

Environmental instability and functional traits predict lemur ecological community structure

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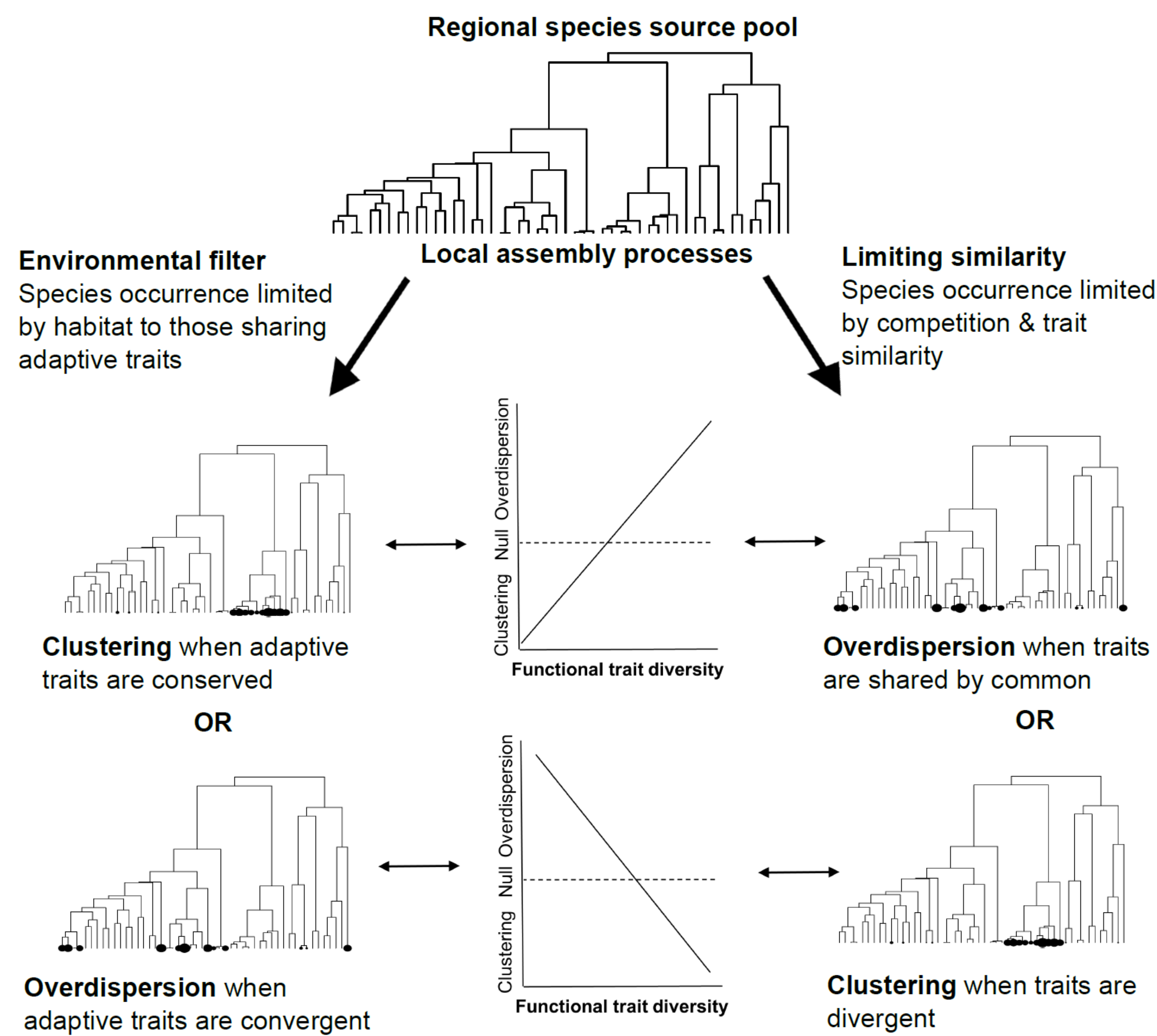
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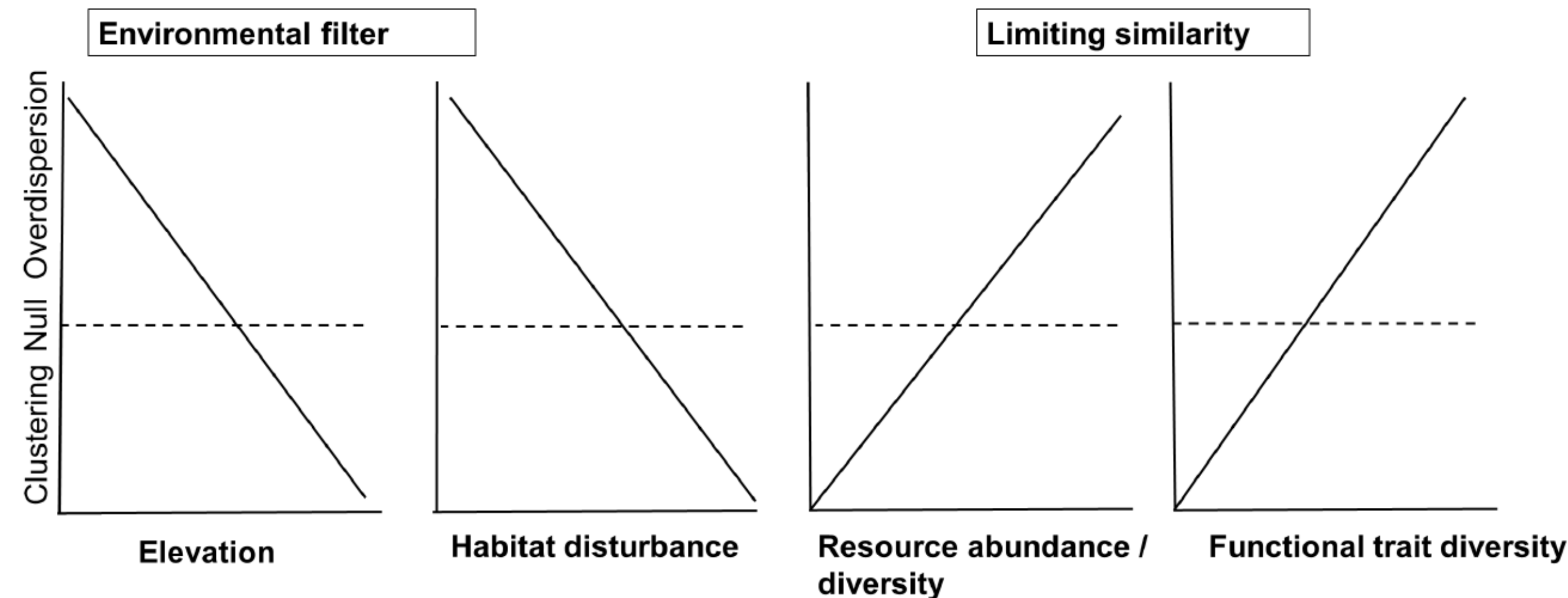
Background:

