

South and Lower South Bay Moored Sensor Program

High-frequency water quality data in support of
Bay science and management

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San Francisco Estuary Institute

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Bay RMP Annual Meeting

Moored Sensor Program

A collaboration of the RMP and the Nutrient Management Strategy (NMS)

Regional Monitoring Program

- Develop sound scientific information to support management of Bay water quality.

Nutrient Management Strategy

- Determine if the Bay is or may become nutrient impaired.
- Guide management of wastewater nutrient discharge to support Bay ecosystems.



Moored Sensor Program

Project goals:

- Condition assessment.
- Characterization of mechanisms underlying water quality patterns.
- Context for more pointed field experiments.
- Model calibration and validation, and model inputs/forcing.

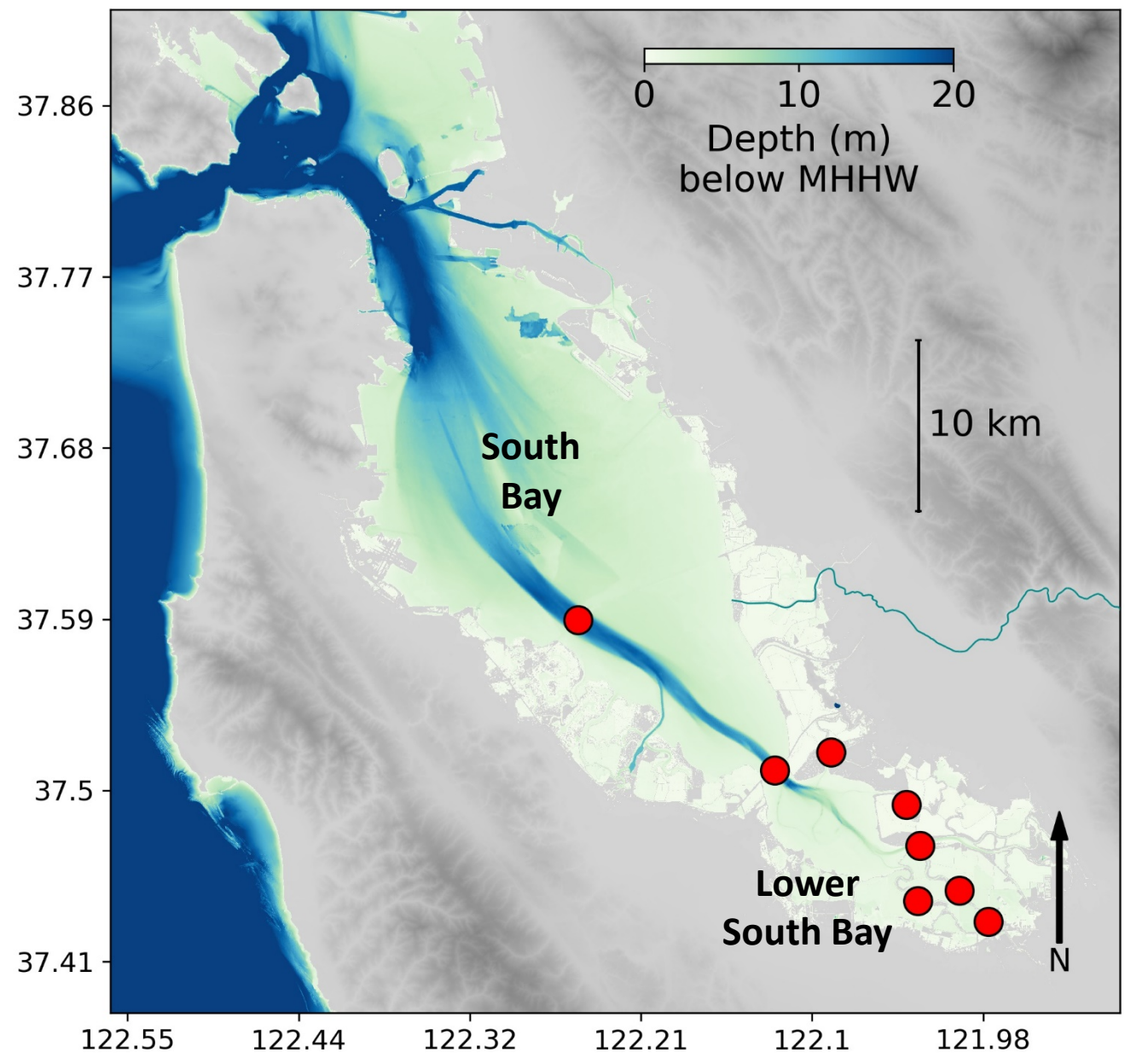


Moored Sensor Program

History and recent changes:

2015-2019:

- Eight stations
- Lower South Bay focus
- Standard multi-parameter water quality instruments at 15-minutes:
 - Salinity, temperature, tides
 - Chl-a and DOM fluorescence
 - Dissolved oxygen and turbidity



Moored Sensor Program

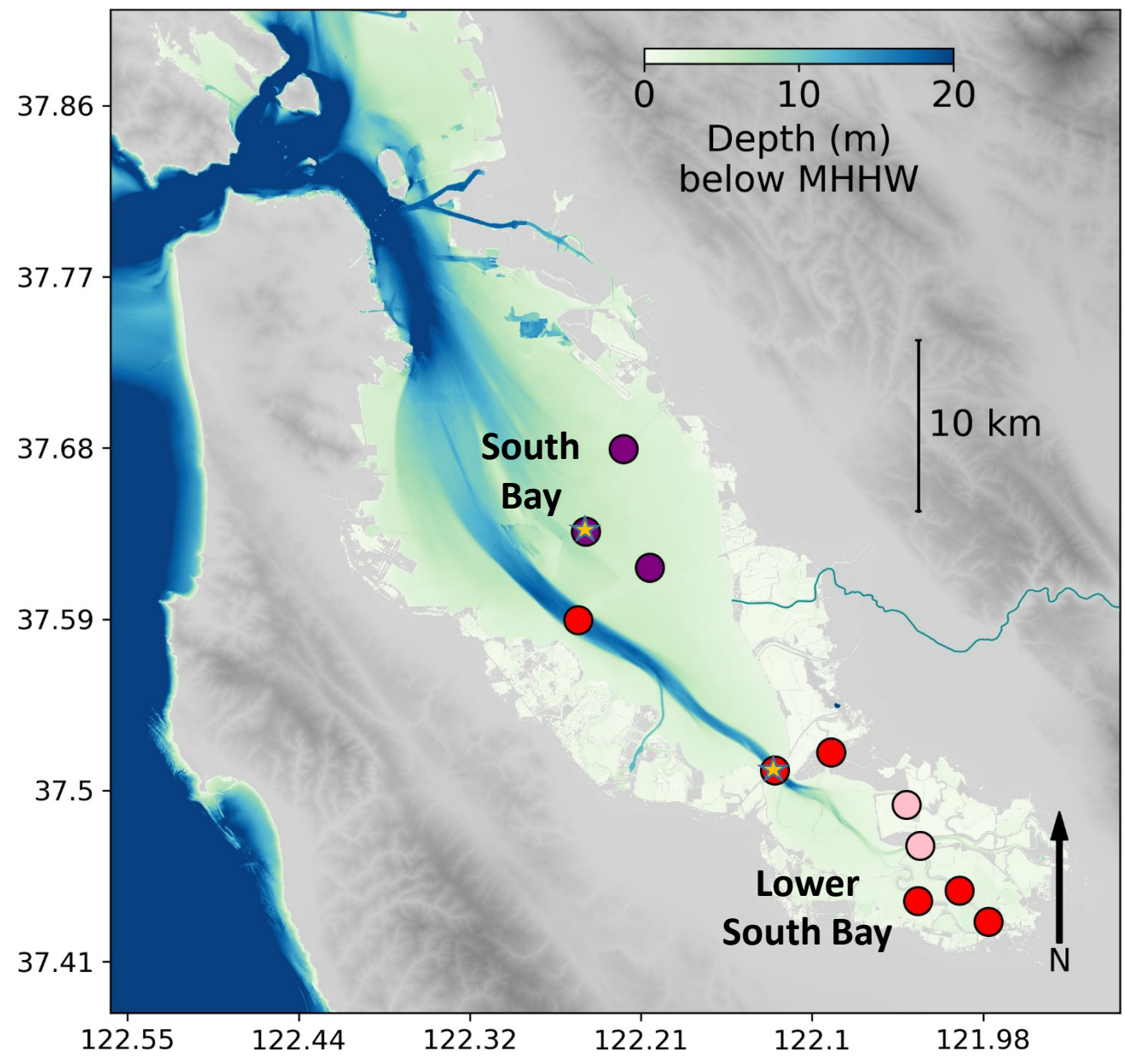
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Summer/fall 2020:

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- Addition of three shoal stations
- Two nitrates sensor added ★



