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Newsheet #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

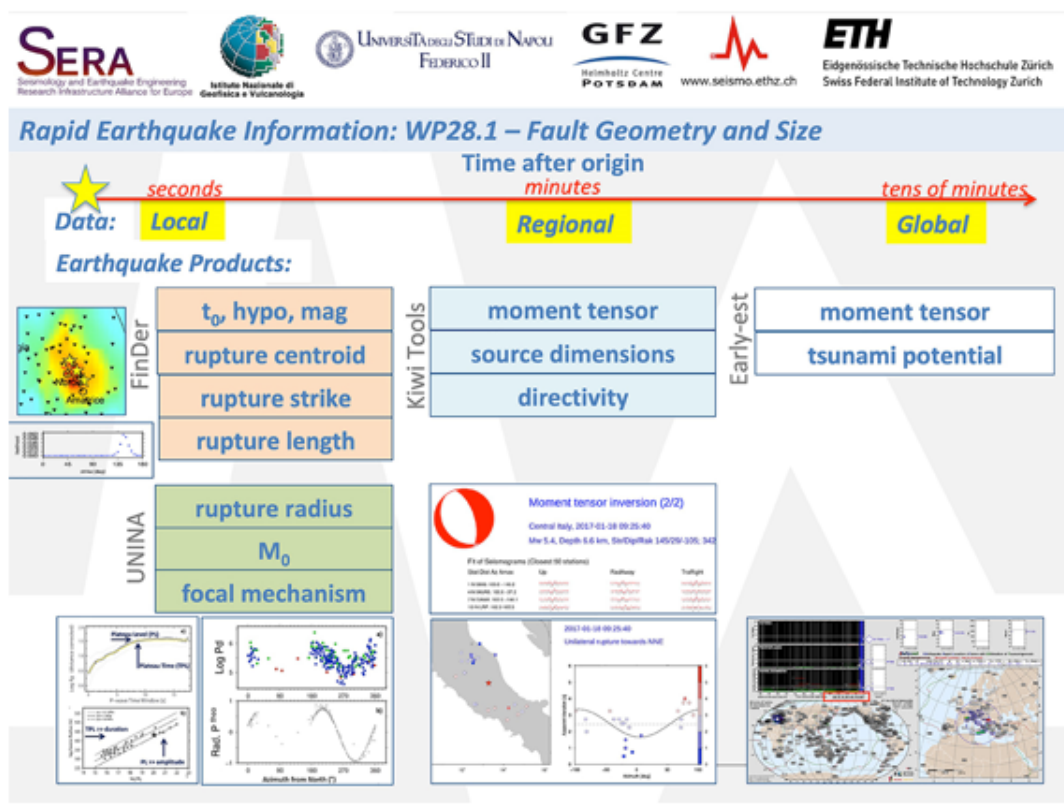
A v0.1 European Exposure Model, developed as part of the 'Risk Modelling Framework for Europe' workpackage (WP26), has been released on EFER's [European Seismic Risk Service portal](#). This exposure model has been used in the development of the [Global Earthquake Model's \(GEM\)](#) Global Seismic Risk 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, with state-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.

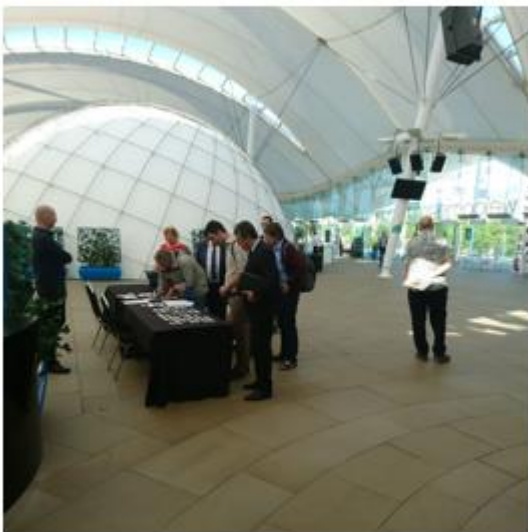
More information and registration can be found [here](#).

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 addressed 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 newsheet 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).

Liability claim

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