ERROR PROPAGATION THROUGH A BAYESIAN NETWORK FOR BIOMASS ESTIMATION IN NEOTROPICAL FORESTS

Quentin Molto [1,2], Vivien Rossi [2], Lilian Blanc [2]

[1] *UAG-UMR EcoFog*
[2] *CIRAD-UMR EcoFog*

The above-ground biomass (AGB) of tropical forests is a crucial variable for the global ecological problems. It concerns both scientists and decision makers, especially through the recently set carbon market. Estimations of AGB from tree inventories are also a crucial point for the development of new methods of estimation, especially from above (plane, satellite).

Tree inventories are the actual material for assessing carbon stocks. They produce a large range of datasets. Some cover small area and give hi-quality information: diameter at breast height (DBH), species Latin names, heights, ... Some datasets cover very large areas but give low-quality information: range of DBH instead of precise measure, family name or even no floristic specification, no heights, ... In addition, some other databases are required, like wood density data and weighted trees. For this study located in French Guiana, we use all of those kinds of datasets.

To make correct inferences about biomass stocks and their evolution, it is essential to quantify the uncertainty associated with AGB estimates. It is also essential to answer those two questions: 1- Where does the uncertainty come from, and 2- How does it change with the data quality.

To answer those questions, we calculate the AGB with a full hierarchical Bayesian model. It allows us to propagate errors through the model until the final AGB distribution. We can then perform a sensibility analysis, changing the error laws. The error laws are describing the uncertainty associated with every field measure. Both width and shapes may vary.

Finally, we discuss the changes in AGB posterior distribution with the changes in error laws and data type. We also give some implication for both previous work and future experiments.