

Preliminary results of new macroseismic data of the 28th February 1969, a 7.9 Ms earthquake at SW of Cape St. Vincent, Portugal

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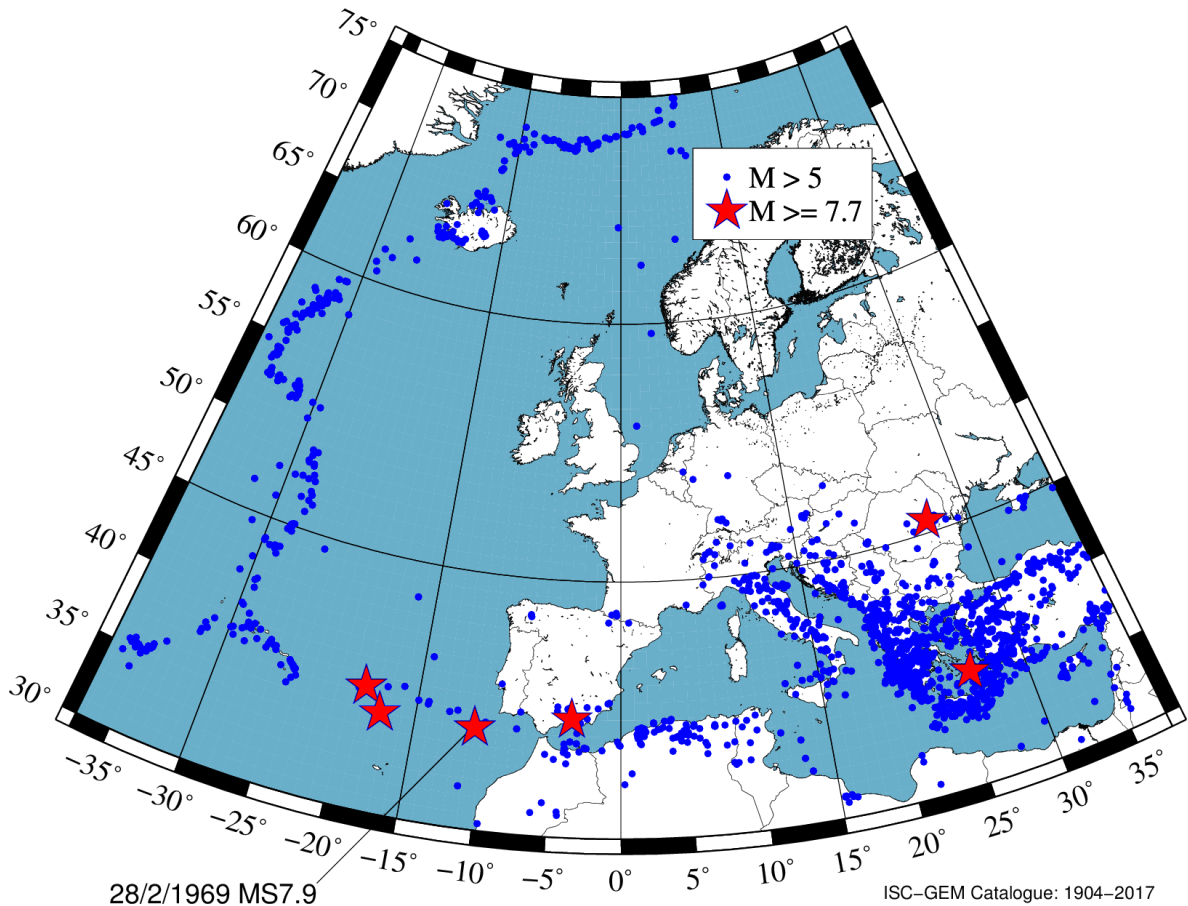
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Outline

- The earthquake of 28/2/1969, 7.9 Ms, SW of Cape St. Vincent, Portugal
- 50-Year anniversary of the 28/2/1969 earthquake
- The macroseismic survey 50 years later
- General aspects of the data acquisition
- Macroseismic evaluation
- Final remarks

