

Open data platforms for smart mobility planning: the case of Brazilian Capitals

Tatiane Borchers
Dirk Wittowsky

Ricardo Augusto Souza Fernandes

Graduate Program in Urban Engineering
Federal University of São Carlos, Brazil

imobis - Institute of Mobility and Urban Planning
University of Duisburg Essen, Germany



1. Introduction

- Data acquisition and open data remains a problem within strategic transport planning;
- Recent movement for governments to share their data (open governance initiatives);
- Open data and digitalisation can assist solving the accessibility and mobility issues, enhance transparency of government actions and also improve citizen participation on the development of policies;

1. Introduction

- Open data consists of data of public interest published by governments, which is characterized by its free and easy availability, i.e., open data is available without any restrictions and can be easily found and accessed;
- Principles: complete, primary, timely, accessible, machine processable, non-discriminatory, non-proprietary and license free;

1. Introduction

- Sharing open data has several challenges, including overcoming low quality of some datasets, format issues and database errors, and meeting the requirements for it to be reused;
- Privacy concerns (exposure at individual and at the community levels).

1. Introduction

The aim of the study is to map whether there are any open data platform initiatives for planning urban mobility and transport systems in Brazilian capital cities, investigating also if there are any climate change data related to mobility (e.g. pollution levels) and dynamic data regarding accidents and/or extreme climate events.

2. Method

- A search for open data platforms in Brazilian capitals; when such platforms were found, the following questions were made:
 - What data regarding mobility systems is available?
 - Is data on climate change events available? If so, which ones?
 - Does the population receive real-time information about events related to mobility, whether everyday or extreme weather? For example, high levels of pollution, accidents, etc.
 - Is popular/citizen participation encouraged by the platform / city?
 - Do the databases contain up-to-date data?

* Disclosure: we analysed only the data available on the platforms, but they may be available in another websites or domains.

