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# **Benthic Oxygen Respiration Rates** on the Oregon Shelf in Winter and Spring

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#### Take Away Message

New winter and spring measurements of benthic oxygen consumption derived using eddy covariance (EC) methods indicate intensified benthic respiration driven by

#### Instrumentation

Two landers equipped with Rockland Scientific MicroSquid-FireSting O<sub>2</sub> (MS-FS) modules that interface PyroScience fiber optic oxygen sensors with a Nortek Vector Acoustic Doppler Velocimeter were used for the collection of simultaneous 64 Hz velocity and dissolved oxygen time series at fixed points 15-30 cm above the seafloor. On some deployments a Rockland MicroSquid with a FP07 micro-thermistor was also used to collect high resolution temperature records for heat flux estimates.

high energy wave conditions and an over-winter retention of organic matter in the Oregon shelf bottom boundary layer. EC measurements were made repeatedly over sand sediments in December 2017 and January, February and May 2018 at ~30 m and 80 m stations adjacent to inshore and mid-shelf moorings of the Ocean Observatories Initiative (OOI) Endurance Array. Six more 2-5 day cruises will extend this seasonal study into 2019.





## **Research Questions**

- $\succ$  What is the temporal variability of benthic O<sub>2</sub> fluxes on the Oregon shelf?
- > Are benthic respiration rates great enough to be the cause of hypoxia?
- How does the near-bottom dynamics of the Oregon shelf environment influence benthic respiration?
- $\succ$  Is the POM produced during the summer upwelling season degraded rapidly in the shelf environment or retained to fuel respiration throughout the year?

## **Sensor Performance**

The PyroScience fiber optic sensors are able to detect oxygen variations ~0.2 µM (with standard Microsquid A/D settings) and do not show a sensitivity to the large variations in velocity created by wave motions.



# **EC Flux Results**

Illustrative deployment records analyzed in 30 min intervals. Each interval was detrended with a 0.005 Hz frequency filter, velocities rotated to minimize wave vertical velocities, and correlation-based time-lag corrections applied to oxygen record before calculating the EC flux.



## **Oregon Shelf Hypoxia**



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