

Tectonic shifts reveal the importance of light availability and macroalgal biomass on blue carbon budgeting

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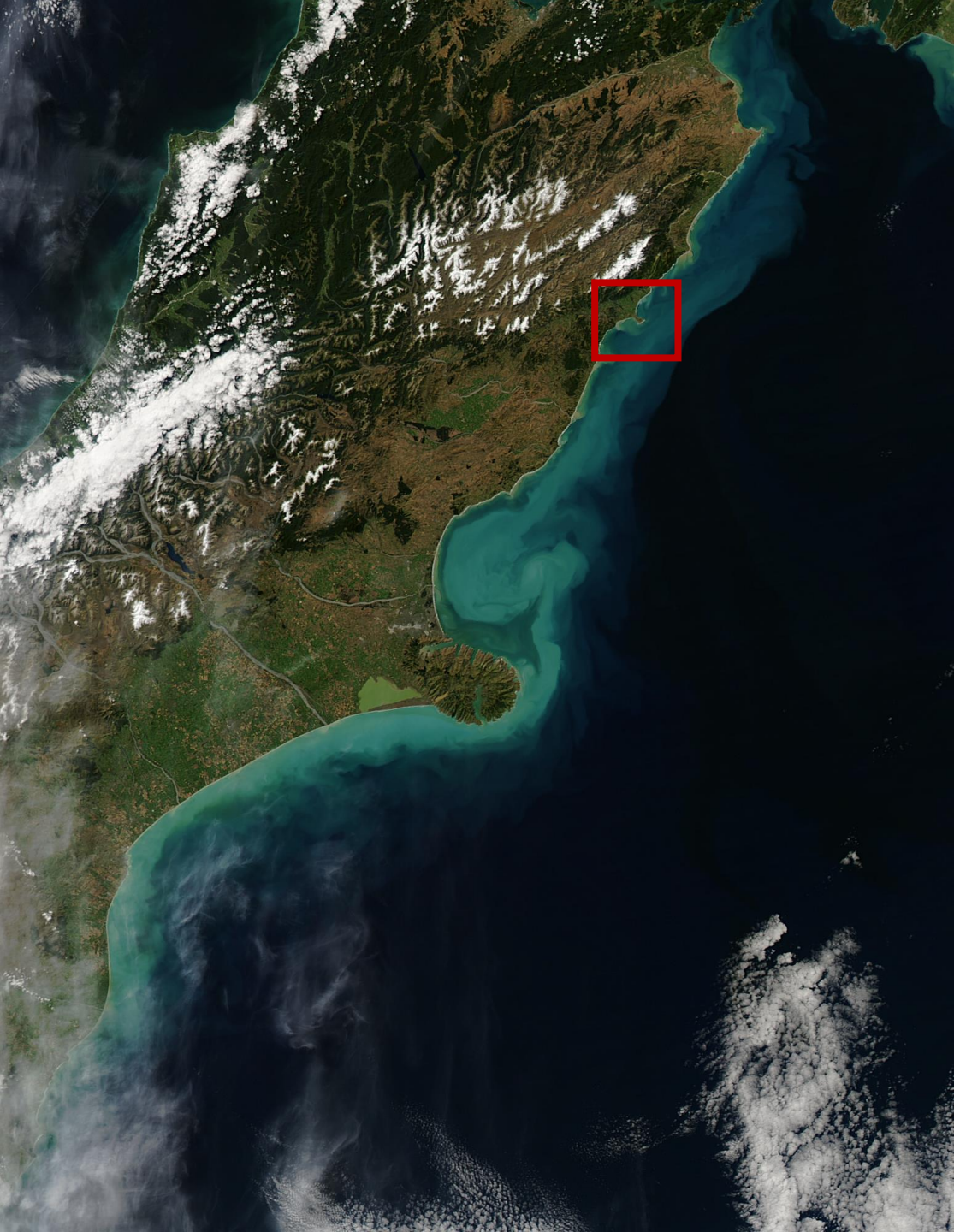


