Deliverable

D8.10 Newsletter released

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Summary

Approximately three times a year, RISE sends an external newsletter via the email marketing service MailChimp to its members or to the interested public respectively. Experiences of other projects proofed the effectiveness and relevance of this communications means in terms of enhancing project visibility and stakeholder engagement. Due to the fact that this newsletter is the first of RISE project, it is important that a certain number of people have already registered for the newsletter first before it is sent out. To gain more subscribers and therefore a higher reach as well, the newsletter is scheduled for Tuesday, 3 March 2020.

	External Newsletter
Objective	in addition to the website as a "pull" tool (people need to visit our website), actively "pushed" insights and news of RISE and its WP's (we send the information)
Target audience	project members stakeholders interested public
Distribution	sign up on website project members
Promotion	website, social media, other newsletters and websites (SED, ETH, SERA)
Frequency	4 times a year, starting February 2020
Schedule	all 12 weeks

1. Newsletter

The first external newsletter gives a brief overview of the project and first insights in two workpackages (WP2 and WP3) and is ordered in different sections:

External Newsletter
Greeting / overview / news in brief
A closer look Insights into different workpackages
RISE terminology Explanation of one important term of RISE project, for example "Dynamic Risk"
Miscellaneous Events, links, papers, conferences – all open to the public
Calendar Events, links, papers, conferences – all open to the public
Icons for website, email and Twitter
Logos and disclaimer

2. Appendix

Did you know that more than 170 million people in Europe are exposed to significant earthquake hazard? Advances in scientific understanding and emerging technologies offer enticing opportunities to consider earthquake risk as a time-dependent process. Developing such innovative approaches and measures in order to reduce future earthquake losses is the mission of RISE. It stands for **R**eal-time earthquake r**I**sk reduction for a re**S**ilient **E**urope and is a three-year project financed by the Horizon 2020 programme of the European Commission.

The RISE Project kick off was in September 2019 and all activities are now gaining momentum. This external newsletter, published three times a year, will update everyone interested in RISE progress, share results, events, open positions and more. In addition, in each external newsletter two work packages will Elaborate on a selected task in an approachable way. In this newsletter, two reports of Prof. Andreas Fichtner and Dr. Marcus Herrmann provide further insights in their research projects.

Another way to stay informed about the project is to follow RISE on Twitter or to discover more on its website.

Do you know someone who could be interested in RISE progress and findings?
You are welcome to forward this newsletter to your contacts!

A welcoming message from RISE project manager Dr. Banu Mena Cabrera

"RISE brings together seismologists, engineers, social scientists, economists, practitioners within and outside academia under one project and one goal; to advance real-time earthquake risk reduction capabilities for a resilient Europe. To maximise the impact of the project, RISE adopts an interdisciplinary and multi-hazard users' perspective and translates all RISE outputs and deliverables into tangible products and services, useful for and used by a wide range of stakeholders. It contains a comprehensive set of communication, dissemination, exploitation, and decision-support activities. In RISE, we are ambitious to achieve our goals and make an impact on societies of Europe and beyond.

As Project Manager, I am very excited about being part of this effort and helping to manage and sustain this collaboration towards achieving RISE objectives. We hope you enjoy getting the most up to date project information through our various channels."

A closer look

"Towards optical sensing of ground motion for improved seismic hazard assessment"

