

Data Needs for **Realistic Circulation Modeling** of Inland & Coastal Waters of the Pacific Northwest

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NOAA Hydrographic Services
Review Panel

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UW Coastal Modeling Group

1 . What NOAA products, data, and services are valued by your organization:

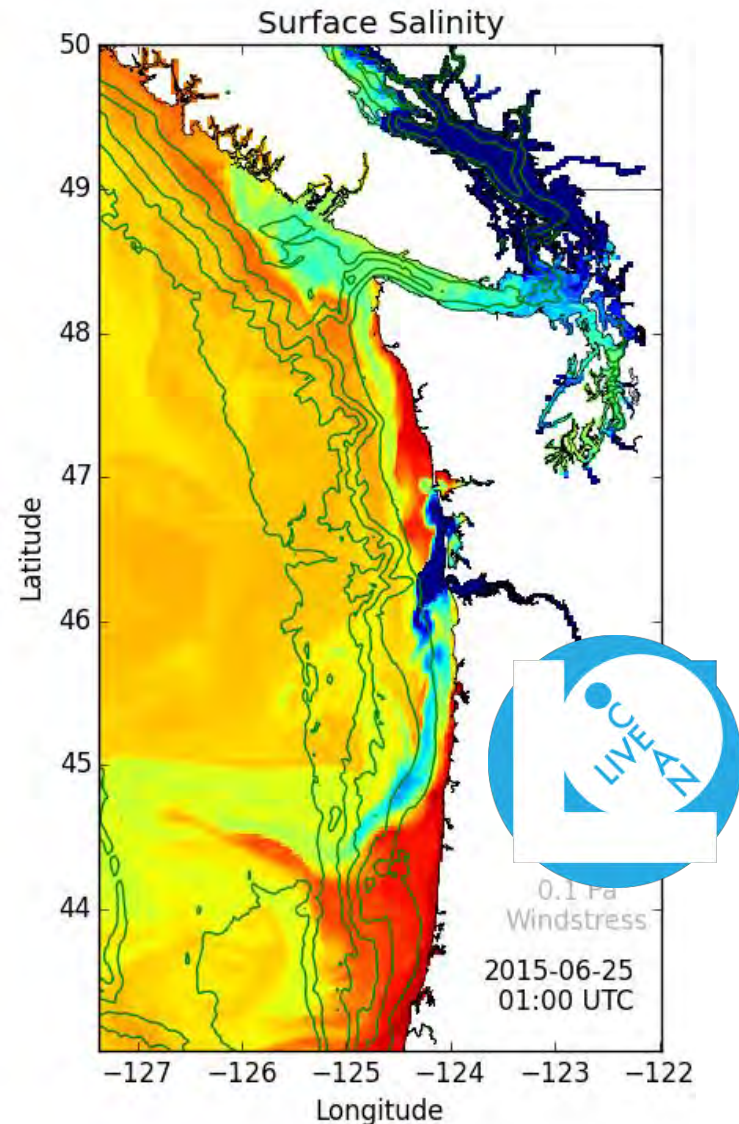
- NDBC buoys
- OCNMS Moorings
- Casts from NOAA cruises
- Sea level from tide stations

2 . What other products, data, and/or services would you like NOAA to approve, and/or offer:

- Simplify automated web access to data
- Current meters
- Sub-surface Temperature, Salinity & Other Variables

LiveOcean Daily Forecast Model

- ROMS (Regional Ocean Modeling System)
- OR-WA-BC Coast and Salish Sea
- Realistic tides, winds, rivers, and open ocean
- Horizontal grid: 1.5 km on coast
- 40 vertical layers
- Run daily on 72 cores: takes 1.5 hours for 3 days of model time
- Full 3D fields stored hourly and sent to cloud storage using Microsoft Azure, simplifying access
- Web front-end developed by NANOOS



