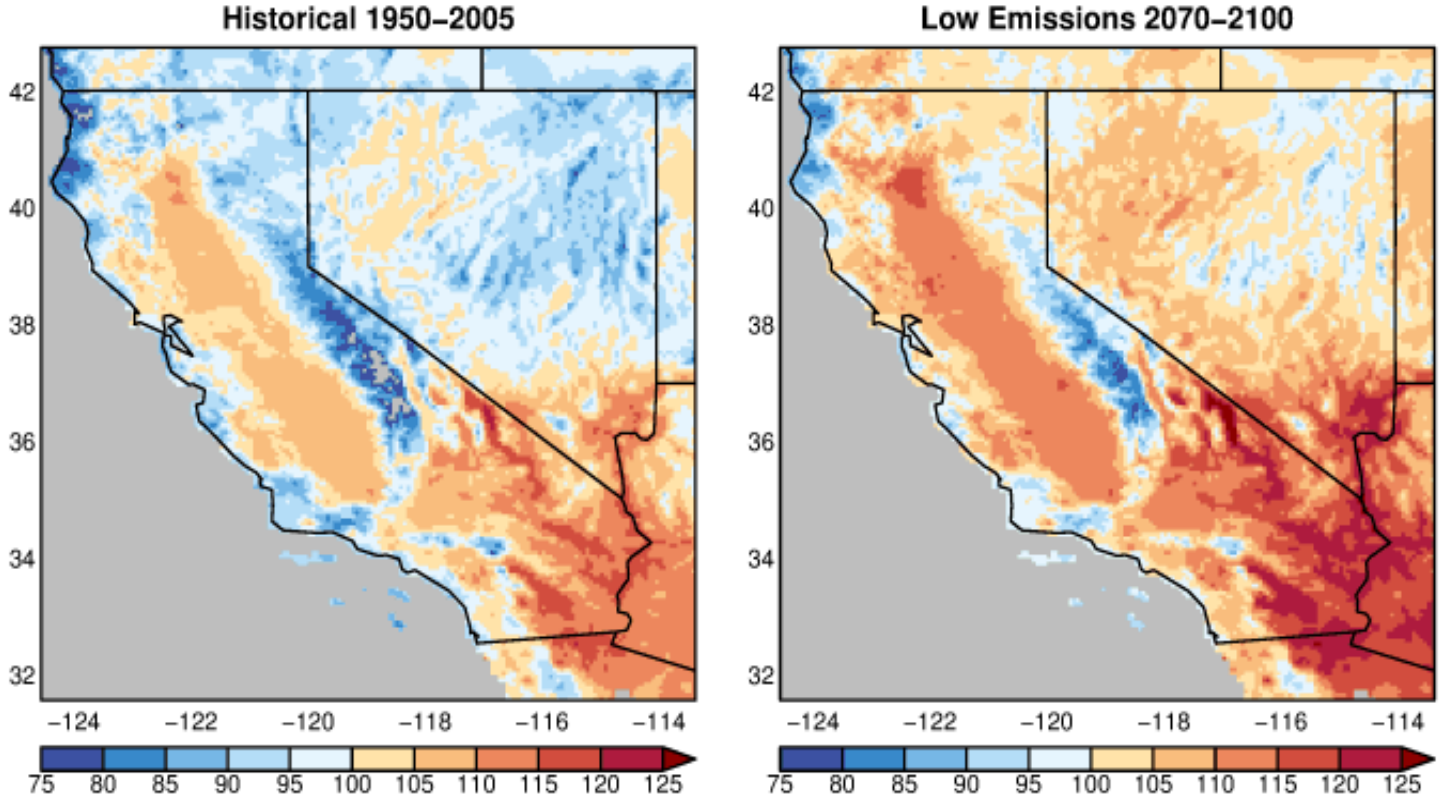
EPC-20-006 Group 1 Overview

Development of Climate Projections for California and Identification of Priority Projections

