

# WORKSHOP EUROPEO

**Come migliorare la gestione dei disastri ambientali e non: Opportunità per una rete comune di agenzie di formazione dell'UE**

**10 FEBBRAIO 2018 | ore 8.30-14**

**NAPOLI | Mostra d'Oltremare | Sala Italia**

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# La mappa della Pericolosità sismica in Europa (Progetto SHARE)



## European Seismic Hazard Map

edited by D. Giardini, J. Woessner, and L. Danciu, Swiss Seismological Service, ETH Zurich, August 2013



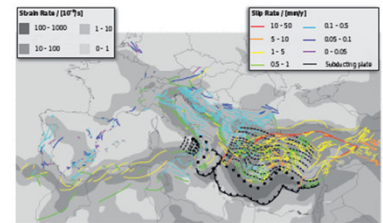
European Commission

### The EU-FP7 SHARE Project

Europe has a long history of destructive earthquakes, and seismic risk can severely affect our modern society, as recently shown by the 1999 Izmit (Turkey) and the 2009 L'Aquila (Italy) events. Seismic hazard defines the likelihood of ground shaking associated with the occurrence of future earthquakes, and is the first step to evaluate seismic risk: the likelihood of damage and loss depending on vulnerability factors (e.g. the type, age and value of buildings and infrastructure, population density and land-use). High hazard does not necessarily imply high risk. Frequent large earthquakes result in high but not necessarily high risk, while even moderate earthquakes may expose densely populated areas to high seismic risk.

The collaborative project "Seismic Hazard Harmonization in Europe (SHARE)" was supported by the EU-FP7 to deliver the first state-of-the-art reference hazard model for Europe, replacing older maps. The SHARE hazard contributes to the Global Earthquake Model (GEM) and serves as input for mitigation policies such as the design of earthquake-resistant multi-storey buildings and critical infrastructures such as bridges or dams.

### Active Faults in Euro-Mediterranean Region



Active faults and seismicity plots in the Euro-Mediterranean region, differentiated by color from slip rate (red to blue) and seismicity. Over 1,100 active faults have been mapped, covering more than 60,000 km of fault length. The geographic extent is the estimated area of deformation if the faults are crust derived from geologic data.

### Map Content

The European Seismic Hazard Map displays the ground shaking (i.e. Peak Horizontal Ground Acceleration) to be reached or exceeded with a 10% probability in 50 years, corresponding to the average recurrence of such ground motions every 475 years, as prescribed by the national building codes in Europe for standard buildings. SHARE maps also the higher ground shaking resulting every 1,000-5,000 years, of importance for critical infrastructures such as dams or bridges.

The ground shaking values depicted in the map reach over 0.5g (i.e. the gravitational acceleration). Low hazard areas (PGA < 0.1g) are colored in blue-green, moderate hazard areas in yellow-orange and high hazard areas (PGA > 0.25g) in red.

The SHARE seismic hazard is assessed with a time-independent, probabilistic approach. Models of future ground shaking are based on the history of earthquakes of the past 1,000 years, on the knowledge of active faults mapped in the field, on the type and size of deformation of the Earth's crust from GPS measurements, and on the instrumental recordings of strong ground shaking generated by past earthquakes.

The SHARE results do not replace the existing national design regulations and seismic provisions, which must be obeyed for today's design and construction of buildings.

### Acknowledgements

Supported by the EU 7th Framework Program, the 4-year SHARE program brought together a core team of over 50 leading scientists from 16 research institutions and 12 countries from Europe, North Africa and Turkey, and more than 250 additional European scientists participating in workshops providing their expertise and data.

SHARE was funded by the EU-FP7 (2007-2013) under grant agreement no. 226907. SHARE hazard was computed using the GEM OpenQuake software. Maps were created using GMT (Wessel and Smith, 1991) and the poster was produced with Adobe Illustrator CS3.

Contact requests: D. Giardini, J. Woessner, L. Danciu, H. Crowley, F. Coblen, E. Grötzl, R. Fritzo and G. Valeriani and the SHARE consortium, SHARE European Seismic Hazard Map for Peak Ground Acceleration, 10% Exceedance Probabilities in 50 years, doi:10.2777/30345, ISBN-13: 978-92-79-251-4-1.

