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OOI Sensor Servicing, Tech Refresh

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Assessment of existing instruments and testing of new approaches.

- the ongoing test of the Pro-Oceanus pCO₂w and Sea-Bird SeapHOx pH test articles on the Endurance Oregon shelf mooring
- secondary anemometer tests on Pioneer and Endurance
- EK-80 and RCA specific instrument upgrades covered in RCA presentation
- New Pioneer MAB instruments covered in Pioneer presentation



Alternate pH and pCO₂ sensor testing – Spring 2024 Oregon Shelf Mooring

Instrument Testing

- Approved PHSEN replacement on Oregon Shelf 7 m frame (SeaBird SeapHOx)
- Candidate PCO₂W replacement on Oregon Shelf 7 m frame (Pro-Oceanus CO₂-Pro CV)
- Recovered candidate PHSEN (ANB)
- Previously tested Idronaut and the previous generation SeapHOx



SeapHOx

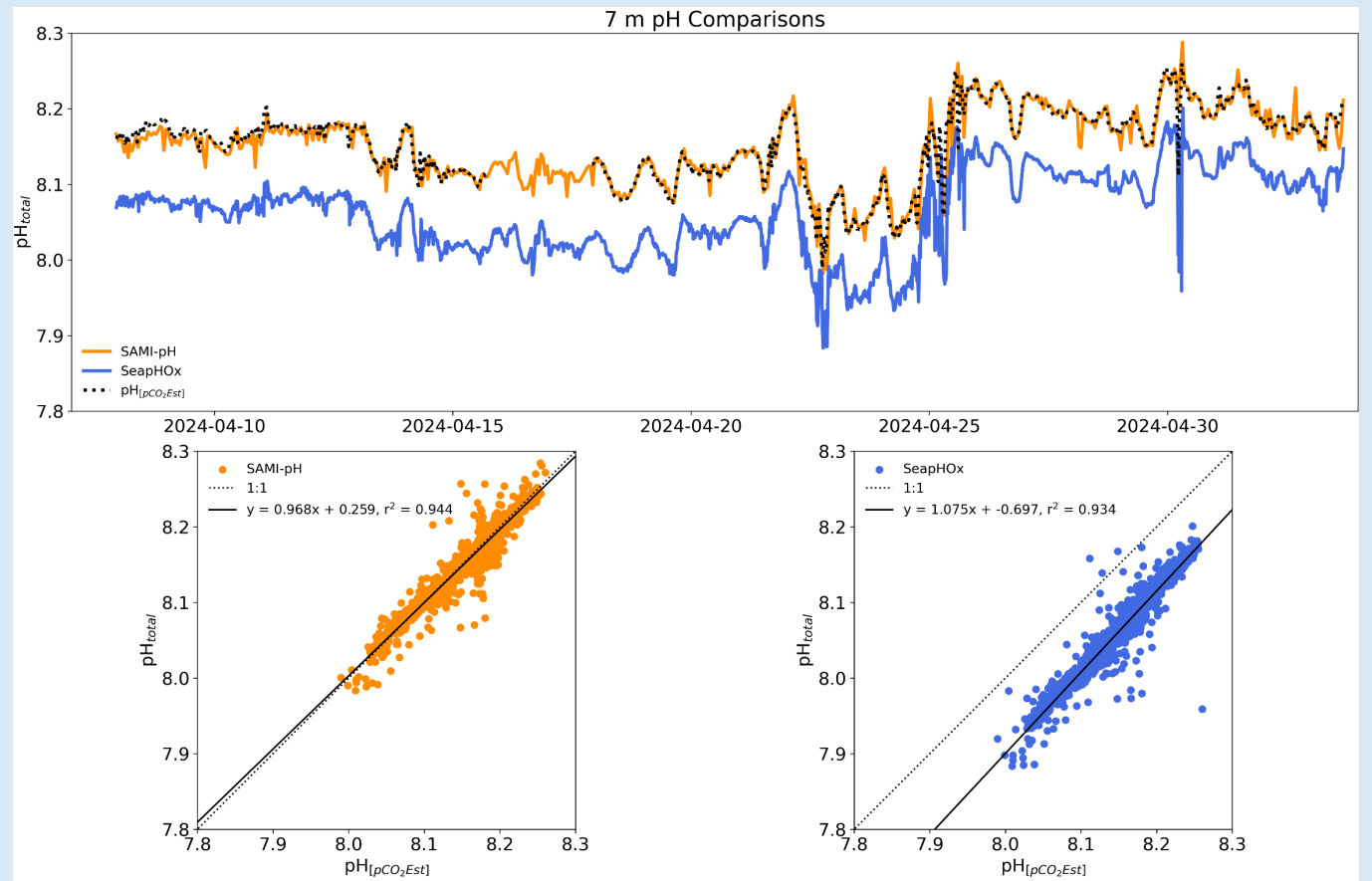
CO₂-Pro



pH Sensor Tech Refresh (Spring 2024)

- *Sea-Bird* Electronics Deep SeapHOx V2 deployed at 7 m alongside a Sunburst Sensors SAMI-pH sensor
- Estimated pH calculated using PyCO2SYS with total alkalinity derived from the SeapHOx T/S measurements (Lee et al. 2006*, Zone 4) and the CO₂-Pro CV pCO₂
- Estimated pH and SAMI-pH agree quite well, while the SeapHOx pH shows a consistent negative offset of 0.088

*<https://doi.org/10.1029/2006GL027207>



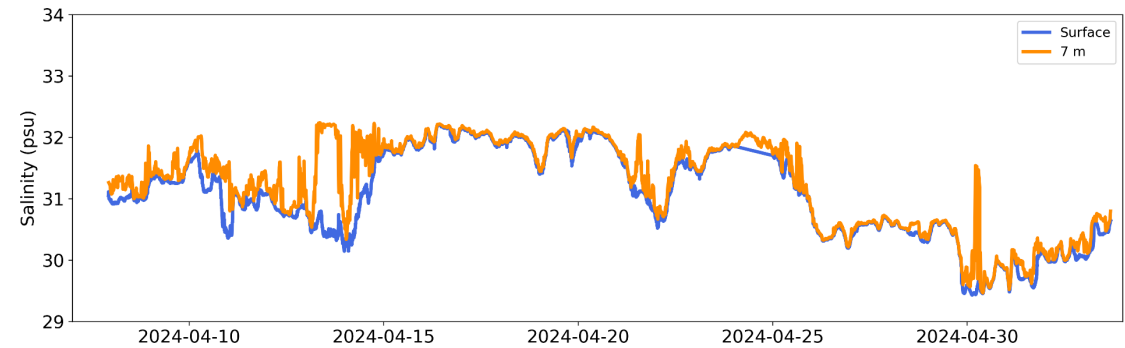
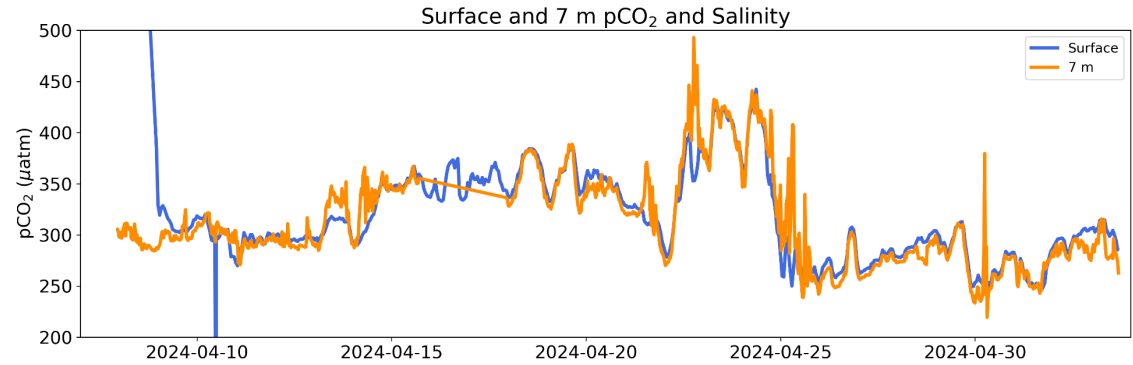
Deep SeapHOx installed in the 7 m instrument frame (NSIF)



