Integrating Motus tracking into aerofauna monitoring at offshore wind projects

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Atlantic Offshore Wind Assessment Collaborative

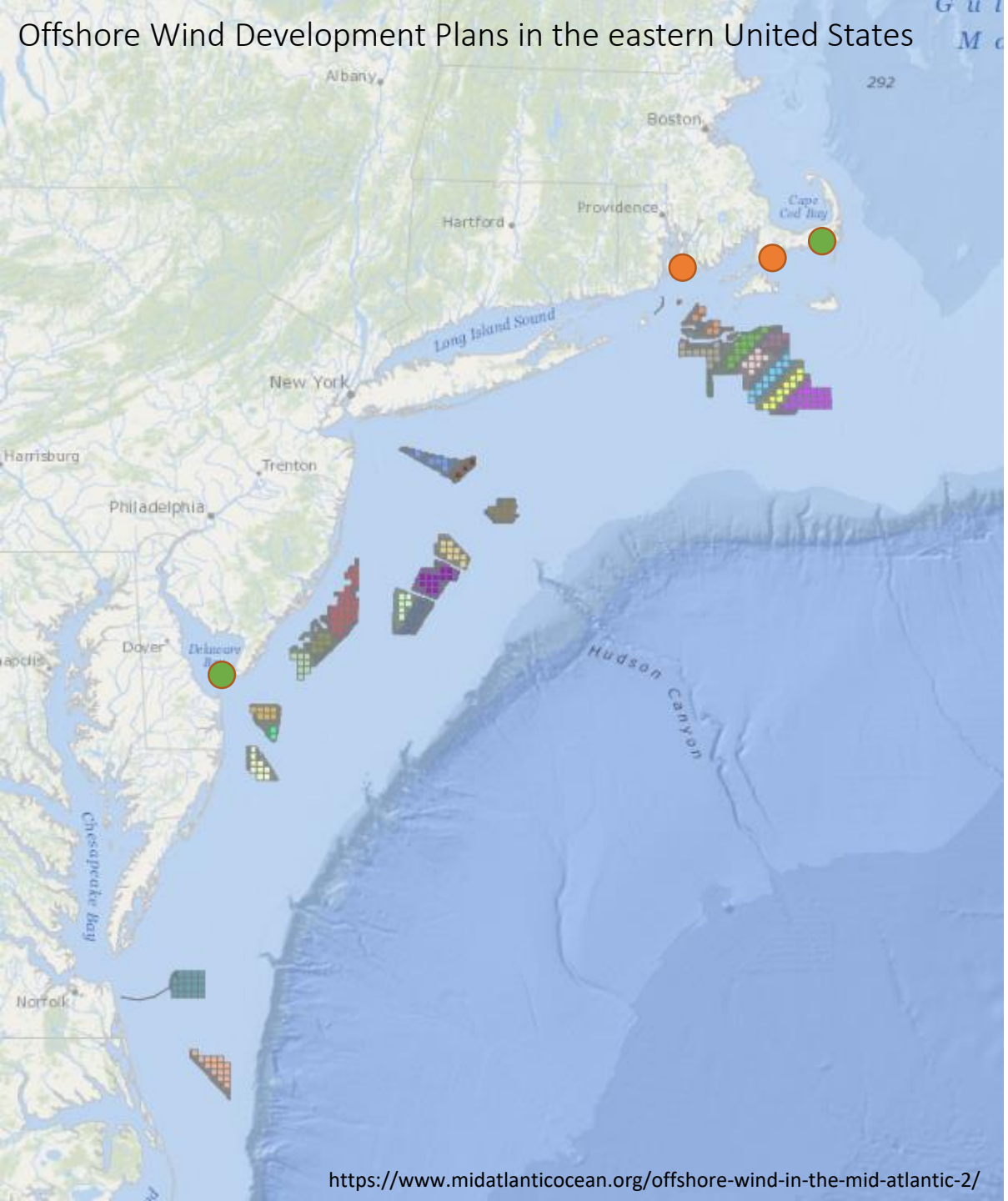
THE UNIVERSITY OF RHODE ISLAND

BOEM
Bureau of Ocean Energy Management

Motus.org/resources

U.S. DEPARTMENT OF ENERGY

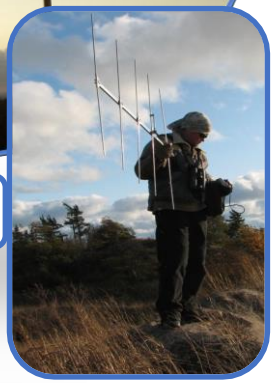
Offshore Wind Development Plans in the eastern United States



https://www.midatlanticocean.org/offshore-wind-in-the-mid-atlantic-2/

Animals and Tracking Devices

Motus



Receiving Stations

Users

Motus Database

Conservation Science

- Basic Discovery
- Policy and Management
- Public Engagement and Education
- Conservation Action

