DELIVERABLE

D2.11 BI-ANNUAL NEWSSHEET M25-M31-M36

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Introduction

SERA mails an external newssheet twice a year via the email marketing service MailChimp to its members, stakeholders and other interested parties. This is an efficient way to update the extended SERA community and provide them with the opportunity to share their experience within SERA. A continuous number of openings (available on MailChimp) proves the importance and effectiveness of this communication tool. Until this day, five external newssheets have been released and the next newssheet is planned for April 2020.

1   Coverage and Reach of External Newssheets

The email marketing service MailChimp allows tracking the mailing list changes. As the following table shows, the number of subscribers to the external newssheet is increasing (as of 30 November 2018: 190).

	NUMBER OF SUBSCRIBERS
SERA NEWSSHEET #4, JUNE 2019	212
SERA NEWSSHEET #5, DECEMBER 2019	217
SERA NEWSSHEET #6, APRIL 2020	227 (retrieved: 30 March 2020)
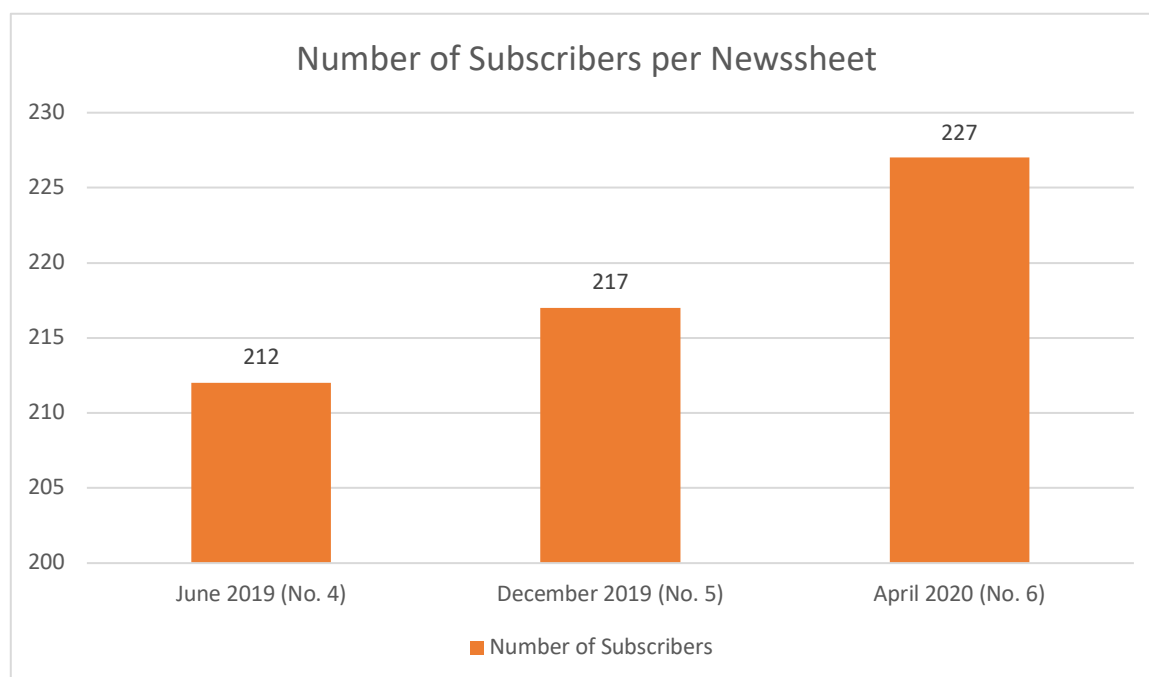
2   Conclusion

The number of subscribers for the SERA external newssheet has been increased constantly during the project. This positive development proves the importance of this communication channel to contribute information towards interested stakeholders.

3 Appendices: Published External Newssheets

The appendix contains the last published external newssheets #4 in June 2019 and #5 in December 2019.

