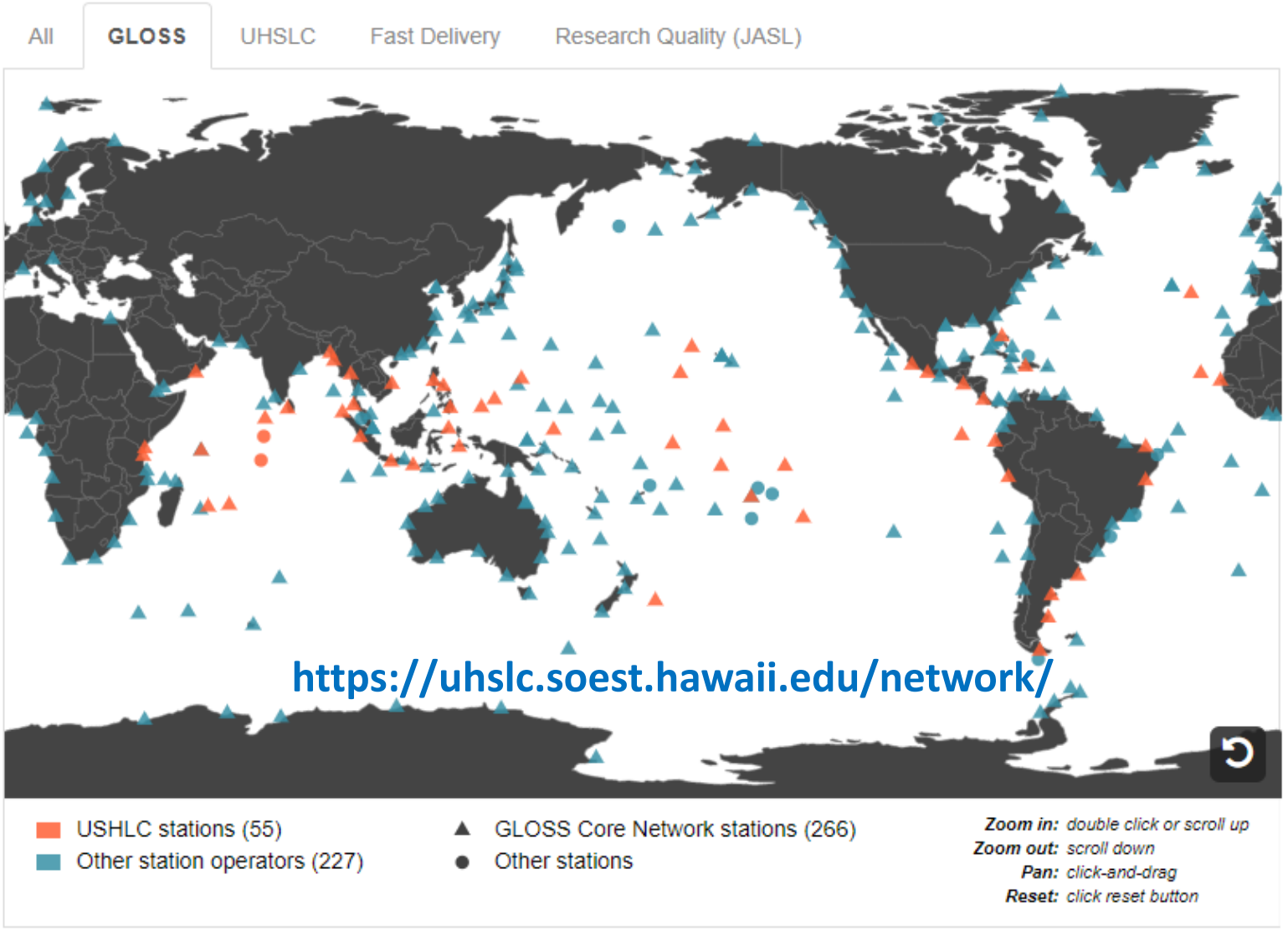
UHSLC database and website update

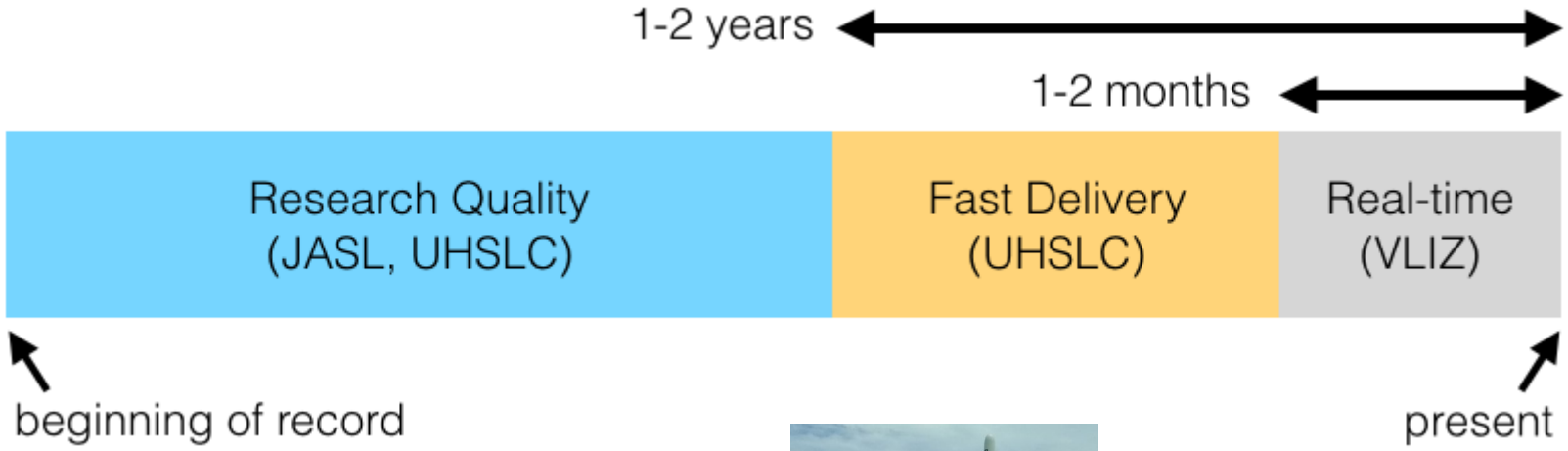
2022 GLOSS-GE-XVII meeting

UNIVERSITY OF HAWAII
SEA LEVEL CENTER

Phil Thompson, Director
