

Climate Change and the Coast

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The Oregon Climate Change Research Inst. (OCCRI)

- Created in 2007
- Foster research within OUS
- Serve as data clearinghouse
- Outreach to non-research community

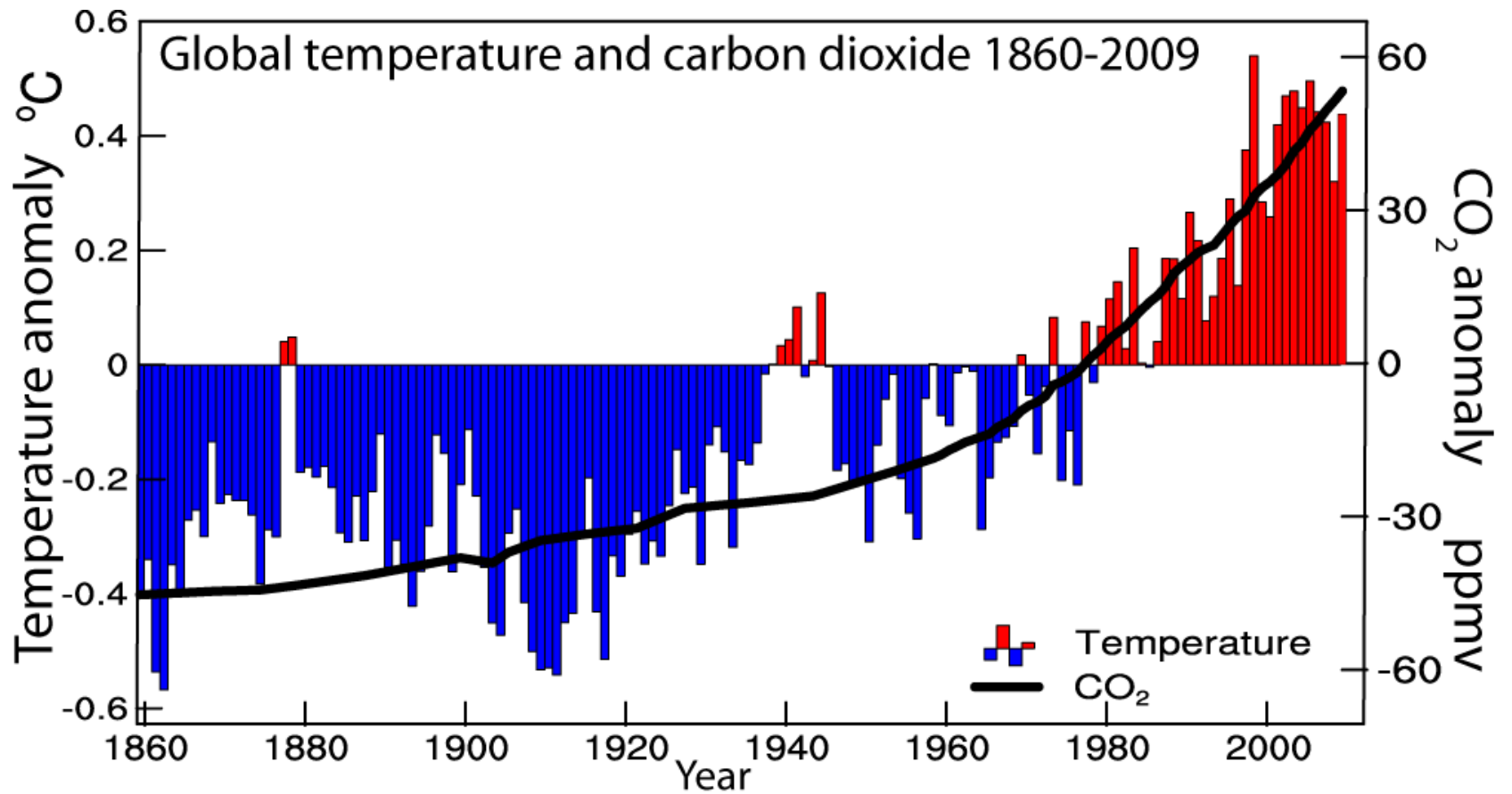
Upcoming Reports

- Oregon Climate Assessment Report (OCAR)
 - Science report
 - Social, physical, biological sciences
 - Faculty lead authors and 70+ contributors
- Oregon Adaptation Framework
 - Policy report
- Both to be released 30Nov2010

