

Some aspects of historical research on «over borders» earthquakes in eighteenth century Europe

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Abstract

In the framework of the CEC project «Review of Historical Seismicity in Europe (RHISE)», the investigation of transfrontier earthquakes has been one of our main tasks. Using a number of case histories, among many others considered during the project, some of the specific problems encountered during the research «inside» the border areas and «out of the borders» repositories are presented, with special attention paid to eighteenth century Europe.

Key words *historical seismology – transfrontier earthquakes – Europe*

1. Introduction

During the three years of activity in the framework of the CEC project «Review of Historical Seismicity in Europe (RHISE)», historians and seismologists of eight countries in Europe (France, Italy, Spain, Portugal, Belgium, Austria, Greece, United Kingdom) shared and tackled problems of methodology and strategy in investigating «over borders» earthquakes (Stucchi, 1993a). The main effort was devoted to the collection of source material useful for the reappraisal of some major earthquakes which affected areas located across the borders of a number of European countries, from the sixteenth to the eighteenth century.

Historical seismology research together with its methods and its scopes has been presented in many contributions (e.g., Ambraseys, 1971; Vogt, 1981; Stucchi and Albini, 1991;

Guidoboni and Stucchi, 1993; Stucchi, 1993b) and these aspects will not be re-discussed here. Moreover, it is beyond the scope of this paper to present a review of the activity performed and the results obtained by the project (a complete list of references can be found in Stucchi, 1993a). In particular, the seismological achievements of the project will not be discussed here; it is worth recalling that, for instance, a new parameterization of the earthquakes investigated was not among the tasks of the project (Stucchi, 1993a).

One of the peculiarities of the activity consisted in a research planned and performed «inside the border areas» or in repositories «out of the borders» of the countries affected by these events.

The selected case histories mostly belong to the 18th century and they are not intended to be exhaustive. They permit, however, some considerations which could throw some light on those investigation problems that are likely to be encountered when dealing with transfrontier earthquakes.

2. Research «inside» the border areas

The search for information on earthquake effects «inside the border areas» is here referred to as the part of investigation that, above all, considers the documentary materials produced by local officers and ecclesiastics. Such research was planned of course considering the sometimes complex political evolutions of the selected areas during the period investigated.

A short overview is presented here on how the search for new information was performed and on the main results, while more details on the research in each area can be found in the references quoted.

The following considerations concern the Ionian Sea and the Gulf of Cadiz areas, which

greatly differ both from the historical and the seismic points of view. In this way, some of the general as well as the specific problems met with in the investigation of «over borders» earthquakes can be appreciated.

2.1. Ionian Sea area

During the eighteenth century, in the Ionian Sea area considered by the project (fig. 1) the «Serenissima» Republic of Venice ruled the Ionian Islands while the Ottoman «Sublime Porta» firmly dominated the opposite mainland.

Table I shows the contribution of the different kinds of sources to the study of ten earth-