Prof. Andreas Fichtner, ETH Zurich

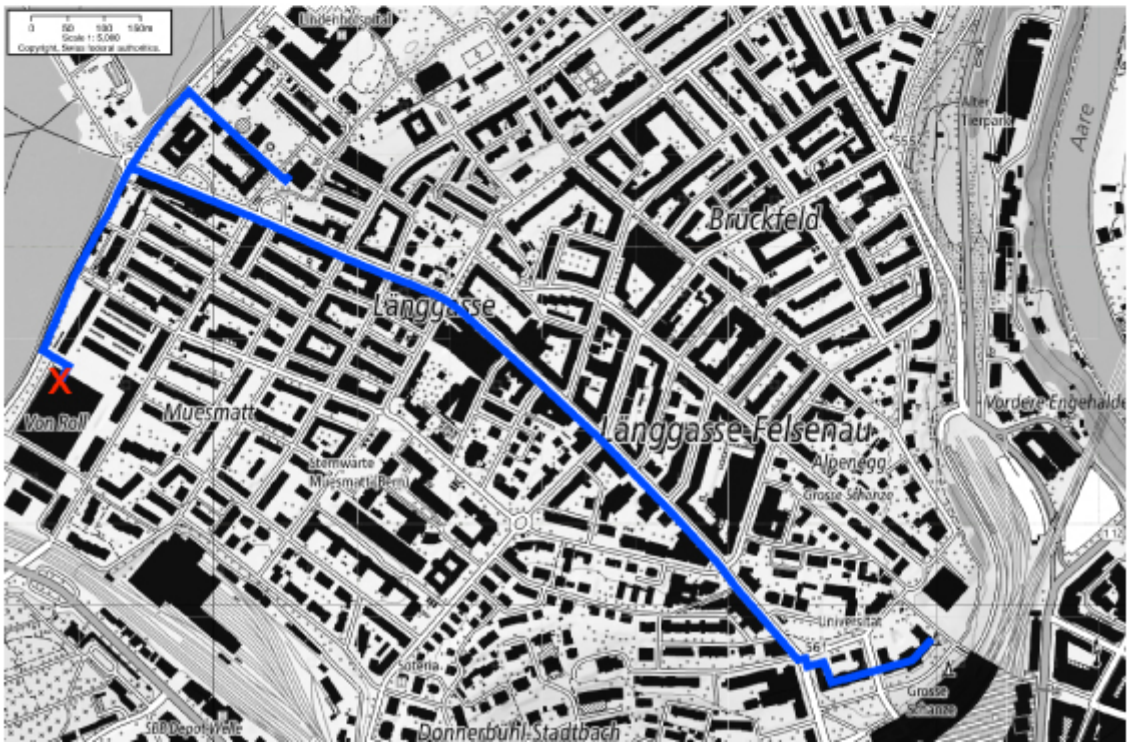
Optical fibres are the backbone of our modern communication network. Short pulses of laser light transmit enormous amounts of data, but on their journey from sender to receiver they also gather information about the optical fibre itself. In fact, microscopic displacements of the fibre slightly distort the laser pulses – an effect that has recently become detectable with highly sensitive interferometers.

This emerging technology, known as Distributed Acoustic Sensing (DAS), allows us to measure ground motion excited by a large variety of sources, such as earthquakes or landslides. Harnessing existing networks of telecommunication fibres, DAS therefore offers the opportunity to assess and potentially mitigate natural hazards in densely populated urban areas.

To explore this opportunity, RISE researchers at ETH Zurich are conducting a pilot experiment in the Swiss capital Bern, closely collaborating with the telecommunication company SWITCH. Several connected telecommunication fibres traversing the city in different directions along a 6 km long path measure ground motion every two metres, in real-time, nearly 1000 times per second (Fig. 1). Most of the observed ground motion is caused by traffic, industrial installations, and construction sites (Fig. 2).

Though the amplitude of these signals is, fortunately, much lower than the ground motion caused by destructive earthquakes, this wealth of data can be utilized to infer rock properties of the upper tens to hundreds of metres of the subsurface. Knowing these properties is essential to predict the ground motion caused by potential future earthquakes.

Research on DAS in urban environments is in its infancy, within the RISE project and worldwide. Initial results are very promising, especially in terms of the quality and unprecedented spatial resolution of the data. Yet, substantial research and development are still needed in order to process the enormous amounts of DAS data efficiently.



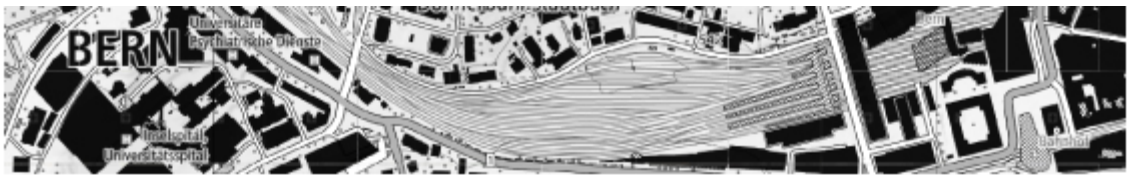


Fig. 1: Map of the north-western neighbourhoods of the Swiss capital city Bern. The position of fibre-optic telecommunication cables used in the DAS experiment are marked in blue. The red cross indicates the location of the interferometer in a building of the University of Bern.

