The species richness pattern and additive diversity partitioning of mosses along a tropical elevational gradient in Hainan Island, China

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Abstract

Understanding the species richness pattern along elevational gradients and its driving mechanisms is critical for biodiversity conservation. We examined the elevational patterns of species richness and evaluated the effects of spatial and environmental factors for all mosses, acrocarpous mosses, and pleurocarpous mosses, respectively, predicted a priori by alternative hypotheses, including mid-domain effect (MDE), habitat complexity, energy, and environment. We assessed the contribution of elevation toward explaining the heterogeneity among sampling sites for each group. Last, we compared the occurrence probability and proportional use of community type along the elevational gradient between acrocarpous mosses and pleurocarpous mosses. We observed negatively skewed (hump-shaped) distribution pattern of species richness along the elevational gradient for each group. The habitat complexity and the MDE hypothesis were supported for the patterns of all mosses and acrocarpous mosses; whereas the habitat complexity and the environment hypothesis were supported for the pattern of pleurocarpous mosses. For many low-lying sampling sites with sunny and dry conditions, extinction and dispersal limitation are the primary processes producing low species richness pattern, which decreases the overall average diversity for each group. The variations of the occurrence probability and proportional use of community type along the elevational gradient between acrocarpous mosses and pleurocarpous mosses explain the contributions of elevation toward the heterogeneity among sampling sites for all mosses. Higher sensitiveness to environmental changes could contribute to a larger increase of species diversity from unfavorable to optimal environment conditions, enlarging elevation effect on explaining the heterogeneity among sampling sites for pleurocarpous mosses.

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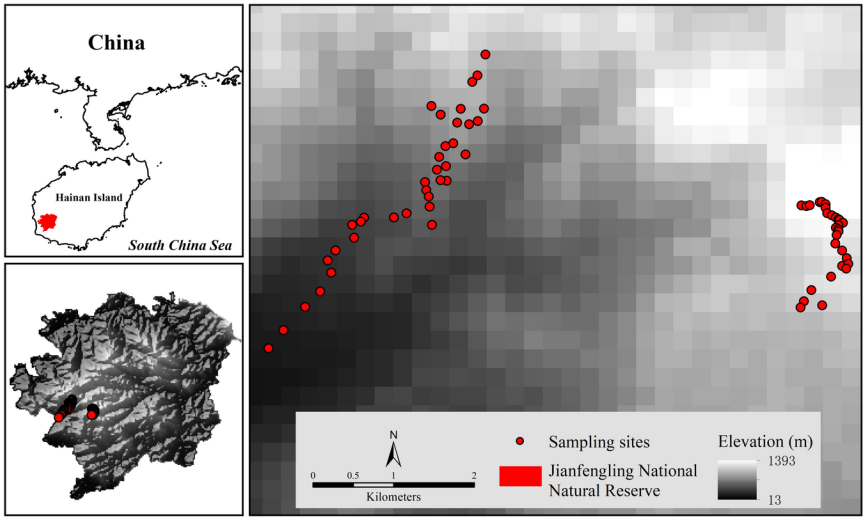