Public Interface

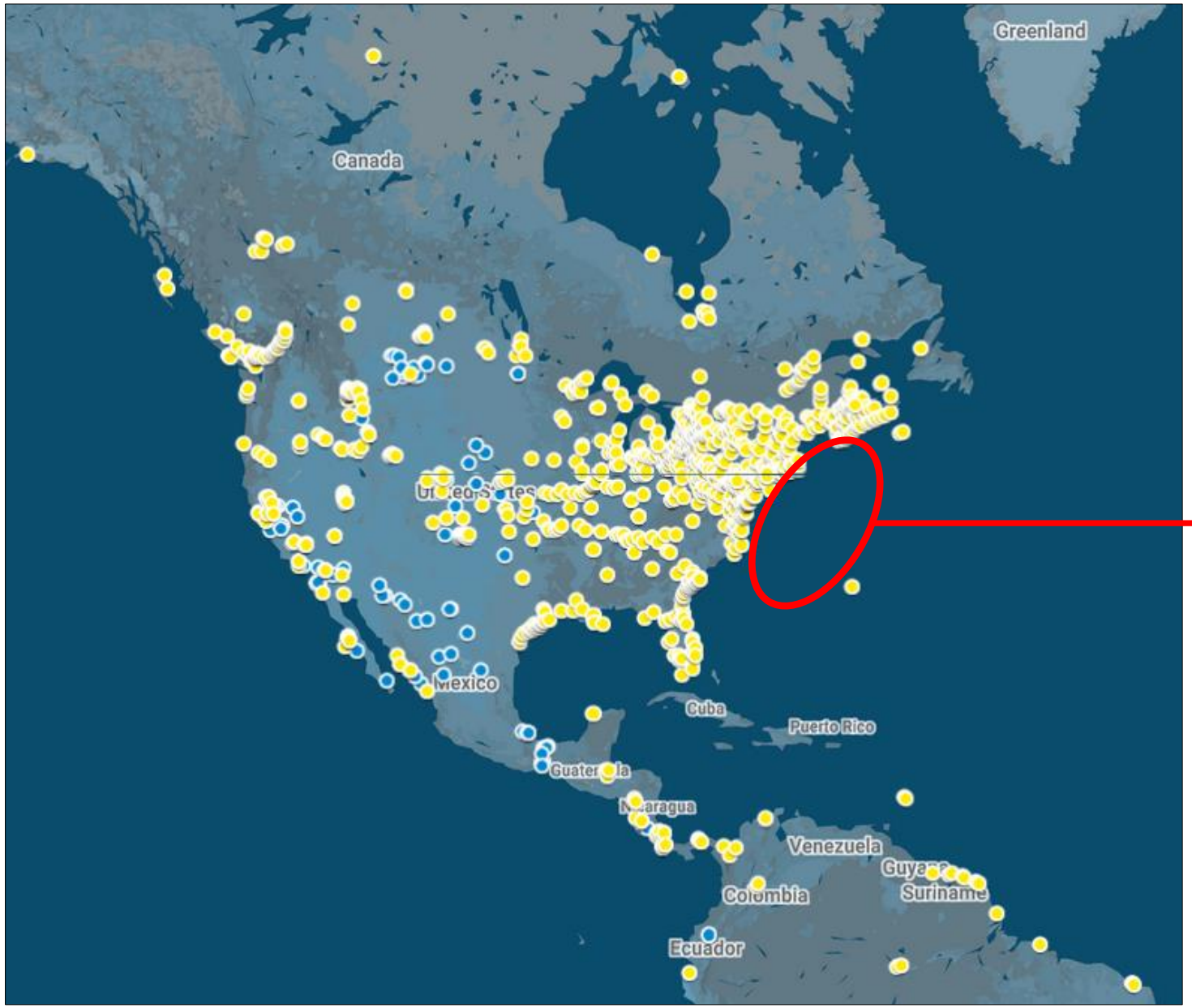
Other data portals and tools

MOVEBANK For Animal Tracking Data

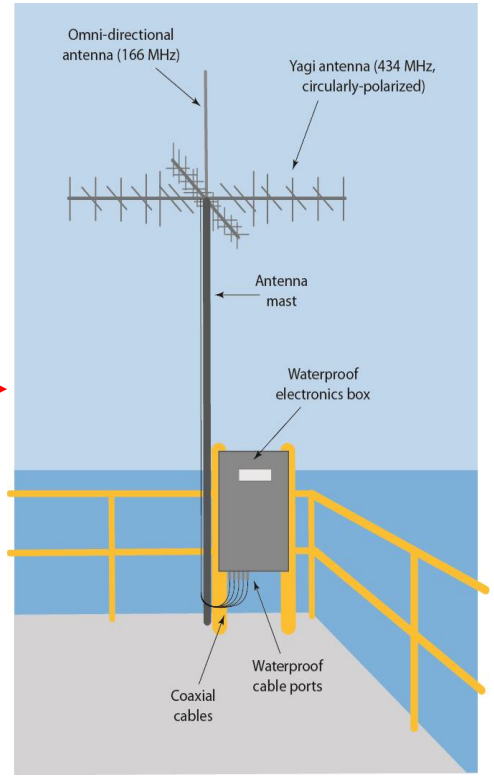
R

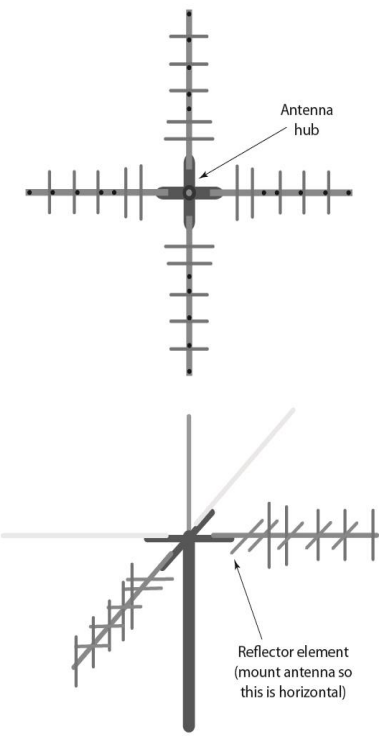
Avian Knowledge Network

Extent of current Motus network



Offshore Deployments Can Fill This Gap





Projects Goals

- Create clear guidance for integrating Motus stations into offshore wind projects
- Provide decision support tools for designing offshore Motus monitoring studies
- Determine the optimal deployment of resources for assessing the presence/absence and movements of offshore bird species

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https://seagrant.gso.uri.edu/wp-content/uploads/2016/09/Block-Island-Wind-Farm-1.jpg

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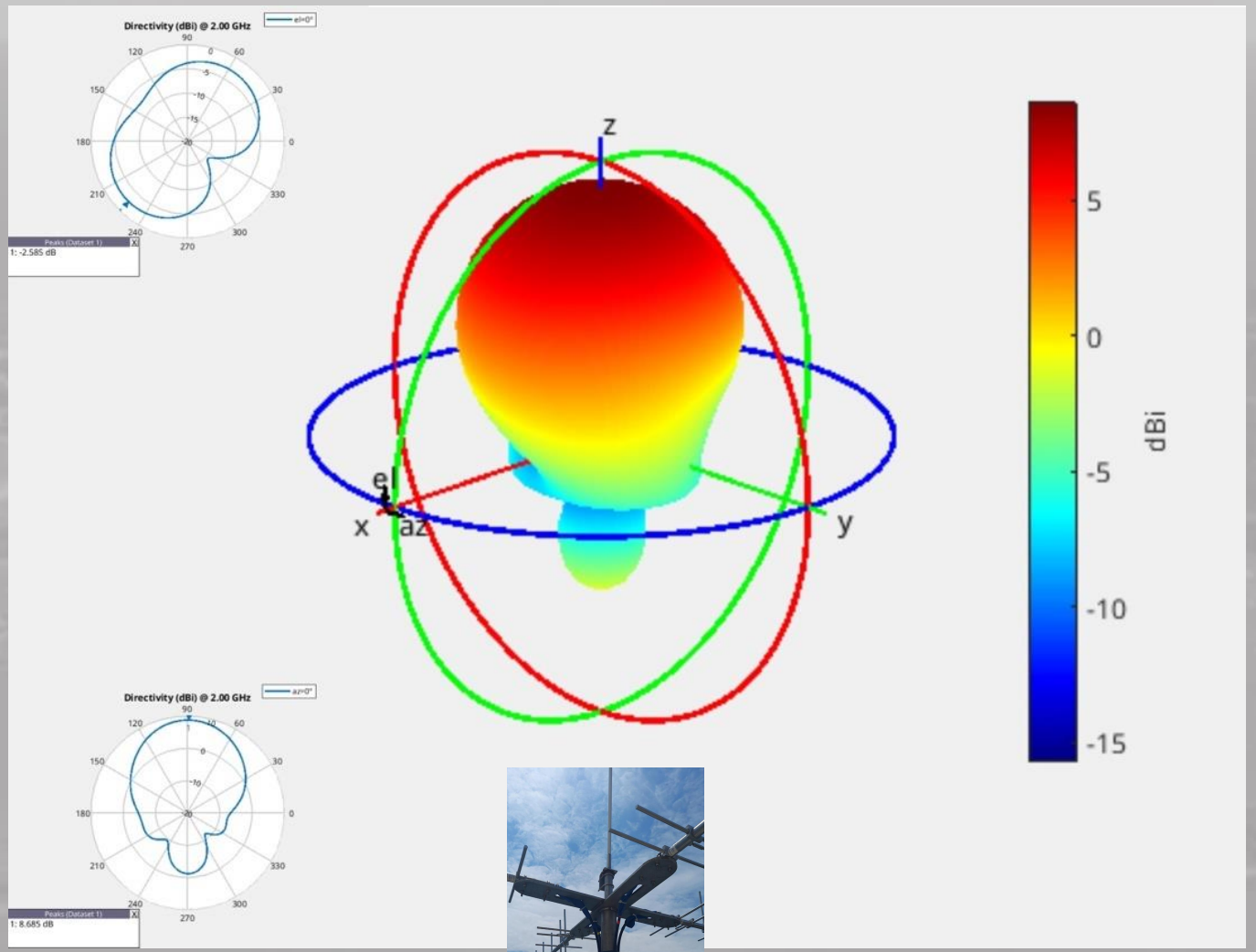
Offshore station calibration

