The Latest Science for the San Diego Region

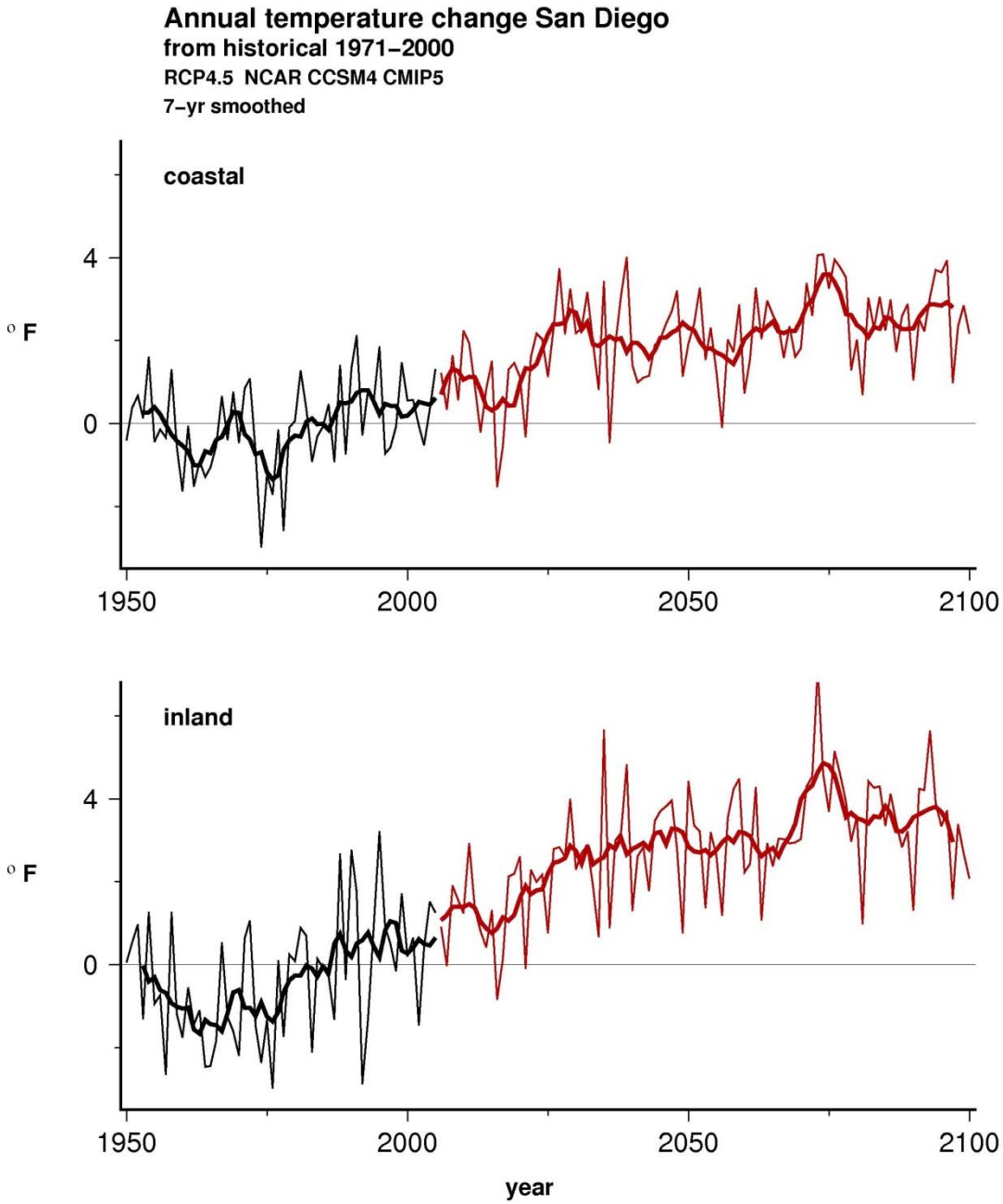
Temperature

Sea Level Rise

Precipitation