Matthew Widlansky, Associate Director



1) GLOSS high-frequency (hourly & daily) data streams



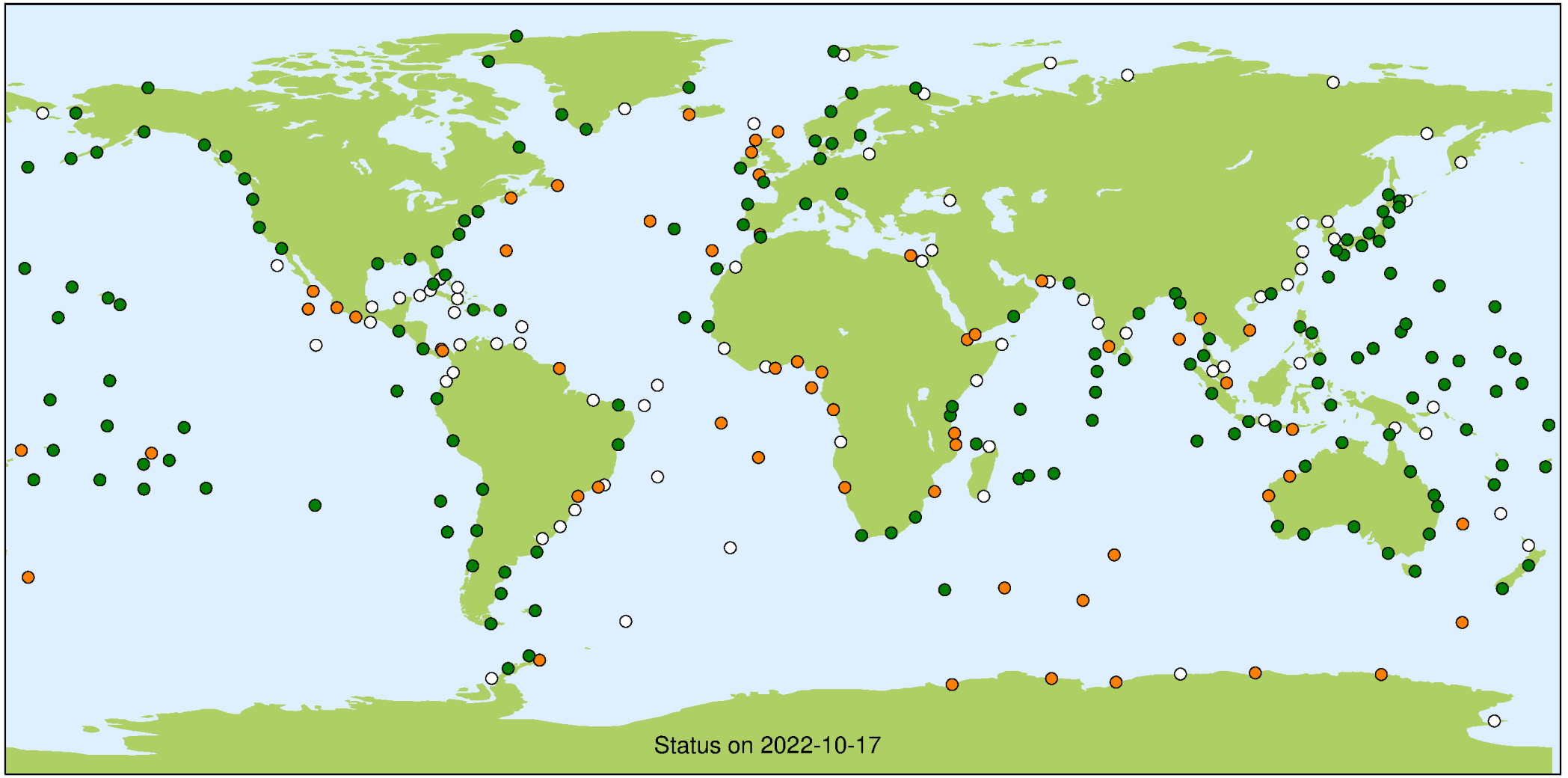
2) New tide gauge stations

Chuuk, Micronesia
(UH 054, GLOSS 116)