	DATE
SERA NEWSSHEET #4	11 June 2019
SERA NEWSSHEET #5	18 December 2019
SERA NEWSSHEET #6	Planned: end of April 2020

4   Contact

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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.
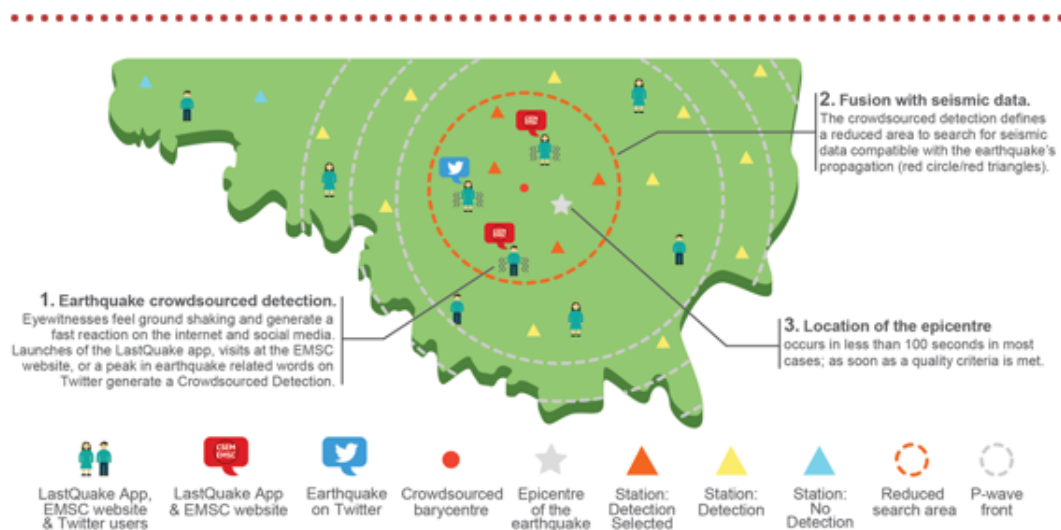
The team used the example of the 2016-2017 Central Italy earthquake sequence to successfully demonstrate, how the output from various algorithms could be combined to produce a continuous stream of earthquake parameters, ranging from rapid estimates of fault rupture dimensions and focal mechanisms, over 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.
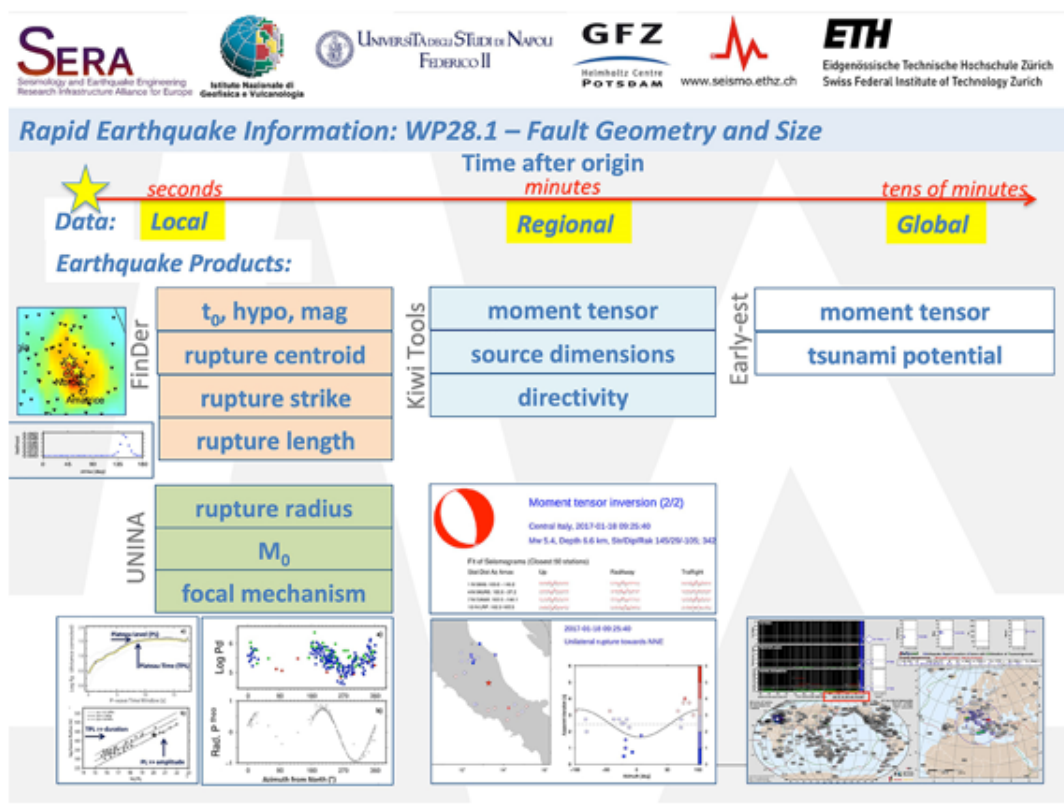
Second factsheet series published

