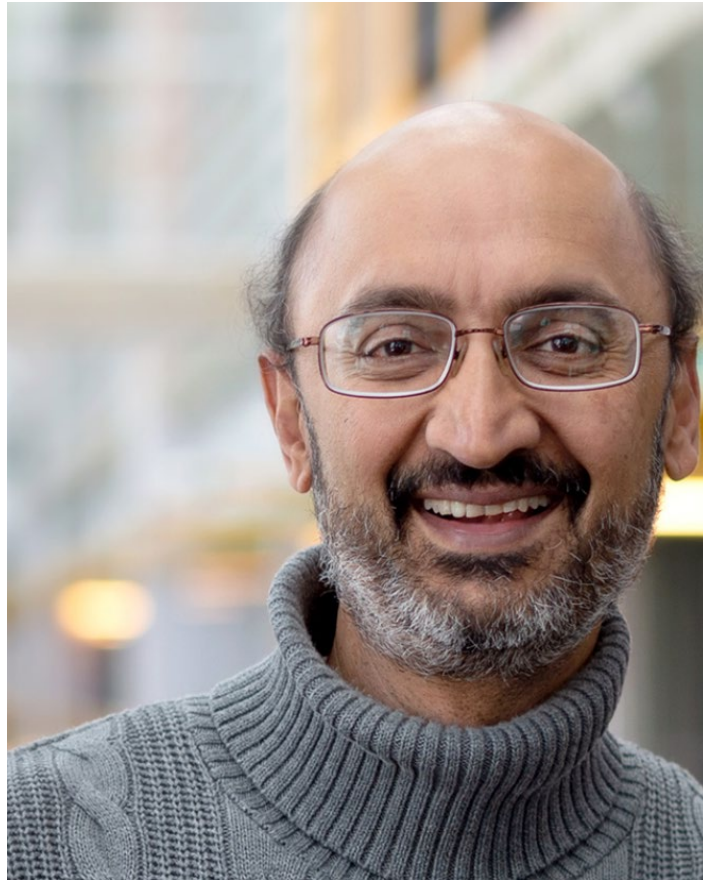


BioSpace25 - Biodiversity insight from Space
10 - 14 February 2025 | ESA-ESRIN | Frascati - Italy

Evaluating the impacts of disturbance on forest carbon and structure across the wet tropics using near-coincident GEDI shots

