

Does sand extraction west of Sylt affect harbour porpoises?



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INTRODUCTION

In the 1990s investigations on harbour porpoises in the German North Sea revealed high abundances around Sylt and Amrum. Frequent observations of calves led to the conclusion that this area is an important breeding ground, so that it was declared a special whale protection area in 1999. However, within this protected area sand extraction takes place in a 9 km² area for coastal protection and plans to increase its size by another 55 km² raised the question of how this would affect harbour porpoises.



Sand extraction ship



T-POD with anchoring system

METHODS

In 2007 and 2008, we conducted an investigation over a one year period to assess the potential impact using aerial surveys and passive acoustic monitoring devices (T-PODs). Once every month the area of interest was surveyed along ten about 50 km long transects (flight speed: 10 Km; flight height: 250 Ft). We used a double platform approach with three observers, so that a flight-specific resighting rate of porpoises could be determined and used as a correction factor for the subsequent calculation of densities. Porpoise densities were then calculated using distance sampling techniques. Over a period of five months during sand extraction activities, we further deployed porpoise detectors (T-PODs, chelonia.co.uk), which are passive acoustic monitoring devices designed to automatically detect the echolocation-clicks of harbour porpoises. We then analysed the proportion of 10 min intervals that contained porpoise clicks (Porpoise positive ten minutes) at the impact as well as at three reference sites and the length of time that elapsed between two porpoise encounters (waiting time) before, during and after sand extraction took place.

RESULTS AND DISCUSSION

Porpoises were present in the area all year round with highest densities (up to 3.5 ind. / km²) and a high number of calf-sightings (about 10 % of all animals) in June and August and with much lower densities during the winter months (below 1 ind. / km²) (Fig.1). This confirms the importance of the area as a breeding ground.

Avoidance of the sand extraction site could not be detected on the basis of aerial surveys. Porpoise densities increased with distance to the coast, so that only few porpoises were generally sighted where sand extraction takes place (Fig.2).