Moored Sensor Program

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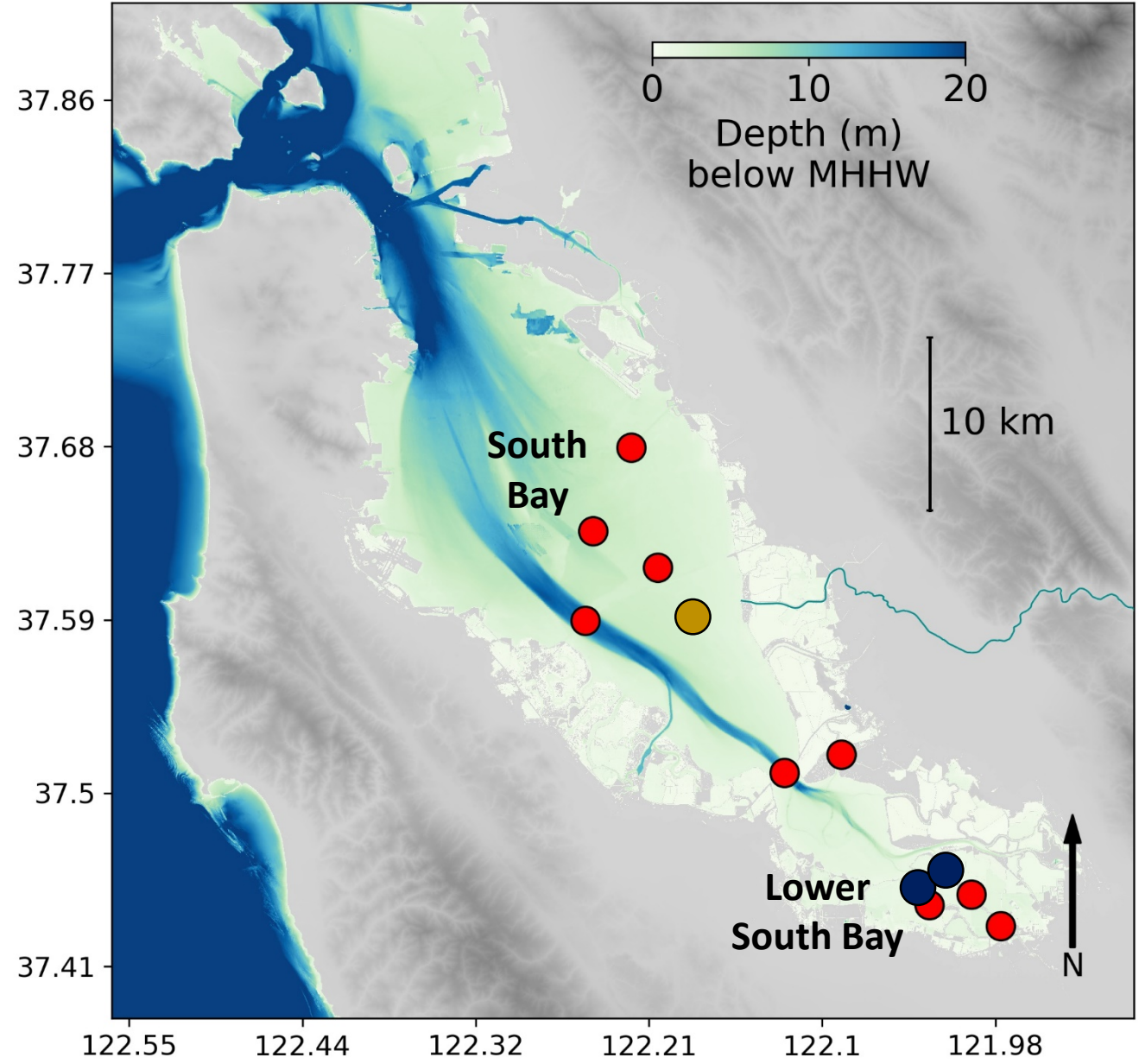
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Fall 2021:

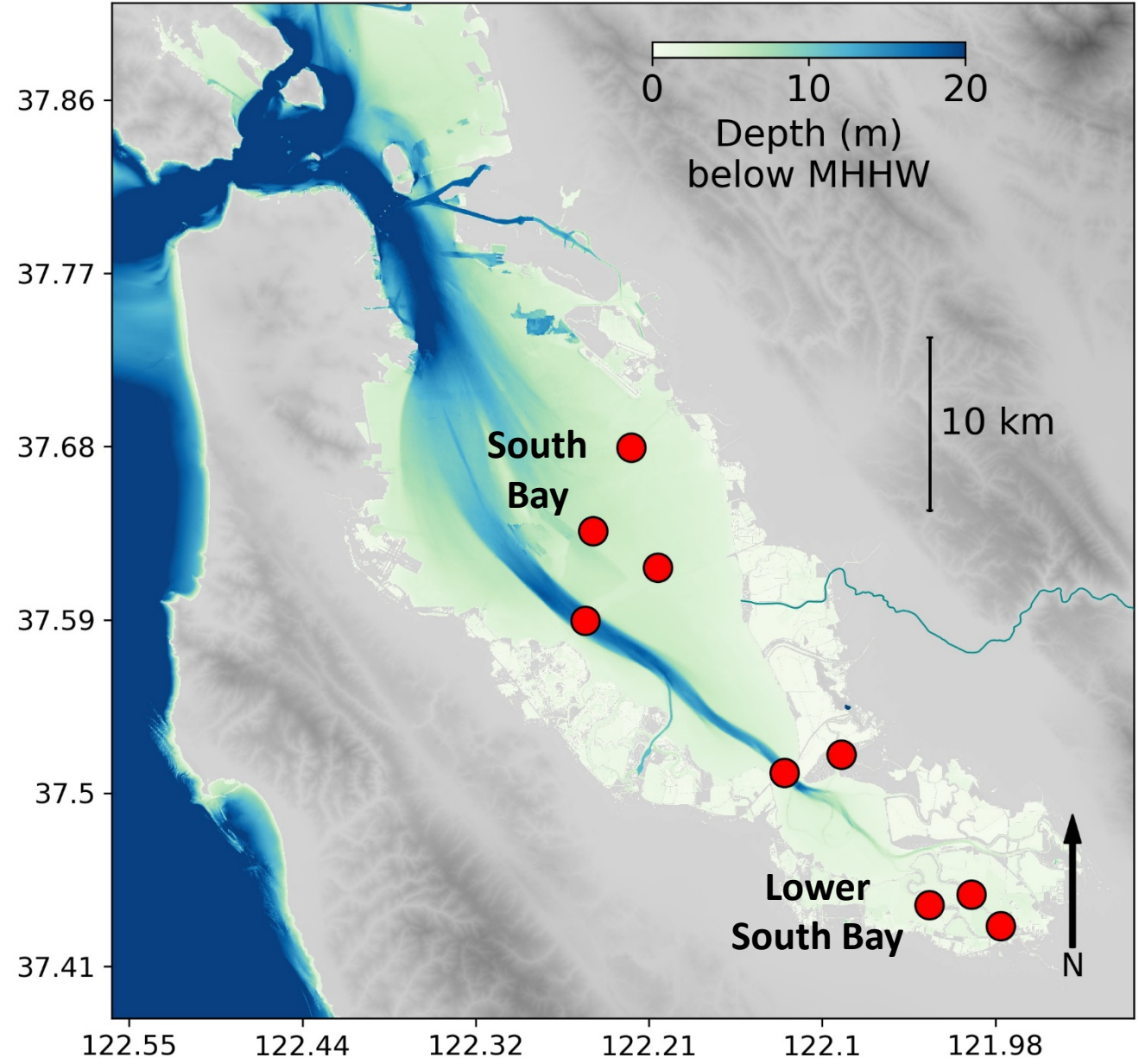
- New turbidity/SSC station (upcoming)
- New DO stations (Alviso and Guadalupe)