SAMI-pH sensor installed in the 7 m instrument frame (NSIF)

pCO₂ Sensor Tech Refresh (Spring 2024)

- Instruments
 - Surface: Pro-Oceanus CO₂-Pro ATM (measures both air and surface water pCO₂). Surface intake 1 m depth, sampled hourly
 - 7 m: Pro-Oceanus CO₂-Pro CV, sampled every 30 minutes
- Salinity data from co-located CTD sensors (surface: sampled every minute, 7 m: sampled every 15 minutes)
- *Good qualitative agreement, with some water mass related differences*



CO₂-Pro CV mounted on the 7 m platform (Near-Surface Instrument Frame, NSIF) showing intake plumbing and exhaust.

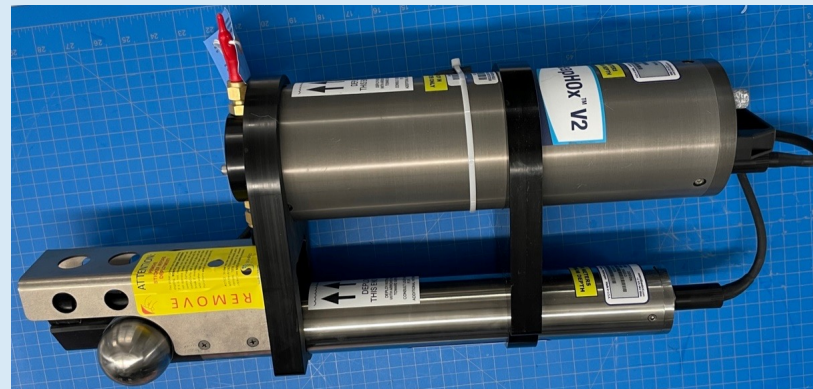


CO₂-Pro ATM on the subsurface instrument plate just above the SBE 37 CT sensor. Water intake is at 1 m nominal depth.



CGSN Irminger Sea SeapHOx test deployment

- The surface mooring (GI01SUMO) will be deployed in June 2024
- The SeapHOx will be deployed in-line on the mooring wire at 20 m
- Inductive communications are planned; internal recording as backup
- There will be a CTDMO above, and a PHSEN below, the SeapHOx
- The SeapHOx sampling rate will meet CTD and PHSEN baselines
- Faster sampling, to also meet CTD as-deployed sampling, will be considered





