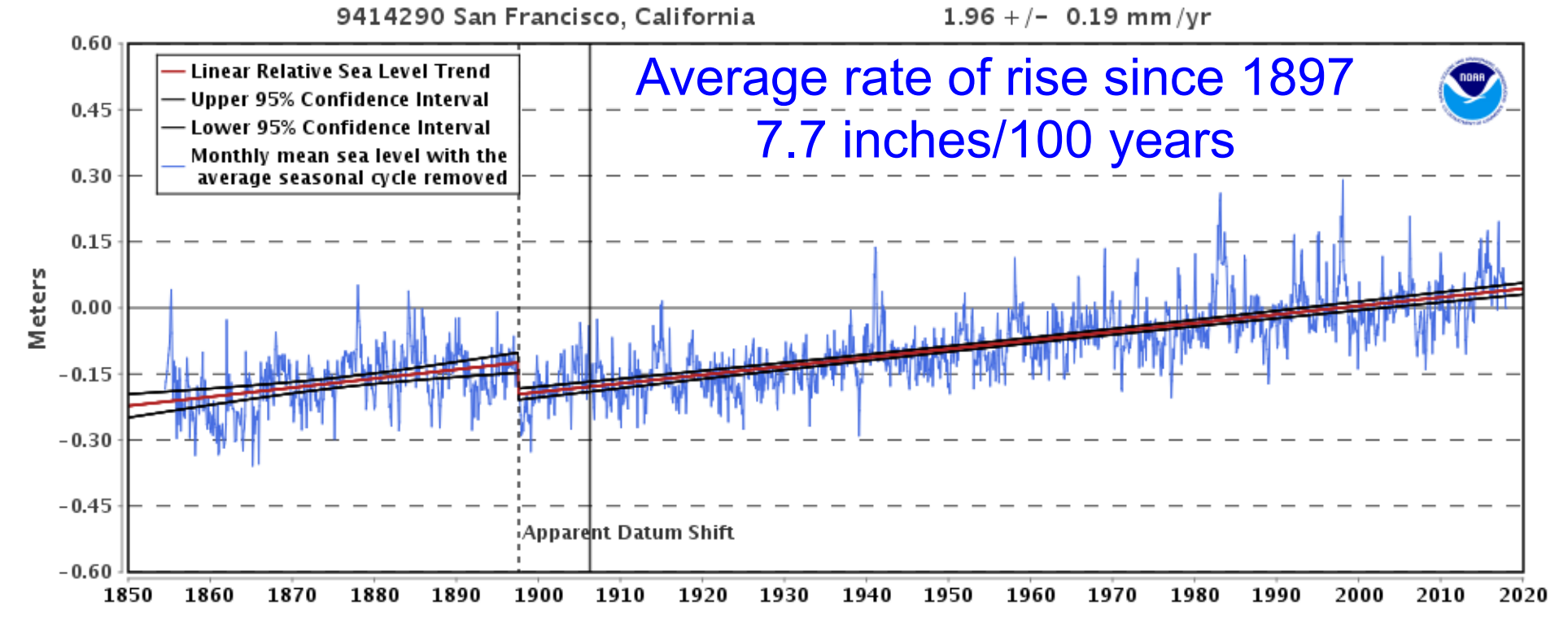
Global sea-level rise was measured from tide gages historically and satellites since 1993.



