High-resolution meteorological datasets for western North America

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IMPETUS:
A common hurdle in resource management is the low resolution of climate information relative to user needs.

Surface Temp:
annual average

Comparing:
1/16th degree to
30 arc-second simulations

SOURCE DATA:
Meteorological Data:
- CBCCSP: Columbia Basin Climate Change Scenarios Project (1/16th degree daily meteorological data): http://www.hydro.washington.edu/2860

High-Resolution Data:
- ClimateWNA: A program to generate arbitrary-resolution climate normal data using an empirically-derived elevation correction for temperature. http://www.genetics.ubc.ca/cfcg/ClimateWNA/ClimateWNA.html

Future Climate Projections:

Hydrologic Model:

METHOD:
Bias correction of low-resolution time series using high-resolution climatology.

NOTE: this means that all time series information is the same as at the lower resolution. This may not be realistic in topographically complex regions.

NEW 30 ARC-SECOND METEOROLOGICAL DATASETS:

1. Pacific NW up to 49N

Variables:
tmax, tmin, precip
Temporal resolution:
Daily
Source data:
low-resolution time series: CBCCSP project
high-resolution climatology: PRISM 30 arc-second climate normals
Future periods:
2020s, 2040s, 2080s
Scenarios:
A1B, B1
Downscalings:
Hybrid Data: echam5
Transient (BCSD):
cosm3, cgm3.1_t47, cnrm_cm3, echam5, echo_g, hadcm, pcm1
Website:
http://cses.washington.edu/picea/mauger/met30s/pnw_30s/

2. Pacific NW, British Columbia, and the AK Panhandle

Variables:
tmax, tmin, precip
Temporal resolution:
Monthly
Source data:
low-resolution time series: CBCCSP project, PCIC
high-resolution climatology: PRISM 30 arc-second climate normals
Scenarios:
A1B
Downscalings:
Transient (BCSD):
bcoc, cosm3, cgm3.1_t47, cgm3.1_t63, cnrm_cm3, cano_3_5, echam5, echo_g, ipsl_cm4_1_p, gfdl_cm2_1, giss_aom, giss_er, hadcm, hadgem1, inmcm3_0, ipsl_cm4, miroc3_2_hv, miroc_3.2, pcm1
Website:
http://cses.washington.edu/picea/mauger/met30s/wna_30s/

Example Application: High-Resolution Snow Simulations for OR & WA

Variables:
snow amount: swe, peak swe
snow dates: peak swe, 10% accum, 90% accum
Source data:
PastNW 30 arc-second daily met data
Snow Model
VIC
Scenario:
A1B 2040s
Spatial Delta Downscaling:
1. composite (average of all GCM projections)
2. miroc_3.2 (warmer / drier summers)
3. pcm1 (cooler / wetter summers)