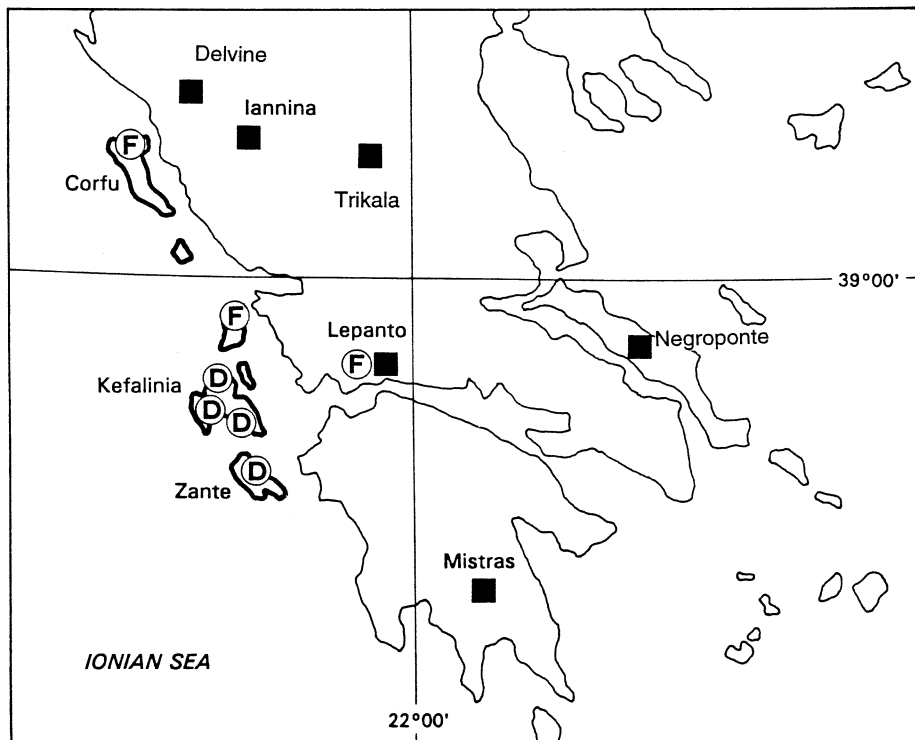


Fig. 1. Venetian dominion on the Ionian Islands (thick line) and Ottoman headquarters on mainland Greece (square) in the 18th century. Distribution of the effects of the July 22, 1767 earthquake, according to Venetian and Ottoman documents are shown (F = felt; D = damage).

Table I. Contribution of Venetian, Ottoman and other sources to the study of 18th century earthquakes in the Ionian Islands.

	1704	1710	1714	1723	1729	1742	1759	1766	1767	1769
<i>Venetian territory</i>										
Cephalonia	□		■	■		○	●	●	●	
Santa Maura	●			□		○			○	●
Zakynthos	□	■		●	●	●	○	■	●	
Corfù	□					○			○	
Itaca								□		
<i>Ottoman territory</i>										
Arta	□			□						
Nafpaktos										▲

Information from Venetian sources: ○ felt, ● damage. Information from Ottoman sources: ▲ felt.
 Information from other sources: □ felt, ■ damage.

quakes which occurred in the Ionian Islands area between 1704 and 1769. Information has been supplied mainly by Venetian documents and by some notes from Ottoman and Greek coeval manuscripts and family diaries.

The Venetian documents, which already turned out to be valuable sources in previous investigations (e.g. Guidoboni and Margottini, 1988), represent the most consistent set of documents retrieved for these events. The Venetian governors, very precise in their documents, usually refer to effects at few places located in the islands. Except for the case of the July 22, 1767 Cephalonia earthquake ($I_0 = X$ MSK 64, according to Shebalin *et al.*, 1974), the macroseismic information provided by Venetian doc-

uments concerns only a single island (fig. 1).

Ottoman headquarters on mainland Greece that provide much of the archival material in the 18th century were far removed from the Ionian Islands, the nearest being Delvine, Yanya (Iannina), Tirhala (Trikala), Inebati (Lepanto), Egribos (Negroponte) and Mizistre (Mistras) (fig. 1). Ottoman sources are usually even more specific than the Venetian documents, dealing with particular structures that needed repair after an earthquake, giving little information about the general effects of an earthquake in a town and no information at all for the countryside.

Also, the kind of Ottoman sources retrieved very rarely refer to earthquakes unless there

was damage caused that needed repairs from local or central funds. Consequently, in the documents stored in the central archives in Istanbul (Basbakalinki Arsivi and Topkapi Saray Archives), information referring to 18th century earthquakes that caused damage in the Ionian Islands is scarce and has been found only for one event, of July 22, 1767. However, Ottoman documents do supplement information for earthquakes with epicentres on mainland Greece, including the Morea, which were strongly felt in the Ionian Islands and *vice versa*, allowing the assessment of the felt area of an earthquake to the east of the Islands.

2.2. Gulf of Cadiz area

In the first half of the 18th century, in the border area in the south of Spain and Portugal (fig. 2), the regional seismic catalogue (Mezcua and Martinez Solares, 1983) refers to two high intensity events: 6 March 1719 ($I_0 =$

IX MSK) and 27 December 1722 ($I_0 = X$ MSK). The sources quoted in this catalogue belong to issues of the *Gazeta de Lisboa* (1719; 1723) that refer to both earthquakes as causing damage and casualties in Portuguese territory only (fig. 2).

