SERA
Seismology and Earthquake Engineering
Research Infrastructure Alliance for Europe

DELIVERABLE

D2.3 Report on communication activities M24 to M36

Work package	WP2 Communication, dissemination and outreach
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Summary

The main internal and external communication measures of SERA, outlined in the communication concept, were implemented and established since the beginning of the project. This deliverable lists all internal and external communication activities of M24 to M36 of SERA. Considering the constant number of subscribers to the internal newsletter, the increasing number of subscribers to the external newsletter and the SERA Twitter account, as well as the steady number of website visitors per month, the effectiveness and relevance of these communications means can be considered proven valuable and effective, and will therefore be continued until the end of the project.

1 Internal communication

The internal communication covers all relevant project developments including organizational matters and enables exchange through different communication channels. The internal communication aims to provide an optimal work environment, where information is easy to retrieve and general knowledge is equally accessible for all participants.

1.1 Internal newsletter

The internal newsletter aims to keep participants up to date regarding important administrative issues, meetings, deliverables and it shall strengthen the community by giving informal insights to the project. Until today, eight internal newsletters were sent to the project participants. Three newsletters are distributed per year. The last internal newsletter is planned for May 2020. For further information about the internal newsletters, refer to D2.6 “Internal Newsletter”.

- See appendix for sent internal newsletters between M24 and M36.

Internal Newsletter Issue	Number of Subscribers
SERA Internal Newsletter #4 (November 2018)	136
SERA Internal Newsletter #5 (March 2019)	136
SERA Internal Newsletter #6 (July 2019)	134
SERA Internal Newsletter #7 (Nov 2019)	134
SERA Internal Newsletter #8 (March 2020)	135

Table 1 Number of subscribers of internal newsletter

2 External communication

The external communication comprises all communication activities addressing professionals in the field of seismic hazard and risk such as engineers, seismologists, the industry, public managers, and non-professionals in the field like media, citizen scientists, homeowners, students, teachers, and other interested persons. The following communication activities are implemented to address SERA stakeholders.

2.1 Website

The SERA website (www.sera-eu.org) acts as the main external communication tool. It addresses all external target groups and provides information on a general and comprehensible level. The website also offers detailed information about work packages, conference dates, and helpful links. An average of 2'169 unique visitors are recorded on the website per month between M24 and M36.

2.2 External newssheet

The external newssheet serves as information channel between the project participants and the external public. It provides deeper insights to the project, compared to the news on the website. Until today, five external newssheets were distributed. The next newssheet is planned for April 2020. We publish a minimum of two newssheets per year. For further information about the external newssheets, refer to D 2.11 "Biannual newssheet".

2.3 Factsheet series

To account substantially to a better understanding of seismic hazard and risk in Europe, several questions have to be answered. With the factsheet series, SERA addresses key questions by explaining crucial terms and concepts as well as by presenting first results to an interested public. The first factsheet series was published in April 2018 (see D 2.7). The second factsheet series was published one year later, in April 2019 (see D2.8). A third series is planned for April 2020 (D2.9).

2.4 Social media

SERA operates a twitter channel to enhance the visibility of the project and to inform the interested public about SERA's workshops, conferences, results and outputs. Until today, 272 persons follow @sera_research (retrieved 30.03.2020). In return, @sera_research follows related projects, project participants and relevant stakeholders.

2.5 Stakeholder dialogue

SERA organised different workshops for professionals, citizen scientists and the interested public. The communication team helped to promote the workshops on the SERA platforms (website, newsletters and Twitter) such as the latest workshop series about earthquakes and marsquakes which took place in Switzerland:

- 03 – 07 February 2020: Workshop series "'Earthquakes and Marsquakes: how to learn about seismicity on rocky planets", OFXB Astronomical Observatory in Saint-Luc, Switzerland

In addition, WP 2 was in charge of organising two workshops within the framework of SERA (see pdf May last year, and updates on the SERA website):

- Two workshops with external stakeholders for code development and risk mitigation strategies, held in Ispra (M11) and Pavia (M30), Italy.

3 Appendices

1. Sent internal newsletters M24 – M36
2. Sent external newssheet M24 – M36

Contact

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November 2018 marks 18 months since SERA started. We have now reached half-time and can, on one hand, look back at a great variety of past events and interesting research results; on the other hand, we still have many upcoming events and developments to look forward to.
This newsletter will provide you with updates on what has happened so far, like the very successful teachers' workshop in Portugal with more than 900 participants, or the JRA1/JRA2 workshop in Krakow.
Upcoming deadlines are communicated for the first periodic report to the EC, some first information is now available about the Second Annual Meeting, and there is a small reminder that every interesting newsletter starts with you and your input!

Organizational matters

First periodic report to the EC

In order to consolidate the SERA pre-financing received by the partners and release the second payment, the EC requires that we submit the official report of activities for the period May 2017 - October 2018. This is a joint task to be conducted between the SERA Office, the WP leaders and the partner administration contacts, who have now received all the required templates (see e-mail Subject: [SERA M1-M18 EC reporting materials] for detailed instructions). Please take a moment to read through the e-mail, download the templates, and ensure that you collect all the inputs from your WP members and organisations to submit your documents **by November 16th 2018**. This is a fixed deadline as the whole consortium reports jointly, so please make sure you allocate sufficient time, and also that you send us questions you may have in advance.

Second Annual Meeting

Following the first annual meeting in Bucharest, we are planning to hold our next scientific annual meeting in **the week of May 6th 2019**. The location is yet to be decided; we therefore invite partners interested in hosting the meeting to contact the Project Manager and/or Coordinator. This will be an important event to discuss progress after two years of project implementation, and also to prepare the external review meeting with the EC that will take place right after the annual meeting.

Reminder about publications within the SERA framework

We would like to remind everyone that in all publications associated to SERA, a sentence has to be included at the end mentioning the project and explaining the affiliation. We propose the following sentence to be included under "Acknowledgements":
This study has been partially funded by the H2020 project SERA (Seismology and Earthquake Engineering Research Infrastructure Alliance for Europe).
As already explained in the last internal newsletter, under Horizon 2020, each beneficiary must ensure open access to all peer-reviewed scientific publications relating to its results. Therefore, open access is also an obligation for all SERA partners.

Input for SERA website, twitter, and newsletters

We love to update the SERA community as well as the general public with news about your latest research results, workshops, conferences, and other activities. In order to provide up-to-date communication, we need your input!
Whether you would like us to tweet (@sera_research) about an upcoming conference you are organizing, write a short report for the SERA website or include some pictures of your last WP field trip in the newsletter: Send an e-mail to Janine Aeberhard or Michèle Marti. One of the SERA goals is to facilitate collaboration and innovations, and being able to provide interesting stories, facts and news starts with you!

Updated Data Regulations According to GDPR

We hope you enjoy receiving and reading the SERA internal newsletter! To comply with the updated data regulations in the EU (GDPR), we need to remind you that we are using MailChimp to compile our newsletter. With your subscription, you agreed to the privacy policy and terms of MailChimp.
To ensure that also the recipients of the external newssheet are aware of the data policy, a consent statement will be added to the next newsletter. To comply with the new regulations, we have activated a double-opt-in process where interested readers receive a second message following their initial sign-up asking for their permission and their agreement to MailChimp's privacy policy

In the spotlight

Teachers' workshop in Portugal

In the framework of SERA, the Instituto Dom Luiz (Portugal) organized in collaboration with Instituto Superior Técnico (Portugal) and the external partners of the WP1 "Seismology @ School" an event that took place from 9 to 11 July 2018. it focused on demonstrating how seismology and seismic engineering can provide tools and examples for educational activities.

The Portugal delegate team, i.e. Susana Custódio, Luís Matias and Guilherme Weishar, organized six SERA workshops as part of the annual meeting at Casa das Ciências (translates to "House of Science"). This conference brings

together Portuguese and Brazilian teachers from STEM fields (science, technology, engineering and math). The majority of the teachers are from high schools (students aged from 14 to 18), but there is some attendance from teachers of students of other age groups. This year, over 900 teachers attended the 3-day event. It is the largest gathering of teachers in Portugal, and this was its 5th edition.

The main goal of this conference is to allow teachers to gain new ideas, concepts, projects, and activities to enrich their lectures. The conference is therefore split in the main Portuguese STEM classes: Physics and Chemistry, Math, Biology and Geology, Introduction to Sciences, Information Technology. The keynote presentations and workshops are for the most part provided by professional researchers. In our case, the SERA workshops were part of the Biology and Geology category, because this is where seismology is taught in the Portuguese curriculum.

Reader's letter

From Monika Sobiesiak for JRA1/JRA2
"JRA1/JRA2 workshop in Kraków and visit of Rudna Mine"

"From 24th to 26th of September, 2018, a JRA1 / JRA2 joint workshop was held in Kraków at the Department of Seismology at the Institute of Geophysics, Polish Academy of Sciences. The workshop was aiming at updating all participants on the on-going work by emphasizing exchange and the use of new software developments, which can be applied to the data sets and testbeds defined within SERA. For this purpose, a rotational working schedule was employed, enabling each participant to have a trial and error testing of the different software of interest.

One major goal of the workshop was to consolidate the various seismogenic environments from tectonic, anthropogenic, and laboratory seismicity. We wanted to offer a practical approach to learn what causes induced seismicity. In order to see and feel this "in-situ", we visited Europe's largest underground copper mine in Poland near the villages of Polkowice and Rudna, north-west of Wrocław. Rudna Mine is one of the three copper mines in the Legnica-Głogow-Copper-District (LGCD) and is characterized by a high rate of seismic activity not only in micro-seismic magnitude ranges but also in intermediate sized seismic events. This hazardous situation gave way for the deployment and construction of the surface network LUMINEUS with 10 accelerometers and 17 short period stations, operated by the Department of Seismology at the IG-PAS in Kraków.