Outline

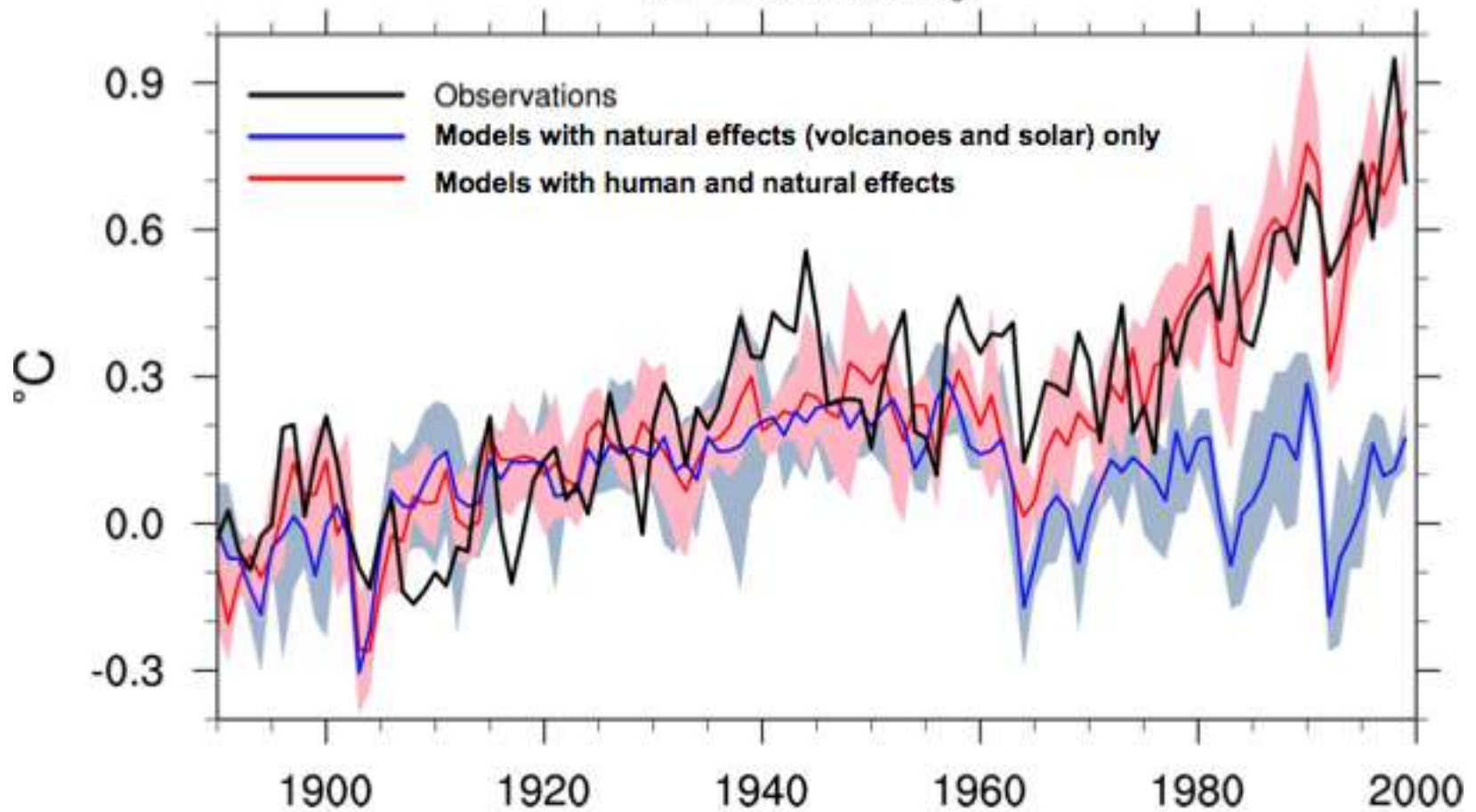
- Introduction
- Sea level
- Wave height and storminess
- Temperature and precipitation
- Ocean chemistry
- Summary/Take Home