3) Product development @UHSLC

4) Possible opportunity for new use of tide gauge data

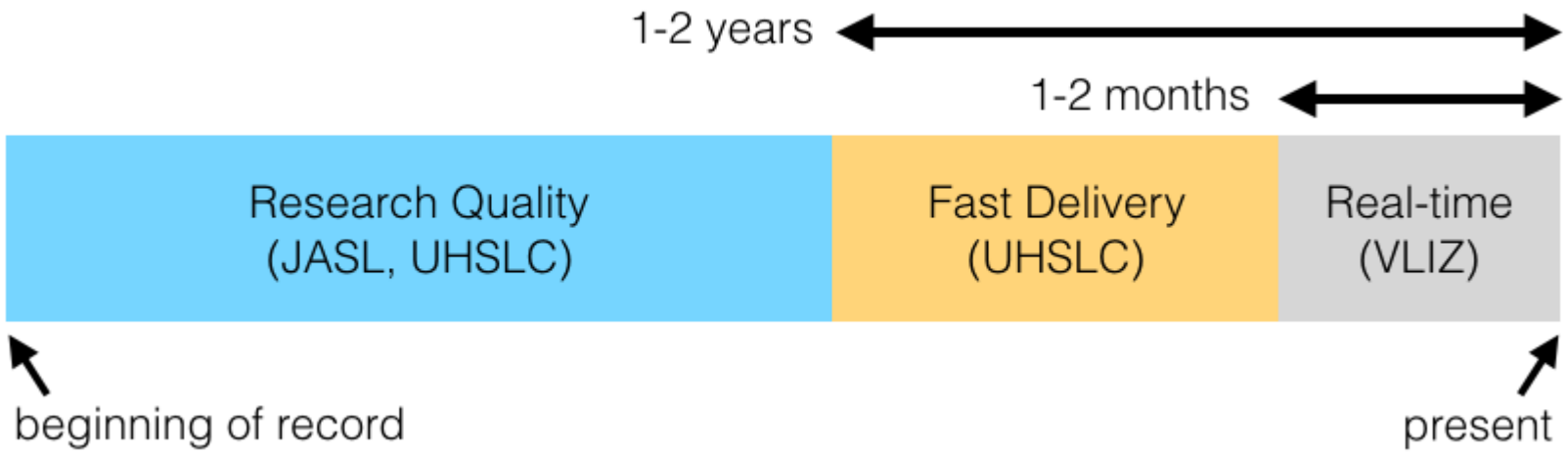
Fast Delivery data (UHSLC) update



https://uhslc.soest.hawaii.edu/datainfo/