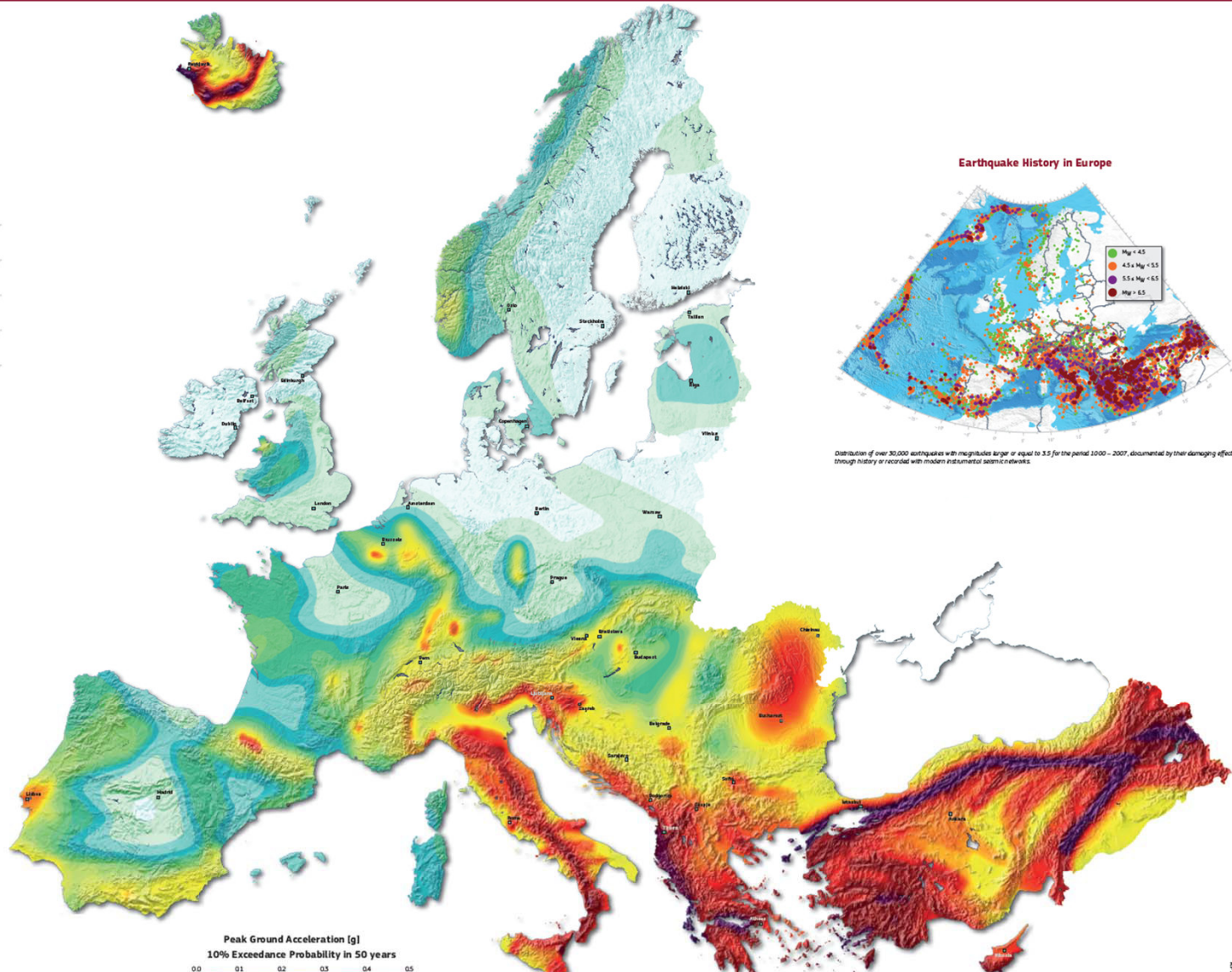
### Online Access

All SHARE products, data and results, are provided through the project website at [www.share-eu.org](http://www.share-eu.org) and the European Facility for Earthquake Hazard and Risk at [www.efeh.org](http://www.efeh.org).

