The extent of edge effects in fragmented landscapes: Insights from satellite measurements of tree cover[1]

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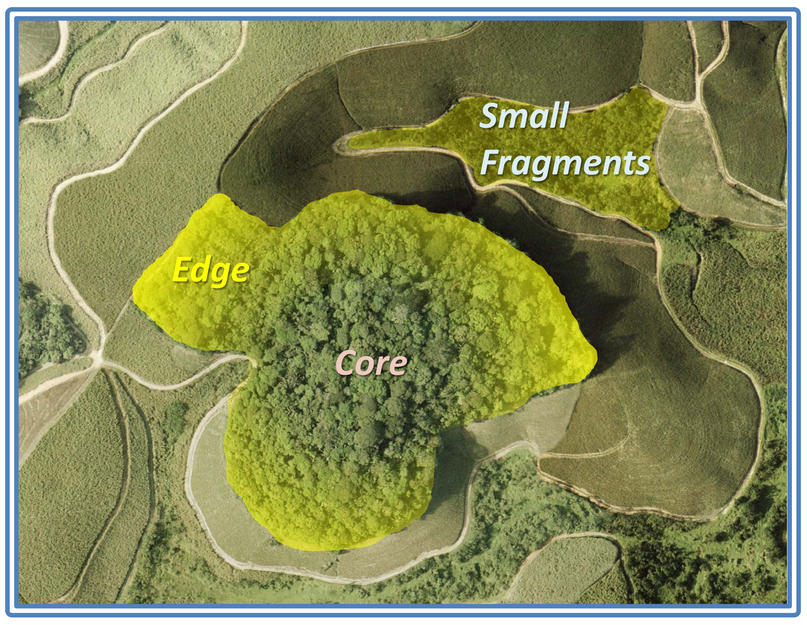
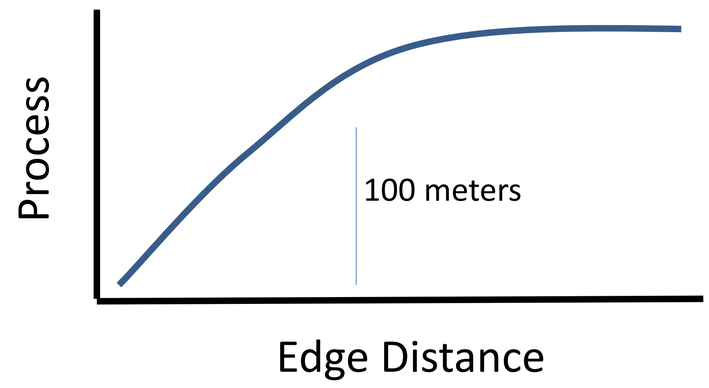
INTRODUCTION

LIVING ON THE EDGE – FINDINGS FROM 35 YEARS OF FIELD FRAGMENTATION EXPERIMENTS

We have good knowledge on the local scale (up to 100 hectares) , from 7 long-term experiments[2] ...

- ***Altered Microclimate Conditions***
- ***Reduced Species Richness***
- ***Early successional tree communities***
- ***Degraded ecosystem functions:***
- *Carbon retention*
- *Nitrogen Fixation*
- *Polination*
- *Seed dispersal*