Introduction

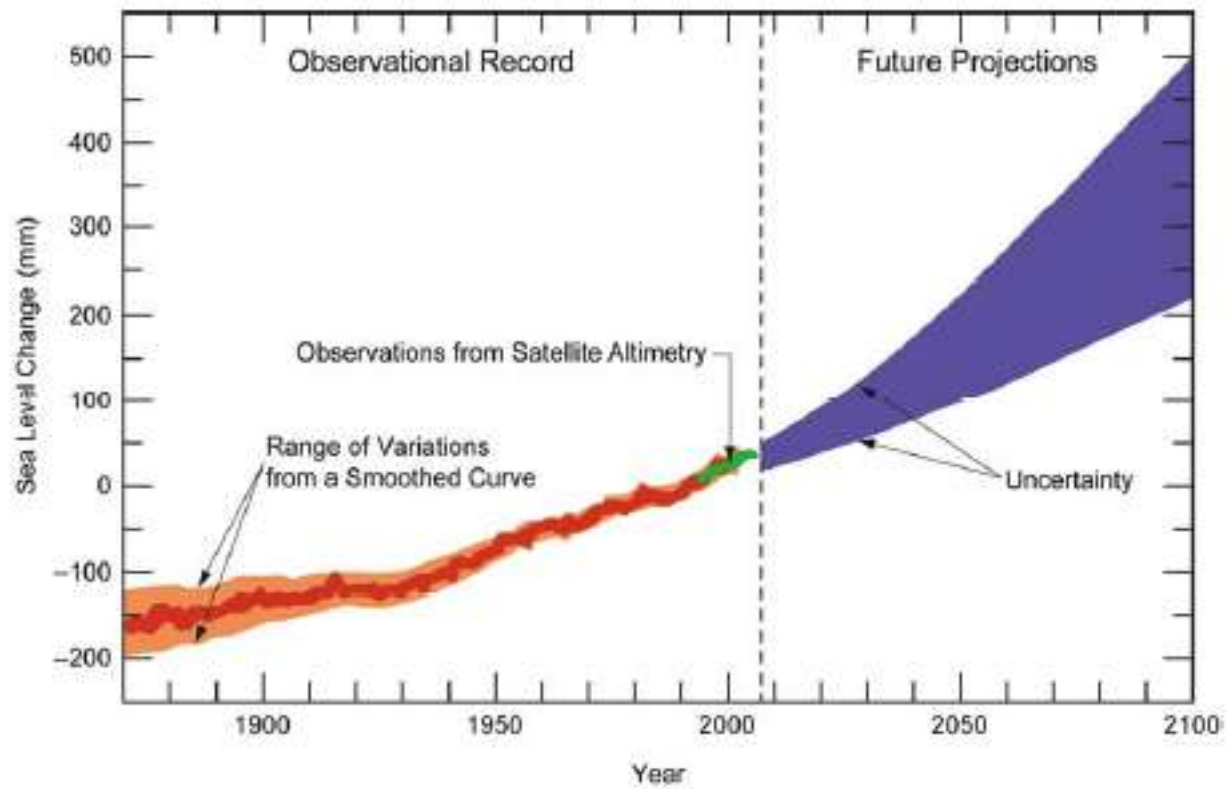


Global Temperature Anomalies

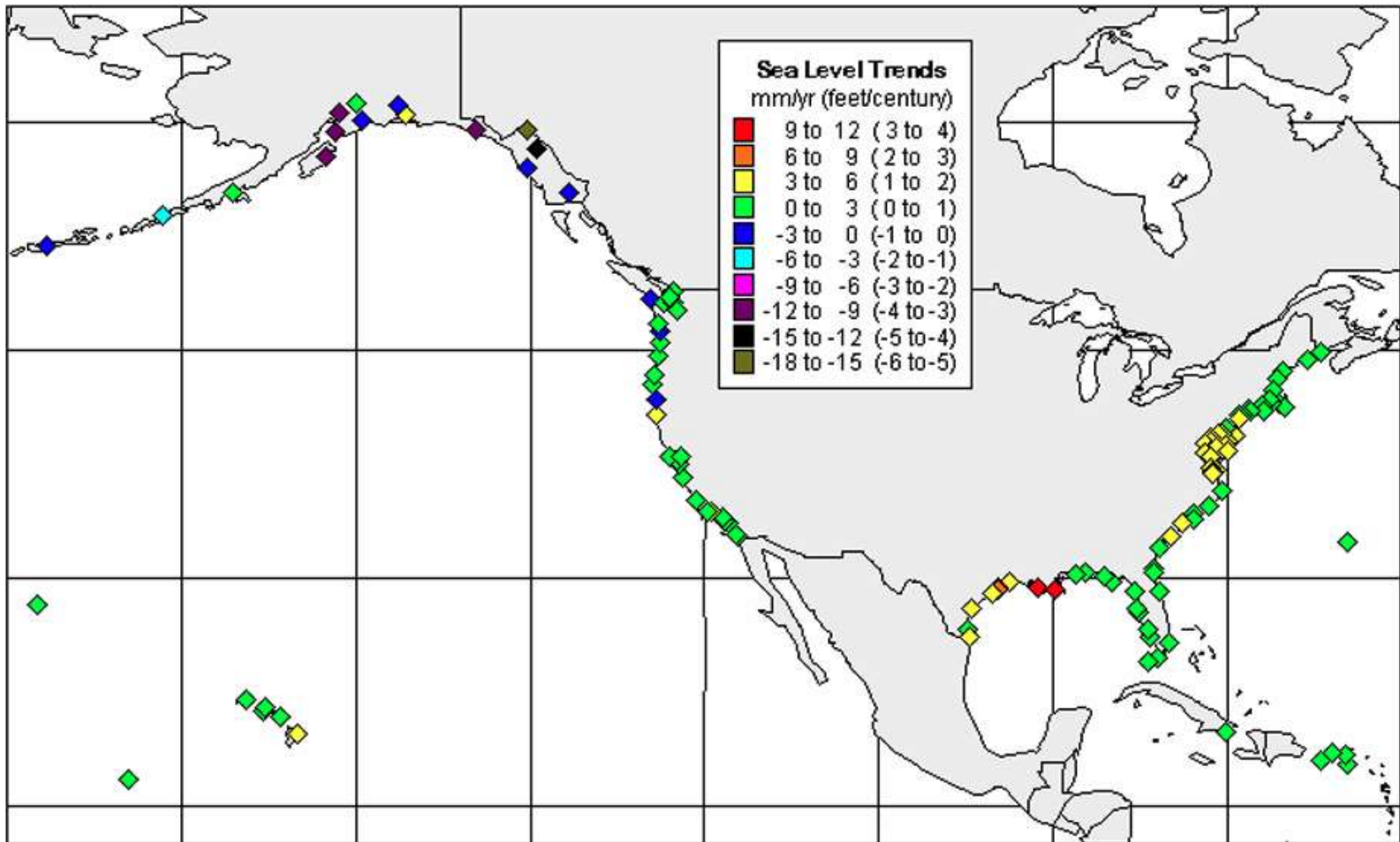
from 1890-1919 average



Sea level



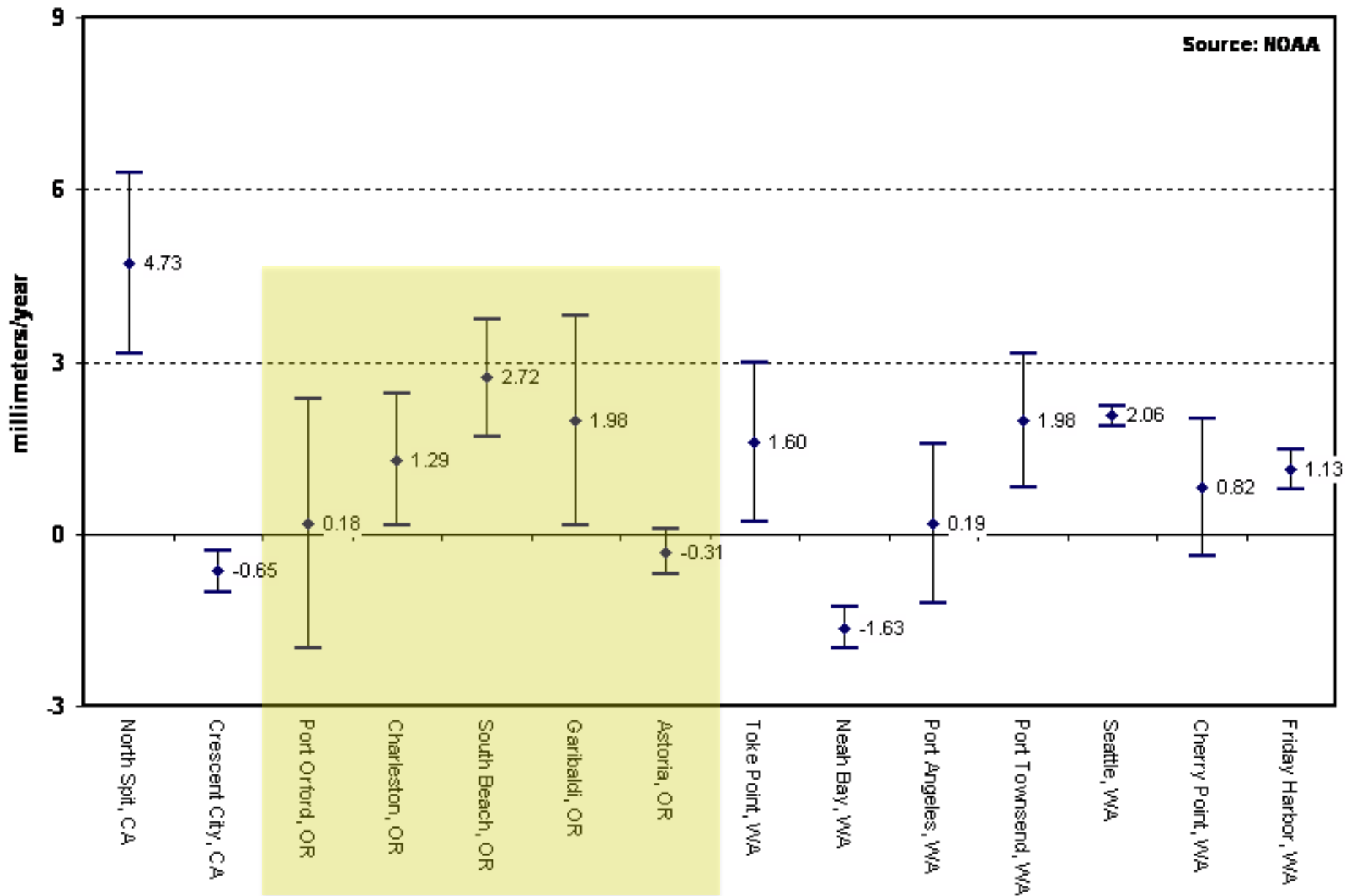
Historic Trends



Global Average = ~1.8 mm/year

