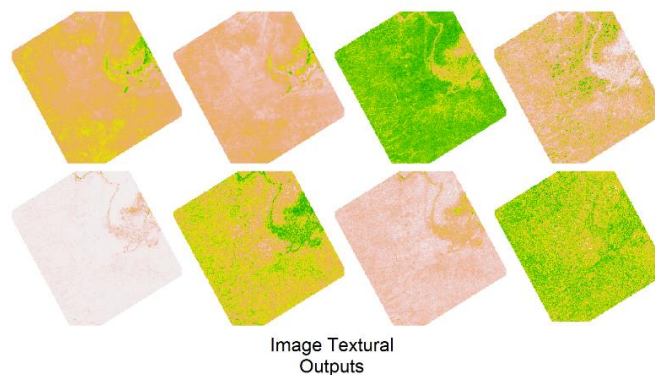


Bachelor and Master's theses topics under the Chair of Soil Science and Geomorphology

Topic: Can we source extra remote sensing covariates to use in digital soil mapping?

Preface

Soil organic carbon (SOC) is important for carbon sequestration and nutrient cycling processes. With this, several researchers have employed digital soil mapping (DSM) coupled with remote sensing derived spectral indices [e.g., Normalized Difference Vegetation Index (NDVI), Soil Adjusted Vegetation Index (SAVI)] to rapidly monitor its distribution and content levels across different landscapes. Some of these spectral indices are quite reliable for estimating SOC and prior studies have demonstrated such. Image texture analysis, on the other hand, computes second-order textural measurements (such as entropy) from individual remote sensing bands (e.g. band 5 – Near-Infrared (NIR) by identifying inherent relationships between neighboring pixels. Such information has proven valuable in ecological and forestry studies but is rarely explored for soil-based prediction.



Aim

We are looking for a motivated student to investigate the feasibility of using image texture-derived information as covariates in the digital soil mapping (DSM) of SOC. Different machine learning models are to be used while employing image texture-derived information as covariates, spectral indices as covariates, and a combination of the two. Like ecological and forestry studies, the benefit of image textural information may serve as valuable covariate data for DSM products in this case SOC models.

Requirements

Prior knowledge of machine learning and remote sensing is required. Additionally, programming knowledge, preferably in R, is required. Ideally, the final thesis should be written in English.

Contacts

For more information contact **Dr. Ndiye Michael Kebonye** (ndiye.kebonye@uni-tuebingen.de) or **Dr. Nafiseh Kakhani** (nafiseh.kakhani@uni-tuebingen.de) and **Prof. Dr. Thomas Scholten** (thomas.scholten@uni-tuebingen.de).