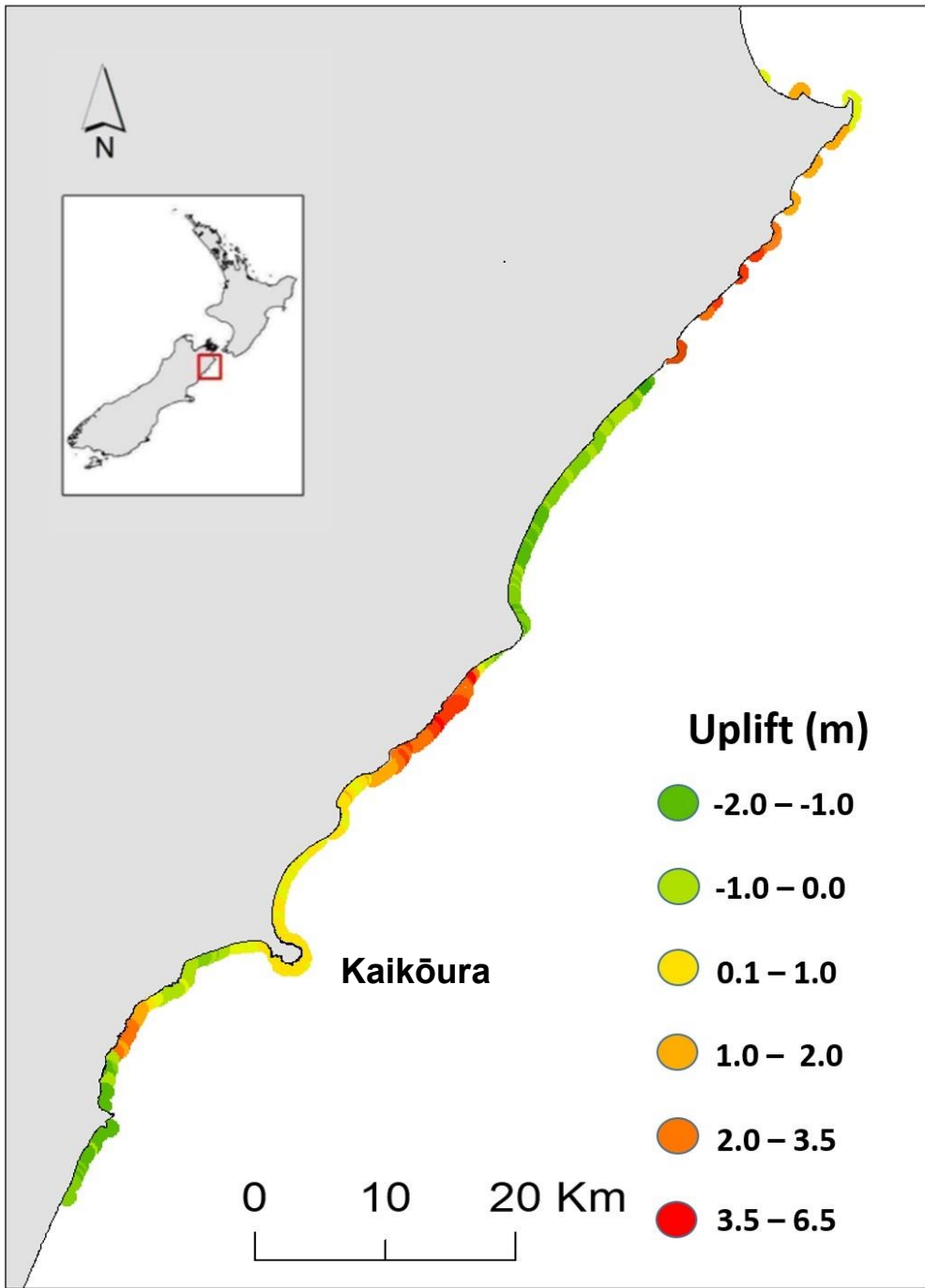
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An underwater photograph of a kelp forest. The water is clear and blue, with sunlight filtering through from the surface, creating bright, shimmering spots on the kelp leaves. The kelp leaves are long, narrow, and yellowish-green, swaying in the water. The overall scene is vibrant and dynamic, capturing the natural beauty of a marine ecosystem.

Project aim

Utilise changes brought about by the earthquake to assess how fluctuations in biomass and light availability influence primary productivity of large macroalgae

