

entrevista

Emilio Carreño Herrero

Director of the National Seismic Network at the National Geographic Institute

Catastrophic events are a permanent preoccupation for MAPFRE RE, and an important part of its business. We are therefore publishing this interesting interview with Emilio Carreño, Director of the National Seismic Network at the National Geographic Institute.

“ Anticipating the place, date and scale of the earthquake is still not possible. Efforts have been channelled towards prevention. ”



Emilio Carreño Herrero Born in Segovia on 10th November 1950. Doctor in Physical Sciences, having gained his PhD at the Madrid Complutense University. Geographical Engineer.

- He works at the National Geographic Institute as Director of the National Seismic Network.
- He began his career at geophysics companies and has worked with insurance and reinsurance companies.
- Within his work in the field of management he has held positions of responsibility in the setting up of the National Seismic Network, and the implementation of the network of accelerographs. Since it was set up in Spain, he has run the Sonseca Seismological Centre for monitoring nuclear explosions. He has been involved as a researcher responsible for a range of European Union-funded projects.
- He has written several books and publications on seismology, interferometry techniques by radar and satellite-image analysis applied to geophysics. He has recently coordinated the publication of the DVD by the Insurance Compensation Consortium and MAPFRE RE regarding earthquakes and tsunamis.





What are the main responsibilities of the National Seismic Information Centre within the National Geographic Institute? Do you think that in Spain seismic monitoring has reached an optimum level, adapting human and material resources to the needs of society?

Its main responsibility is for compliance with the commitments specified by Royal Decree 1476/2004 regarding both seismic and volcanic monitoring throughout the country. Therefore there are ongoing improvements in the seismic network which currently has leading technology on a worldwide level, and although the material resources meet the requirements, human resources are insufficient.

How is the Seismic Network organised in Spain? What contribution does the Spanish National Seismic Network make to the International Community?

The seismic network is in turn made up of a set of networks with different instrument sets and tasks, but whose result must be to determine the characteristics of earthquakes in the shortest time possible and as reliably as possible. There are 40 stations transmitting data via satellite (VSAT), 26 do so by telephone and a special device comprising 27 stations also transmitting data in real time to a data reception centre which acts as a seismic antenna. All of this is supplemented by another set of acceleration and query networks. It comprises a seismic network designed for alerts. The first recipient is

the General Civil Protection and Emergencies Directorate. The National Seismic Network is, together with France's Laboratoire de Détection et de Géophysique (LDG) [Detection and Geophysics Laboratory], the European calculation centre and the alert system in Europe through the Euro-Mediterranean Seismological Centre, a body which provides seismic information to the Council of Europe. Another important role is the fact that it acts, by means of its Sonseca centre (Toledo), as primary station for the International Nuclear Explosion Surveillance System. This centre is internationally acclaimed and is made up of 27 specially equipped stations, and with the most advanced technology it undertakes to record any signs of nuclear testing, as requested by the United Nations.



The assessment of the majority of the scientific community regarding seismic activity in Spain, is that it is “moderate”. Do you not think that the characteristically long periods between earthquakes in the Iberian Peninsula and mankind’s short memory reduce this rating too much?

I think that the moderate seismic activity rating is correct, and I would perhaps say that it is somewhat conservative. Few large-scale earthquakes have occurred in the Iberian Peninsula compared with countries in North Africa. In any case human memory is short where there are long periods of inactivity and with regard to small events. We quickly forget large-scale natural disasters. In the recent tsunami in Indonesia there were 250,000 victims but the mass media does not seem to remember that a few years ago, in 1970, flooding in Bangladesh claimed the lives of 300,000 people.

What advantages and disadvantages does the scientific monitoring of seismic activity have with regard to earthquake prediction?

There is no such thing as earthquake prediction per se, anticipating the place, date and scale of the earthquake. Efforts have been channelled towards prevention, which basically involves applying guidelines for earthquake-proof construction. Another significant advance in this regard involves systematically determining changes in tension in active faults.

This has gone beyond merely theoretical and academic approaches and it is possible to ascertain those areas of active faults where changes in pressure may make tensions relax and trigger other continuously active areas, leading to earthquake. In some senses we are close to knowing where the next earthquake will occur, but not when.