For two hours, the group could visit places in 1000 m depth, where the main excavation levels of the mine are located. It was possible to see how new excavations were prepared, and how the recovered ore bearing rock is transported to the surface. Back at the surface again, we visited the seismological observatory which is in charge of the in-mine seismic monitoring system. In case of earthquakes or collapses, the team has to determine the location as quickly as possible because successful rescue measures depend on this. We learned that the operation of a mine underlies a detailed and strict activity plan. Therefore, we are very thankful that the management and team of Rudna Mine made this interesting visit possible."

From Rémy Bossu for VA1
"Participation in Powell Center Working Group workshop"

"For the VA1, we like to mention our participation in the one week workshop organized by the USGS/NEIC "Future Opportunities in Regional and Global Earthquake Monitoring and Science, Powell Center Working Group, Fort Collins" that aims at defining the future activities for earthquake monitoring.
One of the conclusions is to further develop rapid sharing of parametric data and moment tensors (two activities already performed by the EMSC). In addition, USGS wants to test the integration in their shakemap of the felt reports the EMSC collects into their Shakemap. The authoritative location scheme currently in place at EMSC was well received as a way to avoid earthquake location discrepancies between different monitoring agencies. A second workshop is planned at the end of 2019."

From Helen Crowley for JRA4
"Completion of SERA JRA4 European Vulnerability Workshop"

"We just completed a successful SERA JRA4 European Vulnerability Workshop in Porto from 27th to 28th September. We had a number of invited speakers from across Europe that came to discuss issues including validation/calibration of vulnerability functions, efficient methodologies for the analysis of structures for fragility assessment, estimation of losses from non-structural elements, and estimation of fatalities due to structural collapse. The SERA partners presented the SERA JRA4 framework for European vulnerability assessment, with specific focus on reinforced concrete, steel and masonry structures, and received a lot of useful input and feedback from the attendees. One of the main takeaways from the workshop was that the partners of JRA4 should allow sufficient time for validation and calibration of the vulnerability functions

before presenting the first results of the European risk model, which will take place at the final JRA4 workshop in Istanbul in September 2019."

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SERA in numbers

Calendar

Deadline for completing EC reporting materials
November 16th 2018 (see article above)

ORFEUS Annual Meeting
12 - 14 November 2018
Athens, Greece
Read more

Future design of seismic networks and instrumentation workshop (WP4)
21 November 2018
GFZ, Potsdam, Germany

European Seismic Hazard Model workshop (WP25)
4 December 2018
Milan, Italy

NA5 / JRA4 Workshop
6 - 7 December 2018
Thessaloniki, Greece
Register here until 10 November 2018 or by sending an e-mail to Evi Riga

Marsquake for schools workshop (WP3)
16 January 2019
CNRS, Nice, France

Second Annual Science Meeting
Week of May 6th, 2019
Location TBD

The next internal newsletter will be released in February 2019.
If you would like to share news with your SERA colleagues, please send your inputs to the SERA communication team (janine.aeberhard@sed.ethz.ch or michele.marti@sed.ethz.ch).

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The beginning of this year also marks the beginning of the second project half of SERA and many exciting things are about to come. This newsletter provides information about the upcoming 2nd Annual Science Meeting in Edinburgh, UK, and gives some more details on the External Review Meeting by the EC. Additionally, project members present their latest work such as new shake-table dynamic tests and planned workshops.

Organizational matters

2nd Annual Science Meeting in Edinburgh, 15 to 16 May 2019

As you already know, the 2nd SERA Annual Science Meeting will take place in Edinburgh, UK, from 15 to 16 May 2019. The meeting will end around 15h30 on Thursday. If you haven't registered yet, you can do so here as fast as possible since the registration will soon be closed.
We advise you to arrange your travels early enough as rooms in Edinburgh can get rather pricey and, depending on where you are coming from, travels might take you longer than expected.
Please make sure that at least one member of each WP participates. If you have any questions, contact your WP leader or Project Manager Kauzar Saleh.

Templates for 2nd Annual Science Meeting presentations

In order to keep the presentations uniform, we have provided templates for you to use. You can find them on the Intranet under Home > Documents > C. Templates and logos > Templates. If you have any questions, feel free to ask Janine for help.

External Review Meeting by the EC

The SERA Technical Report M1 to M18 has been submitted and is now being evaluated by the EC. On 7 May 2019, SERA will have an external review

meeting organised by the EC in Brussels, to assess project status at M24. It is therefore very important for all WPs to make sure that they comply with M24 deliverables. Please check whether this is the case early enough and reach out to Project Manager Kauzar Saleh in case of any problems.

In the spotlight

Shake-table dynamic tests on a steel silo filled with wheat: SEismic Response of Actual steel SILOS (SERA-SILOS)

As part of the Transnational Access framework, shake-table dynamic tests are carried out on a full scale steel silo (supplied by AGI Frame) filled with wheat since 25 February 2019 at the Eucentre Foundation ShakeLab.
The tests will be performed on the mono-axial shake-table (7m x 5.6m) in order to evaluate the silo behaviour subjected to seismic actions both in fixed and base isolated configuration.
More information on the experiment can be found here (in Italian).

SERA WP7 Workshop in L'Aquila, Italy

Within the framework of the Network Activity NA5 "Networking databases of site and station characterization" of the SERA-EU project (see SERA-NA5 description for further details), a workshop is organised. It is devoted to the

proposition of guidelines and recommendations for common best practice procedures of site-effects characterization at the seismic strong motion stations, in terms of indicators and quality metrics. Moreover, it will discuss the roadmap for strong motion site characterization in Europe in the next 10 years. All topics are related to the SERA and EPOS activities on connecting infrastructures and communities in the field of site characterization.

Additionally, a training course on Ambient Vibration Techniques for Site Characterization offered the week before (4 to 9 March 2019) and an open workshop on recent advanced techniques for site characterization (9 to 10 March 2019) are taking place**.** These events will be held in the same location as the SERA workshop (further details available here).

SERA+ in preparation

The SERA team is now full hands in the preparation of the next proposal, SERA+, due 20 March 2019 under the INFRAIA-01-2018-2019 H2020 call. If successful, SERA+ will give continuity to SERA for another 3 years from mid 2020 on.
SERA+ connects important stakeholders in the field of seismic hazard assessment and engineering.

Reader's letter

From Helen Crowley, involved in JRA4

"One of the Joint Research Activities of the Horizon 2020-funded project SERA is entitled a 'Risk modelling framework for Europe'. As part of these research activities, a seismic risk model for Europe is being developed and will be presented for the first time at the European Seismic Risk Model Workshop. The main aim of the workshop will be to obtain feedback on the model, such that it can be updated and released in April 2020. It will take place from 12 to 13 September 2019 in Istanbul, Turkey.
A first version of the European exposure model developed in SERA JRA4 was used in GEM's global seismic risk model that was released at the end of last year. It can be accessed here.
Additionally, a paper was submitted to the ICONHIC conference that will take place this summer."

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SERA in progress

2nd Annual Science Meeting
Edinburgh, UK
15 to 16 May 2019

29 deliverables
handed to the EC

Over 20 publications
published within SERA

11 proposals
selected by TA-SEP for trans-national access projects within the 3rd call

22 of 36 months
passed since the project started in May 2017.

176 followers
on Twitter.
Tag us with @sera_research or #sera_research - we will retweet your posts.

Calendar

11 - 12 March 2019, L'Aquila (Italy)
SERA WP7 workshop
More information

07 - 12 April 2019, Vienna (Austria)
EGU2019
More information

15 - 16 May 2019, Edinburgh (UK)
2nd SERA Annual Science Meeting
Register here as soon as possible

6 - 7 June 2019, Belgrade (Serbia)
SERA Workshop 'EIDA and the Balkans'
Register here as soon as possible

12 - 13 September 2019, Istanbul (Turkey)
SERA European Seismic Risk Model Workshop
If interested, register here and contact Helen Crowley

The next internal newsletter will be released in June 2019.
If you would like to share news with your SERA colleagues, please send your inputs to the SERA communication team (janine.aeberhard@sed.ethz.ch or michele.marti@sed.ethz.ch).

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Organizational matters

European Commission

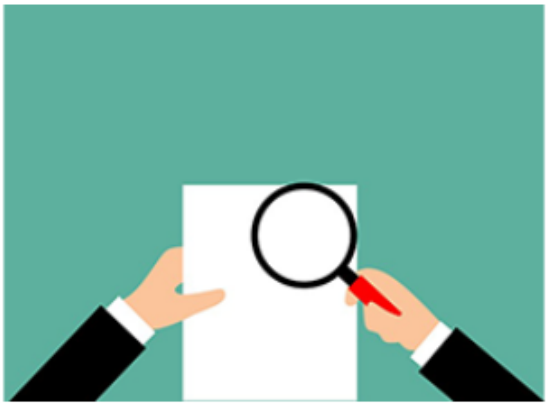
Successful first External Review Meeting

The first External Review Meeting with the European Commission took place on 7 May 2019 in Brussels, Belgium, and we have now received the results. We are happy to announce that, overall, the Commission considers the implementation satisfactory as the project has reached most of its objectives and milestones during the first two years on time. The reviewer, an expert from the reinsurance industry, positively mentioned the project's progress over the last 24 months and the significant impact derived of the expected results in the next reporting period. Especially highlighted were the following points:

- significant increase in access to data and stations, as well as improved data quality and clear roadmaps for future improvements
- better understanding and mitigation of seismic risks by bringing together the earthquake engineering and seismology communities, through the the

work underway for the update of the seismic hazard mode for Europe and the experimental data generated on novel materials
- harmonisation of seismic hazard and risk through improved access and quality of data and the work on the pan-European risk model
- positive steps in the safe exploitation of geo-resources which is a relatively new problem
- improvements in European construction through work on new materials, resisting techniques, and hazard assessment
- increased integration, by extending SERA across all of Europe with an aim to increase applicability of EC8 and better construction in other countries

Although the reviewer was aware that deliverables coupled to the hazard model for EC8 were postponed to match the EC8 schedule, she recommended submitting them as soon as ready to ensure harmonisation with other SERA deliverables. As we have already seen during the last two years, we are sure that this will be no problem and that SERA will continue its excellent work during the last year.