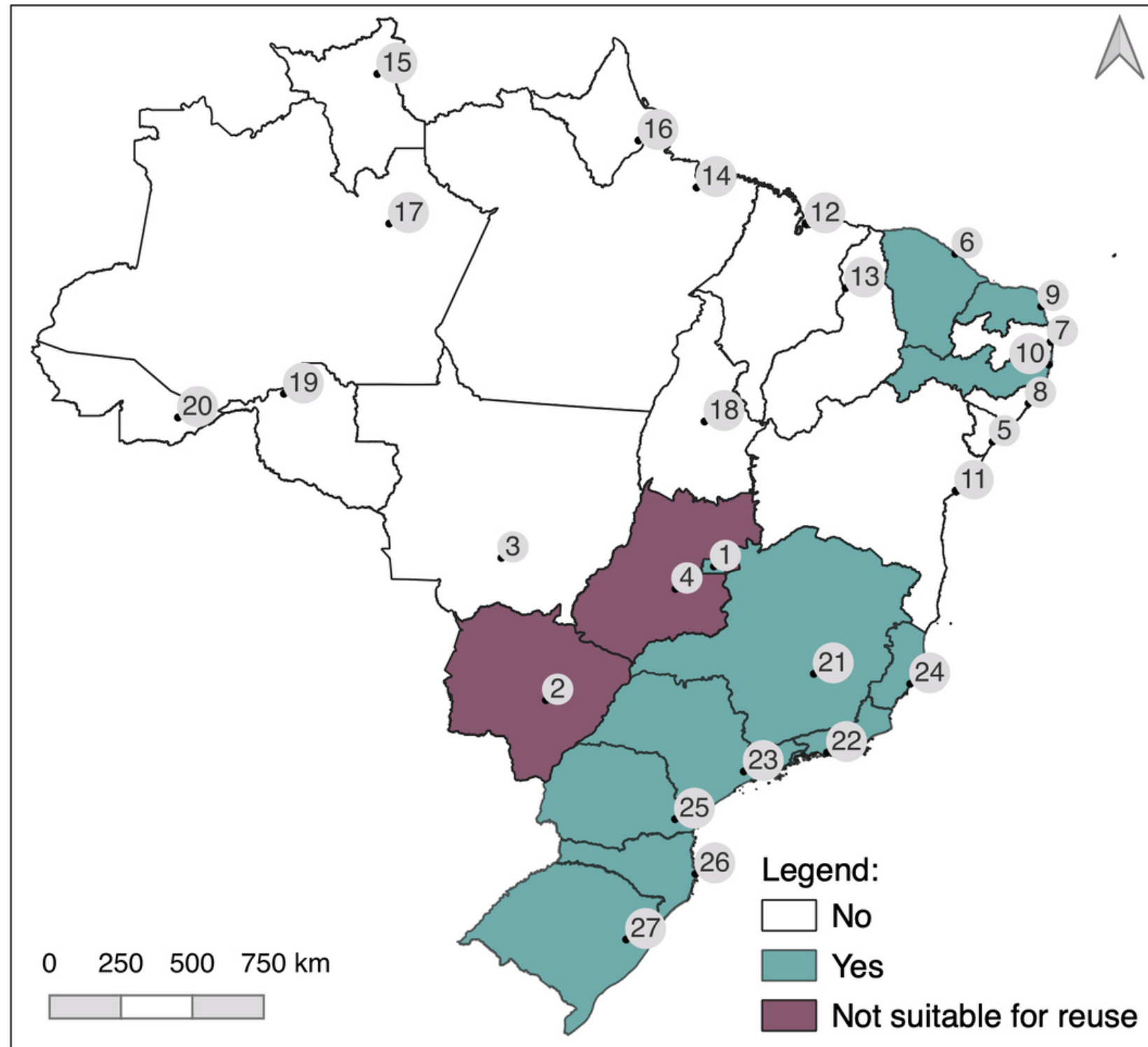
3. Preliminary results

- Most frequent datasets: transport network, public transport and cycling infrastructure;
- Other datasets (less frequent): parking locations, traffic signals, demand, accidents, historical road's average speed;
- The level of pollution and traffic accidents were not found in any of the platforms;
- All platforms seem to have up-to-date data.