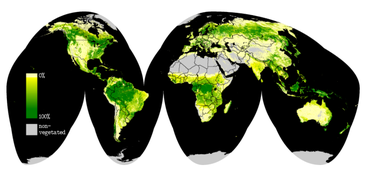




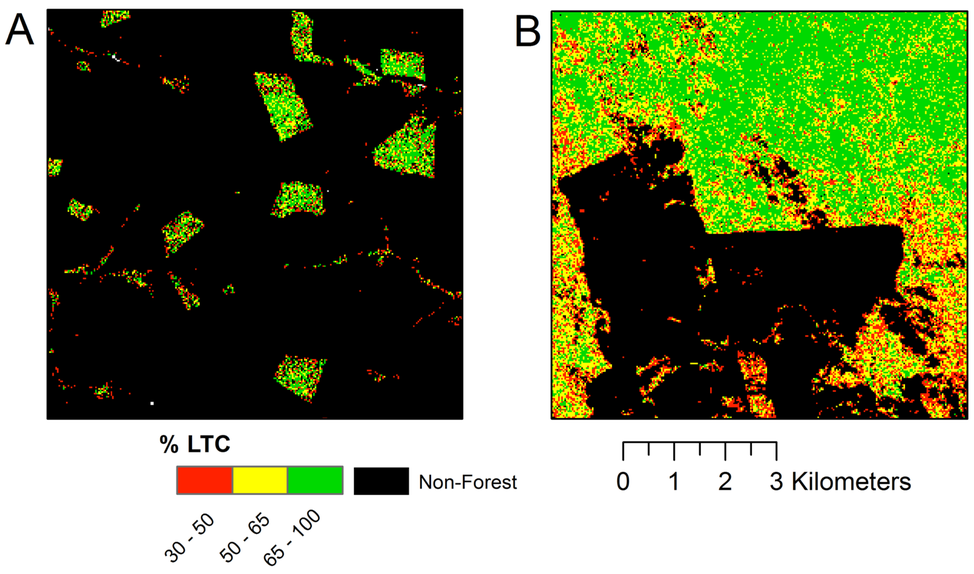
Does this pattern hold for larger scales?

METHODS

THE BIG PICTURE FROM SPACE

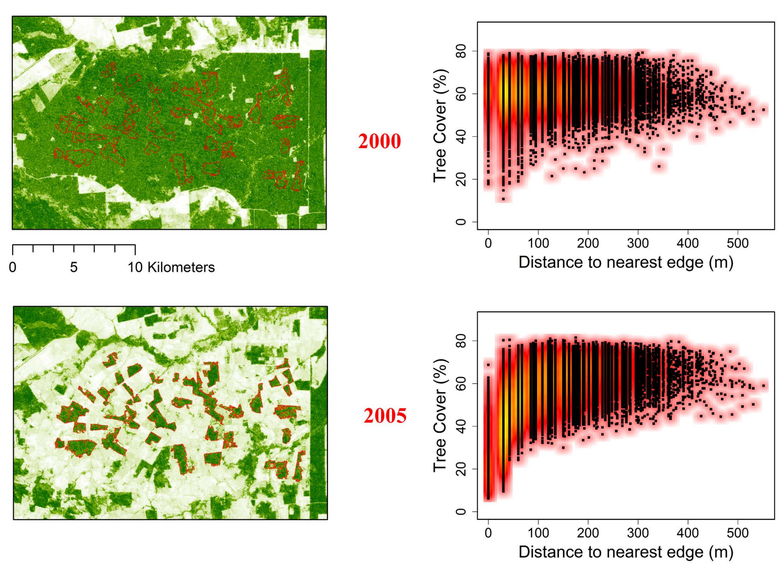


We used LANDSAT Vegetation Continuous Fields maps[3] with 30 meter resolution in order to evaluate Tree Cover conditions on fragmented Landscapes.



RESULTS

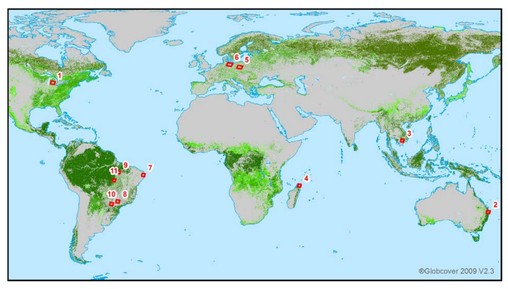
THE "FAN PATTERN"



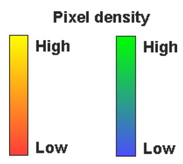
As the larger fragment becomes fragmented, pixels on edges have their tree cover significantly reduced – but not all.

