REACCH
Regional Approaches to Climate Change – PACIFIC NORTHWEST AGRICULTURE

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Climate of the Pacific Northwest during the Anthropocene

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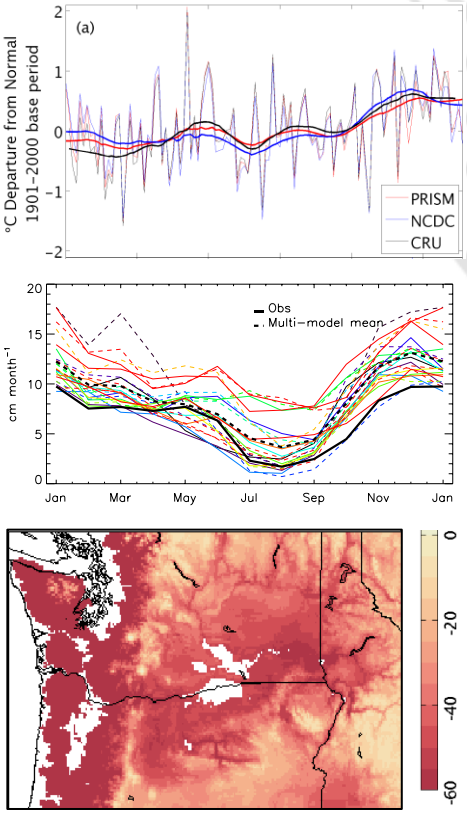

(top) Annual mean temperature anomalies 1901-2011 for the Pacific Northwest USA from 3 datasets.

(middle) Monthly mean precipitation from observations and CMIP5 models.

(bottom) Modeled change in percent of precipitation as snow (2031-2060, RCP4.5 vs. 1950-2005) 14 model mean.

How has seasonal climate in the Pacific Northwest changed over the 20th century, what can we attribute to natural and anthropogenic factors and how will climate evolve over the next half-century? Credible answers to these questions are critical in guiding decisions on regional climate adaptation. Observed changes in seasonal temperature examined across three datasets showed positive, albeit non-monotonic trends across, with more subtle changes in seasonal precipitation. Of interest to the agricultural community and stakeholders is the lack of warming during spring in recent decades. Upon removal of the impact of known natural drivers of regional climate variability we identify coherent and accelerated warming trends consistent with anthropogenic drivers. These results suggest that internal climate variability plays a significant role in modulating the pace of regional warming trends across seasons and helps explain the lack of springtime warming since 1980. Projected regional changes in climate were examined using over 25 global climate models (GCMs) run using two enhanced greenhouse experiments through the 21st century. The credibility of GCMs in simulating features of regional scale historical climate fields was examined to identify models appropriate for the region. Overall, GCM projections for the Pacific Northwest include a continuation of accelerated warming with the largest increases during the summer months coincident with decreases in summer precipitation. Despite increases in precipitation during the cool months, significant reductions in snowfall and increased climatic water deficit during the warm season along with warming are likely to have disparate direct impacts on agriculture and indirect impacts on agriculture through modifying suitability for pest, weeds and diseases. Downscaled climate projections for 10 variables at the daily time step are available for integration across REACCH to help model climate impacts and devise adaption strategies to continue agricultural prospects in the Pacific Northwest.

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