3. Preliminary results



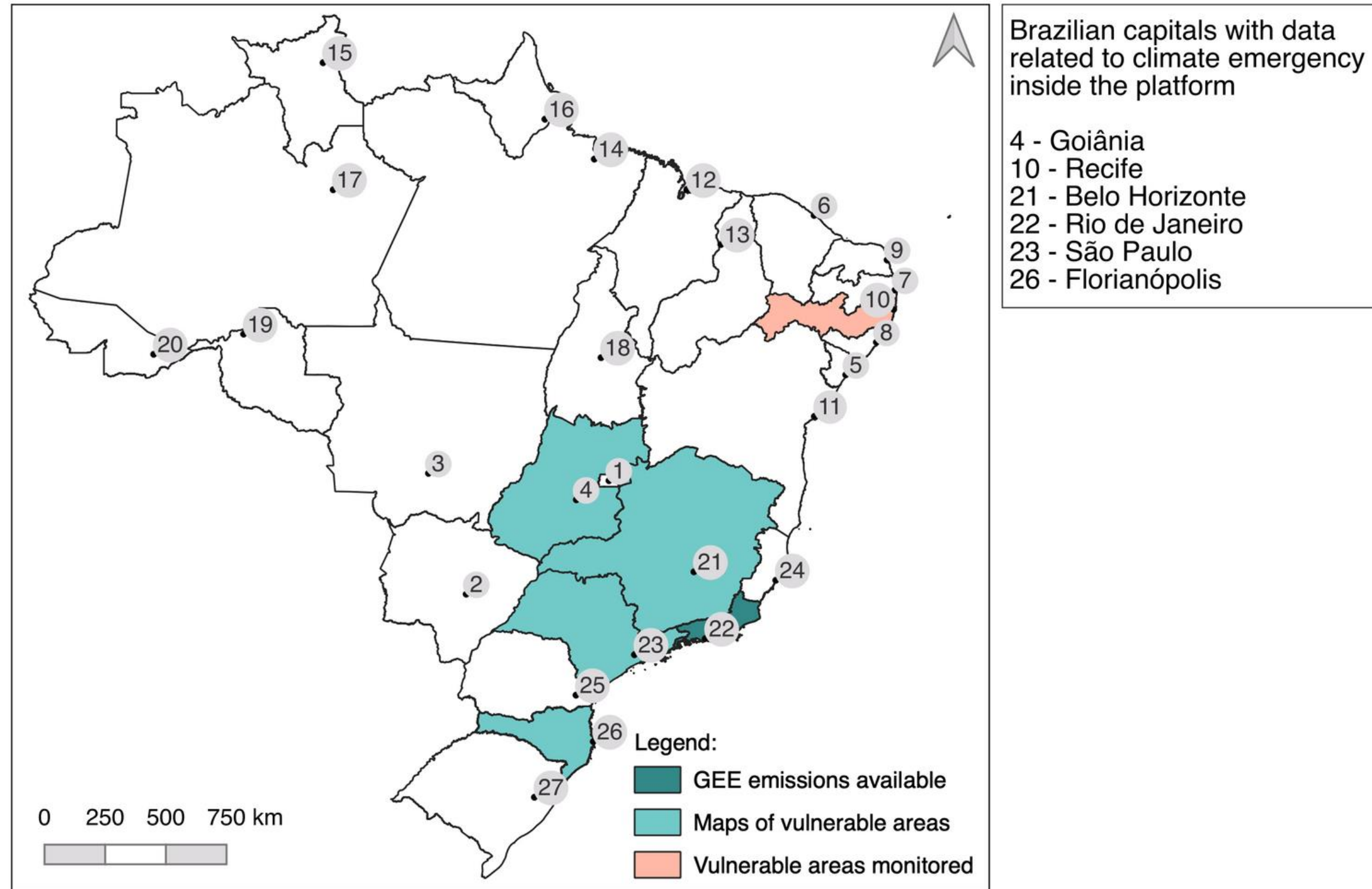
3. Preliminary results



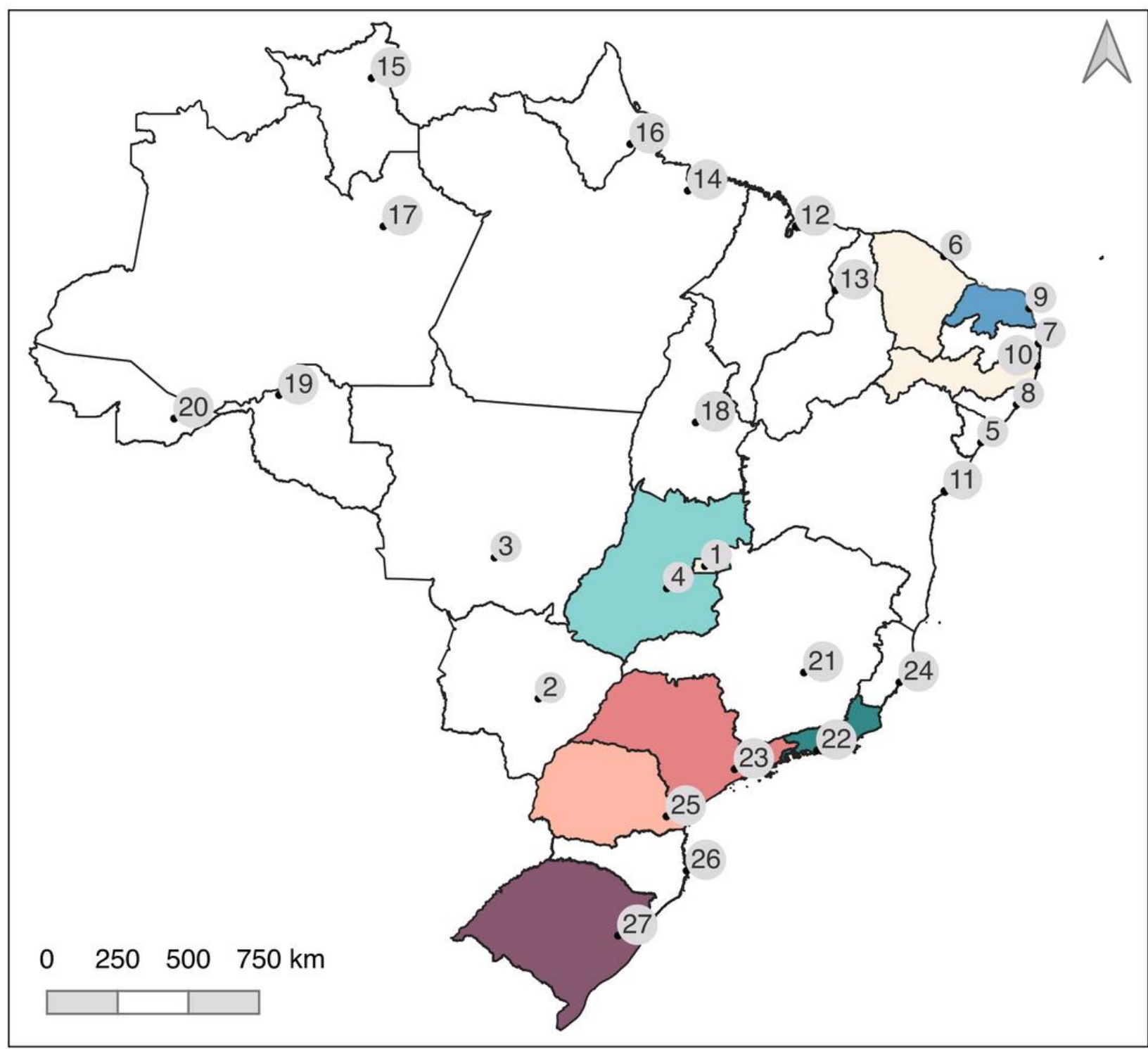
- All Brazilian capitals
- 1 - Brasília
 - 2 - Campo Grande
 - 3 - Cuiabá
 - 4 - Goiânia
 - 5 - Aracaju
 - 6 - Fortaleza
 - 7 - João Pessoa
 - 8 - Maceió
 - 9 - Natal
 - 10 - Recife
 - 11 - Salvador
 - 12 - São Luís
 - 13 - Teresina
 - 14 - Belém
 - 15 - Boa Vista
 - 16 - Macapá
 - 17 - Manaus
 - 18 - Palmas
 - 19 - Porto Velho
 - 20 - Rio Branco
 - 21 - Belo Horizonte
 - 22 - Rio de Janeiro
 - 23 - São Paulo
 - 24 - Vitória
 - 25 - Curitiba
 - 26 - Florianópolis
 - 27 - Porto Alegre

- Brazilian capitals with open data platforms
- 1 - Brasília
 - 2 - Campo Grande
 - 4 - Goiânia
 - 6 - Fortaleza
 - 9 - Natal
 - 10 - Recife
 - 21 - Belo Horizonte
 - 22 - Rio de Janeiro
 - 23 - São Paulo
 - 24 - Vitória
 - 25 - Curitiba
 - 26 - Florianópolis
 - 27 - Porto Alegre

