



# GEO THERMICA

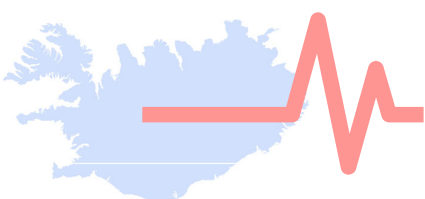
## Control SEISmicity and Manage Induced earthQuakes (COSEISMIQ)

### Deliverable 7

**Deliverable 5:** RISC tool ready for other commercial applications in Europe

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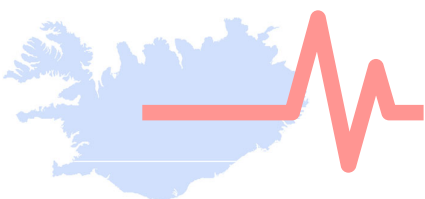
**Publication Date:**



The GEO THERMICA is supported by the European Union's HORIZON 2020 programme for research, technological development and demonstration under grant agreement No 731117

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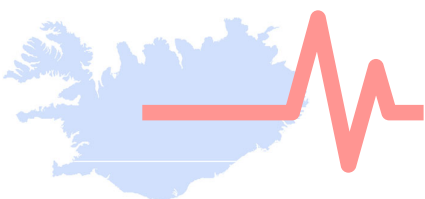
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## Summary

In this Deliverable 7, we present the GitHub repository containing the models used for pseudo-forecasting in Deliverable 6. The repository comprises all data, codes and script for running and analysing four models. The models implemented in here are tuned to forecast seismicity in the entire Hengill geothermal field and are the following: a basic ETAS model (the null hypothesis EM0), a more advanced ETAS version (EM2, see Deliverable 5), the EM1 model as implemented and calibrated in the past months (see Deliverable 5), and a prototype of an ETAS model with hydraulic forcing (ETAS<sub>hydro</sub>).



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## Repository

The GitHub repository “Hengill Seismicity Forecasting Models”, developed in the framework of the COSEISMIQ project, comprises the models, data, and analysis scripts needed to run pseudo-forecasting statistical seismicity models in the Hengill geothermal area. It is available here: <https://github.com/RitzVanille/HengillSeismicityForecastingModels>

The repository comprises documentation for each model and for the data as well as analysis scripts (see Figure 1 for folder structure).

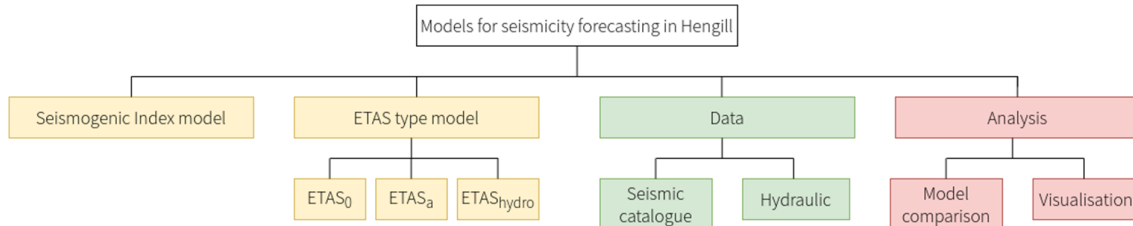


Figure 1: Folder structure of the GitHub repository

Figure 2 shows a schematic view of the interactions between the different files and folders in the repository.

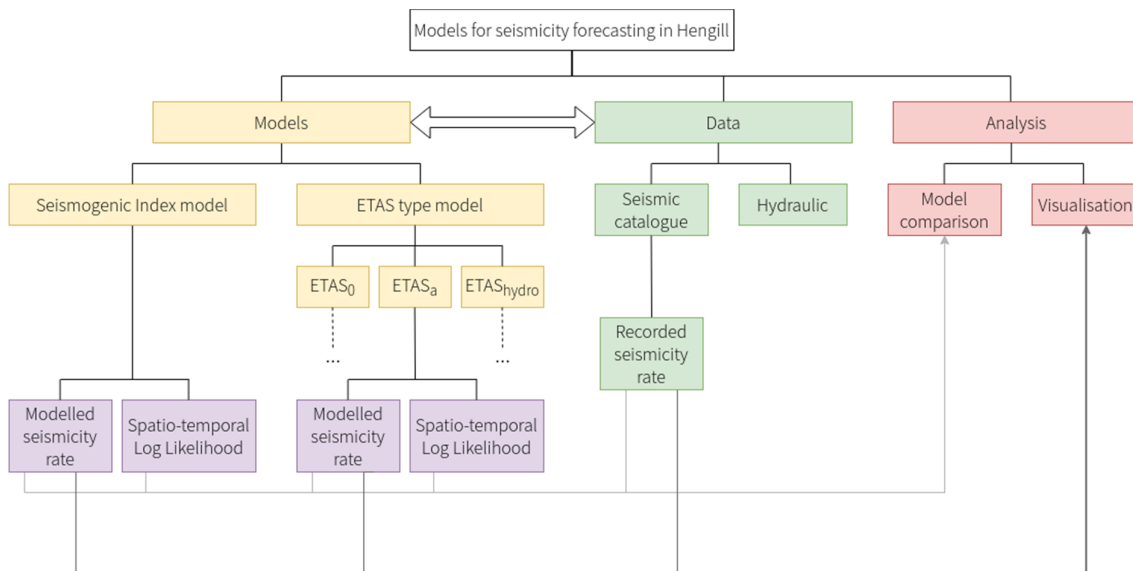
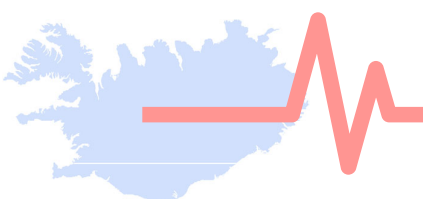


Figure 2: Interactions between folders and files in the GitHub repository



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## Outlook

The repository, as delivered in early December 2021, is set to be improved upon in the coming weeks and couple of months to make as much as the modelling work public possible, in accordance with FAIR principals of data and code dissemination for reproducible science.

### On the ETAS models

At this time, all ETAS codes are not fully available or tested for compatibility with the analysis scripts. This will be done in the coming weeks and added to the repository as soon as possible.

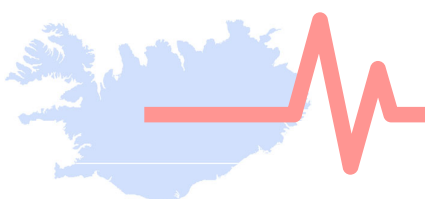
### On the hydraulic data

The hydraulic data available in the GitHub repository is a processed spatio-temporal distribution of the injected and produced volumes, rates and cumulative volumes. They cover the Dec. 1<sup>st</sup> 2018 – Feb. 1<sup>st</sup> 2021 period.

An automated script computing these distributions from raw hydraulic data will be made available with the publication of the raw hydraulic data covering the COSEISMIQ project time frame.

### On the seismic data

The high-resolution seismic data are available from Dec. 1<sup>st</sup> 2018 to August 2021 when the COSEISMIQ network was taken down. The models can easily be modified to use the permanent network (SIL catalogue) to extend the pseudo-forecasting to post-COSEISMIQ times.



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