Monitoring marine mammals at alpha ventus

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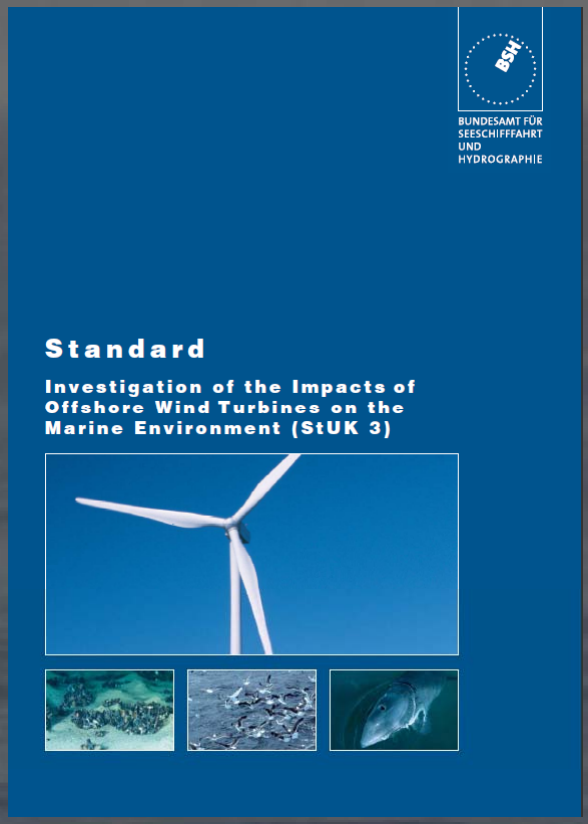
Standardised Monitoring: StUK3

3 Objectives:

- Determine abundance, spatial distribution + temporal variability before construction
- Monitor effects of construction, operation + decommissioning
- Establish a basis for evaluating the results

