Something about cetacean heart rates and ballistocardiograms

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Text of abstract

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Keywords: keyword 1; keyword 2; keyword 3

Highlights: These are the highlights.

# 1 Introduction

Here is a citation (Marwick, 2017)

# 2 Background

# 3 Methods

# 4 Results

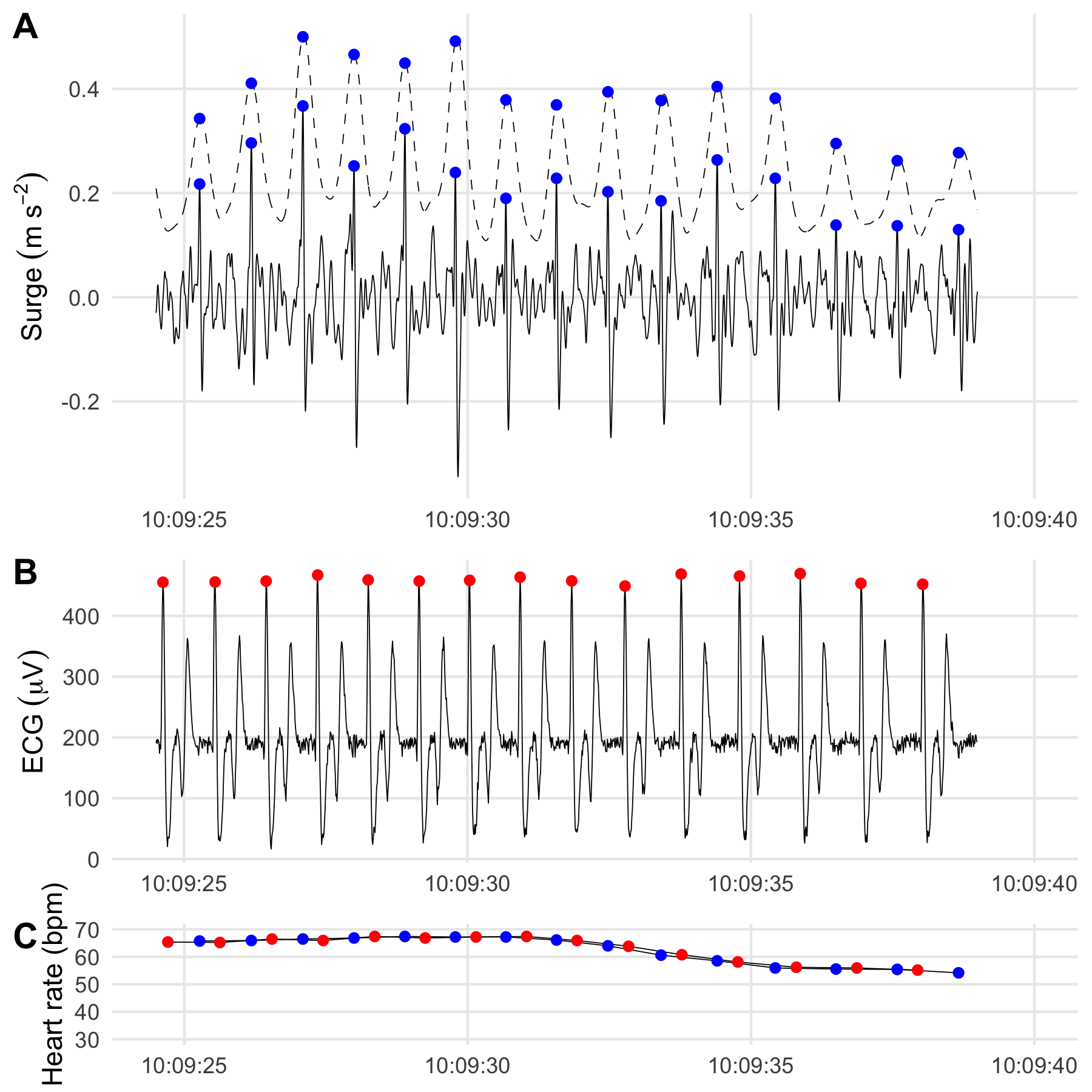


Figure 4.1: A: BCG, B: ECG, C: BPM comparison

#> [1] "0.5% ± 0.3% (mean ± sd))"