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

1. Earthquake crowdsourced detection. Eyewitnesses feel ground shaking and generate a fast reaction on the internet and social media. Launches of the LastQuake app, visits at the EMSC website, or a peak in earthquake related words on Twitter generate a Crowdsourced Detection.

2. Fusion with seismic data. The crowdsourced detection defines a reduced area to search for seismic data compatible with the earthquake's propagation (red circle/red triangles).

3. Location of the epicentre occurs in less than 100 seconds in most cases; as soon as a quality criteria is met.

LastQuake App, EMSC website & Twitter users | LastQuake App & EMSC website | Earthquake on Twitter | Crowdsourced barycentre | Epicentre of the earthquake | Station: Detection Selected | Station: Detection | Station: No Detection | Reduced search area | P-wave front

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 Facilities for Earthquake Hazard and Risk

DISCOVER   EXPLORE   DOWNLOAD

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
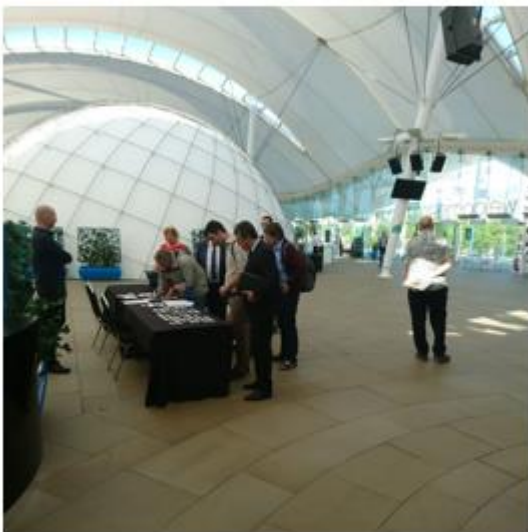
Outlook and events

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

Liability claim

Newssheet #5

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

19th International Symposium
Deep seismic profiling of the continents and their margins
15th – 19th March 2020, Esplanade Hotel Fremantle, Western Australia

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.

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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.

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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.
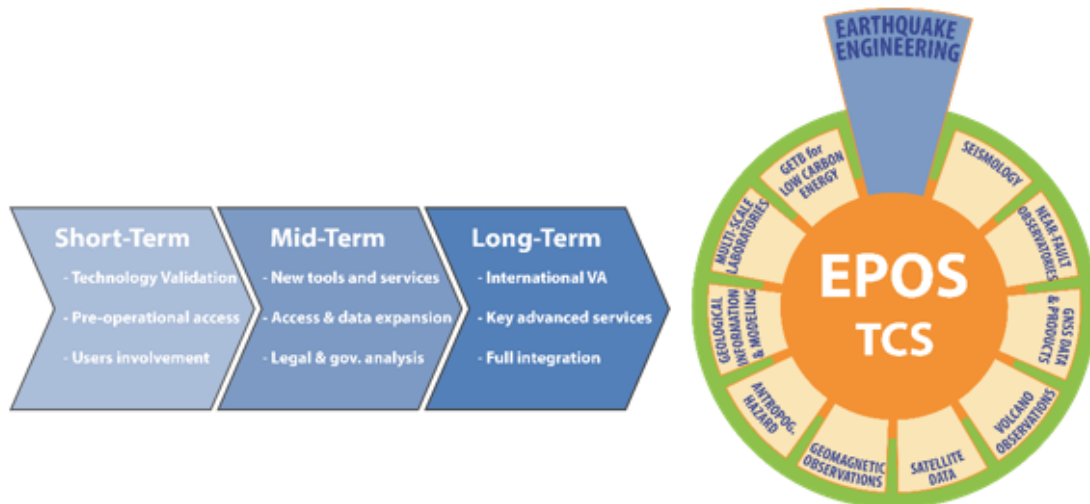
SERA workshop on InSight mission in February 2020

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 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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