

Comparing Carbon Flux Dynamics in Forest and Grassland Ecosystems

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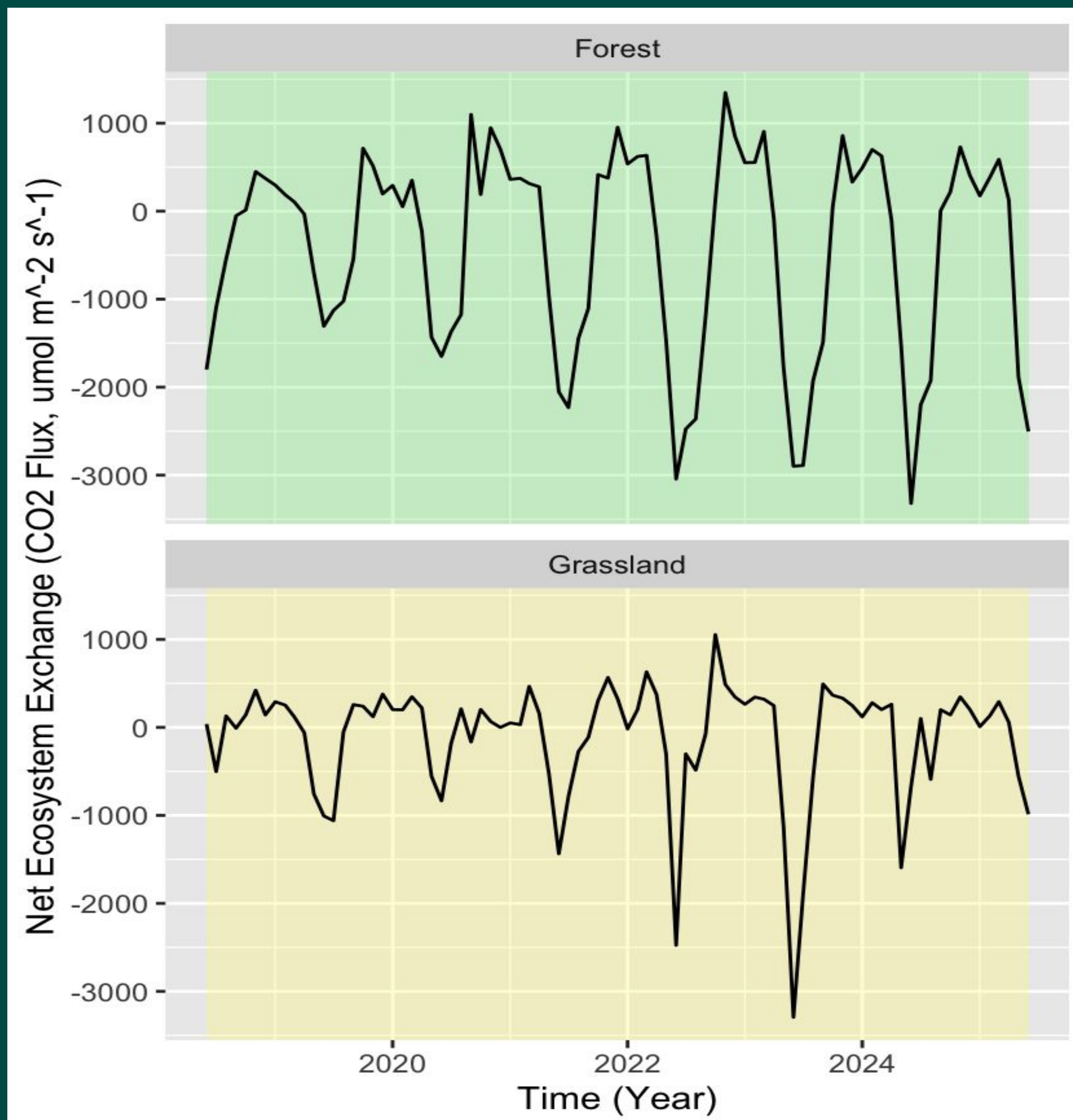
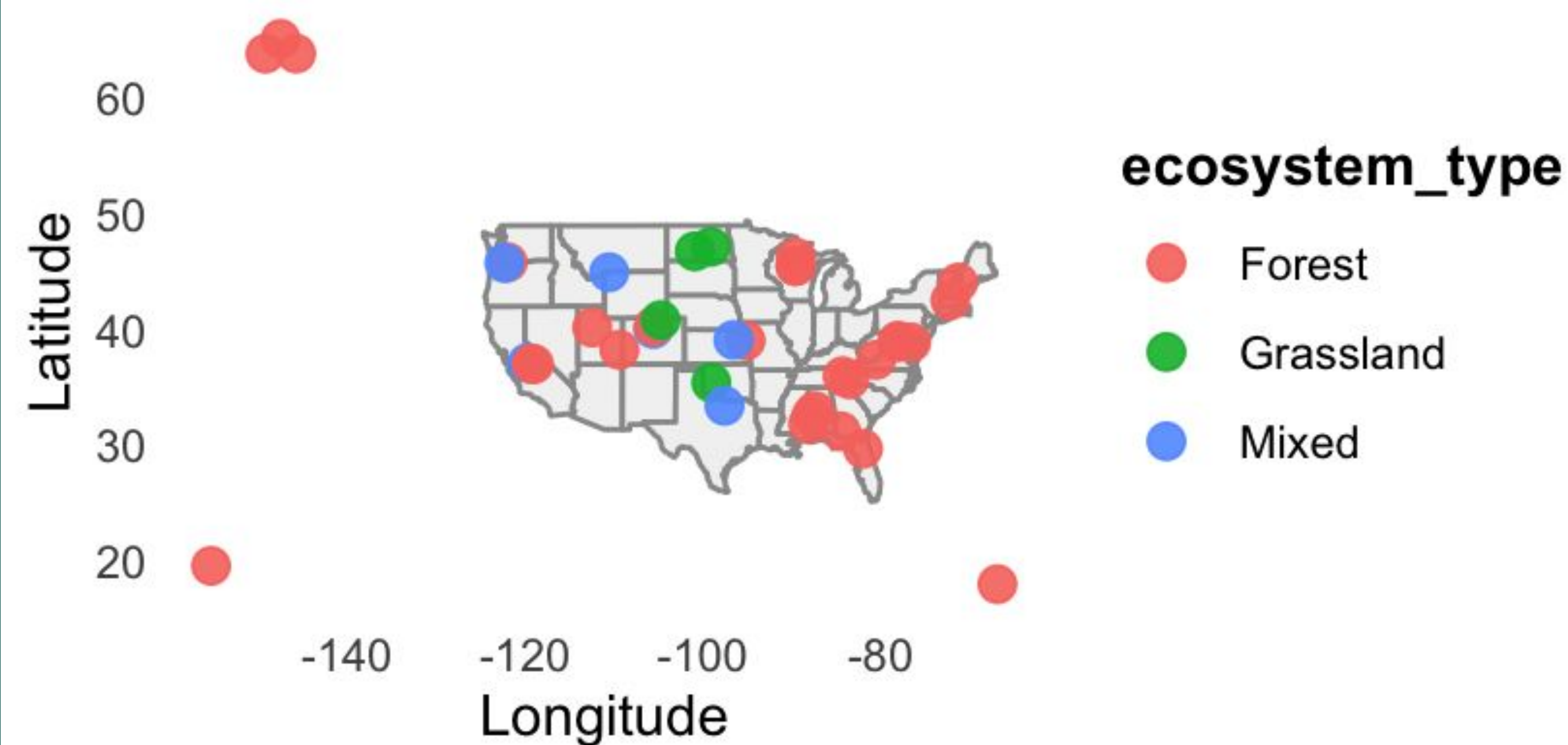
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Abstract:

Ecosystems exchange carbon with the atmosphere through processes measured as net ecosystem exchange (NEE). Understanding these patterns helps predict how ecosystems respond to climate change. This study compares carbon flux behavior in forest and grassland ecosystems using ~10 years (2016–2025) of NEON data.

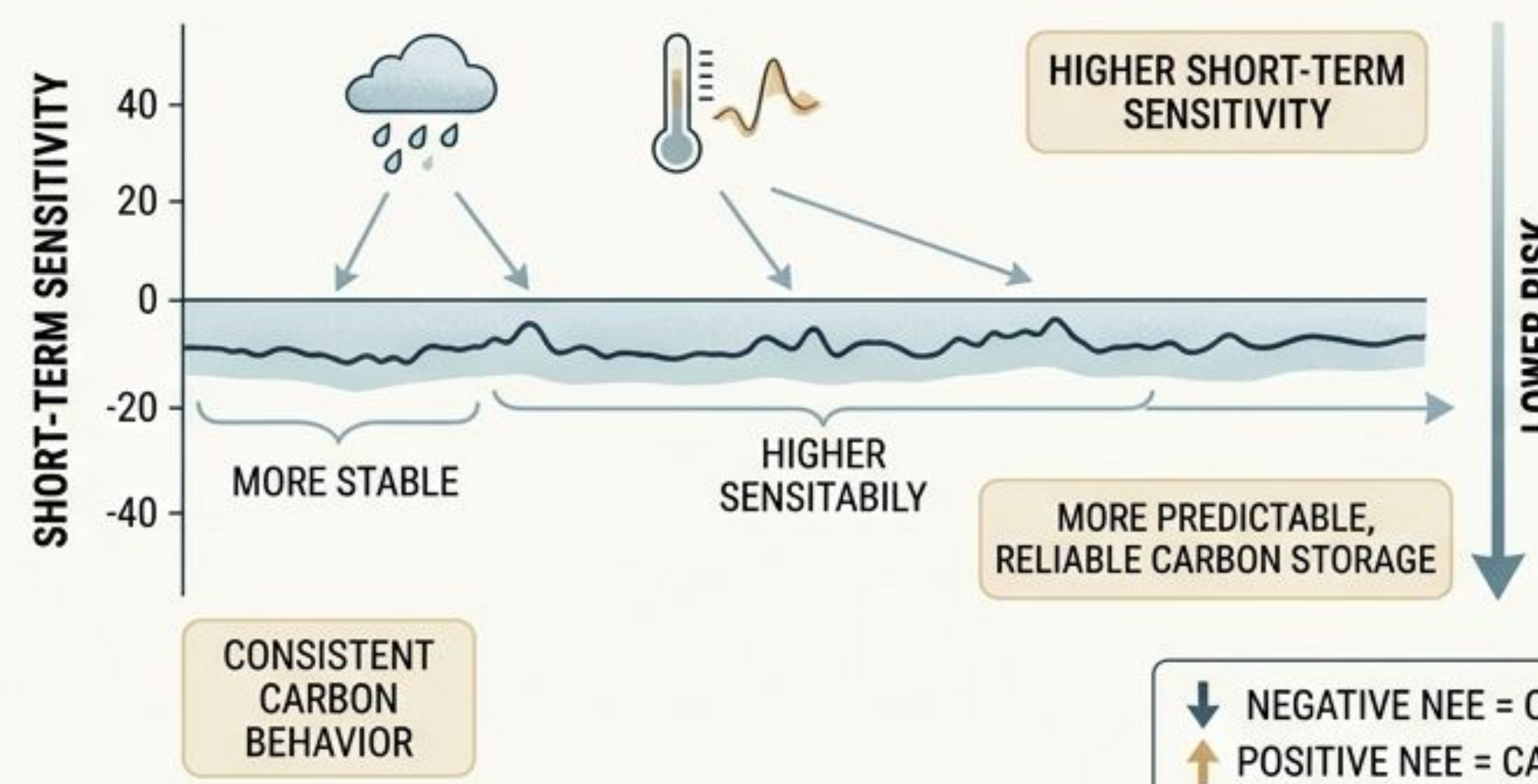
NEON Site Locations



GRASSLAND ECOSYSTEM: STABLE & RELIABLE SINK



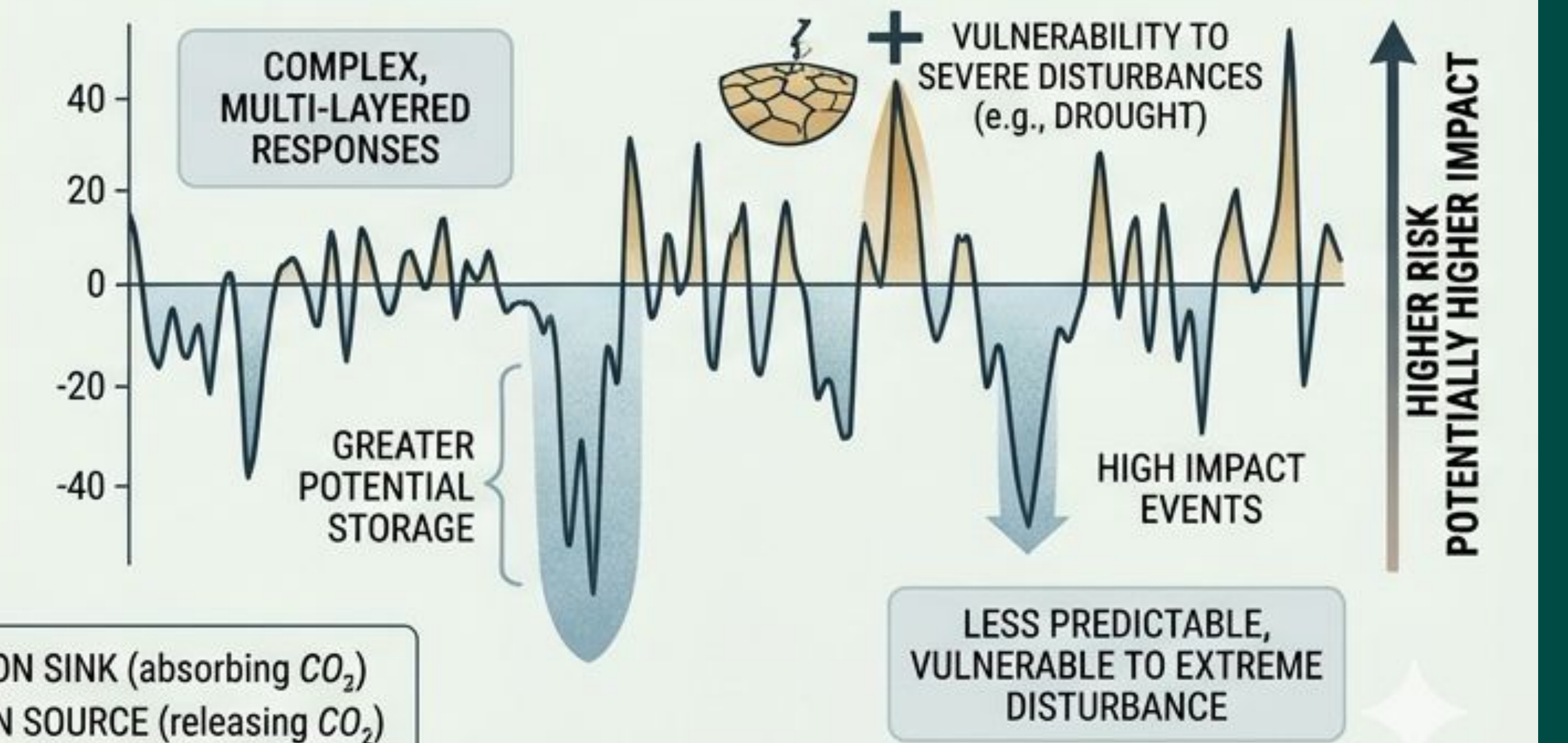
GRASSLAND NEE (Net Ecosystem Exchange) TIME SERIES



FOREST ECOSYSTEM: COMPLEX & VARIABLE SINK



FOREST NEE (Net Ecosystem Exchange) TIME SERIES



[source: NEON, 2016-2025 (~10 years)]

- Forests → stronger carbon sink, but more variable, riskier.
- Grasslands → more stable, predictable carbon sink.

Carbon Balance: Better Together

Forest and grassland ecosystems play complementary roles in carbon exchange.

Grasslands provide more stable and predictable carbon uptake, while forests act as stronger carbon sinks with greater variability and sensitivity to disturbance.

Together, these systems balance carbon dynamics across landscapes, highlighting the importance of maintaining diverse ecosystem types, not favoring one type, especially under changing climate conditions.

Citations

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Acknowledgements

This work is funded by the Alfred P. Sloan Foundation. Supported by the COMPASS House at Cal Poly Humboldt. Find logos for COMPASS, SPARA, Cal Poly Humboldt, EnvEngineering Program.