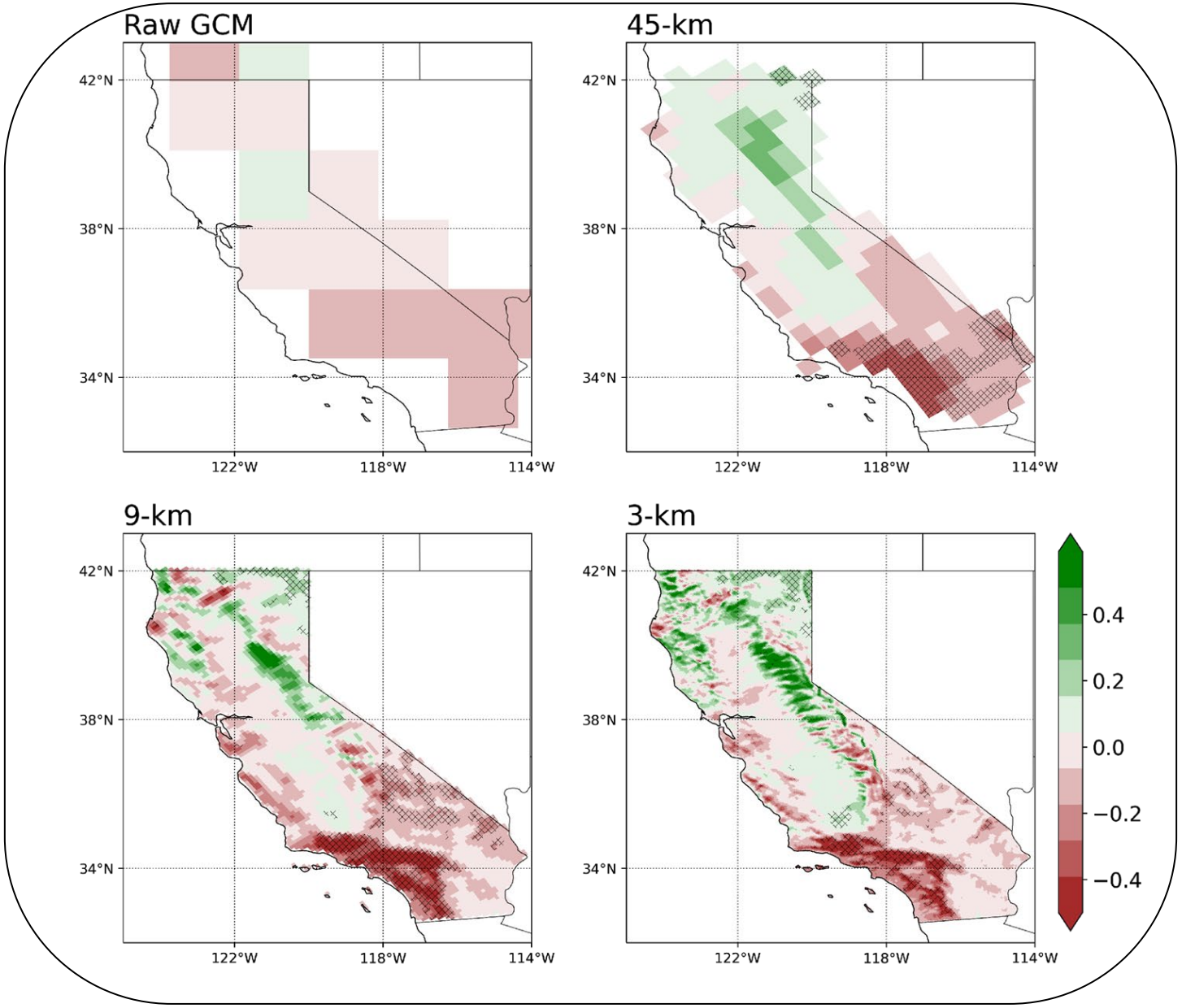
A collaboration amongst SIO/UCSD, UCLA and UC Berkeley

Sponsored by the California Energy Commission through the Electric Program Investment Charge (EPIC) program



Downscaling

Example of changing climate change signal with changing resolution

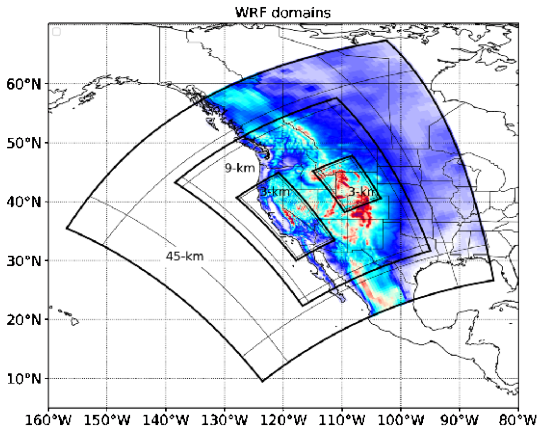


End-of-century minus present-day annual precipitation [mm/d]

Summary of Downscaling

Dynamically Downscaling

- 3 km resolution
- 4 GCMS, at SSP 370
- 21 Hourly Data for Many Variables including temperature, specific humidity, precipitation, winds, solar radiation
- Full data stream will be 6 hourly temporal resolution



