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New Global Biome System: Zonobiome Patterns and Their Climatic Drivers

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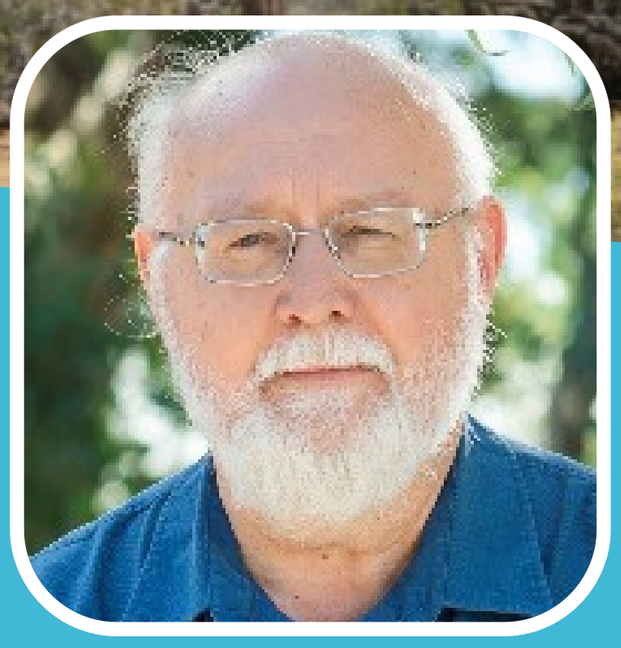

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NEW GLOBAL BIOME SYSTEM: ZONOBIOME PATTERNS AND THEIR CLIMATIC DRIVERS

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A biome is a large-scale biotic community and its environment, defined using functional rather than biodiversity-focused criteria of delimitation. Most of the research in (biotic) community ecology in the past has been concentrated on fine- and mid-scales involving habitats and their complexes at the landscape level. Less attention has been paid to large scales— those involving (sub)continents, hemispheres, and indeed—the entire planet. Knowing the biome structure and its origins is becoming vital to understanding complex patterns in relation to processes operating at large scales. Such processes involve climate dynamics, land-use changes, and effects of continental- and global-level nature conservation efforts.

Biomes are functional units of ecology and are challenging to define and delimit because of the poorly tangible nature of processes underpinning the functioning of large-scale communities. These processes involve biomass production, nutrient cycling, disturbance, recovery dynamics and the like. Several biome schemes are used to tackle the functionality of these large-scale units, with disparate levels of success.

My new Global Biome Scheme (GBS; outlined in my recent books Mucina 2023, Mucina & Rutherford 2024) builds upon widely-used Heinrich Walter's zonobiome system (e.g. Walter & Box 1976), which recognises 9 major biomes on our planet. My system consequently applies two novel criteria, incl. (1) a clearly defined hierarchy of biomes and (2) recognition of the climato-genetic criteria as the drivers of the biome patterns at high levels of the biome hierarchy. My system, encompassing 18 zonobiomes, also offers solutions to problems Walter's system was grappling with in the Southern Hemisphere. The hierarchy of the GBS consists of four levels, including zonobiomes, global biomes, continental biomes, and regional biomes; each level is characterised by its own set of ecological drivers, involving climate at high ranks and soils at the lowest rank. GBS makes provisions for the recognition of zonoecotones (regions of transition between the zones). However, those have never been properly mapped. Delimitation of the zonoecotones remains the most contentious front of biome ecology. In my lecture, I shall demonstrate the use of GBS in several parts of the world, taking you on a biome safari around our planet.

REFERENCES

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