Repeat GEDI footprints measure the effects of tropical forest disturbances



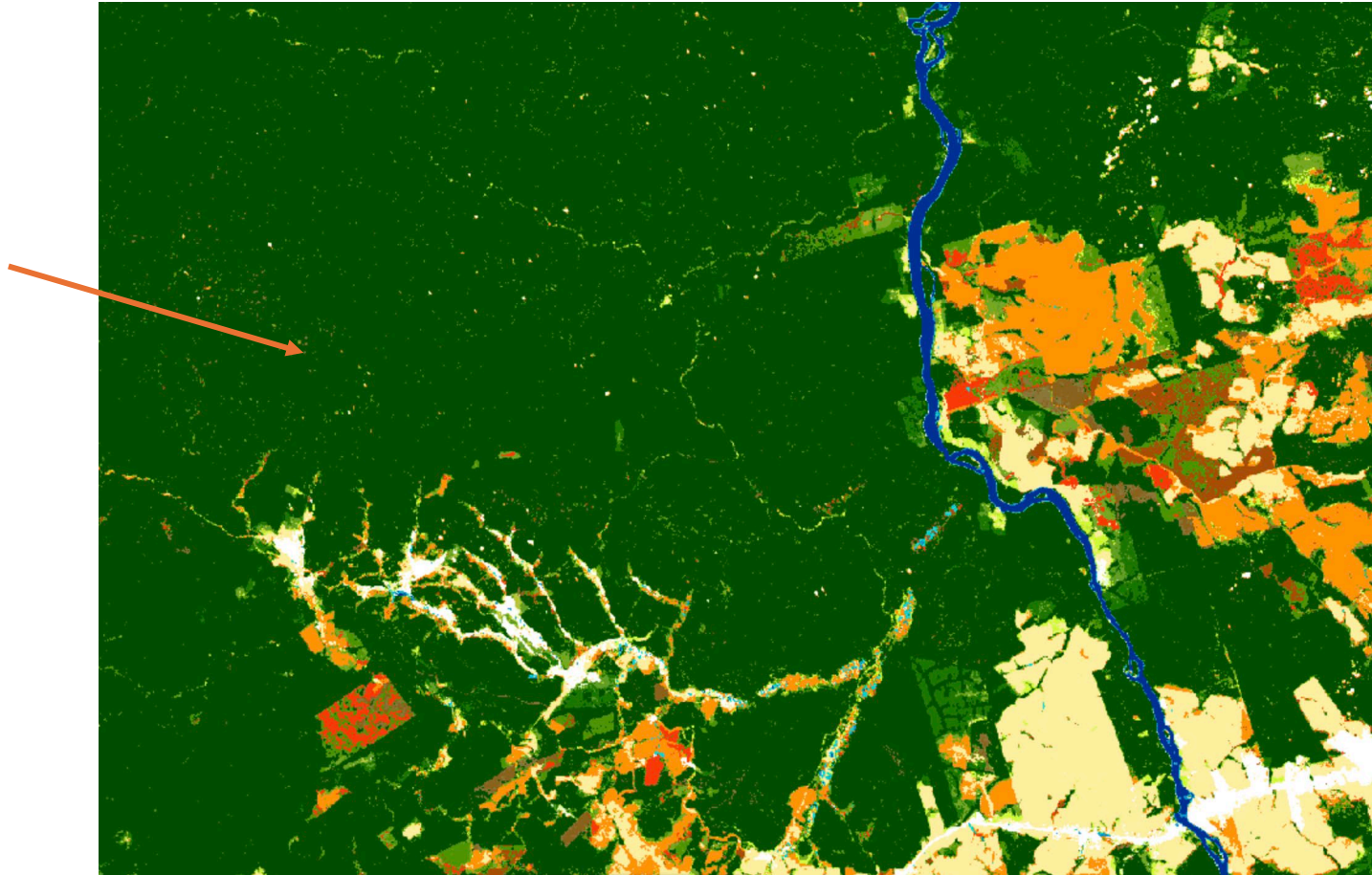
Srinivasan Keshav



Amelia Holcomb

Tropical forest disturbance has important implications for carbon fluxes and biodiversity, but its impacts are difficult to quantify

