Section Sciences et Ingénierie de l'environnement
Design Project 2020 (semestre de printemps)

Proposition n°4

Spatial data science to better understand anthropogenic drivers of Forest Carbon Storage

Partenaire externe

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Taille de l'entreprise (nbre de collaborateurs) 60

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Descriptif du projet

Carbon storage is on average 25% lower in tropical forest edges than interiors, but we don't fully understand why. Data science will enable investigation over broader scales and higher resolutions than ever before possible, informing how to stop this degradation. Data sources will combine advanced remote-sensing and spatially disaggregated socio-economic data.

We have collected a number of global, fine-resolution spatial datasets capturing anthropogenic factors (e.g a 'market influence' map has been constructed, through the incorporation of population density, travel time to major cities and ports, size of markets, and volume of economic activity flowing through them.)

The goal of this project is to spatial statistical regression between these anthropogenic drivers and carbon storage, to better understand their correlation, and ultimately the influence of the former on the latter.

A better understanding of the ways in which forest stores carbon, and the influence of human activities will allow us to pose new hypotheses for how these impacts could be mitigated through policy or incentives.

Objectif et buts

The students will perform regression(s) to explore the determinants of carbon storage based on a suite of socio-economic variables provided. The choice of relevant spatial statistical methods for each variable will be

a/ Perform spatial regression across scales between gridded (raster) datasets of anthropogenic variables and Carbon storage
b/ Propose relevant methodologies (krigging…) for specific variables, and perform spatial regression across scales between point or polygon-based (vector) datasets and the gridded Carbon storage
c/ Statistical analysis to compare correlation with carbon storage of these anthropogenic variables.

Descriptif tâches

1/ Familiarize with the topic (background readings will be provided)
2/ Select 2 “test” datasets of 2 variables of interest from our list - propose spatial regression methods
3/ Perform spatial regression to explore correlation between carbon storage and both of these 2 test datasets. Interprete results.
4/ Scale up to more variables

Divers
Pre-requisites : strong spatial statistics skills (Python preferred).