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OSM critical infrastructure in Chile: Analysing the relation between OSM data completeness and territorial vulnerability

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Zusammenfassung

Volunteered Geographic Information (VGI) efforts have positioned themselves as a valuable complement to official geographic data sources. This has been particularly the case of OpenStreetMap, a collaborative project with a free editable and open geodata set, and a vast network of volunteers around the globe. The platform has been considered particularly useful for the assessment and management of risks of natural events since it contains valuable data for coping with disasters, like the location of main roads and buildings. Nevertheless, critical visions of VGI argue that this information is not tension-free as it presents several technological barriers. Although open, OSM is available and used exclusively by people having access to Internet and Internet-enabled devices. Remote-volunteered efforts like Missing Maps have sought to map remotely areas that might have higher vulnerability levels. However, such areas can still present problems of underrepresentation since more detailed mapping activities might not be conducted by local actors. This is of special relevance for data used before and after the occurrence of an emergency as it can lead to partial damage estimations and inadequate emergency response plans. Although remote-mapping works might be useful in places with scarce geographic information available, necessary information like the location of police stations, hospitals and schools might still be missing. This work in progress aims to explore the possible relations between OSM data quality and vulnerability levels of the territory. Conceived as an extrinsic evaluation of OSM, the study seeks to analyse the completeness level of OSM data referred to critical infrastructure – i.e. features that have a critical role for emergency management in the case of a disaster. Chile is chosen as a case study since it is a country that presents good levels of OSM contributions and it is exposed to a great number of natural hazards including earthquakes, tsunamis, landslides, floods and volcanic eruptions. Official lists of public infrastructure related to education, health as well as police and fire stations are considered, which allows defining a completeness index for each one of these types of infrastructure in every municipality (Chile's lowest political-administrative unit). Based on the National Socio-economic Characterization Survey from 2015, the study considers multiple regression models for estimating the correlation between OSM data completeness levels and socio-economic and demographic variables related to vulnerability levels. This includes variables referred to the amount of population below the poverty line, average incomes and educational levels, among others. Models are also controlled by variables like inhabitants per commune and population density. It is expected that the results lead to a better understanding of OSM data quality and an improvement of remote mapping activities, by evaluating whether the current contributions present biases related to socio-economic characteristics of the territory.