



"Guess what!"

It's the new World Heritage Site and there are harbour porpoises (*Phocoena phocoena*)

Caroline Höschle, Ansgar Diederichs, Miriam J. Brandt, Laura Wollheim & Georg Nehls
c.hoeschle@bioconsult-sh.de

SUMMARY: C-PODs regularly detected numerous harbour porpoise clicks and thus provided detailed information with a high temporal resolution on harbour porpoise presence in the tideways of the Lister basin. This is the first evidence of regular harbour porpoise presence in tideways more than 20 km away from the open sea.

BACKGROUND:

Since June 2009, UNESCO placed the Wadden Sea on the World Heritage List due to its uniqueness in demonstrating how nature, plants and animals adapt themselves to constantly changing conditions. The Inner Wadden Sea is characterised by a vast, varied area, sculpted by the constant flow of tides with noticeable changes even on a daily basis. A complex system of channels and streams alternates with exposed mudflats and sand banks. Porpoises have been studied in the offshore waters near the islands of Sylt and Amrum but little is known on porpoise occurrence in the inner waters. This is the first study to monitor porpoises in the Wadden Sea.

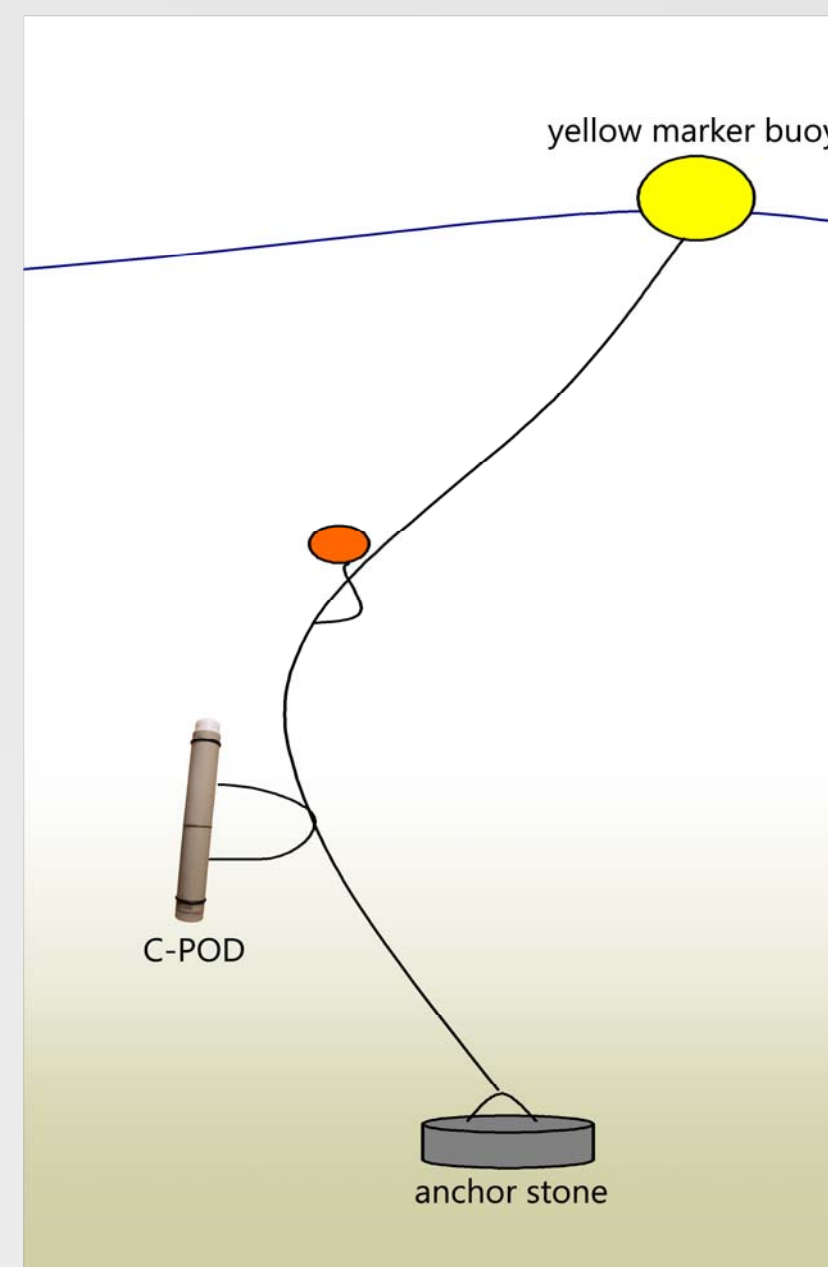


Fig 1: Deployment of C-POD system