To improve the knowledge of the effects of these events in Portugal and in Spanish territory, an investigation on local documents available for the time-window 1700-1755 was carried out by researchers of both countries (fig. 2). No significant differences were found in the availability of local sources belonging to both civil and ecclesiastic administration (Garcia Fitz, 1991; Fitz Canca, 1991; de Noronha Wagner, 1993). The consulted documents are the following:

- parish registers and monastery documents for 7 localities in Algarve (Portugal) and for about 15 localities in the Atlantic coast of Andalusia (Spain) (Fitz Canca, 1991; de Noronha Wagner, 1993);

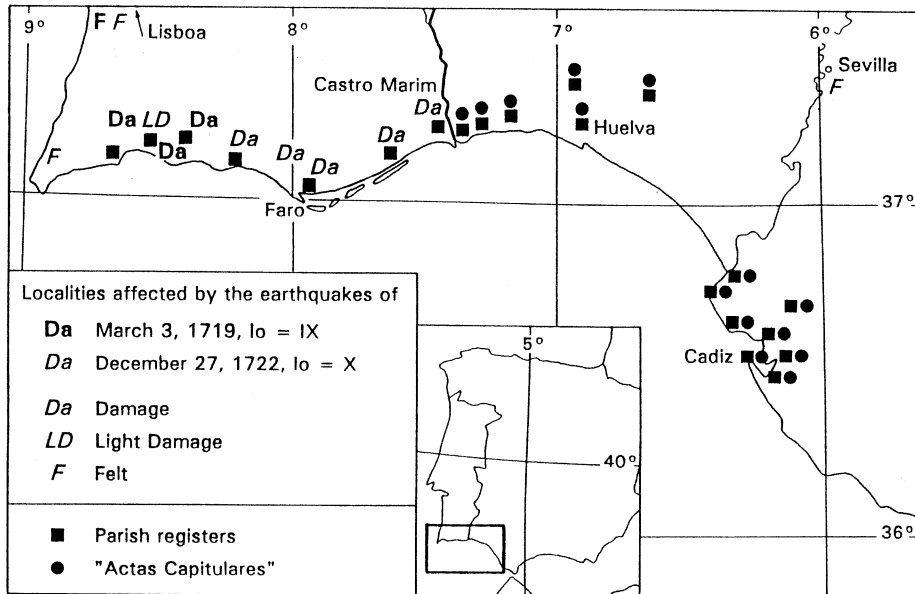


Fig. 2. Border area between Portugal and Spain in the 18th century. The localities where investigation on local sources was carried out are evidenced (square and circle).

– deliberations (Actas Capitulares) of 15 town communities in Andalusia (Fitz Canca, 1991).

The Spanish as well as the Portuguese documents do not contain any direct or indirect reference to the 1719 and 1722 earthquakes; the only exception is a vague indication about the damage caused by the 1722 earthquake to the Jesuit monastery in Vila Nova de Portimão, documented in terms of the expenses required for the re-collocation of the cross on top the façade of the building (de Noronha Wagner, 1993).

3. Research «out of the borders»

From the beginning of the RHISE project, in order to sustain and complement the research performed inside the border areas, that is by means of a set of sources produced in the same countries where the earthquake occurred, an «out of the borders» investigation was planned. The starting hypothesis was that some archives store documents, produced by institutions and individuals, which had an international dimension with respect to the countries involved in the project.

Some of the most important European archives and libraries were chosen for the investigation because they seemed to offer sources potentially useful for all the areas involved in the project: the Archivo General de Simancas, Spain (Rodriguez de la Torre, 1993), the Vatican Archives, Rome (Castelli, 1993), the Haus-, Hof- und Staatsarchiv, Vienna (Vocelka, 1993), the State Archives of Venice (Albini, 1993). The latter archives have a special status in the research, being explored for sources both inside and outside the territory ruled by the Republic of Venice. Also many other less frequented archives and libraries, with special manuscript holdings and periodical collections, have been visited.