3. Preliminary results



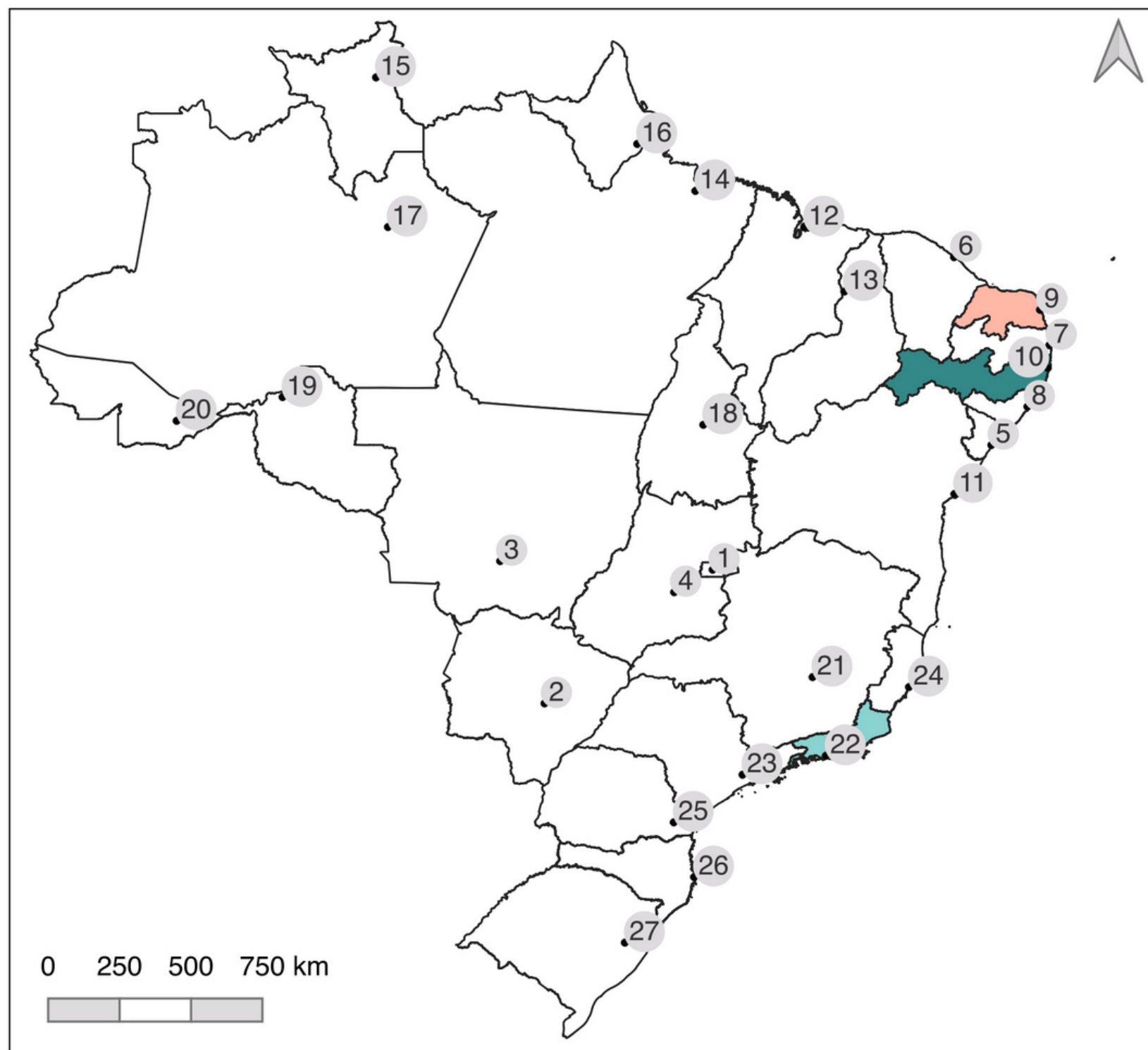
3. Preliminary results



Popular/citizen participation through the platform

- 1 - Brasília - FAQ and contact page
- 4 - Goiânia - suggestion for corrections of the available maps
- 6 - Fortaleza - FAQ and contact page
- 9 - Natal - encouragement to developers create new services
- 10 - Recife - FAQ and contact page
- 22 - Rio de Janeiro - contact page
- 23 - São Paulo - infrastructure evaluation and service requests
- 25 - Curitiba - upload of individual data into the platform (the data is not public to other users)
- 27 - Porto Alegre - submission of ideas into the platform

3. Preliminary results



Real time information

- 9 - Natal - dynamic data may be available upon user registration
- 10 - Recife - the real-time speed of some roads is available
- 22 - Rio de Janeiro - weather conditions are available via an official mobile app

4. Future research

- Deeper investigation of the platforms, identifying challenges or risks to its successful implementation;
- Deeper discussion if the platforms fulfill the open data principles and requirements, presenting best practices examples;
- Analysis of the quality of available data;
- Comparison of the Brazilian reality to other countries (e.g Germany) and exchange expertise;
- Classification of needed data sources for different research fields, discussing the completeness of existing data sources.