★ without noise mitigation



StUK3: 3 approaches for investigating marine mammals

1. Aerial surveys: 183m / 76m

2. Ship surveys

3. Passive Acoustic Monitoring (PAM) at 12 stations

METHODS

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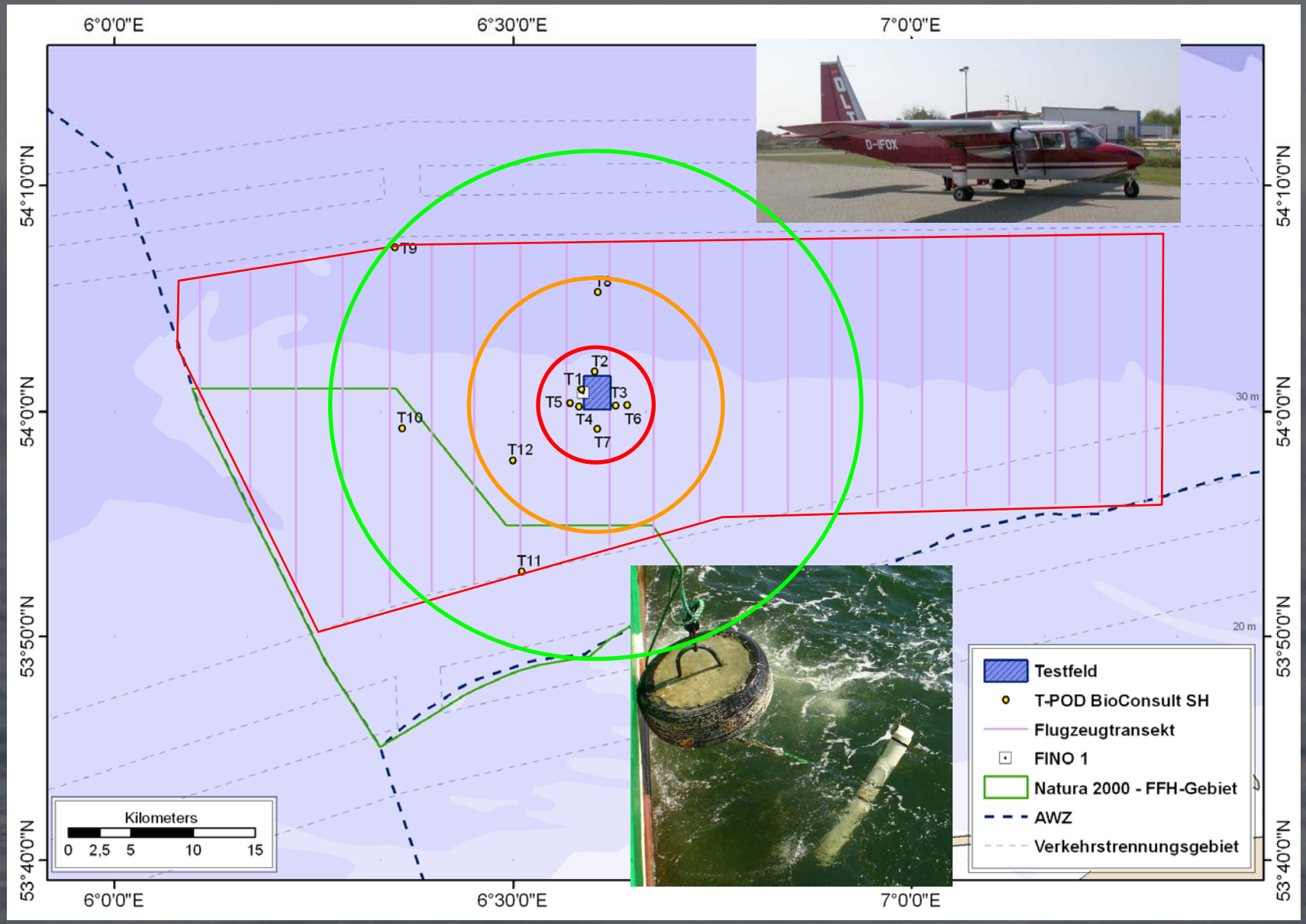
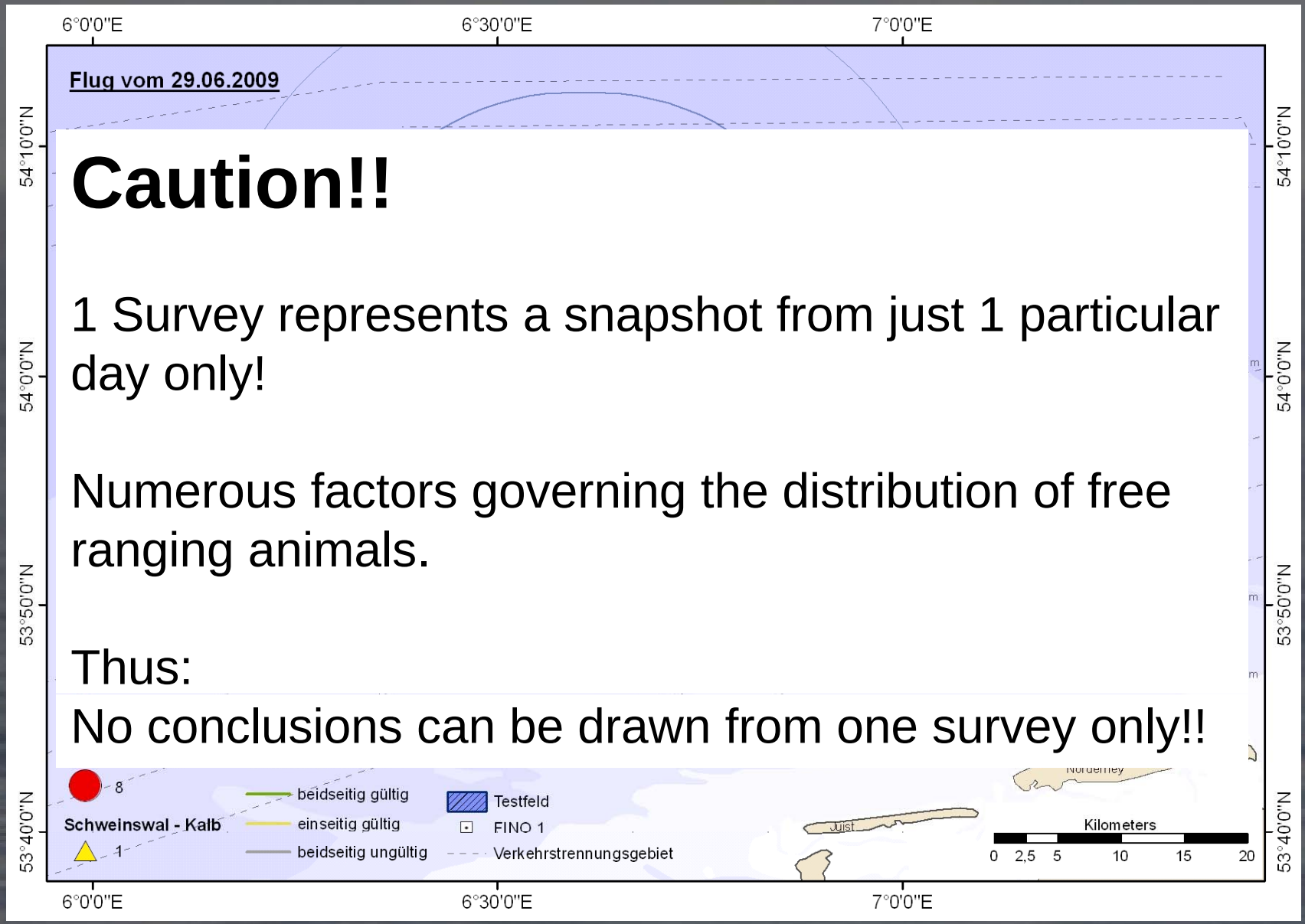




