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GEOSPATIAL MODELS: LIMITATIONS AND PROMISES IN PREDICTING OCCURRENCE AND DIVERSITY OF TOOL USE

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Geospatial models offer a new tool to study the occurrence and diversity of tool use. Geospatial models typically incorporate elevation, hydrology, vegetation, geology, climatic, and behavioral data at local and regional scales. Adapting these models to predict regional variation in tool use entails some challenges for modelers. For example, in addition to favorable ecological conditions providing opportunities to perform the behavior (e.g., appropriate resources), in nonhuman primates tool use typically also requires social support for learning. Therefore, with respect to tool use, geospatial models likely can be enhanced by including variables influencing social learning, such as features of social relationships, group cohesion and composition. Detailed studies at sites or locations which fail to fit models' predictions can help us determine sources of discrepancy. Recent human-induced ecological changes and additional as yet unforeseen ecological and social variables may constrain the predictive value of geospatial models. Clearly, therefore, the scope of the application of geospatial modeling to understanding how and why behaviors are transmitted and maintained within and between populations, groups or communities is immense and is likely to make a significant contribution to our understanding of material culture in primates.

Keywords: geospatial modeling, tool use, ecological opportunities, material culture