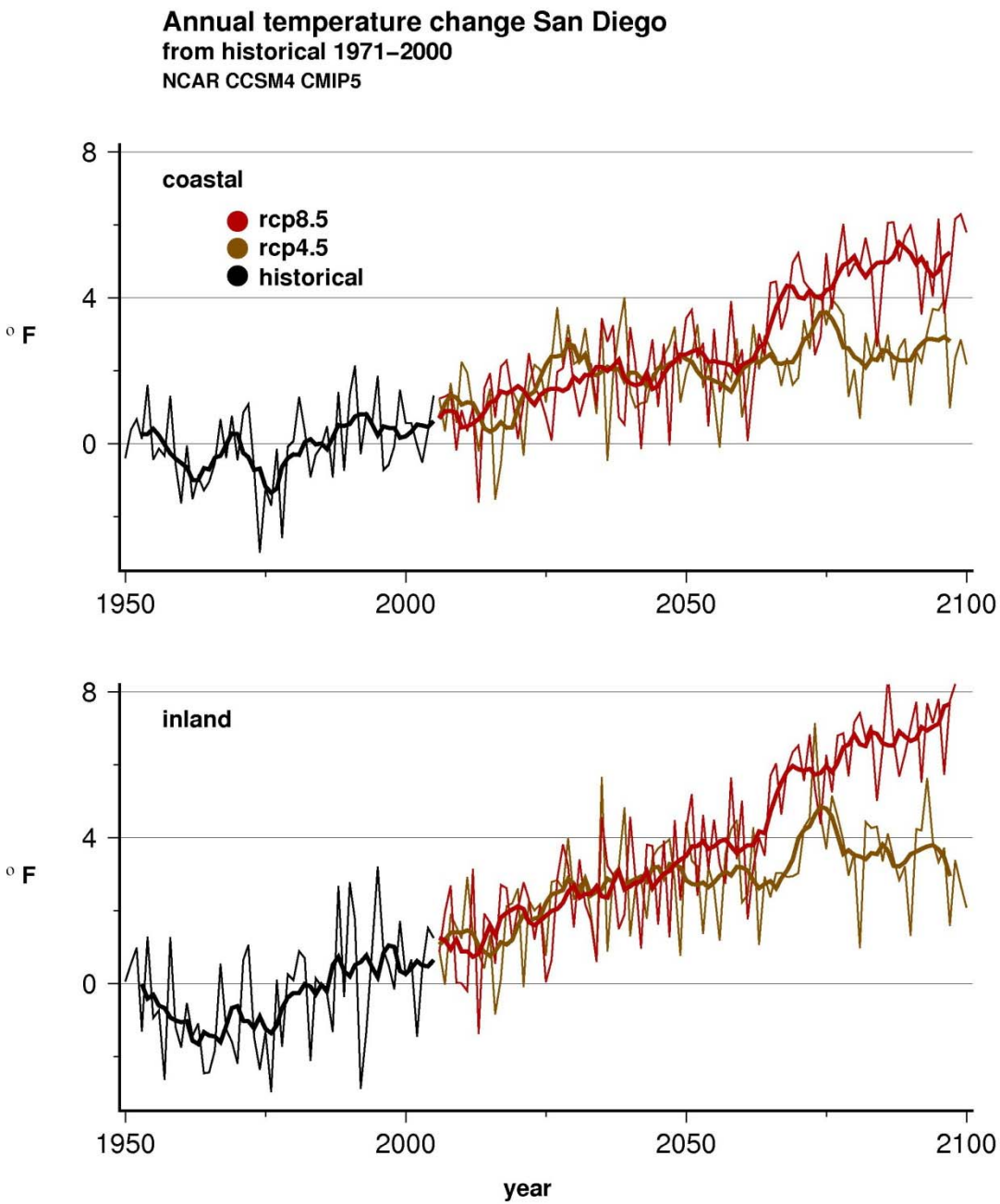
Annual temperatures projected to warm 2-3°F by 2050 under relatively low (RCP 4.5) GHG emissions