Model and Data combined on NANOOS NVS

Apps Disclaimer Settings Log Out

NVS
DATA EXPLORER

Map Asset List Help

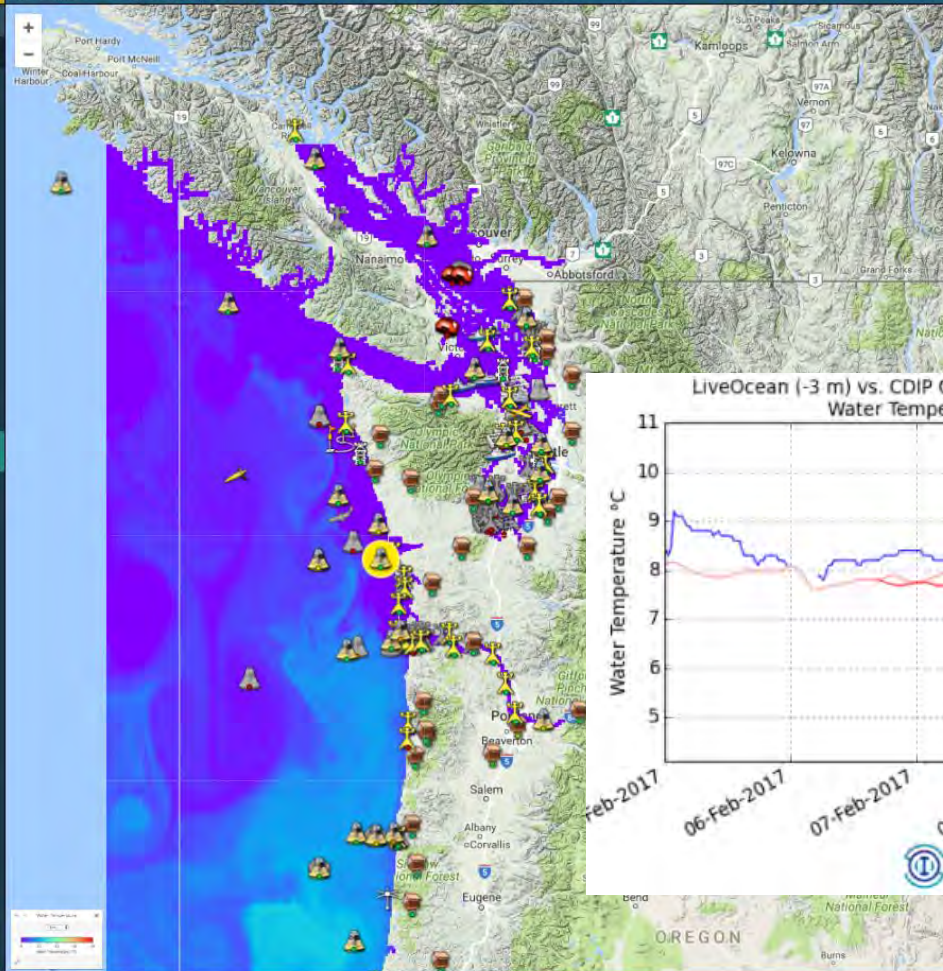
Models

Lat: 47.9023 Lon: -128.5510

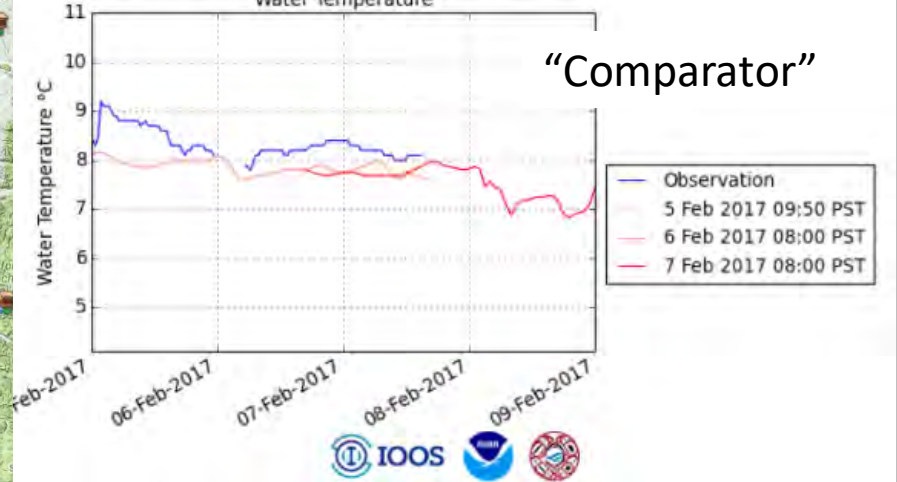
- Regions
- Filters
- Routes
- Current Conditions
- Fixed Platforms
- Mobile Platforms
- Remote Sensing
- Models
- Retired Platforms
- Legend