Moored Sensor Program

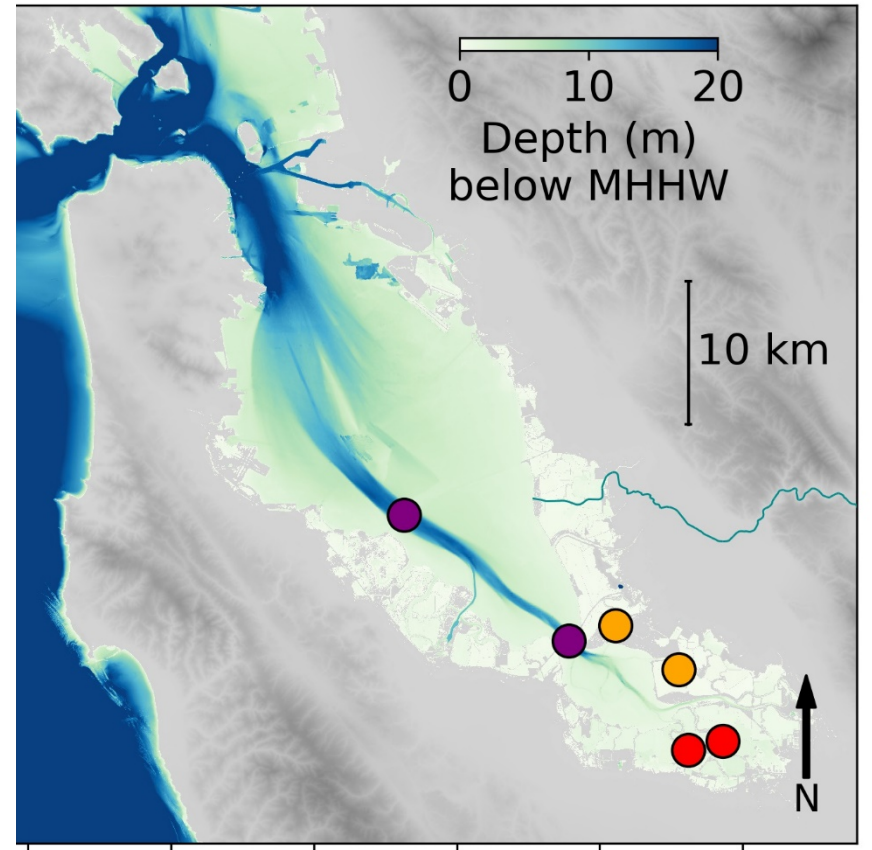
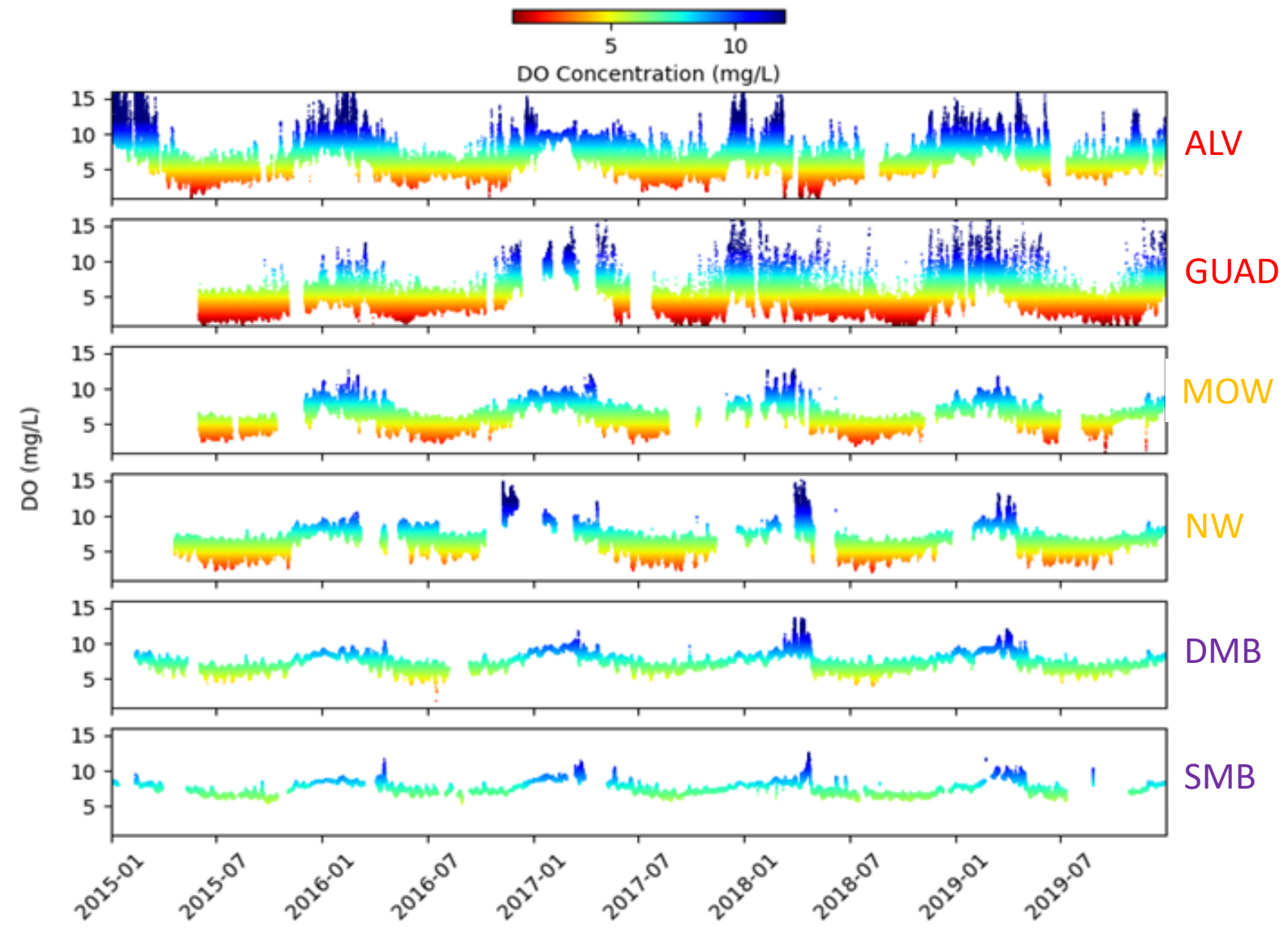
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Moored Sensor Program

Condition assessment – long time scales

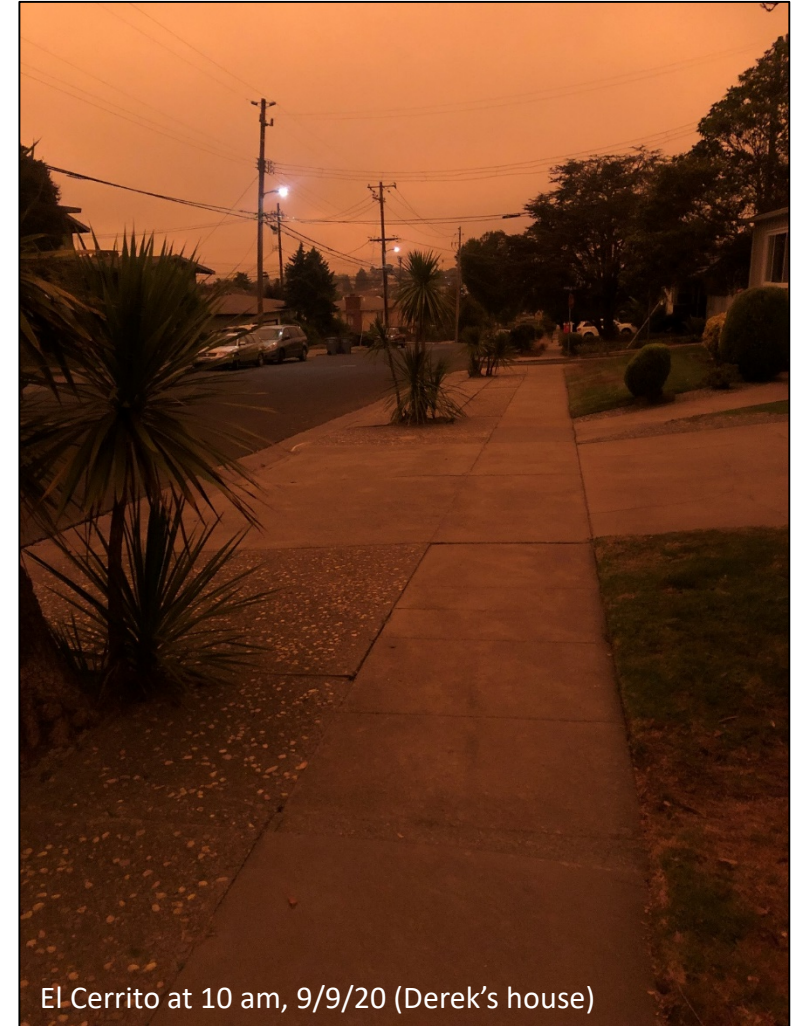


Moored Sensor Program

Condition assessment – event time scales



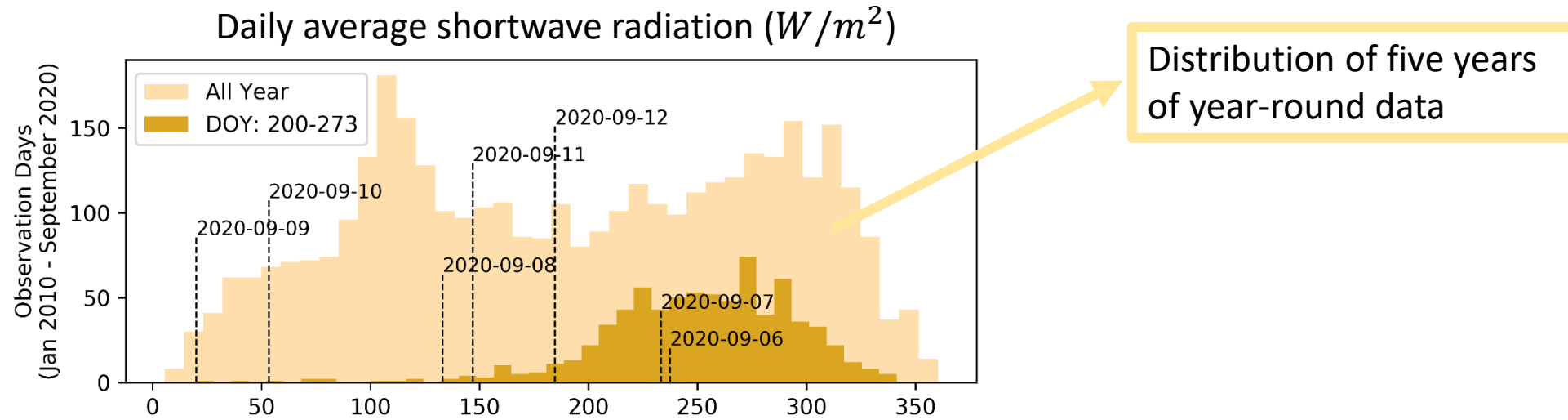
San Francisco at 11 am, 9/9/20 (NY Times)