Historic Local Sea Level Trends

Source: NOAA

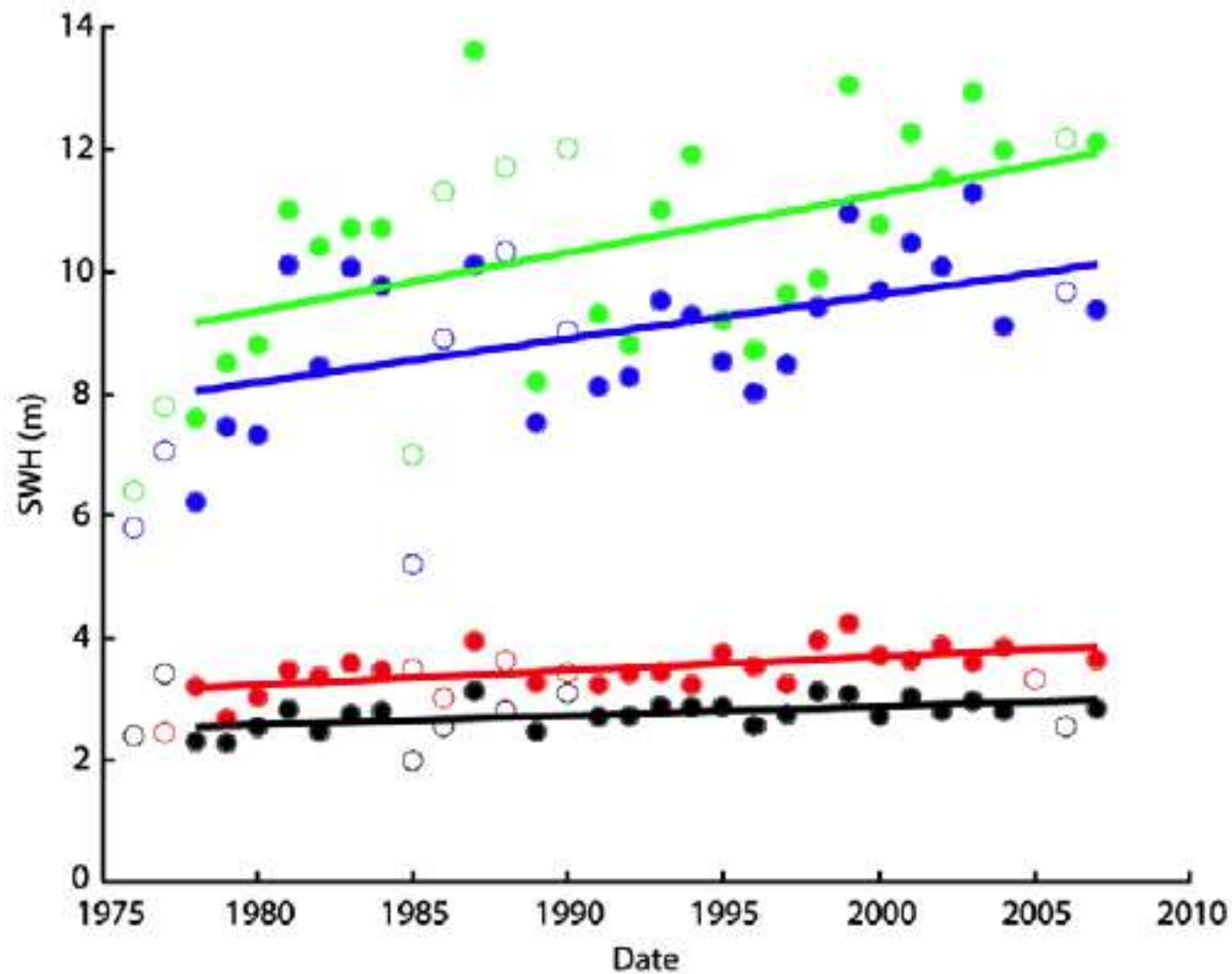


Discussion

- Thermal expansion + melting ice
- Local variability due to geology

- Loss of land/wetlands
- Change(s) in salinity
- Threaten coastal water supplies

Wave height and storminess



- Annual Mean = 0.015 ± 0.01 m/yr ($r^2 = 0.33$)
- Winter Average = 0.023 ± 0.014 m/yr ($r^2 = 0.36$)
- Avg. 5 largest = 0.071 ± 0.054 m/yr ($r^2 = 0.25$)
- Annual Max. = 0.095 ± 0.073 m/yr ($r^2 = 0.25$)