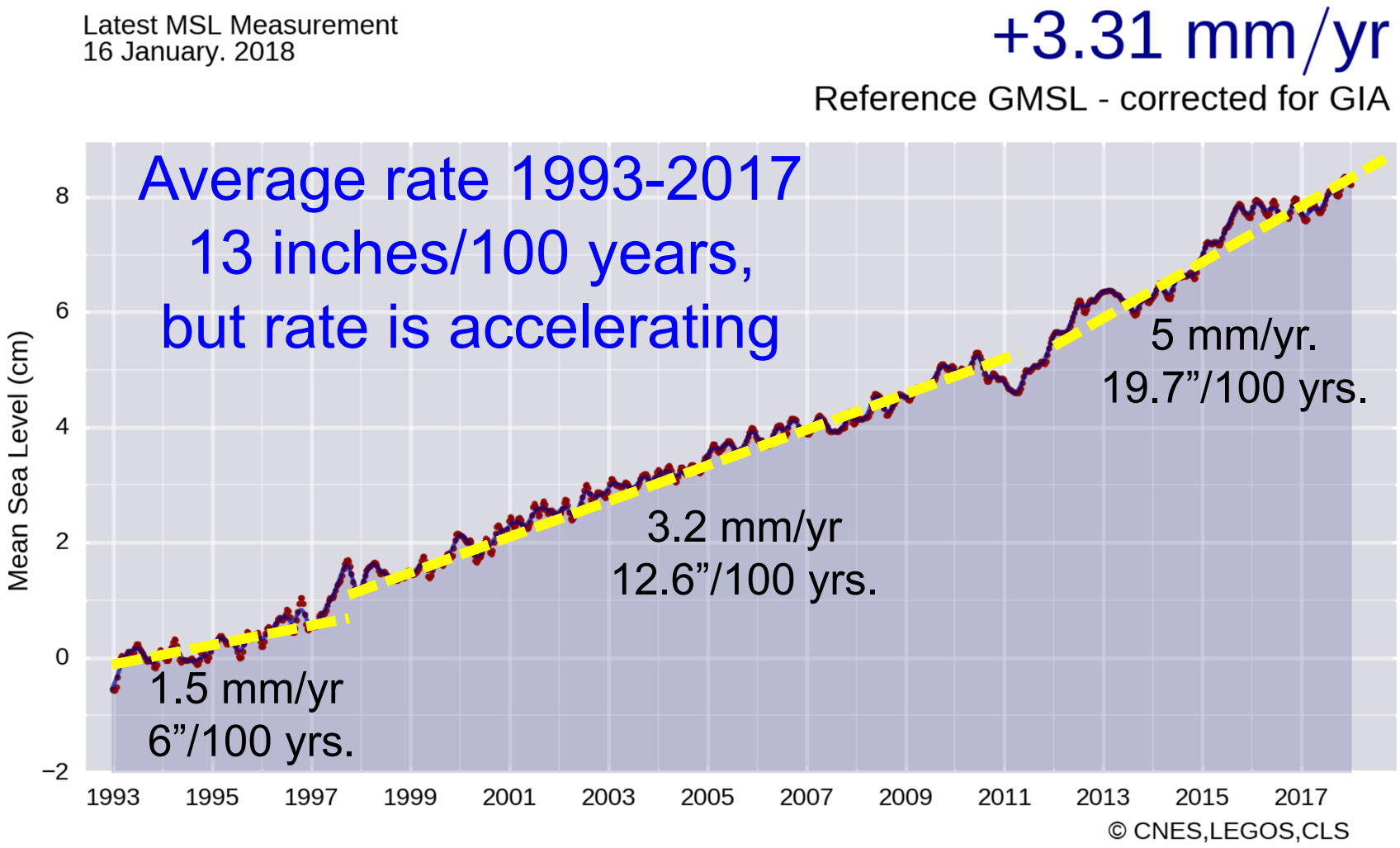
Sea level was essentially constant throughout the entire history of human civilization, but is rising now at a rate that is threatening cities like San Francisco and Oakland that were built along the shoreline.



NOAA TIDE GAGE FOR SAN FRANCISCO
Oldest and longest record in North America



GLOBAL SEA-LEVEL RISE NOW MEASURED PRECISELY FROM SATELLITES



Approximately 216 feet of sea-level rise contained in ice.