El Cerrito at 10 am, 9/9/20 (Derek's house)

Moored Sensor Program

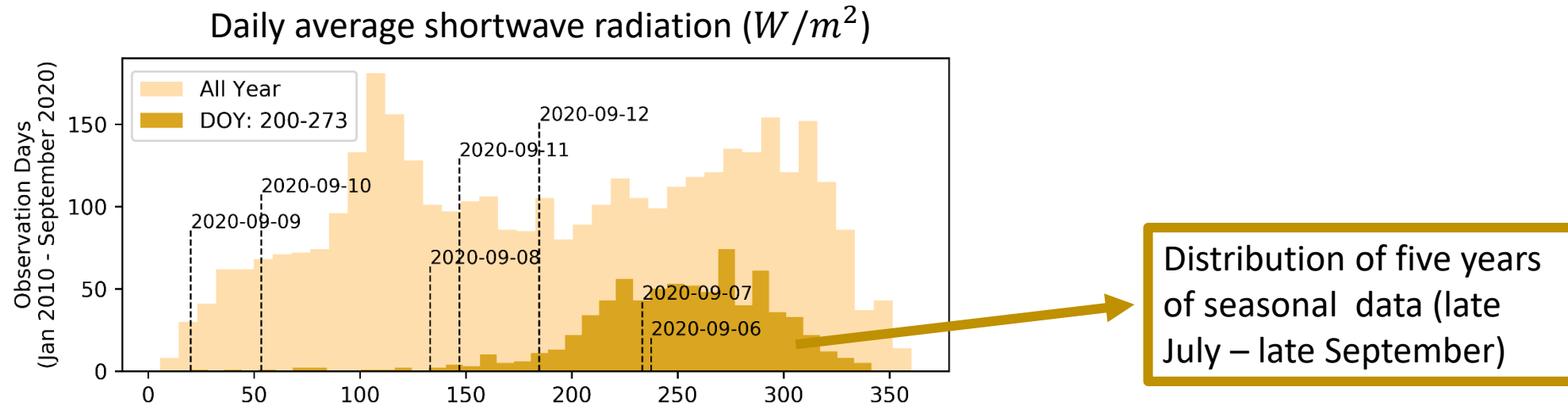
Condition assessment – event time scales



Note: DOY 200-273 is July 17-September 30

Moored Sensor Program

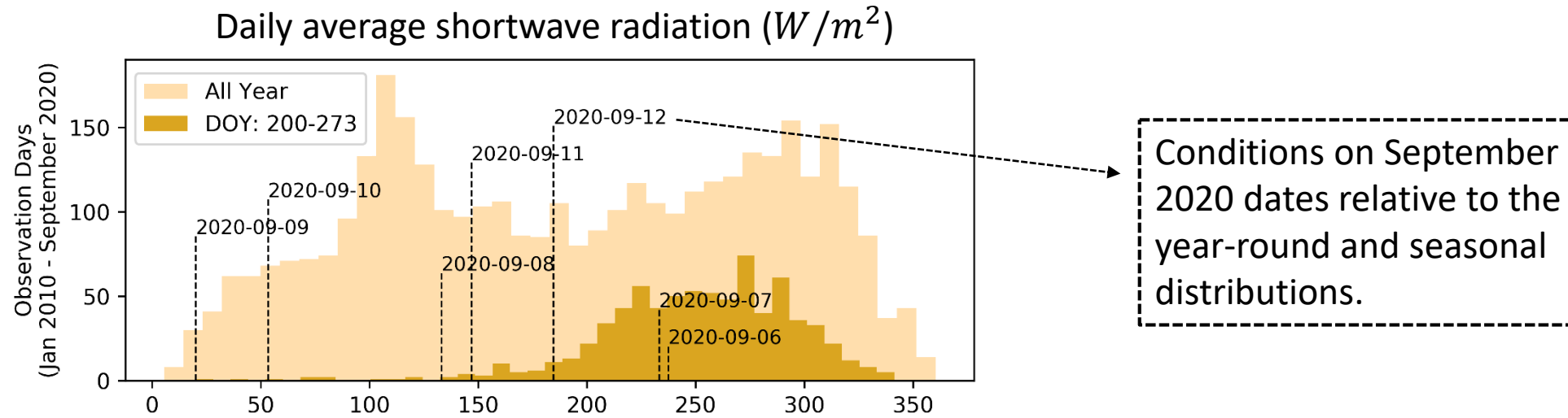
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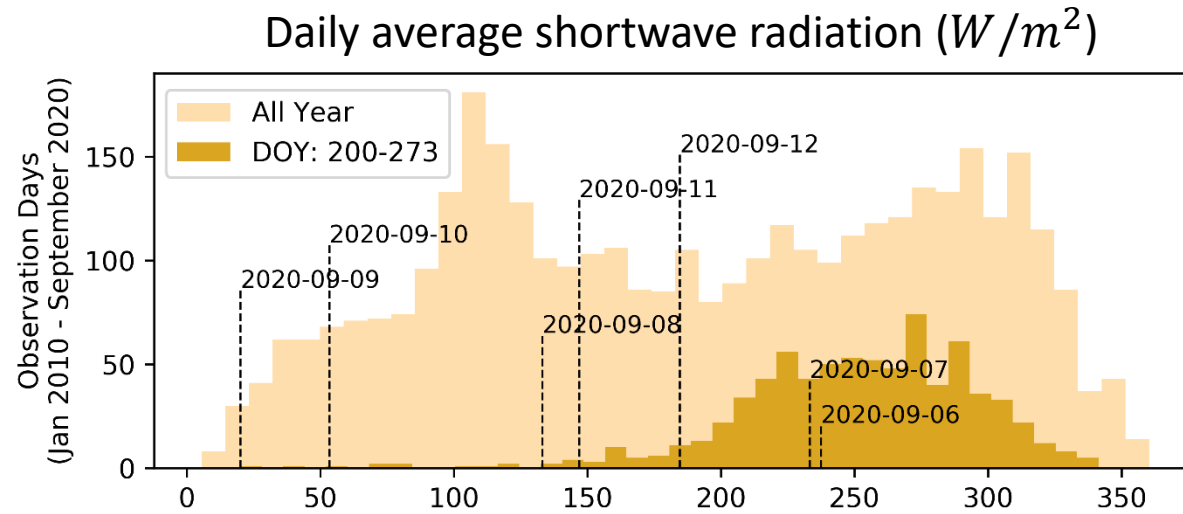
Moored Sensor Program

Condition assessment – event time scales



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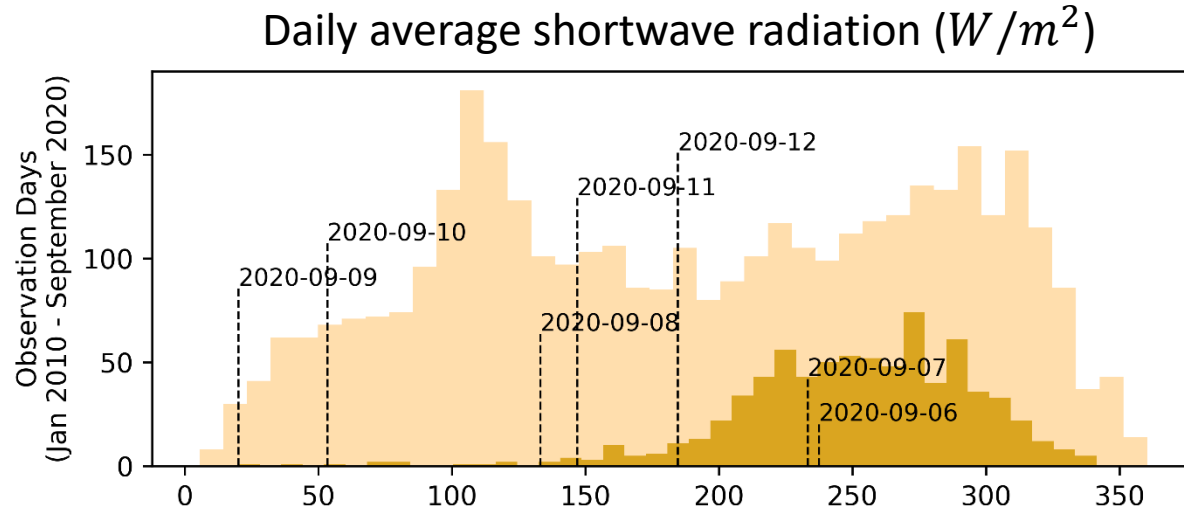
Condition assessment – event time scales