METHODS:

Study period: 4 month (16.08.-2.12.2009)

Data collection: static acoustic monitoring (SAM) via 3 C-POD stations

Study area: Inner Wadden Sea, east of the Island of Sylt, North Sea, Germany

Data Analysis:

- "porpoise positive hours per day" (PPH/day)
- "porpoise positive 10minutes per day" (PP10M/day)
- "porpoise positive minutes per hour" (PPM/hour)

→ GAM with PPM/hour as response variable including the parameters „month“, „time of day“, „hours after high tide“

RESULTS:

• Seasonal patterns

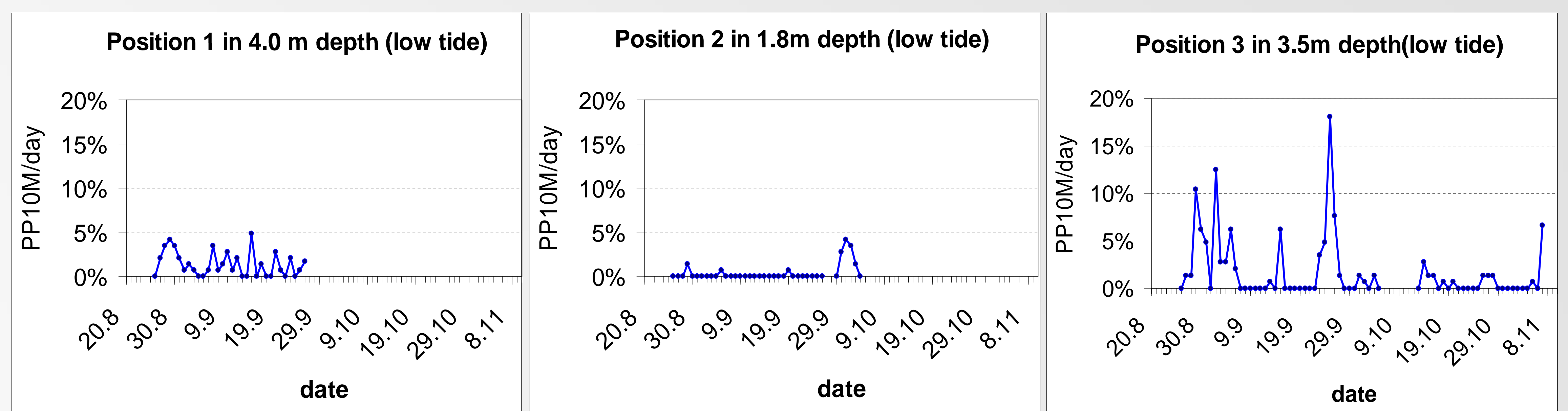


Fig. 3: PP10M/day for all 3 C-POD positions during the study period

Most porpoise clicks were recorded at position 3, located in a 3.5m deep tideway, which is surrounded by exposed mud flats at low tide. Fewest recordings were found at position 2 in shallower waters. A clear seasonal trend is visible at position 3 (with the longest recording time) with most porpoise recordings in Aug. and Sep. and fewer in Oct. and Nov.

• Daily and tidal changes in porpoise activity

The deviance explained by the GAM is 7.24%; all factors are highly significant.

A clear daily activity rhythm is visible with high activity during early morning between 3am and 3pm. During the afternoon, activity decreases until reaching a minimum at 8pm.