Internal financial check

With SERA approaching its final months, the Project Office is running a financial check of expenditure for the period M1-M28 (this is, until end of August 2019). All financial contacts have received an e-mail explaining the information to be provided **by September 16th 2019**. The purpose of this internal financial check is to avoid declaring ineligible costs in the second and last periodic reporting due in April 2020. At that moment, SERA will have to report 2/3 of the total project costs, so it is very important to anticipate potential deviations. Therefore, if your organisation foresees any issues to execute the remaining budget for the M29-M36 period, please inform the Project Manager as well. Finally, remember that costs will only be eligible for reimbursement by the EC if incurred by April 30th 2020.

In the spotlight

Teachers' workshop in Patras, Greece

The National Observatory of Athens – Institute of Geodynamics and Arsakeia Schools of Patras in collaboration with the Center of Sciences of Patras organized a two-day workshop on "Seismology in Education and Society". It took place from 25 to 26 June 2019 on the premises of the Center of Sciences of Patras.

The workshop called for primary and secondary education teachers with interest in STEM training (science, technology, engineering, mathematics) and the subject of Seismology. The two-day workshop was free of charge within the framework of the collaboration between the Institute of Geodynamics and the Arsakeia Schools of Patras. The teachers and researchers from universities and research institutes all over Europe who taught in the workshop have experience in school and citizen seismology and are participating in the SERA project.The participating teachers were assigned to four teams and each of them followed in turn the STEM workshops covering the following topics:
(1) basic knowledge of seismology in education,
(2) engineering seismology in education,
(3) early warning / information systems in school and society; and
(4) earthquake drills at school.

Reader's letter

From Helen Crowley (Eucentre)

"A SERA Balkans Seismic Risk workshop organised by SUZI-SAEE (the Serbian Association for Earthquake Engineering), EUCENTRE (for SERA) and the GEM Foundation was held from 13 to 14 June in Belgrade, Serbia. Colleagues from Bosnia and Herzegovina, Bulgaria, Croatia, North Macedonia, Serbia, and Slovenia came together to discuss common issues related to exposure, vulnerability, and risk modelling in the Balkan countries. The main highlights from the workshop from the SERA perspective included the feedback provided on the European exposure model and the many examples of use of the OpenQuake-engine within the region. All participants agreed the organisation of such seismic risk workshops should become a regular feature in the region."

From Roland Roberts (Uppsala University)

"A large amount of data has been produced by the earthquake engineering and seismology research infrastructures in Europe over the last years, promoting new information technology tools for data sharing within each research community. To make scientific data available and accessible for its reuse for different purposes (science, industry, teaching or training, etc.) under the requirements of the EU mandates of open access, several infrastructure initiatives are currently being developed. That is the case of the EPOS project (European Plate Observing System) that provides a large framework for the integration of all solid earth science data into a single European e-infrastructure following the FAIR principles of data: **F**air, **A**ccessible, **I**nteroperable and **R**eusable. Also following these principles, the Spanish National Research Council (CSIC) is working on making all seismic data accessible by providing them with a DOI and handle. A presentation on the state-of-the-art of SERA Work Package 5 "Networking Deep Seismic Sounding data and products (NA3)" was now published, presenting the current work being developed in collaboration with DIGITAL.CSIC on making seismic data accessible and open access."

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SERA in progress

3rd Teachers' Workshop
Patras, Greece
25 to 26 June 2019

37 deliverables
handed to the EC

24 publications
published within SERA

44 proposals
selected by TA-SEP for trans-national access projects in total

27 of 36 months
passed since the project started in May 2017.

221 followers
on Twitter.
Tag us with @sera_research or #sera_research - we will retweet your posts.

Calendar

12 - 13 September 2019, Istanbul (Turkey)
SERA European Seismic Risk Model Workshop
If interested, register here and contact Helen Crowley (helen.crowley@eucentre.it)

7 - 10 October 2019, Grenoble (France)
2019 EPOS Seismology Workshop
More information here

14 October 2019, Pavia (Italy)
Joint meeting SERA-JRA3 and CEN-SC8 Committee
More information here

April 2020, TBA
SERA Final Meeting
Date and location to be announced in autumn

13 - 18 September 2020, Sendai (Japan)
17th World Conference on Earthquake Engineering
Abstract submission until 30 August 2019 here

The next internal newsletter will be released in November 2019.
If you would like to share news with your SERA colleagues, please send your inputs to the SERA communication team (janine.aeberhard@sed.ethz.ch or michele.marti@sed.ethz.ch).

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SERA is fully on track for its last seven months and the preparations for the final meeting in April 2020 has already started. This newsletter covers everything you need to know until the final reporting and about all the deliverables that haven't been submitted yet.
But first, we will take a look at what happened since the last internal newsletter: the EC has granted EPOS-ERIC a project, a SERA workshop on the InSight mission and its seismic recordings is being organised, and several workshops continue to demonstrate the high quality collaboration of the SERA project.

Organizational matters

SERA Final meeting

The final SERA meeting will take place in **Zurich on April 23rd to 24th 2020** in the Alumni Pavillon. On the first day, the management board meeting will be held in the morning. The science meeting will start at 2 pm and finish at 1 pm on the second day. The General Assembly will follow from 2 pm to 3 pm in the afternoon of the second day. Registration instructions and the preliminary agenda will be sent in early December. As usual, we expect at least one representative of each WP to participate at the Science meeting, and a member or proxy of each partner organisation for the General Assembly. If you have questions, please send them to sera_office@erdw.ethz.ch.

Procedure final reporting

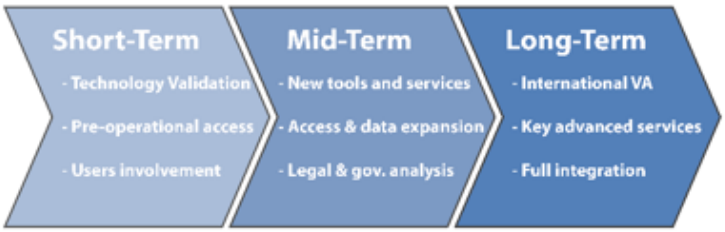
The end of the project will be very busy, with about 40 deliverables to be submitted in April and a couple in February. You can find a list of all deliverables here.

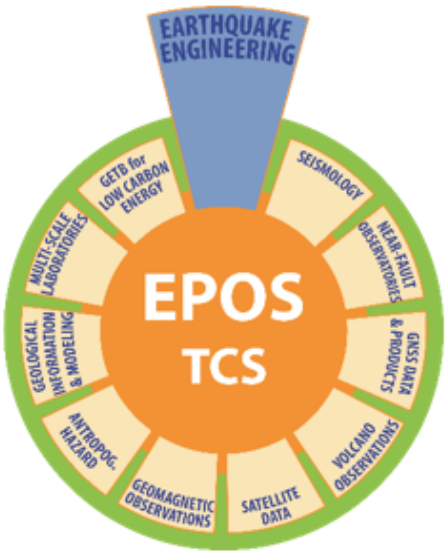
Deadline February deliverables: 26th February 2020.

Deadlines April deliverables: 14th April 2020. Please plan this work ahead, the deadline is right after Easter and cannot be extended this time. Also, let's try to ease the work of the Management Board as they will have a lot to read in little time, so if you anticipate reports before the deadline that will be much appreciated. TA WPs might need to provide their deliverables to the TA coordinator before they are added to the final TA deliverable, A. Pavese will send you specific instructions. It is important also that all TA experiments are completed by the end of March 2020 to ensure outputs can be integrated in the corresponding deliverables and the budget executed.

We will also collect materials for the **final project report in April 2020**, and for the **second periodic report during May 2020**. We will send the templates in February. For your planning, remember that only expenses/tasks conducted until April 30th are eligible under the grant.

In the spotlight





Integration of data banks and access services from the earthquake engineering and seismology research infrastructures

A number of European research projects in the fields of seismology and earthquake engineering have produced large amounts of data and related services with the goal of developing new approaches for seismic risk reduction. Nevertheless, the two adjacent scientific disciplines of earthquake engineering and seismology have not yet interfaced their data, lacking an interoperable data-sharing structure. A strategy for the integration of data banks and access services from the earthquake engineering (SERIES) and seismology (EPOS) research infrastructures was developed as part of the "Networking experimental seismic engineering databases (SERIES)" work package (WP6). The Joint Research Centre, University of Patras and University of Bergen are contributing to WP6.

The SERIES project represents the most significant effort in Europe towards the interoperability of earthquake engineering experimental data. The work conducted in SERIES enabled the automated integration of experimental results within a number of European laboratories and brought a source for experimental data so that the earthquake engineering community can access data from any SERIES partner by using a single, unified web interface. On the other hand, EPOS integrates the key research infrastructures in seismology, volcanology, geodesy, geology, geomagnetism, anthropogenic hazards, and geoenergy applications. Each thematic community develops specific services that are validated and introduced in EPOS for sustainable operation.

