

Phylodiversity Structure and Climate Impact on African Special Habitats: A Call to Action for Conservation Policy

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The unique biodiversity of quartz fields and Afromontane ecosystems in Africa are marked by specialized plant communities and high phylogenetic diversity. Their limited geographic ranges and specialized plant adaptations make them highly vulnerable to shifting climate patterns, impacting species survival and ecosystem stability. For our studies, we integrate phylogenetic diversity analyses with ecological data to investigate the evolutionary and ecological significance of these special habitats. Specifically, we test whether African special habitats with high phylogenetic diversity, endemism, and unique functional traits are more likely to represent biodiversity hotspots critical for conservation. Identifying these hotspots will reveal areas where species richness and evolutionary distinctiveness align, providing strategic priorities for conservation to enhance resilience against climate change and habitat loss. Our objectives are to (i) unravel the patterns and processes shaping African biodiversity, and (ii) highlight key taxa and habitat features essential for informed conservation strategies. For instance, our recent findings suggest that, despite close geographic proximity within the Cape Regions, quartz fields differ notably in species pools and phylogenetic structure, indicating local adaptation and evolutionary divergence among quartz specialists. These findings emphasize an urgent need to prioritize special habitats within broader conservation policies, addressing not only cases of local plant poaching but also the resilience of these ecosystems in the face of climate pressures.