

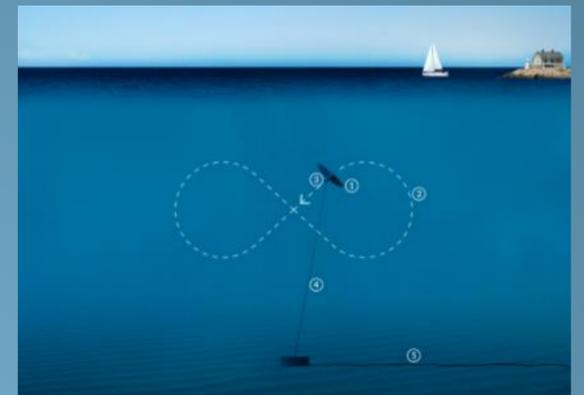
SEACAMS2

Variation in composition and vertical distribution of marine fauna in the Holyhead Deep

Research question: How are fauna and physical variables in the Holyhead Deep distributed vertically over diel and semidiurnal / lunar tidal timescales?

Aim: To understand vertical distribution of fauna (nekton such as fish, micronekton and plankton) and their drivers in the Holyhead Deep over diel, lunar time scales to reveal temporal and vertical prey availability for diving seabird and marine mammal foraging.

Collaboration context: 'Holyhead Deep has been identified as a perfect location for a commercial-scale Deep Green installation. The area matches all the site requirements by providing low-flow tidal velocities (1.5–2 m/s mean peak flow) at a depth of 80–100 meter, only approx. 8 km from Holyhead, where Minesto UK head offices are located' minesto.com

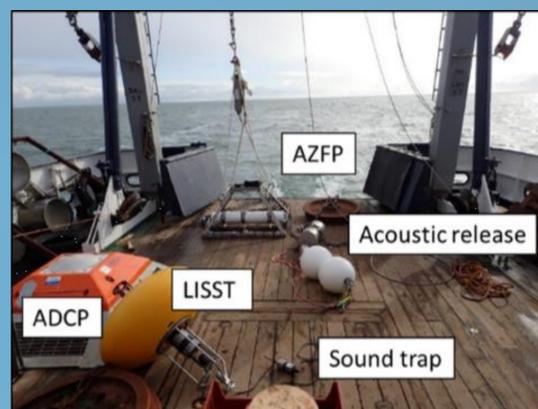


Kites generate electricity from tidal currents

Sampling approach



Biological samples were collected at different targeted depths along with oceanographic measurements during deployment and recovery cruises.



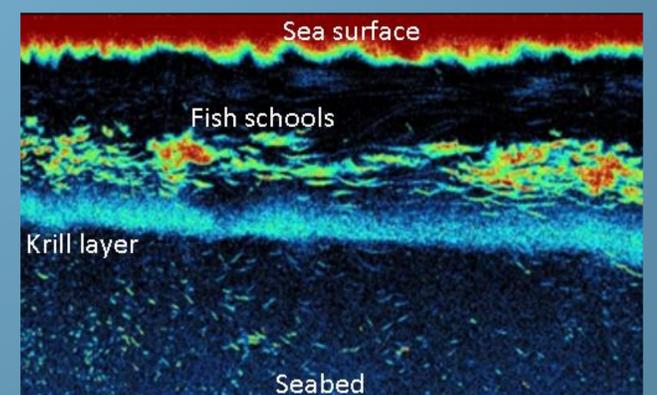
Acoustic and optical instruments deployed in the Holyhead Deep in October 2016 from the RV Prince Madog collected data for nearly 4 months.



24 – 48 hour CTD stations to understand the water column properties in the Holyhead Deep and how it changes with tidal and seasonal variation.

Results

- For full results please see the freely available published research in 'Whitton, Timothy A., et al. "Vertical migrations of fish schools determine overlap with a mobile tidal stream marine renewable energy device." *Journal of Applied Ecology* 57.4 (2020): 729-741.'
- Fish schools undertake diel vertical migrations driven by the depth of light penetration into the water column, controlled by the supply of solar radiation and water column light absorption and scattering, which in turn depends on the cross-sectional area of suspended particulate matter (SPM).
- Fish schools were found shallower in the morning and evening and deeper in the middle of the day when solar radiation is greatest, with the deepest depths reached during predictable bimonthly periods of lower current speeds and lower cross-sectional area of SPM.
- Potential kite operations overlap with fish schools for a mean of 5% of the time that schools are present (maximum for a day is 36%). This represents a mean of 6% of the potential kite operating time (maximum for a day is 44%). These were both highest during a new moon spring tide and transitions between neap and spring tides.



For further information contact :

Dr. Timothy Whitton
t.whitton@bangor.ac.uk
01248 383936

