Earthquakes in the Mediterranean and Middle East

The ability to predict future earthquake hazards in a particular region requires an understanding of seismic activity far back into history – long before the advent of modern seismographic instruments. This book uses a multidisciplinary approach to examine historical evidence from the last 2000 years for earthquakes in the eastern Mediterranean and Middle East and attempts to answer the following questions. When and where have large earthquakes happened in the past? Is it possible to assess the location and magnitude of earthquakes from literary and archaeological sources? How can this evidence contribute to our scientific understanding of earthquake activity?

Early chapters review techniques of historical seismology, including assessments of macroseismic data. The main body of the book comprises a catalogue of more than 4000 earthquakes that have been identified from historical sources. Each event is supported by textual evidence extracted from primary sources and translated into English. Most of these events are also evaluated in terms of location, magnitude and associated physical and societal effects. The area covered encompasses southern Rumania, Albania, Bulgaria, Macedonia, Greece, Turkey, Lebanon, Israel, Egypt, Jordan, Syria and Iraq. The book documents past seismic events within that region, places them in a broad tectonic framework, and provides essential information for those attempting to prepare for, and mitigate the effects of, future earthquakes and tsunamis in these countries.

This volume is an indispensable reference for all researchers studying the seismic history of the eastern Mediterranean and Middle East, including archaeologists, historians, Earth scientists, engineers and earthquake-hazard analysts.

A parametric catalogue of the seismic events presented can be downloaded from www.cambridge.org/9780521872928.

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Earthquakes in the Mediterranean and Middle East

A Multidisciplinary Study of Seismicity up to 1900

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Imperial College, London

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Preface

Throughout the ages earthquakes have been one of the most destructive natural hazards, if not to human life itself, then most certainly to the works of man. Earthquake hazards are not always perceived to their full extent. They have long been associated with crises in human affairs, and they are seen as having certain effects or consequences that are rarely specified in advance or fully understood. In a developing country of limited resources and with investments concentrated in seismic areas, the consequences of a large earthquake should be feared as much as the phenomenon itself.

The literary and field studies of ancient and modern earthquakes show that people view differently the challenges and hazards of their natural environment. In historical times the damage and sudden crippling of the economy of a state led to population movements, emigration and crises in political affairs, triggering invasions and wars and even truces between belligerent states. The loss of life must have been considerable but is difficult to estimate. Also in modern times, particularly in developing countries, earthquakes have caused economic and political crises, increases in taxation and undesirable, though necessary, borrowing from other countries.

The average number of people killed today annually is certainly much smaller than the annual number of persons killed by drugs, famine, undeclared wars and motor cars. At the present level of technology, earthquakes cannot be prevented. However, subject only to budgetary constraints, their disastrous effects can be minimised. Earthquakes are destructive because man has made them so by investing his wealth with a disregard for the hazards he knows that Nature may have in store for him. This disregard stems from a variety of reasons, the most important being simply the lack of awareness and technical knowledge to alleviate such risks. Another cause is often the apathy of the populace, which is

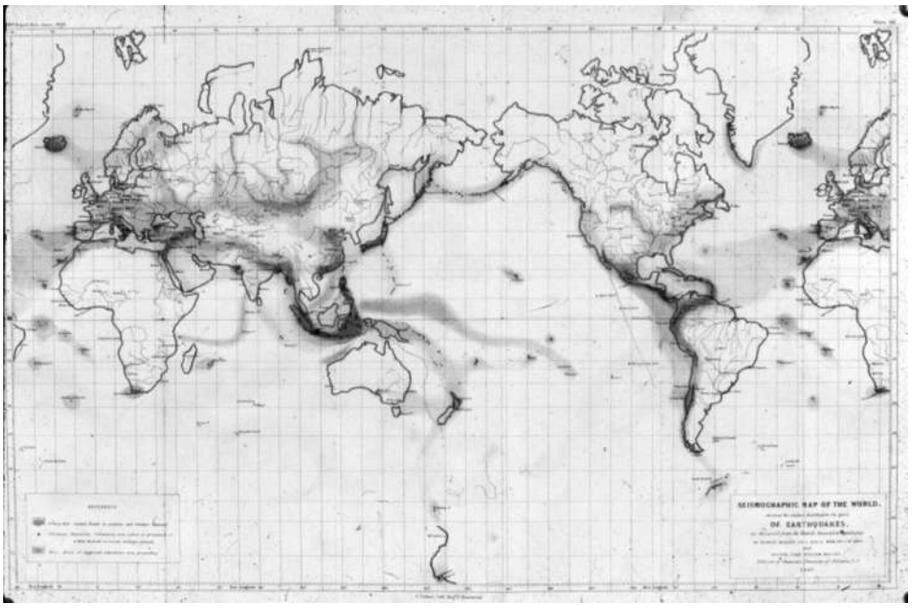

Figure 1 A map of worldwide seismicity before 1851, determined from literary sources by Mallet in 1857.

probably due to ignorance. It was, and to some extent still is, not uncommon for people to accept earthquakes and their effects as acts of God about which very little can be done.