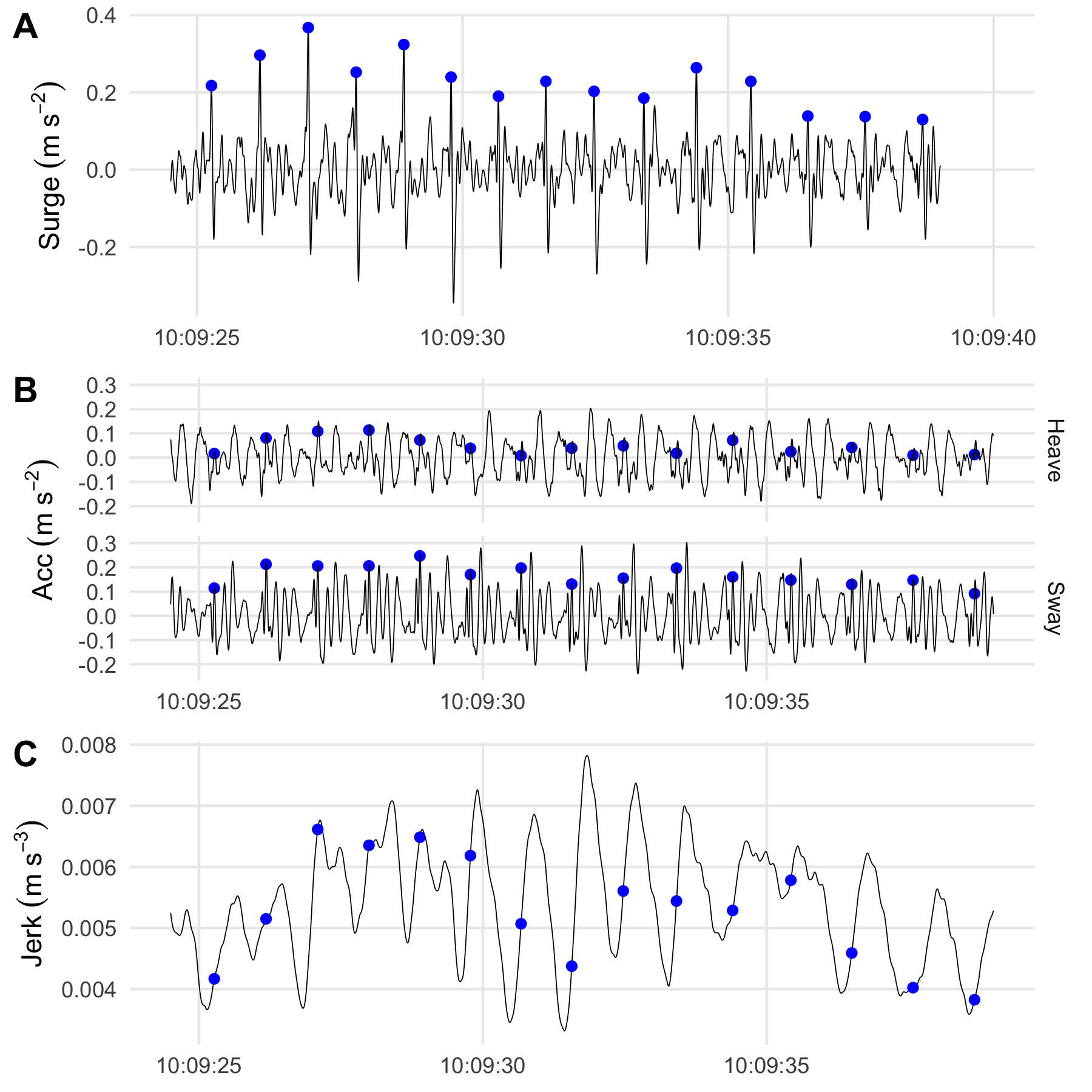


Figure 4.2: A: The BCG signal is clearest in surge (longitudinal axis acceleration). Solid line: surge bandpass filtered to [1.0 25.0] Hz. Dashed line: local range of surge in 0.25 s sliding window (smoothed). Blue dots indicate peak of the BCG I-wave. B: BCG signal is not as strong in heave (dorso-ventral axis) or sway (lateral axis) as in surge. The sway signal is likely due to movement of the chest cavity (see video S1). C: Some, but not all, heart beats are visible as peaks in the norm of the jerk vector.