Data processing and delivery @ UHSLC

Current process



Future objective

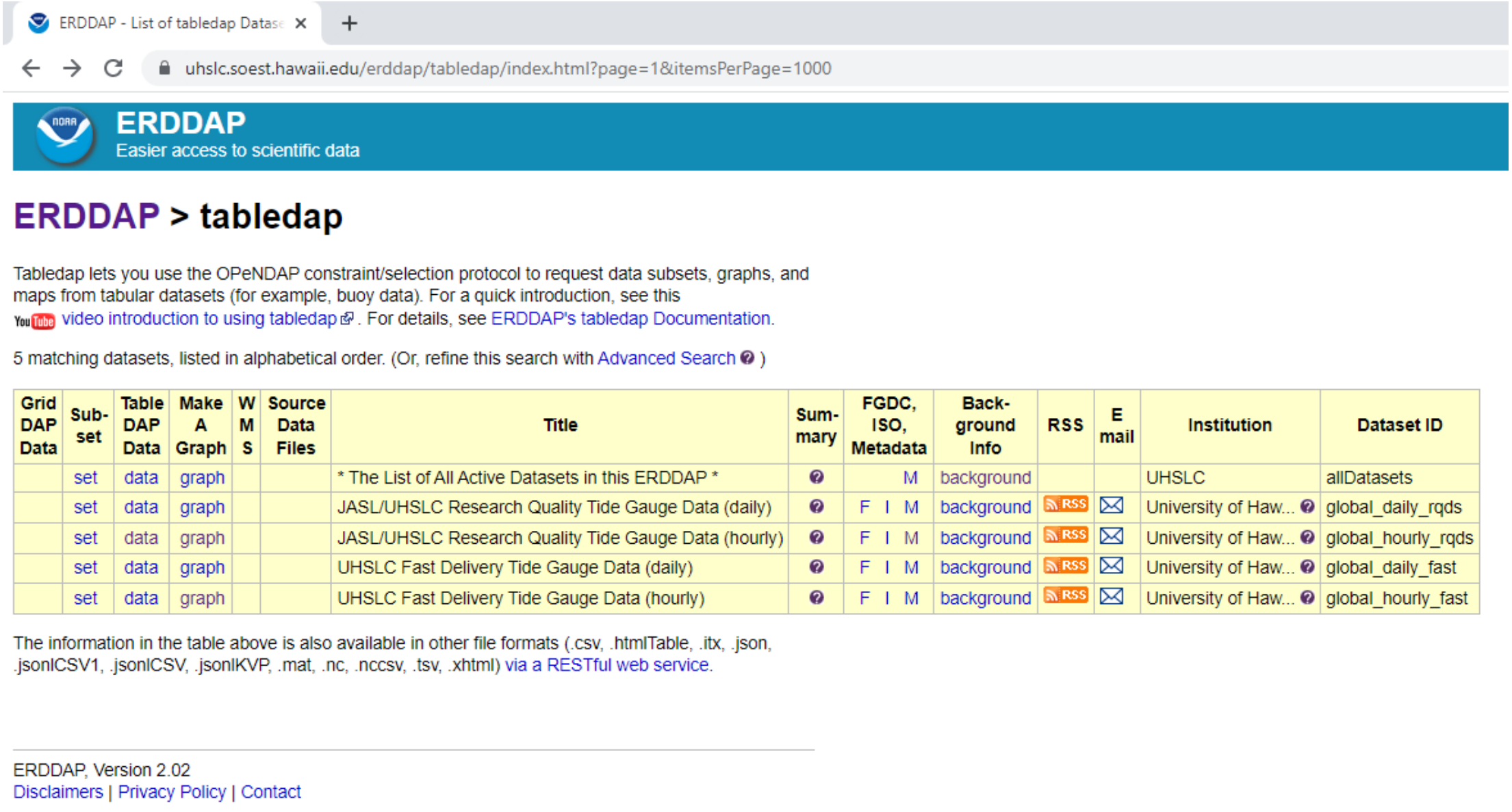
Provide the most up-to-date and quality-controlled hourly and daily data for as many stations as possible.