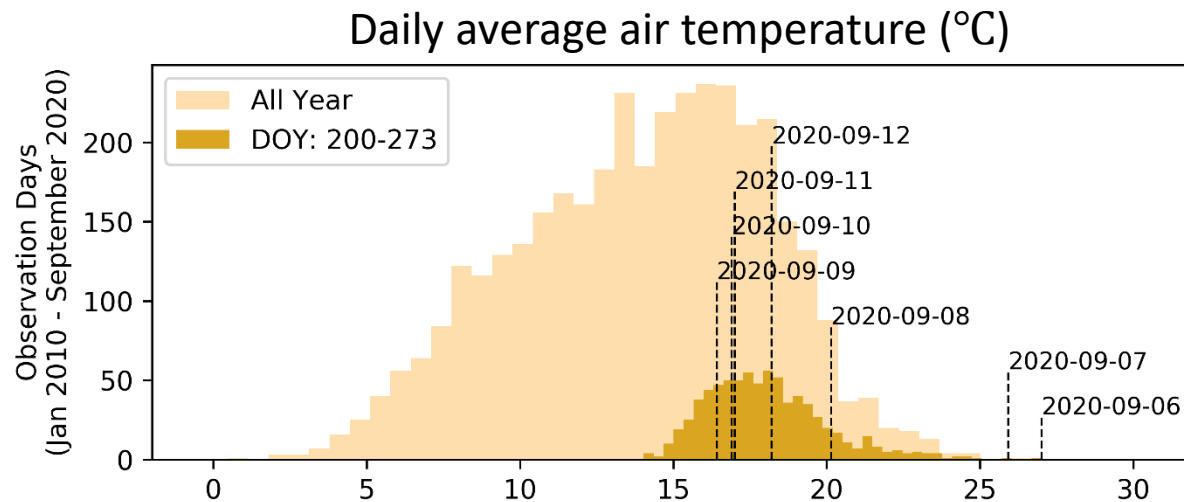
September 9th, 2020 had the equivalent daily average light conditions of the darkest of winter days, and was the darkest July-Sept day in the last decade.

Moored Sensor Program

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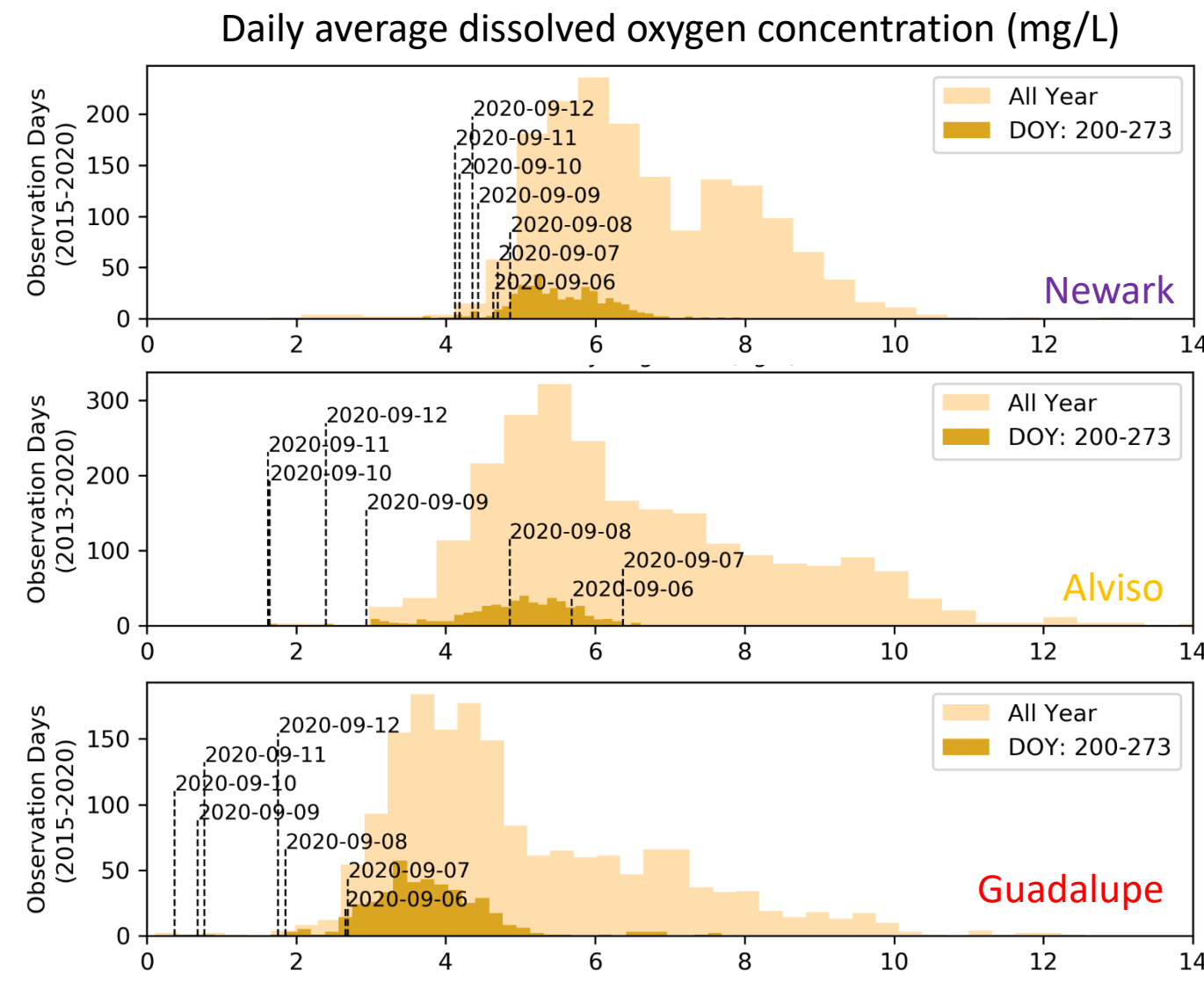


September 6th, 2020 had some of the highest daily average air temperatures recorded in the last decade. September 7th wasn't much cooler.