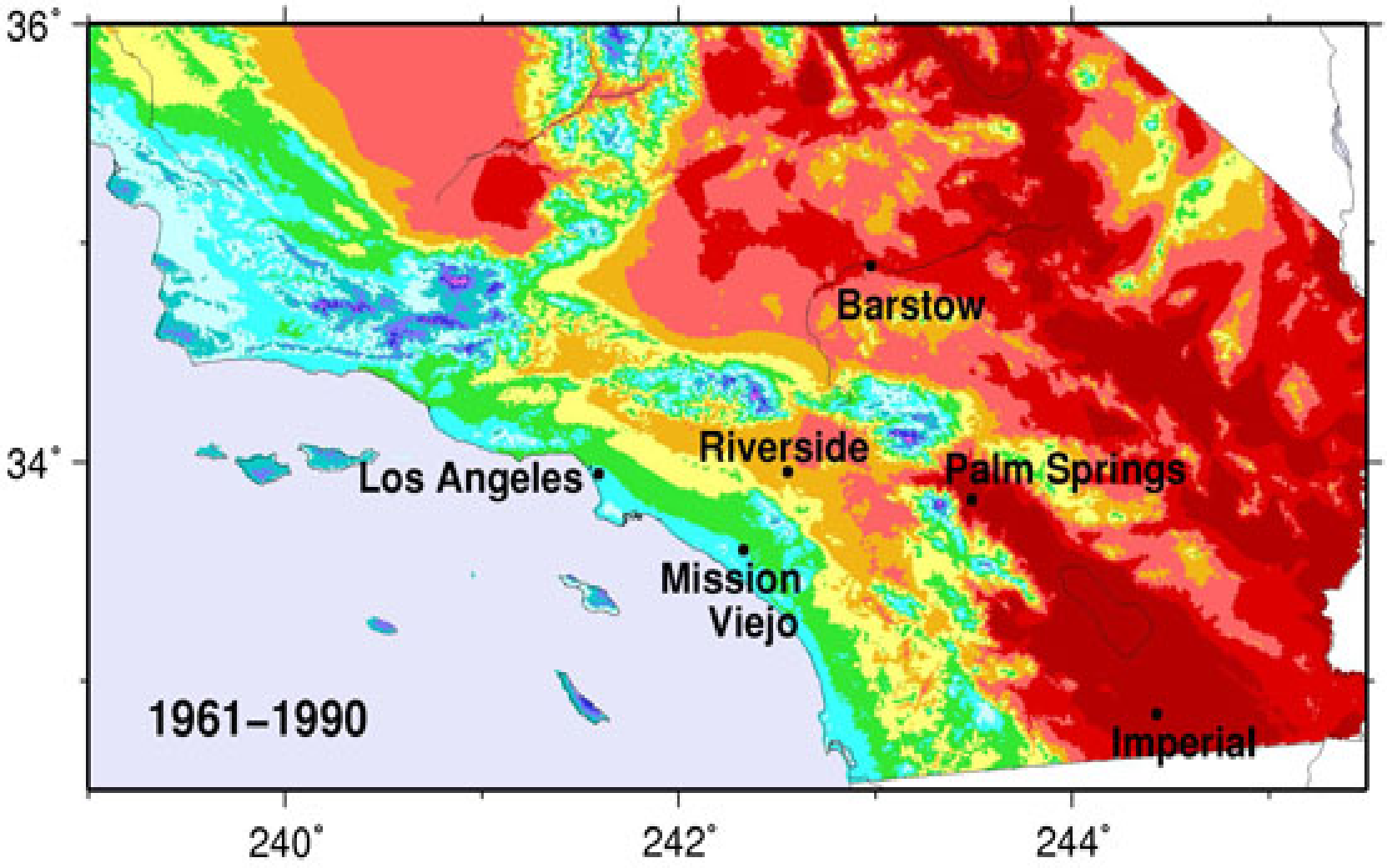
Greater warming in Inland area than along Coast.



Annual temperatures projected to warm at somewhat higher rate under RCP 8.5 scenario out to mid-21st Century, but at considerably higher rate than RCP 4.5 after 2050.

This tendency occurs in coastal and Inland areas.