The deliverable "D6.5 Roadmap for the integration of data banks and access services from the earthquake engineering (SERIES) and seismology (EPOS) research infrastructures" proposes the integration of the SERIES databases in the existing EPOS service as a new Thematic Core Service (TCS) and exploring possible interoperability with other TCSs (e.g. Seismology) and with international partners. The first step is to consider the SERIES database as the first service of a new Earthquake Engineering Thematic Core Service (E/ENG TCS) within the EPOS architecture. SERIES will initially provide, through EPOS, integrated access to key data and experimental measures produced at some of the best facilities for earthquake engineering worldwide. In its mature phase,

the integration process will provide an advanced interoperability within the earthquake engineering community itself, with the sibling TCS seismology and other TCSs, and with international partners. This objective will be guaranteed by means of the implementation of new services and tools for improving user accessibility and experience.
The roadmap identifies the cross-discipline needs in earthquake engineering and seismology data assessed through a questionnaire directed to users and stakeholders operating in the two fields. The questionnaire collected information on requirements and use cases for earthquake engineering and seismological data serving as the basis for the developed roadmap. The metadata structures in EPOS and SERIES were compared, followed by a gap analysis and leading to the requirements for the metadata catalogues development for the proposed new E/ENG TCS. The final version of the roadmap was discussed with SERA and international partners during a dedicated workshop. The roadmap puts forward a strategy with different tasks envisaged to be performed in three steps (short-, mid- and long-term). In the short-term, by the end of the SERA project, a pre-operational access service will be provided to selected SERIES datasets in order to allow validation of identified access technologies and involvement of the user community, for further implementation in EPOS. The activities performed in the mid-term will include a review of how the newly developed services and products will become fully compatible with the requirements of EPOS, at a technical, legal, governmental, and financial level. Full integration of the earthquake engineering TCS in EPOS will be achieved in the long-term by providing also access to research infrastructures, laboratories, and data centres established outside Europe, thus improving the international dimension of EPOS.

SERA workshop on InSight mission in February 2020

From 4 to 6 February 2020, SERA education participants will meet at the François Xavier Bagnoud Observatory in St. Luc to lead a series of seminars on the InSight mission and its seismic recordings.

Observations of the sky, the sun, the planet path, and the interaction with the digital planetarium will allow children and their teachers to immerse themselves in the solar system and to experience the adventures of Mars@School together with Marsty. Find the programme here.

EPOS-SP

The EC has granted EPOS-ERIC with the EPOS-Sustainability Phase (SP) project, a three-year project to ensure the long-term sustainability of EPOS-ERIC. The expectation is that the project will help to consolidate the operation of Virtual Access services developed during the EPOS-Implementation Phase and SERA through EPOS-ERIC. About 11 partners taking part in SERA will participate in EPOS-SP.

Reader's letter

JRA4 workshop in Istanbul

From Helen Crowley, eucentre

"On 12 and 13 September 2019 over 70 researchers, academics, and industry professionals came together for the SERA European Seismic Risk Model Workshop, hosted at Bogazici University in Istanbul. The main aim of this workshop was to obtain feedback on the research activities being undertaken as part of the development of the 2020 European Seismic Risk Model (ESRM20), which will be released at the end of the SERA project and hosted on the European Seismic Risk Services portal. These research activities include an update to the European seismic hazard model, new proposals for modelling site amplification at a regional scale, exposure and vulnerability modelling for the predominant building classes in Europe, and validation and verification of the European risk results. All presentations from the workshop can be downloaded here. On the second day of the workshop, over 50 participants were trained to reproduce the results of the European risk model with the open source OpenQuake-engine software."

Towards a harmonized seismic hazard and risk assessment for Europe

From Michèle Marti & Stefan Wiemer, ETH Zurich

"On 2 October 2019, the EFEHR consortium was officially established. EFEHR stands for "European Facilities for Earthquake Hazard and Risk" and is a network connecting professionals to advance earthquake hazard and risk assessment in the European-Mediterranean area. EFEHR aims at strengthening the collaboration of the community, facilitating scientific advance and innovation, and exchanging best practices in seismic hazard and risk assessment. Via its web portal it facilitates access to relevant software, databases, and models. EFEHR is not replacing national or local efforts, but is supporting and enriching them. EFEHR is closely integrated in the framework of the European Plate Observatory System (EPOS) allowing the EFEHR consortium to establish itself as an advanced community and to connect with relevant peers. At the latest meeting with almost 30 participants from all over Europe, first results of the next generation hazard and risk models for Europe where discussed. Therewith, the newly established EFEHR consortium will meaningfully contribute to one of the main achievements SERA envisions. To learn more about EFEHR, check out this fact sheet."

This column is a section open to all SERA participants. It gives you the opportunity to share your latest research, best practice experiences, open questions or comments and news from your research field. Whatever comes to your mind, contact the SERA communication office. We are looking forward to receiving your input!

SERA in progress

InSight Workshop
coming up in February 2020

37 deliverables
handed to the EC

24 publications
published since the beginning of SERA

44 proposals
selected by TA-SEP for trans-national access projects in total

30 of 36 months
passed since the project started in May 2017.

251 followers
on Twitter. Tag us with @sera_research or #sera_research - we will retweet your posts.

Calendar

SERA Activities

4 - 6 February 2020, St. Luc (Switzerland)
Workshop on InSight

23 - 24 April 2020, Zurich (Switzerland)
SERA final meeting
Additional information will be distributed shortly

Congress

9 - 11 July 2020, Osaka (Japan)
World Congress on Geology & Earth Science
More information

Conferences

22 - 23 November 2019, Fribourg (Switzerland)
17th Swiss Geoscience Meeting
More information

The next internal newsletter will be released in February 2020.
If you would like to share news with your SERA colleagues, please send your inputs to the SERA communication team (janine.aeberhard@sed.ethz.ch or michele.marti@sed.ethz.ch).

Liability claim
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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730900.

View this email in your browser

SERA is entering its final phase with only two more months to go. The members of different tasks were working hard during the last few months: the STRULAB Reaction Wall facility at University of Patras successfully concluded its last TA Project and a new version for the IS-EPOS Platform has been successfully launched; scroll down to read more about it!

Furthermore, around 450 students and 28 teachers attended the workshop series "Earthquakes and Marsquakes'" which took place in February; organized by Anne Sauron (ETH Zurich) and HES-SO Valais-Wallis. The participants enjoyed it very much to learn more about Mars and to see the Moon's interesting surface through a telescope.

Due to the actual situation with the coronavirus, the SERA final meeting takes place online. More information here in this newsletter!

Stay healty!

Organizational matters

Virtual SERA final meeting

Due to the coronavirus, many events around the globe have been cancelled or postponed until next year. Fortunately, the SERA final meeting will still take place, however not in Switzerland but **online**.

Therefore, please keep the two days, **23 and 24 April 2020,** reserved for the SERA final meeting. As mentioned, the final meeting will be held online during these two days. How, when and where? We will inform you in a separate e-mail and provide further details.

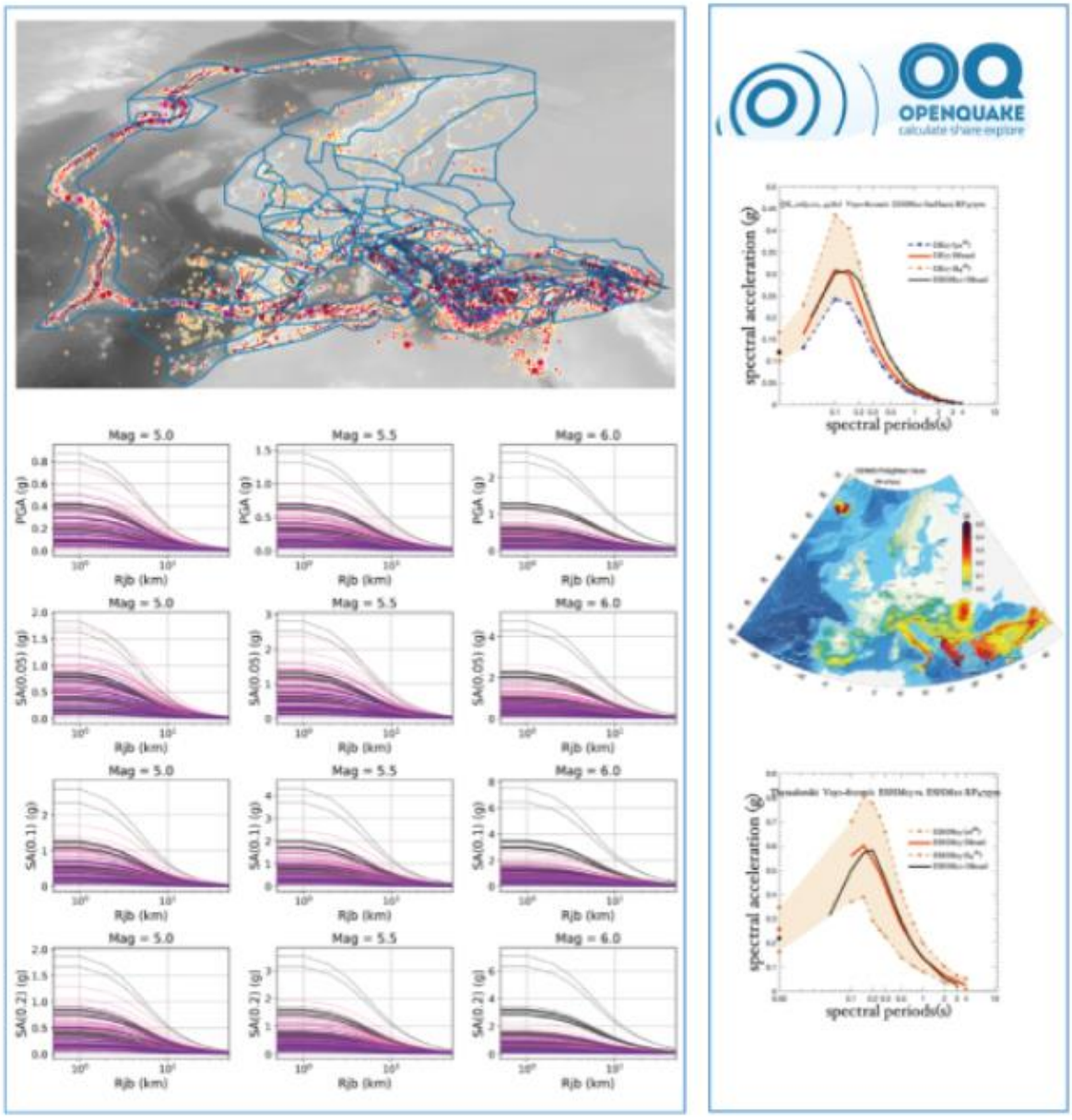
Please make sure that one member per WP is available to deliver the project status. The final meeting will be coupled to the last General Assembly meeting, so we expect at least one representative per partner to attend the GA meeting.