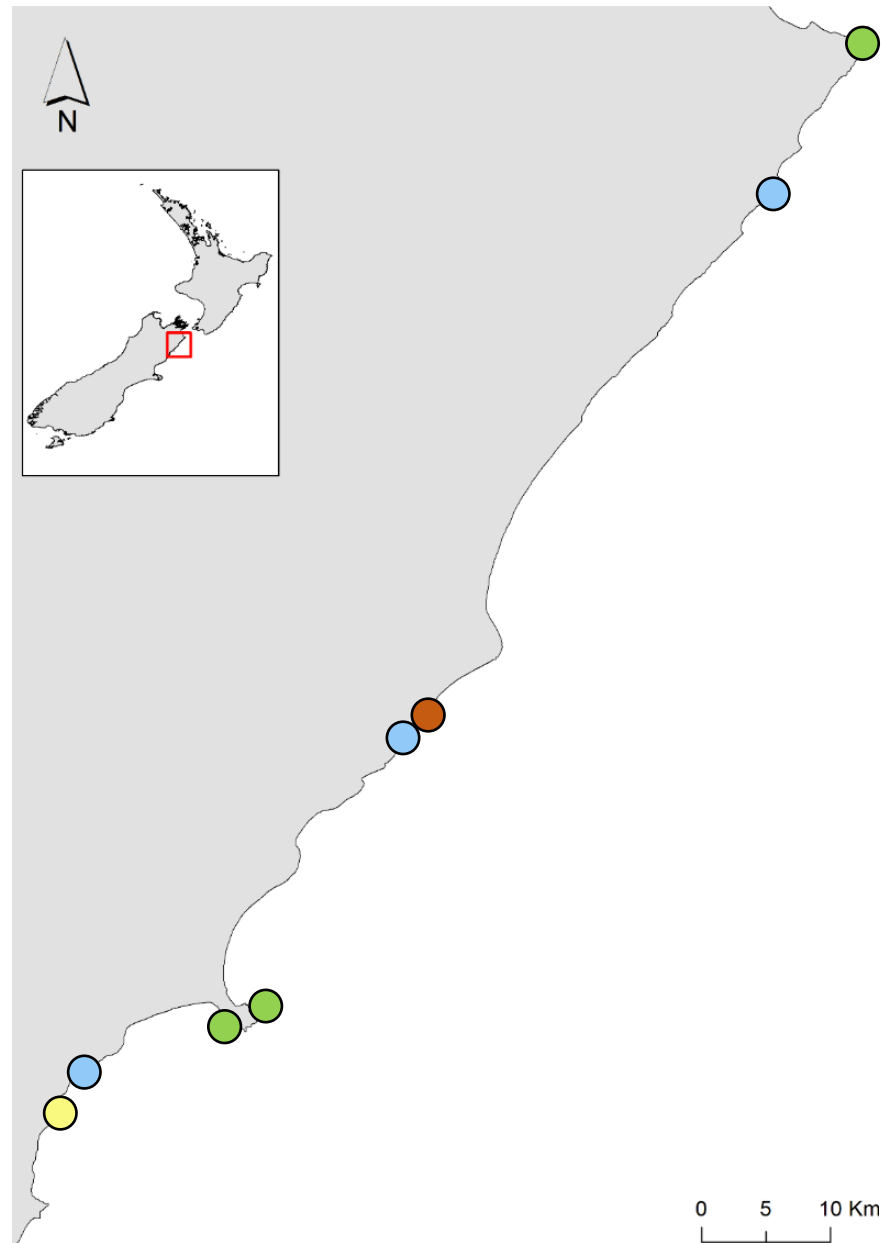
Project aim

Utilise changes brought about by the earthquake to assess how fluctuations in biomass and light availability influence primary productivity of large macroalgae

Objectives

1. Estimate light availability along the coastline
2. Monitor biomass changes over time
3. Estimate the productivity of multiple species through time

Site locations and sampling



Uplift groups (m)