estimated present-day historical July average daily Tmax

1km downscaled to 1km

Hugo Hidalgo, Tapash Das, Mike Dettinger

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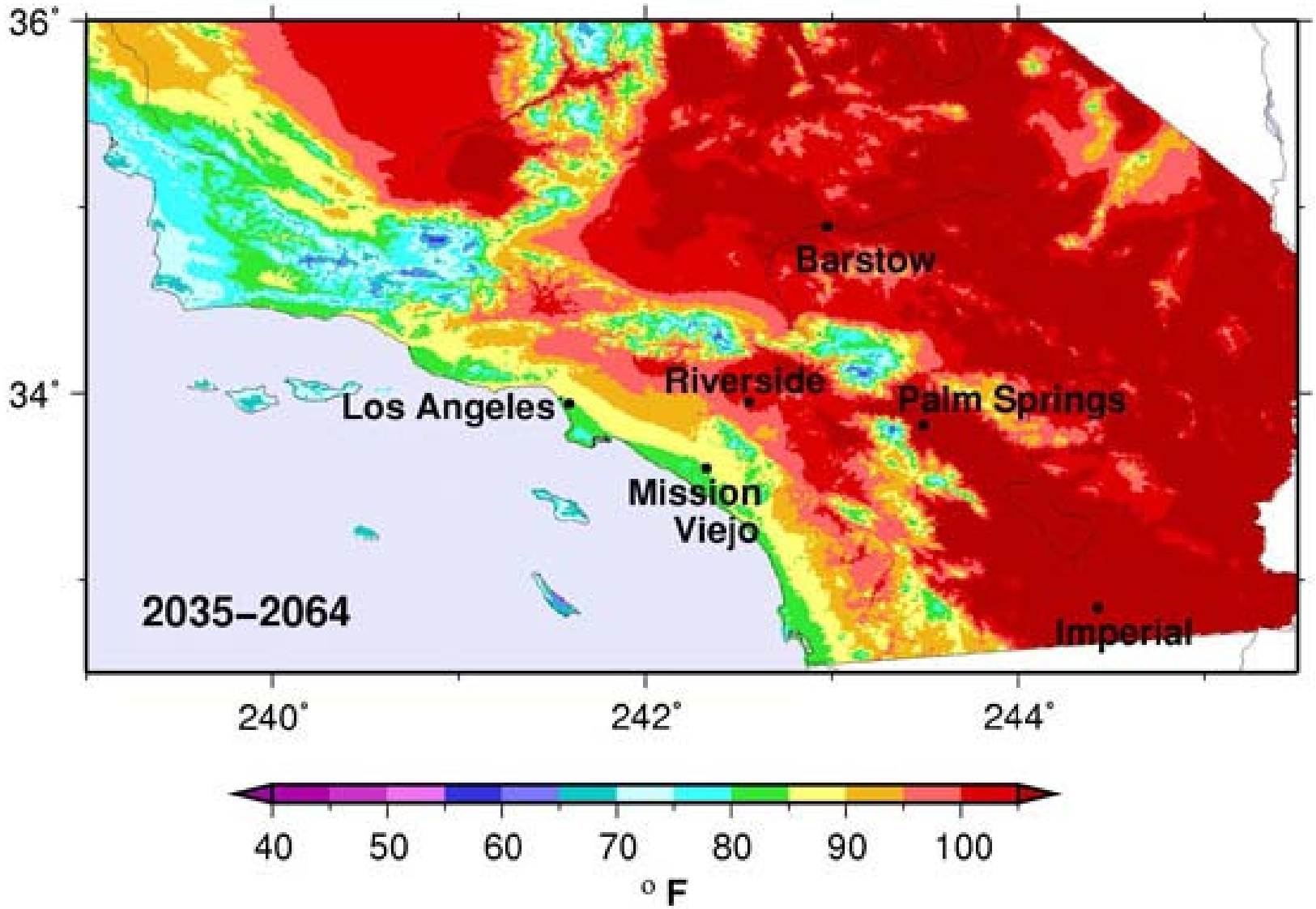