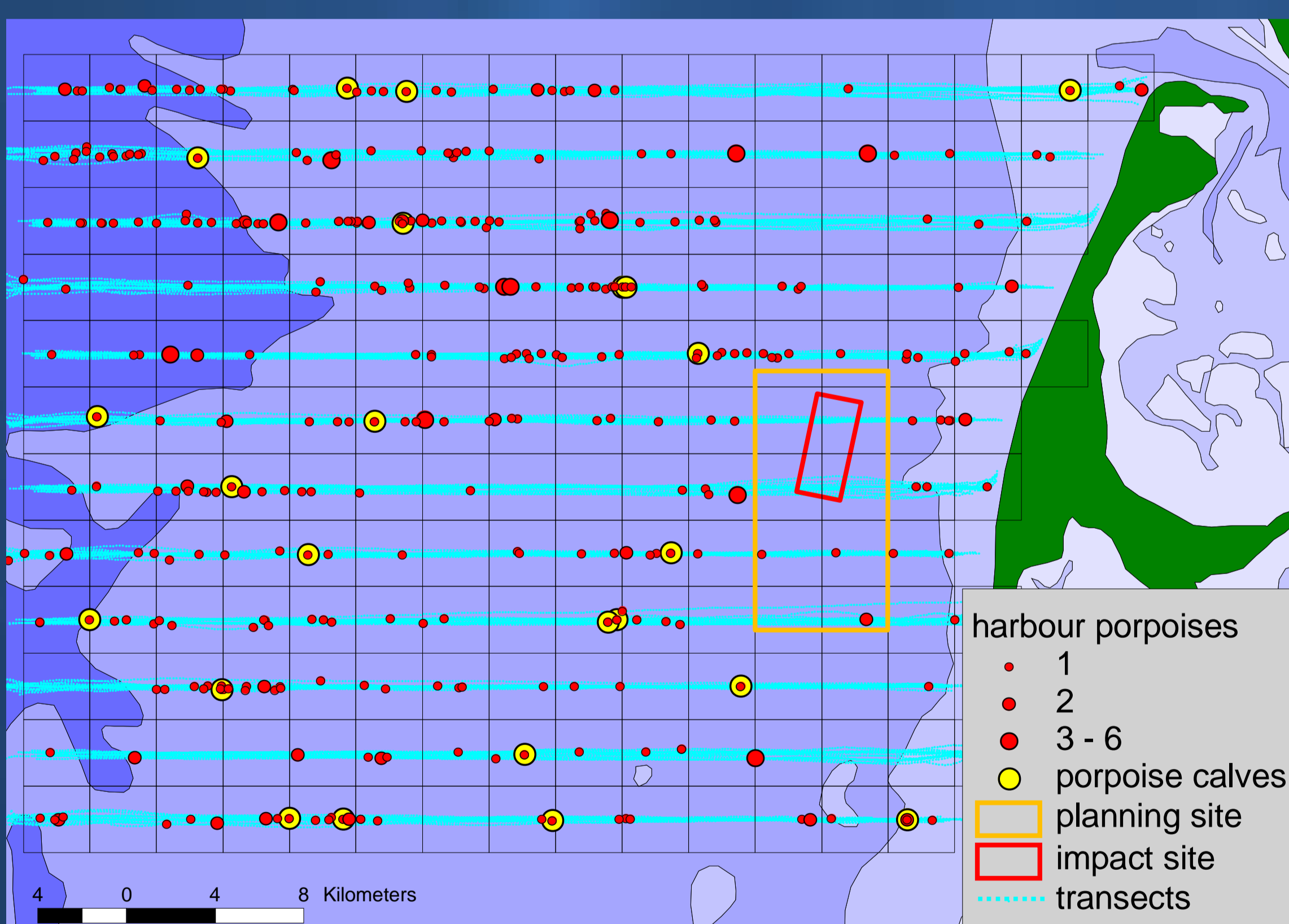


Fig.2: Porpoise distribution map (all sightings) during all aerial surveys.



CONCLUSIONS

On the basis of aerial surveys and acoustic recordings of porpoise echolocation clicks we could not detect any long-term avoidance of the sand extraction site by harbour porpoises. Although benthic organisms are partly destroyed by sand extraction, other studies found fish biomass not to be negatively influenced probably because most fish are highly mobile. Therefore the area might not decrease in quality as feeding habitat for porpoises. However, as detected by our T-POD data, acoustic disturbance by the dredging ship might lead to short lasting avoidance of the area around the ship with a relatively local effect. Such effects are detectable by acoustic recordings with a high spatial and temporal resolution but can not be detected by aerial surveys alone.