-0.3 – 0

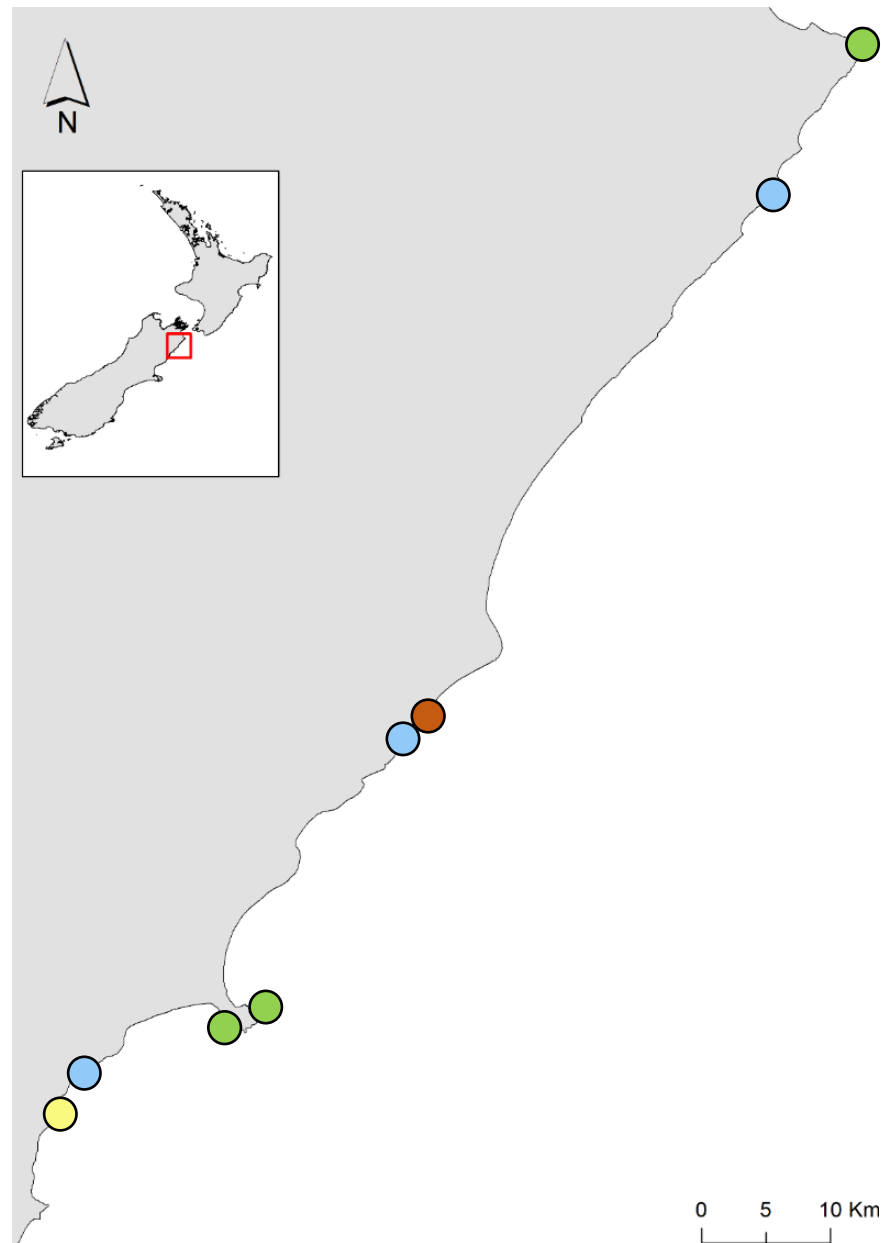
0 – 1

1 – 2.5

4 – 6.5

- 12 sites in 8 locations
- 2017 – 2021

Site locations and sampling



Uplift groups (m)

-0.3 – 0

0 – 1

1 – 2.5

4 – 6.5

- 12 sites in 8 locations
- 2017 – 2021

Biomass sampling

- 30m transect
- 10 x quadrats

Durvillaea spp.