This is all down to digital instruments, which give us a more detailed insight into how the causes of earthquake work.

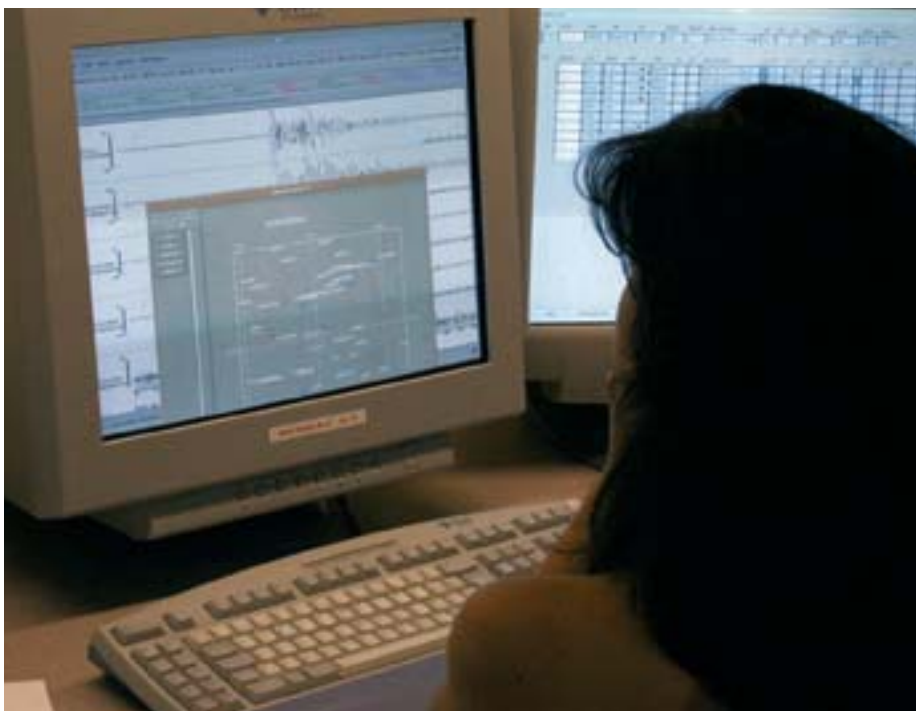
In what sense has research into seismic risk moved forward in recent years? Do you think that the insurance and reinsurance sectors appropriately reflect these advances in their business practices?

Knowledge of seismic risk has improved, among other reasons thanks to the digitisation of data. The types of buildings, their height, year of construction and other details are key to studying vulnerability. Such a large range of information can only be handled thanks to the existence of new databases from the land registries and the files of the various regions.

Contact between the National Seismic Network and insurers and reinsurers has increased in recent years. The requirements of many companies for statistics has driven forward the creation of databases on earthquakes, and these are being used to set up of seismic networks. Another example of taking advantage of the information is the result of loss adjusters’ reports which give us an insight into the damage classification of an earthquake and enable us to determine the intensity without fear of making a mistake.

What relationship is there between seismic risk and tsunamis in Spain? What historical disasters of this kind have affected Spain?

Despite there being 24 reported cases of tsunamis on Spanish coasts, the significant tsunami in terms of victims and material damage was in 1755, which turned out to be truly catastrophic.





IMPORTANT TSUNAMIS (1990 - 2004)

Location	Date	Earthquake Magnitude
Southeast Asia	26 December, 2004	Ms = 9.5
South of Peru	23 June, 2001	Ms = 8.4
Shikotan, Kuril Islands	4 October, 1994	Ms = 8.1
Irian Java	17 February, 1996	Ms = 8.0
Jalisco, Mexico	9 October, 1995	Ms = 7.9
Marmara Sea, Turkey	17 August, 1999	Ms = 7.8
Wewak, Papua New Guinea	9 September, 2002	Ms = 7.8
Sulawesi Island, Indonesia	1 January, 1996	Ms = 7.7
Kronotskiy Cape, Kamchatka	14 December, 1997	Ms = 7.7
Okushiri Island, Sea of Japan	12 July, 1993	Ms = 7.6
Flores, Indonesia	12 December, 1992	Ms = 7.5
Chimbote, Peru	21 February, 1996	Ms = 7.5
Pentecost Island, Vanuatu	26 November, 1999	Ms = 7.3
East of Java, Indonesia	2 June, 1994	Ms = 7.2
Nicaragua	2 September, 1992	Ms = 7.2
Mindoro, Philippines	14 November, 1994	Ms = 7.1
Aitape, Papua New Guinea	17 July, 1998	Ms = 7.1