The differences in attitude to earthquake hazards found both in historical and in modern times cannot be explained in terms of the magnitude or frequency of such disasters alone. It is the perception of the disaster that controls the attitude and stimulates awareness. For instance, very little improvement in building materials and in methods of construction results from an earthquake that destroyed or destroys today remote villages in a developing country. After a very short period of enthusiasm for a restoration plan, the interest of the few concerned dies out. Apart from those afflicted, few in the country will be affected and soon the whole problem will be forgotten. In contrast, the damage or destruction of a capital city or of a major engineering structure on which the economy of the country depends will stimulate a completely different degree of awareness. Here, the disaster may or might not affect the economy of the country, but the strain will be felt by all, but again will soon be forgotten.

Since we cannot know what will happen in the future, to estimate likely earthquake hazards we have to find out what happened in the past and extrapolate from there a little. Previous research has uncovered evidence of destructive earthquakes in areas where only small earthquakes have been experienced within the last century or so. This is not surprising: the timescale of geology is vastly different from that of human history, so some parts of the world may suffer violent earthquakes over a very short period of the geological timescale. It follows, therefore, that, if we took account only of information about the last century, during which earthquakes have been recorded by instruments (and even then not uniformly throughout the globe), we would have no way of knowing whether an apparently seismically 'quiet' area today is in fact at risk from a damaging earthquake.

A striking illustration of the value of historical data, and one of the germinal impulses leading us to study the long-term occurrence of earthquakes, came primarily from comparing two maps of world seismic activity. The first, Mallet's map, Figure 1, was compiled in the mid-1800s by a painstaking, solitary scientist, and the second, Figure 2, was compiled in the mid-1900s, by a group of seismologists as the result of a worldwide multi-million-dollar effort.

Both the similarities and the differences between these maps show that the former was anticipatory of later discoveries. One can see almost all the plate boundaries and seismic zones we know today depicted solely from historical data. The data Mallet used to construct this map are as crude as the hypothesis or theory of plate tectonics that makes one look for such boundaries. However, on the same map one can also see seismically active regions, such as the Dead Sea fault and Eastern Anatolian fault zones (Figure 3), these being shown as almost totally inactive on the twentieth-century map.

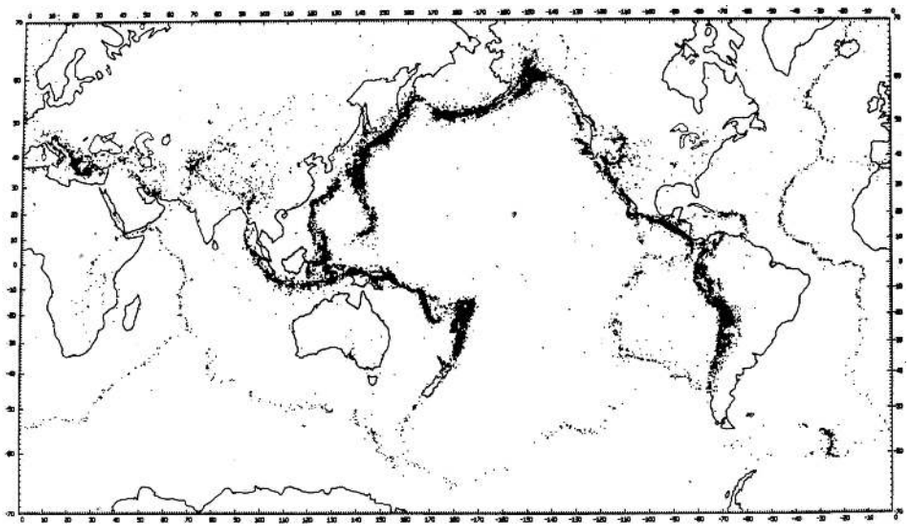

Figure 2 The worldwide distribution of instrumentally determined locations of earthquakes 1962–1967 (Barazangi and Dorman 1969).

