Geophysical Research Abstracts
Vol. 19, EGU2017-4911, 2017
EGU General Assembly 2017

LiDAR-based Prediction of Arthropod Abundance at the Southern Slopes of Mt. Kilimanjaro

Alice Ziegler
Germany (alicezieglerstudents.uni-marburg.de)

LiDAR (Light Detection And Ranging) is a remote sensing technology that offers high-resolution three-dimensional information about the covered area. These three-dimensional datasets were used in this work to derive structural parameters of the vegetation to predict the abundance of eight different arthropod assemblages with several models. For the model training of each arthropod assemblage, different versions (extent, filters) of the LiDAR datasets were provided and evaluated. Furthermore the importance of each of the LiDAR-derived structural parameters for each model was calculated.
The best input dataset and structural parameters were used for the prediction of the abundance of arthropod assemblages. The analyses of the prediction results across seven different landuse types and the eight arthropod assemblages exposed, that for the arthropod assemblages, LiDAR-based predictions were in general best feasible for "Orthoptera" (average R^2 (coefficient of determination) over all landuses: 0.14), even though the predictions for the other arthropod assemblages reached values of the same magnitude. It was also found that the landuse type "disturbed forest" showed the best results (average R^2 over all assemblages: 0.20), whereas "home garden" was the least predictable (average R^2 over all assemblages: 0.04). Differenciated by arthropod-landuse pairs, the results showed distinct differences and the R^2 values diverged clearly. It was shown, that when model settings were optimized for only one arthropod taxa, values for R^2 could reach values up to 0.55 ("Orthoptera" in "disturbed forest"). The analysis of the importance of each structural parameter for the prediction revealed that about one third of the 18 used parameters were always among the most important ones for the prediction of all assemblages. This strong ranking of parameters implied that focus for further research needs to be put on the selection of predictor variables.