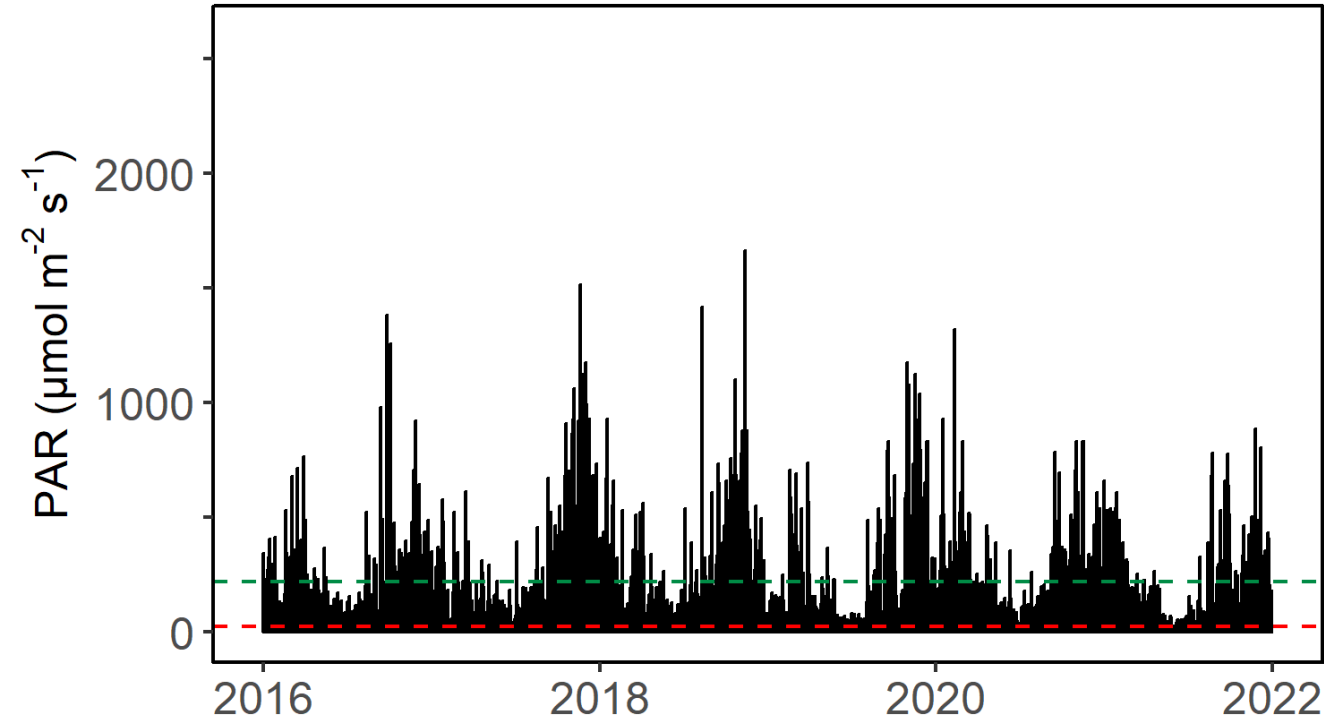


Carpophyllum maschalocarpum

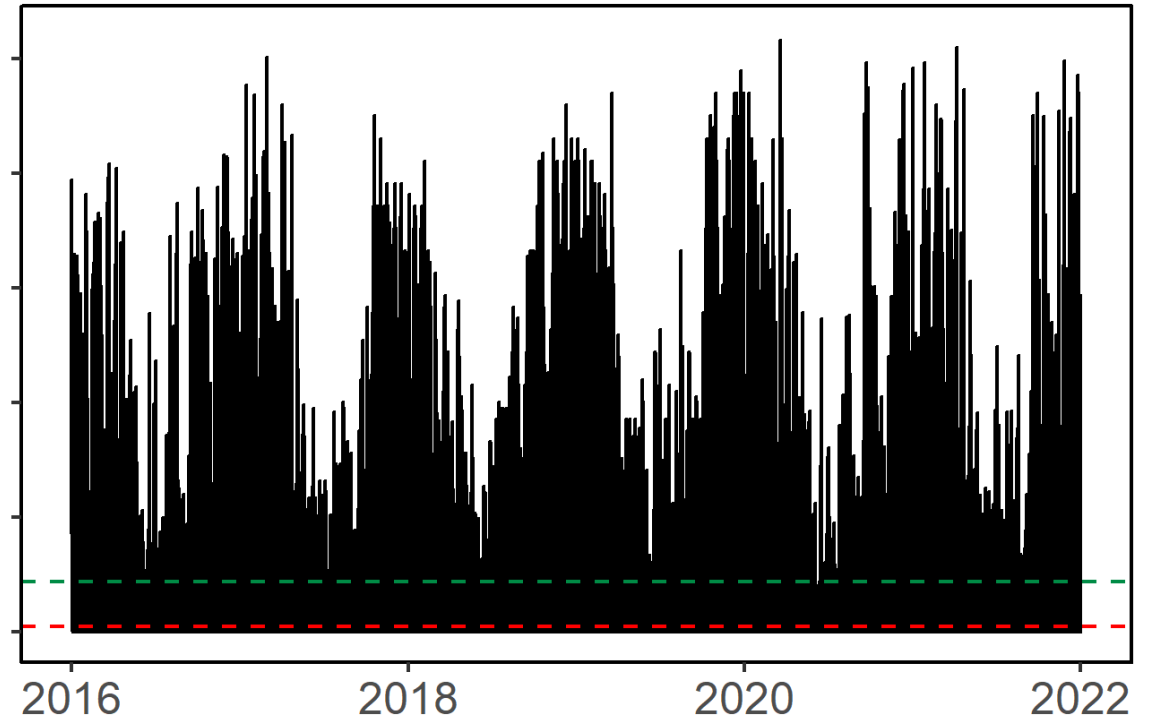


1. Light dynamics (submerged, daytime only)

