Scale Eqivalencies for OpenStreetMap Polygons

A. Reimer, C. Kempf, M. Rylov and P. Neis*

March 15, 2014

Abstract

All vector based geodata are ex- or implicitly linked to a certain geometric scale. Scale is inadvertently introduced while capturing the vector geometries, e. g. through some form of digitization, as well as at the modelling stage. Most geoprocessing tasks presuppose or at least benefit from information regarding the inherent geographic scale of the input data. More complex geoprocessing algorithms, e. g. generalization tasks, require input scale as a prerequisite for parameterization. VGI-Projects such as OpenStreetMap (OSM) do not provide explicit scale information and are not structured to do so. We introduce a method that allows to assign scale equivalencies to OSM polygons. The method is solely based on the individual polygons under consideration. It does not need any official data or ground truth after an initial calibration and is applicable beyond OSM-Data. It runs in linear time, making it a viable data-enrichment technique. The method has been applied to the full set of worldwide residential area and forest polygons of OSM. A worldwide parameterization can naturally not take into account the many variations in actual geography. We show exemplarily how local geographic circumstances can be modelled in this approach. This refinement is highlighted for city blocks in areas with a more recent colonial history. For the case of the OSM-Dataset on a world level, we statistically investigate potential dependencies and correlations between the generated capture scale equivalencies and national social and demographic attributes. We show that compilation scale is independent from other national determinants of data-quality such as number of contributors or level of economic development.

*Heidelberg University, Institute of Geography Dept. for GIScience