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NATURE | ARTICLE

日本語要約

Contribution of Antarctica to past and future sea-level rise

Robert M. DeConto & David Pollard

Affiliations | Contributions | Corresponding author

Nature **531**, 591–597 (31 March 2016) | doi:10.1038/nature17145

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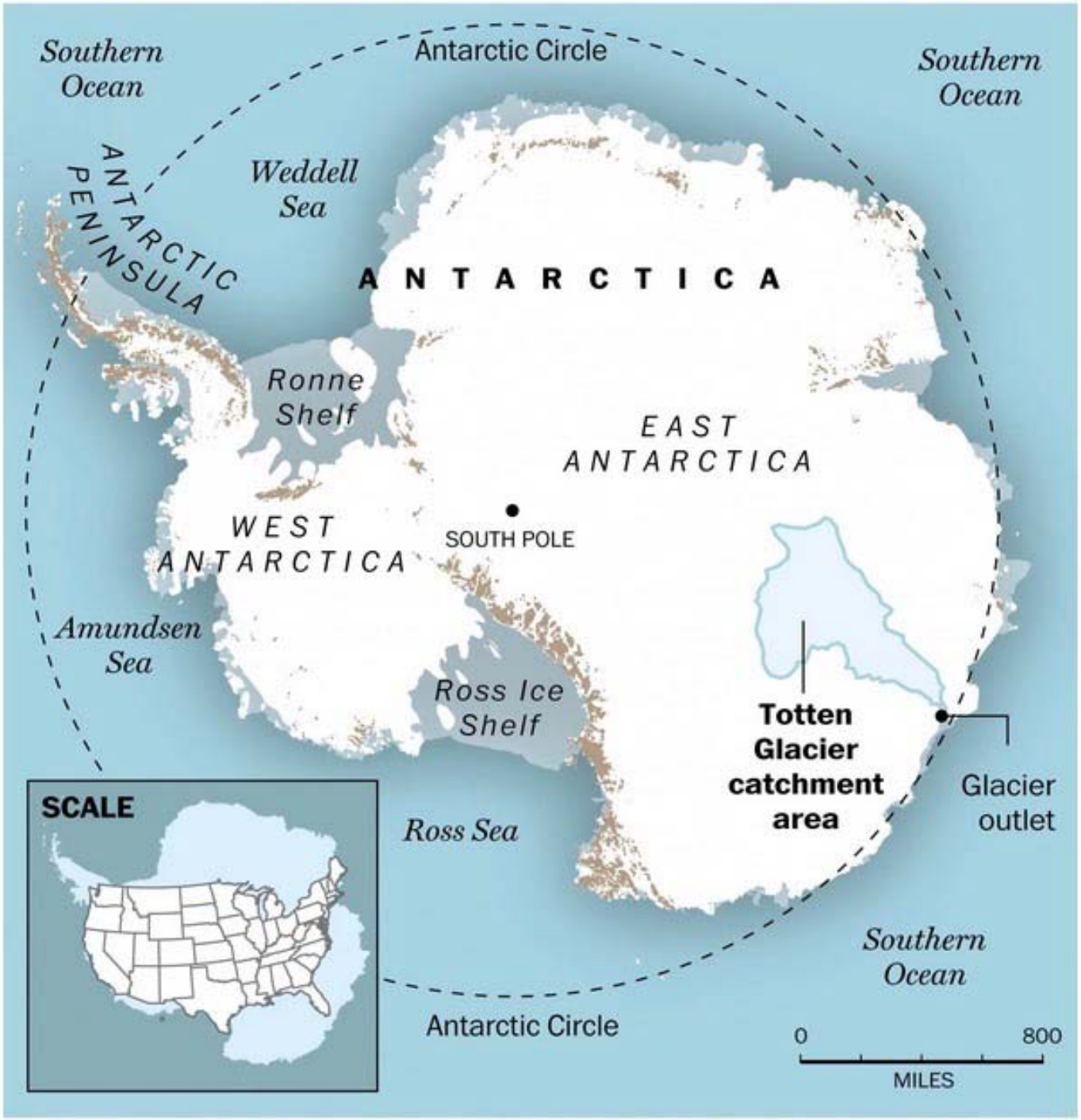
Abstract