Figure 3 A detail of Mallet's 1857 seismicity map focusing on the general area of our study. The highest seismicity is shown for the Red Sea, the Dead Sea Fault zone and its extension along the East Anatolian Fault Zone, regions that have been seismically quiescent for more than 150 years.

In fact any interested scientist before the turn of the twentieth century, or any scholar much earlier, could have gained access to historical data for early earthquakes dating from before Mallet's time. Had it occurred to him to do so, he would perhaps have discovered plate tectonics and almost all the main deforming belts in the region we know today, as well as the world distribution of seismic hazard.

There is more to be seen in Mallet's map than appears to be there at first sight. In particular, it shows the results of interdisciplinary research that can come to fruition not through the agency of a national or international committee for planning or financing research in global or regional seismicity, which would probably cause the project to founder by setting up unimaginative constraints, such as an unrealistic time limit, but by the efforts of dedicated individuals such as Mallet, in the days when one had time and was able to read and write in languages other than computer language.

The need to test observations of short-term seismicity against longer-term trends identified from historical studies requires one to resort to original material that can best be assessed from an interdisciplinary study that gives a far fuller understanding of earthquake hazard, because it is based on human experience of earthquakes over a much greater segment of the geological timescale, namely 2000 years or more under favourable conditions, than the mere 80 years or so of the instrumental record of earthquakes. Such information is invaluable, not only in the study of earthquakes *per se*, but also regarding the climate and weather, and can guide the engineer to design structures to resist the forces of Nature without being taken by surprise by unexpected events.

When, in the early 1960s, I first started the systematic study of historical earthquakes in Iran, it was not

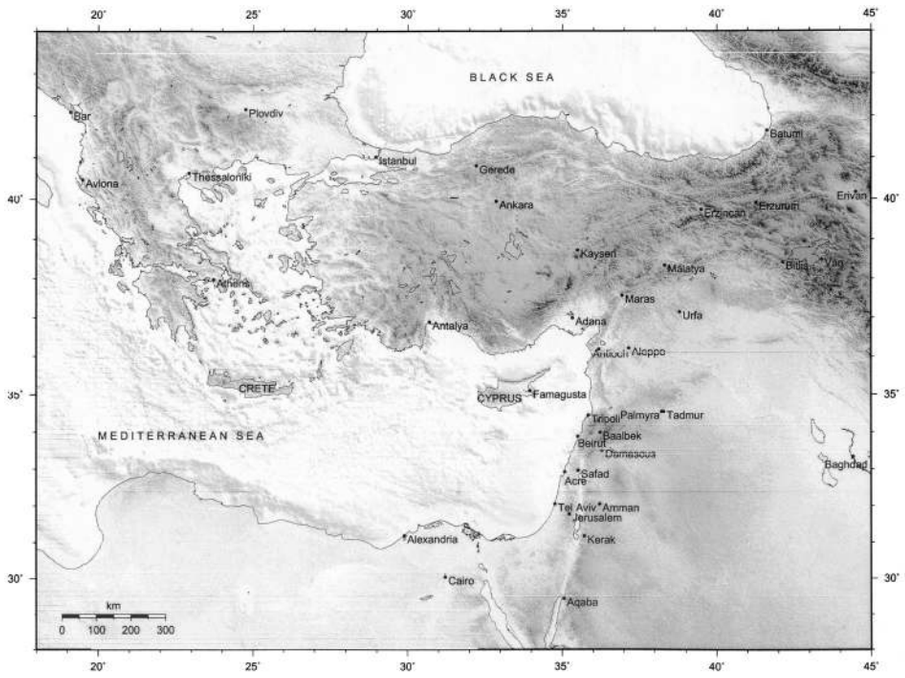

Figure 4 A map of the region under investigation.

clear in advance just how much their study could lead to a better understanding of their generic cause and the associated hazard. The benefit of being able to refer to observations over a period more than ten times longer than the 80 years or so that has elapsed since the advent of modern seismology, however, was obvious. Soon the work extended to neighbouring regions and ended up with the whole of the Eastern Mediterranean and the Near East, an area confined between 28° and 43° N and 18° and 45° E, extending from Greece to Iraq and from the Danube to Egypt, Figure 4.

