CHALLENGE

Cetaceans in energetic coastal waters (of interest to marine renewable energy development) are difficult to study, due to large waves and strong tidal currents. These dynamic environments impose challenges on long-term autonomous acoustic monitoring deployment. SAMS has made significant advancements in low-cost, simple mooring and drifting survey solutions.

Two example areas in Scotland are presented here.

TIDAL STUDY

Method

For the ‘Marine Renewables Energy and the Environment (MaREE) project to study porpoise in the Kyle Rhea, we developed static and mobile platforms for CPODs to study porpoise presence and distribution across the tidal cycle. The static moored CPODs monitored temporal changes while mobile ‘Drifting PODs’ allowed changes in spatial distribution of porpoises over time to be studied. The two platforms demanded different designs, but both had to be deployable from a small RIB. The moored CPODs were deliberately positioned in strong tidal streams, periodically experiencing currents in excess of 4 ms⁻¹.

Equipment - 'Drifting PODs'

- surface buoyancy
- GPS logger
- surface flag
- subsurface drogue
- ballast
- polypropylene rope

Drifted with CPOD suspended 5 m below surface with tidal movement until retrieved.

Results

- Vocalising porpoise activity was detected significantly more on the Ebb tide, and localised to the south of the channel.

ACKNOWLEDGEMENTS

Thank you to the following:

University of the Highlands and Islands
SAMS, Scottish Marine Institute, Oban, Argyll, PA37 1QA, UK

email: jim.elliott@sams.ac.uk

Funded by MaREE (Marine Renewable Energy and the Environment) search ‘maree eri projects’

Download a copy of the poster here:

http://www.hebmarine.com

Visit www.hebmarine.com for more information.
**CHALLENGE**

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Two example areas in Scotland are presented here.

**Method**

For the ‘Hebridean Marine Energy Futures’ project to study harbour porpoises at a wave site, we developed low cost, simple subsurface moorings that could easily be deployed and recovered, whilst not interfering with installed wave energy devices and meeting procedural needs of the EMEC ‘Billia Croo’ site and the device owners. The site is swept by ~1ms⁻¹ of tide, and wave height can exceed 12m during storms. Previous phases of the study had been localised to ‘scientific zone’.

**Design**

For the phase 4, an array of acoustic recording devices (CPODs) was laid in relation to the mooring position of a PWP device. The average depth was 60m. Due to heavy vessel traffic and device movement, no part of mooring was allowed within 25m of the surface. The moorings included an acoustically activated popup recovery system.

Each mooring was laid using an oceanic acoustic release ensuring the position would be accurate.

**Equipment (one of 7)**

- 50kgs steel/concrete ballast
- Sonardyne LRT 7986 with rope canister and float
- 15metres of 12mm floating polypropylene rope
- hard floats
- shackles and swivels
- 2x CPODs

**Results**

The single mooring design proved effective at maintaining position and safe retrieval, when the delayed recovery system worked correctly.

- Mooring design should include appropriate fixing points to allow secondary recovery method.
- Using two acoustic recorders per mooring provided essential residual backup.
- Porpoises were detected regularly during all C-POD deployments. Av. daily encounter rates ranged between 1.7 – 9.4 encounters per day. There was no obvious influence of the Pelamis device presence.
- In winter most porpoise encounters occurred at night whereas in summer there was little difference in day-night encounter rates. This may have significant consequences for future marine mammal survey design.

**ACKNOWLEDGEMENTS**

Thank you to the following:

- University of the Highlands and Islands
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- Scottish Marine Institute
- Scottish Government
- European Region Development Fund
- Scottish Funding Council

Funded by MaRREE (Marine Renewable Energy and the Environment) search ‘maree eri projects’.

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**WAVE STUDY**

**Results**

- The single mooring design proved effective at maintaining position and safe retrieval, when the delayed recovery system worked correctly.
- Mooring design should include appropriate fixing points to allow secondary recovery method.
- Using two acoustic recorders per mooring provided essential residual backup.
- Porpoises were detected regularly during all C-POD deployments. Av. daily encounter rates ranged between 1.7 – 9.4 encounters per day. There was no obvious influence of the Pelamis device presence.
- In winter most porpoise encounters occurred at night whereas in summer there was little difference in day-night encounter rates. This may have significant consequences for future marine mammal survey design.
- Significant differences in daily encounter rates among moorings indicate spatial heterogeneity in porpoise distribution at small scales (100’s of metres), but reasons remain unknown.

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**PLAN of PHASE 4 MOORING LAYOUT, INCLUDING C-POD POSITIONS, SITE INFRASTRUCTURE AND DEPTH**