Deliverable 7.7

D7.7 Distribute ground-motion testing software codes

Deliverable information	
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Lead	[GFZ]
Authors	[Karina Loviknes (GFZ), Danijel Schorlemmer (GFZ), Tara Evaz Zadeh (GFZ), Fabrice Cotton (GFZ)]
Reviewers	[Ian Main]
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Summary

This deliverable is an extension of the already submitted deliverable D7.4 from February 2022. Due to the difficulties created by the international chip crisis, the necessary low-cost sensors were not delivered. Hence, no installation for ground-motion testing was possible. Nevertheless, we investigated non-linear amplification in ground-motion models. The conclusion reached is that that linear amplification modules are satisfactory and frequently outperform the more complicated non-linear models. For this work, we teamed up with the URBASIS project (see Acknowledgments).

We have collected damage assessments from the 29 December 2020 M6.4 Petrinja and the 6 February 2023 M7.8 Turkey-Syria earthquakes. The damage assessments using the exposure model developed in Deliverable D2.13 were computed with the respective loss-calculator that was developed alongside the model software. This calculator is able to work on multi-resolution grids and can aggregate damage and loss to buildings or grid tiles.

Codes

All codes for the ground-motion testing were developed in Python and use libraries provided in R. The `README.md` file in the repository guides the user through the installation process. The user needs to download the dataset from Bahrampouri et al. (2020)[1] and the model coefficients from the non-linear site amplification models of Seyhan and Stewart (2014)[2] and Abrahamon et al. (2014)[3]. The use of the codes has been made easy by providing a fully documented Python Jupyter notebook that guides the user through the test process.

The testing codes and the Jupyter notebook for non-linear ground models can be obtained at:

> https://git.gfz-potsdam.de/karinalo/test_nl_siteampmodel

The codes are also available from Zenodo:

> https://zenodo.org/record/6299826

with the DOI:

> 10.5281/zenodo.6299826

The codes for the risk testing were developed in Python and are using open-source databases, either PostGIS or SpatiaLite. The codes for the loss-calculator can be found at:

> https://git.gfz-potsdam.de/dynamicexposure/globaldynamicexposure/loss-calculator

The codes to create the exposure model excerpts for the damage and loss calculation can be found at:

> https://git.gfz-potsdam.de/dynamicexposure/globaldynamicexposure/exposure-share

1https://doi.org/10.17603/ds2-e0ts-c070

2https://journals.sagepub.com/doi/suppl/10.1193/063013EQS181M

3https://journals.sagepub.com/doi/suppl/10.1193/070913EQS198M

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