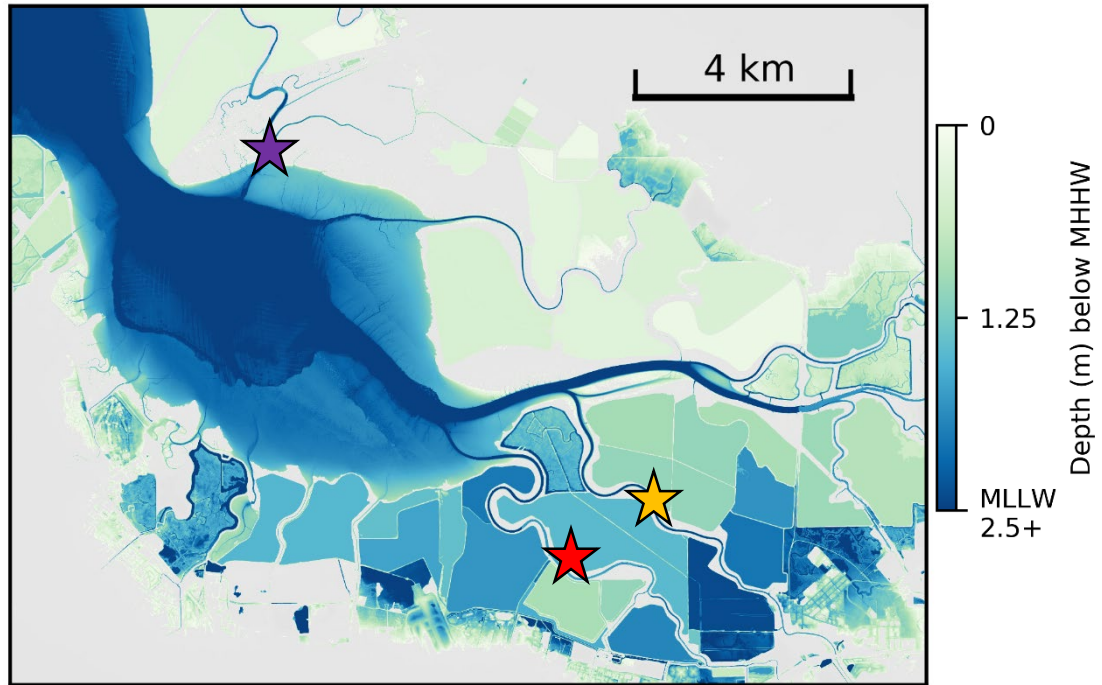
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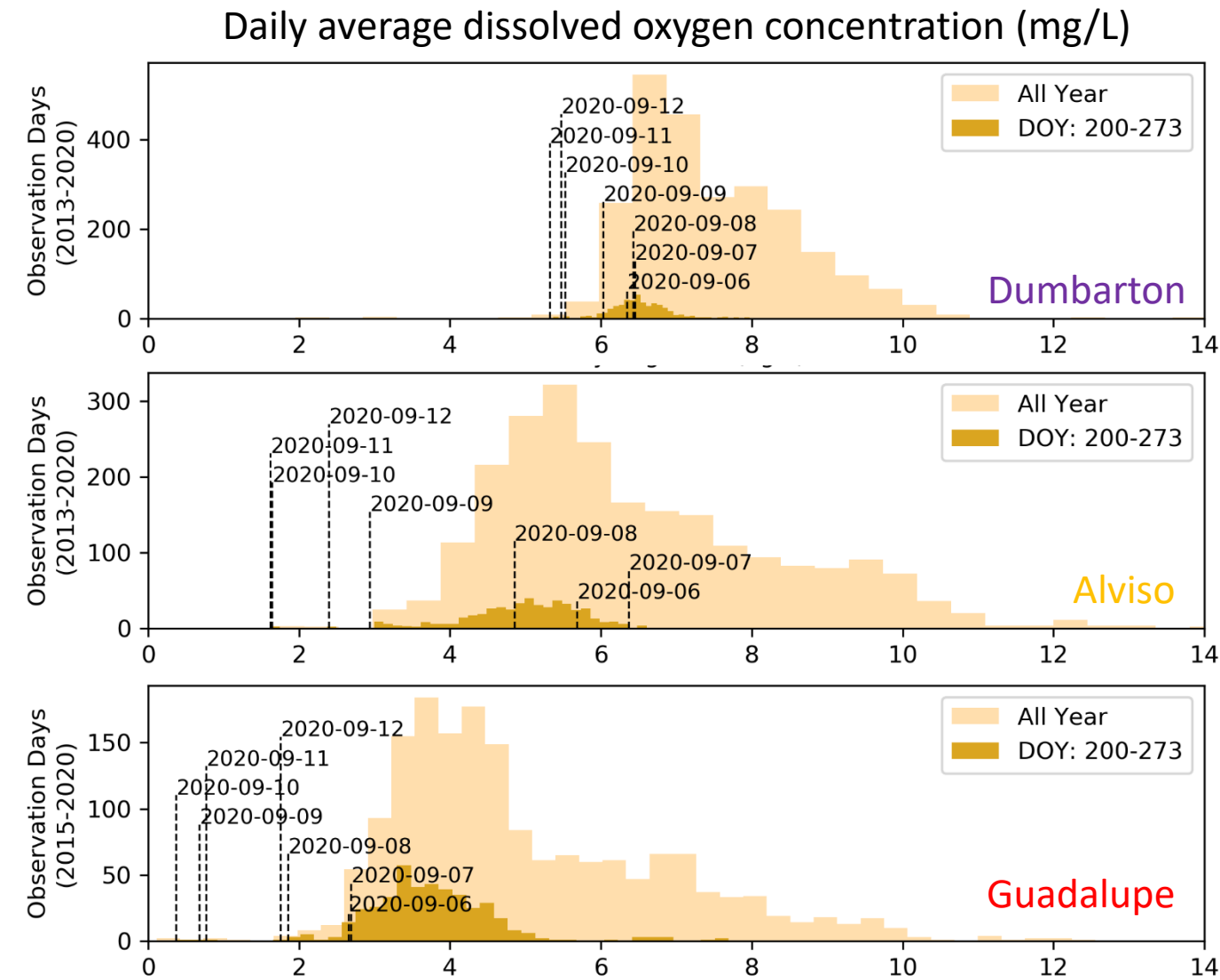
Water Quality Conditions



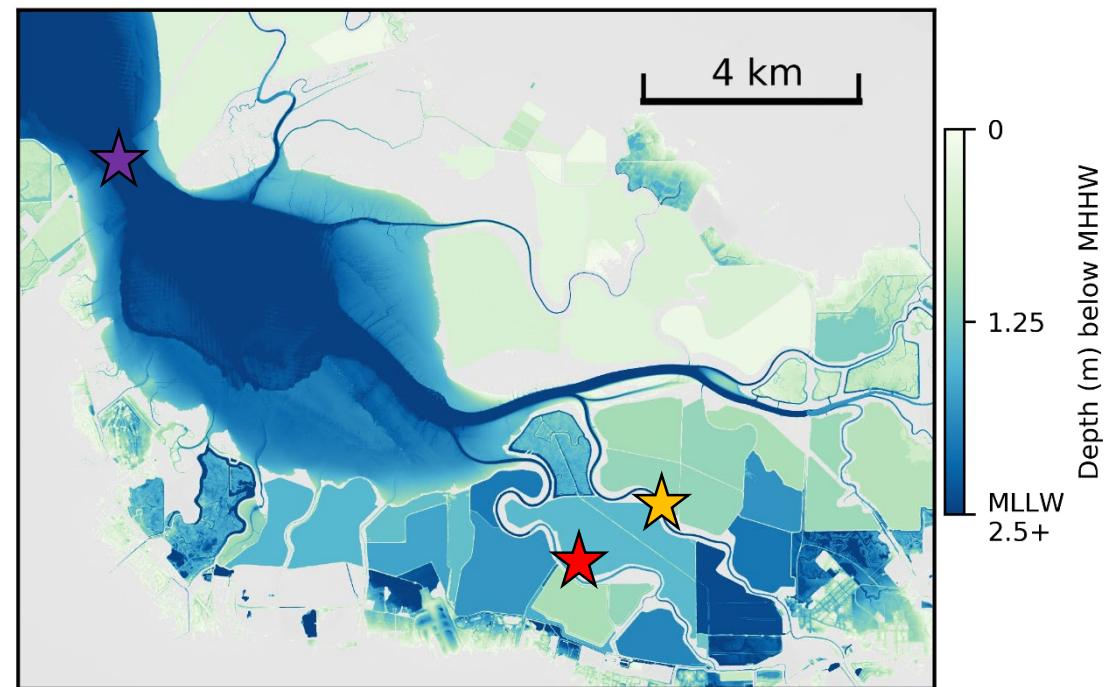
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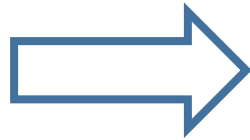


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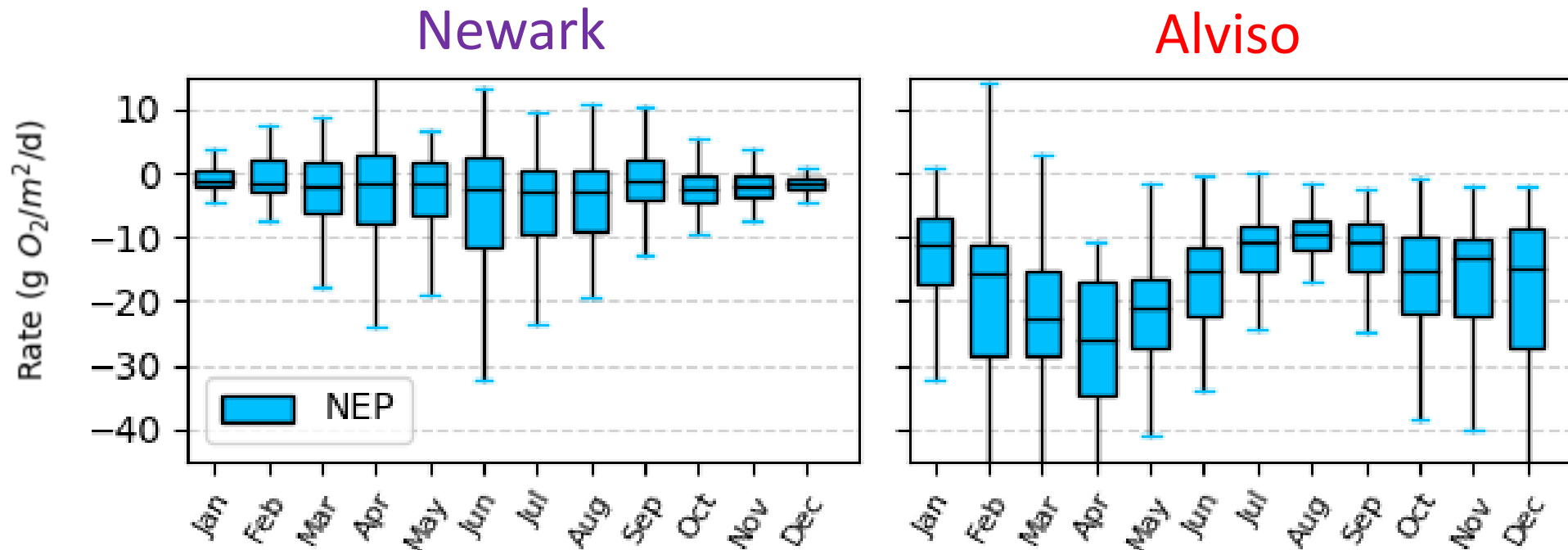
Moored Sensor Program