Acknowledgments

This study was supported by the Deutscher Akademischer Austauschdienst (DAAD) [Grant Number 57645446] and by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) [Grant Number 88887.682401/2022-00].



Deutscher Akademischer Austauschdienst
German Academic Exchange Service



Offen im Denken

Thank you!

Contact:

tatiane@estudante.ufscar.br

tatiane.borchers@stud.uni-due.de

References

- Balogun, A.-L., Marks, D., Sharma, R., Shekhar, H., Balmes, C., Maheng, D., Arshad, A., Salehi, P., 2020. Assessing the Potentials of Digitalization as a Tool for Climate Change Adaptation and Sustainable Development in Urban Centres. *Sustainable Cities and Society* 53, 101888. <https://doi.org/10.1016/j.scs.2019.101888>
- Belo Horizonte, 2023. BHGEO - Prefeitura de Belo Horizonte. BHGEO. URL <http://geonetwork.pbh.gov.br/geonetwork/srv/por/catalog.search#/home> (accessed 2.23.23).
- Borchers, T., Figueirôa-Ferreira, V.G., Fernandes, R.A.S., 2021. Privacy concerns on the mobility of smart cities, in: *Proceedings BTSym'21*. Presented at the Brazilian Technology Symposium 2021, Campinas.
- Brasília, 2023. Plano de Dados Abertos DF. Plano de Dados Abertos DF. URL <http://dados.df.gov.br/> (accessed 2.23.23).
- Campo Grande, 2023. SISGRAN - Sistema Municipal de Indicadores de Campo Grande – MS | PMCG. URL <https://sisgranmaps.campogrande.ms.gov.br/> (accessed 2.23.23).
- Consoli, S., Presutti, V., Reforgiato Recupero, D., Nuzzolese, A.G., Peroni, S., Mongiovi', M., Gangemi, A., 2017. Producing Linked Data for Smart Cities: The Case of Catania. *Big Data Research* 7, 1-15. <https://doi.org/10.1016/j.bdr.2016.10.001>
- Curitiba, 2023. Base cartográfica - Prefeitura Municipal de Curitiba. URL <https://geocuritiba.ippuc.org.br/basecartografica/> (accessed 2.23.23).
- Dinko, A., Jackiva, I.Y., Budiloviča, E.B., 2021. Data Sources Analysis for Sustainable Trip Planner Development for Riga City. *Transport and Telecommunication Journal* 22, 321-331. <https://doi.org/10.2478/ttj-2021-0025>
- Docherty, I., Marsden, G., Anable, J., 2018. The governance of smart mobility. *Transportation Research Part A: Policy and Practice* 115, 114-125. <https://doi.org/10.1016/j.tra.2017.09.012>
- Florianópolis, 2023. Prefeitura de Florianópolis - Geoportal. URL <https://geoportal.pmf.sc.gov.br/map> (accessed 2.23.23).
- Fortaleza, 2023. Dados abertos Fortaleza [WWW Document]. URL <https://dados.fortaleza.ce.gov.br/> (accessed 2.28.23).
- Goiânia, 2023. SIGGO - Sistema de Informações Geográficas de Goiânia. URL <https://portalmapa.goiania.go.gov.br/mapafacil/> (accessed 2.28.23).
- Hu, T., Guan, W.W., Zhu, X., Shao, Y., Liu, L., Du, J., Liu, H., Zhou, H., Wang, J., She, B., Zhang, L., Li, Z., Wang, P., Tang, Y., Hou, R., Li, Y., Sha, D., Yang, Y., Lewis, B., Kakkar, D., Bao, S., 2020. Building an Open Resources Repository for COVID-19 Research. *Data and Information Management* 4, 130-147. <https://doi.org/10.2478/dim-2020-0012>
- Janssen, M., Matheus, R., Zuiderwijk, A., 2015. Big and Open Linked Data (BOLD) to Create Smart Cities and Citizens: Insights from Smart Energy and Mobility Cases, in: Tambouris, E., Janssen, M., Scholl, H.J., Wimmer, M.A., Tarabanis, K., Gascó, M., Klievink, B., Lindgren, I., Parycek, P. (Eds.), *Electronic Government, Lecture Notes in Computer Science*. Springer International Publishing, Cham, pp. 79-90. https://doi.org/10.1007/978-3-319-22479-4_6