Sea-based methods

Air-based methods

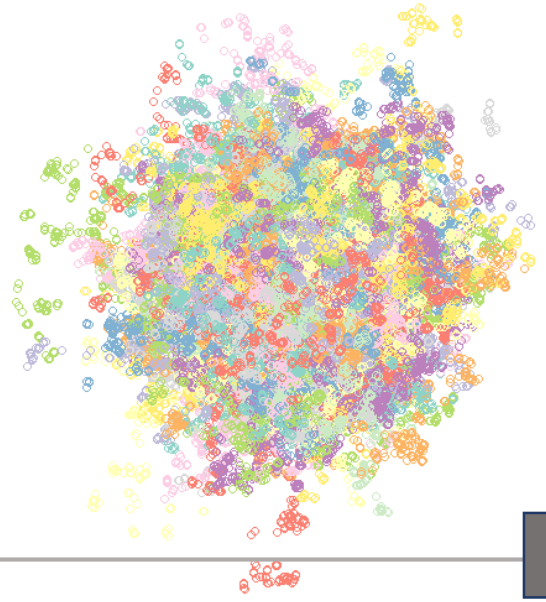
Offshore Station calibration

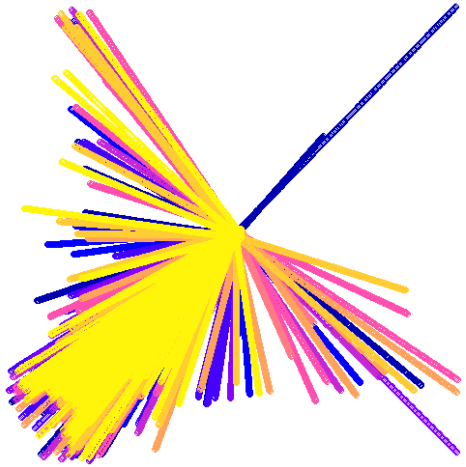
- Detection field is estimated using signal strength values from known position calibration points
- Both omni and directional antennas calibrated
- Used for method evaluation, position estimation and study design assessment

