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PAM based monitoring of harbour porpoises (*Phocoena phocoena*) during constructions of the Nord Stream gas pipeline in the Pomeranian Bight

by

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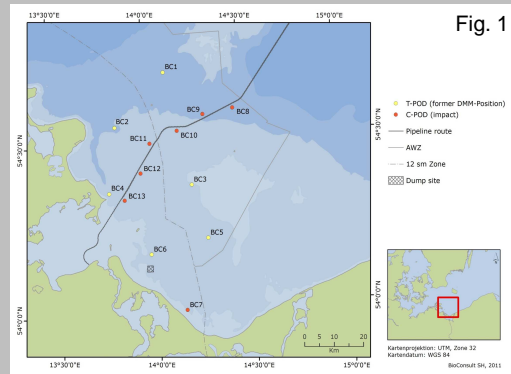


Fig. 1

Introduction + Methods

Nord Stream is a twin pipeline system through the Baltic Sea transporting gas from Russia to Germany. Construction works in the German Baltic Sea took place between May to December 2010 and September to November 2011. Construction works included dredging, laying the pipeline and backfilling. These activities go along with considerable noise emissions that can affect harbour porpoises. BioConsult SH monitored harbour porpoise presence and spatial distribution with six C-POD-Positions in close vicinity to the pipeline and seven POD Positions with a double deployment of C- and T-PODs in the surroundings (Fig. 1) for both construction years.

Results

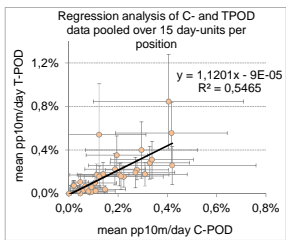


Fig. 2

All data were processed with the C-POD algorithm v 2.026 and T-POD algorithm v 7.41. The C- and T-POD data are significantly and positively correlated ($R^2 = 0.55$; Spearman Rank = $p < 0.001$, $r_s = 0.80$, $N = 35$, Fig. 2).

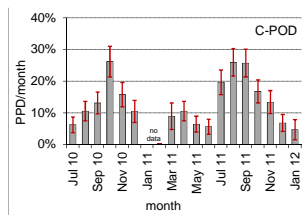


Fig. 3

Overall number of porpoise detections recorded by PODs was very low. However, detection positive days per month pooled over all data showed a distinct seasonal pattern for C- and T-POD data in both years (Fig. 3). Porpoise activity was low during spring and winter months and increased over summer/autumn.

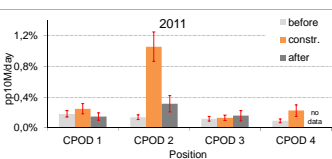


Fig. 4

Spatial analysis of Porpoise detection revealed a gradient from North to South (Fig. 5). Continuously high detection rates were observed at station 2 northeast of Rügen and station 11 close to the pipeline. Lowest detection rates occurred at the three most southerly stations 5, 6 and 7.

Fig 4 shows recorded pp10M/day before, while and after constructions exemplarily for 4 C-POD Positions during constructions in 2011. Fig. 6 displays counts of pp10M units during a day with usual shipping traffic highlighting Nord Stream's fleet during construction activities in October 2011.

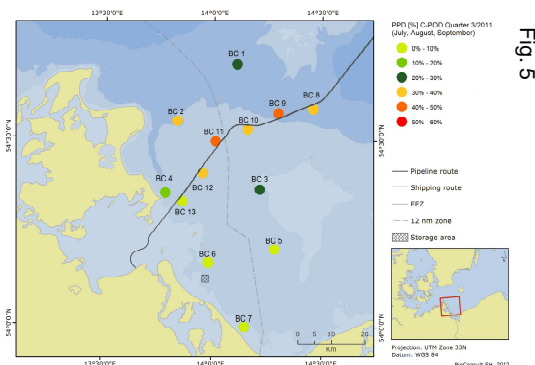


Fig. 5

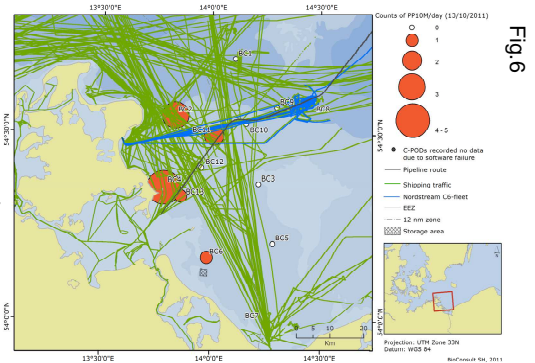


Fig. 6

Discussion + Conclusion

Porpoise activity showed a north-south gradient with more recordings at northerly positions. T- and C-POD data revealed a general peak in porpoise detections between August and October for both recording years. Additionally, a patchy distribution pattern occurred due to some positions with constantly more detections like Position 2 and Position 11.

Even though only at 15 % of all recording days at least one porpoise signal could be recorded, these numbers are higher than expected from former studies. This led to the hypothesis that a slight increase of porpoise abundance in that particular area happened over the past eight years, which is supported also by POD data from other studies.

During both winter the Pomeranian Bight was covered with ice for two months. Due to this fact in combination with the clear seasonality it might be that porpoises undergo a seasonal migration from the Belt Seas into Central Baltic waters and vice versa.

POD data from 2010 and 2011 provided no indication for any displacement effect on harbour porpoises in the Pomeranian Bight due to construction activities of the Nord Stream project. However, a proper statistical analysis of potential effects is still open for the final report, which will be written using a data set from 2010, 2011 and 2012.

Take Home Message

Come and visit the lovely island of Rügen during summertime to do some nice "porpoise-watching"!