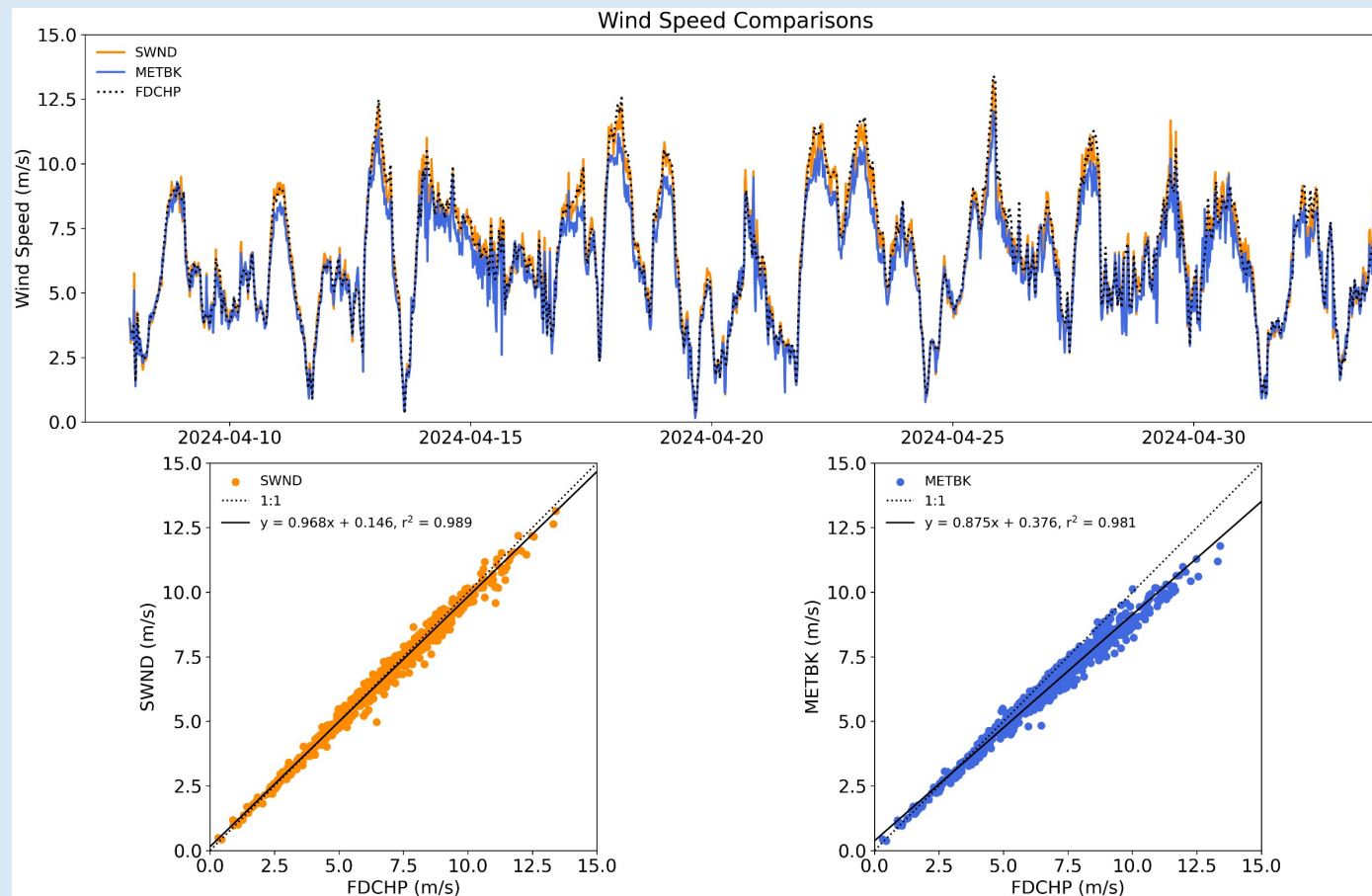
METBK Sonic vs Stand-Alone Sonic and FDCHP

- Sensors:

- Stand-alone ASIMET Sonic Wind Module (SWND) polled every 5 seconds for the raw measurements
- ASIMET System (aka METBK) data, reporting processed eastward and northward wind velocities every minute
- Flux Direct Covariance High Power (FDCHP) system reporting 20-minute averaged, motion corrected wind speed data every hour