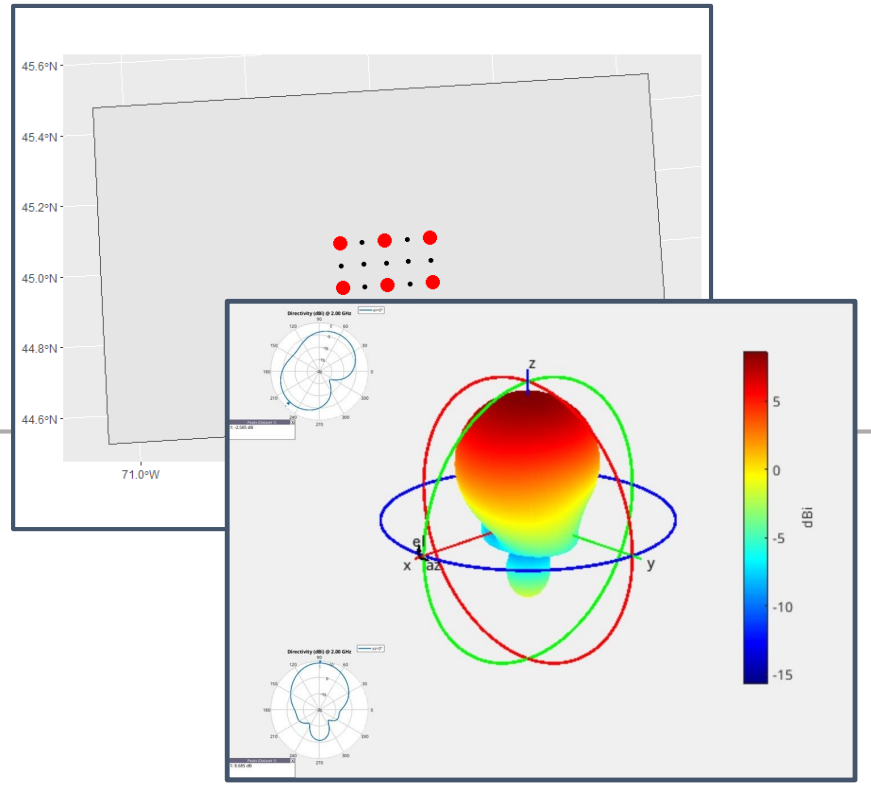


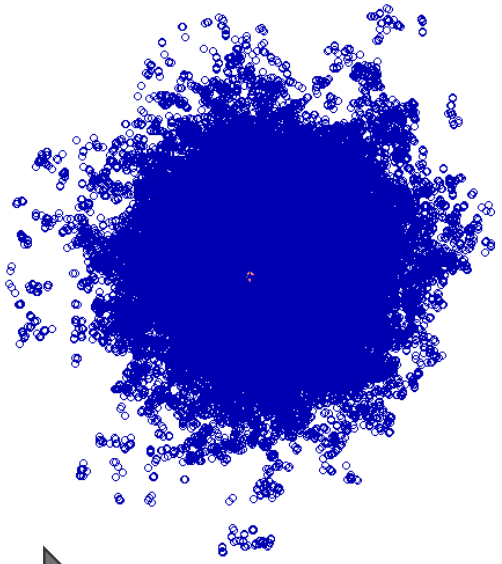
Motus simulation

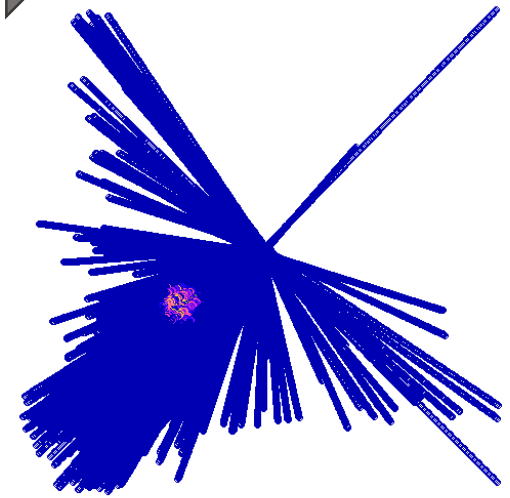
Detection threshold = -100dB±3











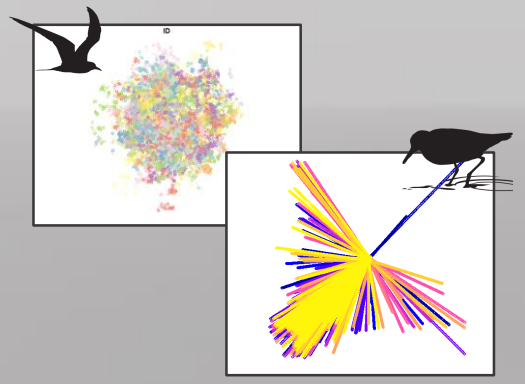
Movement Tracks

Station locations and calibrations

Estimated detections

Motus Design Analysis

Strata



Movement Type

Number of Motus Stations

1 – 6

(7-40% coverage)

1000

300

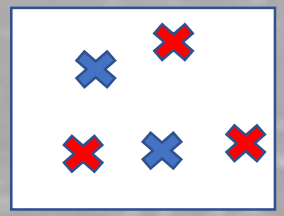
50

5

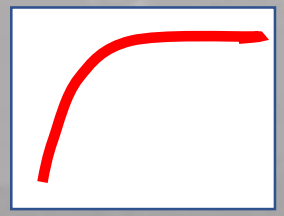
Flight Height

Metrics

Individuals Detected

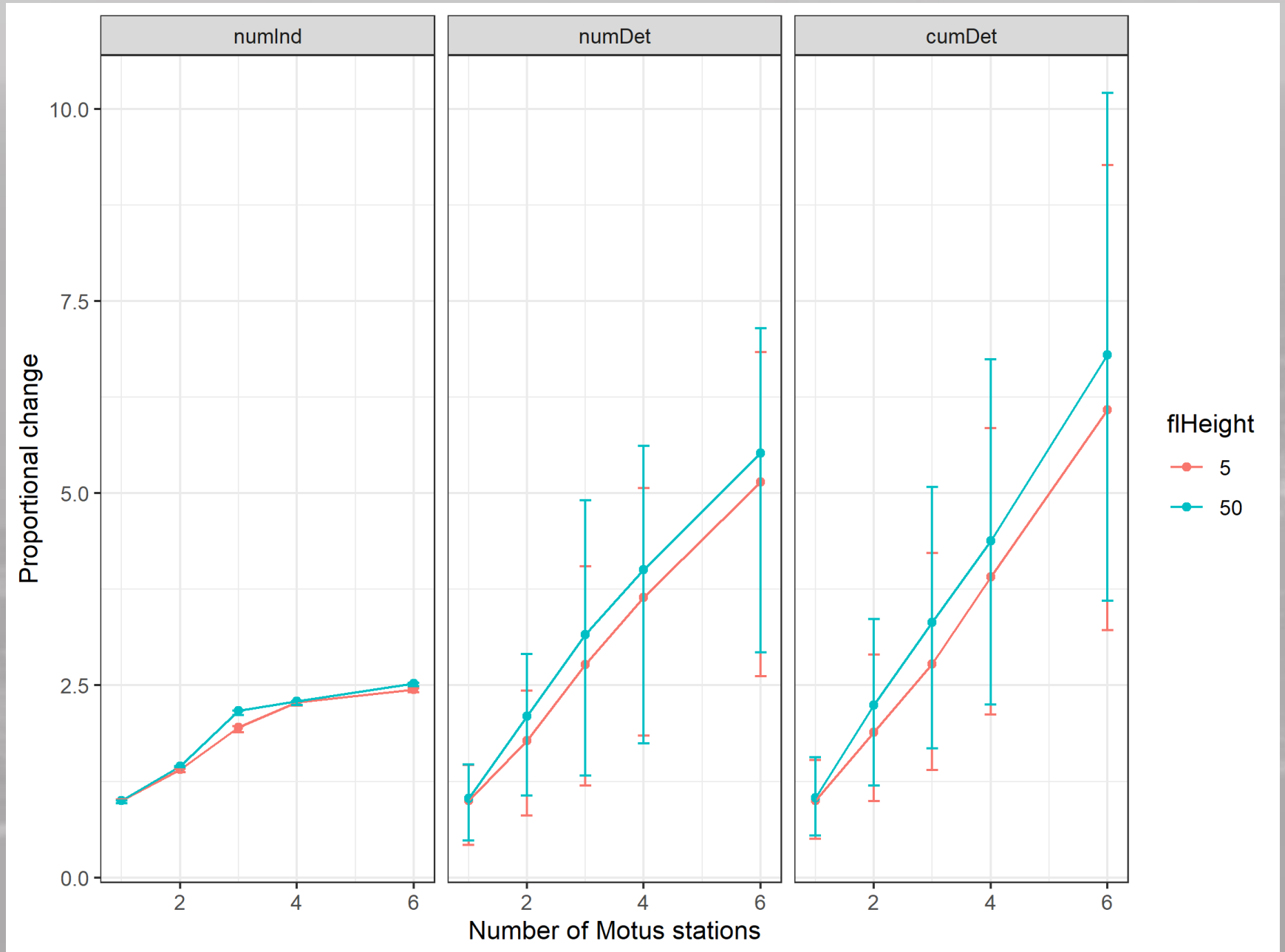


Positions Detected



Cumulative Detections

Results: Seabirds



Key Takeaways:

Number of individuals detected plateaus after 3-4 stations

Effort translates into more positions detected and cumulative detection probability