Forecast

- CMOP Columbia
 - Salinity
 - Water Temperature
- HYCOM
 - Currents
 - Salinity
 - Water Temperature
- LiveOcean
 - Salinity
 - Water Temperature
- N. Amer. Mesoscale (NAM)
 - Air Temperature
 - Barometric Pressure
 - Relative Humidity
 - Wind Gust
 - Winds
- NOS/CO-OPS Tides
- NW WRF Forecasts
 - Air Temperature
 - Barometric Pressure
 - Specific Humidity
 - Winds



LiveOcean (-3 m) vs. CDIP Grays Harbor (-0.5 m)
Water Temperature



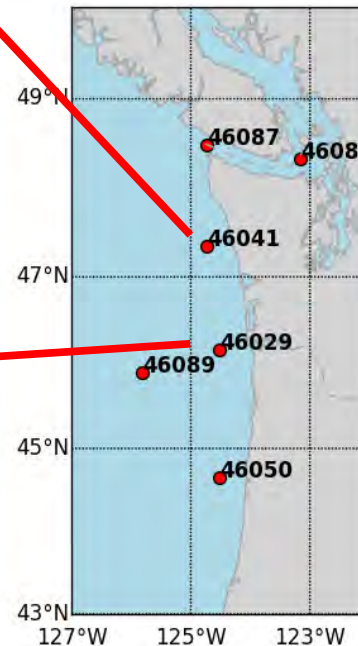
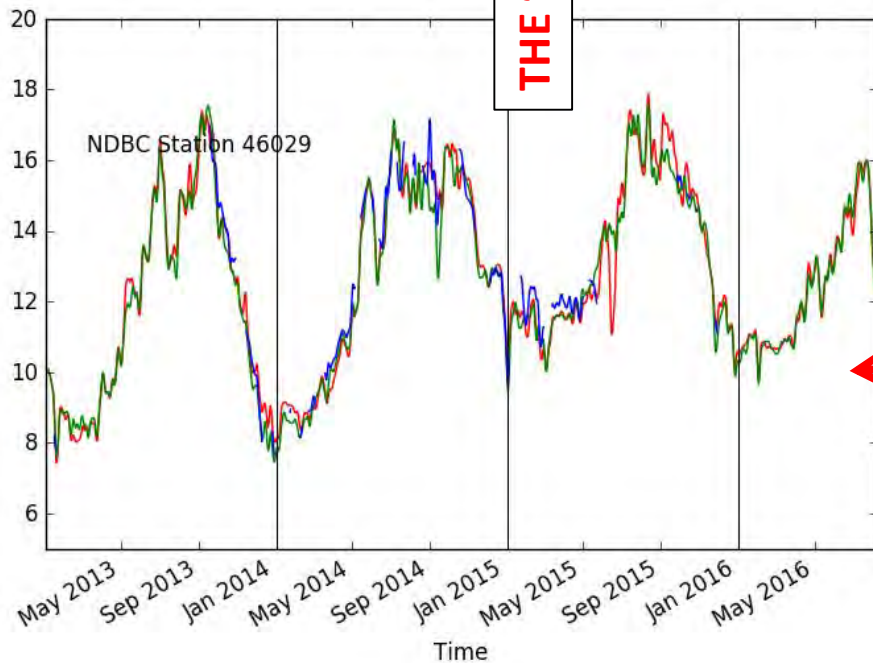
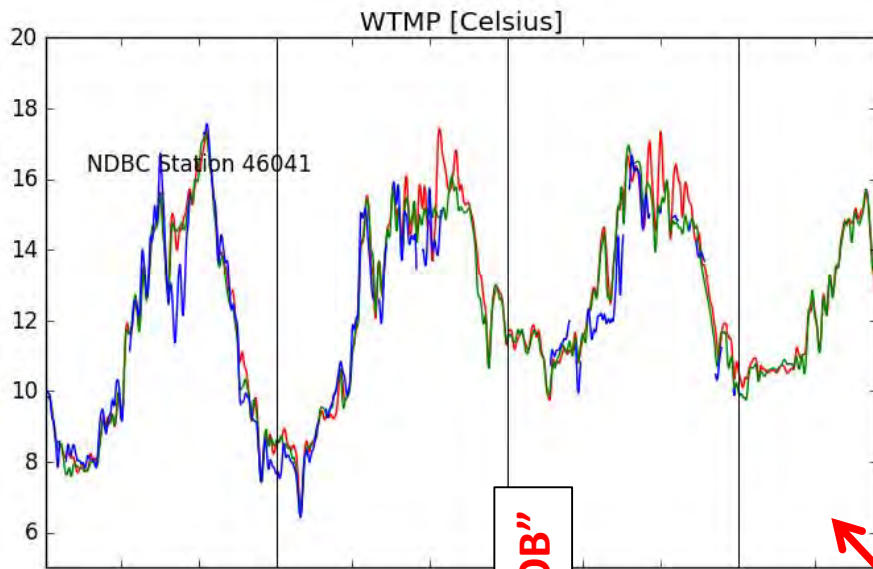
1 Feb 2017 2 Feb 2017 3 Feb 2017 4 Feb 2017 5 Feb 2017 6 Feb 2017 7 Feb 2017 8 Feb 2017