References

- Mahrez, Z., Sabir, E., Badidi, E., Saad, W., Sadik, M., 2022. Smart Urban Mobility: When Mobility Systems Meet Smart Data. IEEE Trans. Intell. Transport. Syst. 23, 6222–6239. <https://doi.org/10.1109/TITS.2021.3084907>
- Morishita-Steffen, N., Alberola, R., Mougeot, B., Vignali, É., Wikström, C., Montag, U., Gastaud, E., Lutz, B., Hartmann, G., Pfaffenbichler, F., Hainoun, A., Gaiddon, B., Marvuglia, A., Andreucci, M., 2021. Smarter Together: Progressing Smart Data Platforms in Lyon, Munich, and Vienna. Energies 14, 1075. <https://doi.org/10.3390/en14041075>
- Natal, 2023. Portal da Transparência da Mobilidade Urbana de Natal. URL <http://dados.natal.br/group/mobilidade-urbana> (accessed 2.28.23).
- Parycek, P., Höchtl, J., Ginner, M., 2014. Open Government Data Implementation Evaluation. J. theor. appl. electron. commer. res. 9, 13–14. <https://doi.org/10.4067/S0718-18762014000200007>
- Porto Alegre, 2023. Dados abertos POA. URL <https://dadosabertos.poa.br> (accessed 10.18.23).
- Recife, 2023. Dados Abertos da Prefeitura de Recife. URL <http://dados.recife.pe.gov.br/id/> (accessed 2.22.23).
- Rio de Janeiro, 2023. Data.Rio. URL <https://www.data.rio/> (accessed 2.22.23).
- São Paulo, 2023. Portal de Dados Abertos da Prefeitura de São Paulo. URL http://dados.prefeitura.sp.gov.br/pt_PT/ (accessed 2.22.23).
- Sookhak, M., Tang, H., He, Y., Yu, F.R., 2019. Security and Privacy of Smart Cities: A Survey, Research Issues and Challenges. IEEE Commun. Surv. Tutorials 21, 1718–1743. <https://doi.org/10.1109/COMST.2018.2867288>
- Soriano, F.R., Samper-Zapater, J.J., Martinez-Dura, J.J., Cirilo-Gimeno, R.V., Martinez Plume, J., 2018. Smart Mobility Trends: Open Data and Other Tools. IEEE Intell. Transport. Syst. Mag. 10, 6–16. <https://doi.org/10.1109/MITS.2017.2743203>
- Veljković, N., Bogdanović-Dinić, S., Stoimenov, L., 2014. Benchmarking open government: An open data perspective. Government Information Quarterly 31, 278–290. <https://doi.org/10.1016/j.giq.2013.10.011>
- Vitória, 2023. GeoWeb Vitória. URL <https://geoweb.vitoria.es.gov.br/> (accessed 2.22.23).
- Wen, Y., Zhang, S., Zhang, J., Bao, S., Wu, X., Yang, D., Wu, Y., 2020. Mapping dynamic road emissions for a megacity by using open-access traffic congestion index data. Applied Energy 260, 114357. <https://doi.org/10.1016/j.apenergy.2019.114357>