A typical climate model scenario of July afternoon temperature

GFDL A2 1km downscaled to 1km mid 21st Century (2035-64) average Tmax

Hugo Hidalgo Tapash Das Mike Dettinger

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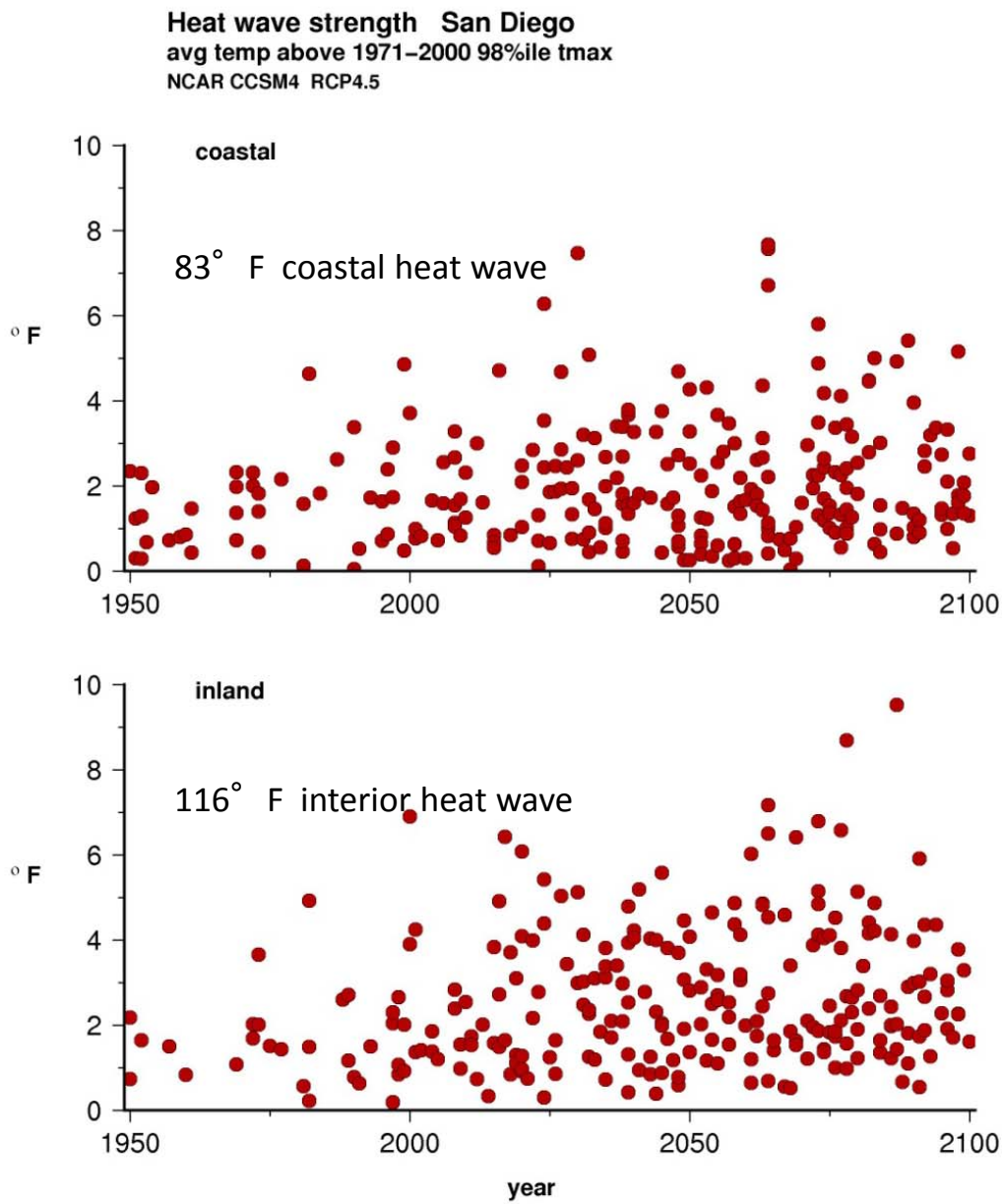


Heat Waves – occurrence varies from year to year, but climate models project substantial rise in heat wave number and intensity through the coming decades.

Heat Waves duration-- longest duration in today's Climate tends to be 4-6 days but climate models project Increasing length of hot spells in future decades