LiveOcean (Model) vs. CDIP 46211 (Buoy) - Water Temp.



Validation NDBC Buoys 3.5 years

NDCB Observed SST
LiveOcean version 1
LiveOcean version 2



NDBC Buoy Data Issues

- Historical data is designed to be accessed by clicking on a year on a website
- Can be automated (many years, many buoys) using python
- But process is “brittle” because data are served as csv. XML would be more robust (as is done for USGS rivers)
- Also, the csv headers change over time...
- Excellent data source – need more variables and subsurface instruments.

NDBC Header Changes:

1984-1993:

YY MM DD hh WD WSPD GST WVHT DPD APD MWD BAR ATMP WTMP DEWP VIS

1994-1995:

YY MM DD hh WD WSPD GST WVHT DPD APD MWD BAR ATMP WTMP DEWP VIS\r

1996-1997:

YY MM DD hh WD WSPD GST WVHT DPD APD MWD BAR ATMP WTMP DEWP VIS

1999:

YYYY MM DD hh WD WSPD GST WVHT DPD APD MWD BAR ATMP WTMP DEWP VIS

2000-2004:

YYYY MM DD hh WD WSPD GST WVHT DPD APD MWD BAR ATMP WTMP DEWP VIS TIDE

2005-2006:

YYYY MM DD hh mm WD WSPD GST WVHT DPD APD MWD BAR ATMP WTMP DEWP VIS TIDE

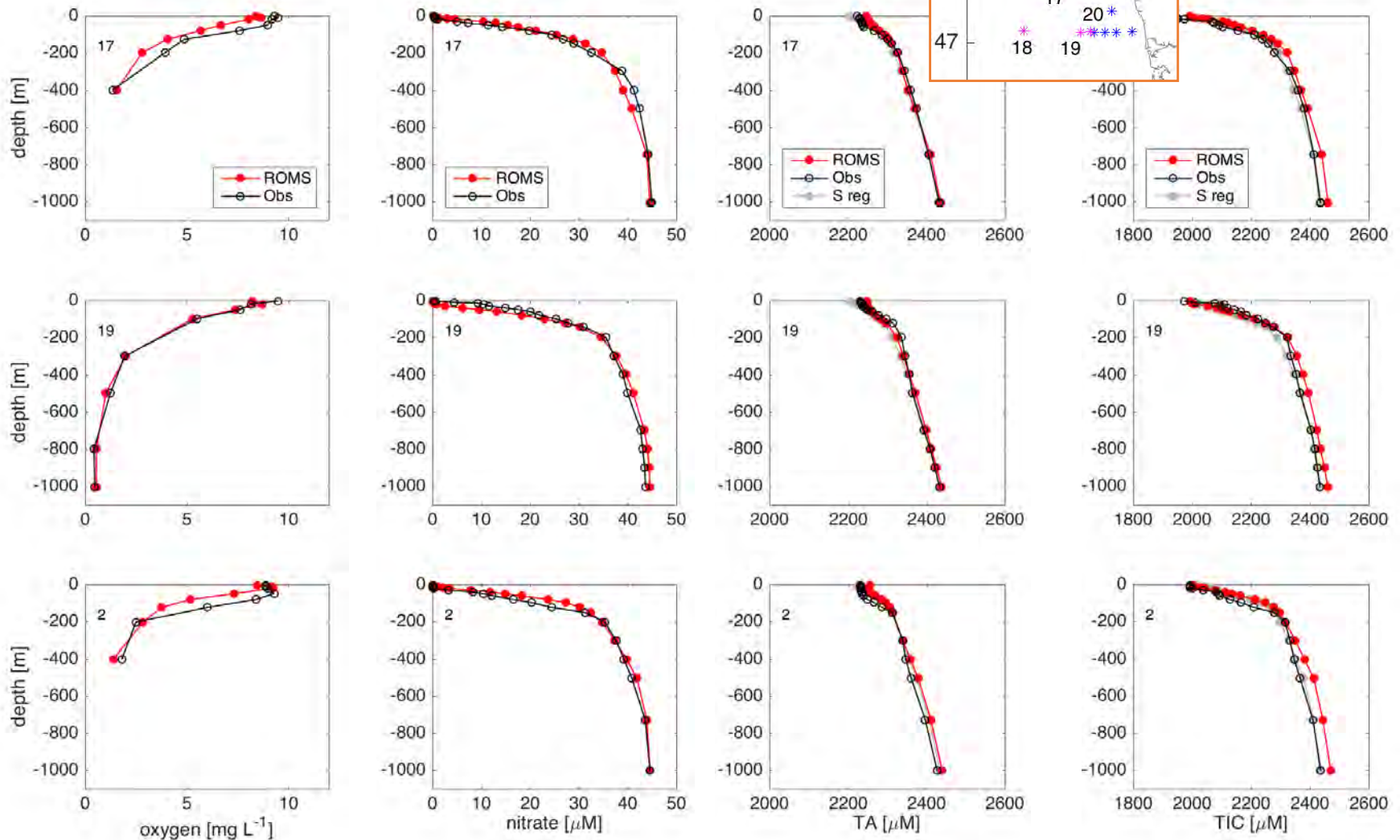
2007-2015: (but 2008 and 2010 had deg instead of degT, just for MWD)