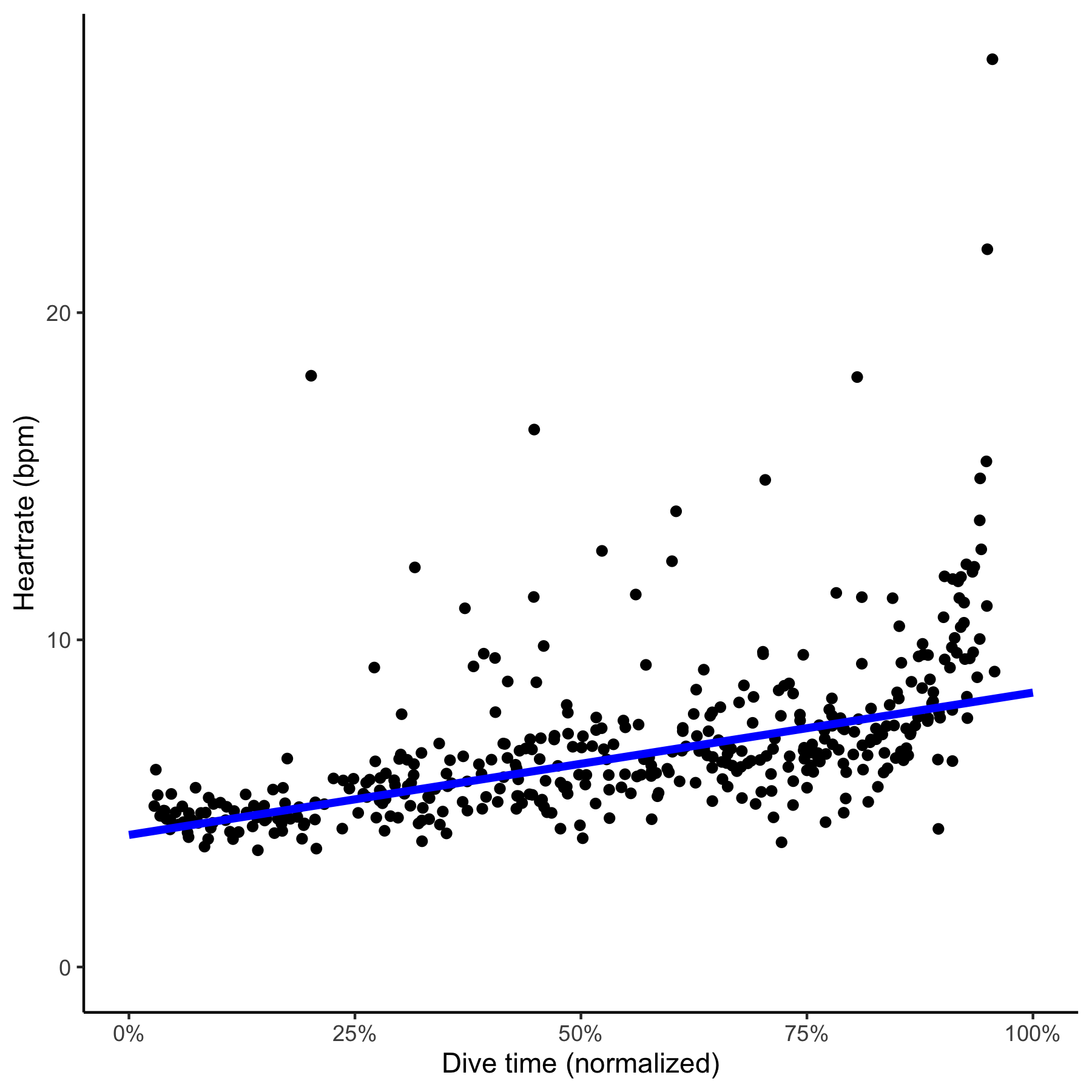


Figure 4.3: Heartrates observed in the ballistocardiogram exhibit characteristic diving physiology patterns. Bradycardia is greatest at the start of the dive (~4-5 bpm), increasing towards the end (~8-9 bpm).

The magnitude of bradycardia was strongest at the start of dives and relaxed towards the end. On average, heartrate increased from 4 bpm at the start of dives to 8.4 bpm by the end (Theil-Sen regression, ).