Characterization of mechanisms underlying water quality patterns

Novel synthesis
of MSP data



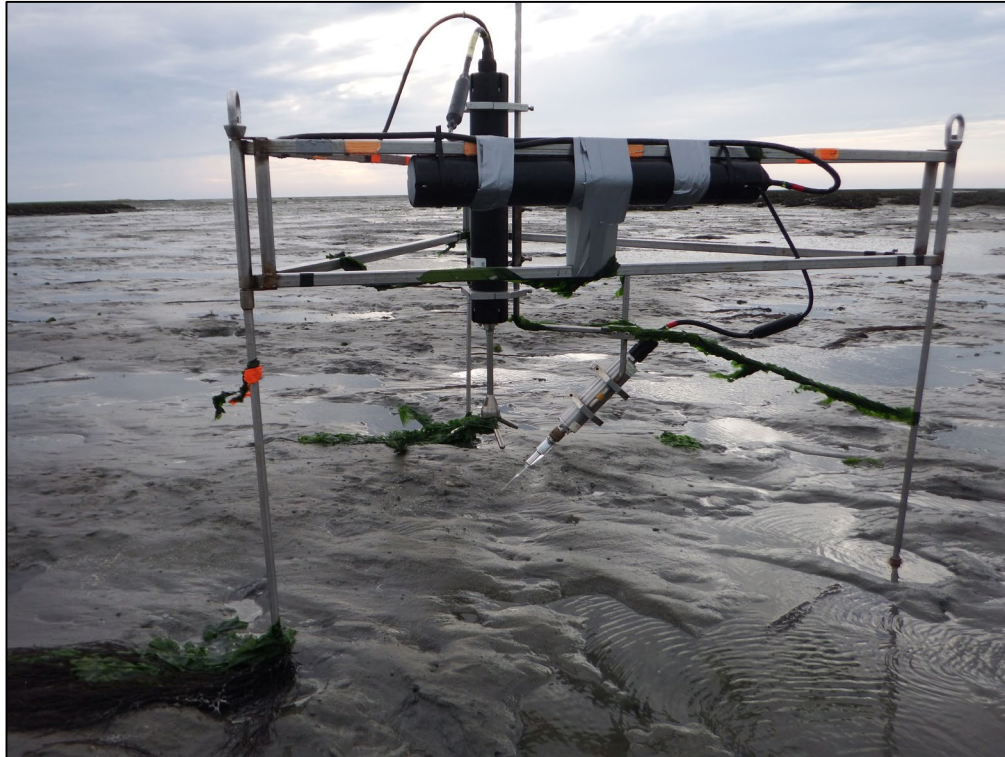
Net oxygen consumption rates
are more negative at **Alviso** than
at **Newark** (and are severe!)



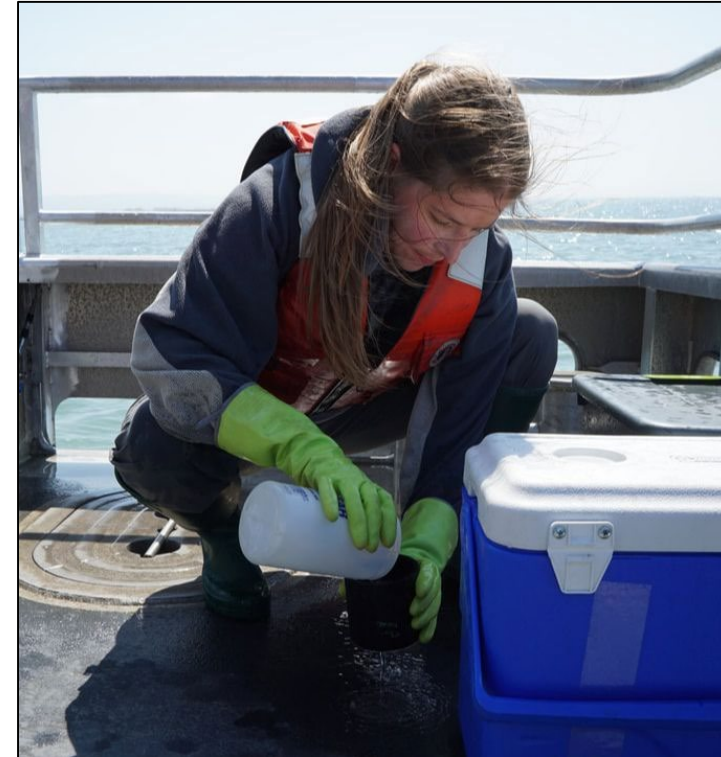
Moored Sensor Program

Supporting data for pointed field experiments

Localized experiments benefit from system-scale context



Benthic oxygen consumption

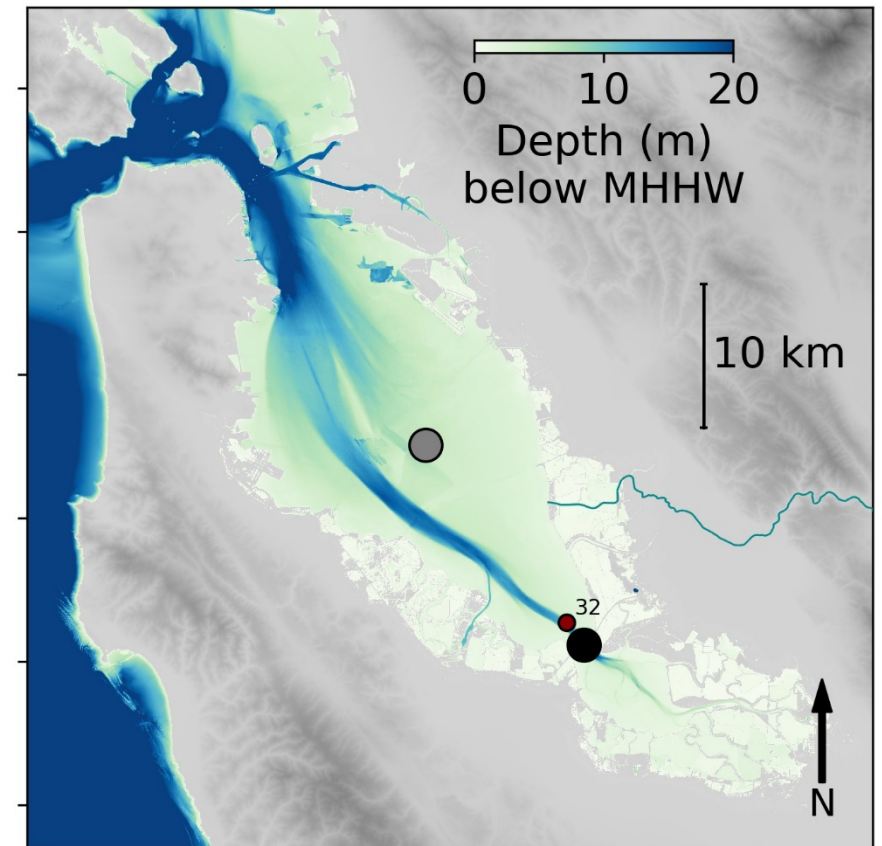
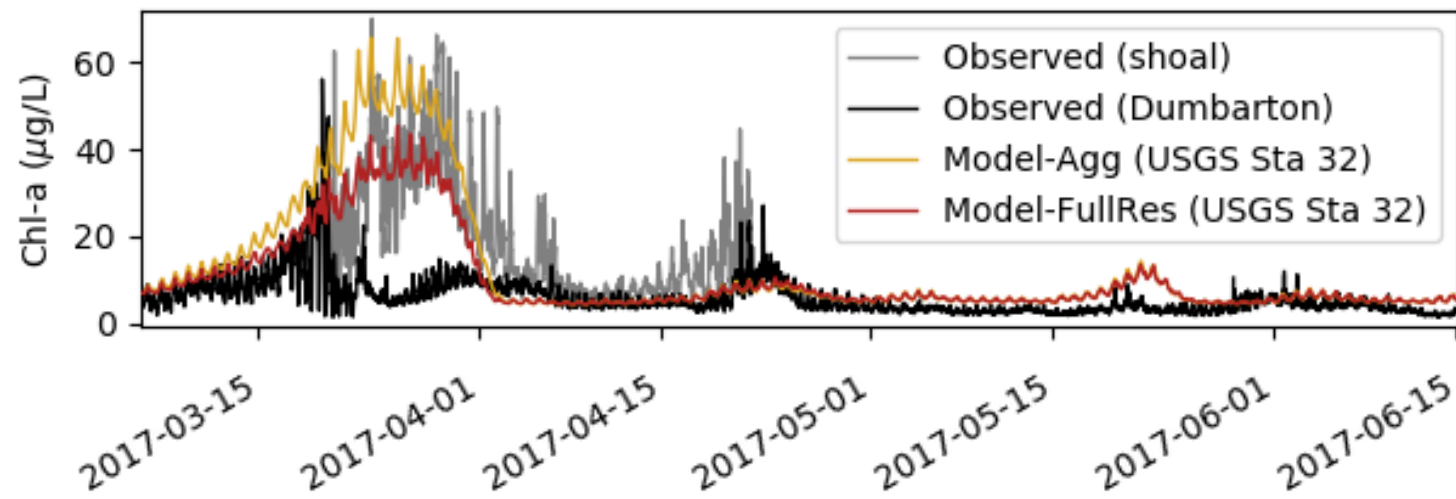


Sediment nutrient transformations

Moored Sensor Program

Calibration and validation of models

Can we properly simulate seasonal South Bay algal blooms?