The earthquake of 28/2/1969, 7.9 Ms 180 km SW of Cape St. Vincent, Portugal



Lat 36.033 Lon -10.613

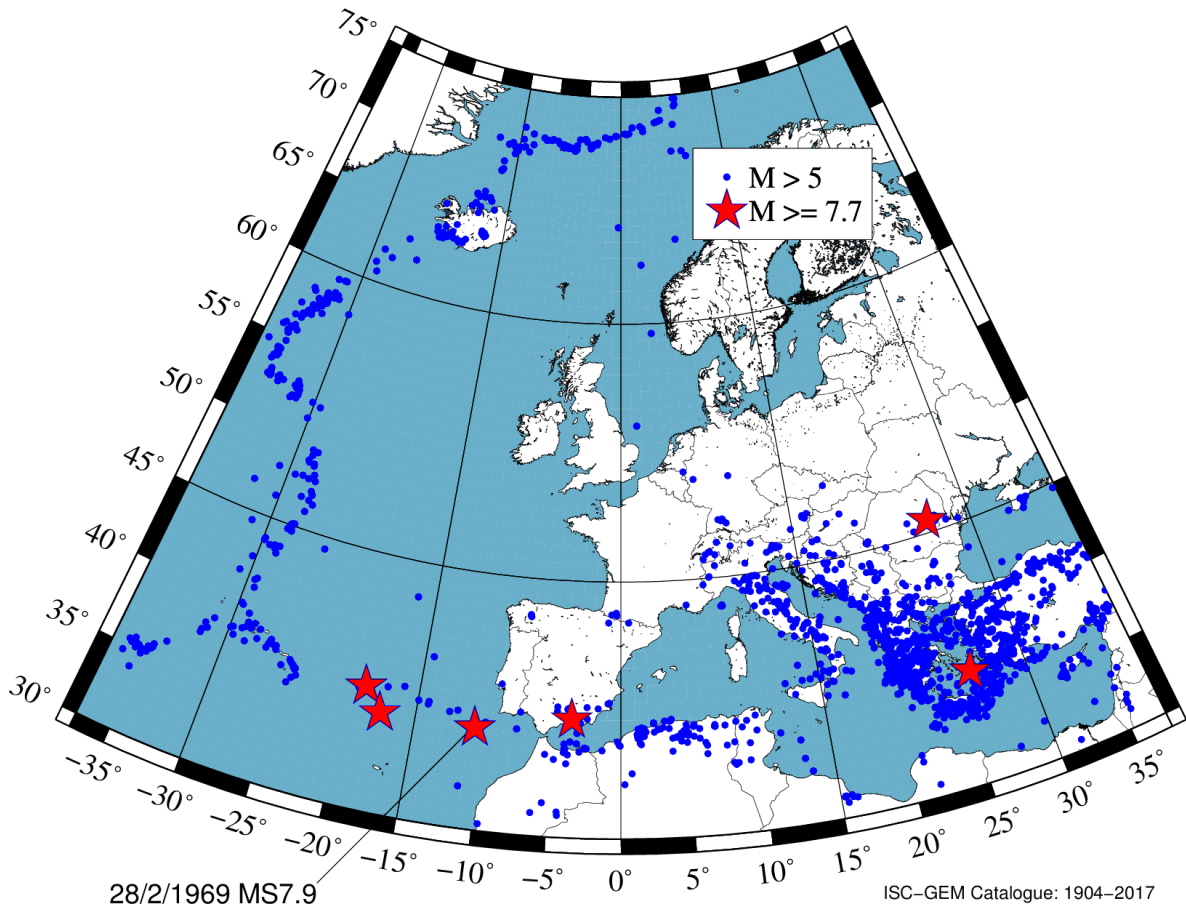
ISC-GEM Global Instrumental Earthquake Catalogue:
1904-2017

(37.5°W ≤ Lon ≤ 37.5°E; 30°N ≤ Lat ≤ 75°N; Mw ≥ 7.7)

Year	Mw	Int.	Region
1941	7.84	VI	Glória F., Atlantic
1954	7.8	VI	Granada, Spain
1969	7.8	VIII	Gorringe, Atlantic
1975	7.8	IV	Glória F., Atlantic
1940	7.74	IX	Vrancea, Romania
1956	7.7	IX	Amorgos, Greece

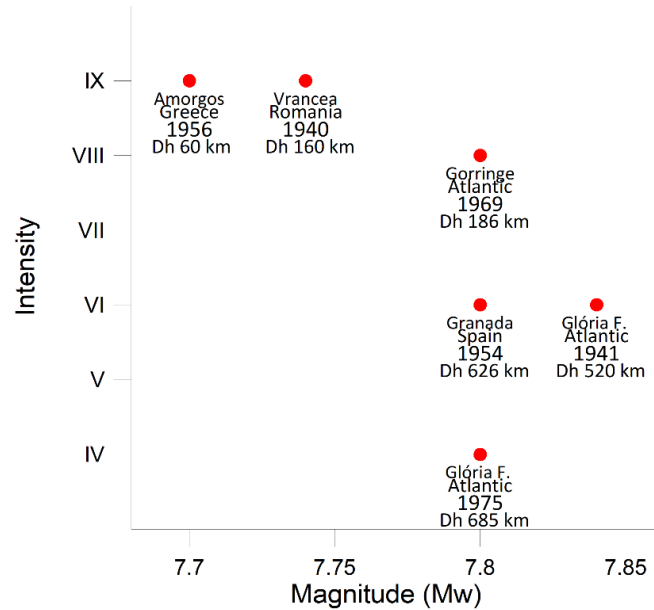
The most important in Europe in the 20th century
Combination of Magnitude (7.9Ms) and macroseismic effects
(maximum intensity VIII)