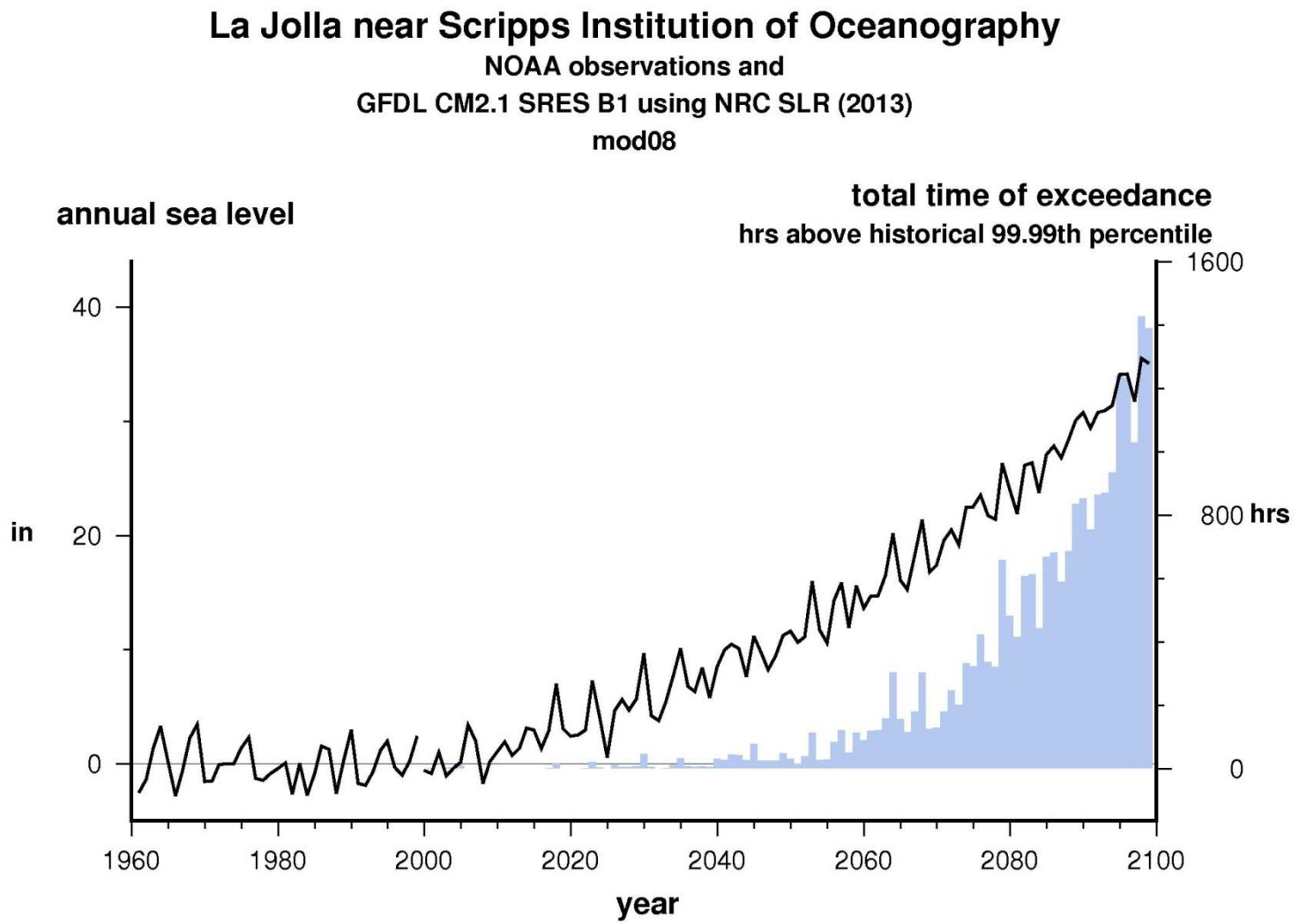
Nighttime Temperatures increase too!

Sea level rise

Time Period	South of Cape Mendocino
2000-2030	4 to 30 cm (.13 to .98 feet)
2000-2050	12 to 61 cm (.39 to 2.0 feet)
2000-2100	42 to 167 cm (1.38 to 5.48 feet)

Source: State of California Sea Level Rise Guidance Document, based on National Research Council report *Sea Level Rise for the Coasts of California, Oregon, and Washington."*

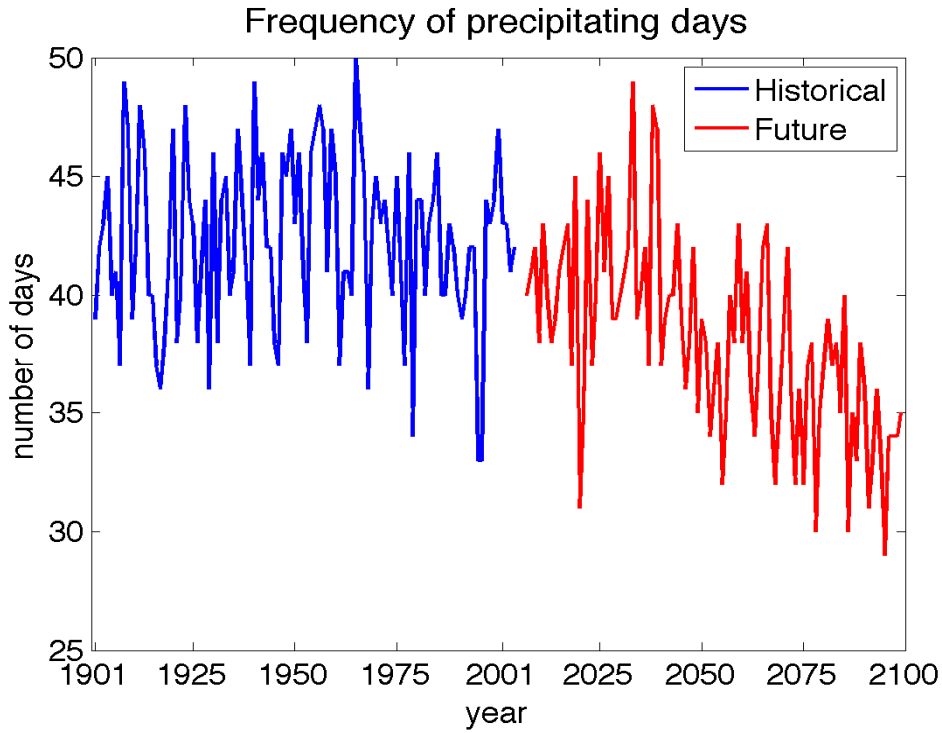
As mean sea level rises, so does the number of high sea level events and their duration—this exposes coast to big waves more often and for longer intervals