Flight height increases detection probability by a small amount

Uncertainty in detection can significantly alter outcomes

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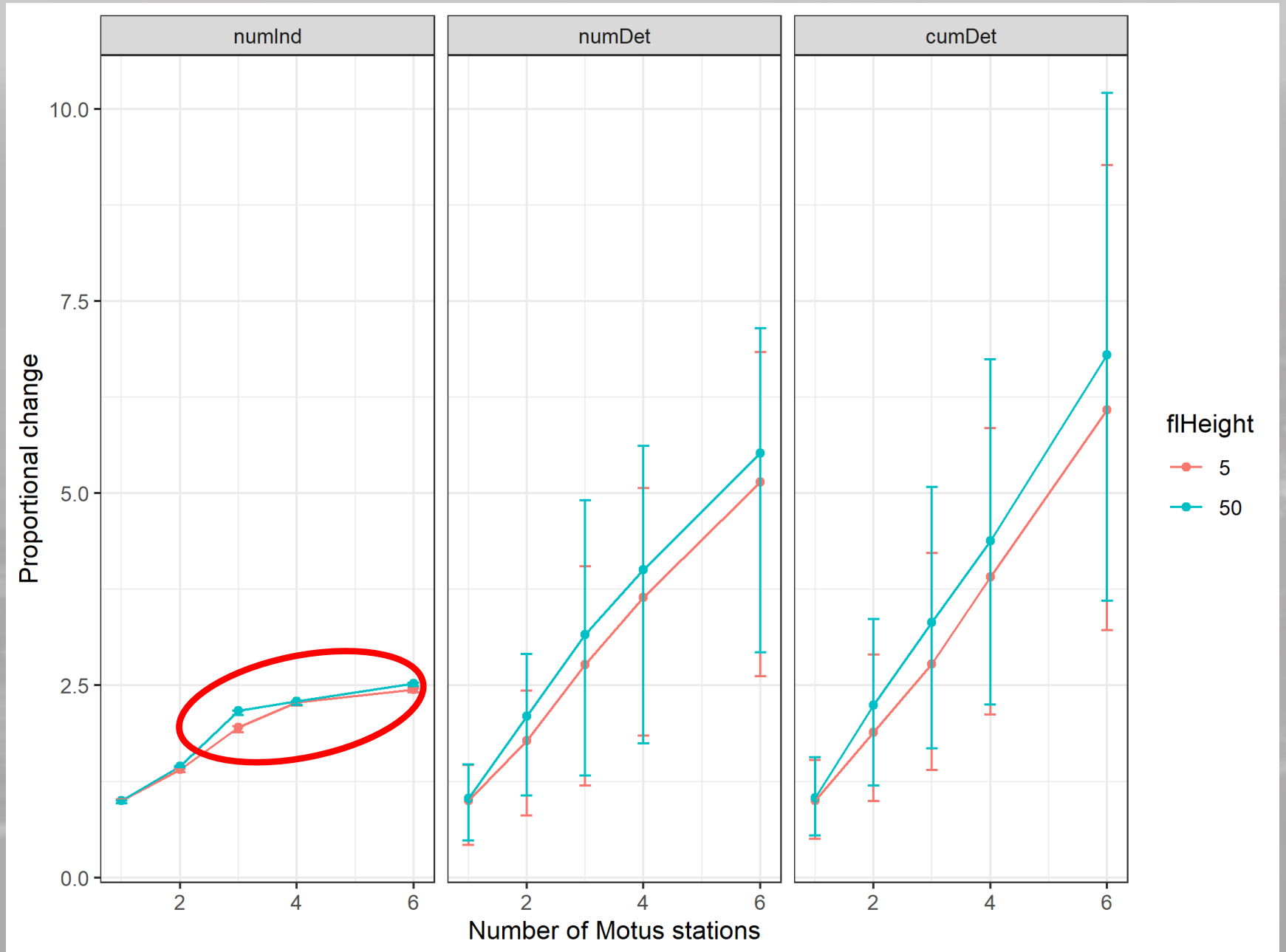

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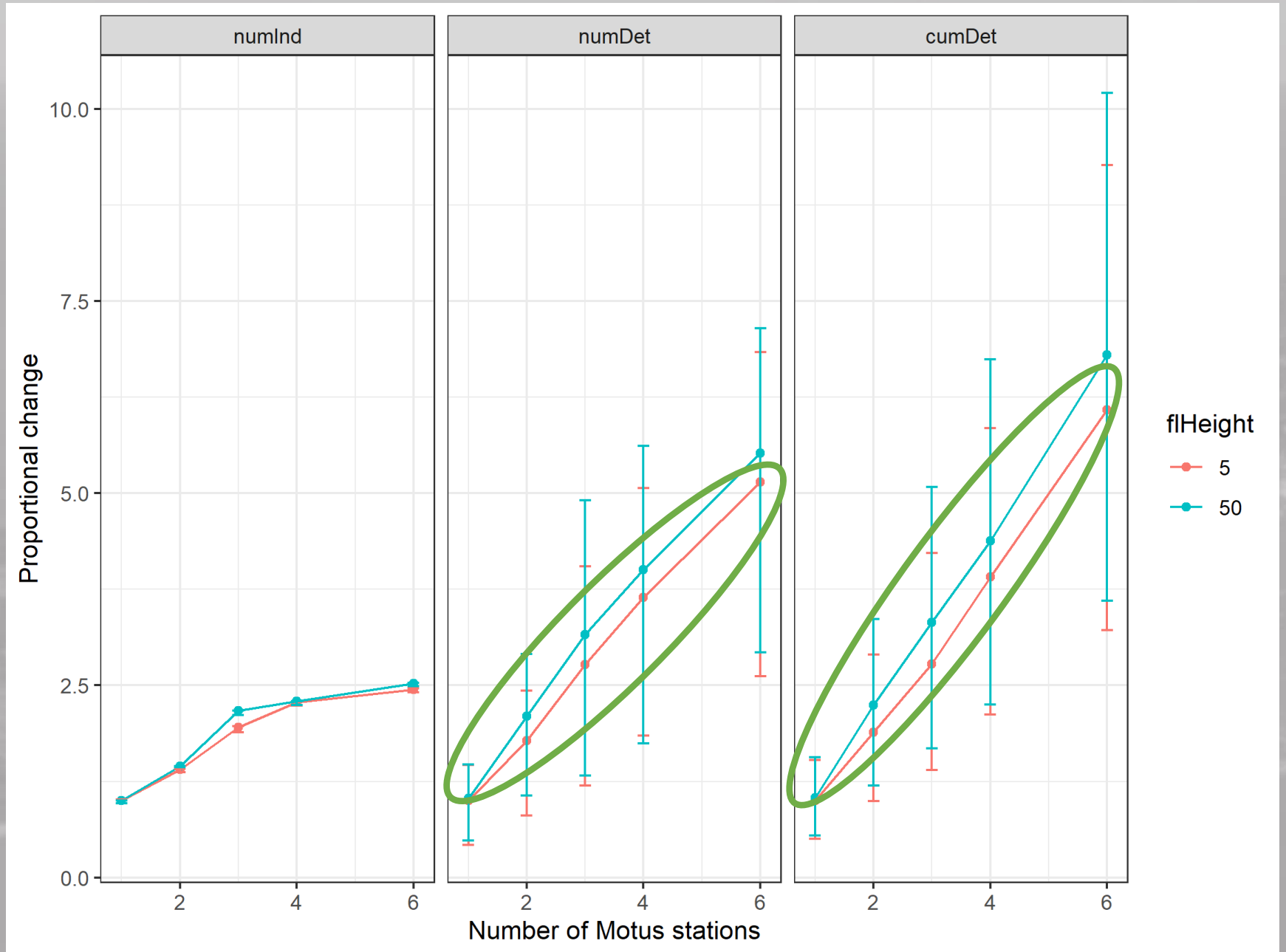