The earthquake of 28/2/1969, 7.9 Ms 180 km SW of Cape St. Vincent, Portugal



Lat 36.033 Lon -10.613

ISC-GEM Global Instrumental Earthquake Catalogue:
 1904-2017
 (37.5°W ≤ Lon ≤ 37.5°E; 30°N ≤ Lat ≤ 75°N; Mw ≥ 7.7)

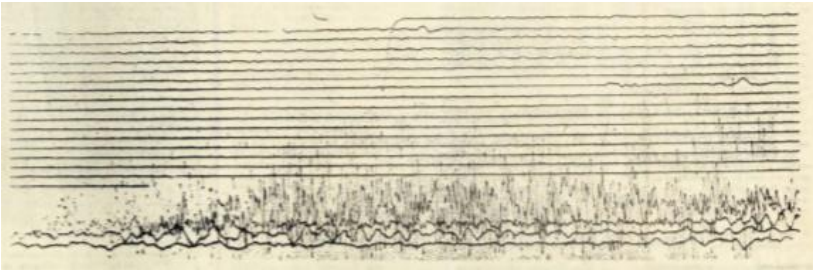


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The earthquake of 28/2/1969, 7.9 Ms 180 km SW of Cape St. Vincent, Portugal

Photos at the newspapers in the days after the event

- 3:41 a.m (local time)
- Felt until 1300 km from the epicenter (ex., Bordeaux in France, and the Canary islands in Spain)
- Felt in Portugal, Spain, Morocco, Andorra and France
- Maximum Intensity VIII at Algarve region in the South of Portugal



Record at the Serra do Pilar seismographic station
(O Comércio do Porto, 1/3/1969)



The clock at the train station stopped
(DL, 28/2/1969)

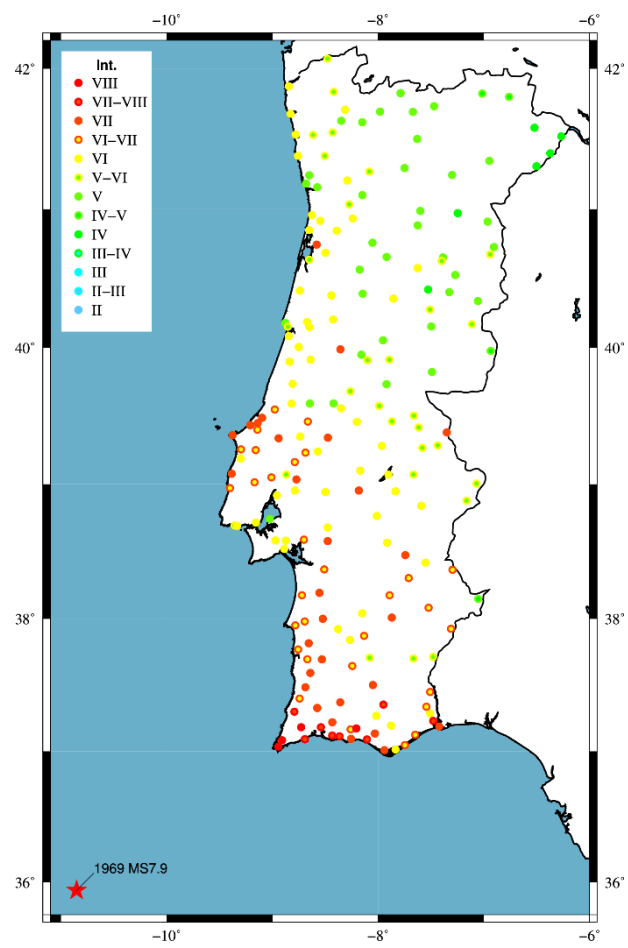


Damages in Lisbon
(Diário Popular, 28/2/1969)



Building damages in Algarve region

The 1969's earthquake distribution of intensities on MIDOP



Data of Anuário Sismológico de Portugal (SMN, 1969)

50-Year anniversary of the 28/2/1969 earthquake

Portuguese seismic network and academic institutions collaborate in order to launch an international survey

<http://sismo1969.ipma.pt>

SENTIU O SISMO? ESCOLAS EM CASO DE SISMO SOBRE O SISMO EFEITOS REDE SÍSMICA ALERTA TSUNAMIS APOIOS E PARCEIROS



To publicize the survey it was created a webpage (<http://sismo1969.ipma.pt/>) with the link to the questionnaire

Did you feel the 1969 earthquake? Do you know histories about this event?

- Social networks


- Portuguese media

- Other institutions joined to the initiative:
IGN, EMSC,...



- A school contest (with a prize) was organized, inviting the students to interview their older relatives

The 1969's earthquake web-survey

- Implemented at IPMA's webpage using the software package 
- Answers in free text or macroseismic questionnaire mode
- The 1969's earthquake macroseismic questionnaire was based on:

1) the EMS-98 scale

2) the IPMA's macroseismic web questionnaire, with some specific questions added related with the type of report (direct, interview or indirect), trust level (total or partial), effects on electricity and phone networks and type of movements.