The investigation in the chosen archives and libraries was intended to retrieve information not only on the country of origin, but also on those countries linked to the country of origin by political, economic, spiritual and cultural relations.

The research consisted mostly in samplings inside the documentation, oriented by ad hoc feasibility studies; these latter had the aim of identifying those documents which, according to the peculiarities of each archive and of each government and institution which originated them and using the previous experiences of historical research on earthquakes, were most likely to contain information on macroseismic effects. In some cases (*e.g.*, for some periodicals, Albini and Rodriguez de la Torre, 1993), a systematic search was carried out. Therefore, the samplings aimed to collect material for an evaluation of the information potential of the following sources:

- consular and diplomatic correspondence of some European representatives, today kept in the archives of Vienna, Simancas, Venice, Paris, London;
- hand-written new-sheets (Haus-, Hof- und Staatsarchiv, Vienna) and periodicals (Dutch, German, Spanish, Portuguese, French copies, in many European libraries);
- diaries or reports by travellers, sometimes published, more often not.

These sources are linked by one main characteristic: they are available at one place and they contain information from observation points spread over the areas considered by the project. Figure 3 shows the places of origin for most of the retrieved information.

In what follows we present some remarks on the results obtained for the two areas mentioned in the previous section.

For the Gulf of Cadiz area, the reports of the French consuls in Cadiz and Lisbon, kept at the Archives Nationales in Paris, have been explored. A short description of the December 27, 1722 earthquake effects in Portugal was found in a report of the French consul in Lisbon (ANP, 1723). After the description of the effects at Lisbon, the consul explains that the damaging effects in Algarve resolved him «d'informer le Conseil de ce que l'on en écrit». Since his report is dated January 19, it seems reasonable to suggest that he took the information on effects in Algarve from the January 14 issue of the *Gazeta de Lisboa*; a comparison between the two texts shows their close similarity. Therefore, the document does not supply

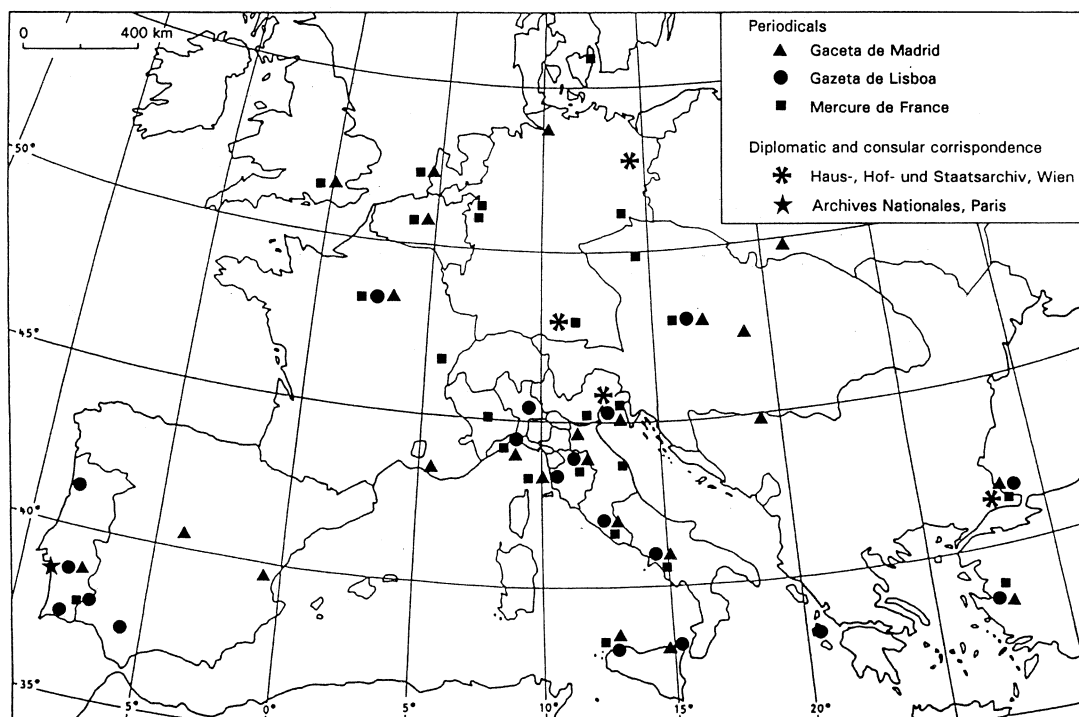


Fig. 3. Places of origin of the information retrieved from investigating diplomatic and consular correspondence and collections of periodicals (from Albini and Rodriguez de La Torre, 1993, modified).

original or additional information, except for the confirmation of the effects in Lisbon described as follows: «un tremblement de terre qui ne fut pas des plus sensibles puisqu'il ne causa ici aucun dommage».