Caution!!

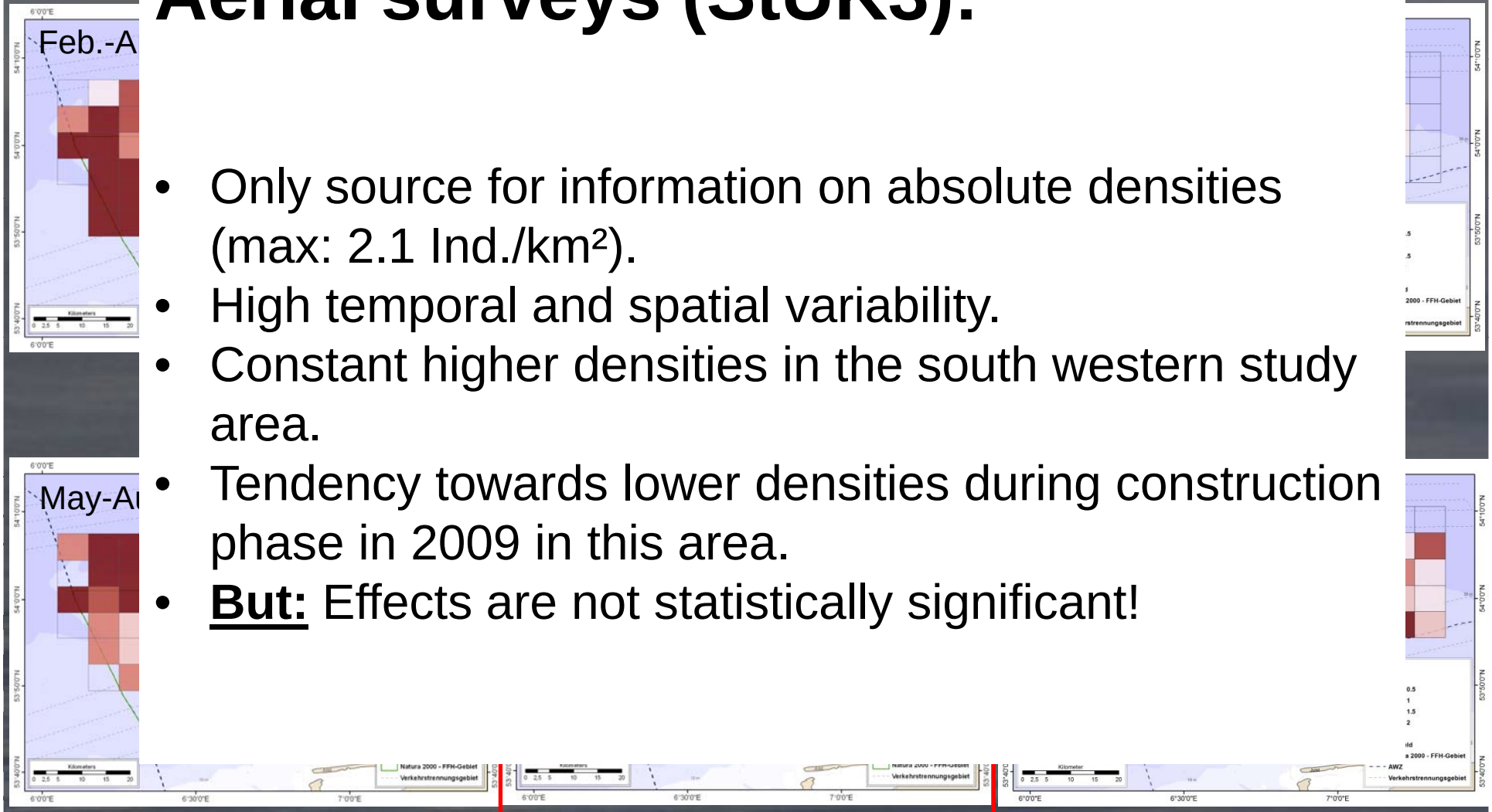
1 Survey represents a snapshot from just 1 particular day only!