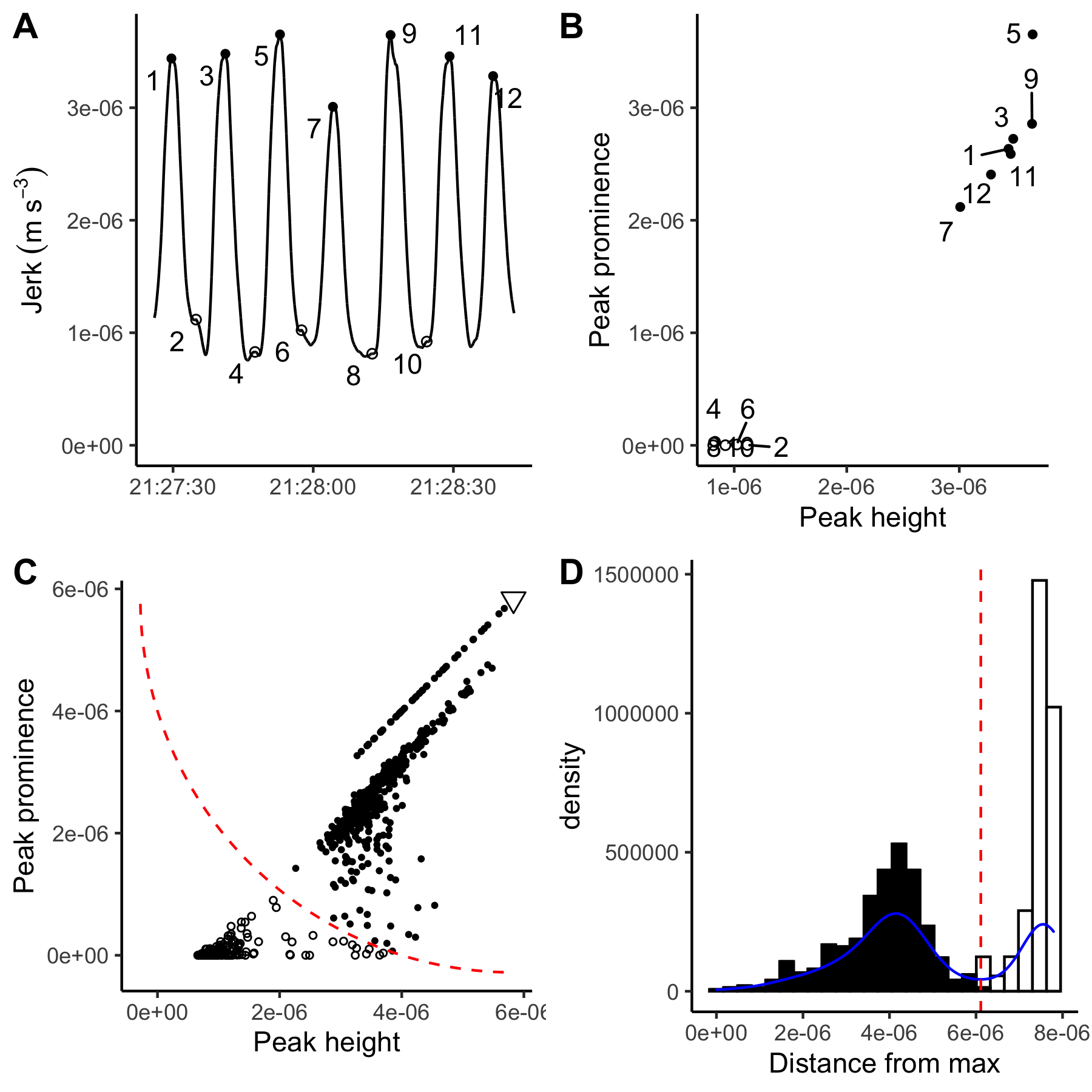


Figure 4.4: Major peak selection procedure for identifying heartbeats. A Even after smoothing, the norm of the jerk vector (line) has peaks that correspond to heartbeats (solid points) and artifacts (hollow points). We used a data-driven approach to retaining only major peaks. 75 s data excerpt shown as example. B In height-prominence space, peaks form two clusters corresponding to valid heartbeats (solid) and artifacts (hollow). C To separate the clusters, we calculated each peak’s distance from the greatest peak (triangle); retaining all peaks closer to the greatest peak (solid circles) than the valley in the bimodal distance distribution (red dashed line) and rejecting the farther peaks (hollow circles). D The bi-modal distribution of peak distances. We selected the the valley in the distance density (blue line) for the distance threshold (red dashed line). Solid and hollow histogram bars correspond to retained and rejected peaks, respectively.

Figure 4.1 shows how we can have a caption and cross-reference for a plot.

# 5 Discussion

# 6 Conclusion

# 7 Acknowledgements

# 8 References

Marwick, B., 2017. Computational reproducibility in archaeological research: Basic principles and a case study of their implementation. Journal of Archaeological Method and Theory 24, 424–450. <https://doi.org/10.1007/s10816-015-9272-9>

### 8.0.1 Colophon

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