Proposal

- Stop separating Research Quality and Fast Delivery so that a single UHSLC dataset is updated as fast as possible.
- Distinguish quality control levels across the data.
- Expand the station list to include all-available quality-controlled data.

Unified data access (ERDDAP) to Research Quality and Fast Delivery

See discussion with Phil Thompson



Station maintenance and new installations

- COVID-19 travel restrictions made critical remote maintenance to keep stations operating, and also install new equipment—thank you Local Partners!

- UHSLC is actively scheduling station maintenance visits as travel restrictions ease (15 core-station-visits planned by September 2023, with 2 completed recently).

- New stations are planned in Hawaii and American Samoa during 2023 (high-density spatial coverage).

New tide gauge

- Chuuk, Micronesia (UH 054, GLOSS 116)
- July 2020 installation
- Partnership with Korea South-Pacific Ocean Research Center

New product for visualizing recent or past extreme water levels:

Station Explorer—Climatology

https://uhslc.soest.hawaii.edu/stations

Next step for relating Water Levels, Datums, and Surveys:

Station Explorer—Benchmarks *(in development)*

Station:

007 Malakal, Palau

Water Levels | Tide Calendars | Datums | Climatology

COUNTRY:	Palau
NAME:	Malakal
UHSLC ID:	7
GLOSS ID:	120
LAT:	7.330
LON:	134.463

QUALITY CONTROLLED STATION DATA

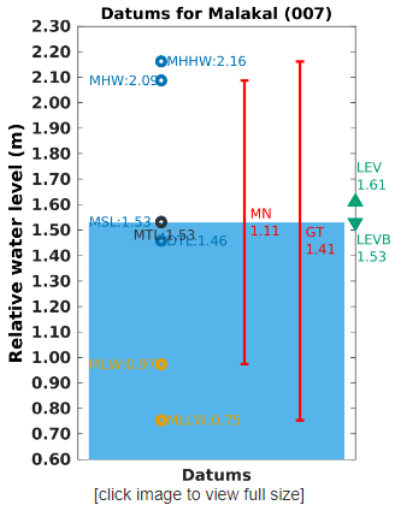
	Fast Delivery	Research Quality
HOURLY:	.dat .csv .nc	.dat .csv .nc
DAILY:	.dat .csv .nc	.dat .csv .nc
METADATA		

Metric | English

MHHW | MLLW

GMT | LST

Datum	Value	Description
Epoch	01-Jan-1983 to 31-Dec-2001	Tidal Datum Analysis Period
MHHW	2.162	Mean Higher-High Water (m)
MHW	2.087	Mean High Water (m)
MTL	1.530	Mean Tide Level (m)
MSL	1.532	Mean Sea Level (m)
DTL	1.458	Mean Diurnal Tide Level (m)
MLW	0.974	Mean Low Water (m)
MLLW	0.753	Mean Lower-Low Water (m)
STND	0.000	Station Datum (m)
GT	1.409	Great Diurnal Range (m)
MN	1.114	Mean Range of Tide (m)
DHQ	0.149	Mean Diurnal High Water Inequality (m)
DLQ	0.438	Mean Diurnal Low Water Inequality (m)
HWI	Unavailable	Greenwich High Water Interval (in hours)
LWI	Unavailable	Greenwich Low Water Interval (in hours)
Maximum	2.785	Highest Observed Water Level (m)
Max Date & Time	24-Jun-2013 07	Highest Observed Water Level Date and Hour (LST)
Minimum	-0.034	Lowest Observed Water Level (m)
Min Date & Time	20-Jan-1992 01	Lowest Observed Water Level Date and Hour (LST)
HAT	2.567	Highest Astronomical Tide (m)
HAT Date & Time	28-Aug-1988 07	HAT Date and Hour (LST)
LAT	0.175	Lowest Astronomical Tide (m)
LAT Date & Time	01-Jan-1987 01	LAT Date and Hour (LST)

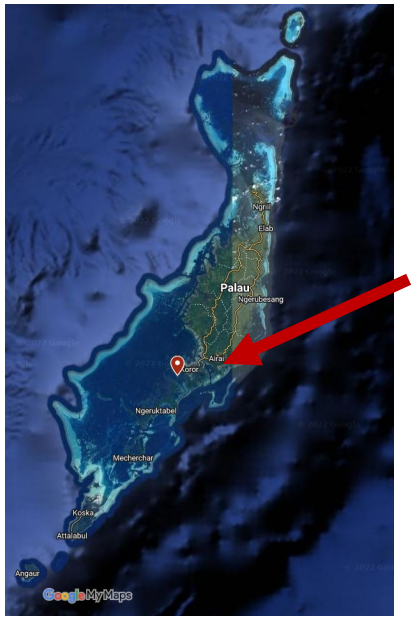


[click image to view full size]

