Geophysical Research Abstracts
Vol. 16, EGU2014-6794, 2014
EGU General Assembly 2014

Exploring the Quality and Usability of OpenStreetMap Data

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OpenStreetMap (OSM) is an international project which provides free geographic data by creating and distributing continuously new geodata on a strictly voluntary basis [1]. The open availability of global geographical data invites a wide use of OSM data for a range of fields and applications in many different user groups. Though ongoing contribution of map data by OSM volunteers, and by new volunteers joining OSM, the total volume of OSM data increases steadily.

The aim of this study is to explore the global OSM dataset and to define the quality of the dataset through its intrinsic properties instead of comparing its spatial location accuracy to a reference dataset. For instance, one hypothesis states that the spatial object density of OSM will correlated with population density. Other studies have already confirmed this correlation for specific study areas [2], but not on a global scale. Another aspect of this study is to explore the semantic properties of tags used to describe OSM elements.

The project includes the implementation of suitable hard- and software environments and the definition of study parameters in terms of quality and usability oriented to the ISO 19113: Geographic information - Quality principles.

Common tools for OSM data experience problems with the handling of object tags because unknown key-value combinations (elements of tags) are not supported in some software applications. This means that in the these objects may be missing the data subset used by a specific application. Approximately 36% of key-value pairs in OSM are unique. Only 10% of key-value pairs are widespread and commonly used world wide. Considering the total number of OSM elements exceeding 2 billion, the heterogeneity of tags used to characterise OSM objects offers both a trove of semantic richness but also poses a challenge to semantic interpretation of the global OSM dataset.

References:

[1] Offical OpenStreetMap Wiki, URL: http://wiki.openstreetmap.org (January 2014)

[2] Neis, P., Zielstra, D., Zipf, A., 2011, The Street Network Evolution of Crowdsourced Maps: OpenStreetMap in Germany 2007-2011