

REVIEW ARTICLE

Ecohydrological drivers of Neotropical vegetation in montane ecosystems

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Abstract

Montane ecosystems are known for their high numbers of endemic species, unique climate conditions, and wide variety of ecosystem services such as water supply and carbon storage. Although many ecohydrological and climatic studies of montane environments have been carried out in temperate and boreal regions, few have been done in Neotropical regions. Hence, the objective of this review is to synthesize the existing literature on the main factors (biotic and abiotic) that influence vegetation distribution, functional traits, and ecohydrological processes and feedbacks in tropical montane ecosystems and to identify key knowledge gaps. Most of the literature used includes work conducted in Neotropical montane rainforests, cloud forests, and grass/scrublands (e.g., *páramos*, *punas*, and *campos de altitude/rupestres*). Fog is a major climatic attribute in tropical montane habitats. We found that fog regimes (frequency and intensity of fog events) influence both water inputs (i.e., canopy interception and foliar water uptake) and outputs (evapotranspiration) and represent an important driver of local species composition, dominance of plant functional types, and ecological functioning. The stability and conservation of tropical montane ecosystems depends on such ecohydrological fluxes, which are sensitive to increases in air temperature and changing precipitation and fog regimes. Furthermore, to better inform effective conservation and restoration strategies, more work is needed to elucidate how key ecohydrological processes are affected by land use

conversion to agriculture and pasture lands, as human activities influence the water budgets in Neotropical montane watersheds not only at regional-scales but also globally.