Provided by S. Rahimi

LOCA-Hybrid Downscaling

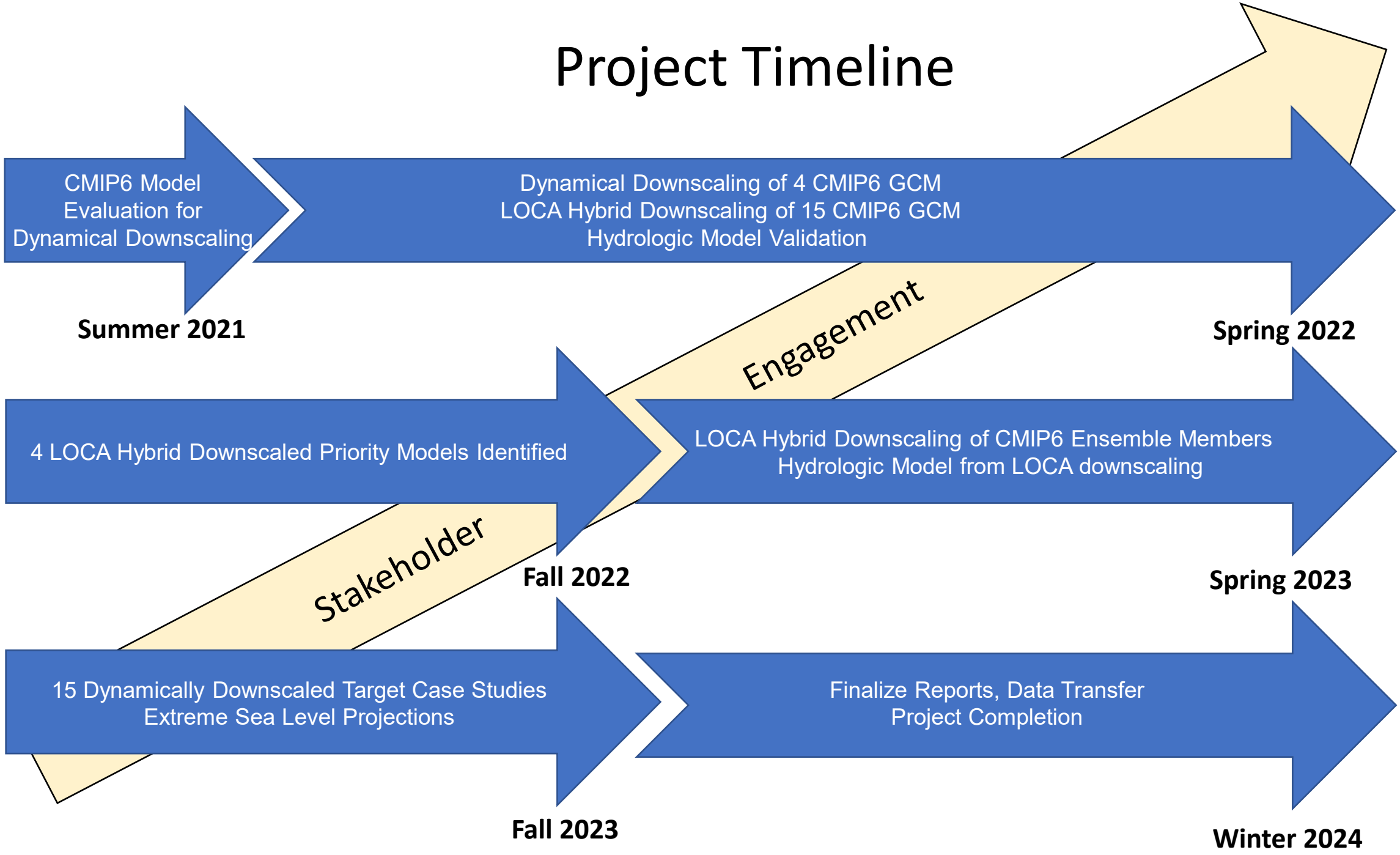
- Adds models, emission scenarios, and ensemble members to WRF results
- Will use WRF output in LOCA2 training to improve estimates of future change (hybrid statistical-dynamical downscaling)
- Downscale 15 GCMs
- 3 SSP's (emissions scenarios), SSP245, SSP370, SSP585
- Multiple ensemble members available for some models
- **Daily** Temperature, precipitation, humidity, wind, surface solar
- Bias corrected to match available observations over historical period
    - Can do custom bias correction to a particular station location if stakeholders need that

Hydrology

- Hourly to daily for all variables including streamflow
- 3 models – VIC, Noan-MP, and SUMMA