Effets sur les personnes

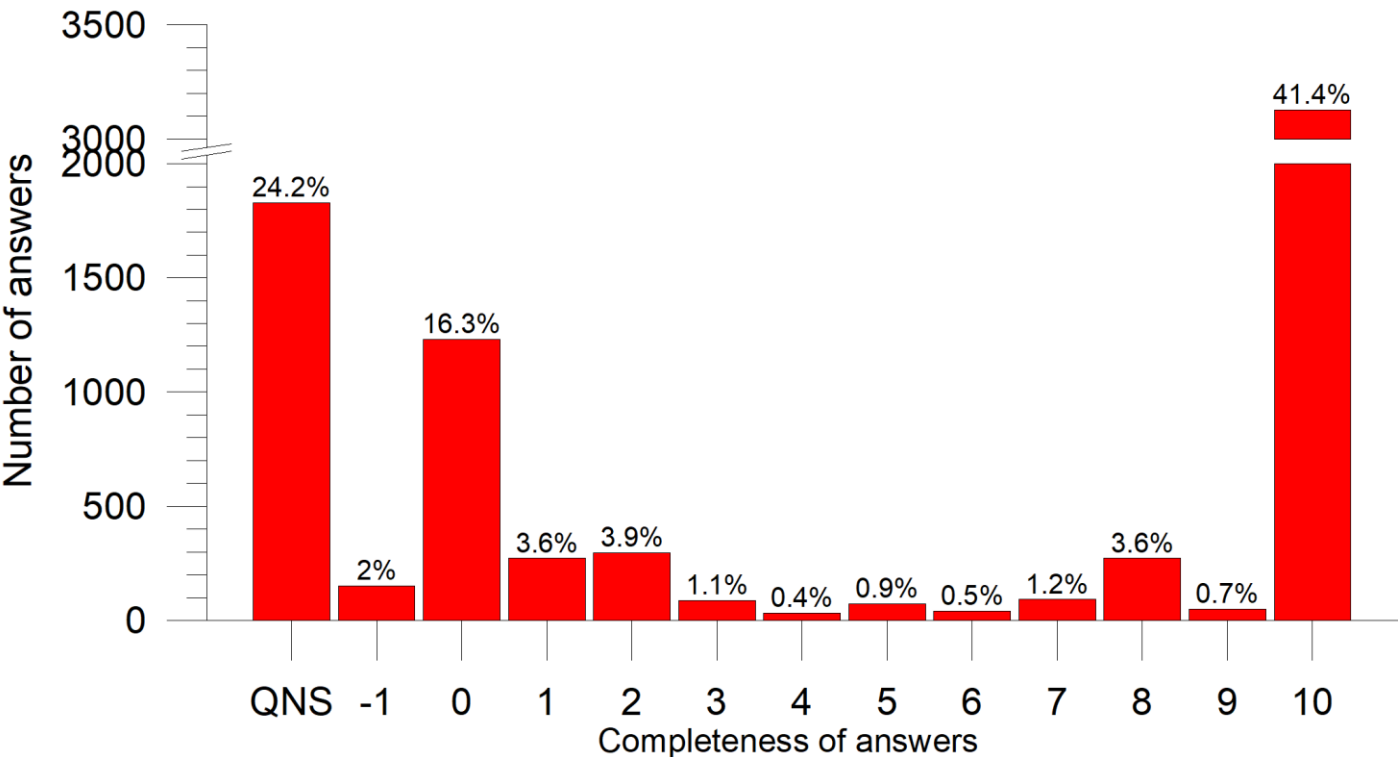
* Avez-vous ressenti le séisme?

- ☐ Oui
- ☐ Oui! Je dormais et je me suis réveillé avec le tremblement de terre.
- ☐ Je n'ai pas ressenti directement, mais j'ai remarqué des effets
- ☐ Je n'ai pas ressenti et j'étais réveillé! Je me suis aperçu plus tard (conversations, nouvelles, etc...)
- ☐ Je n'ai pas ressenti! Je dormais et je ne me suis pas réveillé, j'ai réalisé plus tard
- ☐ Je ne suis pas sûr, mais je me souviens bien de ce qui s'est passé ensuite.

