PNW Climate Change Scenarios

IPCC AR 4 Emissions Scenarios:

A1B Medium High

B1 Low

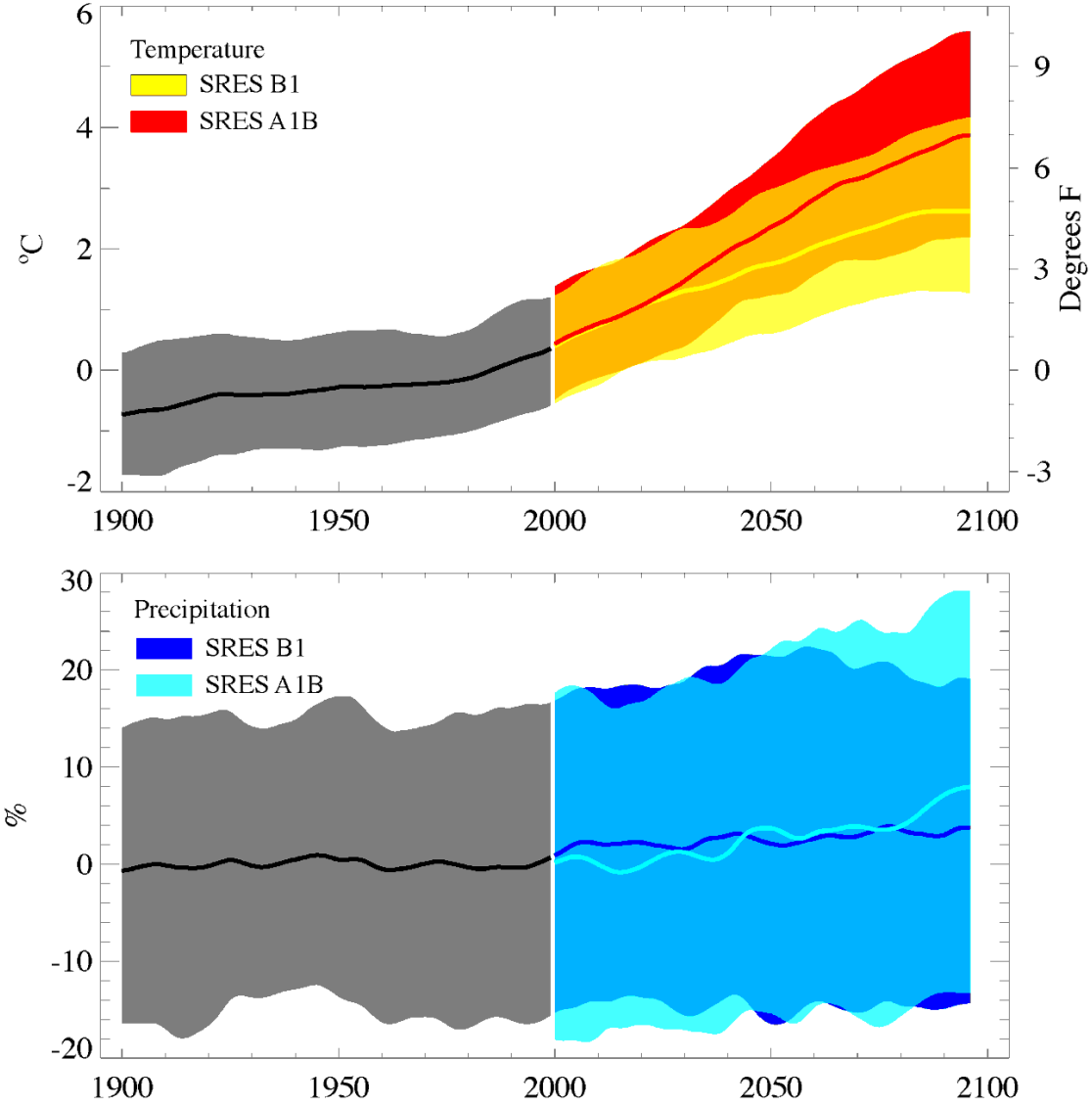


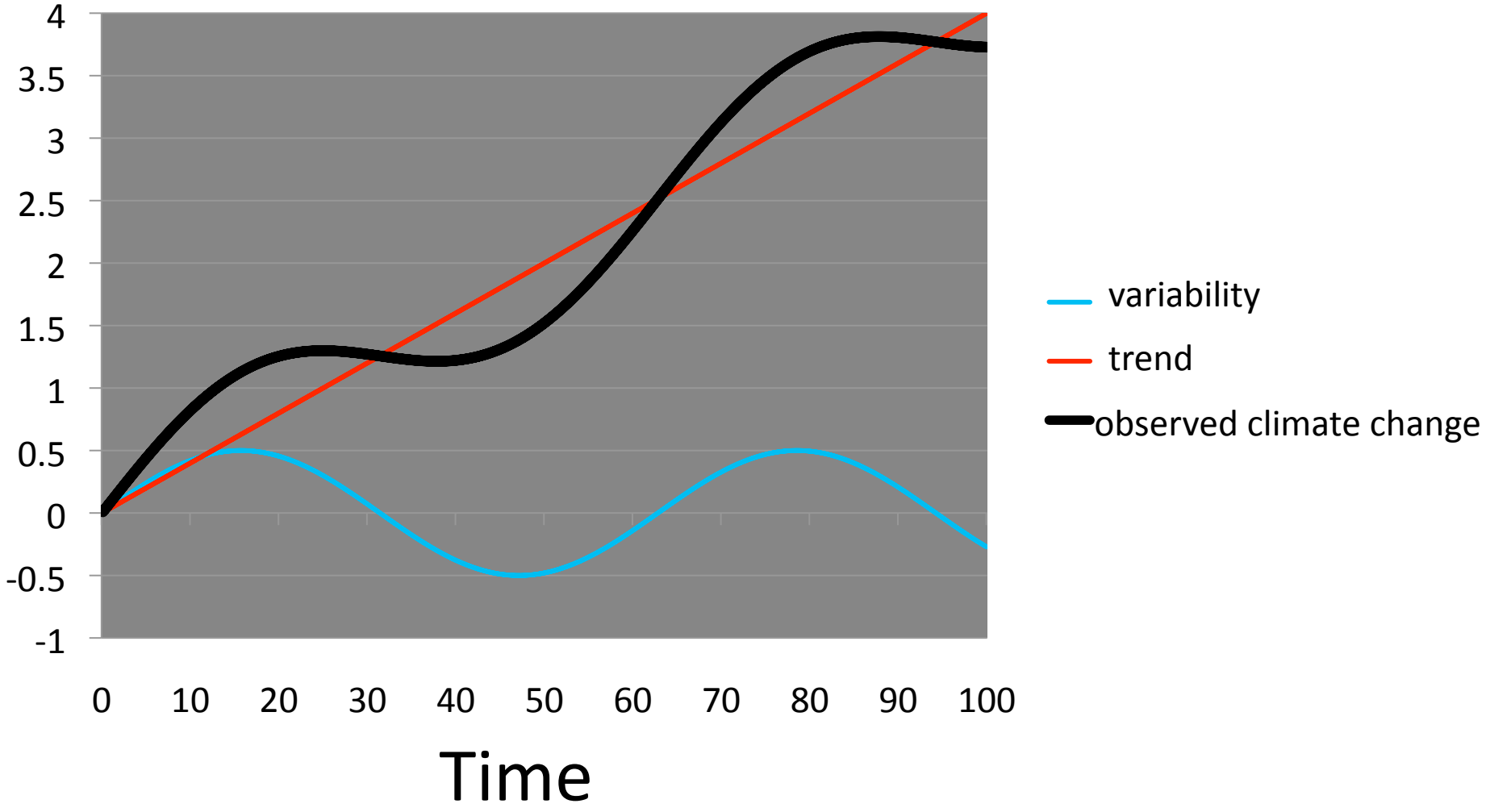
Figure shows change compared with 1970 - 1999 average

Mote, P.W., and E.P. Salathé. 2010. Future climate in the Pacific Northwest. Climatic Change 102(1-2): 29-50, doi: 10.1007/s10584-010-9848-z