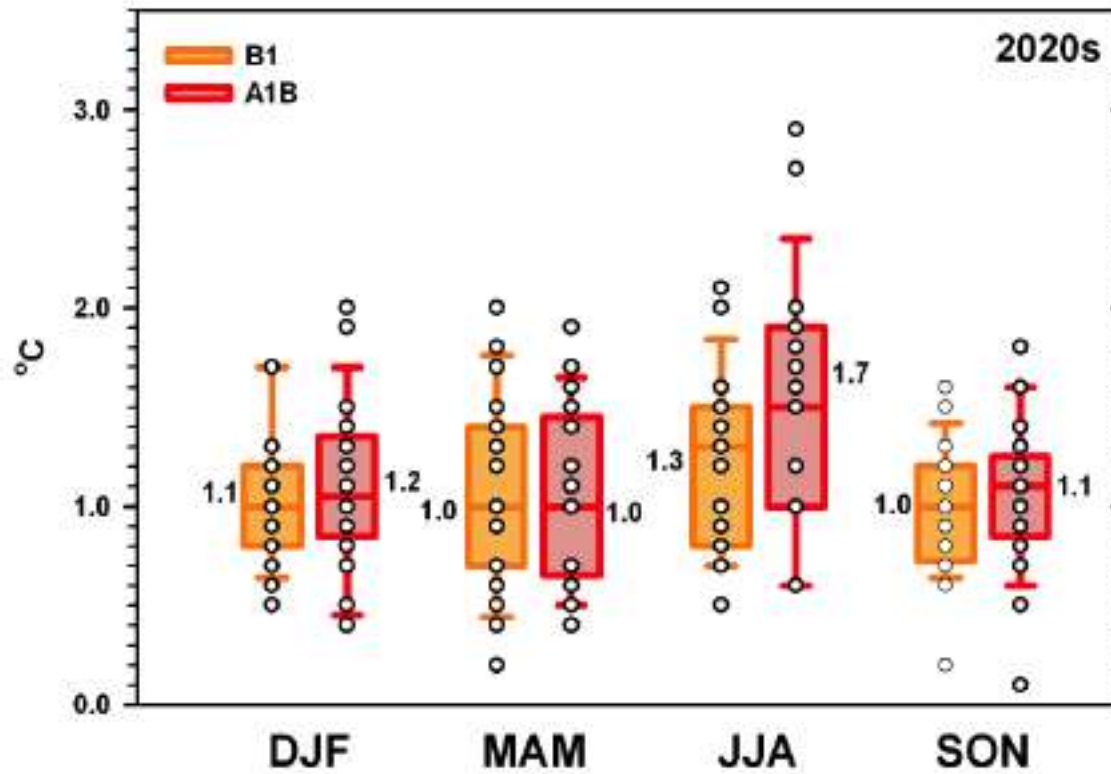
Discussion

- Climate controls not firmly established
- Impacts could exceed those of SLR

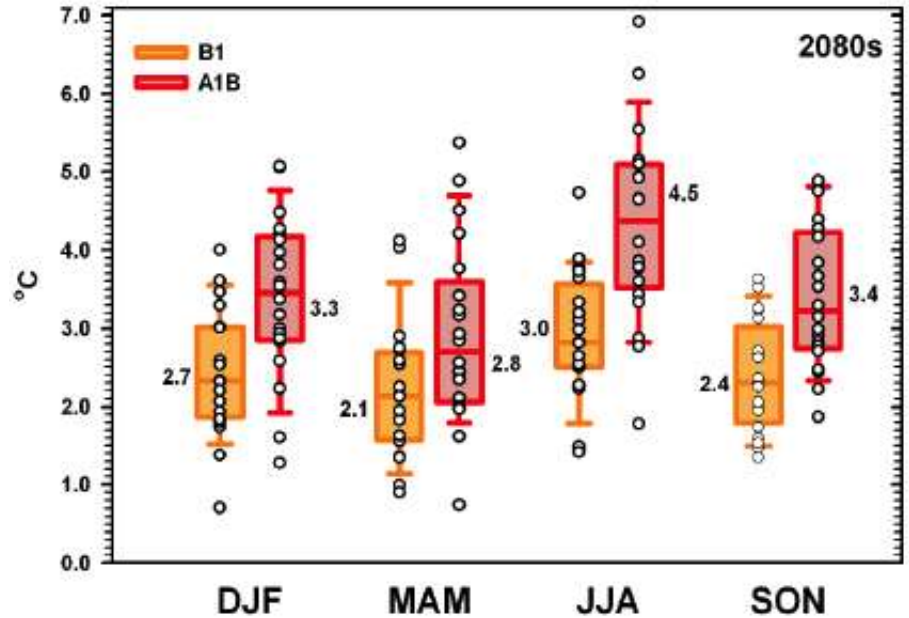
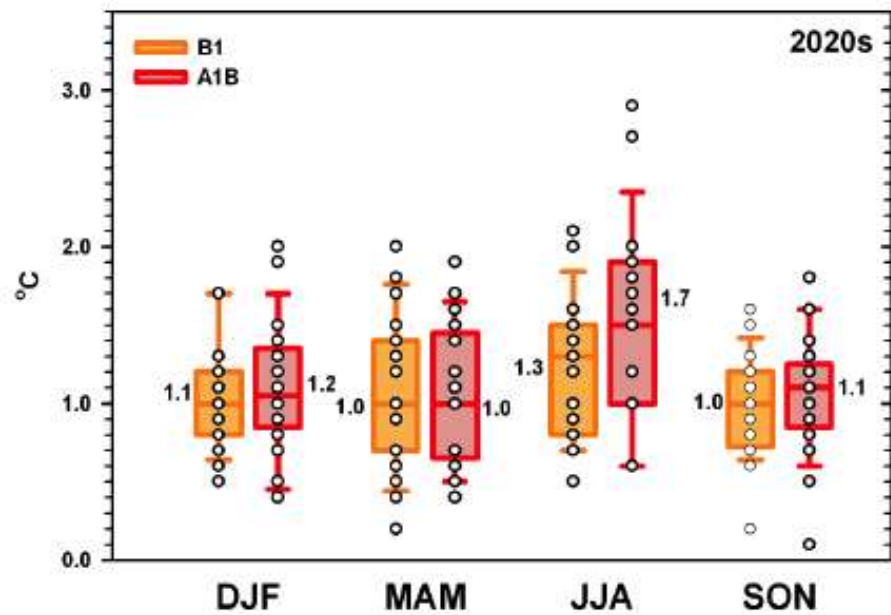
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Temperature and precipitation

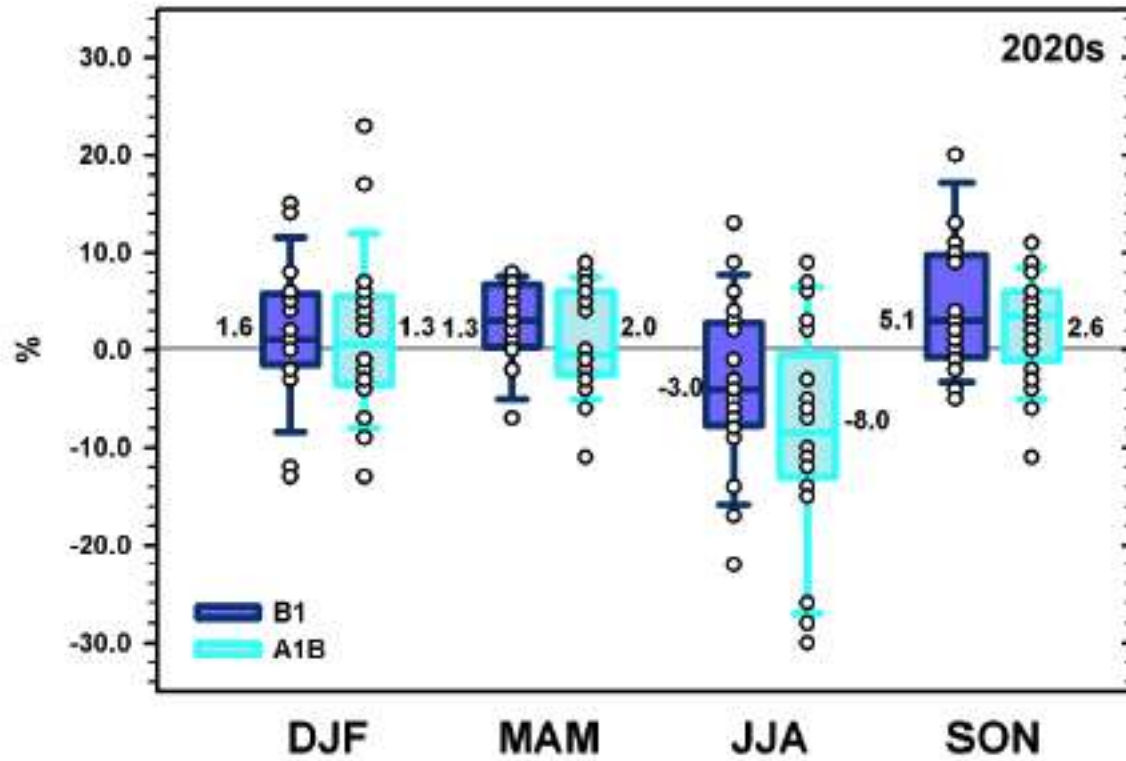
PNW Projected Seasonal Temperature Increase