The area of origin, to the south east of cabo San Vicente, is an area of constant seismic activity and could cause another major earthquake followed by a tsunami. As we only have historical records of this event, it is not possible to establish periods of inactivity, therefore we are looking at a tsunami which, with luck, we may never see or which could happen at any time.

What similarities can be seen between the tsunami in south-east Asia last year and the one created by the 1755 earthquake?

In the case of south-east Asia, the scale of the earthquake which caused the tsunami was recorded as being 9.5. In the case of the 1755 earthquake, there is no data from instruments and therefore the scale is

deduced by other geophysical and macro-seismic methods and is estimated at 8.5. This means that the tsunami of 26th December 2004 is 1 grade higher in magnitude and therefore the energy released was 32 times greater than in the case of 1755. Should such an earthquake occur now, creating a tsunami, the human and economic losses would be huge.

Could you briefly explain what can be done from a scientific, political and civil protection point of view to prevent, mitigate and manage the damage caused by earthquakes?

The most effective measures are those which prepare citizens to react properly and promptly in the case of a tsunami alert. There would be no point setting up a tsunami alert system if transmission of





the information from the seismic network detecting the earthquake to the citizen does not work. An earthquake like the one in 1755 would cause a wave which would take 60 minutes to reach our coasts. Taking into account calculation time and checking and transmission of

the information, in the best-case scenario, the population would be alerted with 30 minutes to spare.

In the case of earthquakes, damage research is driven by the need for there to be monitoring of compliance with earth-

quake safety regulations and land planning policy for those towns in the greatest danger. Unfortunately in many countries with higher levels of seismic activity than ours, the authorities have reacted by taking measures after suffering significant earthquakes.



In Spain, property damage and loss of profits caused by earthquakes, volcanic eruptions, tsunamis and other natural disasters, are covered by the Insurance Compensation Consortium. What role does the National Geographic Institute play? What type of cooperation is there between the two institutions?

I have already mentioned something in this regard. The National Geographic Institute issues the corresponding



certificates giving the officially accepted figures for the earthquake. The figure regarding intensity (damage) is of significant interest when it comes to paying compensation. In this sense great efforts have been made over recent years by both institutions with exhaustive studies in every case which enable a rigorous assessment of damage and make the determining of the intensity value completely objective, despite the fact that it can be subjective due to the way it is established. The work of the Insurance Compensation Consortium regarding seismic issues is excellent with regard to the assessment of damage and is done quickly and extremely rigorously. Thanks to mutual cooperation, today we have available exhaustive supplementary

information which future generations of studies into seismic activity, using these databases, will thank us for.

What practical measures can be recommended for populations living on coasts near to points which may generate tsunamis?

At the moment, until recommendations are made by the civil defence bodies, who we know to be developing plans in this regard, I would recommend that in towns near to the south-east coasts of the peninsula where a strong earthquake has been felt, pay close attention to possible radio warnings and be alert to any unusual behaviour in the sea. If it seems that a tsunami is immi-

nent perhaps it would be sufficient to leave the beach and go up to the upper floors of a building. I have to admit that I don't know if I would react properly myself.

What has prompted the re-publication of the DVD Earthquakes and Tsunamis in Spain?

Basically the population's need for information, the raising of awareness on the part of insurers and reinsurers regarding events which may be economically disastrous for them and to increase the awareness of local authorities of towns which may be affected by one of these events in order to increase interest in prevention. ■

Earthquakes and Tsunamis in Spain

DVD published by the Insurance Compensation Consortium and MAPFRE RE on Earthquakes and Tsunamis in Spain.

This DVD on "Earthquakes and Tsunamis in Spain" can be obtained by sending an e-mail request to: trebol@mapfre.com

