TSUNAMI SERVICES

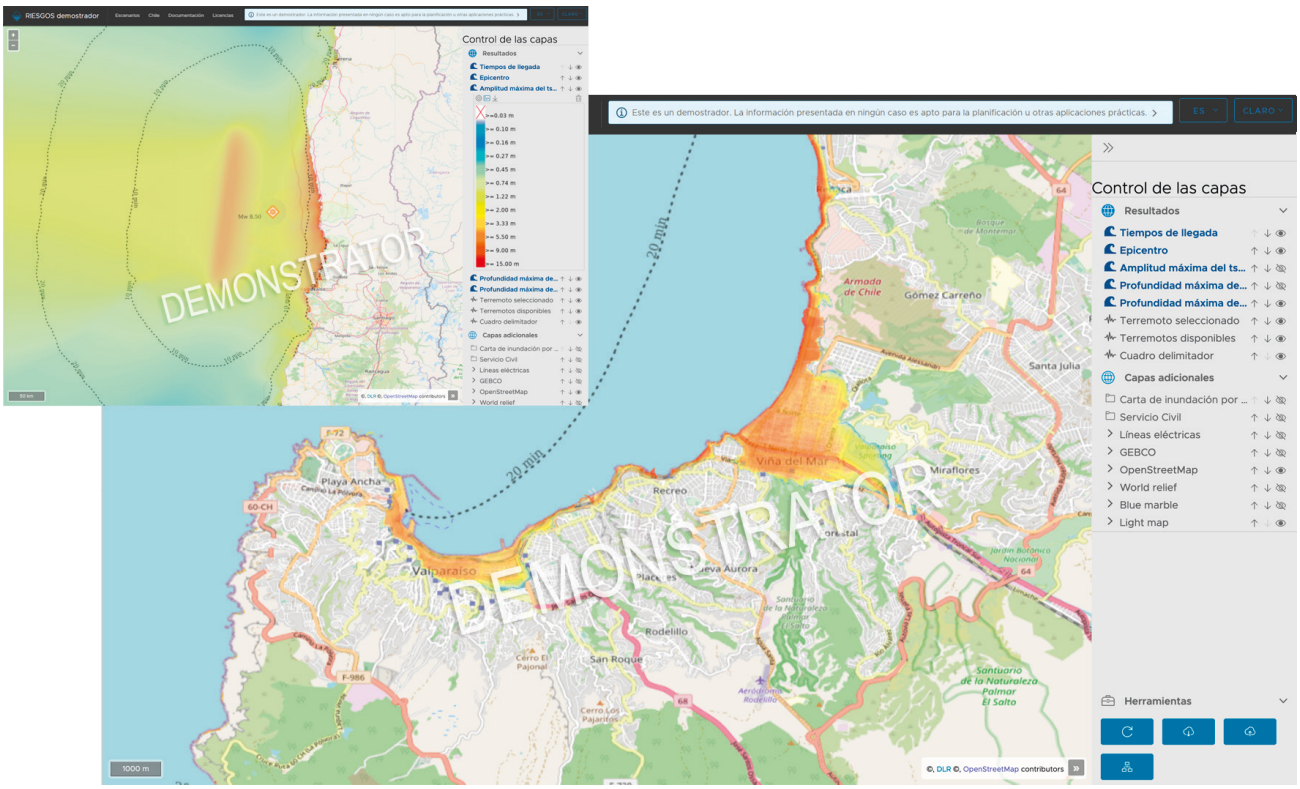
Tsunami simulations as part of the multi-hazard assessment

BACKGROUND

Due to the geophysical setting, the Chilean and Peruvian coastal areas are prone to large magnitude earthquakes. In the past, many of such events generated large tsunamis and the joined effect of ground acceleration and tsunami inundation caused much devastation in the region. Therefore, it is essential to include the impact of potential future tsunami events into a multi-hazard assessment of that area. The approach followed in the RIESGOS project is based on a **database of historical and potential future tsunami events**. Special focus is put on pilot areas encompassing Valparaíso and Viña del Mar in Chile and the agglomeration Lima and Callao in Peru. The impact of tsunamis generated in the vicinity of those regions is estimated by **numerical simulations** and provided to project partners for visualization and further processing.

