Ghislain Vieilledent

Ecology – Applied Statistics

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born in 1979 in Nantes (40 yrs old)

Positions

2009 – pres. **Research scientist**, *Cirad, UMR AMAP*, Montpellier (France), Ecology and applied statistics.

2015 – 2018 **Seconded National Expert (SNE)**, *European Commission, Joint Research Center*, Ispra (Italie), Modelling and forecasting anthropogenic deforestation in the tropics.

2009 – 2012 **Detached researcher in Madagascar**, *Cirad, dP Forêts et Biodiversité*, Antananarivo (Madagascar), Functioning and conservation of tropical forest ecosystems in Madagascar.

Research topics

Main topics **Community ecology:** competition between species, intraspecific variability, and demography of rare species; **Conservation biology:** role of tropical forests in the global carbon cycle and species vulnerability to land-use and climate change; **Statistics applied to ecology:** advanced statistical models for modelling species distribution and tropical anthropogenic deforestation.

Intraspecific variability During my PhD thesis in Grenoble and a stay in Durham (NC), in collaboration with Benoît Courbaud and James S. Clark, we have used both theoretical and empirical models to show that intraspecific variability had an important and under-appreciated role in determining tree species coexistence and community stability in temperate forests with a restricted number of species[6,9]. Now at UMR AMAP in Montpellier collaborating with Isabelle Maréchaux (co-supervising the PhD thesis of Camille Girard-Tercieux), I am interested in continuing this research in hyperdiverse tropical forests.

Background and diploma

2009 **Cemagref de Grenoble, AgroParisTech.** *PhD thesis* in statistics applied to forest ecology. Tree species coexistence mecanisms in mixed mountain forests (Norway Spruce and silver Fir).

2004 **Ecole Nationale Supérieure Agronomique de Rennes (ENSAR).** *Diploma of Agronomy*. Agronomy, quantitative ecology and conservation biology.

Funded research projects

2019 – 2022 **RELIQUES** project (in charge of WP1), Effect of forest fragmentation on biodiversity in ultramafic forests of New-Caledonia, **CNRT**, 251380 €. `https://cnrt.nc/reliques`

2014 – 2019 **BioSceneMada** project (coordinator), Biodiversity scenario under the effects of both climate change and deforestation in Madagascar, **FRB–FFEM**, 116748 €. `https://bioscenemada.cirad.fr`

2010 – 2012 **REDD+** projects, Contribution of Madagascar tropical forests to the global carbon cycle, **AFD, GoodPlanet, WWF**, 69210 €.

Software development

Statistical R packages **hSDM** and **jSDM** for advanced species distribution modelling, contributions to **MCMCpack** for generalized linear mixed models (glmm).

twoe Development of the R package and Capsis module named **twoe** for simulating tropical forest dynamics from forest inventory plots: `http://capsis.cirad.fr/capsis/help_en/twoe`

Scientific publications

Summary

Since 2009, 34 scientific articles and 3 book chapters, **H-index**: 23 (Google Scholar), 16 (Web of Science). Complete list at: `https://ecology.ghislainv.fr/publications`

Publications in link with the CESAB-iDiv project proposal

[10] **Laurans M., B. Hérault, G. Vieilledent and G. Vincent.** 2014. Vertical stratification reduces competition for light in dense tropical forests. *Forest Ecology and Management*, 329:79–88. [doi: 10.1016/j.foreco.2014.05.059]

[9] **Courbaud B., G. Vieilledent and G. Kunstler.** 2012. Intra-specific variability and the competition-colonisation trade-off: coexistence, abundance and stability patterns. *Theoretical Ecology*, 5(1):61–71. [doi: 10.1007/s12080-010-0095-8]

[8] **Rüger N., U. Berger, S. P. Hubbell, G. Vieilledent and R. Condit.** 2011. Growth strategies of tropical tree species: Disentangling light and size effects. *PLoS ONE*, 6(9):e25330. [doi: 10.1371/journal.pone.0025330]

[7] **Albert C. H., F. Grassein, F. M. Schurr, G. Vieilledent and C. Violle.** 2011. When and how should intraspecific variability be considered in trait-based plant ecology? *Perspectives in Plant Ecology, Evolution and Systematics*, 13(3):217–225. [doi: 10.1016/j.ppees.2011.04.003]

[6] **Vieilledent G., B. Courbaud, G. Kunstler, J.-F. Dhôte, and J. S. Clark.** 2010. Individual variability in tree allometry determines light resource allocation in forest ecosystems: a hierarchical Bayesian approach. *Oecologia*, 163(3):759–773. [doi: 10.1007/s00442-010-1581-9]

Other high impact publications

[5] **Strona G., S. D. Stringer, G. Vieilledent, Z. Szantoi, J. Garcia-Ulloa and S. A. Wich.** 2018. Small room for compromise between oil palm cultivation and primate conservation in Africa. *Proceedings of the National Academy of Sciences PNAS*, 115(35):8811–8816. [doi: 10.1073/pnas.1804775115]

[4] **Kunstler G., D. Falster, D. Coomes, F. Hui, R. Kooyman, D. Laughlin, L. Poorter, M. Vanderwel, G. Vieilledent, S. J. Wright, M. Aiba, C. Baraloto, J. Caspersen, J. H. C. Cornelissen, S. Gourlet-Fleury, M. Hanewinkel, B. Hérault, J. Kattge, H. Kurokawa, Y. Onoda, J. Penuelas, H. Poorter, M. Uriarte, S. Richardson, P. Ruiz-Benito, I.-F. Sun, G. Ståhl, N. Swenson, J. Thompson, B. Westerlund, C. Wirth, M. Zavala , H. Zeng, J. Zimmerman, N. Zimmermann, and M. Westoby.** 2016. Plant functional traits have globally consistent effects on competition. *Nature*, 529:204–207. [doi: 10.1038/nature16476]

[3] **Vieilledent G., O. Gardi, C. Grinand, C. Burren, M. Andriamanjato, C. Camara, C. J. Gardner, L. Glass, A. Rasolohery, H. Rakoto Ratsimba, V. Gond, and J.-R. Rakotoarijaona.** 2016. Bioclimatic envelope models predict a decrease in tropical forest carbon stocks with climate change in Madagascar. *Journal of Ecology*, 104:703–715. [doi: 10.1111/1365-2745.12548]

[2] **Chave J., M. Réjou-Méchain, A. Búrquez, E. Chidumayo, M. S. Colgan, W. B. C. Delitti, A. Duque, T. Eid, P. M. Fearnside, R. C. Goodman, M. Henry, A. Martínez-Yrízar, W. A. Mugasha, H. C. Muller-Landau, M. Mencuccini, B. W. Nelson, A. Ngomanda, E. M. Nogueira, E. Ortiz-Malavassi, R. Pélissier, P. Ploton, C. M. Ryan, J. G. Saldarriaga, and G. Vieilledent.** 2014. Improved allometric models to estimate the aboveground biomass of tropical trees. *Global Change Biology*, 20:3177–3190. [doi: 10.1111/gcb.12629]

[1] **Kunstler G., S. Lavergne, B. Courbaud, W. Thuiller, G. Vieilledent, N. E. Zimmermann, J. Kattge and D. A. Coomes.** 2012. Competitive interactions between forest trees are driven by species' trait hierarchy, not phylogenetic or functional similarity: implications for forest community assembly. *Ecology Letters*, 15(8):831–840. [doi: 10.1111/j.1461-0248.2012.01803.x]