

# OpenStreetMap Data as a Basis for Official Geospatial Data: An Investigation into Updating the Building Stock Data for Municipalities in Baden-Württemberg, Germany

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## Abstract:

An essential task of a state is to provide everything for the essential needs of its citizens. This includes the provision of a functional infrastructure and information on land, transport routes and topography, as summarised under the term geospatial base data or Fundamental Geospatial Data Themes (UN-GGIM 2019, European Parliament and of the Council 2007). The task of the authorities established for this purpose, such as the National Mapping and Cadastral Agencies, is to provide this base data, while complying with certain quality standards. These data are needed, among other things, for planning purposes, to secure land transactions, for disaster preparedness, generally to support government and private activities. It should be noted that special traceable quality characteristics can be attributed to these official data, e.g. with regard to the structure and quality of the data and their spatial coverage, often also with regard to update cycles and methodology and licensing conditions. Generally, these are also provided as meta-data according to ISO 19115.

With regard to the scale reference and intended use of the geospatial data, a distinction can be made between scale ranges for cadastral maps and topographic maps. Depending on the size of the country, the collection and maintenance of the data place very high demands on these institutions. This can be an impossible task for some countries (Konecny et al., 2015). For example, it is estimated that it takes more than 190 years to produce comprehensive topographic maps for Indonesia (Tampubolon, 2020). Lack of data provision or delays in updating data have direct relevance for many areas of government and private action and hinder or prevent further developments. This is also the case in Germany (ATKIS-DLM project group, 2020). According to Müller (2017), the quality parameter "topicality" does not exist for data in the real estate cadastre.

How to overcome this problem? In addition to geospatial data collection by public agencies or by private companies, there is the approach that private individuals collect data for various purposes. Volunteered Geographic Information (VGI), a term introduced by Goodchild, 2007, means that individuals or a community of people voluntarily collect geo-referenced data and make it freely available (Coleman et al. 2009, Coleman 2010, Laarakker & de Vries 2011). The OpenStreetMap project in particular has become very well known as an exemplary example of such VGI: The data are collected worldwide by volunteers, but also supplemented by data donations from public authorities and companies. The quality of the data is to a certain extent controlled by the mutual control of the volunteers collecting the data. The form of data collection, structuring, accuracy and coverage of the data have been scientifically studied (see for example Arsanjani et al., 2015, Basiri et al., 2019, Minghini & Frassinelli, F., 2019).

In addition to the possibility of systematically deploying Earth observation systems, one approach to effectively support the initial collection and ongoing maintenance of geospatial data is to incorporate VGI into the creation of spatial data infrastructures (San Martin et al., 2019)

In the submitted paper, the topicality of the building stock in municipalities in Baden-Württemberg, part of the Federal Republic of Germany, is examined. Three municipalities were selected and included in the study according to the spatial type concept of the Federal Office for Building and Regional Planning (BBSR 2023): rural

town 2,000-5,000 inhabitants, small town 5,000-20,000 inhabitants, medium-sized town, 20,000-100,000 inhabitants. The analysis concept is explained and the quantitative and qualitative results of the project, which is currently in its final phase, are presented. The aim is to use these results to derive and communicate recommendations for action for the municipalities, but also for the public surveying administration, in order to contribute to timely and effective action by municipal decision-makers and citizens through faster provision of geospatial data.

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