Two milestones to be finalized: ESHM and ESRM

Within the next months, two of the most important outcomes of the joint-research activities established in the SERA project are going to be finalized. The first milestone is the 2020 update of the European Seismic Hazard Model (ESHM20) and second the publication of the newly developed European Seismic Risk Model (ESRM). Both models are developed on a state-of-the-art probabilistic framework which includes:

- novel scientific methods;
- rigorous assessment of the uncertainties and built-upon the most recent datasets such as earthquake catalogues, active faults or ground shaking recordings;
- tectonic and geological information;
- input models (seismogenic sources, ground shaking, exposure and vulnerability of the built environment).

The main output of the ESHM20 describes the severity of the ground shaking at specific locations across Europe represented as maps, curves and uniform spectra. The ground shaking will be described by elastic-response spectra acceleration for various spectral ordinates. ESHM20 also provides the basis for deriving seismic design parameters for the next version of the European Seismic Design Code (CEN-EC8). For this task, a working group of SC8 has been established to work with the SERA JRA3 hazard team. This task is still ongoing, therefore, a final proposal of the engineering demand products will be due in October 2020. All datasets, key components and results will be open for access and re-use at the web-platform of the European Facilities of Earthquake Hazard and Risk.

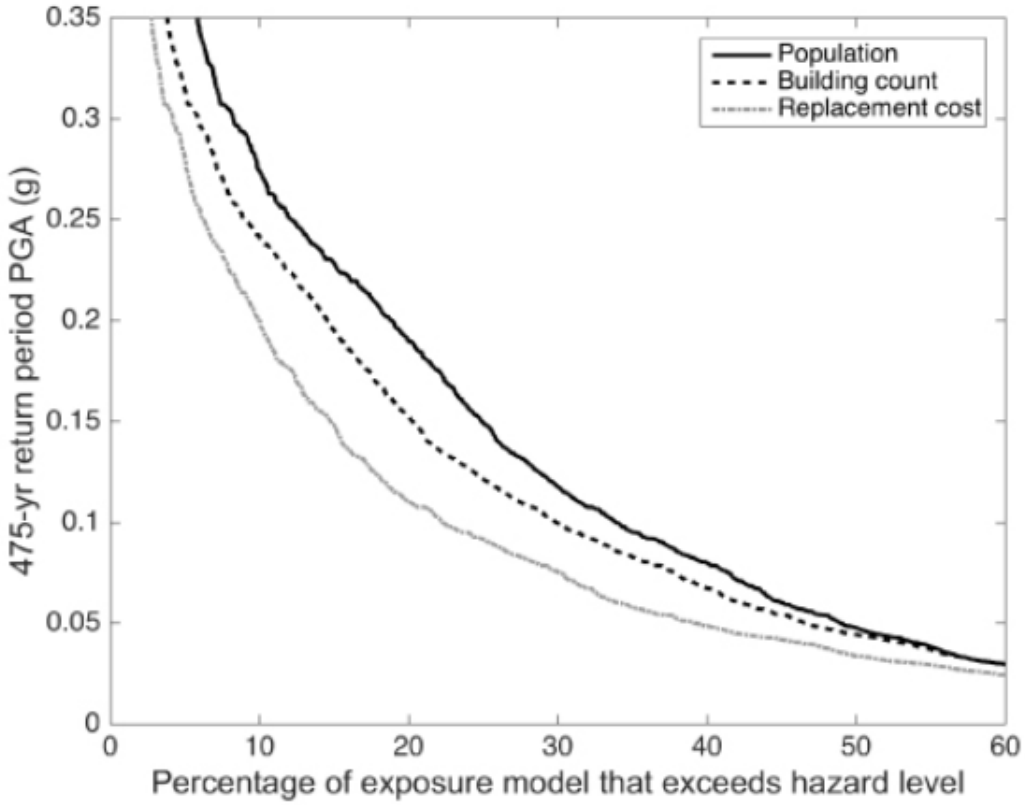


A simplified view of the seismogenic source model (the map), the ground motion

models for various earthquake scenarios (the plots with magenta curves) and the range of products under the OpenQuake panel.

ESRM20 shortly explained

The European Seismic Risk Model (ESRM20) is the first ever model derived for the Euro-Mediterranean region after a long history of European projects covering aspects of exposure, vulnerability and risk modelling (e.g. LESSLOSS, NERA, SYNER-G, STREST). The main risk metrics that will be released with the model include national and sub-national maps of average annual loss (AAL), probable maximum loss (PML) as well as national loss exceedance curves for 45 countries in Europe. The underlying exposure and vulnerability models used to estimate the risk metrics will also be openly released together with data, methodologies and scripts used to produce these models.



This graph shows the percentage of the European population, building count and building replacement cost across Europe exposed to hazard levels that exceed different levels of PGA (g) with a 475-year return period.

Outstanding deliverables

We have a large number of deliverables due on **14 April 2020**. We do not have margin for posponing them, so please contact Kauzar in the next few days if you anticipate any issues preventing from delivering.

Work package	Deliver-able	Title
WP1	D1.5	Implementation of SERA services in EPOS operational phase, INGV
	D1.6	Final report of the Scientific Advisory Board, ETHZ
	D1.7	Final project report, including impact assessment, ETHZ
WP2	D2.3	Report on communication activities from M24 to M36, ETHZ
	D2.6	Internal newsletter M24-M30-M36, ETHZ
	D2.9	Fact-sheets M36, UPAT
	D2.11	Bi-annual newssheet M25-M31-M36, ETHZ
	D2.15	Interactive web tool, EUCE
	D2.16	Final summary report addressing professional stakeholders, JRC
	D2.17	Final compilation of technical reports, EMSC
WP3	D3.2	Integrated results of educational seismology workshops, CNRS
	D3.4	Science with seismo@school: results and targets, ETHZ
	D3.5	Integration between educational and citizen seismology initiatives: achievements and strategies, NOA
WP4	D4.4	EIDA metadata model standards, NOA
	D4.5	EIDA documentation system, KNMI
	D4.7	Strategies for future network design, CNRS
WP5	D5.5	Validation of pre-operational access phase to selected DSS datasets and products, CSIC
WP6	D6.6	Validation of pre-operational access phase to selected SERIES datasets, JRC
WP7	D7.5	Validation of pre-operational access phase to selected site and station characterization datasets, CNRS
WP10	D10.1	Technical report on SERA Transnational Access activities TA1-TA10 M36

WP11	D11.1	Overall summary report on TA for public outreach – 1 (see D17.1), EUCE
WP12	D12.1	Overall summary report on TA for public outreach – 2 (see D17.1), EUCE
WP13	D13.1	Overall summary report on TA for public outreach – 3 (see D17.1), EUCE
WP14	D14.1	Overall summary report on TA for public outreach – 4 (see D17.1), EUCE
WP15	D15.1	Overall summary report on TA for public outreach – 5 (see D17.1), EUCE
WP16	D16.1	Overall summary report on TA for public outreach – 6 (see D17.1), EUCE
WP17	D17.1	Overall summary of TA for public outreach EUCE
WP21	D21.1	Assessment report of VA External Board on VA1-VA5 M36, EMSC
WP22	D22.1	Overall summary of VA for public outreach, EMSC
WP23	D23.4	Testbed validation of tools and resulting high level products: software toolbox, validation methodologies, demonstration report, CNRS
	D23.5	Analysis of network performance for investigations of earthquake physics, CNRS
WP24	D24.4	Test-bed validation of tools and resulting high level products: software toolbox, validation, methodologies, demonstration report, ETHZ
	D24.5	Analysis of network performance for investigations of earthquake statistics, NRS
WP25	D25.6	ESHM20: documentation, data and models for EFEHR distribution, ETHZ
	D25.7	ESHM20: hazard products for risk applications, EUCE
WP26	D26.8	Testing and verification of framework at city and national scales, BUON
WP27	D27.3	Assessment of the potential for city-laboratory based multi-hazards research and a long term development roadmap, UBRI
WP28	D28.4	Design, test and prototype experimentation of a software platform for real-time quake shaking and validation on earthquake case studies, UNINA
	D28.5	Report on methodologies performance analyses of qualitative impact assessment methods, INGV

Project second reporting and closure

Despite the current circumstances, we are aiming at closing the project on time. Below is the list of documents that will be requested from you with **deadline 15 May 2020:**

- **Technical report** for the period M19-M36 (to WP leaders, TA, VA coordinators)
- Inputs for the **Dissemination report**, and **Gender report**, for the period M19-M36 (to WP leaders)
- **Financial reports** for the period M19-M36 (to Admin contacts)

In October, we conducted an internal financial check with all partners, and did not identify unspent funds to be redistributed. Also, no major deviations from the activity plan.