Numerous factors governing the distribution of free ranging animals.

Thus:

No conclusions can be drawn from one survey only!!

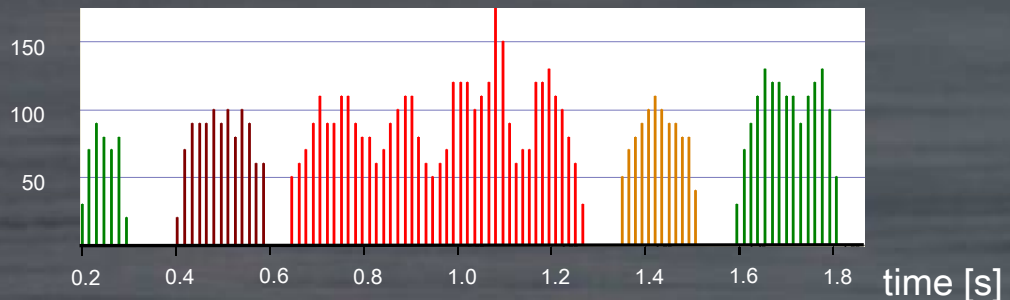
Aerial surveys (StUK3):

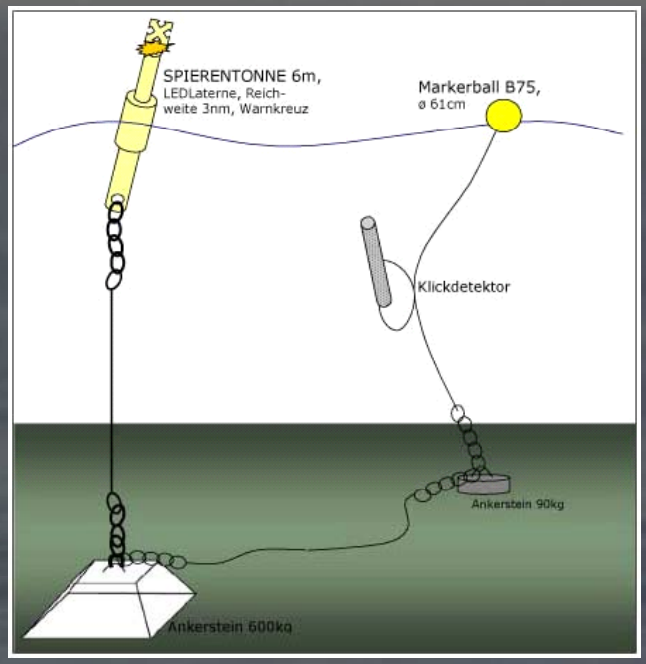


- Only source for information on absolute densities (max: 2.1 Ind./km²).
- High temporal and spatial variability.
- Constant higher densities in the south western study area.
- Tendency towards lower densities during construction phase in 2009 in this area.
- **<u>But:</u>** Effects are not statistically significant!

Porpoise Click Detector (POD; Chelonia.Ltd)

- Continous recording of high frequency sound events.





