



# Diurnal click patterns of Harbour Porpoises (*Phocoena phocoena*) in two different areas



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## Introduction

Porpoises use an echolocation system for navigation and exploration of objects at close ranges, especially feeding. The animals emit series of signals (Click Trains) at a frequency of about 130 kHz. The inter click intervals (ICI) between 20 and 60 ms used for navigation, changes up to 2 ms whilst observing an object at a close range (Verboom und Kastelein 1995, 1997, Verfuß et al. 2002, 2005). In this study we investigated the diurnal rhythms and the feeding behaviour of porpoises in two different areas in North and Baltic Sea.

## Methods



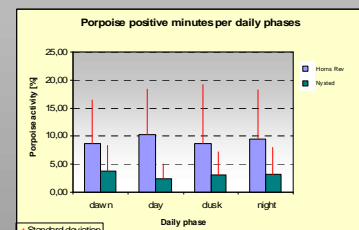
From June to September 2005 we deployed in two study areas at 4 different positions TPODs 1.5 m above the sea bottom at 6-10 meters water depth. One area is west of Horns Reef (North Sea/Dk), the other south of Nysted (Baltic Sea/Dk).

To study the diurnal rhythm of porpoises we measured the echolocation activity by the parameter Porpoise-Positive-Minutes (PPM) and compared among four 'daily phases': dawn and dusk (3 hours around sunrise and sunset), night and day. During a 24-hour-rhythm we also compared the proportion of click trains with a minimum ICI below 10 ms, which indicates feeding behaviour, to the number of all click trains.

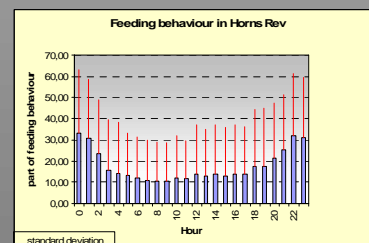
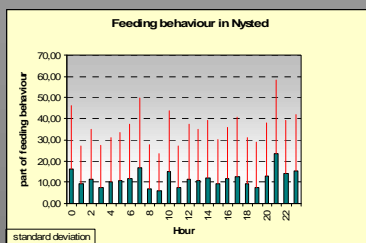
## Results

In Nysted the highest porpoise activity was during dawn. The activity during phases of twilight shows a statistical significant difference in contrast to night and day.

In Horns Rev we measured the highest activity during day. Phases of twilight show a similar porpoise activity and we found a significant difference between night and day in Horns Rev.



The diurnal rhythm of click activity is not similar to the rhythm of main feeding activity. In both areas the porpoises were foraging primarily at night. The 24-hour-rhythm of feeding activity shows a more distinctive pattern of feeding proportions in Horns Rev.



## Conclusions

- Basic differences of marine conditions at North- and Baltic Sea let expect variation in porpoise behaviour
- Rhythm of feeding behaviour is similar to diurnal rhythms of fish species occurring in this areas
- Feeding pattern in Nysted could also be an indication for smaller densities of prey fishes. In this case the porpoises have to forage whenever they have the ability to.

However, it is not known, whether the reasons for different diurnal activity of porpoises in these areas are abiotic or biotic. The results of this investigation show that differences in fish occurrence and density could be an explaining factor.