If this situation has changed since then, please contact Kauzar in case we need to conduct another Grant Agreement amendment before the

closure of the project.

TA proceedings book

At the end of the project, a TA proceedings book published by EUCENTRE will be available as PDF on our website. It provides interesting insights of all TA activities and results gained from SERA project.

In the spotlight

Workshops for students and teachers: Earthquakes and Marsquakes

Prof. Anne Sauron, ETH Zurich

The workshop series 'Earthquakes and Marsquakes: how to learn about seismicity on rocky planets' took place from 3 to 7 February 2020. The goal of the workshop was to develop knowledge of earthquakes, introduce planetary science and 'marsquakes' from the InSight mission as a tool for teaching.

The OFXB Astronomical Observatory in Saint-Luc, Switzerland, hosted these workshop. It is Switzerland's only observatory that is dedicated toward education for the public and schools. The altitude of its location increases the chances of clear skies; hence it is an excellent location for planetary studies.

Seven primary classes with 110 students, and three secondary classes with 80 students attended the presentation of Mars@School InSight mission. In addition, 28 teachers were invited to use powerful telescopes to look at the night sky. The observations highlighted the sheer density of stars in the sky not visible to the naked eye. They were able to discover the surface of the Moon in fine detail where landscape features and meteorite craters could clearly be seen. Valuable insights were gained by the 25 students and their teachers who spent the day at the OFXB Observatory to do solar observation and work on Mars and InSight.


PIC•COLLAGE

HITFRAMES TA project at STRULAB Reaction Wall

Prof. Stathis Bousias, University of Patras

STRULAB Reaction Wall facility at the University of Patras successfully concluded its last TA Project. In the framework of TA research project "**H**ybr**I**d **T**esting of an Existing Steel **FRA**me with Infills under **M**ultiple **E**arthquake**S**" (HITFRAMES) a 2/3-scaled two-storey three-bay steel frame was tested through hybrid simulation and sub-structuring pseudo-dynamic (PsD) method. Lead user of the TA project was the Department of Civil Engineering at the University of Liverpool (UK). The aim of the project was to access the seismic capacity of steel multi-storey framed buildings designed primarily for gravity loads. Several buildings of this type exist, however, they exhibit low energy absorption and insufficient dissipation capacity under seismic loadings as demonstrated by recent earthquakes in the Mediterranean area.

The case study steel frame was designed for gravity loads only and had a rectangular plan layout with a 6.5 m long span, a width of 3.5 m and two storeys of 2.5 m height each. Weak and non-ductile beam-to-column connections were intentionally utilized for the tested frames at both floors. The experimental program consisted of two phases. The first phase included tests on the 2/3-scaled spatial steel building comprising a two-storey one-bay frame (3D-frame), which was sub-structured from an actual existing multi-storey building. In the second phase, the behaviour of a two-storey 2D-frame with the same geometry as the 3D-frame was tested. The plane frame was then also retrofitted with typical commercial buckling restrained braces (BRBs). Then, an earthquake sequence comprising foreshock, mainshock and aftershock was considered. The sample time history is the near-field East-West component recorded at Norcia during the 2016 Central Italy earthquake; the value of peak ground acceleration (PGA) is equal to 0.47 g for the mainshock.

The preliminary conclusions are:

- masonry infills significantly augment the lateral stiffness and strength in steel bare frames;
- the response of double-layered infills in steel frames differ from the

response of the counterpart infills in reinforced concrete (RC) framed buildings. As a result, existing models used to simulate the response of infills in RC structures are not adequate to reliably predict the response of steel infilled frames;

- Restrained braces are cost-effective means to retrofit existing vulnerable steel frames, provided that the connections to the beam-column connections are rigid.

Release of a new version of the IS-EPOS Platform

A new version (2.33) for the IS-EPOS Platform is released, and available here. This is one of the frequent updates every two to three months to

accommodate new data sets, applications and technical changes. Within SERA WP22, virtual access, we provide access to the platform and its data sets which offer a large variety of different anthropogenic seismicity episodes and their related parameters from production, exploitation and extraction activities. Besides these data sets, a number of software applications support everything: from a quick look to the data with an overview to detailed analysis options. You are welcome to explore it!

SERA in progress

Final SERA meeting
more information coming soon

41 deliverables
available on Sharepoint

25 publications
published since the beginning of SERA

44 proposals
selected by TA-SEP for trans-national access projects in total

34 of 36 months
passed since the project started in May 2017.

272 followers
on Twitter.
Tag us with @sera_research or #sera_research - we will retweet your posts.

RISE Newsletter - sign up!

RISE
Real-time earthquake risk reduction for a reSilient Europe

More than one hundred and seventy million people in Europe are exposed to significant earthquake hazard. While long-term actions such as appropriate and well-enforced building codes remain the backbone of earthquake risk reduction, 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. **RISE** 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.

RISE adopts an integrative, holistic view of risk reduction; **a dynamic risk framework** that will combine all of the relevant information available to assess time and location dependent earthquake hazard and risk. Dynamic risk assessment includes, for example, operational earthquake forecasting, earthquake early warning, as well as rapid loss assessment. Emerging technologies will be combined with improved modelling capacities to design future products aimed at strengthening preparedness and resilience. Thereby, RISE considers the broad societal, economic and scientific impact of dynamic risk contributions. RISE takes an equally all-encompassing view on dissemination and communication of earthquake information to different stakeholders. The project brings together 19 organisations from across Europe as well as five international partners. RISE has started in September 2019 and will end in August 2022.

Would you like to stay updated on RISE progress?
Subscribe here to the project's newsletter!

The newsletter will offer project updates and developments, preliminary and final results, and of course it's feature section A closer look where each work package provides insight into a related topic of their choosing. The newsletter will be distributed up to than three times a year, so no spamming; all the important information will be summarized in one compact e-mail.

Calendar

SERA related activities

23 - 24 April 2020
Online
SERA Final Science Meeting & General Assembly

SERA related conferences

22 - 23 May 2020
Barcelona (Spain)
14th International Conference on Urban Earthquake Engineering and Seismology |

ICUEES2020

06 - 11 September 2020
Corfu (Greek)
37th GA of the European Seismological Commission| ESC2020

13 - 18 September 2020
Sendai (Japan)
17th World Conference on Earthquake Engineering | WCEE

The next internal newsletter will be released in May 2020.
If you would like to share news with your SERA colleagues, please send your inputs to the SERA communication team (nadja.hermann@sed.ethz.ch or michele.marti@sed.ethz.ch).

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730900.

SERA
Seismology and Earthquake Engineering Research Infrastructure Alliance for Europe

Newssheet #4

SERA is well on its track and had some eventful past months. The first annual review meeting with the European Commission went by well and the second Annual Science Meeting was a success with more than 50 SERA community members participating in Edinburgh, Scotland. They presented an impressive amount of results, some of them featured in this issue.
With two years of the project having already passed, the last year has now started promisingly and we are excited for the next few steps.

Twitter Website Email

Highlights

First version of European Exposure Model released

Helen Crowley, Eucentre

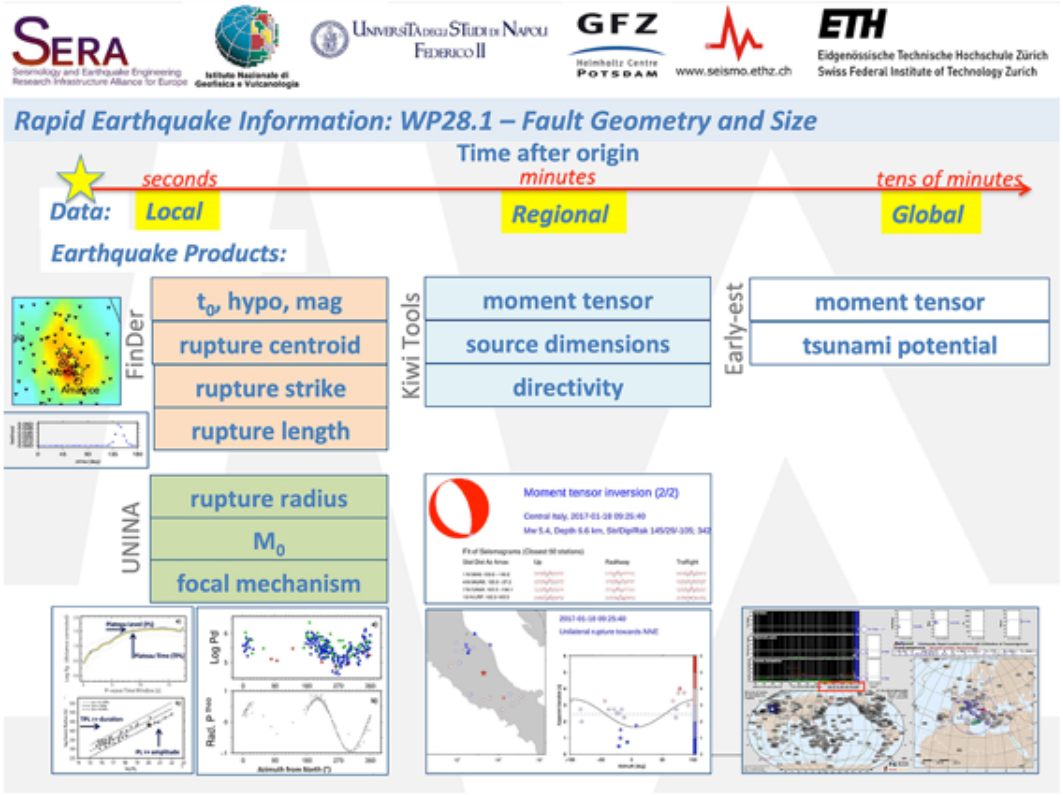
A v0.1 European Exposure Model, developed as part of the 'Risk Modelling Framework for Europe' workpackage (WP26), has been released on EFEHR's European Seismic Risk Service portal. This exposure model has been used in the development of the Global Earthquake Model's (GEM) Global Seismic Risk Map v2018.1, released in December 2018. Improvements to the European exposure model are ongoing within SERA, together with developments in physical vulnerability and site amplification modelling, all of which will be integrated within the European Seismic Risk Model 2020 (ESRM20), a preliminary version of which will be presented to over 100 participants from both academia and industry at a workshop in Istanbul in September 2019.