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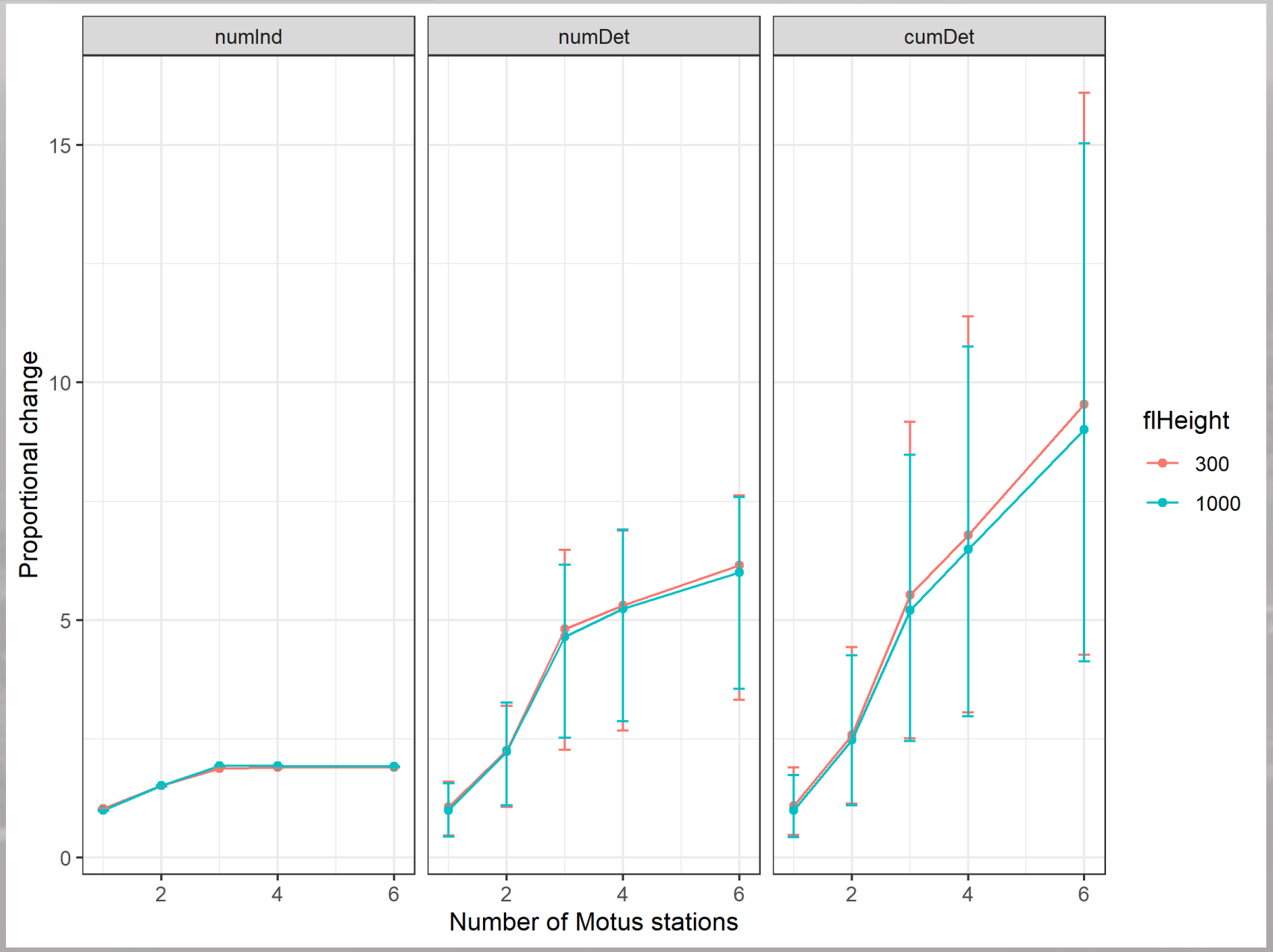

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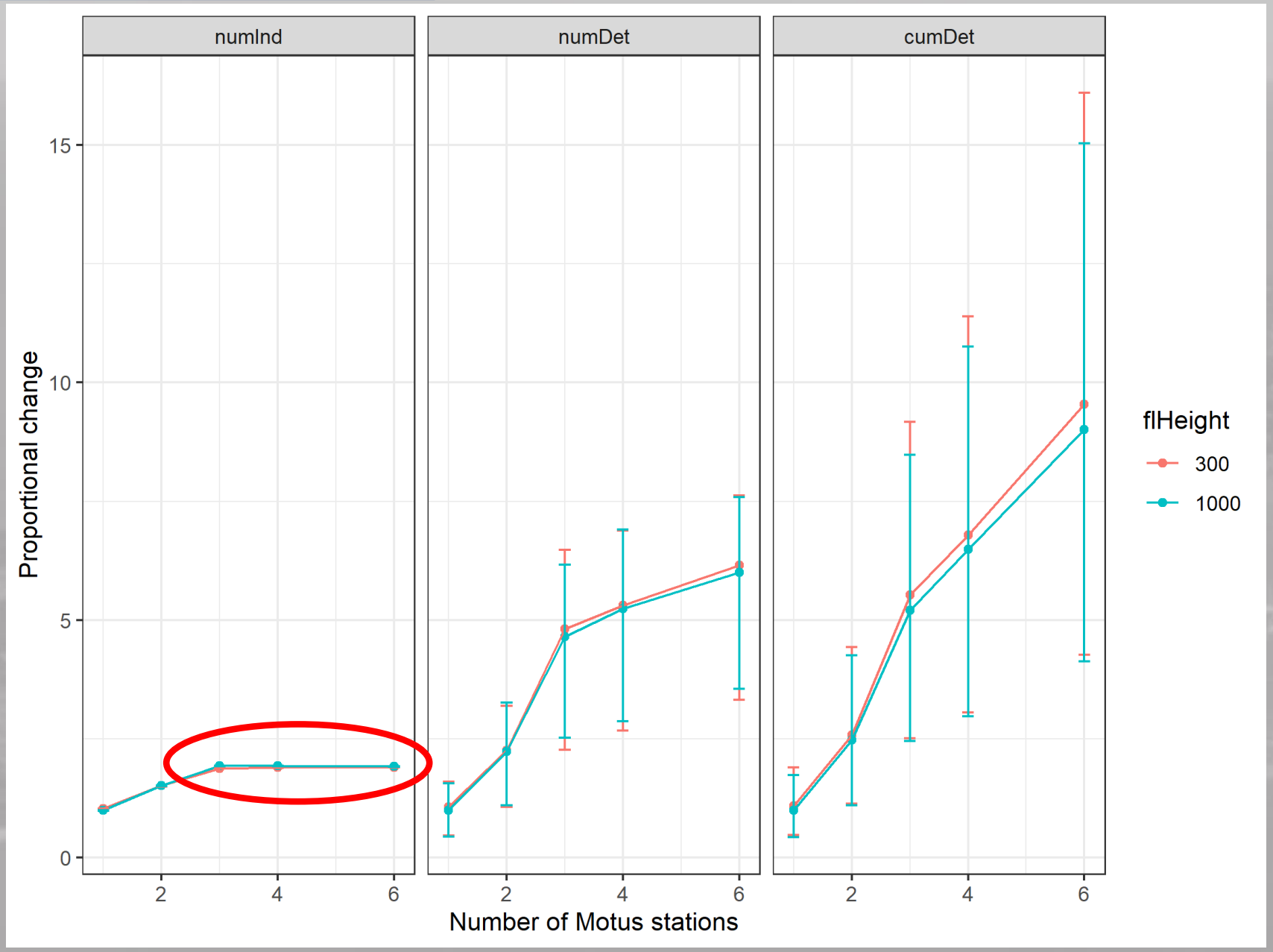