Site 1



Site 2



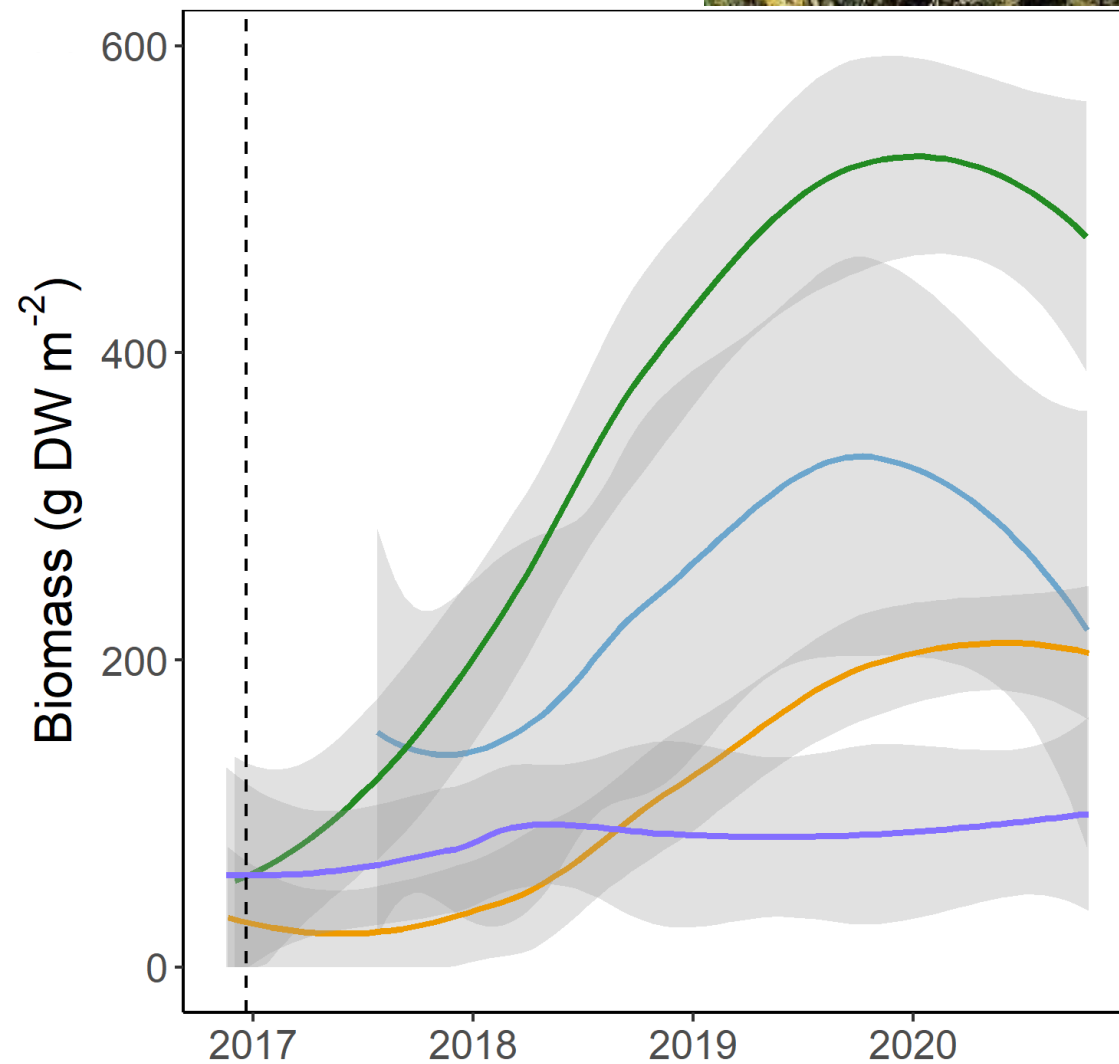
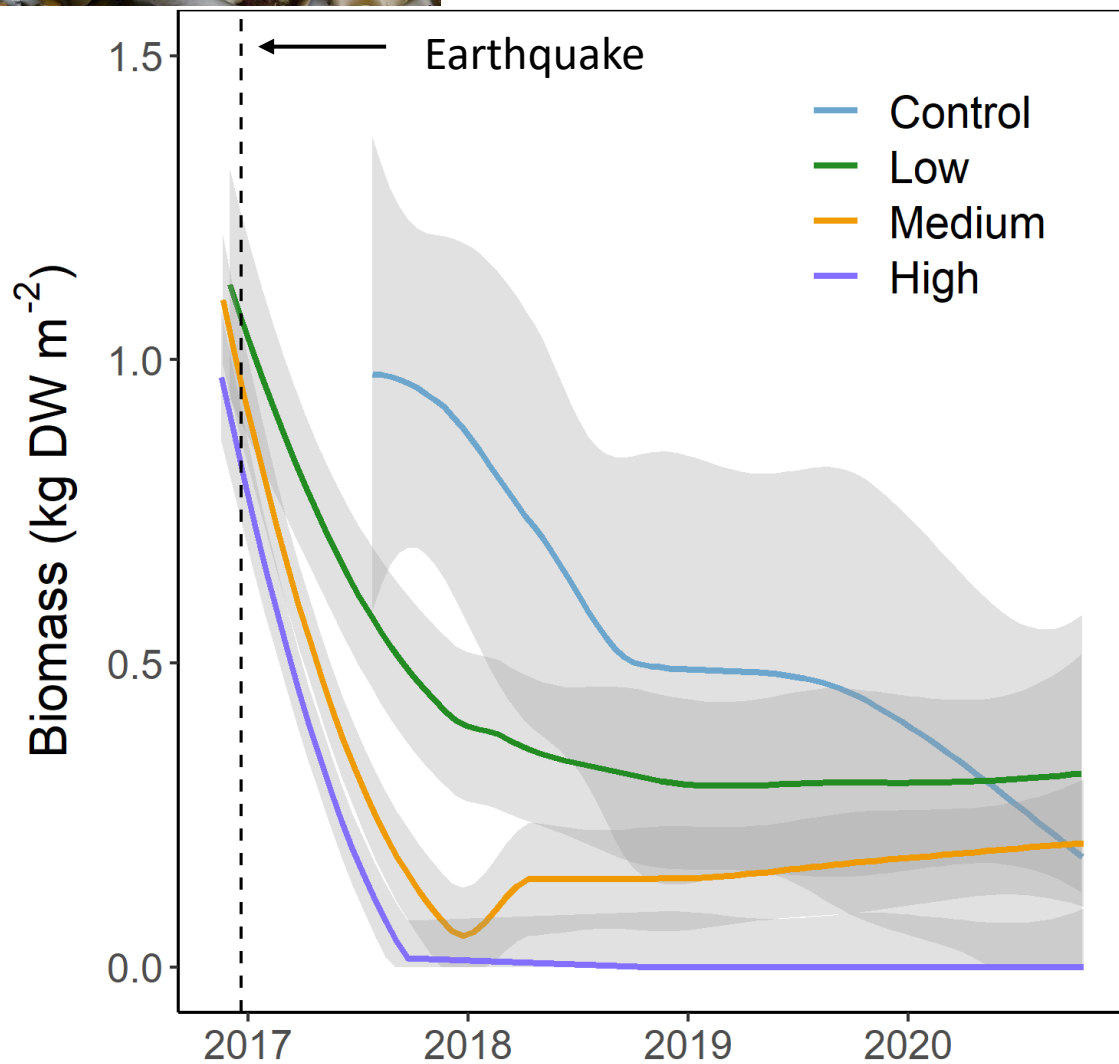
2. Biomass changes over time