Making use of rapid earthquake information

M. Böse, ETH Zurich

By providing rapid source and ground motion information after moderate and large earthquakes in Europe and around the world, earthquake losses can be reduced and lives saved. As part of the SERA Work Package 28, Task 1, "Fault Geometry and Size", scientists from ETH Zurich, the University of Naples, GeoForschungsZentrum (GFZ) Potsdam, and the Istituto Nazionale di Geofisica e Vulcanologia (INGV) have developed and tested novel algorithms to characterize especially large earthquakes with fault rupture dimensions of tens to hundreds of kilometers in length.

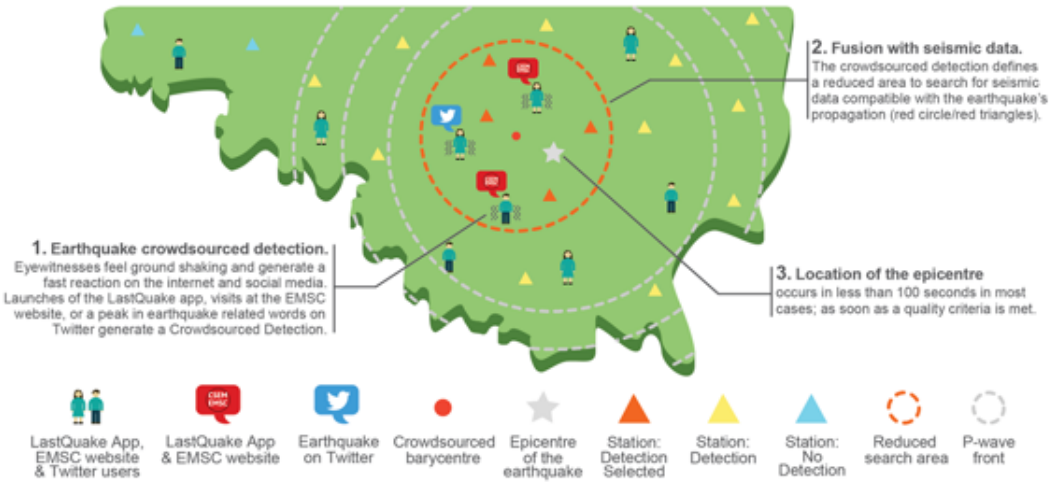
The team used the example of the 2016-2017 Central Italy earthquake sequence to successfully demonstrate, how the output from various algorithms could be combined to produce a continuous stream of earthquake parameters, ranging from rapid estimates of fault rupture dimensions and focal mechanisms, over moment rate functions to moment tensors. If automated and operated in real-time in a dense network of seismic sensors, some of this information could be provided fast enough to be useful for earthquake early warning. Other information, such as moment tensors, requires the data from more distant regional and global seismic network stations. Although somewhat slower, this information is still very useful for the rapid response after major earthquakes, including the coordination of rescue teams. The project, which was led by ETH Zurich, ended in October 2018 and led to a series of scientific publications.



Second factsheet series published

With our fact sheet series, we address key questions SERA is challenged with and present preliminary results. To account substantially for a better understanding of the SERA project, this time we introduce several projects integrated into SERA.The second factsheet series was now published online and as PDF. Some of the projects presented are:

- LastQuake
- EFEHR
- ARISTA
- IMPEC
- IS-EPOS
- ORFEUS
- ESM, AHEAD, EDSF



How to rapidly detect and locate felt earthquakes

Two papers related to JRA6 have been recently published on how to rapidly detect and seismically locate felt earthquakes. The first one, published in *Seismological Research Letters*, presents detections based on LastQuake smartphone app launches, a method named App Earthquake Detection (AED). Eyewitnesses are shown to launch LastQuake rapidly after feeling the tremor leading to automatic detection as fast as 20s regardless seismic data.

This is the latest "crowdsourced earthquake detection" method in operation at EMSC (European Mediterranean Seismological Centre) and complements detections based on EMSC website traffic monitoring and Twitter Earthquake detection (TED) based on the number of published tweets (messages on Twitter) containing the keyword "earthquake" in various languages. Compared to the 2 other methods, the detection via the app is often faster and offers the best geographical information.

The second article, published in *Science Advances* in collaboration with GFZ (Germany) and Istvan Bondar (Kövesligethy Radó Seismological Observatory, Hungary), combines crowdsourced earthquake detections with seismic data from the GEOFON global networks to produce faster and more reliable seismic locations. In the best cases, when the station coverage is adequate and EMSC is well identified in the region, seismic locations can be obtained in less than one minute of the origin time. It is a cheap way to improve earthquake network time performance at little cost for those felt earthquakes where the public desire for information is high.

European Seismic Hazard Model 2020 (ESHM20): Peer Review Workshops

Within SERA, the updates of the 2013 European Seismic Hazard Model (ESHM13) is ongoing. The updated model is due in 2020 and it will serve to two purposes: an informative reference seismic hazard model for Eurocode Code 8 (CEN-EC8), and for the seismic risk model of Europe. The ESHM20 follows the same principles as the ESHM13, withstate-of-the art procedures homogeneously applied for the entire pan-European region, without the country-borders issues.

To review the main elements of the ESHM20, two-day meetings will be organized in several cities. The main aim of these workshops will be to obtain feedback on the ESHM20 model, such that it can be updated and finally released in April 2020.

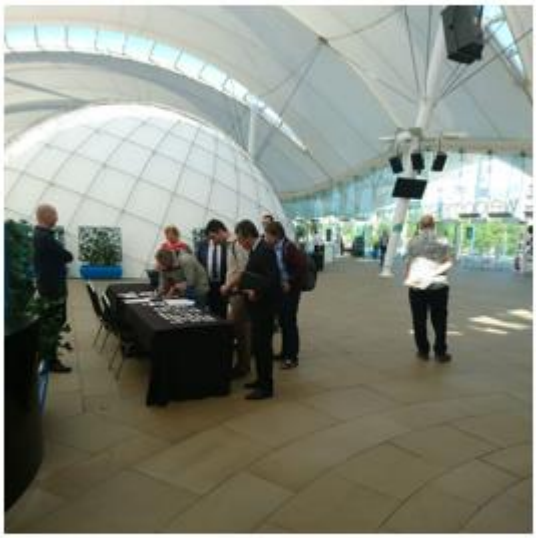
The SERA-JRA3 hazard team will present the latest research and provide critical updates on data compilation, curation and harmonization, development of the seismogenic sources, ground motion models, model implementation, outputs and results spanning across Europe without limitations of the country boundaries.

More information and registration can be found here.

A glimpse into...

Second Annual Science Meeting in Edinburgh, Scotland

The second Annual Science Meeting was held in Edinburgh, Scotland, from 15 to 16 May 2019. It was organized by ETH in collaboration with the British Geological Survey. Over 50 members of the SERA community participated. Many interesting presentations were held, each work package and task giving a brief summary of its status quo and future plans. Fruitful discussions arose and many challenges could be adressed during these two days. To also further promote networking, one of SERA's main objectives in the scientific community, the organisation team planned a social dinner on Wednesday night where the discussion could be continued over a delicious meal. The Science Meeting provided an excellent opportunity to strengthen international collaboration and to share all of the different participants contributions



Outlook and events

Outlook and events

12 - 13 June 2019, Potsdam (Germany)
EFEHR workshop with focus on Central Europe and Scandinavia
More information here

24 - 26 June 2019, Crete (Greece)
COMPDYN 7th International Conference on Computational Methods in Structural Dynamics and Earthquake Engineering
More information here

2 - 3 July 2019, Athens (Greece)
EFEHR workshop with focus on the Balkans, south-eastern Europe and Turkey
More information here

12 - 13 September 2019, Istanbul (Turkey)
SERA European Seismic Risk Model Workshop
If interested, register here and contact Helen Crowley (helen.crowley@eucentre.it)

7 - 10 October 2019, Grenoble (France)
2019 EPOS Seismology Workshop
More information here

14 October 2019, Pavia (Italy)
Joint meeting SERA-JRA3 and CEN-SC8 Committee
More information here

13 - 18 September 2020, Sendai (Japan)
17th World Conference on Earthquake Engineering
Abstracts can be submitted until 30 August 2019

The next external newssheet will be released in November 2019.
We welcome always feedback and suggestions - send them to the SERA communication team (janine.aeberhard@sed.ethz.ch or michele.marti@sed.ethz.ch).

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730900.

SERA Newssheet #5

Seismology and Earthquake Engineering Research Infrastructure Alliance for Europe

Diving into the last six project months, the SERA members are continuing to complete tasks to contribute to conferences and symposiums as well as to collaborate internationally. The preparations for the SERA final meeting in April have already started and many tasks have entered their final stages.
But before all of that, the SERA team would like to wish you peaceful holidays and a happy New Year!