#YY MM DD hh mm WDIR WSPD GST WVHT DPD APD MWD PRES ATMP WTMP DEWP VIS TIDE

#yr mo dy hr mn degT m/s m/s m sec sec degT hPa degC degC degC mi ft

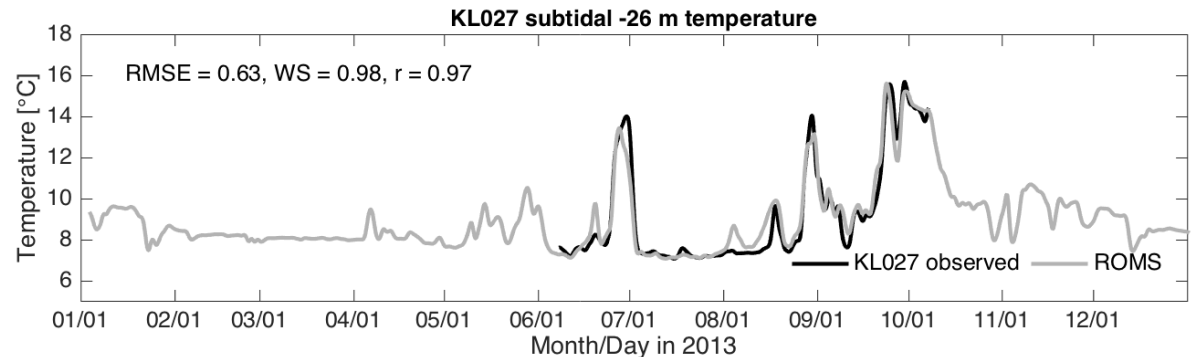
