Improved inference of tropical vegetation properties using seasonal Landsat Vegetation Indices

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Photography encouraged

1. MOTIVATION

- Ecologist measure disturbed vegetation properties more accurately by field sampling.
- These ecological plots have limited spatio-temporal data due to short-term projects, funding constraints.
- Huge grant investment on satellite sensor development that are sensitive to vegetation are less appreciated.
- Higher temporal- and medium-resolution optical Landsat derived **Normalized Difference Vegetation Index (NDVI)** is widely employed to estimate vegetation biophysical properties in **undisturbed ecosystem** especially at **peak growing** with varying performances among biomes types.

2. METHODOLOGY

- Peak (dry) and end (wet) seasons Landsat derived ten greenness, moisture content and fire severity vegetation indices (VIs) using Landsat Thematic Mapper (TM) and Operational Land Imager (OLI).
- Field sampled species number, basal area/ aboveground biomass (AGB) in fire/ logged tropical biomes.

Aim is to explore statistical relationship to inform post-fire tropical vegetation properties and recovery using seasonal VIs.

3. RESULTS

- Peak-season Green NDVI, Normalized Difference Moisture Index (NDMI), Normalized Burn Ratio (NBR2) are useful for species number, basal area/ AGB in homogenous open savanna and savanna forest (**fig 1**).
- Late-season NDVI, Green NDVI, NDMI, NBR showed stronger relationships in more complex forest biomes (**fig 2**).
- It took 9 and 16 years to recover species number and basal area in mixed peatswamp and evergreen forests (**fig 3**).

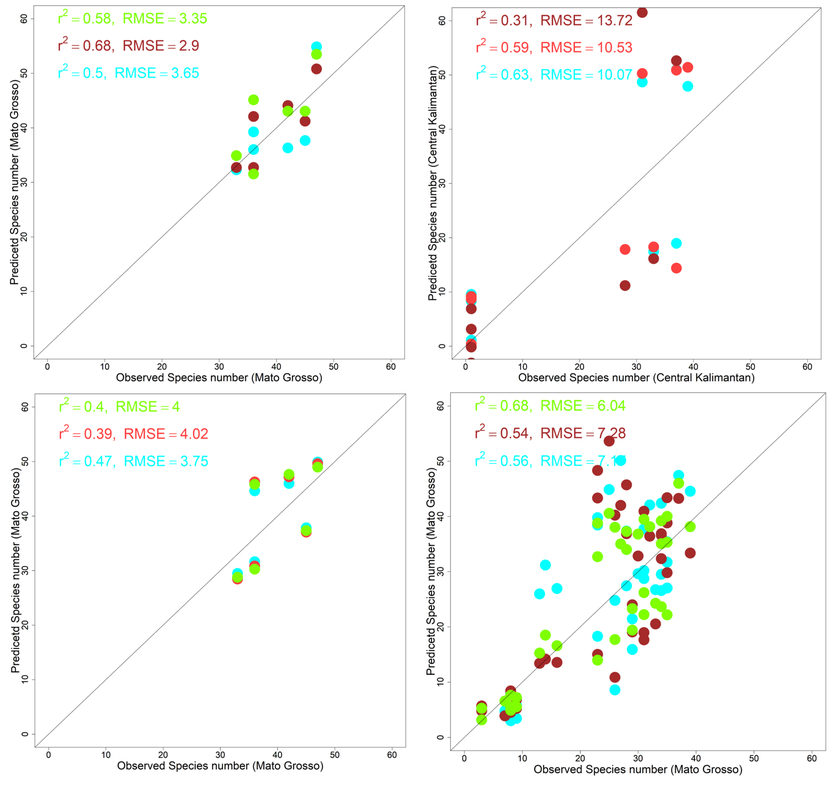

Fig 1. Sensitivity of species number in peak (top panel) and end (bottom panel) seasons VIs for 3 tropical sites.

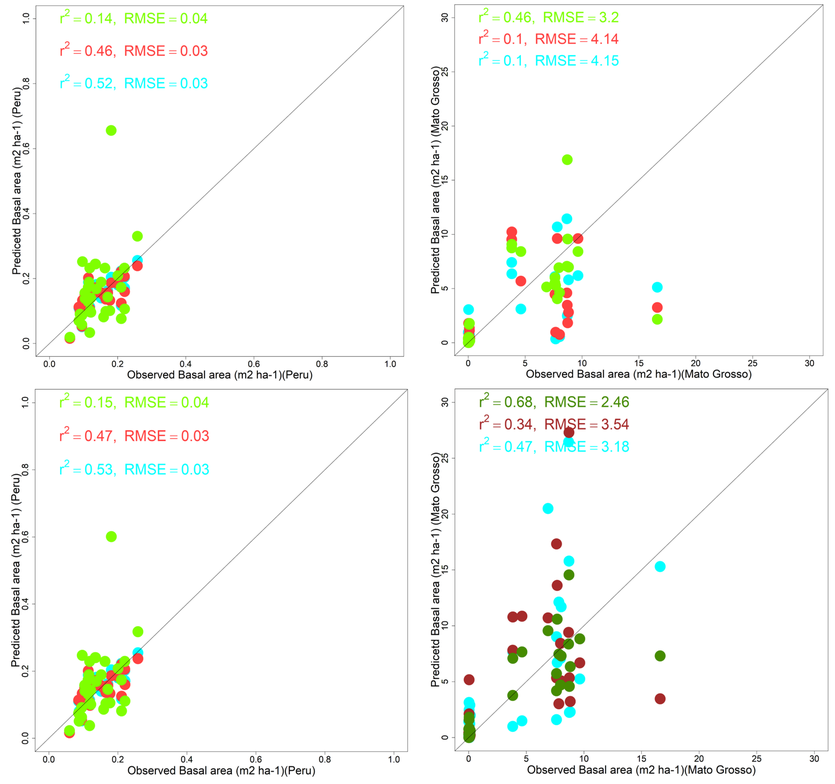

Fig 2. Sensitivity of basal area in peak (top panel) and end (bottom panel) seasons VIs for 2 tropical sites.

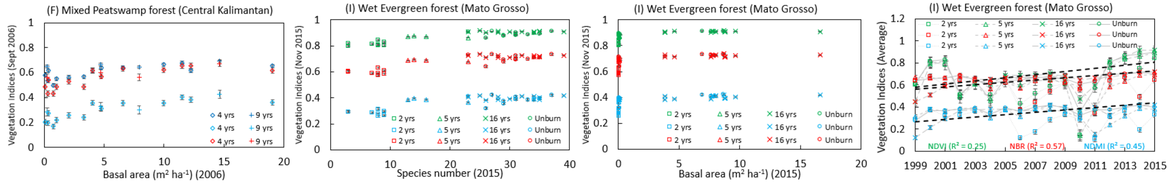

Fig 3. Species number and basal area recovery for mixed peatswamp and wet evergreen forests.

4. CONCLUSION

- Landsat derived seasonal greenness, moisture content and fire severity data are useful to infer post-fire vegetation properties.
- Multi-temporal greenness, moisture content and fire severity indices help to monitor vegetation recovery to support limited spatio-temporal ecological sample plots in disturbed tropical ecosystems.

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