High resolution
detection using
optical imagery

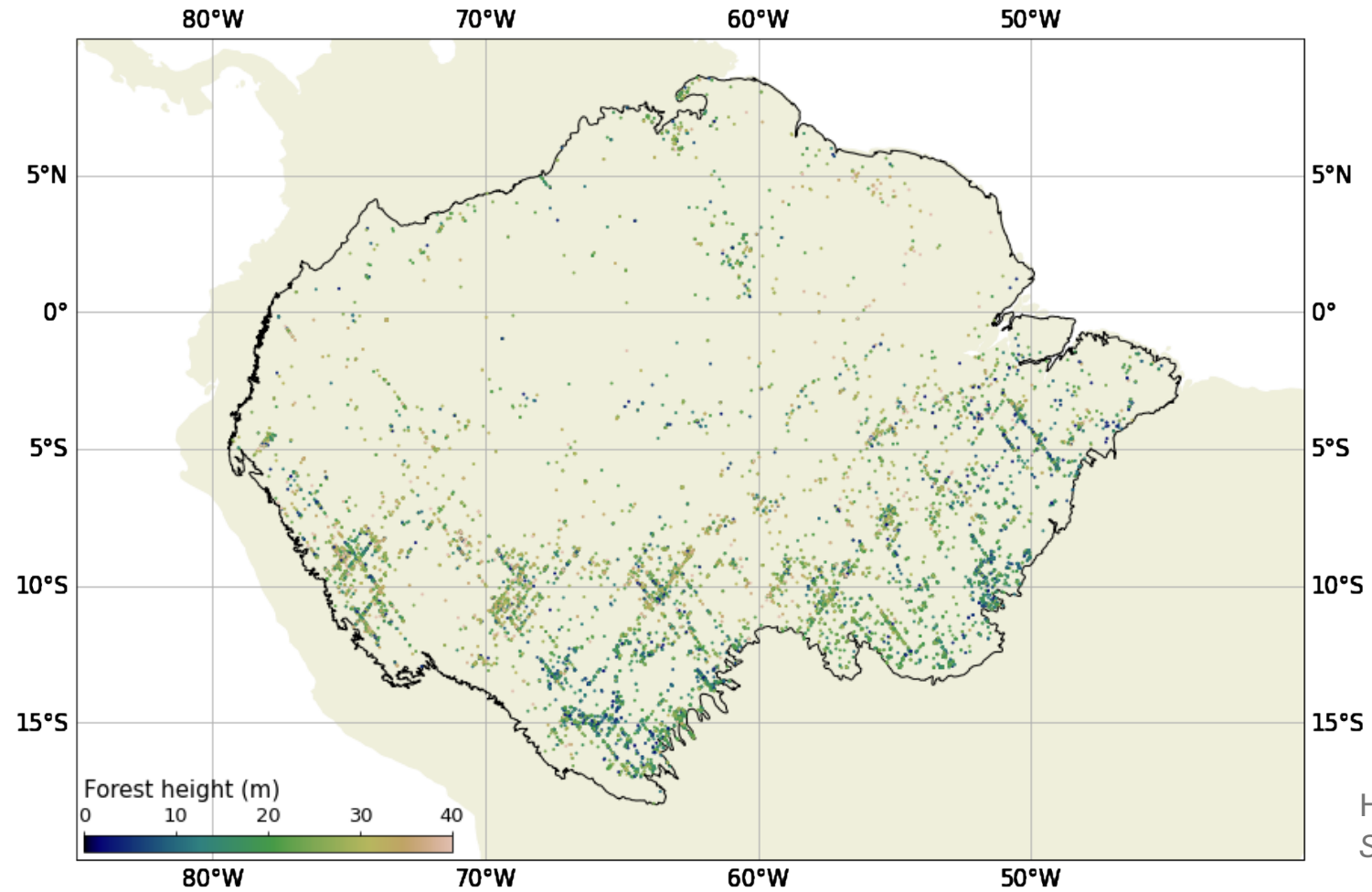


JRC TMF (Vancutsem et al,
Science Advances, 2021)

The GEDI sensor measures aboveground carbon stocks and structure, but it is difficult to use to measure change