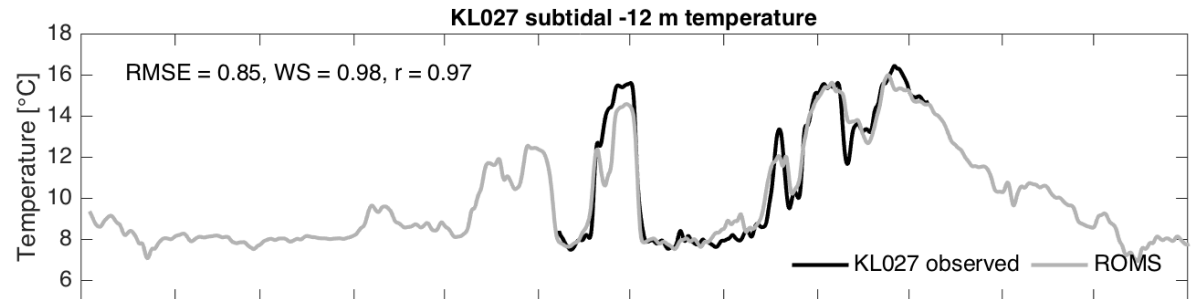
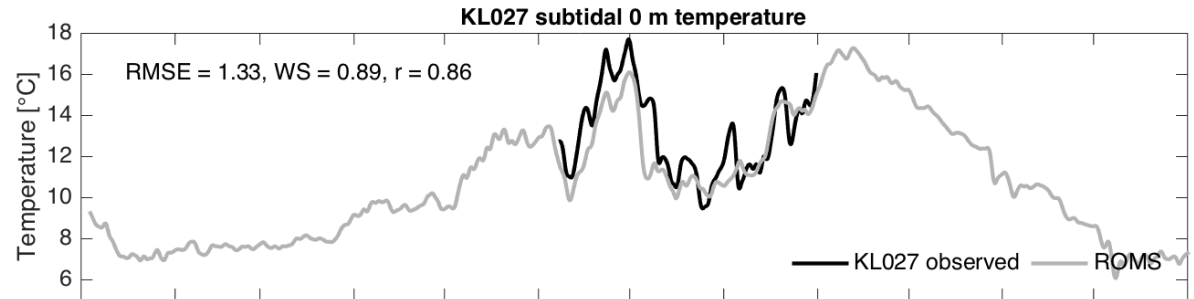
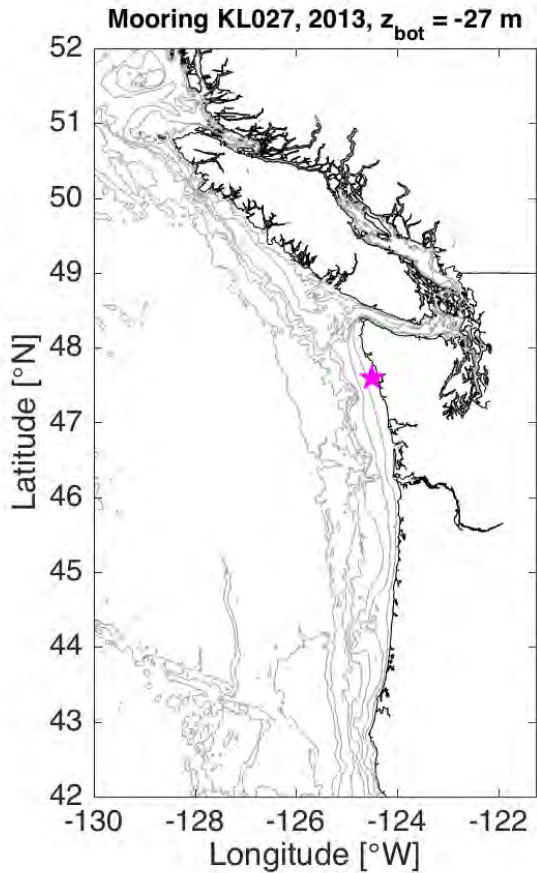
Validation NOAA Casts 2013