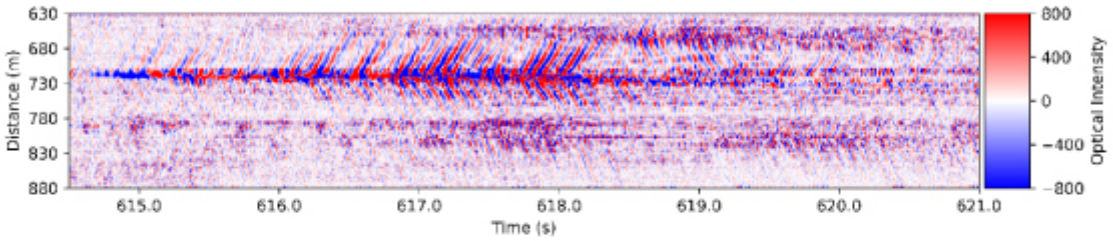


Fig. 2: Snapshot of an urban DAS recording in Bern for receivers located at distances between 630 m and 880 m from the interferometer. The record is 6.5 s long. Colours indicate strain rate in the direction of the fibre. The prominent signal corresponds to slow traffic at a speed of around 20 km/h (5.5 m/s). The more steeply dipping waves emanating from the traffic signal have a propagation speed of nearly 400 m/s, which corresponds to the shear wave velocity of the upper few tens of metres of the subsurface.

"What is Operational Earthquake Forecasting?"

Dr. Marcus Herrmann, University of Naples

To advance earthquake predictability research such as Operational Earthquake Forecasting (OEF) is one important focus of RISE. This research can benefit from the constantly evolving observational capabilities of seismic monitoring efforts, which, for instance, result in an ever-increasing amount of recorded earthquakes, especially toward smaller magnitudes. Such capabilities need to be exploited to gain more insight into the earthquake occurrence processes and, therefore, to improve earthquake forecasting.

In our first step we explore existing high-resolution earthquake catalogs that contain events with magnitudes down to M_L0 or below. We started to develop an interactive tool that will facilitate and aid us in a more intuitive analysis of seismicity in five dimensions (see Figure 1).

