Urabn land cover at criticality and city size distributions

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Human development has far-reaching impacts on the surface of the globe. The transformation of natural land cover has different forms and besides agricultural practices, urban growth is an eminent transformative process. We analyze global land cover data and extract cities as defined by maximally connected urban clusters. The analysis of city size distribution for all cities on the globe confirms Zipf's law. Moreover, investigating the percolation properties of the urban fabric we determine the closeness to criticality for various counties. At the identified critical thresholds, the urban land cover of the countries undergoes a transition from separated clusters to a gigantic component of country scale. We find that the Zipf-exponent decreases approx. logarithmically with the considered observational scale.