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Näher dran.

Hazard Carrier Data from OpenStreetMap Data

Automatic Generation of Hazard Carrier Data for Usage in the Risk Assessment of Water Supply Areas

The water safety plan is an established approach to empower water suppliers worldwide to provide safe drinking water. Hazard carrier data, which depicts the sources of potential water quality compromise, e.g. fuel station is essential for every water safety plan. However, hazard carrier data is not available for every region, and the cost of an available dataset can exceed the local water supplier capabilities.
It is evaluated if the free and widely available OpenStreetMap (OSM) data can be used for hazard carrier data generation. The suitability is evaluated by examining the performance of OSM data against requirements for hazard carrier data and conducting a tool for automatic hazard carrier data generation from OSM data.

The thematic requirement is a list of 33 hazard carrier types a hazard carrier dataset should cover. Usually, several different datasets are combined to gain a comprehensive hazard carrier dataset. Therefore, there is no minimum number of hazard carrier types a single dataset has to represent to be suitable. OSM data is capable of representing more hazard carrier types than some other hazard carrier data sources as shown in figure 1.

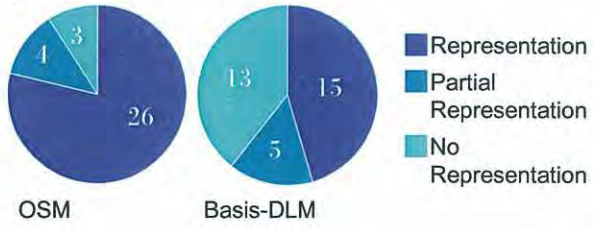

Figure 1: Capability of Representing the 33 Hazard Carrier Types – Comparison OSM and ATKIS Basis-DLM

The performance against the quality requirements is exemplarily evaluated for two diverse water supply areas.
The examined quality requirements are

- Potential of missing hazard carrier,
- Excess hazard carrier,
- External accuracy of hazard carrier.

The quality is evaluated through an intrinsic approach in which quality indicators are calculated from OSM metadata and a complementary quality analysis with reference data.
Subsets of the OSM data of both areas have been proven to meet the requirements while the complete datasets have a high probability of meeting them.

The conducted prototype is used to generate hazard carrier data from OSM data. The prototype utilizes free and open source software and can be configured for the use in different regions. An overview of the utilized tools is given with figure 2.

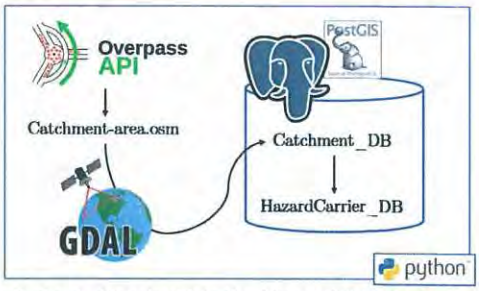

Figure 2: Tools Used within the Hazard Carrier Data Generation Prototype (GDAL/OGR: GDAL Team CC BY-SA 3.0; Overpass API Logo: Public Domain; PostGIS Logo: Web.rian CC BY-SA 3.0, creativecommons.org/licenses/by-sa/3.0/)

OSM data should be considered as possible hazard carrier data source in every water safety plan. However, the quality of a local OSM dataset cannot be guaranteed to meet all requirements. If the requirements are not met, still the benefits of using OSM hazard carrier data could prevail depending on the local water safety plan implementation and hazard carrier data situation.

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