

THE INFLUENCE OF CLIMATE AND SOIL CONDITIONS ON PLANT SPECIES TURNOVER IN A TROPICAL MONTANE CLOUD FOREST.

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Beta diversity greatly contributes to large scale plant diversity in tropical cloud forests, characterized by steep environmental gradients. Woody plant species turnover was studied at the Monteverde Cloud Forest Reserve in north-western Costa Rica, with the objective to elucidate the arrangement of species diversity from the Atlantic to the Pacific slope. Seven 500 m² forest plots were established between 1200 and 1500 masl on both slopes. Individuals with a dbh \geq 5 cm were identified. Temperature, precipitation (rain and fog collectors) and soil moisture were measured bi-weekly on all plots from March to December 2003, and soil acidity was determined. Species' distributions were explored by feeding pair wise Sørensen measures into a Principal Component Analysis. Relationships between floristic similarity and environmental variables were analyzed using Mantel tests. Climatic differences were greatest between the ridge and the lower Pacific slope. In total, 483 woody plants were identified, belonging to 133 species. The plots could be divided in three distinctive floristic units which clearly reflected different topographic positions. Floristic similarity was negatively correlated with differences in horizontal precipitation (from clouds and wind-driven rain). The outstanding dissimilarity of the ridge crest community, compared to all other sites, suggests that beta-diversity in the study area is largely driven by species with narrow spatial ranges, due to environmental factors which are related to frequent cloud immersion. Conservation strategies have to take into account that beta diversity of tropical cloud forest plants largely depends on the small scale arrangement of present and future climatic conditions.