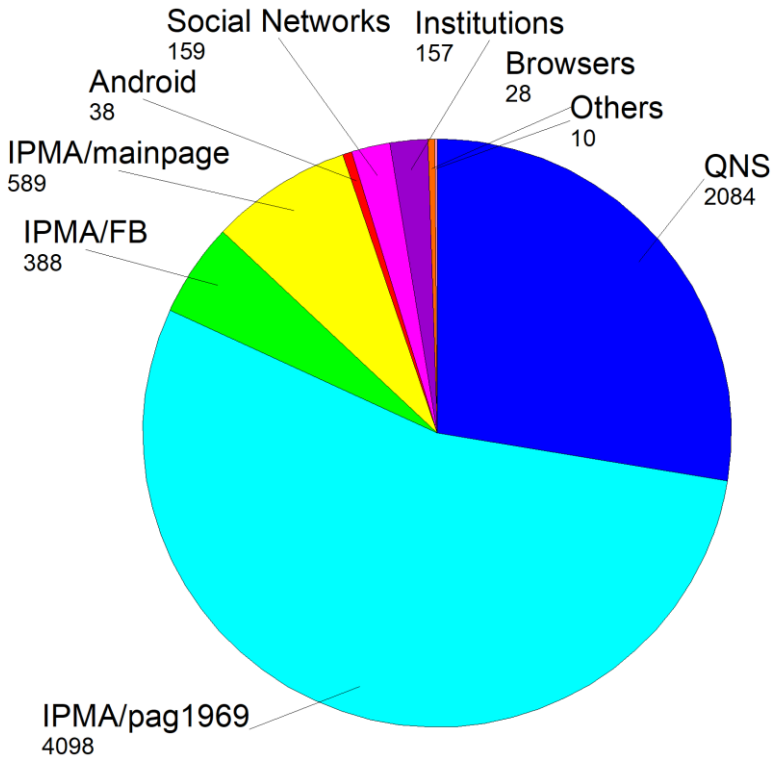
Example of multiple-choice question (FR)

The 1969's earthquake web-survey answers

received from 20/2/2019 to 30/3/2021



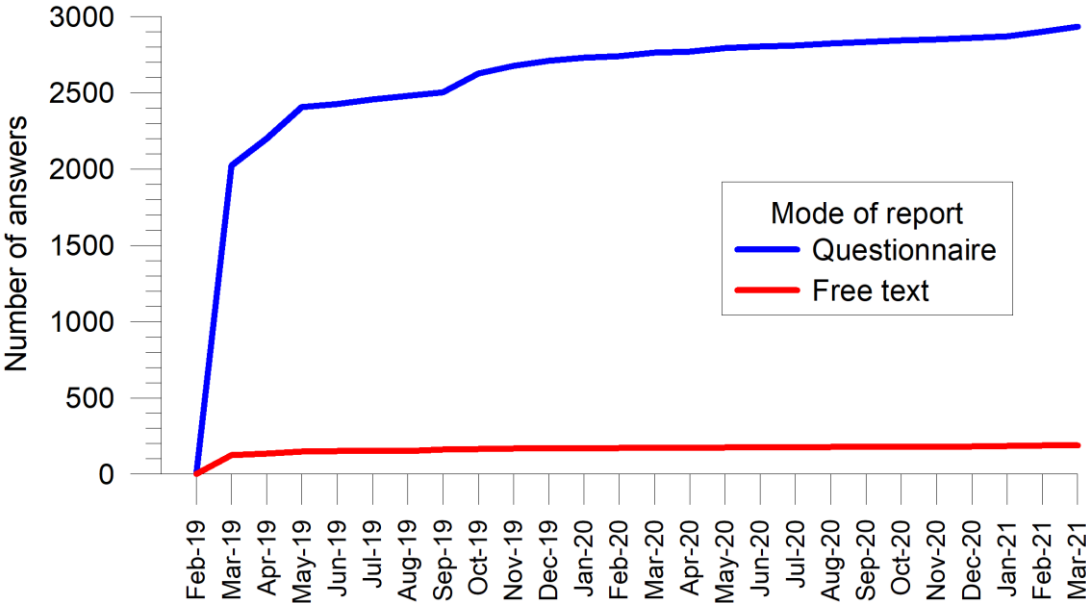
The DB of LimeSurvey stored 7555 records but many of them are incomplete or empty
41.4% are complete



54% of the accesses to the survey were made by the link at the webpage <http://sismo1969.ipma.pt>

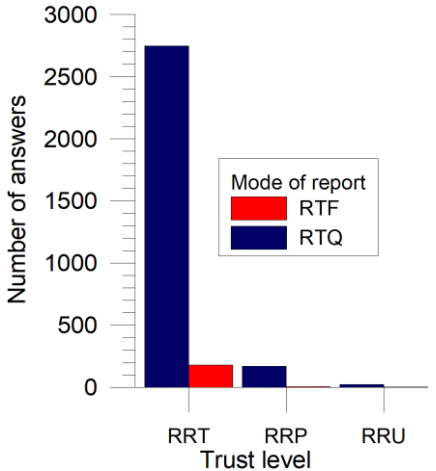
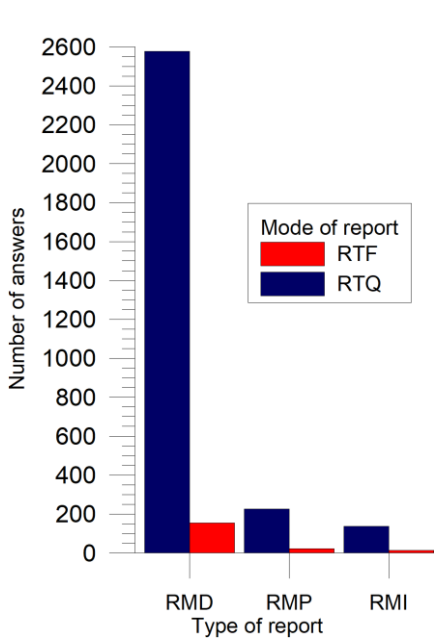
The 1969's earthquake web-survey answers

received from 20/2/2019 to 30/3/2021



3128 answers complete and submitted with success
More answers received in the 3 first months