- Porpoise Positive Time:
  - „PP10M/day“
  - „PPM/hour“
- Waitingtime = time period between two consecutive porpoise events (at least 10 minutes)

RESULTS+DISCUSSION

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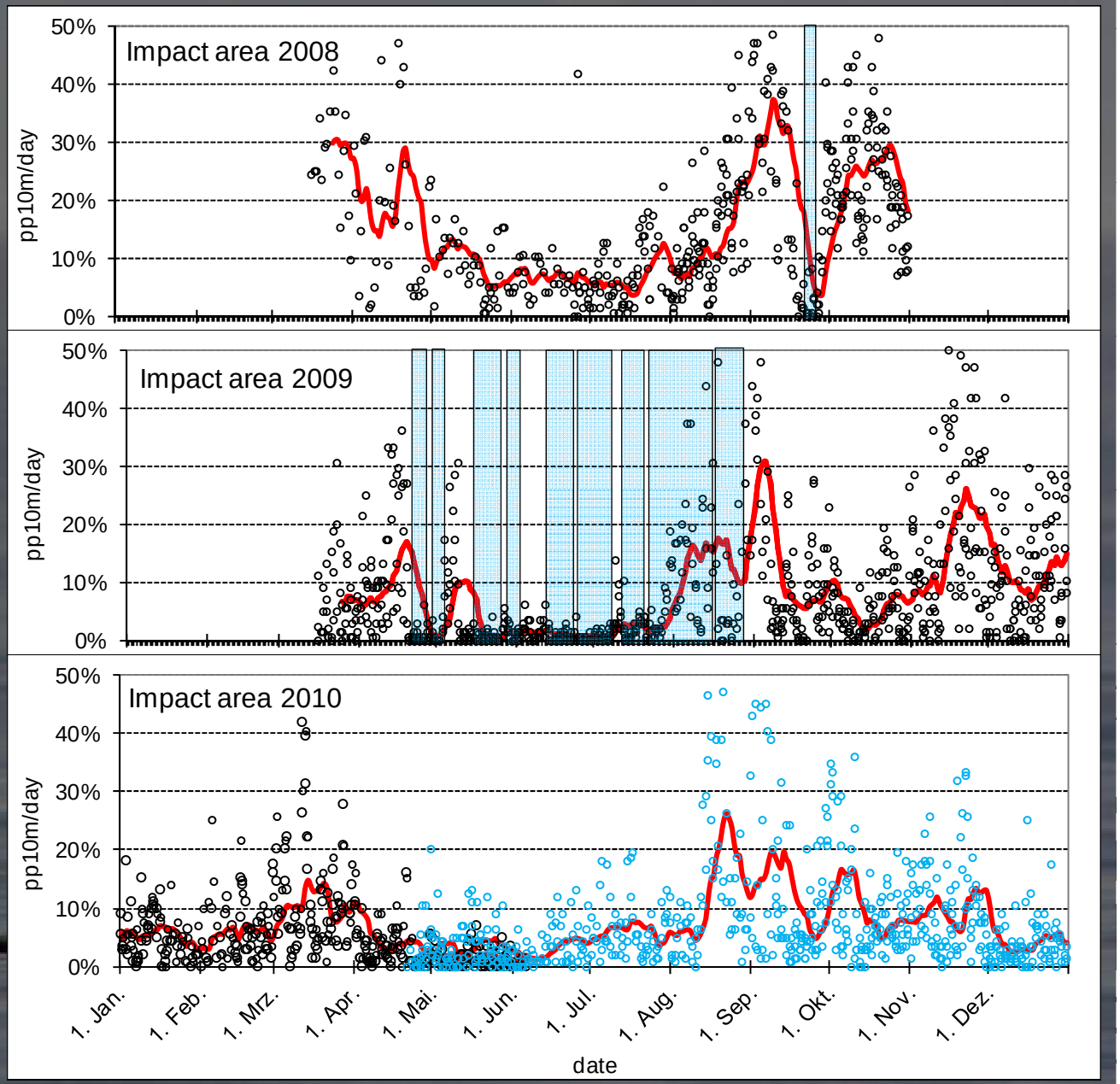
3 PODs close to windfarm:

- Detections every day.
- High variability from day to day.
- Clear seasonal trend over 3 years.
- Pile driving during a period of (natural) minimum abundance.
- Increasing detection rate before pile driving was finished.

