Geophysical Research Abstracts
Vol. 20, EGU2018-8509, 2018
EGU General Assembly 2018

LiDAR-based prediction of plant and arthropod taxa at the southern slopes of Mt. Kilimanjaro

Alice Ziegler (1), Stephan Wöllauer (1), Marcel Peters (2), Insa Otte (1), Roland Brandl (1), Andreas Hemp (3), Andreas Huth (4), and Thomas Nauss (1)

(1) Philipps University Marburg, Germany (alice.ziegler@geo.uni-marburg.de), (2) University of Würzburg, Germany, (3) University of Bayreuth, Germany, (4) Helmholtz Centre for Environmental Research - UFZ, Germany

The measurement of biodiversity is a substantial task in environmental science. Performing field campaigns is still the common practice, even though it implies high costs and time expenses.
The aim of this study is to determine if LiDAR (Light Detection and Ranging) derived parameters are suitable to predict different taxa (plants and arthropods) on community level and to reveal the most valuable parameters.
The study was carried out in the framework of the KiLi Project (DFG-Research Unit 1246 KiLi) where extensive field studies as well as airborne LiDAR missions were executed to retrieve datasets at the southern slopes of Mt. Kilimanjaro.
A set of 80 structural variables were calculated from the three dimensional high resolution LiDAR point clouds (e.g. mean height of vegetation, gap fraction and penetration rate) and then used to predict diversity of 35 taxa using data-driven modeling strategies. As there are different types of landuse at the research area the analysis was divided in predictions across all landuse types and those only for forested areas.
First results with partial least square models indicate, that predictions, for some taxa, are feasible with R^2 up to 0.55 (Leave-one-out-cross-validation). Differences between the results of predictions across all landuse types to predictions for forested areas only are evident and vary between taxa. This study therefore indicates the potential of LiDAR data as a tool for biodiversity mapping.