Spatial cross-border discontinuity in settlement pattern on Czech-Polish borderland

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A settlement pattern refers to the distribution of buildings and houses in a geographic region and the relationship between one house or building to another. In our case, indicators of urban sprawl are considered as a way of assessing settlement pattern. Urban sprawl, characterized by the chaotic placement of new buildings, was the most dominant spatial growth model in post-socialistic urban and rural areas. While urban sprawl is a well-known concept, rural sprawl is rarely seen in the literature. It is defined as construction activities in rural areas which degrade the scenic or environmental quality of the area with a typical expression of "leapfrog", which refers to housing development within agricultural areas, resulting in a patchwork that does not resemble a compact city. To quantify settlement pattern, we created eight metrics for the Czechia-Poland cross-border historical region of Těšín Silesia based on available building data from 1840 and 2020. We applied an approach based on a well-known and popular method (Regression Discontinuity Design) to measure spatial discontinuity. To describe the spatio-temporal changes, a combination of spatial, statistical and cartographic methods was used. The observed differences have been developing for more than 150 years; at the start, this area belonged to the territory of one state, and later it was

divided by a national border. The division of the region resulted in areas following different development trajectories. From the perspective of geoinformatics, the advantage of discontinuity analysis is the simplification of the presented information by transferring it from a map to a graph while preserving the basic spatial information to allow a more general point of view which can be combined with commonly used methods (e.g., choropleth maps or local spatial autocorrelation) to assess local differences.

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