Provided by B. Bass

Project Timeline



Extra Slides

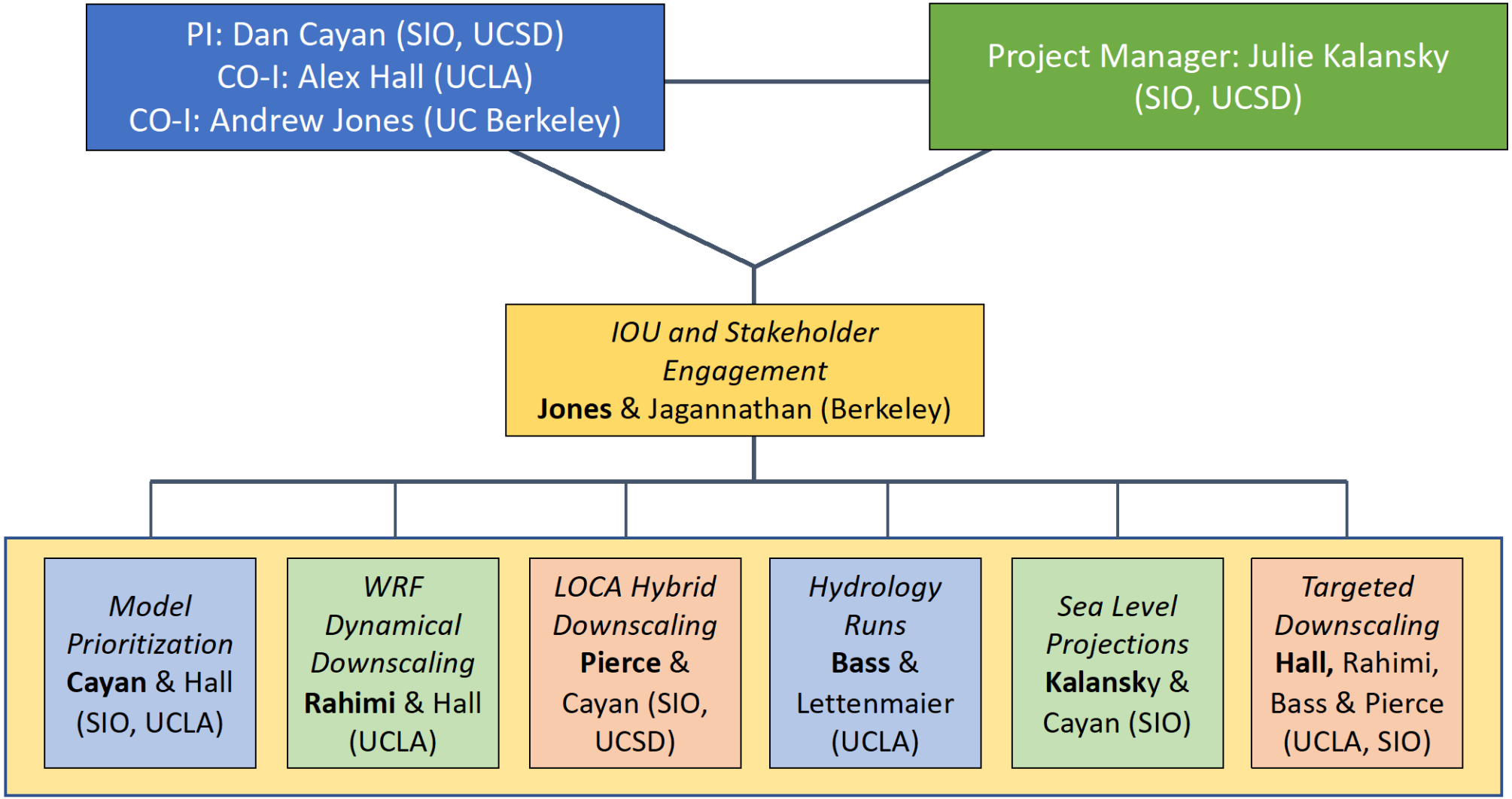
Thanks to “Group 2” and Stakeholders for Feedback

Glad to address questions offline:

Dan Cayan, Julie Kalansky Scripps Institution of Oceanography

dcayan@ucsd.edu jkalansky@ucsd.edu

EPC-20-006 Project Structure



WHAT'S NEW ?

1) a new cohort of global climate models from CMIP6 archive will be downscaled.
2) Physical realism improved with WRF dynamical downscaling of key scenarios, and LOCA hybrid statistical downscaling
3) Spatial detail will be increased to a 3-km spatial resolution, compared to 6-km previously.
4) Data frequency will be increased to hourly for a number of variables (determined in conjunction with the stakeholders) rather than daily previously.
5) Greater completeness will be achieved since WRF computes essentially any atmospheric variable of interest, while in the previous assessment the output variables were limited to those with adequate observations to train the statistical model.
6) work together with stakeholders and with Group 2 platform and decision support team to produce data best suited to address questions of interest.
7) Estimation of uncertainty will be enhanced by using multiple land surface models.