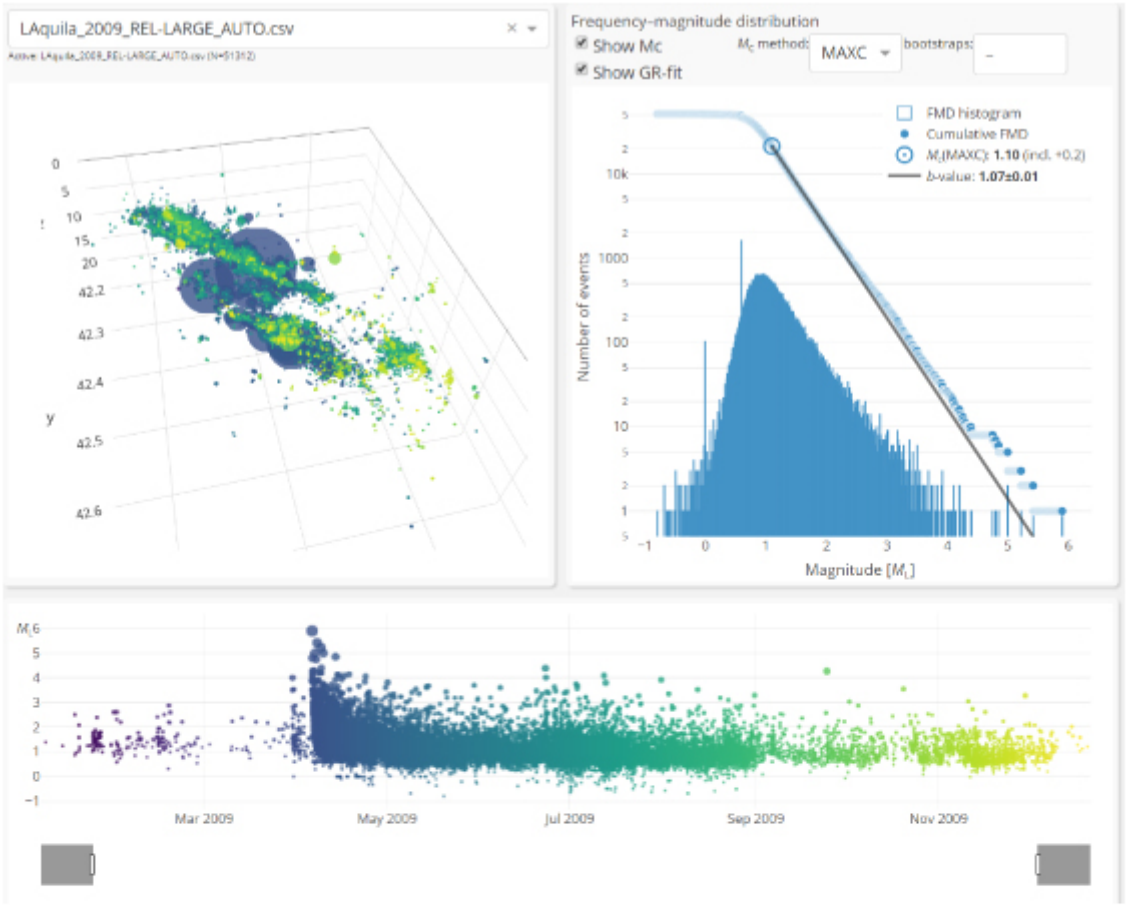


Figure 1: Screenshot of our interactive tool to explore seismic catalogs in five dimensions: spatially (rotatable 3D, top left), temporally (bottom), and magnitude-wise (Frequency-magnitude distribution, FMD, top right). Notice that the spikes in the FMD indicate magnitude errors in the example catalog of the L'Aquila sequence [Valoroso et al. 2013]. The interface runs in a web browser and can be made accessible for other researchers or the public. More analytic components and their interactions are currently being developed.

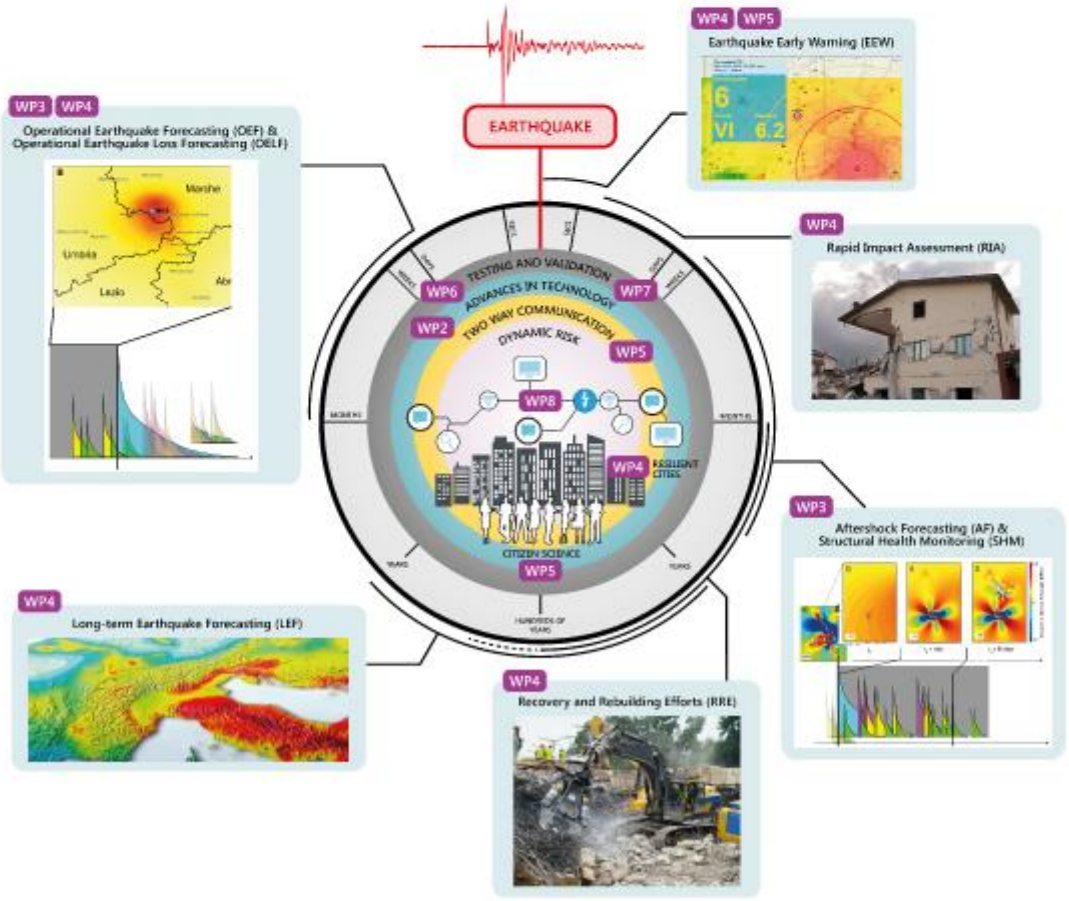
In particular, we will focus on these aspects:

1. Spatio-temporal variability in the frequency-magnitude distribution: e.g., statistical analyses of event sizes could tell us more about the state of a fault system.
2. Earthquake clustering properties: e.g., well-located hypocenters could reveal how earthquake sequences progress and how earthquakes are triggered.
3. Foreshock analysis: e.g., earthquakes prior to a larger earthquake might share a common spatial-temporal pattern. In addition, high-resolution catalogs could potentially reveal many more sequences that have foreshocks than is currently believed.
4. Limits of the current quality of earthquakes catalogs, e.g., what information are we missing?

We will adopt state-of-the-art methods (e.g., from the machine learning domain) to augment these analyses, for instance to employ a parameter selection and search for signals and patterns that are indicative of the earthquake occurrence process.

Our findings will have an impact for improving our understanding of the earthquake occurrence process. Our gained knowledge could allow us to develop innovative earthquake forecasting models, which can be stochastic, physics-based and/or of a hybrid type. Ultimately, our advances will contribute to a better mitigation of the seismic risk which will be analysed within another work package of RISE.

RISE terminology



The concept of "Dynamic Risks"

The RISE key concept and vision is to promote a shift in how earthquake risk is assessed and managed. We believe that by profiting from advances in scientific understanding and the dramatically changing technological capabilities, earthquake hazard and risk can soon be appreciated not as a constant in time, but as an evolving, integrated and dynamic risk. The dynamic risk that a structure is exposed depends on its structural type, location, occupancy, soil conditions, and topography, while people's risk is also affected by their exact location within a structure. However, dynamic risk also includes changes with time; gradually through urbanization, building stock changes and rapidly following a recent moderate or large earthquake, when the risk increases for the next days and weeks dramatically.

People's perception of — and behaviour relating to — risk is very personal and depends on far more than simply the probabilities for potential effects. Thus, good risk assessment and good risk communication must go hand in hand, with different forms of communication suitable for different timeframes and different regional contexts.

Discover here more about the main concepts of RISE to handle dynamic risks!

Miscellaneous

EU-funded projects at the European Seismological Commission

Together with a related EU-funded project TURNkey, RISE will host a session a at the 37th General Assembly of the European Seismological Commission ESC2020 in Corfu. The session is entitled "Towards operational forecasting of earthquakes and early warning capacity for more resilient societies". The session description reads as follows:

To help mitigate the risks related to earthquakes, citizens need additional protection that goes beyond building codes and retrofitting actions. These include Earthquake Early Warning (EEW) approaches and operational earthquake forecasting (OEF), but also Rapid Response to Earthquake (RRE) systems. Besides scientific and technological advances, a focus must be on improved preparedness due to more effective two-way communication of forecasts, early warning and uncertainties for users and the public.

In 2019, two new seismology and earthquake engineering related projects were awarded by the European Commission, RISE and TURNkey. In these two projects, more than 40 European institutions are collaborating on numerous aspects of improving real time seismology and its communication, and seismic risk reduction capacity. This session will give the opportunity to present and discuss first project results with the wider community. In addition, we welcome contributions on all aspects of improving earthquake resilience, including the scientific background, actual implementation scenarios and problems in communicating OEF, EEW and RRE results to stakeholders and public.

Become a part of it!

This is an excellent opportunity to learn more about the work conducted in the framework of these two European projects. We are looking forward to your contributions and encourage you to hand in your abstracts to join this session.

The abstract deadline is on 12 April 2020!

More information

Calendar

RISE related activities

6 - 11 September 2020, Corfu (Greek)
37th Assembly of the European Seismological Commission
More information

RISE related conferences

3 - 8 May 2020, Vienna (Austria)
EGU General Assembly 2020
More information

The next external newsletter will be released in September 2020. If you have anything you would like to share, please send your input to the communications team (nadja.hermann@sed.ethz.ch or michele.marti@sed.ethz.ch).

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