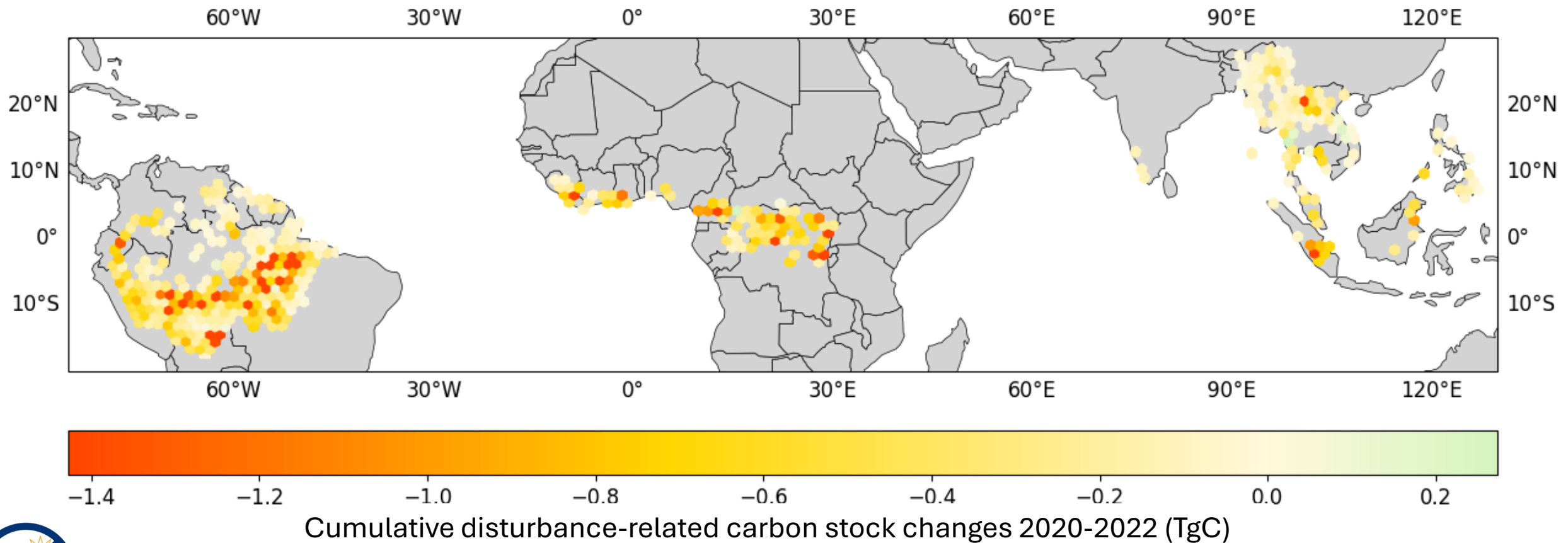


Near-coincident GEDI footprints provide a huge pantropical sample of the impacts of disturbance



Holcomb et al, *Remote Sensing of Environment*, 2024