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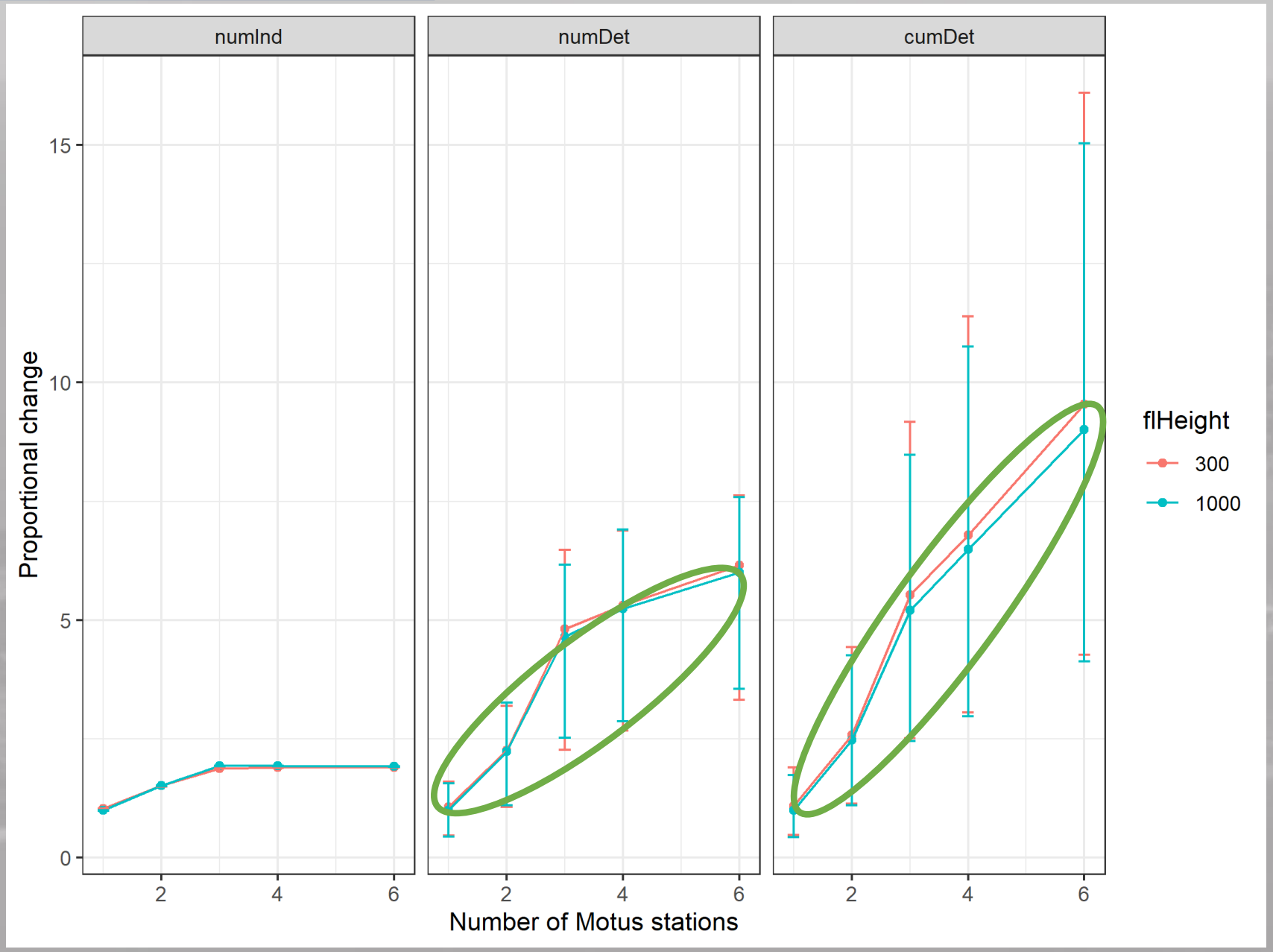

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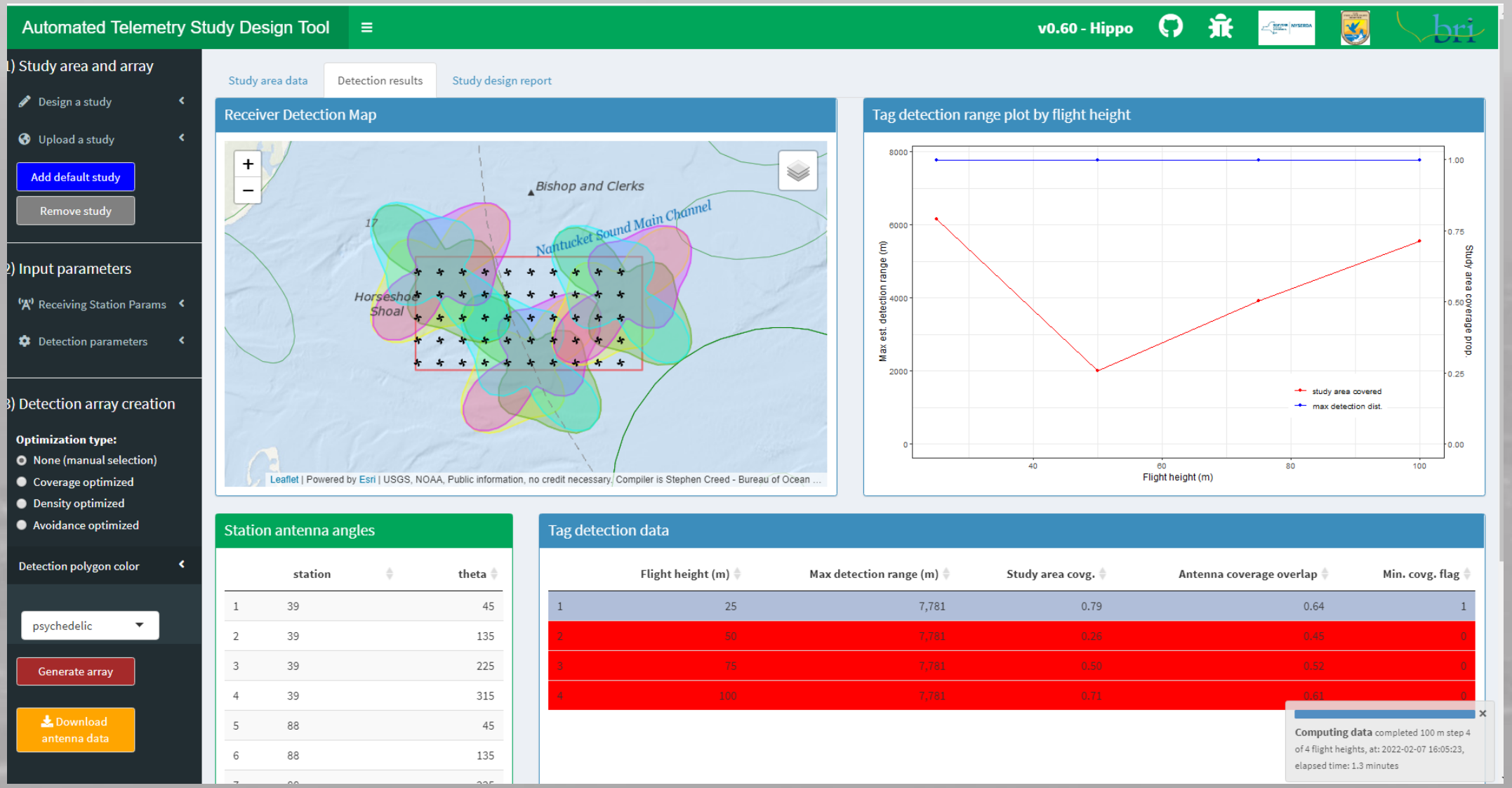
Summary