The consular correspondence and the reports by travellers have not yet been fully explored for the Ionian Sea area. Samplings were carried out for instance in the reports, kept at the Archives Nationales in Paris, of the French consul in Arta, in Epyrus, mainland Greece opposite the Ionian Islands, for the second half of the 18th century, and in the correspondence of the Venetian consuls in the Adriatic and Ionian areas, kept at the State Archives of Venice (Albini, 1993). Such samplings did not provide any useful information.

Two examples follow, illustrating records on earthquakes unknown to current seismic catalogues.

With respect to earthquakes which affected the Italian territory in the period 1741-1755, table II presents the information retrieved by means of samplings in some funds of diplomatic and consular correspondence kept in the Archivo General de Simancas, Spain, in the Haus-, Hof- und Staatsarchiv, Vienna and in the State Archives of Venice. Relevant information was found about 7 earthquakes among them, three events not included in the seismic catalogue of Postpischl (1985).

In the case of the earthquake of August 6, 1741 in Southern Italy, the investigation of the Spanish diplomatic correspondence (Rodriguez de la Torre, 1993) permitted the identification of a letter by the Marques de Salas, a Spanish representative in Naples (AGS, 1741). This letter gives a reliable description of the effects of the earthquakes in Naples, while the information about its effects in the rest of the region is

rather generic: «Nápoles, 8 de Agosto de 1741. El domingo 6 del corriente, a los dos y media de la tarde se sintió en todo Nápoles una escosa... de terremoto que duró dos ave marías. ... fue sensible en todo Nápoles y según las noticias que hasta ahora se tienen, lo ha sido también en la Tierra de Lavor, en la Provincia de Montefusco... El Marques de Salas». The *Gazeta de Lisboa Occidental* (1741) adds more information, referring to an earthquake with the same date, which should have caused damage at Montefusco, Ariano, Mirabella.

Such information, even if reliable, is not sufficient to establish the seismic parameters of the event, simply suggesting that a damaging earthquake has escaped notice by a catalogue

compiler and that additional investigation could help fill in the gap.

Unknown to current seismic catalogues and listings for the Ionian Islands is a sequence of events which occurred in Zakynthos in 1662 (Vogt and Albini, 1992). These events are described by von Degenfeld (XVII century), a German mercenary in the service of the Army of the Republic of Venice, in his diary of travels in Italy and Greece, kept first in the archives of the Kraichgau Chivalry, now in the manuscripts department of Badische Landesbibliothek, Karlsruhe. This is how von Degenfeld described the main event of March 16, 1662:

«*Zante, 1662* – It is a pity that such a fine island is so subjected to earthquakes, I fully experienced myself in a most dreadful way. During the present

Table II. Information on earthquakes that affected the Italian territory in the period 1741-1755, retrieved from sampling the diplomatic correspondence holdings of the Archivo General de Simancas, Spain (AGS), the Haus-, Hof- und Staatsarchiv, Vienna (HHSta) and the State Archives of Venice (ASVenezia). The asterisk indicates that the newly retrieved information could be related to this earthquake. Information concerning earthquakes not included in the Italian catalogue is in bold.