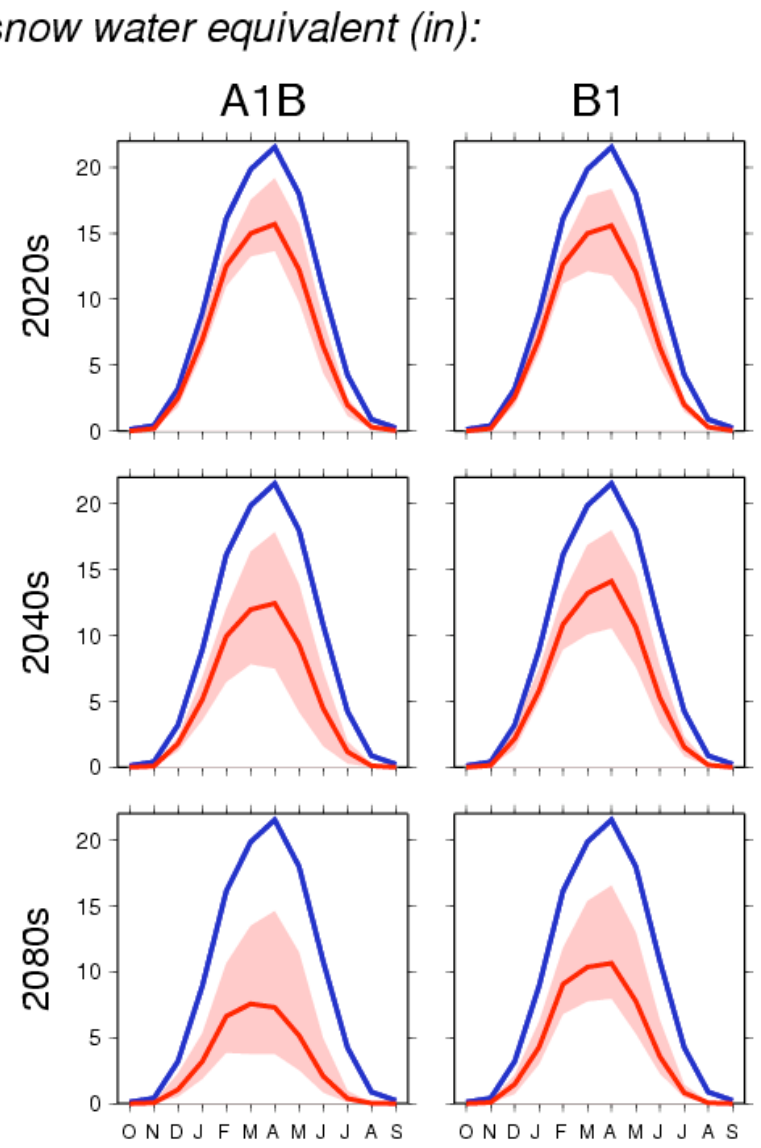
Climate Model Consensus:

- Strong Warming: All Seasons, Especially Summer
- Relatively Small Changes in Annual Precipitation
- Wetter Falls, Winters, and Springs
- Drier Summers

“Climate change” will express itself in real time as a complex combination of variability plus any systematic trend.



Climate Change = Changing Hydrology



Elsner, M.M., L. Cuo, N. Voisin, J.S. Deems, A.F. Hamlet, J.A. Vano, K.E.B. Mickelson, S.Y. Lee, D.P. Lettenmaier. 2010: Implications of 21st century climate change for the hydrology of Washington State, Climatic Change. doi: 10.1007/s10584-010-9855

Wetlands will respond to changing seasonal water availability, and wetland biota will respond to their changing habitat.

Pacific Northwest wetlands are very diverse in their characteristics:

- Natural
- Agricultural
- Managed
- Constructed

} Sensitive to human factors such as land use, irrigation, drainage

- Coastal wetlands (estuaries, salt marsh)
- Riparian wetlands (rivers)
- Littoral wetlands (lakes)
- Palustrine wetlands (bogs, fens, swamps, ponds)
  - Mountain wetlands in complex topography
  - "Pothole" wetlands in relatively flat lowland areas
  - Forest wetlands, etc

- Groundwater
- Streams
- Rainfall
- Snowmelt
- Wastewater/stormwater
- Salt water/tidal

} Wetlands often have multiple sources of water feeding them, and most are affected by climate change.

Overarching Research Objectives:

1) Characterize the impacts of a changing climate on the hydrologic characteristics of specific wetlands via combined **monitoring** and **hydrologic modeling**,

2) Without detailed data, assess future landscape-scale changes in wetland behavior via **hydrologic modeling**,

3) Map the location and hydrologic characteristics of wetlands via **remote sensing**,

4) Relate these changes to important **biological responses** and (ultimately) **wetland conservation strategies**, **management decisions**, etc.