Precipitation

- San Diego will retain its strong Mediterranean climate with relatively wetter winters and dry summers.
- Projections of future annual average precipitation are mixed- some wetter some drier.
- Variability of annual precipitation will remain high- region still highly vulnerable to drought

Global Climate Models project that San Diego's number of rainy days will diminish



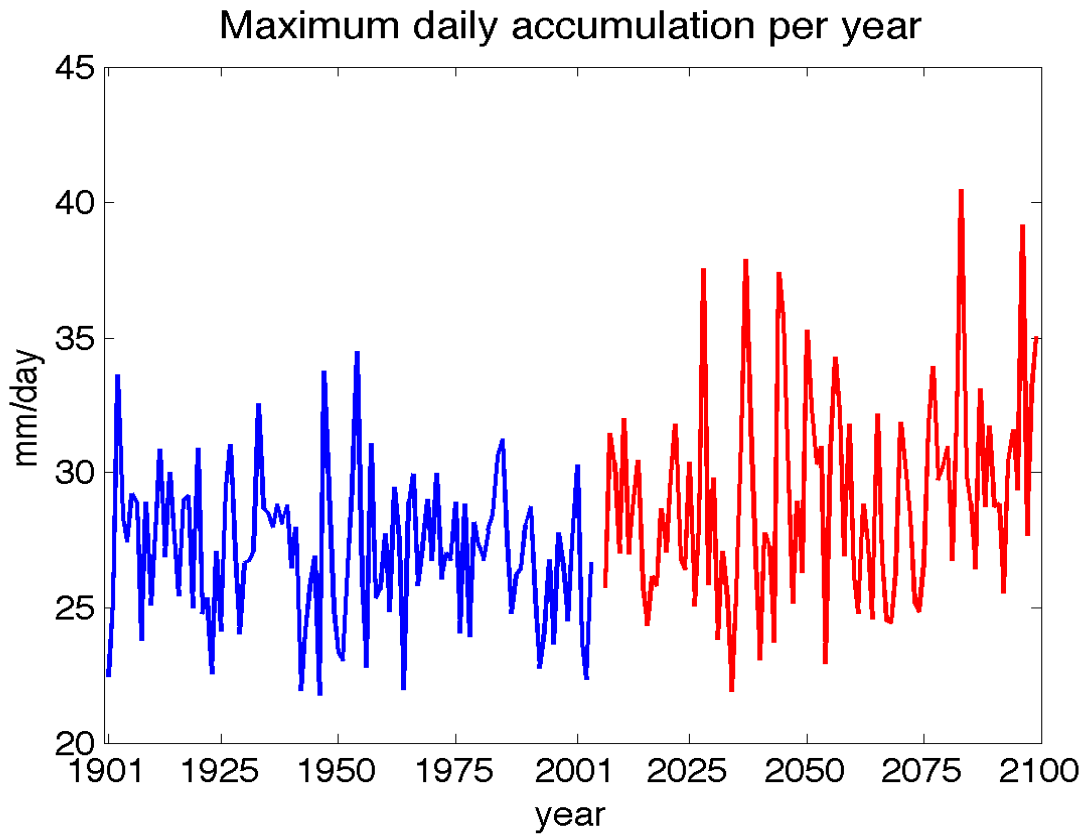
Median of 25 models

CMIP5 RCP8.5 Suraj Polade

but… Global Climate Models project that San Diego's highest daily precipitation events might increase