Twitter Website Email

Highlights

SERA at the SEISMIX 2020 Symposium

The International Symposium on Deep Seismic Profiling of the Continents and their Margins (SEISMIX) is a biennial scientific meeting. Its next edition will take place in March 2020 in Perth, Australia. This symposium is the largest in its field and is focusing on control source and natural source imaging of the subsurface, from an exploration to a continental scale. It also addresses the latest technological and scientific developments in the application of seismic methods.

Researchers from the Institute of Earth Sciences Jaume Almera (ICTJA-CSIC) in Barcelona are presenting their latest and ongoing work related to SERA at the SEISMIX Symposium. The main aim is to disseminate the effort among the community and to stimulate discussions related to seismic data sharing and receiving input on new or desired services based on FAIR (findable, accessible, interoperable, and reusable) DSS (deep seismic sounding) data. Special focus will be devoted to the necessity of desired data products and services related to DSS, which could contribute to EPOS. In addition, the seismic database of ICTJA, in coordination with DIGITAL.CSIC (the digital repository of CSIC), will be presented as a paradigmatic example of data management following the FAIR data principles.

The SEISMIX Symposium will be an outstanding opportunity to make the work carried out within the framework of SERA and EPOS more visible, to discuss cutting edge developments in seismic data management outside Europe, and to reinforce and promote new network collaborations.

SlabSTRESS TA project at JRC ELSA Reaction Wall

The SlabSTRESS Transnational Access project was successfully completed at the ELSA Reaction Wall. The team was comprised of 14 researchers from Politecnico di Milano (Italy), École polytechnique fédérale de Lausanne (Switzerland), Universitatea Tehnica de Constructii Bucuresti (Romania) and Universidade NOVA de Lisboa (Portugal).

The test specimen was a full-scale two-storey reinforced concrete flat-slab structure with plan dimensions 9 x 14 m. The testing programme included pseudodynamic tests (hybrid simulation of the physical specimen and numerical shear walls) with input corresponding to the Serviceability and Ultimate Limit States and quasi-static tests under imposed cyclic displacement with increasing amplitude (three slab-column joints were strengthened after the first cyclic test).

The experiment provided new knowledge on the response of flat-slab structures that could not be captured in previous tests on column-slab sub-assemblies. The results will help to calibrate models, verify the Eurocode and Model Code models for punching shear, develop new rules for the deformation-based design and for detailing flat-slab structures subjected to earthquake and gravity loads, and improve the design of flat-slab frames as primary seismic structures.

In the ongoing blind prediction competition, 19 research groups from 13 countries are participating. Visit www.slabstress.org and follow them on ResearchGate for updates.

Integration of data banks and access services from the earthquake engineering and seismology research infrastructures

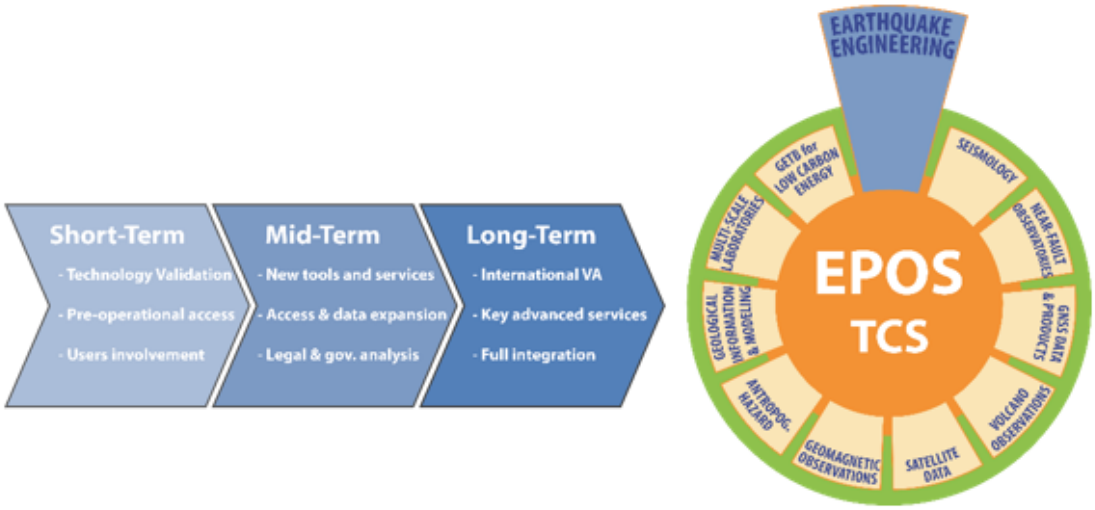
A number of European research projects in the fields of seismology and earthquake engineering have produced large amounts of data and related services with the goal of developing new approaches for seismic risk reduction. Nevertheless, the two adjacent scientific disciplines of earthquake engineering and seismology have not yet interfaced their data, lacking an interoperable data-sharing structure. A strategy for the integration of data banks and access services from the earthquake engineering (SERIES) and seismology (EPOS) research infrastructures was developed as part of the "Networking experimental seismic engineering databases (SERIES)" work package (WP6). The Joint Research Centre, University of Patras and University of Bergen are contributing to WP6.

The SERIES project represents the most significant effort in Europe towards the interoperability of earthquake engineering experimental data. The work conducted in SERIES enabled the automated integration of experimental results within a number of European laboratories and brought a source for experimental data so that the earthquake engineering community can access data from any SERIES partner by using a single, unified web interface. Complementary, EPOS integrates the key research infrastructures in seismology, volcanology, geodesy, geology, geomagnetism, anthropogenic hazards, and geoenergy applications. Each thematic community develops specific services that are validated and introduced in EPOS for sustainable operation.

The deliverable "D6.5 Roadmap for the integration of data banks and access services from the earthquake engineering (SERIES) and seismology (EPOS) research infrastructures" proposes the integration of the SERIES databases in the existing EPOS service as a new Thematic Core Service (TCS) and exploring possible interoperability with other TCSs (e.g. Seismology) and with international partners. The first step is to consider the SERIES database as the first service of a new Earthquake Engineering Thematic Core Service (E/ENG TCS) within the EPOS architecture. SERIES will initially provide, through EPOS, integrated access to key data and experimental measures produced at some of the best facilities for earthquake engineering worldwide. In its mature phase, the integration process will provide an advanced interoperability within the earthquake engineering community itself, with the sibling TCS seismology and other TCSs, and with international partners. This objective will be guaranteed by means of the implementation of new services and tools for improving user accessibility and experience.

The roadmap identified the cross-discipline needs in earthquake engineering and seismology data assessed through a questionnaire directed to users and stakeholders operating in both fields. The questionnaire collected information on requirements and use cases for earthquake engineering and seismological data. These findings serve as the basis for the roadmap developed . The metadata structures in EPOS and SERIES were compared, followed by a gap analysis. Hence, this lead to the requirements needed to develop the metadata catalogues for the proposed new E/ENG TCS. The final version of the roadmap was discussed with SERA and international partners during a dedicated workshop. The roadmap puts forward a strategy with different tasks envisaged to be performed in three steps (short-, mid- and long-term). In the short-term, by the end of the SERA project, a pre-operational access service will be provided to selected SERIES datasets in order to allow validation of identified access technologies and the collaboration with the user community for further

implementation in EPOS. The activities performed in the mid-term will include a review of how the newly developed services and products will become fully compatible with the requirements of EPOS, at a technical, legal, governmental, and financial level. Full integration of the earthquake engineering TCS in EPOS will be achieved in the long-term by providing also access to research infrastructures, laboratories, and data centres established outside Europe, thus improving the international dimension of EPOS.



SERA workshop on InSight mission in February 2020

From 4 to 6 February 2020, SERA education participants will meet at the François Xavier Bagnoud Observatory in St. Luc to lead a series of seminars on the InSight mission and its seismic recordings.

Observations of the sky, the sun, the planet path, and the interaction with the digital planetarium will allow children and their teachers to immerse themselves in the solar system and to experience the adventures of Mars@School together with Marsty. Find the programme here.

EPOS-SP

The EC has granted EPOS-ERIC with the EPOS-Sustainability Phase (SP) project, a three-year project to ensure the long-term sustainability of EPOS-ERIC. The expectation is that the project will help to consolidate the operation of Virtual Access services developed during the EPOS-Implementation Phase and SERA through EPOS-ERIC. About 11 partners taking part in SERA will

participate as well in EPOS-SP.

A glimpse into...

...a harmonized seismic hazard and risk assessment for Europe

On 2 October 2019, the EFEHR consortium was officially established. EFEHR stands for "European Facilities for Earthquake Hazard and Risk" and is a network connecting professionals to advance earthquake hazard and risk assessment in the European-Mediterranean area. EFEHR aims at strengthening the collaboration of the community, facilitating scientific advance and innovation, and exchanging best practices in seismic hazard and risk assessment. Via its web portal it facilitates access to relevant software, databases, and models. EFEHR is not replacing national or local efforts, but is supporting and enriching them. EFEHR is closely integrated in the framework of the European Plate Observatory System (EPOS) allowing the EFEHR consortium to establish itself as an advanced community and to connect with relevant peers. At the latest meeting with almost 30 participants from all over Europe, first results of the next generation hazard and risk models for Europe where discussed. Therewith, the newly established EFEHR consortium will meaningfully contribute to one of the main achievements SERA envisions.
To learn more about EFEHR, check out this fact sheet and have a look at www.efehr.org.

Outlook and events

SERA Activities

4 - 6 February 2020, St. Luc (Switzerland)
Workshop on InSight

Congress

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

The final external newssheet will be released in April 2020.
We welcome always feedback and suggestions - send them to the SERA communication team (janine.aeberhard@sed.ethz.ch or michele.marti@sed.ethz.ch).

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