Mode of report:
Questionnaire (RTQ) - 94%
Free text (RTF) - 6%

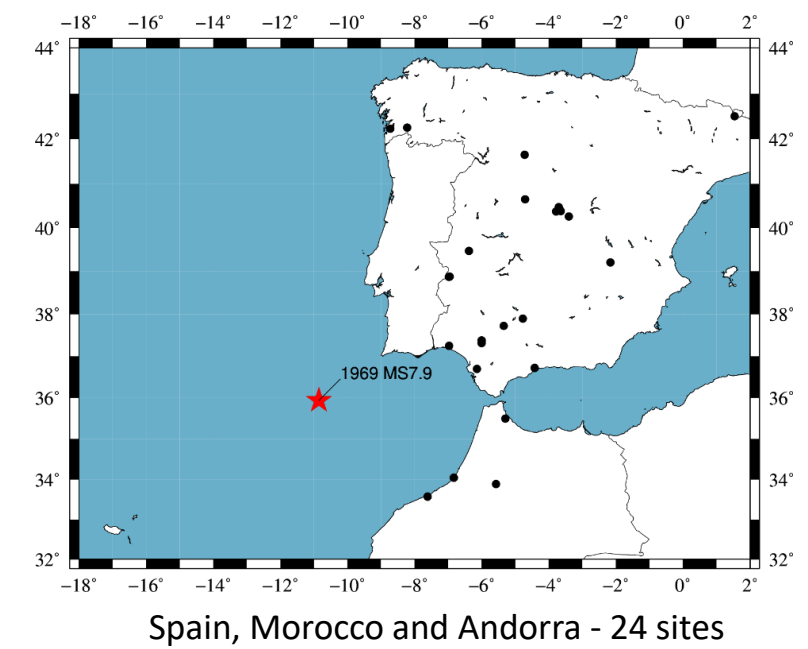
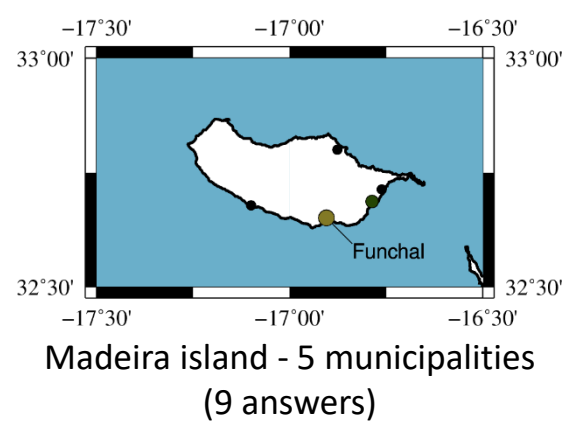
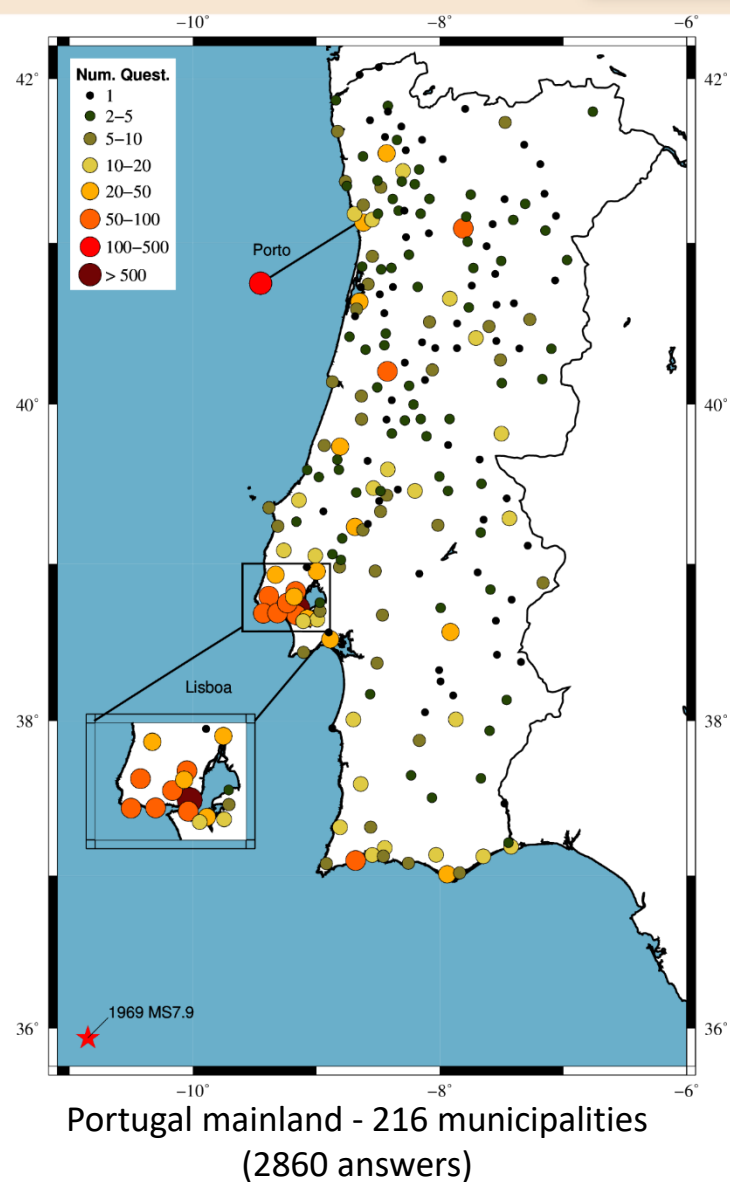