Minimum occurrence of porpoise presence is reached 4-5 hours after high tide. Less than average activity occurs before low tide; slightly fluctuating activity at other times.

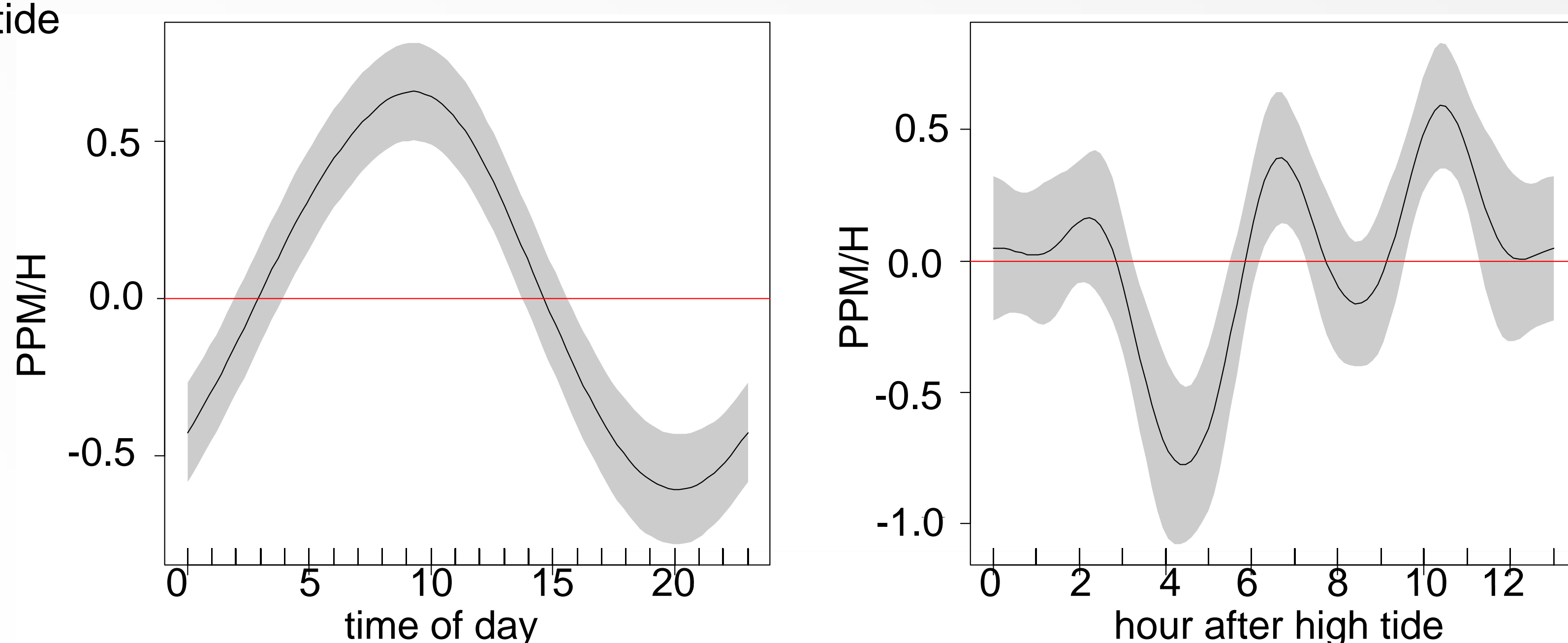


Fig 4: The effects of "time of day" and "hour after high tide" on PPM/H. Shown is the deviation from the overall mean as calculated by the GAM. The grey shaded band encompasses the 95% confidence interval.

DISCUSSION:

This preliminary results show that porpoises regularly occur in this fast changing environment. It can be assumed that porpoises avoid low tides and shallow waters in particular when no obvious tideways are near by. The clear pattern with high diurnal activity confirms similar findings of Diederichs *et al.* (2008). Daily and tidal changes in porpoise activity may be linked to prey availability. Further analysis of feeding click trains will address this issue in more detail.

