# Correlation analysis between forest carbon stock and spectral vegetation indices in Xuan Lien Nature Reserve, Thanh Hoa, Viet Nam

The Dung Nguyen (1,2) and Martin Kappas (1)

(1) Cartography, GIS and Remote Sensing Dept., Goerg-August-Universität Göttingen, Germany (tnguyen4@gwdg.de), (2) Forest Inventory and Planning Dept. Vietnam National University of Forestry, Ha Noi, Viet Nam (dungdtr@yahoo.com)

In the last several years, the interest in forest biomass and carbon stock estimation has increased due to its importance for forest management, modelling carbon cycle, and other ecosystem services. However, no estimates of biomass and carbon stocks of deferent forest cover types exist throughout in the Xuan Lien Nature Reserve, Thanh Hoa, Viet Nam. This study investigates the relationship between above ground carbon stock and different vegetation indices and to identify the most likely vegetation index that best correlate with forest carbon stock. The terrestrial inventory data come from 380 sample plots that were randomly sampled. Individual tree parameters such as DBH and tree height were collected to calculate the above ground volume, biomass and carbon for different forest types. The SPOT6 2013 satellite data was used in the study to obtain five vegetation indices NDVI, RDVI, MSR, RVI, and EVI. The relationships between the forest carbon stock and vegetation indices were investigated using a multiple linear regression analysis. R-square, RMSE values and cross-validation were used to measure the strength and validate the performance of the models. The methodology presented here demonstrates the possibility of estimating forest volume, biomass and carbon stock. It can also be further improved by addressing more spectral bands data and/or elevation.