- Increased Motus effort lead to increases in individuals detected, positions detected, and cumulative detection probability for both species groups
- Flight height made little difference to detection metrics within species
- The number of individuals detected plateau after ~3-4 Motus stations (20-27% of turbines)
- The number of positions detected and the cumulative detection probability increased with survey effort
  - Seabirds showed a consistently linear increase with shorebirds perhaps showing the beginnings of diminishing returns around 4-6 stations (27-40% of turbines)
- As the Motus collaborative has studies with a wide variety of goals, we should consider multiple objectives in offshore deployments

Study Design Tool



Let us know if you are interested in testing out the tool!

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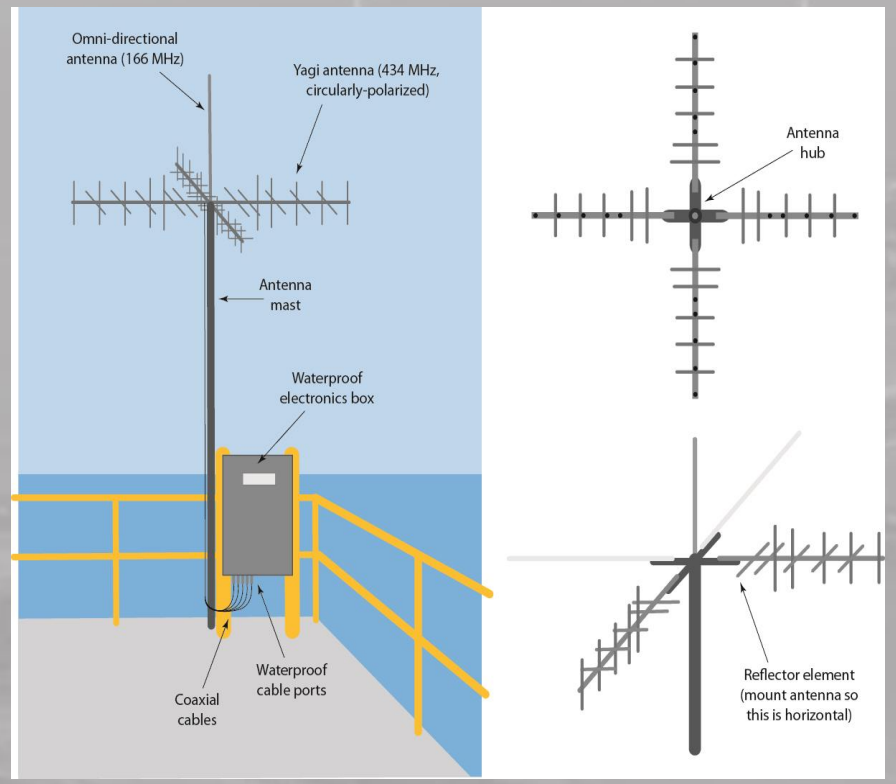
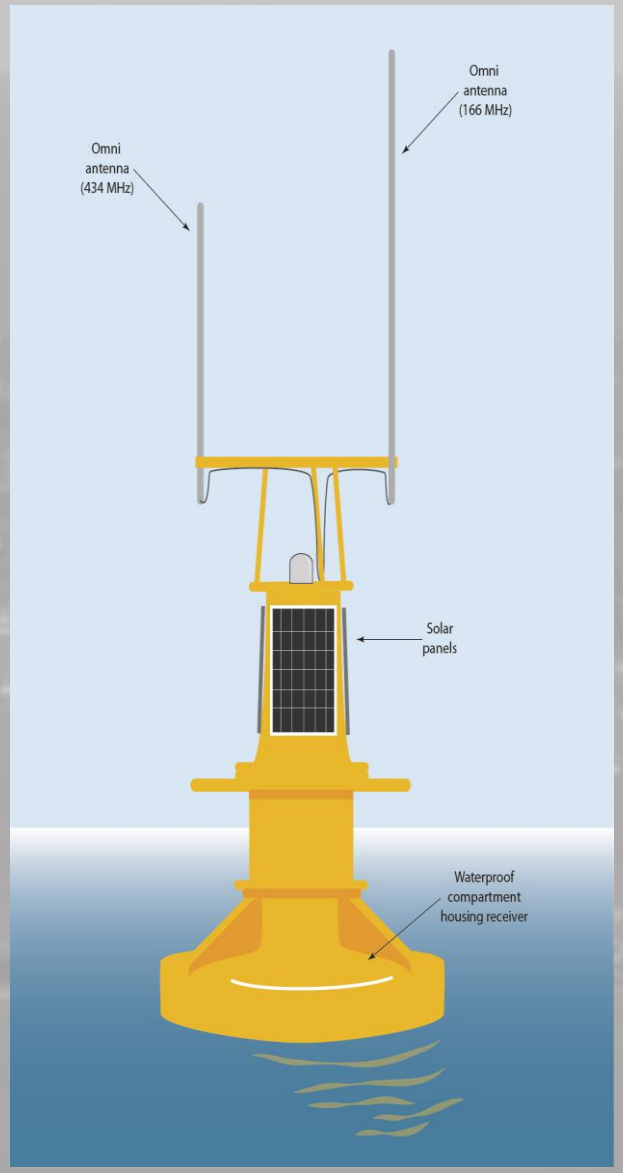
Deployment Guidance



Overall Goal:

To develop standardized protocols for using automated radio telemetry to monitor birds and bats in offshore environments.

Guidance should be out later this year. Let me know if you want to see a draft version!



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Questions?

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