Ecological community assembly

- Environmental filters & Limiting similarity (Cavender-Bares et al. 2009, Vamوسي et al. 2009)



Predictions:



Methods:

- Field transect surveys for lemurs 7/2011-3/2014
- 31 transects, 5 localities around Ranomafana National Park and COFAV southeast Madagascar, 1500km of surveys
- Environmental variables: elevation, human use history and botanical inventories
- Lemur densities (DISTANCE, Thomas et al. 2010)

Alpha Diversity – within sites

Phylogenetic Community Structure:

- Mean Nearest Taxon Index (MNTD), *picante**
- Phylogeny of 13 sp (Springer et al. 2012)

Functional Trait Diversity:

- Rao's quadratic entropy, *syncsa**
- Diet (%folivory), Life History (AFR), Size (body mass), Sociality (group size)

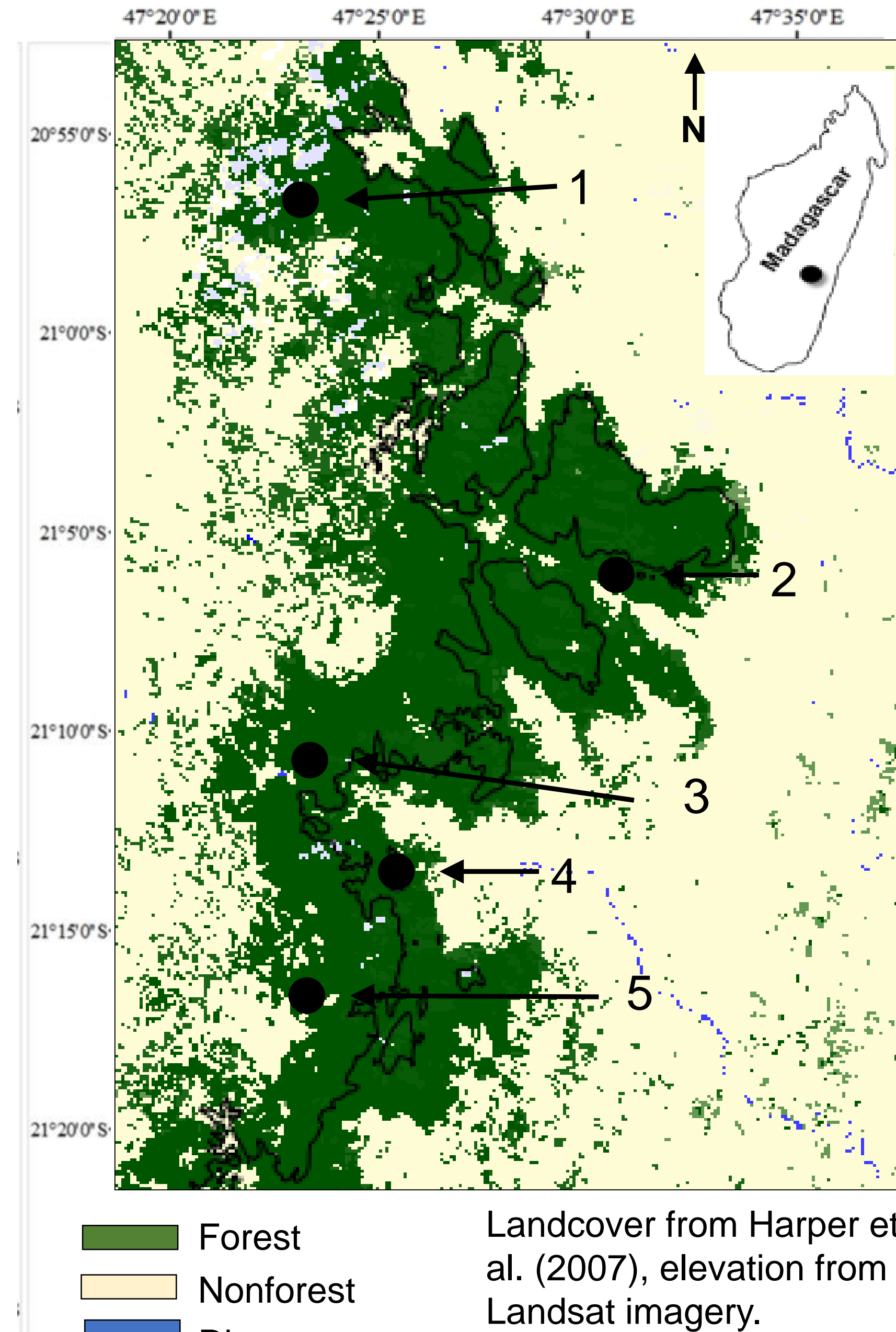
General Linear Mixed Models:

- Random effect = Locality, *nlme**
- Spatial autocorrelation

Beta Diversity – dissimilarity among sites

- Lemur & tree taxonomic dissimilarity (Sorenson's index) *vegdist**
- Lemur phylogenetic dissimilarity (Phylo-Sorenson's index) *picante**
- Elevation + Distance dissimilarity *daisy**