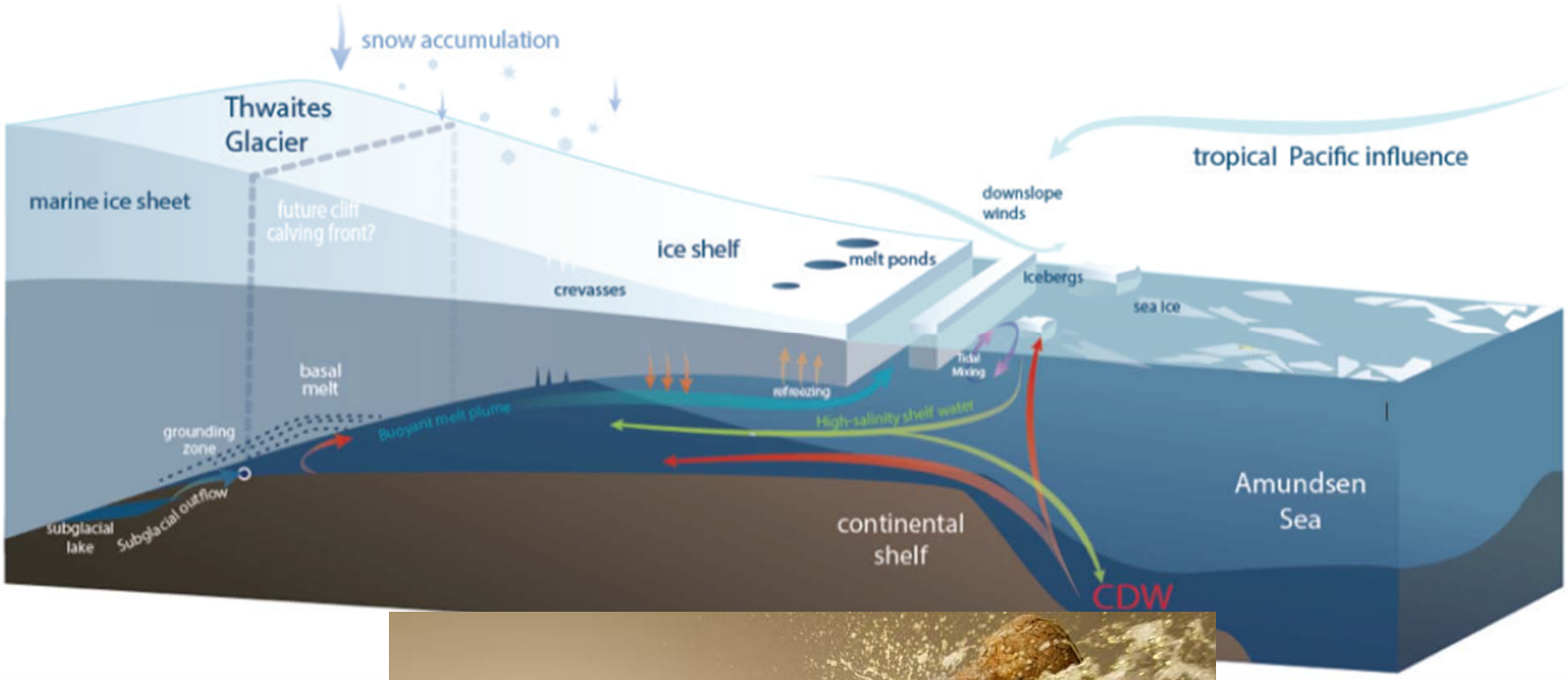
Abstract · Introduction · Marine ice sheet and ice cliff instabilities · The Antarctic Ice Sheet in the Pliocene · The Antarctic Ice Sheet during the LIG · Future simulations · Large Ensemble analysis · Long-term commitment to elevated sea level · Methods · Change history · References · Acknowledgements · Author information · Extended data figures and tables · Supplementary information

Polar temperatures over the last several million years have, at times, been slightly warmer than today, yet global mean sea level has been 6–9 metres higher as recently as the Last Interglacial (130,000 to 115,000 years ago) and possibly higher during the Pliocene epoch (about three million years ago). In both cases the Antarctic ice sheet has been implicated as the primary contributor, hinting at its future vulnerability. Here we use a model coupling ice sheet and climate dynamics—including previously underappreciated processes linking atmospheric warming with hydrofracturing of buttressing ice shelves and structural collapse of marine-terminating ice cliffs—that is calibrated against Pliocene and Last Interglacial sea-level estimates and applied to future greenhouse gas emission scenarios. Antarctica has the potential to contribute more than a metre of sea-level rise by 2100 and more than 15 metres by 2500, if emissions continue unabated. In this case atmospheric warming will soon become the dominant driver of ice loss, but prolonged ocean warming will delay its recovery for thousands of years.

Antarctica holds 61% of Earth's fresh water: 6,400,000 cubic miles of ice and ~190 feet of potential sea-level rise.