Oxygen, Nitrate, Alkalinity, DIC

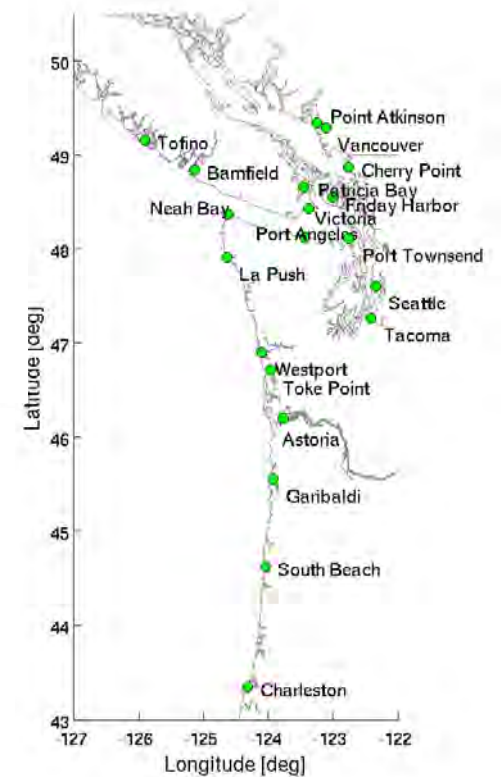
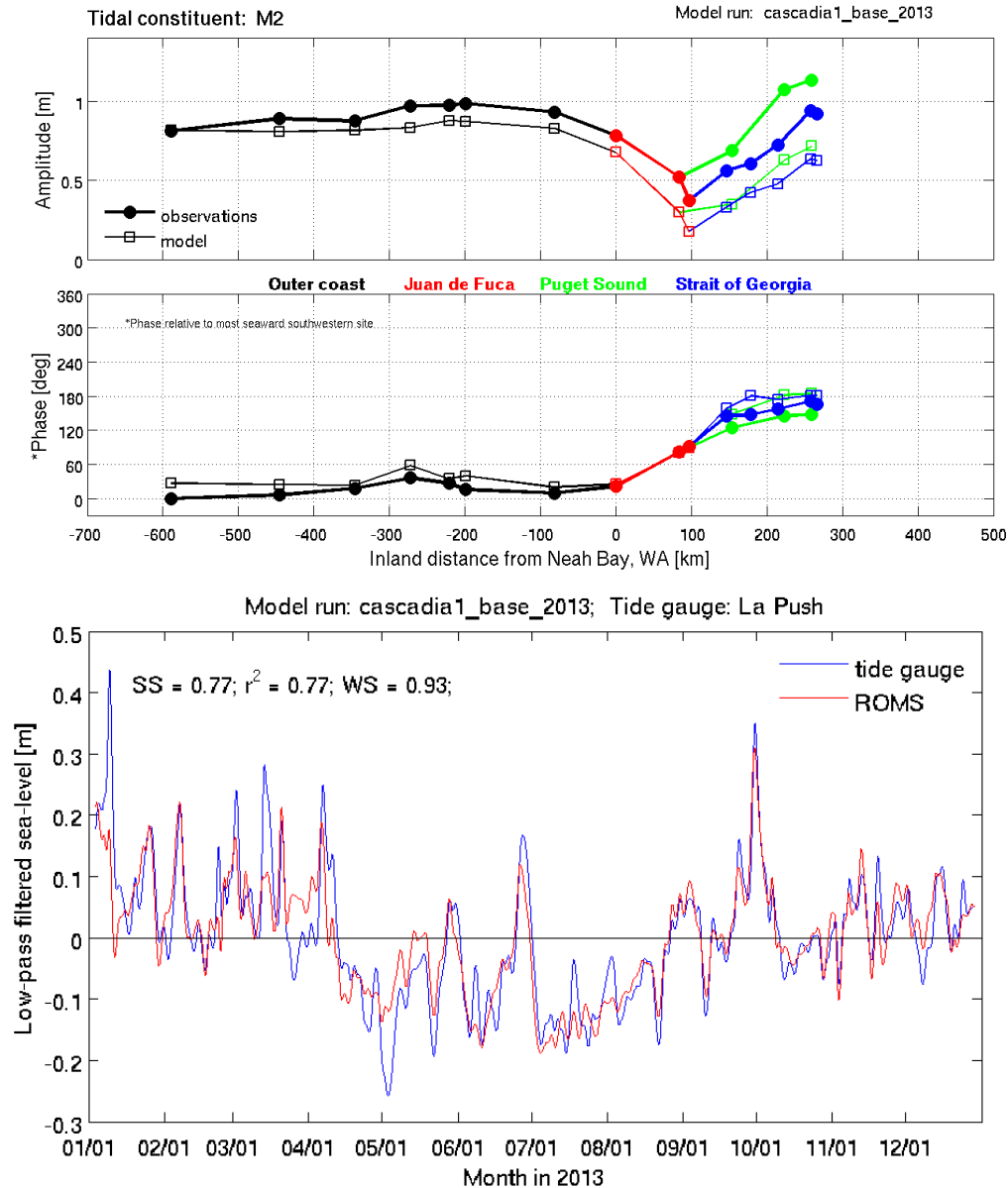


Validation OCNMS Mooring

Temperature in 27 m of water



Validation: Tides



Tide Station Data Issues

- Have to download 1 year at a time by hand (probably could be automated).
- Longer time series are available (e.g. Seattle goes back to pre-1900!!)
- BUT one can only get monthly averages for longer records.
- The NOAA Tides & Currents website is becoming an outstanding source of tide information. Great for teaching.

Questions?