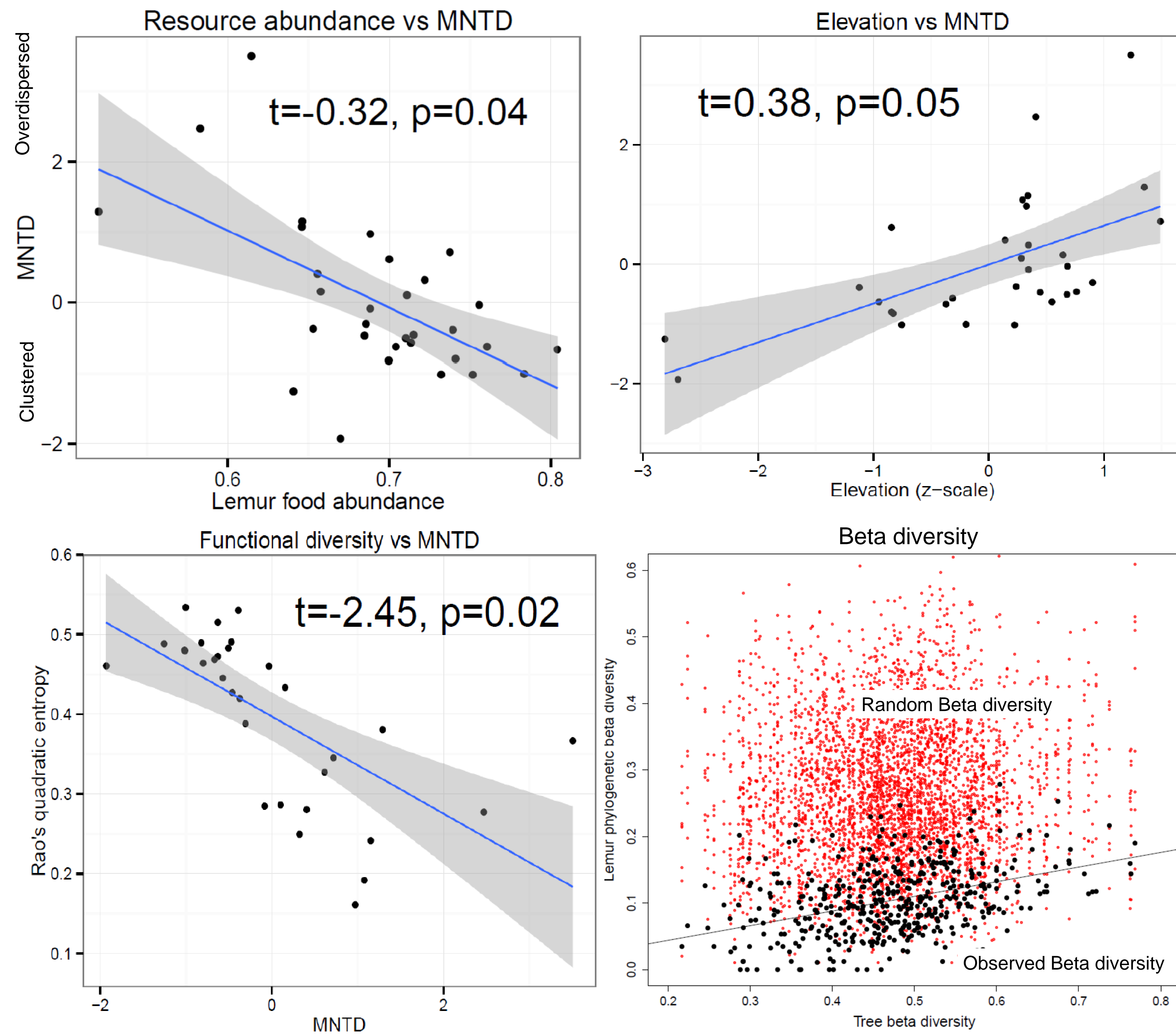
*R packages



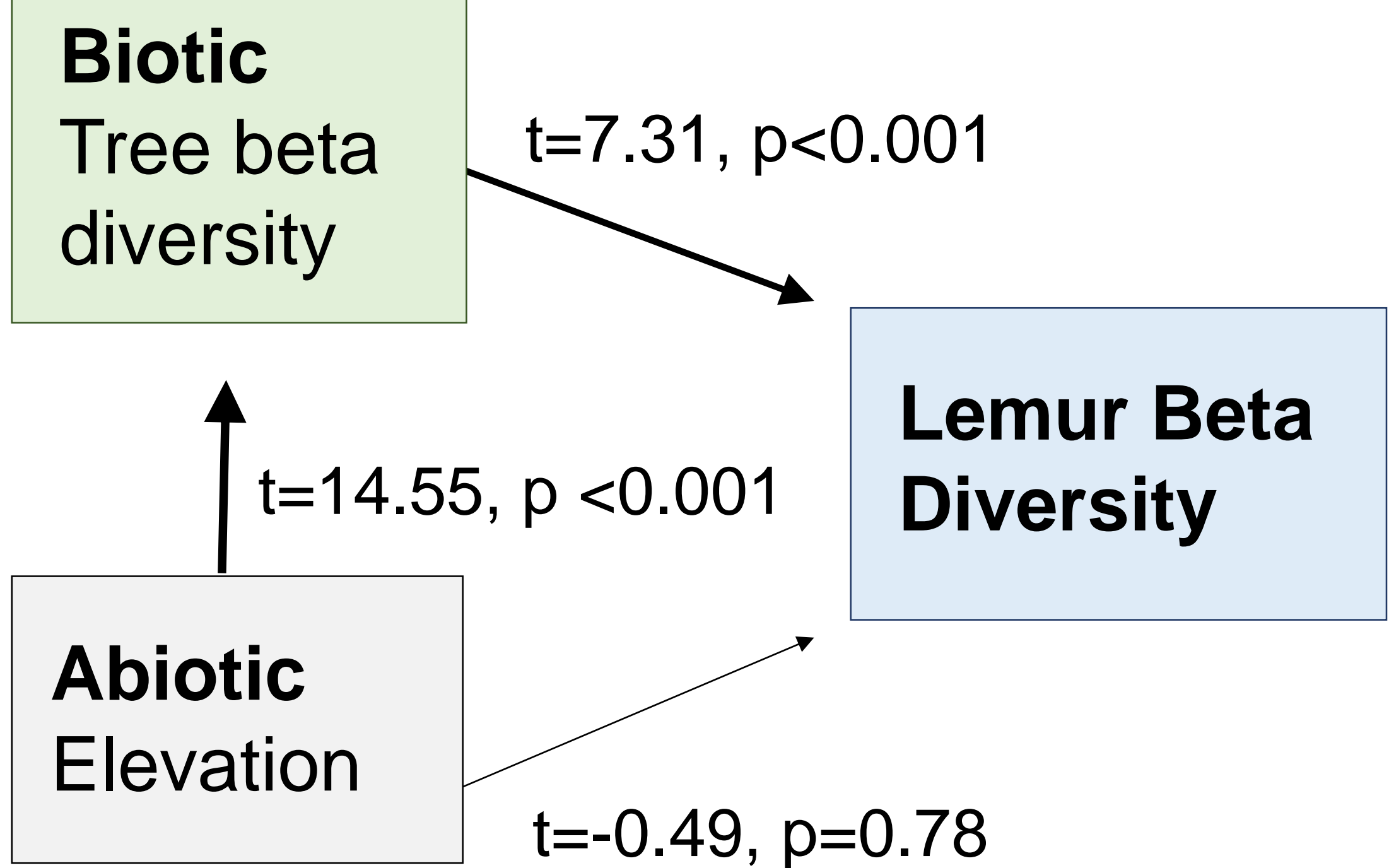
- 1: Ampatsona
- 2: Miaranony
- 3: Vohiparara
- 4: Valohoaka
- 5: Maharira