Moored Sensor Program

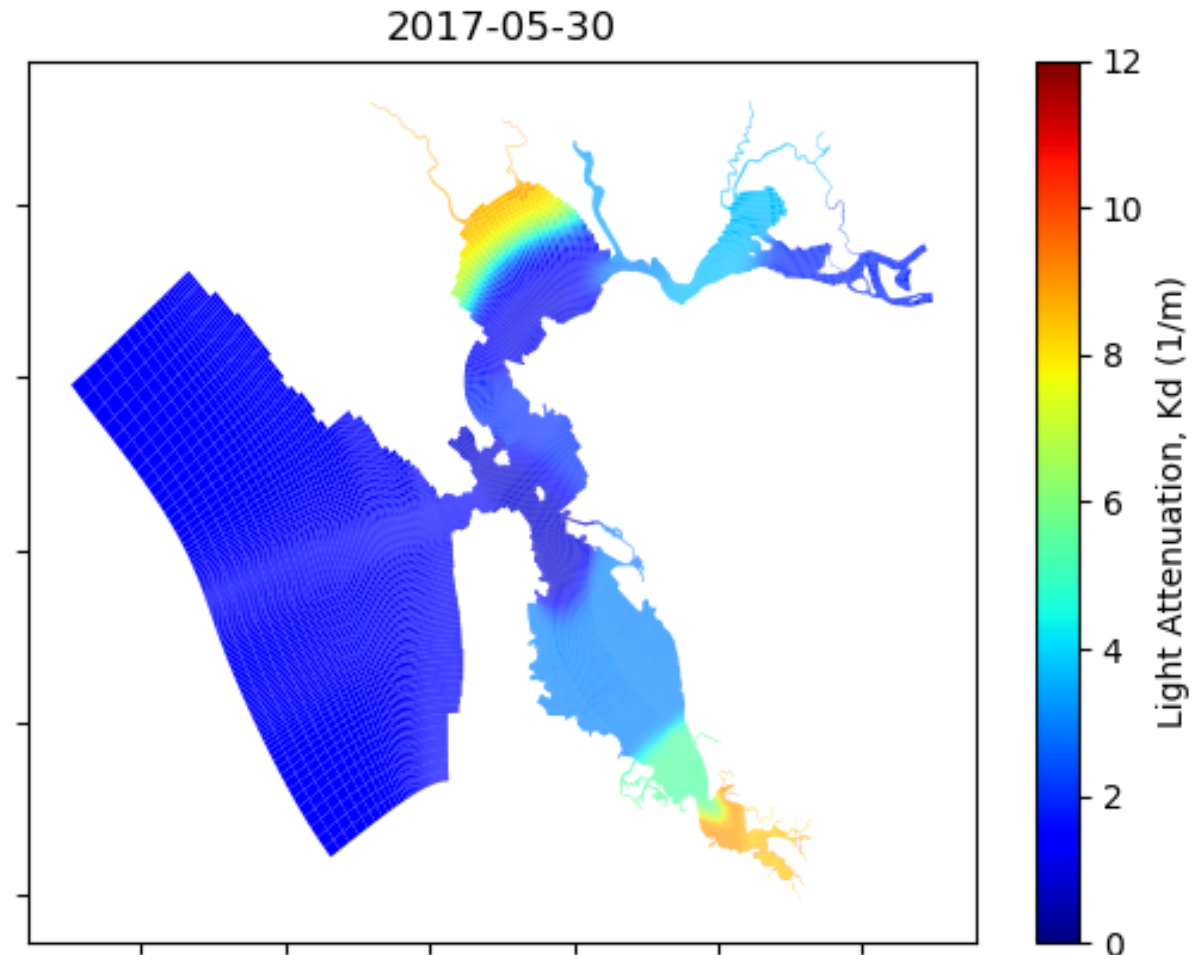
Model inputs

Extrapolation of space-time varying light attenuation fields as a model input.

Proper characterization of light attenuation essential to models.

Expanded program will:

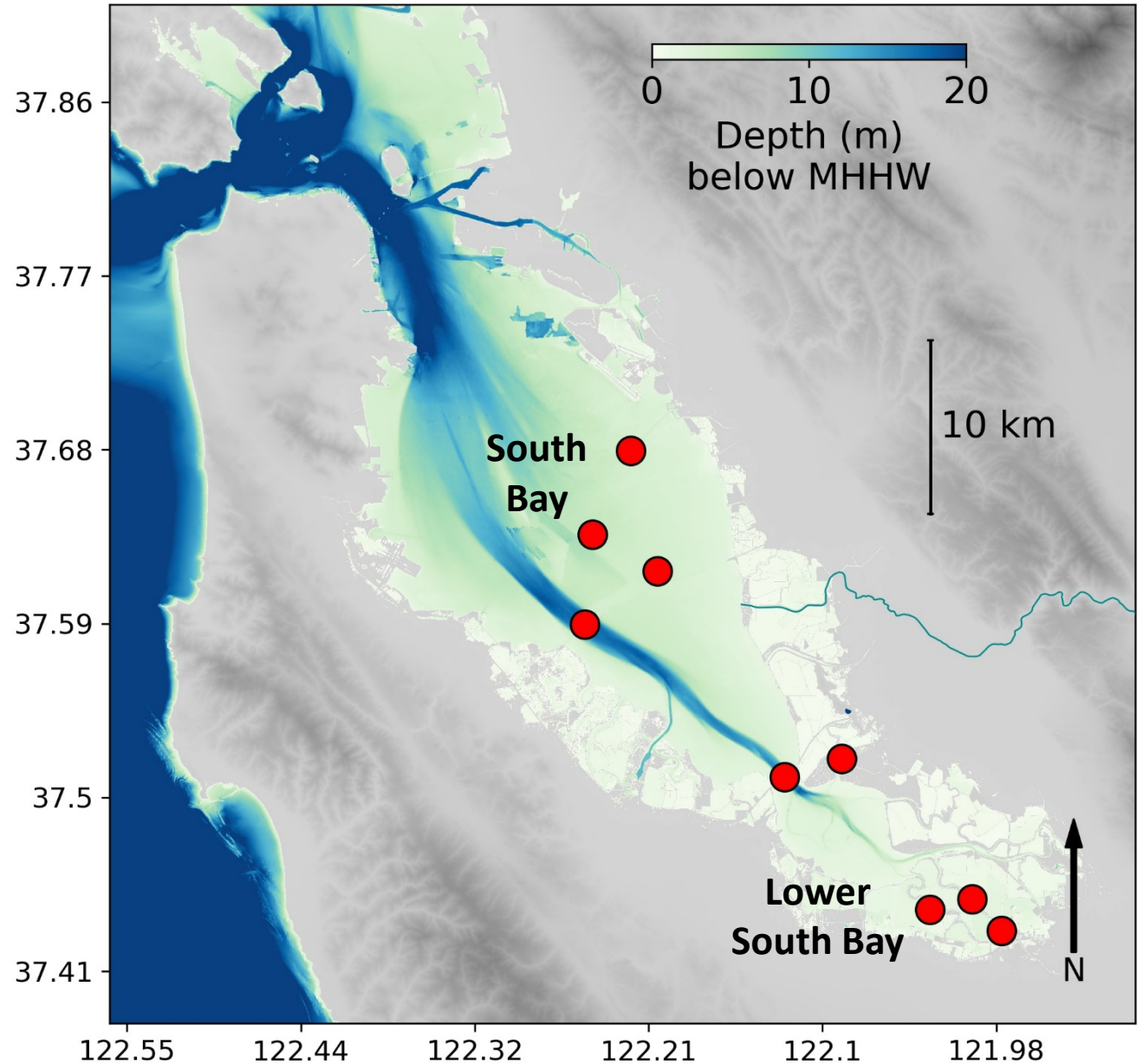
- Improve model-input data products
- Support sediment model development.



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Acknowledgments

Monitoring takes a village

Current SFEI staff: Kristin Art*, Ari Chelsky, Lilia Mourier, Lorenzo Flores, Sienna White, Jen Hunt, Melissa Foley, Dave Senn

Past SFEI staff: Erika King, Emily Novick, Zephyr Sylvester, Lissa MacVean

USGS-MarFac: Dan Powers, Pete Dal Ferro, Tim Elfers, Jenny White, others

USGS-CAWSC: Thomas Johnston, Katy O'Donnell, Dylan Burau, Kyle Nakatsuka, Alex Etheridge, Liz Stumpner, Darin Einhall, Balt Von Hoyningen, Tamara Kraus, Brian Bergamaschi, others

South Bay Salt Pond Restoration Project: Donna Ball, Dave Halsing

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- NMS via Bay Area Clean Water Agencies (BACWA)
- SBSPRP