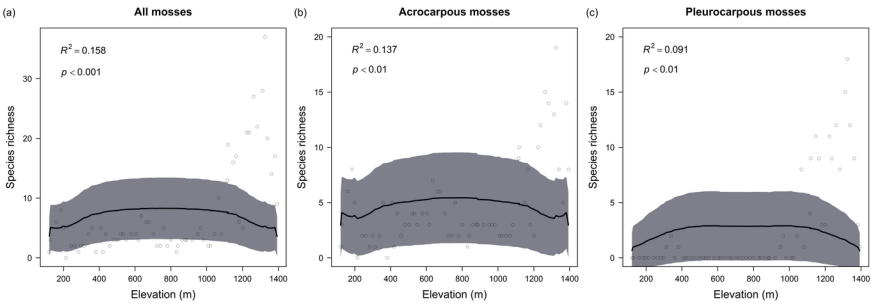

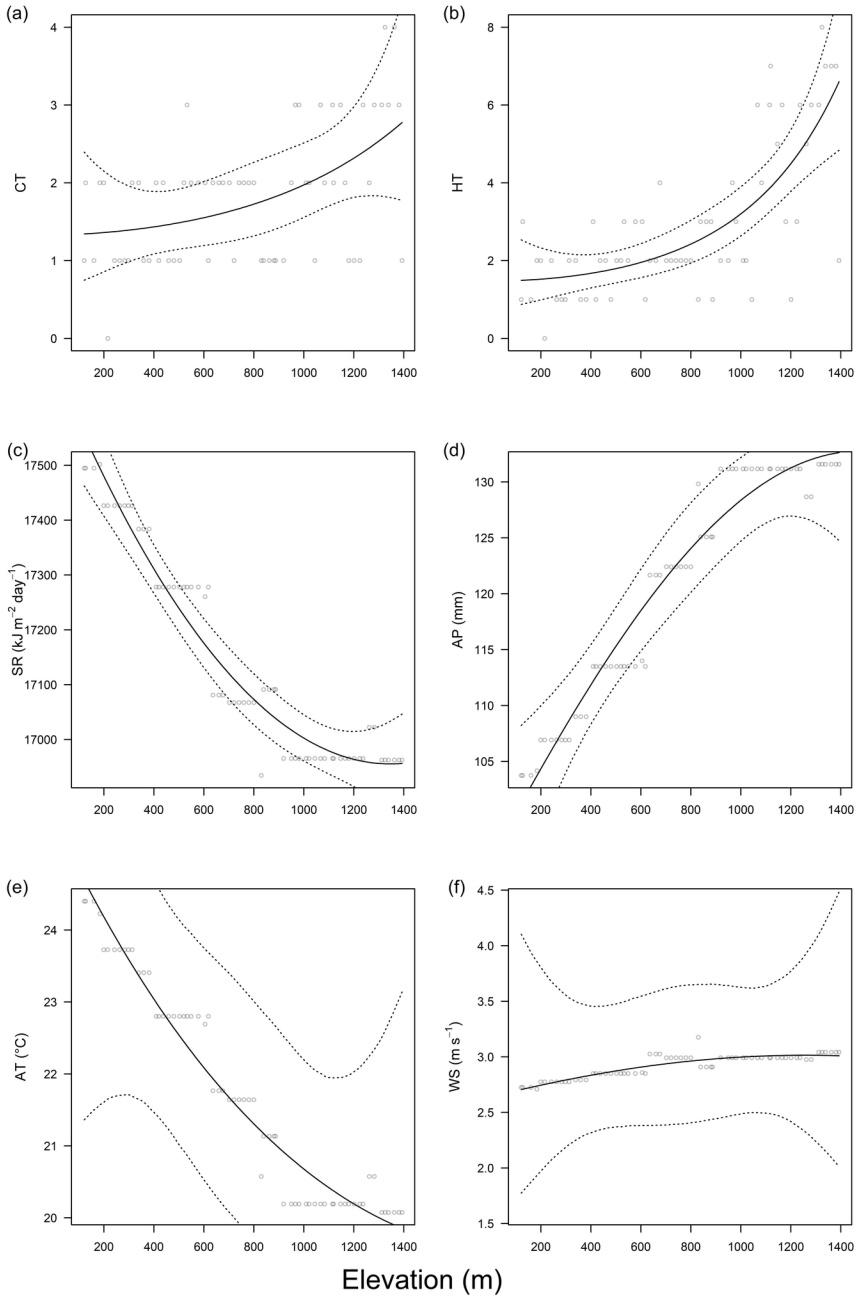

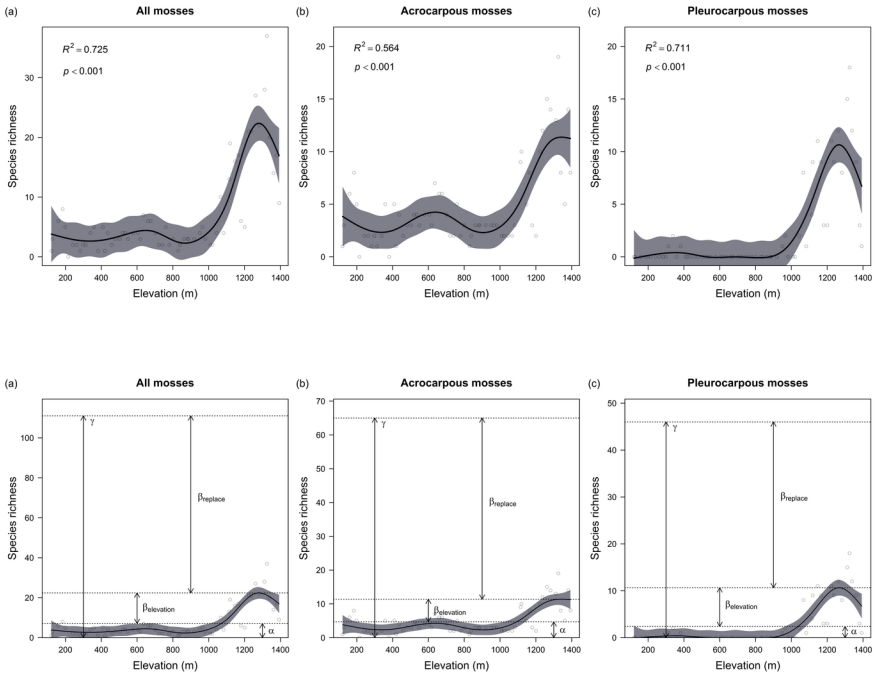

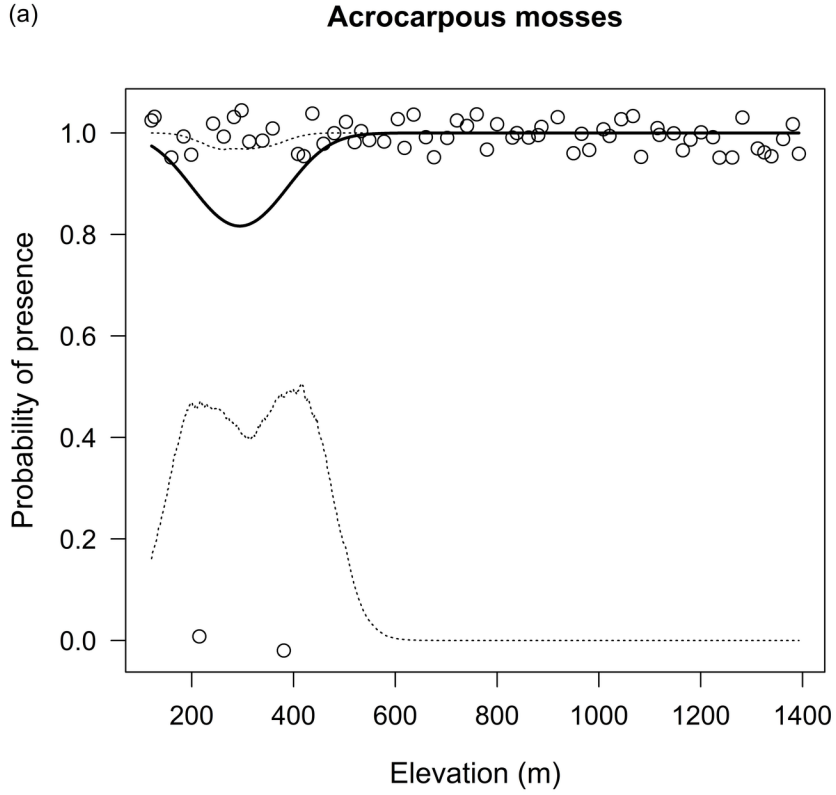