Results:

Relationships between mean nearest taxon distance (MNTD), abiotic and biotic predictors, and functional diversity. Shaded area: 95% confidence interval.



Beta diversity: partial Mantel tests, strong effect of tree dissimilarity on lemur dissimilarity controlling for elevation; weak effect of elevation on lemur dissimilarity controlling for tree dissimilarity.



Conclusions:

- Lemur community assembly related to resource abundance & elevation
- Closely related species w/ divergent traits dominate high-resource communities
- Divergence in body size
- Overdispersion at high elevation w/ low niche diversity
- Convergence on folivory, small body size, nocturnality
- Lemur dissimilarity among transects related to tree dissimilarity

Acknowledgments: I thank the following agencies for financial support & those logos printed below: NSF GRF, Turner Fellowship, AGEP-T-FRAME Scholarship, Primate Conservation, Inc., American Society of Primatologists, International Primatological Society, Primate Action Fund, La Conservatoire pour la Protection des Primates, Seneca Park Zoo. Permitting: Stony Brook IACUC: 2011-1875-R1-OBSER-USA, Malagasy Ministry of the Environment, Madagascar National Parks: #225/12/MEF/SG/DGF/DCB.SAP/SCB. I thank all the amazing staff of MICET (esp. B Andriamahaja), Centre ValBio (esp. E Larney, J Cadle, Jean de Dieu, Dede, Prisca), MNP staff at RNP, and all my field assistants, especially: Tongaso Lydia, Donné Kelly, Nirina Thielie Emille, Donné Lehibe, Ravaosolonirina, Jean Modesta, Nirina X, Jean Claude, Zafy, Hery, Pierre, Koto, Justin, Albert, Joseph, Sepha, Georges, Francois, Randimby, Rabia, Ravelo, Ravelosoa, Ramiaraka, Rakoto Zafy, Da, Raphily, Ramboa, and all the supportive people of the fokontany Ampatsona-Ambohidaza, Dera, Tavao, B Singletary. For training in phylogenetic systematics, comparative methods and statistical analyses I thank: the AnthroTree workshop held by C. Nunn and supported by the NSF (BCS-0923791) and the National Evolutionary Synthesis Center (NSF grant EF-0905606); I thank the UC Davis Bodega Bay Applied Phylogenetics Workshop leaders, especially P. Wainwright, L. Mahler, S. Price, and B. Moore. Thanks to J. Smaers and S. Johnson for helpful discussions. I thank my advisors: PC Wright and ER Seiffert, and my committee members W Jungers, L Dávalos, and C Nunn.



References: Cavender-Bares et al. (2009). *Ecology Letters* 12(7): 693-715.
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