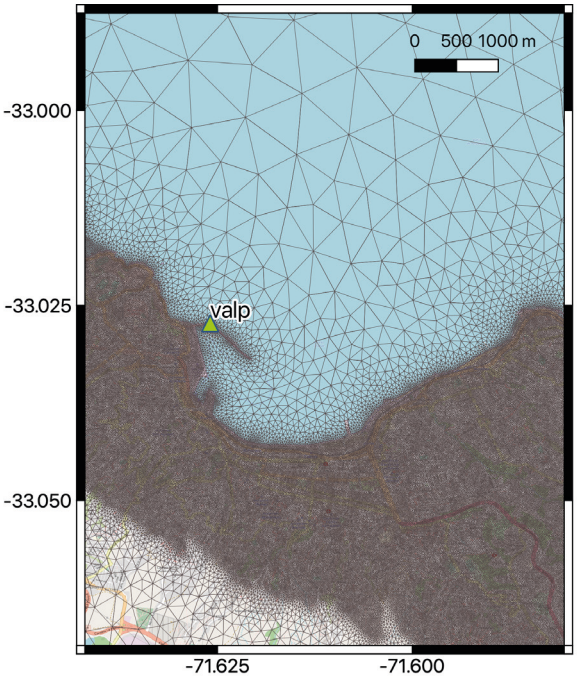
NUMERICAL APPROACH

The numerical simulations are carried out with the **finite element model TsunAWI** based on triangular meshes (more information about TsunAWI: tsunami.awi.de). Such a discretization of the model domain allows for much freedom with respect to the resolution of the mesh. The shape of the coastline and important local features are represented adequately.



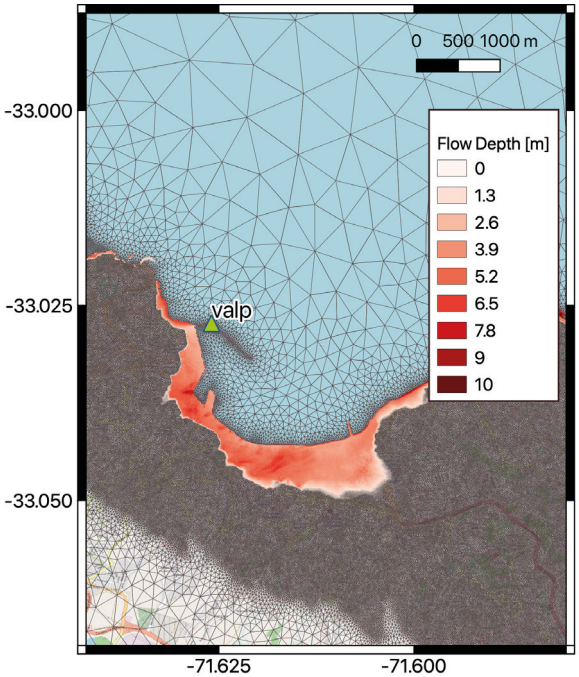
The source area, maximum amplitude and inundation of a tsunami generated by a hypothetical Mw 8.5 earthquake offshore the Chilean coast in Screenshots of the RIESGOS Demonstrator. The data products are provided via OGC-conformal web services.

A small section of the triangular mesh is shown in the figures on this page.



Small section of the triangular mesh used for tsunami simulations in Chile. The tide gauge station of Valparaíso is marked and used for data comparisons.

Especially, the flow depth on land may be used to estimate the impact on buildings and infrastructure.



The mesh overlayed by tsunami inundation as raster data product for the same scenario as shown in the first figure.

DATA PRODUCTS

From all numerical simulations, the relevant data products are determined and made available via web services. These data products include:

- Estimated **arrival time (ETA)**
- Estimated **wave height (EWH)**
- Estimates of the **inundation depth** in the coastal area

The data products are provided to the project partners in OGC-conformal web services.

MODEL EVALUATION

In order to validate the numerical method, inundation results are compared to published data and numerical results of earlier model studies. Additionally, a joint study is undertaken together with RIESGOS project partners at the technical university UTFSM in Valparaíso. The aim is to compare the different modeling approaches employed by the institutions. The study is supposed to increase confidence in the numerical activities as well as to identify specific benefits of the various methods.

SPONSORED BY THE

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More information about the project:
www.riesgos.de

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