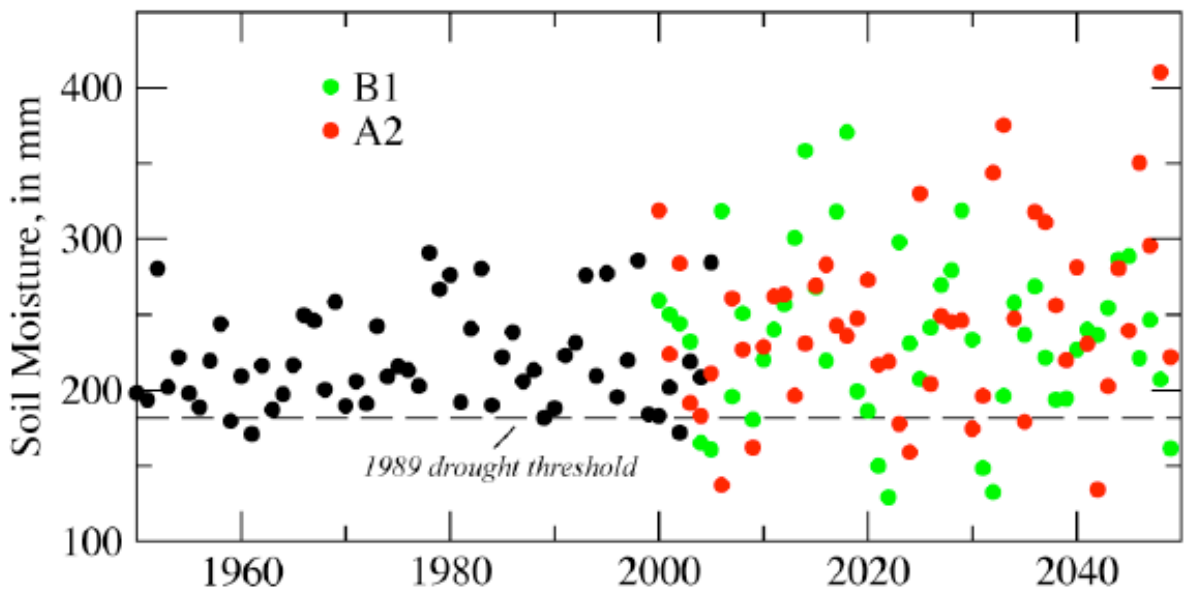
Median of 25 models

CMIP5 RCP8.5 Suraj Polade



Soil Moisture Conditions

Simulated Annual-Mean Soil Moisture, Western San Diego County



Droughts become 50% more common by 2050

Source: Climate Change-Related Impacts in the San Diego Region by 2050, California Climate Change Center, August 2009

Key Takeaways

- More frequent and longer-lasting heat waves
- More frequent extremely high sea levels
- Shorter rainy season
- Rain events are more intense

Wildfire

Photo Source: Our Changing Climate 2012

- Climate Considerations: Higher temps and shorter rainy season
- Drier soils and vegetation → increased wildfire risk
- The ***fire season may be longer and less predictable,*** putting more homes, firefighters, and natural lands at risk for longer periods of time.
- Land use and development patterns could increase the costs of wildfires

Water Demand and Supply

- Climate Considerations: Higher temps, changes in precipitation
- The region's major sources of water could shrink by 20% or more by 2050.
- By 2050, water demand is expected to increase by 29% as a result of population and economic growth.
- "San Diego's water supply plans are likely to be severely challenged by climate change."

Photo Source: Our Changing Climate 2012

Public Health

Photo Source: Our Changing Climate 2012

- Climate Considerations: Heat waves, wildfires, precipitation patterns
- Hotter temperatures not only pose direct heat exposure risks, but also exacerbate air pollution and wildfire risk which also have health implications
- ***Elderly, children, low income residents, and the chronically ill*** are the most at risk
- Future development→ Potentially more people living in inland areas and exposed to extreme heat conditions and poor air quality.

Energy Demand and Supply

- Climatic conditions: Higher temperatures, heat waves
- Hotter weather →higher demand for electricity
- Hydropower: key resource, vulnerable due to reduced snowpack
- Transmission: losses in high temperature and vulnerability to wildfire
- Shortages could lead to brown/blackouts

Photo Source: Our Changing Climate 2012

Coastal Flooding

Source: Dan Jarvis, California King Tides Photo Project

- Climatic Considerations: Sea level rise, Increasingly frequent extreme sea levels
- Inundation of low-lying areas
- Storm-related flooding may reach farther inland and occur more often
- Erosion of beaches and cliffs
- Most vulnerable sectors: Stormwater, wastewater, shoreline parks, transportation facilities, commercial buildings, and ecosystems

Inland/ Urban flooding

- Climatic Considerations: Rain events could become more intense
- Changing precipitation patterns could affect stormwater drainage and river flooding
- Potential for more landslides/mudslides with wildfires + intense rain events

Photo source: California Department of Transportation