The binary classification “disturbed/undisturbed” conceals substantial spatial variation in disturbance impacts

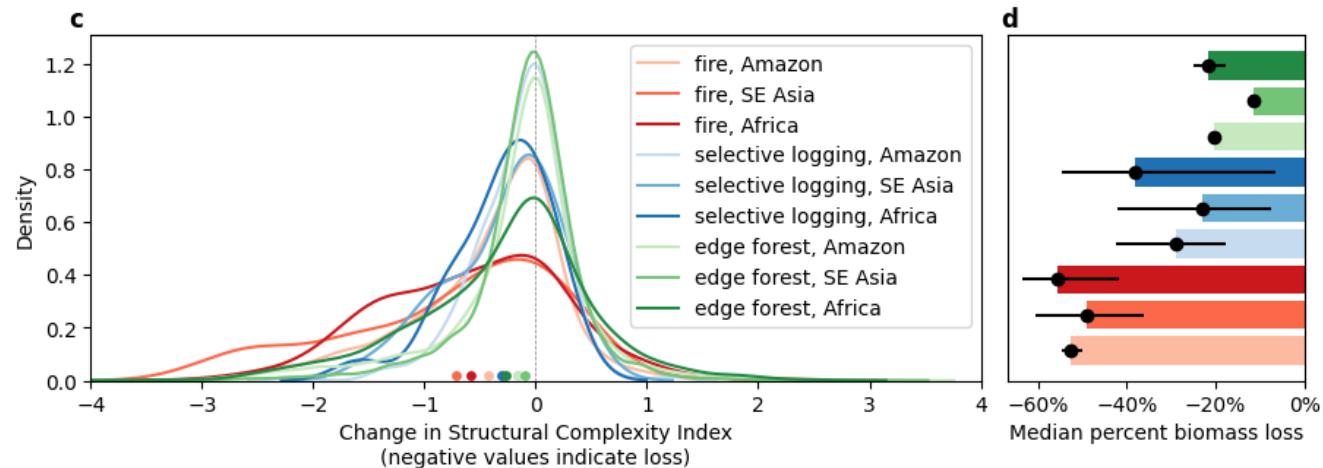
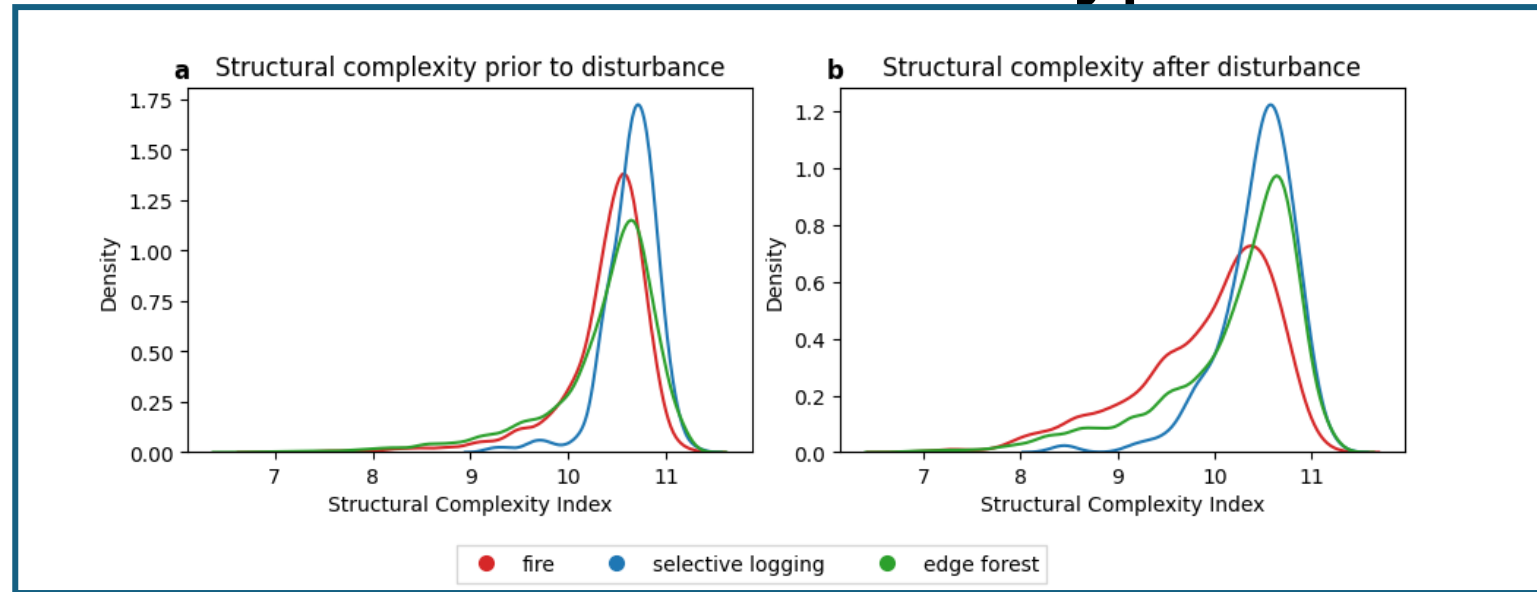


