

## Abstract

Lacunarity results can be skewed by edge effects and this may have negative implications for research projects in ecological pattern analysis and modeling. The problem occurs because the standard gliding-box algorithm over-samples the center of a map and under-samples along its edges. This effect is particularly strong when the scale of inquiry is large relative to the extent of the map, as fewer box mass estimates are utilized to form the distribution from which lacunarity is calculated. We devised a new algorithm where we allowed the gliding-box to overlap beyond the edge of the map and wrap back around to the opposing side, thereby solving both problems. In this study, we compare the standard lacunarity algorithm with this new periodic boundary algorithm (a method often used in cellular automata modeling) to quantify the differences between the two approaches and to determine when the standard algorithm may suffer from deleterious effects. We performed our analysis upon several neutral landscapes to evaluate the importance of pattern as well. We found that the standard algorithm skews results when the pattern is strongly heterogeneous or aggregated, especially when the classes are not evenly distributed around the center of the map or when percent cover  $p_i$  is low. The advantages and disadvantages of both algorithms, as well as other

potential remedies such as up-weighting samples along the edges, are discussed.