An ANOVA-type procedure for replicated spatio-temporal point patterns with environmental applications

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Several methods to analyse structural differences between groups of replicated spatio-temporal point patterns are presented. We calculate a number of functional descriptors of each spatio-temporal pattern to investigate departures from completely random patterns, both among subjects and groups. The statistical distributions of our functional descriptors and of our proposed tests are unknown, and thus we use bootstrap and permutation procedures to estimate the null distribution of our statistical test. A simulation study provides evidence of the validity and power of our procedures. Several applications in environmental problems will be presented.