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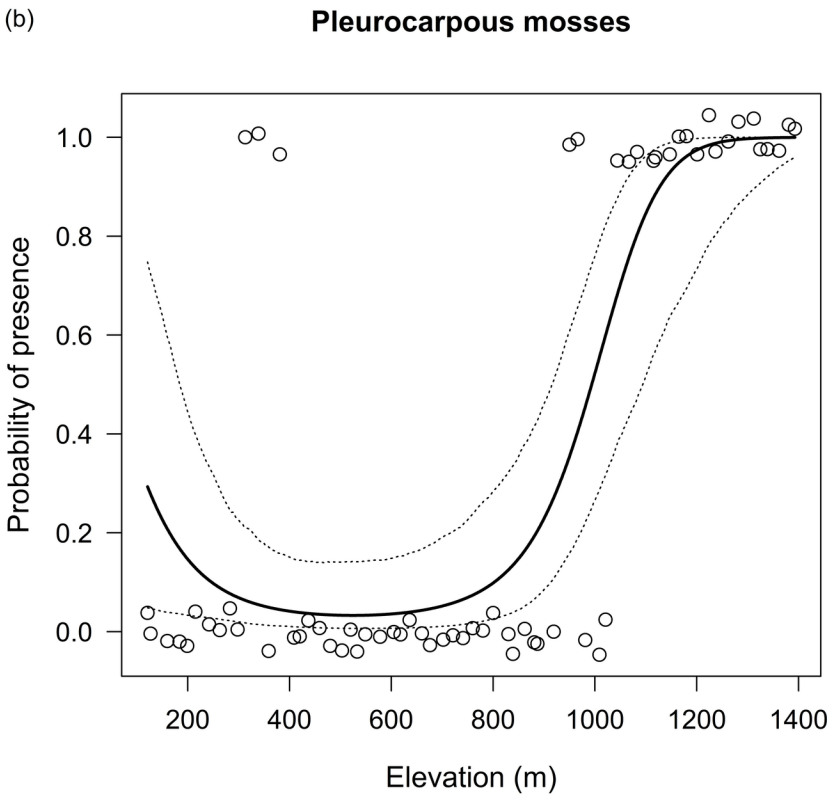

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