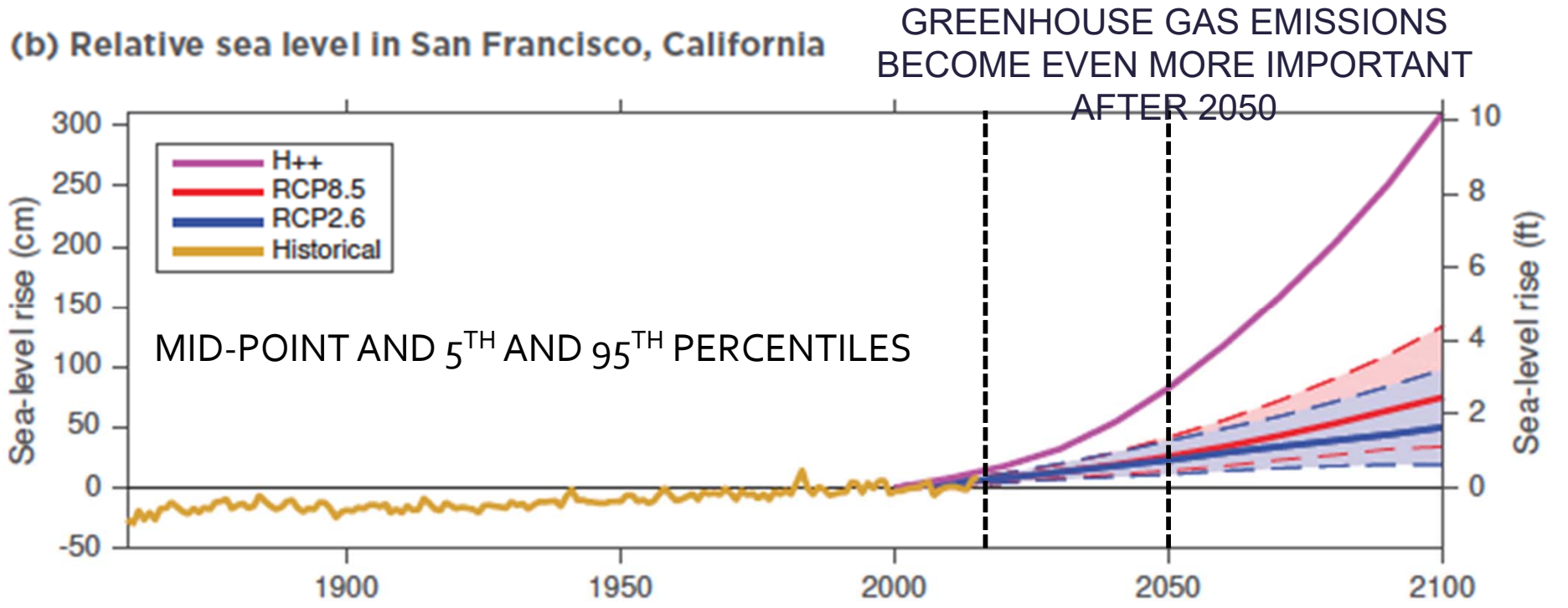
ANTARCTIC ICE SHEET/GLACIAL DYNAMICS



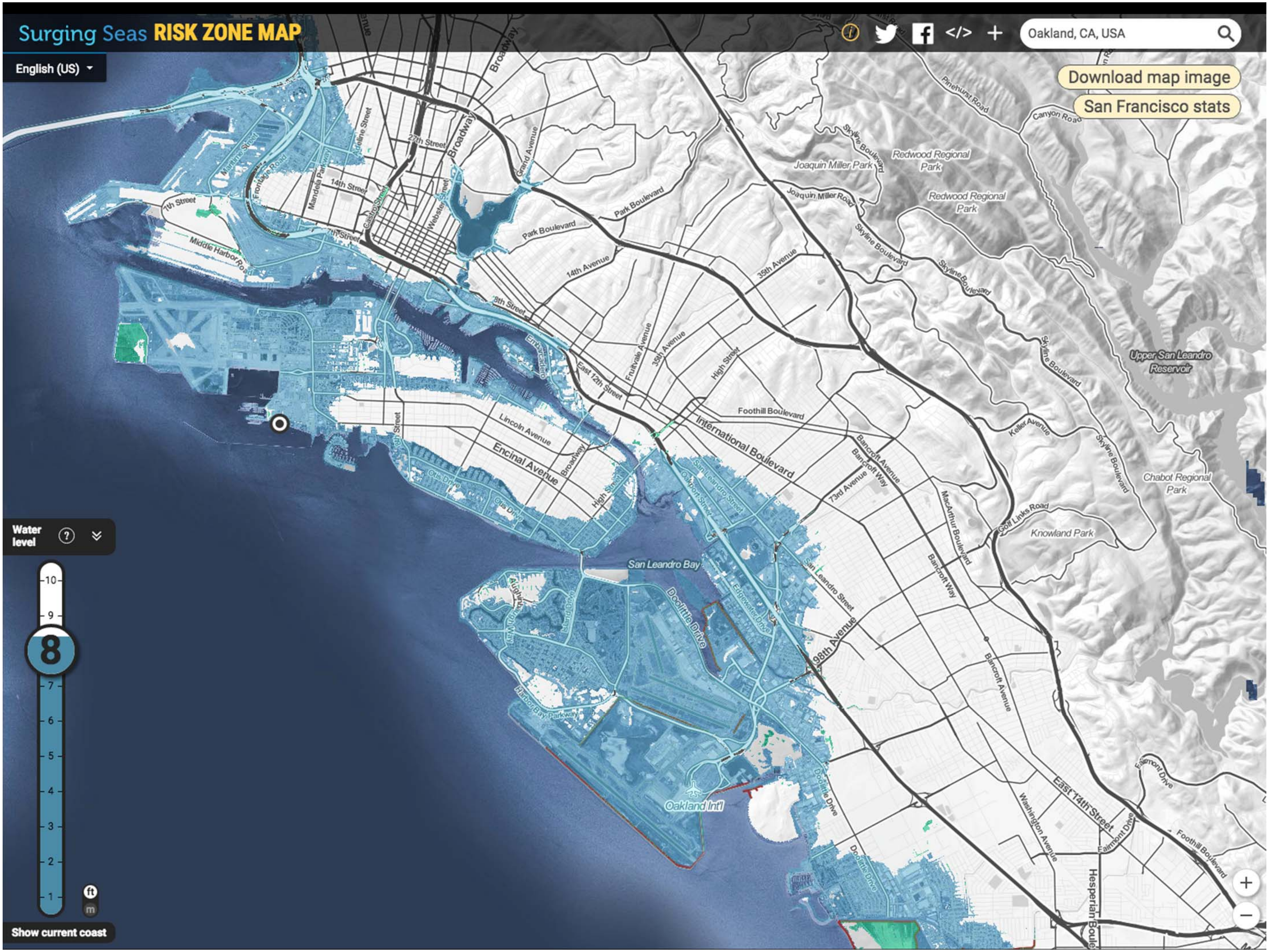
KEY FINDINGS: RISING SEAS IN CALIFORNIA

- Direction of sea-level rise is clear.
- Rate of ice loss from Greenland and Antarctic Ice Sheets is increasing.
- New evidence has highlighted the potential for extreme sea-level rise.
- Probabilities of specific sea-level increases can inform decisions.
- Current policy decisions are shaping our coastal future.
- Waiting for absolute scientific certainty is neither a safe nor a prudent option.