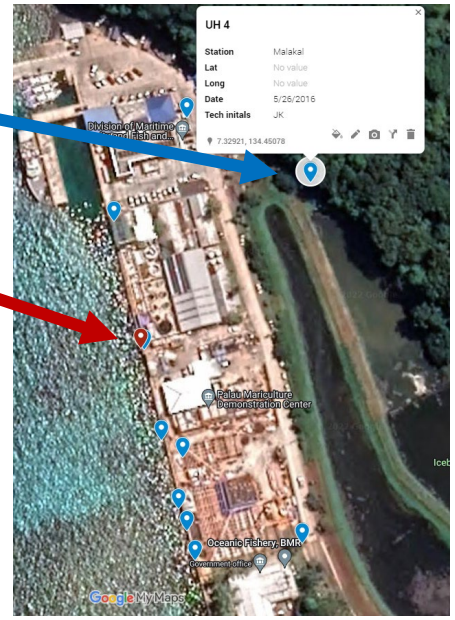
Values are with respect to the Station Datum, or zero reference level for the tide gauge, as indicated in the table.

Primary Benchmark (UH4)

6.83 m above Station Zero datum



Tide gauge

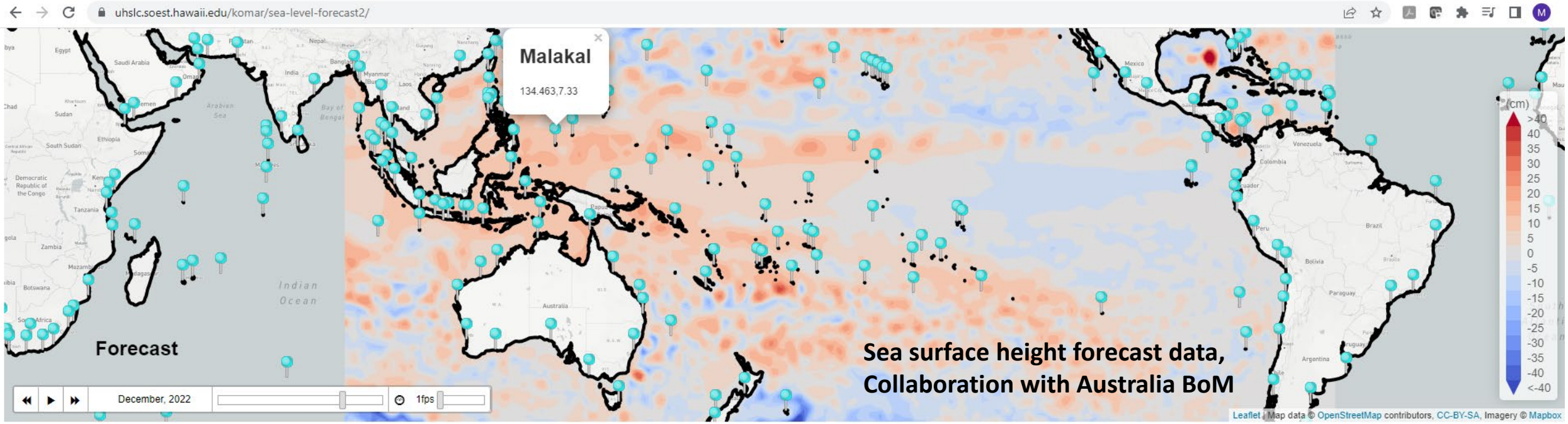


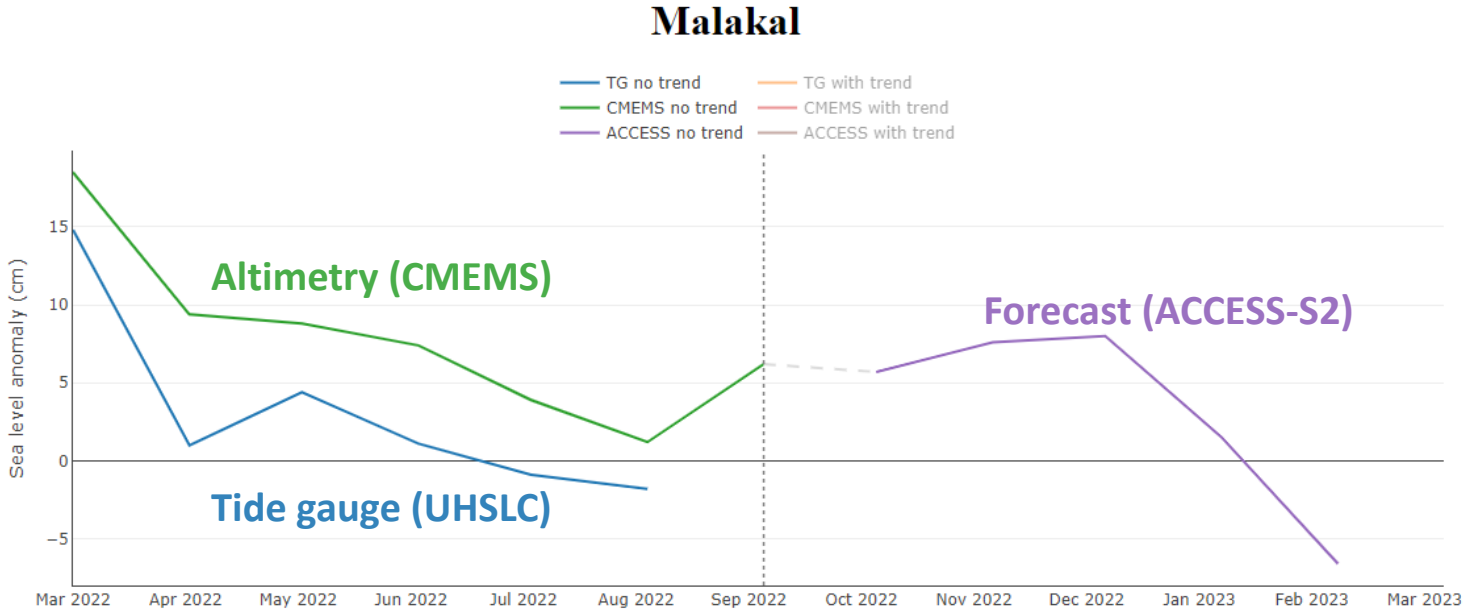
Benchmark components:

- Name, Level, & Coordinates
- Description, Map, & Photos
- How-to-use information

1" rounded brass disk set in a boulder

Future work: Tide gauge data for climate monitoring and forecasting





Needed:
Tide gauge processing for climate model data assimilation

Discussion idea