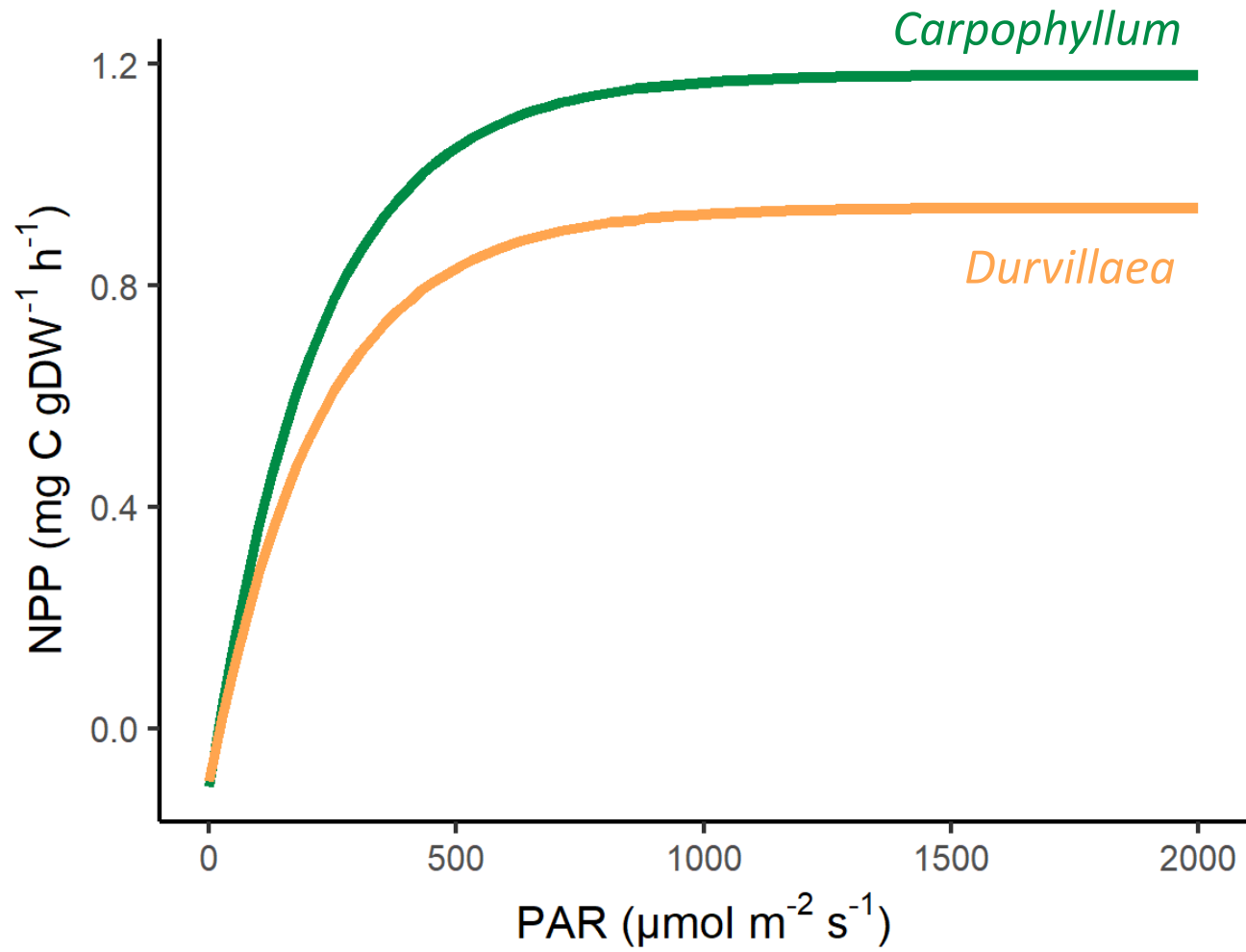
Durvillaea spp.