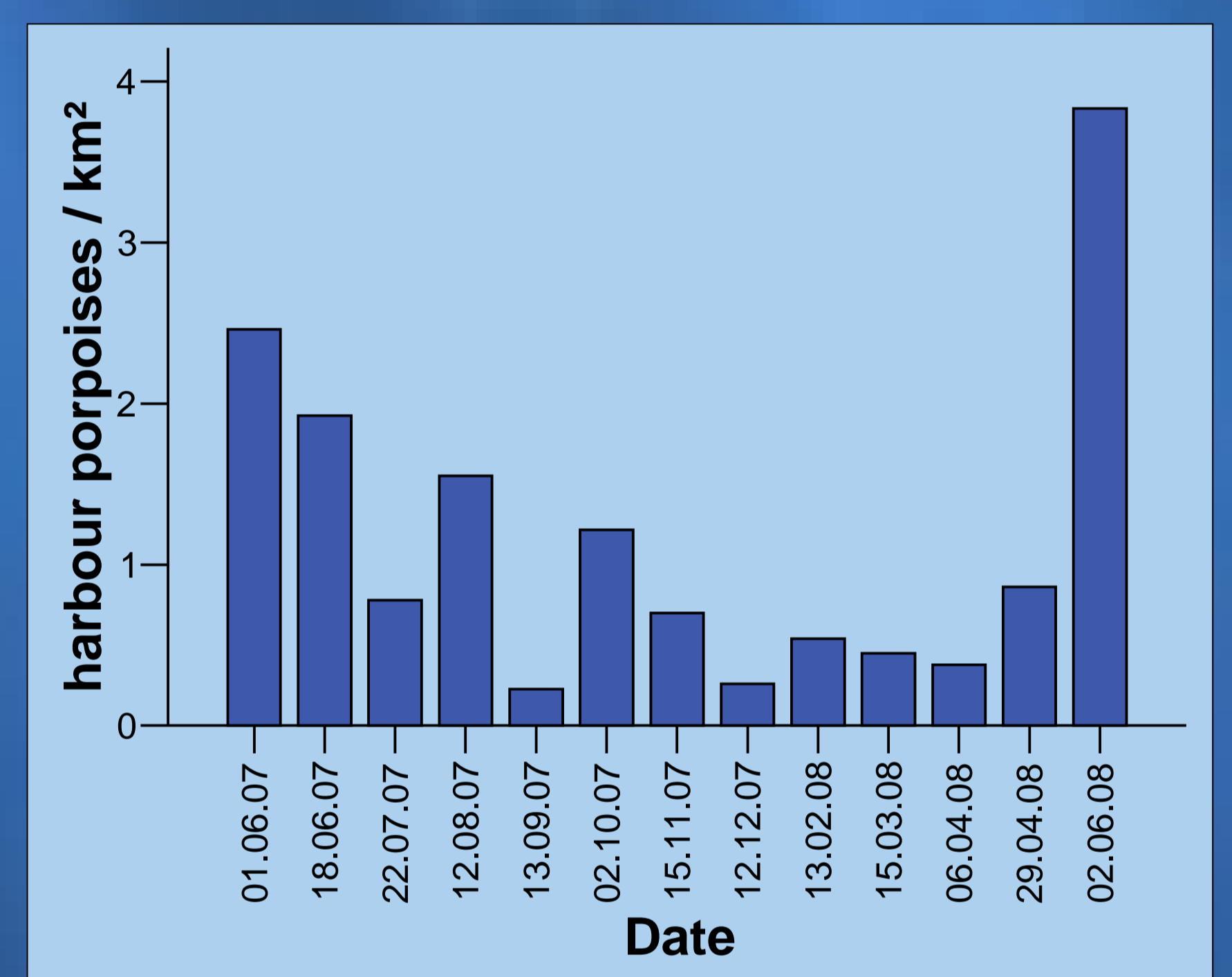


Fig.1: Porpoise densities during all aerial surveys.

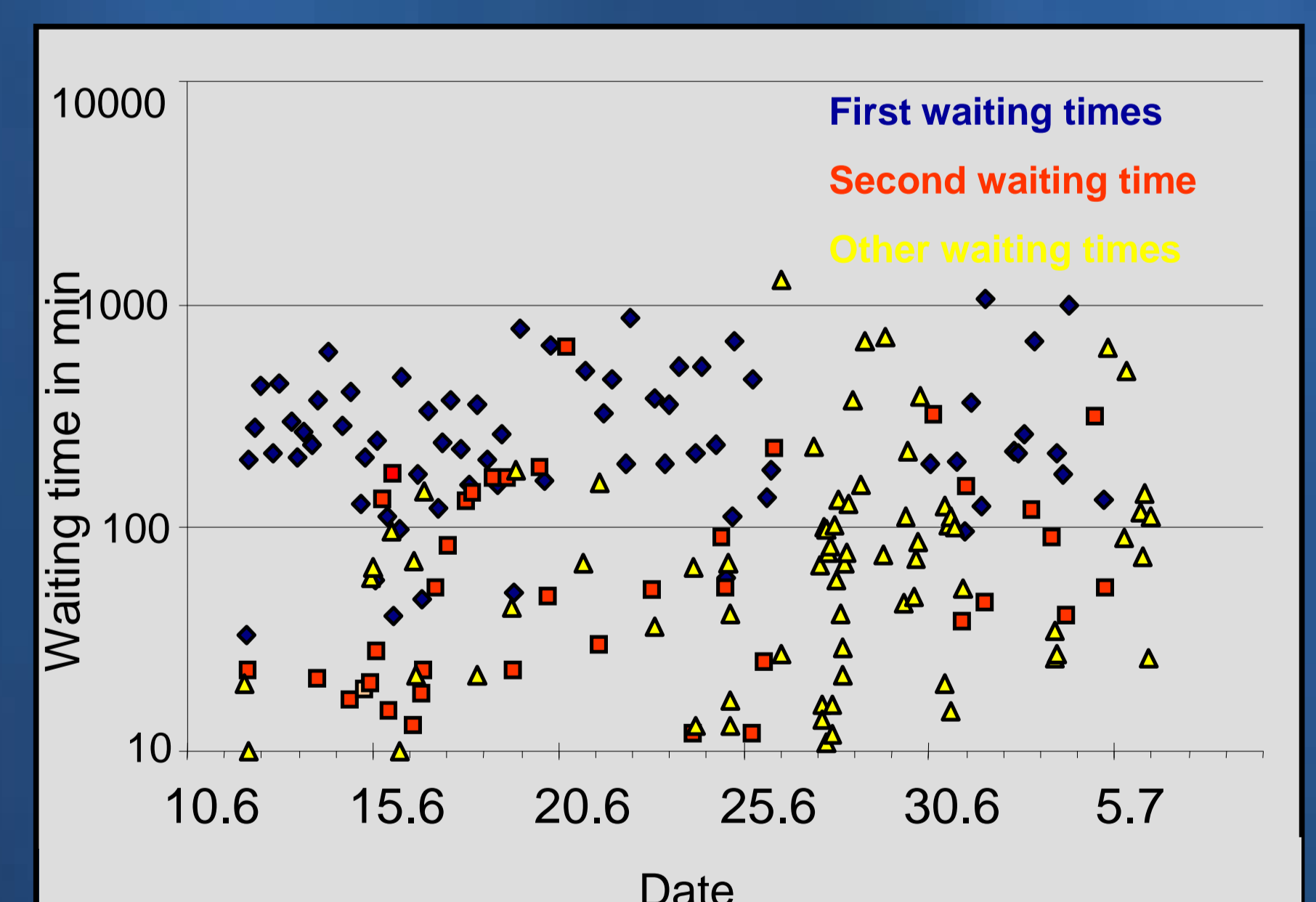


Fig.3: Waiting times between porpoise encounters detected by T-PODs.

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