Opportunities and challenges for using tide gauges to improve climate monitoring and forecasting

1) What are potential advantages of assimilating tide gauge data into climate forecast models?

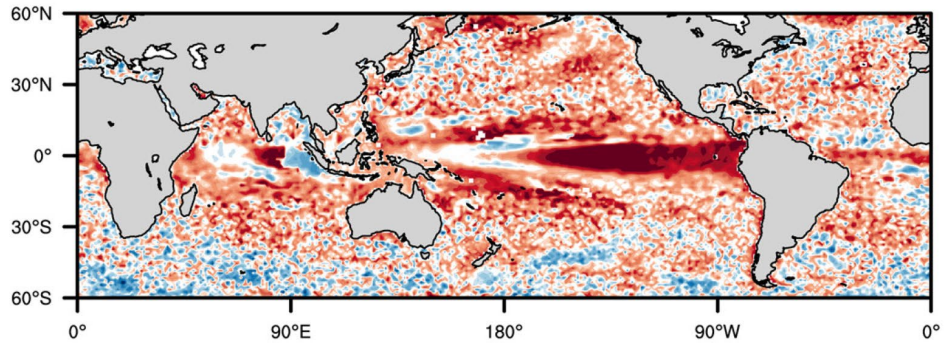
2) What are challenges to tide gauge data assimilation?

3) Are there examples from other disciplines to consider? (Regional storm surge forecasting?)

Sea surface height forecast skill from 10 models

Difference from persistence skill

January starts (July targets)



Red = Improvement

Note lack of improvement near some coasts

(Long et al. 2021, *JGR-Ocn*)

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