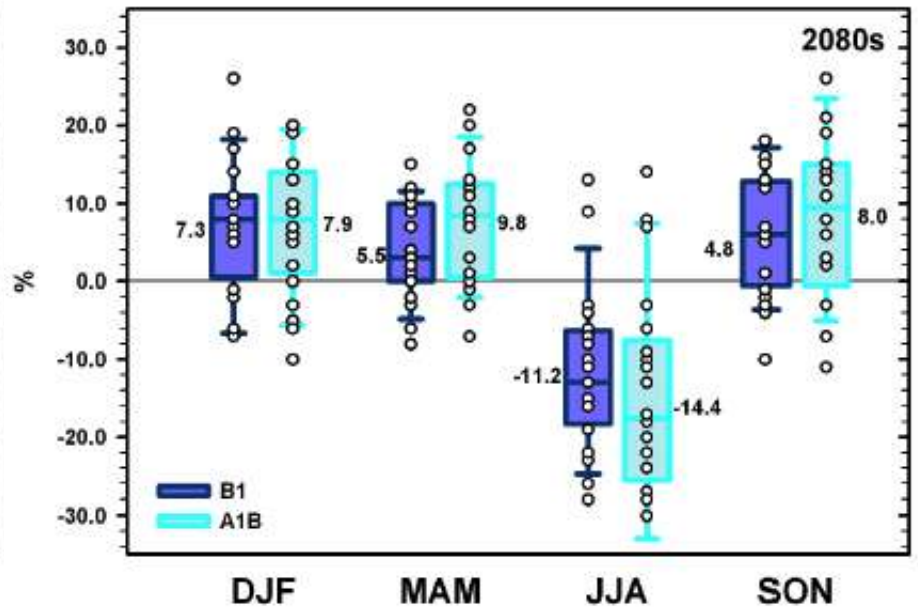
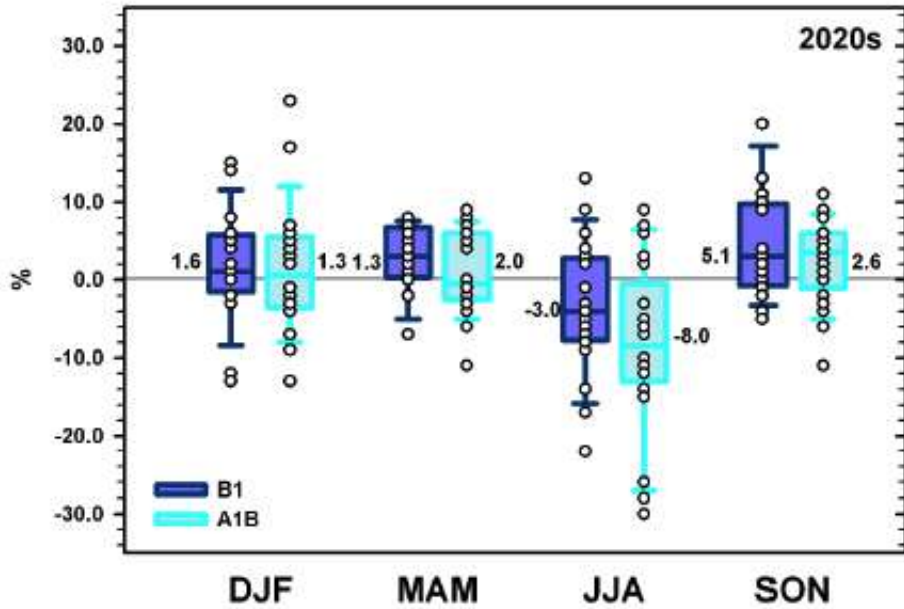
PNW Projected Seasonal Temperature Increase