### Legal Notice

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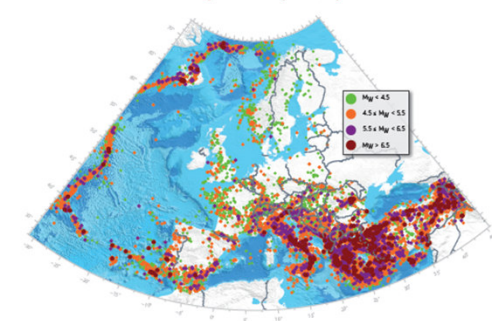
### SHARE Partners



Peak Ground Acceleration [g]  
10% Exceedance Probability in 50 years



### Earthquake History in Europe



Distribution of over 30,000 earthquakes with magnitudes larger or equal to 3.5 for the period 1000-2007, documented by their damaging effects through history or recorded with modern instrumental seismic networks.

# RAPPORTO TRA CAUSA ED EFFETTI

## *La Vulnerabilità fa la differenza*

Onna (AQ)  
Terremoto del 6  
aprile 2009

~ 25m

**EDIFICIO CROLLATO**

**EDIFICIO INTEGRO**

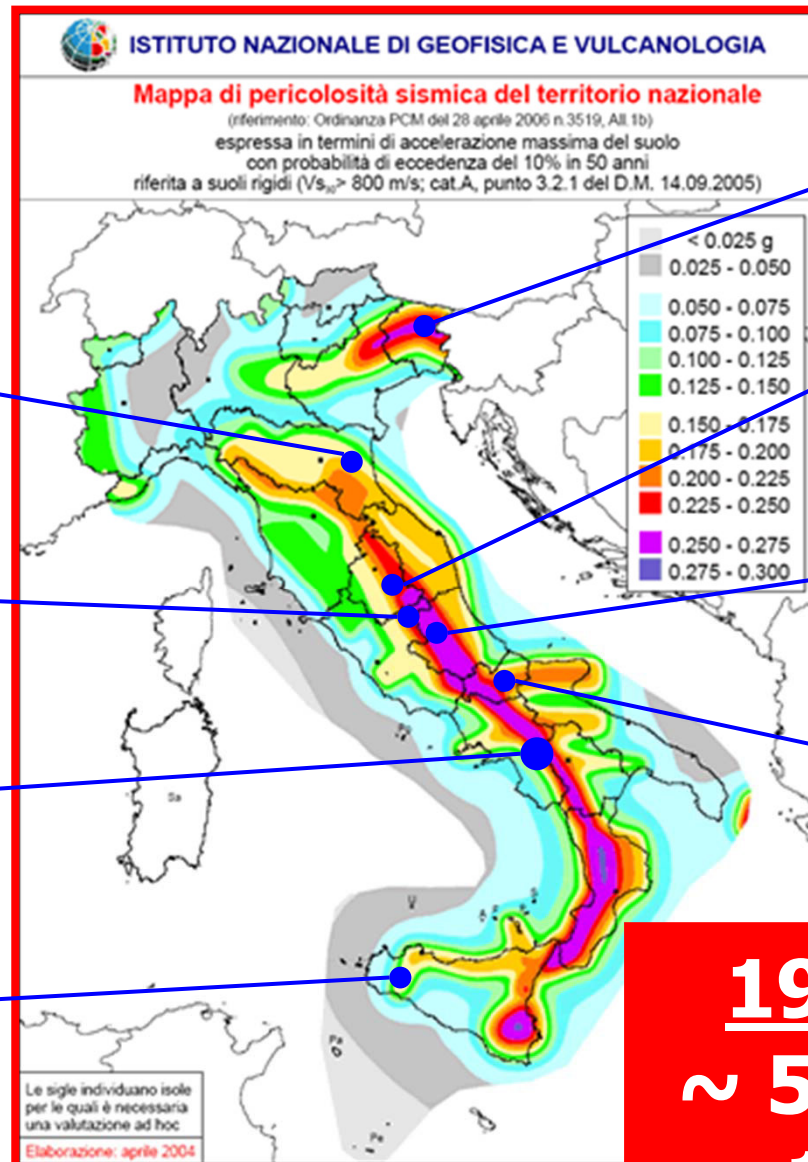
**EDIFICIO DANNEGGIATO**

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# LA PREVENZIONE MANCATA

## Vittime e Costi dei terremoti degli ultimi 50 anni in Italia



**EMILIA 2012**  
Mw 5.9  
27 vittime, 13.300 M€

**ITALIA CENTRALE 2016-17**  
Mw 6.5  
299 vittime, 23.500 M€

**CAMPANIA-BASILICATA 1980**  
Mw 6.9  
2700 vittime, 52.000 M€

**BELICE 1968**  
Mw 6.1  
296 vittime, 9.200 M€

**FRIULI 1976**  
Mw 6.4  
989 vittime, 18.500 M€

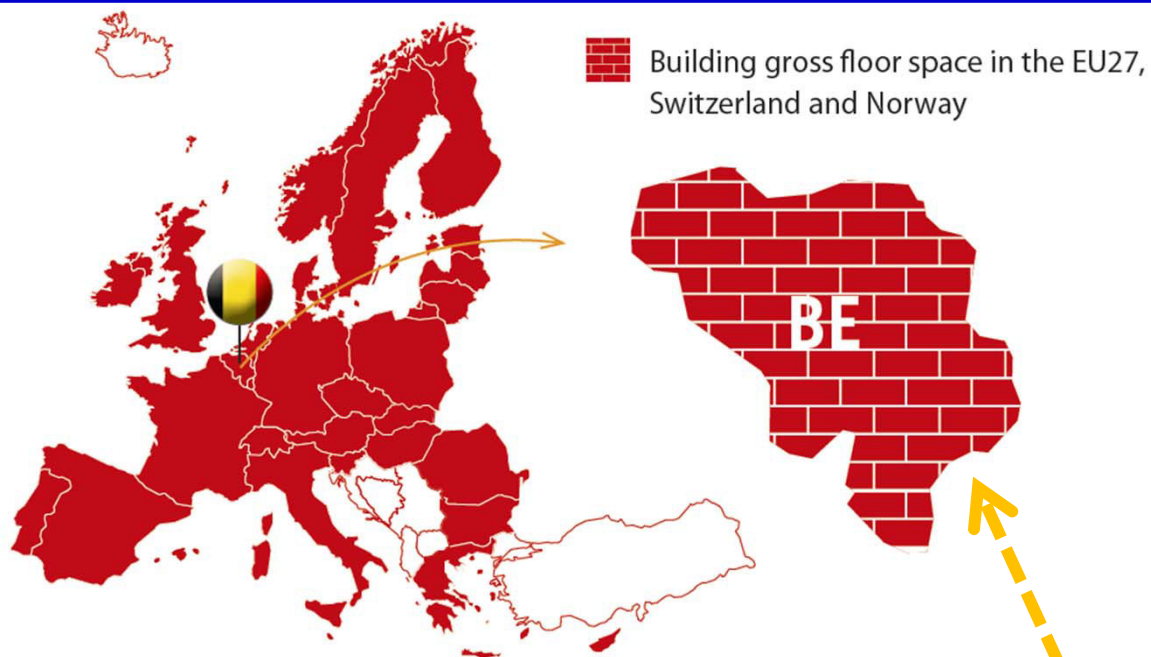
**UMBRIA-MARCHE 1997**  
Mw 6.1  
11 vittime, 13.400 M€