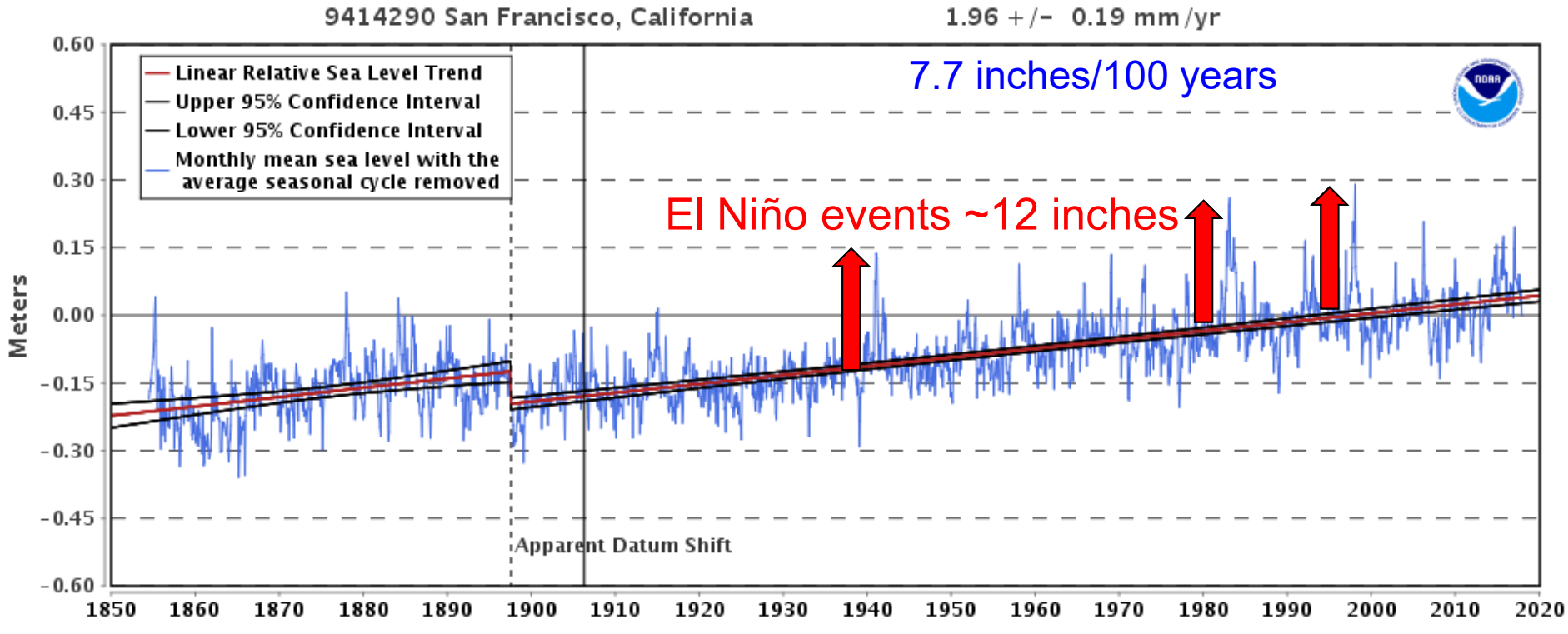
PROJECTIONS OF FUTURE SEA-LEVEL RISE FOR SAN FRANCISCO




Oakland International
Airport


Surging Seas RISK ZONE MAP
Oakland, CA, USA
English (US)
Download map image
San Francisco stats
Water level
8
10
9
7
6
5
4
3
2
1
ft
m
Show current coast
San Leandro Bay
Oakland Int'l
International Boulevard
Encinal Avenue
Lincoln Avenue
Foothill Boulevard
98th Avenue
East 14th Street
Broadway
Park Boulevard
14th Avenue
35th Avenue
High Street
MacArthur Boulevard
Bancroft Avenue
Doolittle Drive
Harbor Bay Parkway
Skyline Boulevard
Joaquin Miller Park
Redwood Regional Park
Upper San Leandro Reservoir
Chabot Regional Park
Knowland Park
Golf Links Road
Keller Avenue
Hesperian Boulevard
Washington Avenue
Middle Harbor Road
7th Street
14th Street
27th Street
Grand Avenue
Fruitvale Avenue
East 12th Street
Embarcadero
Canyon Road
Pinehurst Road

Importance of short-term events combined with sea-level rise



Jan. 27, 1983 El Niño High Tides

STATION	PREDICTED TIDE (FT. MLLW)	RECORDED TIDE (FT. MLLW)	DIFFERENCE (FEET)
SAN DIEGO	7.40	8.35	0.95
LOS ANGELES	6.9	7.96	1.06
SAN FRANCISCO	7.1	8.87	1.77

THE EMBARCADERO- KING TIDE

Amplification of flood frequencies with local sea level rise and emerging flood regimes

Maya K Buchanan[1,4], Michael Oppenheimer[1,2] and Robert E Kopp[3]

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Environmental Research Letters, Volume 12, Number 6

Coastal Flood frequency amplification under RCP 4.5

	10-year flood	10-year flood	100-year flood	100-year flood	500-year flood	500-year flood
SITE	**2050**	**2100**	**2050**	**2100**	**2050**	**2100**
Alameda	3.0	71.5	0.3	20.2	0.04	6.0
San Francisco	6.8	115.2	0.8	51.4	0.17	19.3

Coastal flood frequency amplification under RCP 8.5

SITE	2050	2100	2050	2100	2050	2100
Alameda	4.5	116.1	0.44	44.1	0.07	13.04
San Francisco	10.3	155.1	1.24	92.6	0.28	42.6

State of California Sea-Level Rise Guidance

2018 UPDATE

>> **STEP 1:** *Identify the nearest tide gauge.*

>> **STEP 2:** *Evaluate project lifespan.*

>> **STEP 3:** *For the nearest tide gauge and project lifespan, identify range of sea-level rise projections.*

>> **STEP 4:** *Evaluate potential impacts and adaptive capacity across a range of sea-level rise projections and emissions scenarios.*

>> **STEP 5:** *Select sea-level rise projections based on risk tolerance and, if necessary, develop adapation pathways that increase resiliency to sea-level rise and include contingency plans if projections are exceeded.*