94% of the respondents has a high level of trust on the report
(RRT – total; RRP – partial; RRU – unknown)

88% of the answers are direct reports
via questionnaire
(RMD – direct; RMP – interview; RMI - indirect)

The 1969's web-questionnaire answers

Spatial distribution

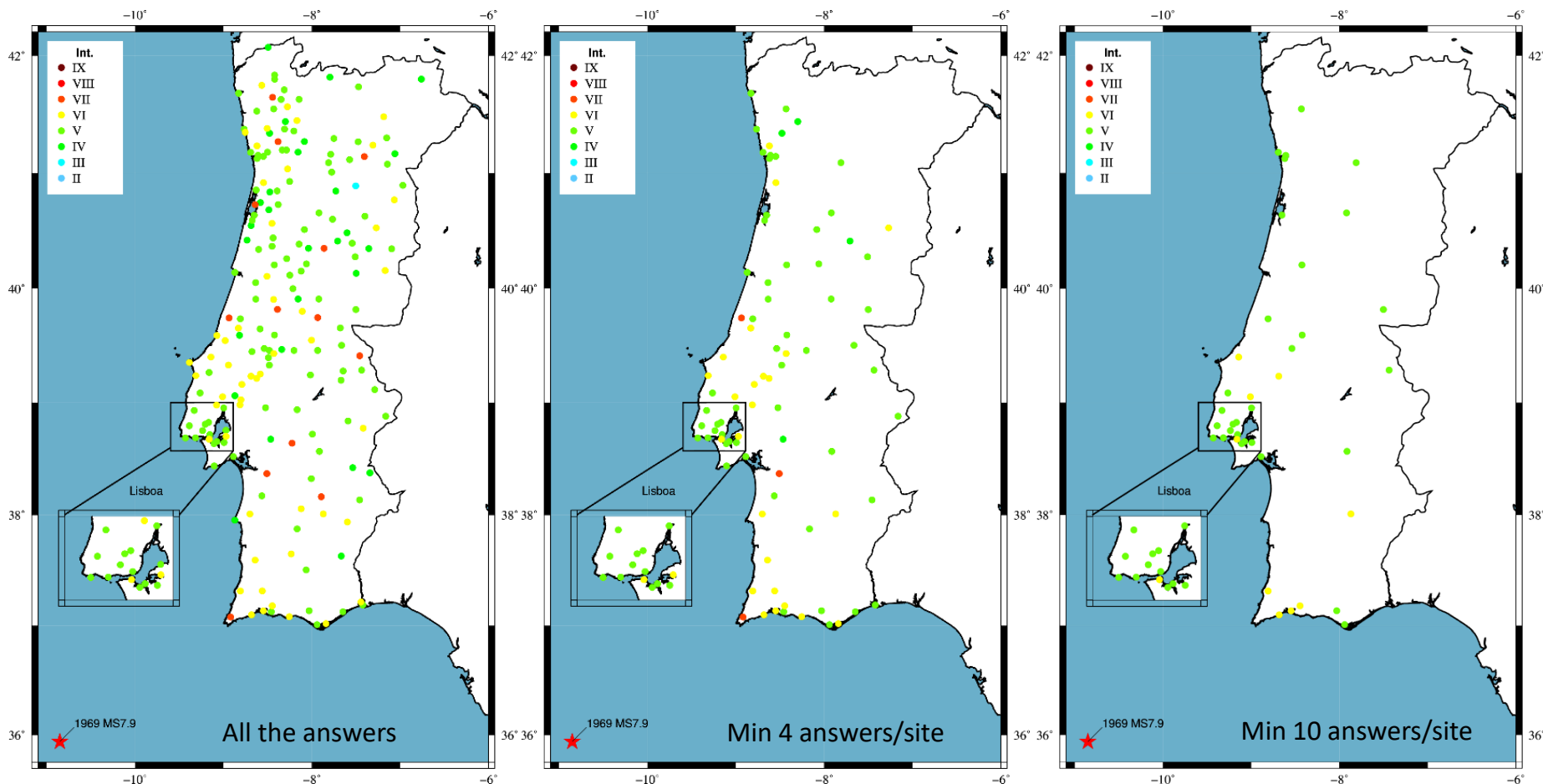


Municipalities with more answers:
Lisbon (963)
Porto (136)