**ABRUZZO 2009**  
Mw 6.3  
309 vittime, 13.700 M€

**MOLISE 2002**  
Mw 5.7  
30 vittime, 1.400 M€

**1968 – 2017**  
**~ 5000 vittime**  
**~ 150.000 M€**

# La situazione in Europa: superficie totale edificata



Fonte: *Europe's buildings under the microscope, BPIE, 2011.*

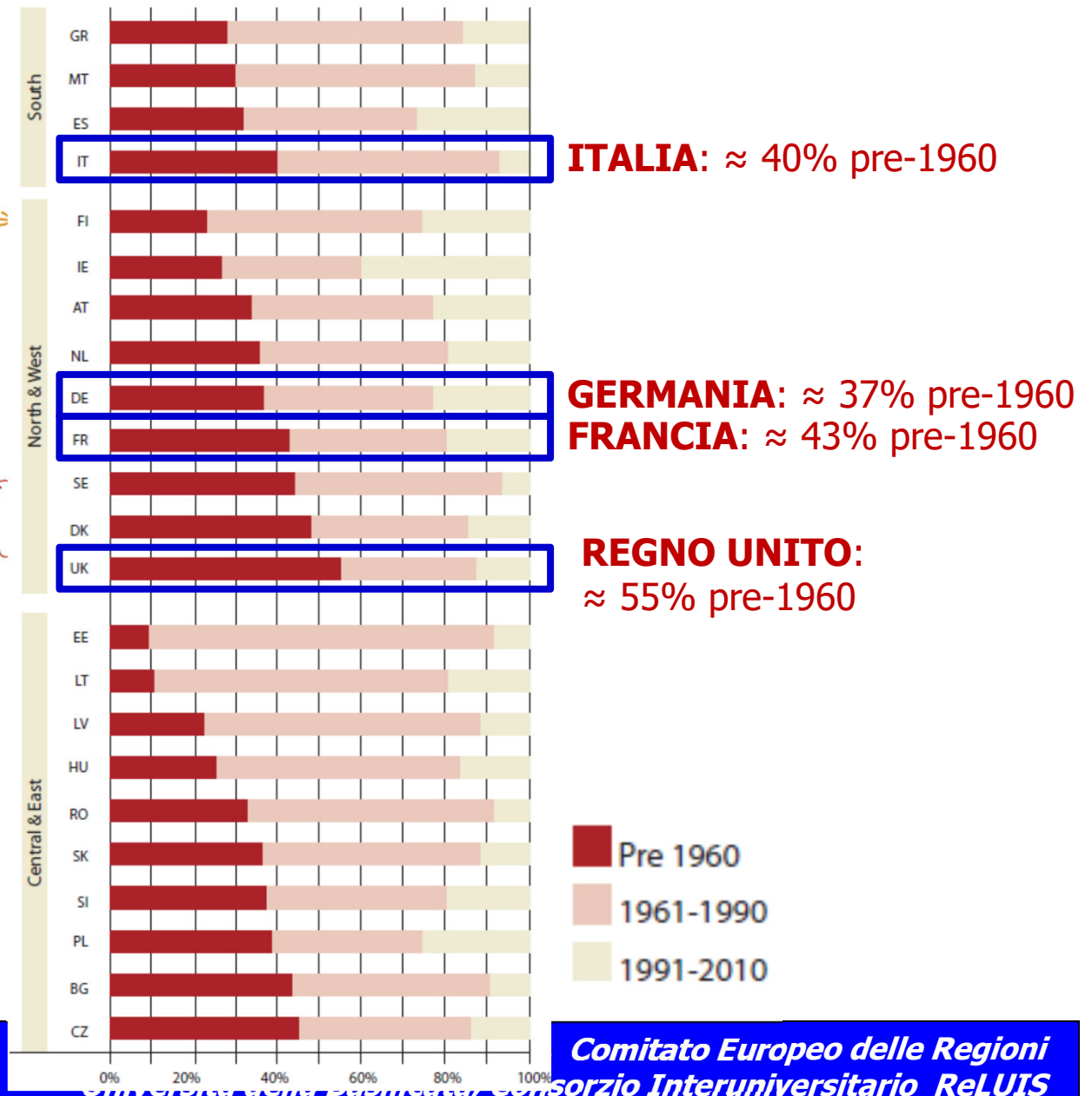
	Population (2010)	Land area (km <sup>2</sup> )	Building Floor Space
EU27	501 million	4 324 782	24 billion m <sup>2</sup>
US	309 million	9 826 675	25 billion m <sup>2</sup>
China	1 338 million	9 598 080	35 billion m <sup>2</sup>

**Nei Paesi della UE vi sono 24 miliardi di m<sup>2</sup> di superficie totale edificata (di cui 3 miliardi in Italia)**

# Età degli edifici in Europa



**Circa il 40%  
degli edifici in  
Europa è stato  
costruito prima  
del 1960**



# La Riqualificazione Sismica e Termica di Edifici Esistenti Una Nuova Politica in Italia e in Europa

**Opinion on "A European policy on the seismic  
requelification of buildings and infrastructure"**  
Giardini, J. Woessner, and L. Danco, Swiss Seismological Service, ETH Zurich, August 2013

Rapporteur: Vito SANTARSIERO  
Administrator: Dimo STOYANOV  
Expert: Angelo MASI

**(125<sup>th</sup> Plenary Session on 9-11 October 2017, Brussels)**



## IL COMITATO EUROPEO DELLE REGIONI

propone che i parametri descrittivi del rischio sismico di un territorio, ed analogamente per i rischi derivanti da altre calamità naturali, valutati secondo criteri opportunamente definiti, possano essere considerati tra quelli di riferimento per la ripartizione dei fondi SIE tra le regioni d'Europa; sottolinea che l'UE deve esigere che tutte le infrastrutture costruite con fondi SIE o con qualsiasi altro fondo dell'UE siano resistenti alle catastrofi;

Vito SANTARSIERO  
Angelo MASI

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