Evolving Human Landscapes: A Virtual Laboratory Approach

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Abstract

Different human societies shape landscapes differently. Anthroecology theory explains this long-term differential shaping of landscapes as the product of sociocultural niche construction (SNC): an evolutionary theory coupling social change with ecosystem engineering. The evolutionary mechanisms underpinning this theory cannot be tested without experimental approaches capable of reproducing emergent selection processes acting on the combined suite of cultural, material, and ecological inheritances that determine the adaptive fitness of human individuals, groups, and societies. Agent-based modeling, as a ‘generative social science’ tool, appears ideal for this. Here we propose an agent-based virtual laboratory (ABVL) approach to generating and testing basic hypotheses on SNC as a general mechanism capable of producing the broadly varied anthroecological forms and dynamics of human landscapes from prehistory to present. While major challenges must still be overcome, a prospective modeling framework specification, guiding questions, and illustrative examples demonstrate clear potential for an ABVL to test predictions of anthroecology theory through generative social simulation.

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