Source			Earthquake				Italian catalogue		
Archive	Date	Author	From	Locality	Date	Max eff.	Date	Epic. area	I_0
AGSimancas	02-05-1741	M. de Salas	Portici	Fabriano	1741	D			
HHSta, Vienna	29-04-1741	Luigi Pio di Savoia	Venice	Fabriano	24-04-1741	D	24-04-1741	Fabriano	IX
AGSimancas	08-08-1741	M. de Salas	Naples	Naples, Irpinia	06-08-1741	F			
HHSta, Vienna	26-08-1741	Luigi Pio di Savoia	Venice	Naples	1741	D			
ASVenezia	01-1742	S. Bichi, consul	Leghorn	Leghorn	19/27-01-1742	D			
HHSta, Vienna	19-05-1742	Giannelli, consul	Leghorn	Leghorn	1742	D	27-01-1742	Leghorn	VIII
AGSimancas	22-08-1742	M. de Salas	Naples	Naples	17-08-1742	F			
HHSta, Vienna	01-09-1742	Luigi Pio di Savoia	Venice	Naples	1742	F			
HHSta, Vienna	15-06-1743	Luigi Pio di Savoia	Venice	Ferrara	1743	F	* 29-05-1743	Ferrara	VI-VII
AGSimancas	24-05-1746	M. de Salas	Portici	Naples	24-05-1756	F			
ASVenezia	13-12-1755	G. Gobbi resident	Turin	Turin, Ivrea, Vercelli, Novara	09-12-1755	F F or D	09-12-1755	Switzerland	VII

spring only short time-spans were without some of them. On the 16th March, around 10 in the evening one lasted three quarters of an hour. It seemed that all would be turned into ruins. Indeed a large part of the fortress, some 70 houses and 16 Greek churches [...] fell down. [...] Luckily, shortly before a small shock had occurred, warning people and giving them time to retire from houses to open places. Otherwise many would have been killed. Actually they are accustomed to flee from their houses as soon as they hear an earthquake, thus escaping the collapse of the houses on their heads. At such times, the women, living in a very secluded way [...] proceed to the roofs [...] to the utmost two stories high because of earthquakes. Their argument is that when a house collapses they stay atop of it, avoiding its fall on themselves. It seems that many of them saved their life doing so. If an earthquake comes so suddenly that the inhabitants do not dare to reach an open space, fearing collapsing houses, they proceed to doorways, solidly built for this reason of strong stones, saying that if the whole house collapsed the doorway would nevertheless stand on».

This can be considered to be an important testimony for two main reasons. It provides a precise description of the effects of the earthquake and gives information about some cultural attitudes of the islanders for the earthquake phenomenon: the use of earthquake resistant devices (the doorways reinforced by stones) and the response of women, which is different from that of men respecting, also in such circumstances, their different social roles.

4. Conclusions

Some case histories have been briefly presented above with the aim of illustrating the main aspects of the strategy of investigation adopted in the frame of the RHISE project.

The investigation on Ionian Islands seismicity succeeded in retrieving documents which are valuable for historical-seismological purposes in typology, quantity and quality of the information they supply. The geographic and documentary «barriers» were found to be not impossible to overcome; but they still restrict our knowledge of the 18th century seismicity in this area. To assess the size of an earthquake, one has to establish the area over which

the shock caused damage and the distance over which it was felt. This assessment is not possible when the available macroseismic information concerns only one locality per earthquake, which is the most common situation for the majority of earthquakes in the Ionian Islands.

The results of the research on the seismicity of the Gulf of Cadiz within the time-window 1700-1750 are not encouraging. Even after what can be considered a consistent research, the 1719 and 1722 earthquake effects are still documented by a single source and only inside the Portuguese territory. This lack of documentary evidence is difficult to interpret and evaluate. It could mean that the sources chosen as the most valuable to be primarily investigated were inappropriate or, on the contrary, it could represent an important hint to the fact that the size of the two earthquakes given by the regional catalogue should be reconsidered.

The investigation of consular and diplomatic correspondence, periodicals, and travellers' reports supplied confirmation and data about new localities on already known earthquakes. The most significant results obtained consist of information on earthquakes not included in regional seismic catalogues and listings.

As a general conclusion, it can be said that the very different geographical and historical milieux considered by the RHISE project influenced all the aspects of the investigation, and resulted in both different attitudes of the researchers towards the study of transfrontier earthquakes and achievements which are not equal for all the areas. Despite these partially disappointing results, the historical investigation in the frame of the project succeeded in supplying original source material for most of the over borders earthquakes of the investigated areas.

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