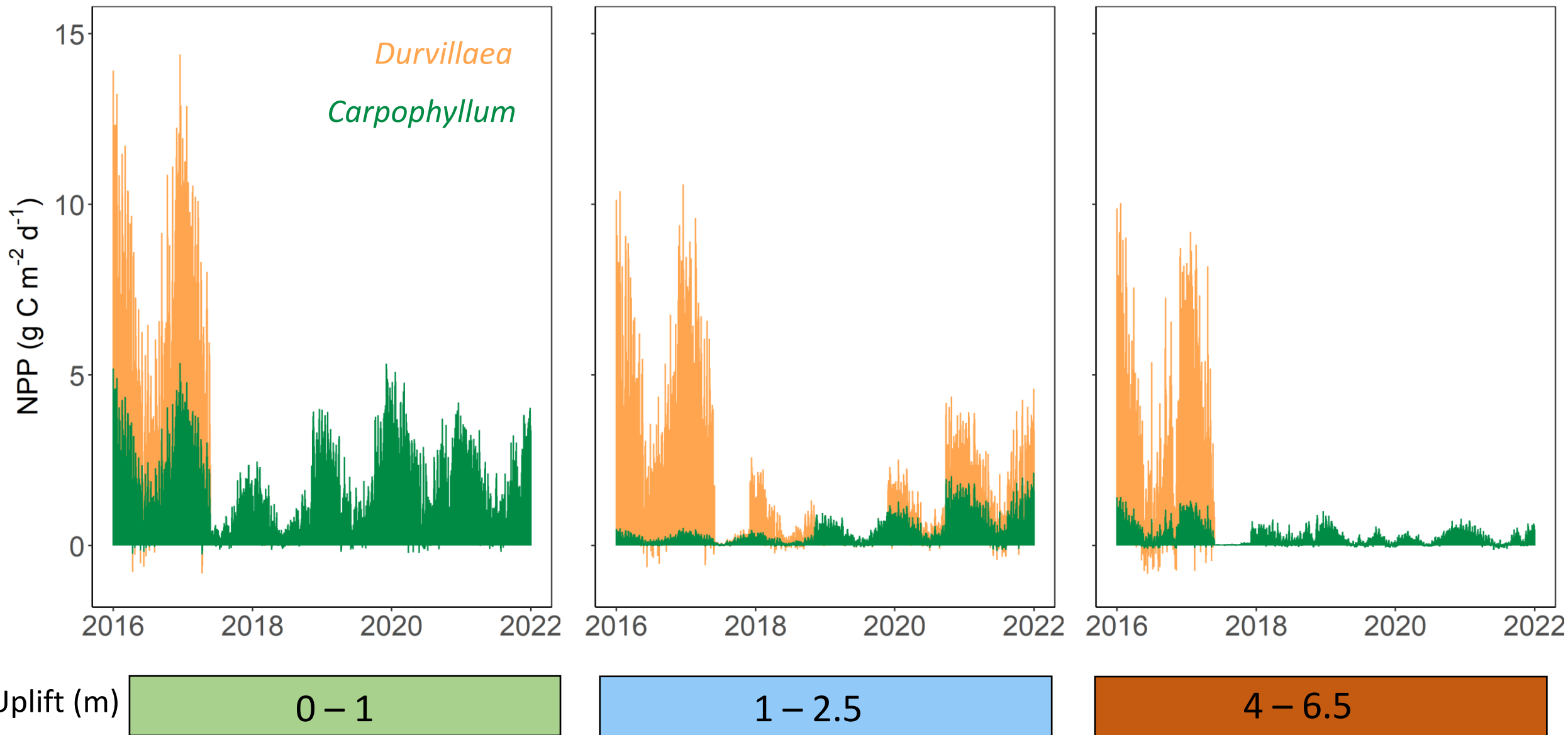
*Carpophyllum
maschalocarpum*



3. Estimating productivity



3. Estimated submerged daily NPP



Conclusions and implications

- Changes in biomass and light considerably influenced primary productivity of two large fucoids over 130 km of coastline over 5 years.
- NPP was most sensitive to changes in light when it was limiting, and biomass when light was not limited
- Reduced productivity has implications for C export and local ecosystem functioning

Acknowledgements



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Thank you

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