Challenge: Analysis of ramming effects next to other effects (season, year, food, etc).



RESULTS+DISCUSSION

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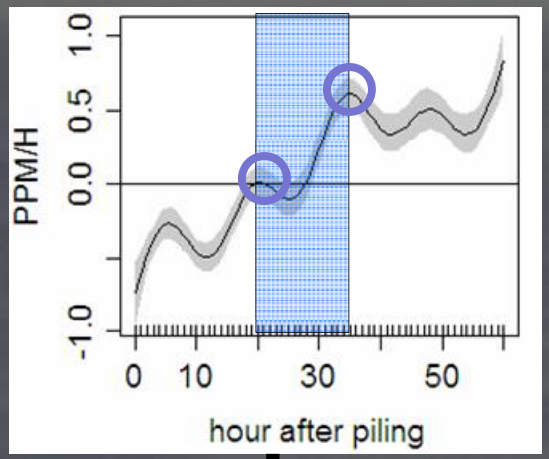
GAM-Analysis: PPM/hour ~ „hours after piling“ + „distance“ + „time of day“

Dist. group 1 (0.5 – 4 km)



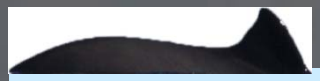
20 – 35 hours

PPM/hour (after pile driving stopped)

1- 4 km:	20-35 h
6-10 km:	9-12 h
14-22 km:	no effect

Waitingtime (including time of pile driving)

1- 4 km:	27 h (13-70 h)
6-10 km:	16 h (8-24 h)
14-22 km:	5 h (4 - 6 h)



SUMMARY

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- Porpoises are present every day (>2 Ind./km²).
- Clear spatial pattern: More porpoises year round in the Borkum Reefground area.
- Clear seasonal pattern: Low detection rate from May to July around Alpha Ventus . Stable over 3 years.
- Analysis of POD data could prove a negative effect of pile driving on porpoises:
  - The effect shows a gradient in both, spatial and temporal scale.
  - Strong effect nearby (up to 35 h)
  - Weak effect over 14 km away (during time of pile driving).
- Results fit very well to findings at Horns Rev II.

CONCLUSION

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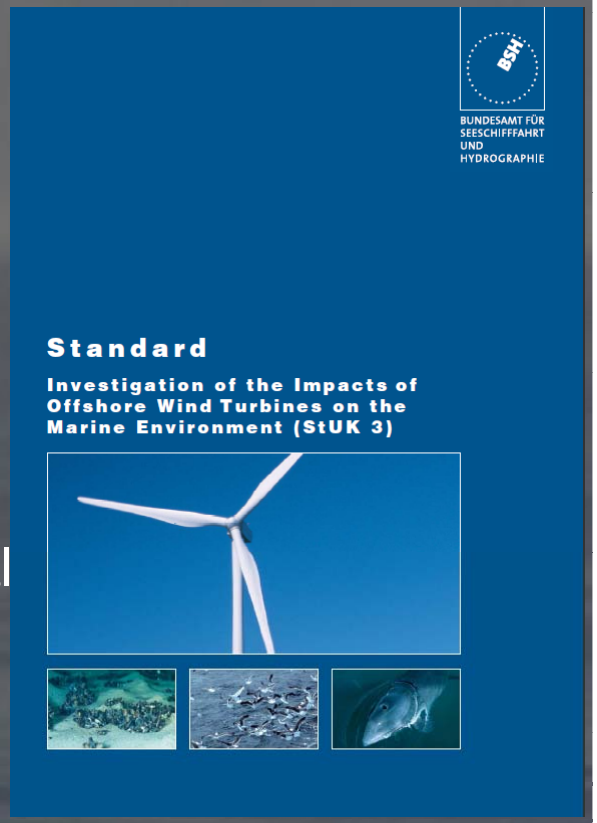
Standardised Monitoring: StUK3

The StUK3-Monitoring at Alpha Ventus could:

- Show a high variability in spatial + temporal distribution before construction.
- Prove a negative effect of pile driving activities on harbour porpoises with both, a spatial and temporal gradient.
- Establish a robust basis for evaluating the results.



High variability in ecological data calls for:

- **Clear questions to be answered (windfarm specific effects versus cumulative effects).**
- **A robust data basis.**

Thank you for your attention!

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