The closest reports:
Sagres (Vila do Bispo) 180 km away from the earthquake epicentre

The 1969's earthquake web-questionnaire answers evaluation

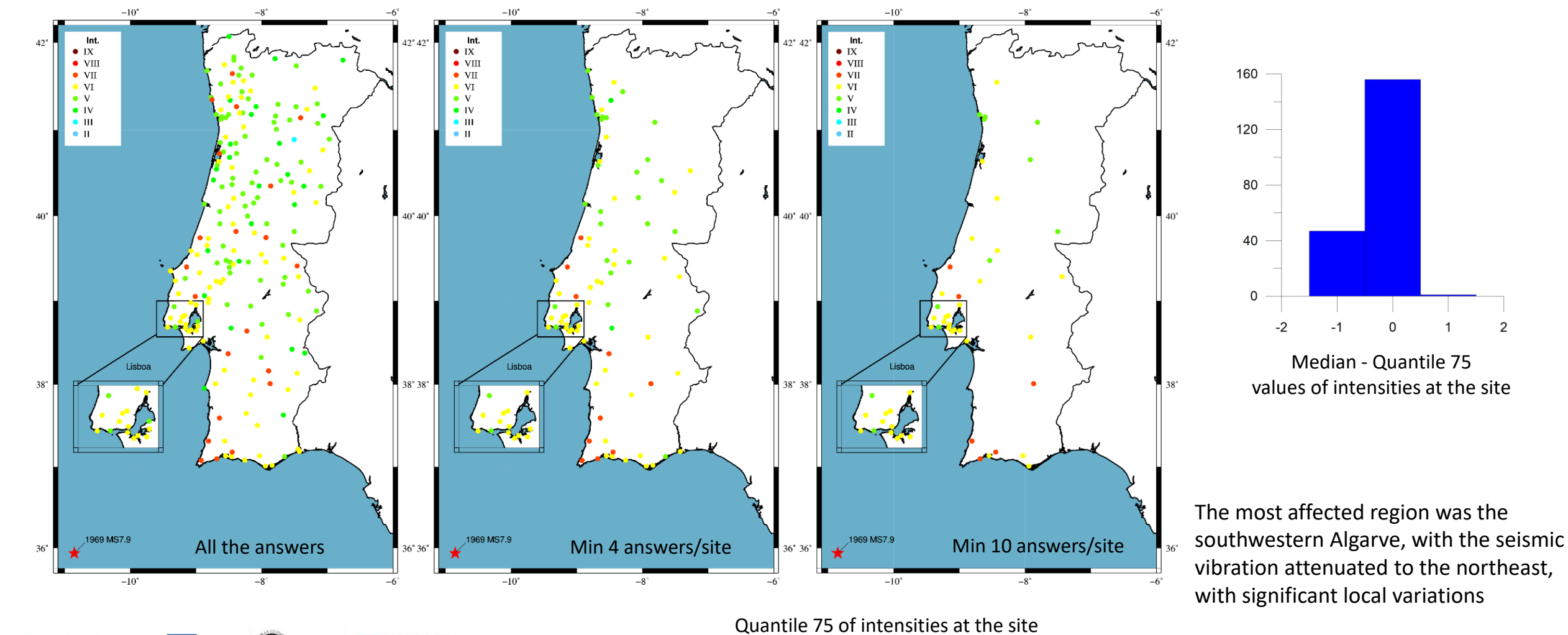
Preliminary results of intensities per MDP using the automatic routine with the answers received until 30/3/2021



The portuguese seismic network has an algorithm developed and implemented to make a quick analysis of the reported effects and convert them into degrees of seismic intensity

Median of intensities at the site

The 1969's earthquake web-questionnaire answers evaluation



Final Remarks

- The macroseismic web-questionnaire “Did you feel the 1969 earthquake?” with the collaboration of the population and schools allowed collect thousands of responses
- New technologies, as mobile devices, allowed the acquisition of an amount of quantifiable and unquantifiable data, which was still in the memory of the population
- Many citizens still remember well this earthquake and most are between 60 and 70 years old
- The data obtained will complement the existing lack of information in some regions, such as Lisbon
- Possibility to perform a test with the automatic evaluation algorithm with real data, which could include damages on buildings
- The success of this initiative led to the launch of a similar survey regarding the 1st January 1980 earthquake in Azores islands



Thanks for your attention...