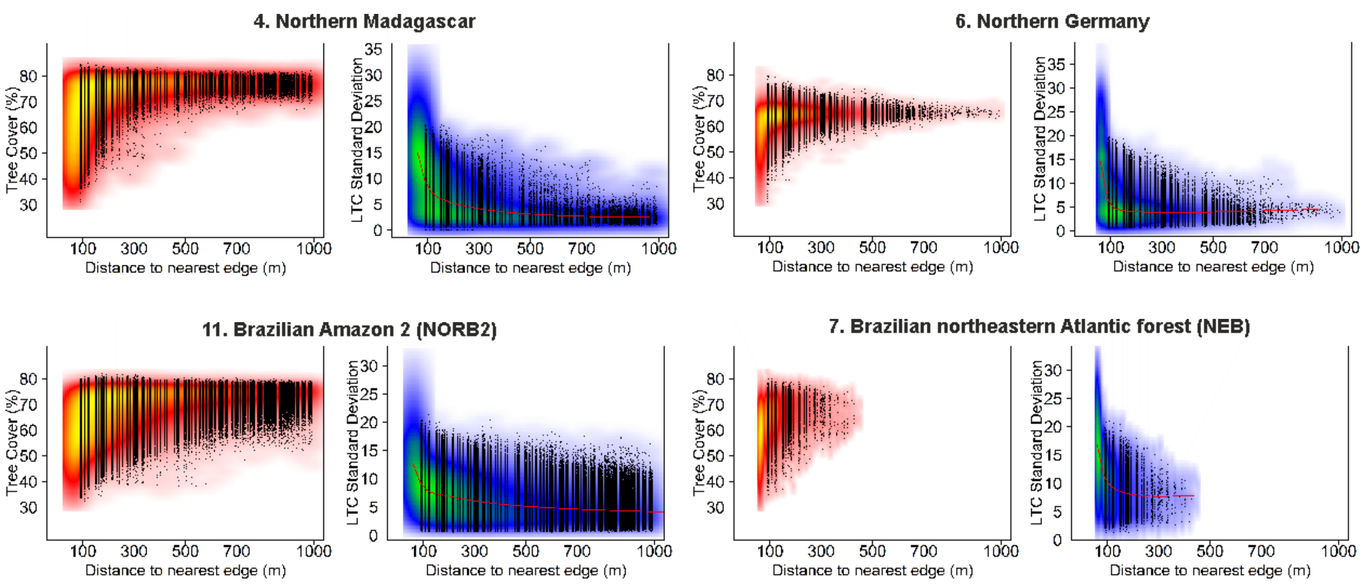
RESULTS

GLOBAL ANALYSIS



11 LANDSAT VCF scenes were analysed relating Tree Cover and edge distance (in red/yellow). Also the standard deviation of Tree Cover within a 60 meter radius neighborhood was estimated (blue/green).





DISCUSSION

IMPLICATIONS FOR CONSERVATION

- ***Even though average values for tree cover in edges are lower than in core, edges can be better characterized as areas where tree cover experiences intense variability***
- ***Core areas have consistent high tree cover values, which confirms their role as important in conservation designs***
- ***Edge-Core thresholds are variable, and we were still unable to identify what determines their values***
- ***Many other processes related or not to tree cover could exhibit the same "fan pattern" in edges.***

REFERENCES

1. Dantas de Paula, M., Groeneveld, J., Huth, A. 2016. The extent of edge effects in fragmented landscapes: Insights from satellite measurements of tree cover. Ecological Indicators 69, 196-204

2.Haddad, N. et al. 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. Science Advances, 1(2) 1-9

3. Sexton, J. et al. 2013. Global, 30-m resolution continuous fields of tree cover: Landsat-based rescaling of MODIS vegetation continuous fields with lidar-based estimates of error. International Journal of Digital Earth. 6(5) 427-448.

DAAD Deutscher Akademischer Austausch Dienst
German Academic Exchange Service

CNPq Conselho Nacional de Desenvolvimento Científico e Tecnológico