Holcomb et al, *In prep*

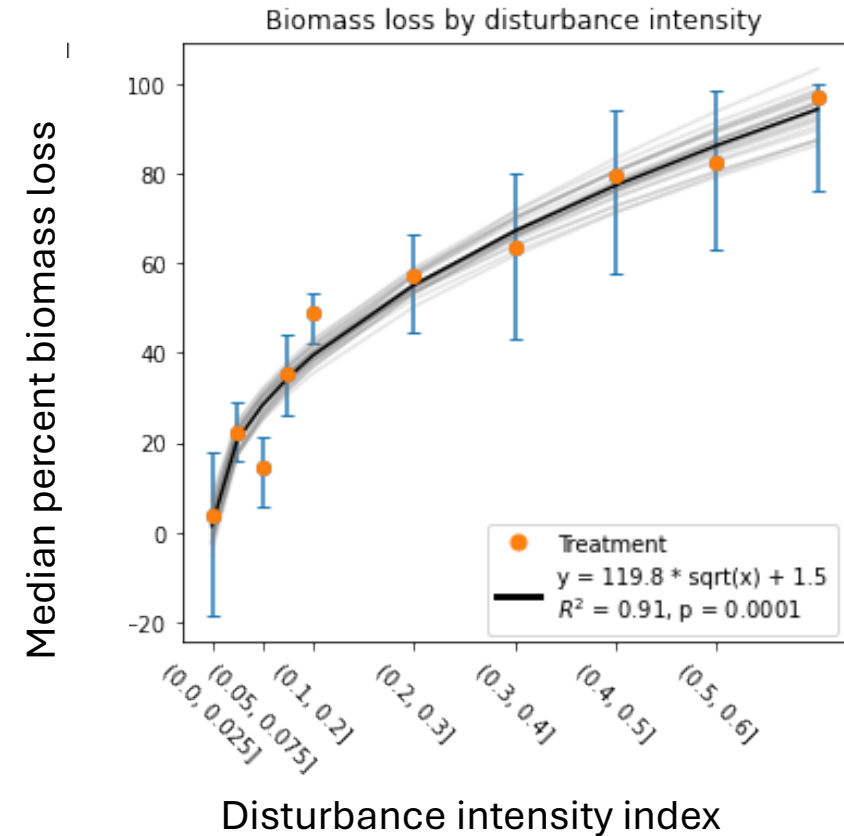


NO PHOTOS

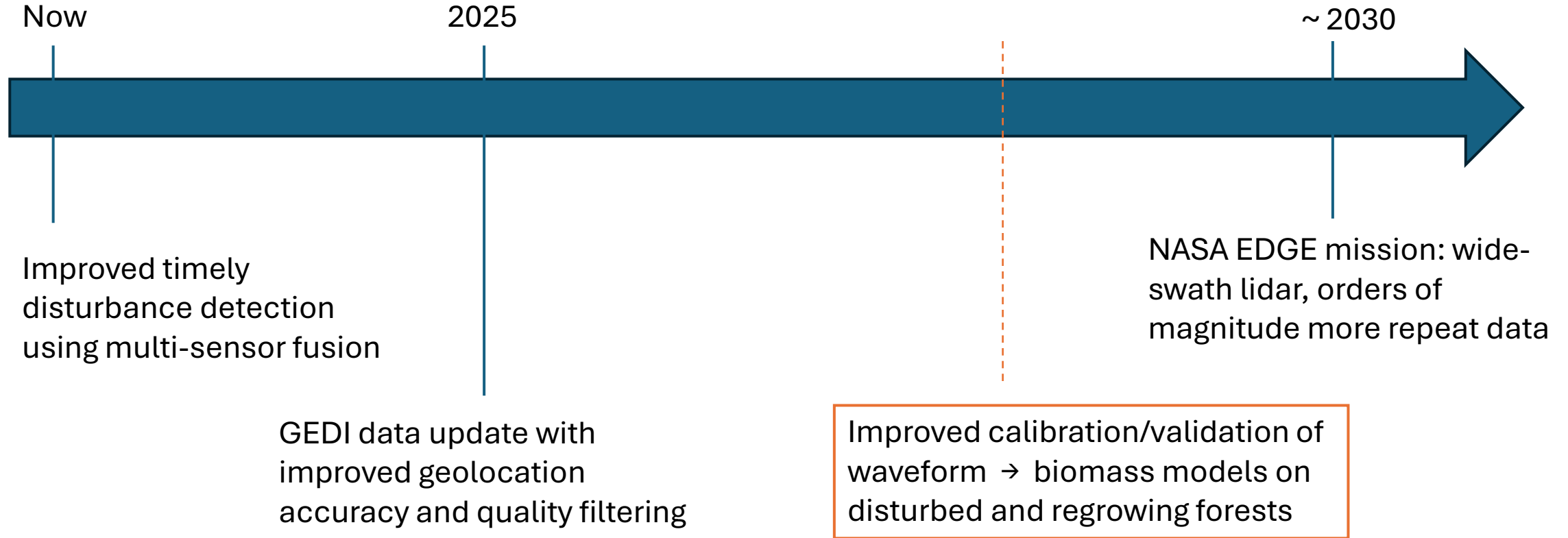
GEDI uncovers patterns of structural complexity loss in disturbances of different types



Landsat-measured disturbance intensity is correlated with GEDI-measured percent biomass loss



Looking to the future



Conclusions

Forest disturbance is not a binary event, but a complex and ongoing process.

Repeat GEDI footprints can help uncover these impacts:

- spatiotemporal variation in disturbance losses
- effects on forest structure & structural complexity
- potential to use GEDI to validate or train Landsat-based intensity estimators

Contact: ah2174@cl.cam.ac.uk

GEDI Toolbox



gediDB: A toolbox for Global Ecosystem Dynamics Investigation (GEDI) L2A-B and L4A-C data

gediDB

CI passing codecov 93% docs passing benchmarked by asv pypi v2024.9.0 code style black

mypy checked DOI 10.5281/zenodo.11183201

gediDB is an open source project and Python package that makes working with GEDI L2A-B and L4A-C data easy and fun!

In collaboration with:
Simon Besnard, Felix Drombowski
@ GFZ Research Centre

Next steps to refine impacts of disturbance of carbon cycle

- **Collect *in situ* data**
- **Integrate data from ESA's BIOMASS mission**
- **Quantify link between disturbance intensity from optical imagery and carbon flux**