PNW Projected Seasonal Precipitation Change



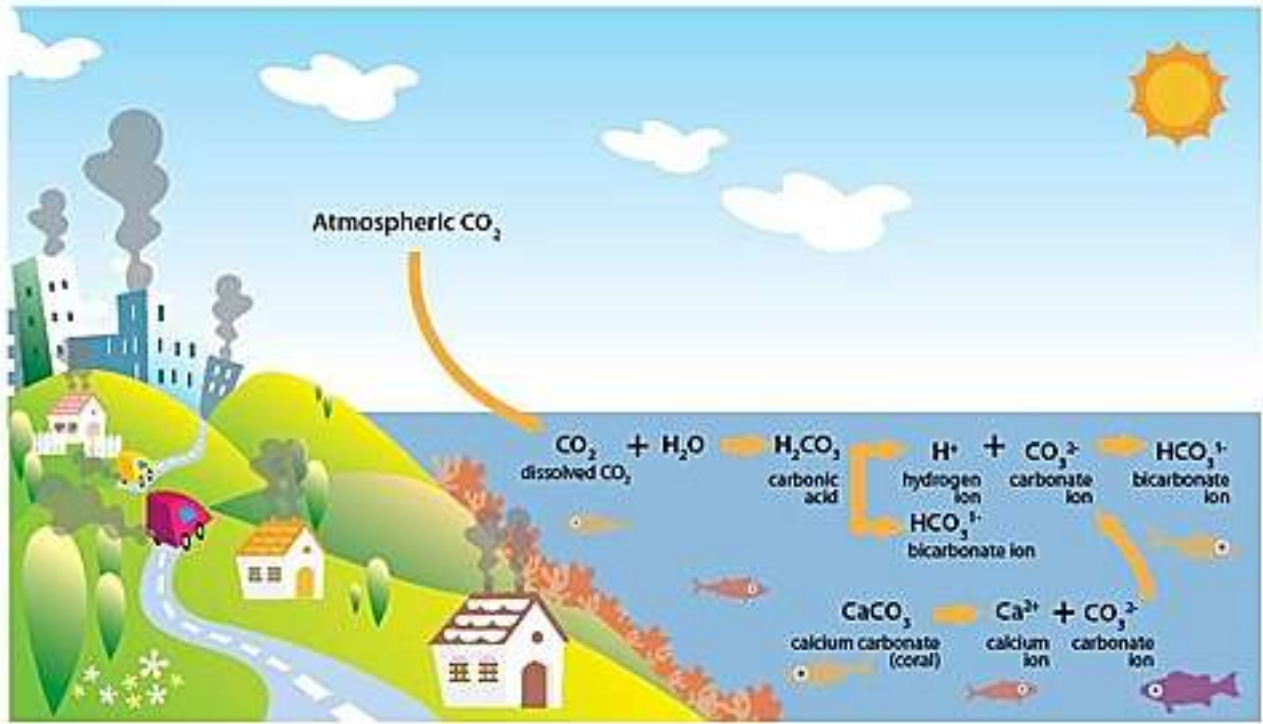
PNW Projected Seasonal Precipitation Change



Discussion

- All models suggest warmer 21C
- SRES divergence greatest after mid-century
- Precip projections not consistent; drier summers, wetter rest of year?
- Changes in ecology (e.g. species composition)

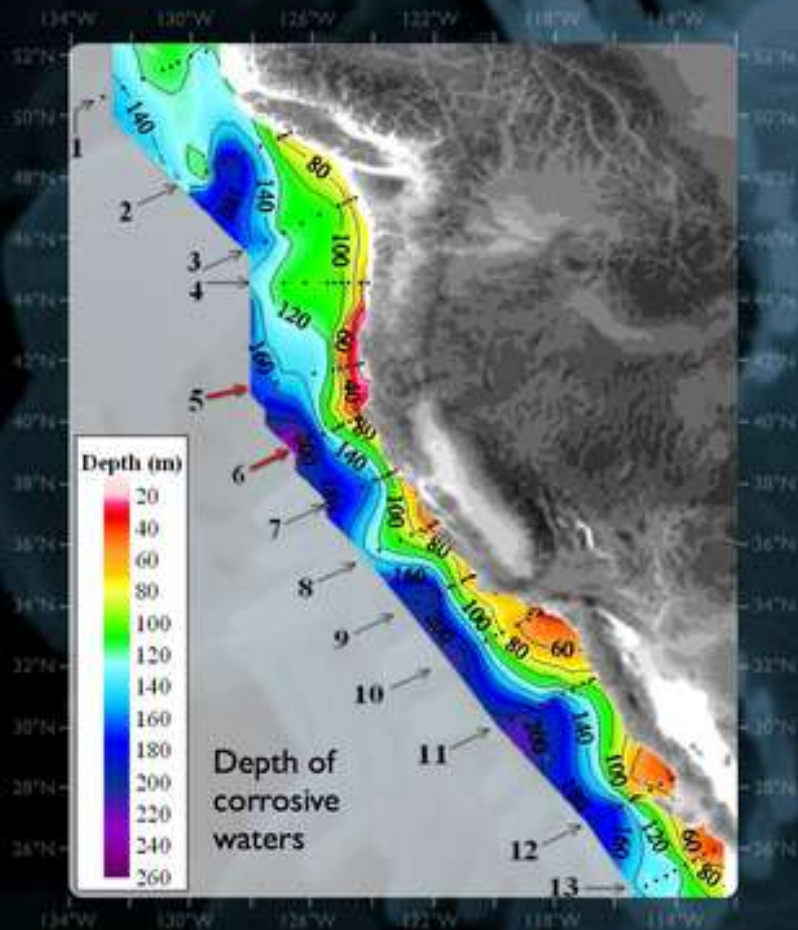
Ocean chemistry



Ocean Acidification of the North American Continental Shelf

NACP Coastal Survey Cruise:
11 May - 14 June 2007

On transect lines 5 and 6 the
corrosive water reaches all the
way to the surface in the
inshore waters near the coast.



cev

Data Source: Richard Feely, NOAA

Discussion

- CO₂ emissions changing oceanic chemistry
- pH is falling

- Suggests negative impact(s) on calcifiers
- Potential effects on ecology, food webs (high uncertainty)

Summary

- Sea level rising
 - Loss of wetlands, change salinity, etc.
- Increased wave height and storminess
 - Loss of wetlands, change salinity, etc.
- Temp = increase; Precip = ?
 - Change ecology (e.g. species composition)
- Ocean acidification
 - Change marine ecology

Take Home

- Multiple processes at work
- Significant uncertainties exist
 - Process uncertainties
 - “Sociological” uncertainties
- Adaptation strategies => robust and resilient



Oregon Climate Change Research Institute