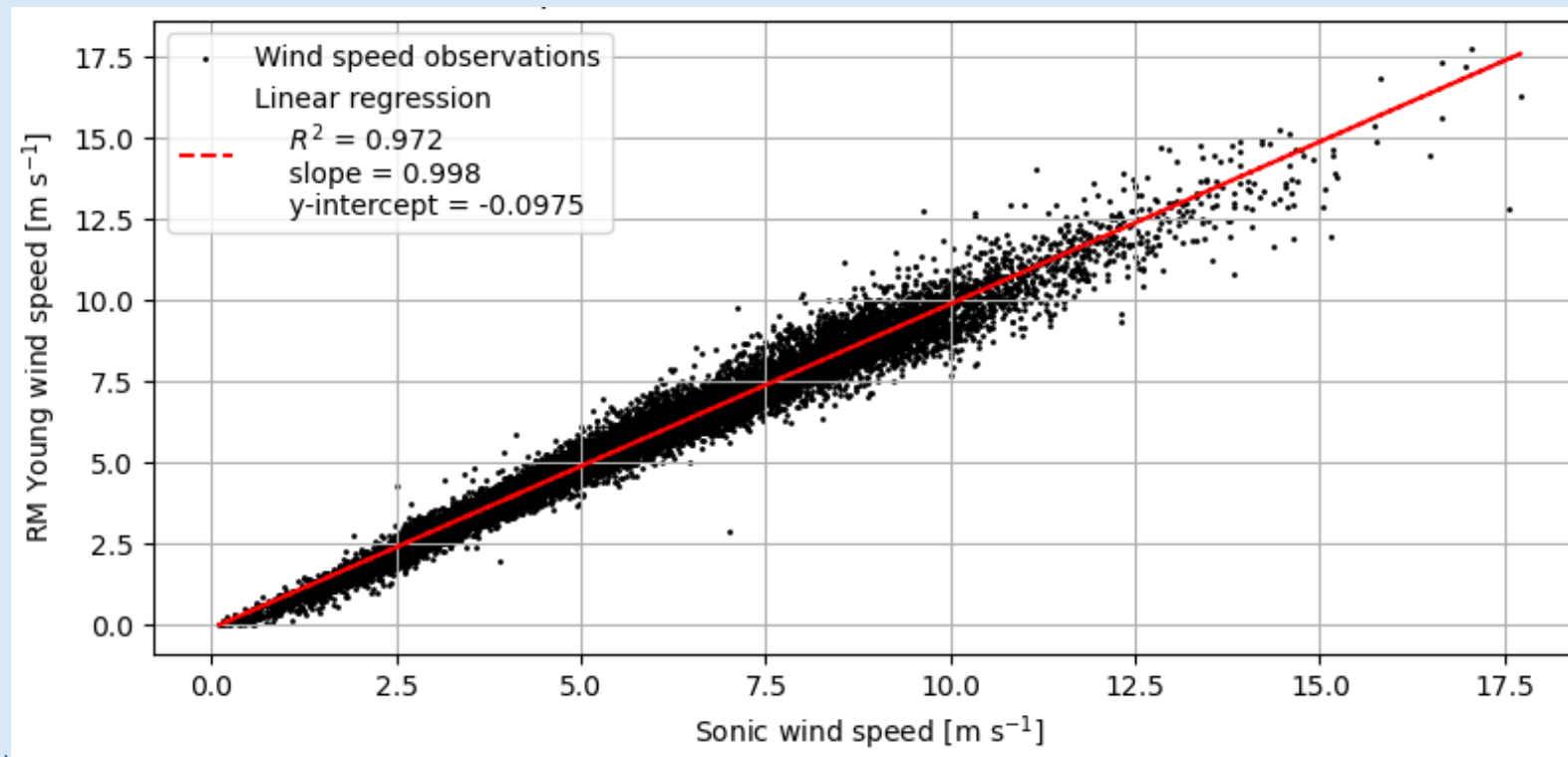
- Preliminary results: Endurance 20

- 26+ days of telemetered data comparing 20-minute averages of SWND and METBK to the 1/hour, 20-minute averaged FDCHP
- Continue to observe reduced wind speed values from the METBK compared to the FDCHP at higher wind speeds
- Stand-alone SWND module data agrees with the FDCHP. Further analysis required



METBK Sonic vs RM Young Wind

- Preliminary results: Pioneer MAB
 - 27 days of telemetered data; compare 1 min speeds after QC check
- Inconclusive so far, need more data > 10 m/s





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Questions?