Much of the region is tectonically active, with a seismic history that is amply, but not uniformly, documented throughout the past two millennia. This region is an outstanding natural laboratory for the investigation of earthquakes and seismic sea-waves (the so-called *tsunamis*) because its tectonic motions are rapid and varied and reasonably well understood.

At the same time attempts were made to acquire for comparison an insight into the long-term seismicity of less-well-documented, but equally seismically active, regions, such as Afghanistan, Pakistan and northern India, including parts of Tibet, East and West Africa and Central America, with varying degrees of success. The cursory study of the seismicity of the European area, that is, of Iceland, northwest Europe including the UK, Holland, Norway and Sweden, as well as of Switzerland was incidental and not as thorough as it should have been, but was useful nonetheless in demonstrating the diverse problems that arise from the exposure of various types of constructions to earthquakes, from the various ways of reporting earthquake effects and the historiography of different parts of the world.

At the outset of this work, in the early 1960s, I began with a reappraisal of existing descriptive earthquake catalogues and of field reports. Soon it became clear that these, as well as later works, including some of my earlier works, had many shortcomings: some of them were lacking the approach necessary for clarifying problems of dating and location, in particular the assessment of the area over which a particular earthquake was felt or caused damage, which is important for the estimation of its magnitude. Other works lacked clear perspective and originality, and the purpose for which they were written was not evident.

This led to an attempt to purge these catalogues of errors and spurious events, but disentangling complications and rectifying the various errors was found to be such a time-consuming process that it prompted a fresh start, by resorting directly to original sources. The work started from primary sources quoted in pre-1963 earthquake catalogues, which drew on both occidental and oriental sources that for many years had been standard references concerning historical earthquakes for the region. Into this improved database, gradually, over a long period of time and with the great help of Charles Melville, Jean Vogt, Caroline Finkel and Dominic White among others, I incorporated a much larger body of

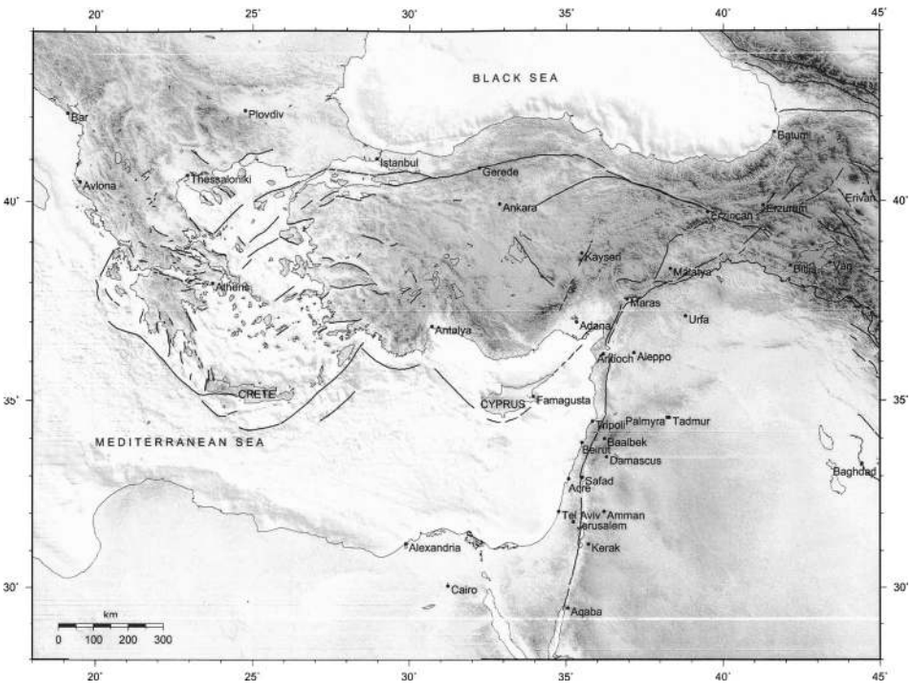

Figure 5 Major tectonic elements of the study region.

information from a wide variety of primary sources, both published and unpublished. We have gone to some lengths in the treatment of sources is point out the errors I perceive in some of these works, particularly recent. The intention towards their authors is not vindictive – rather I view this scientific debate as a positive step forward for the whole academic community involved.

The principal justification for returning to primary sources was to improve on previous interpretations, by adopting a consistent and systematic approach to all the pertinent material, which is easier to say than to do. In so doing, of course, one is not simply looking to verify the information of existing catalogues. Using the experience gained from field studies and applying knowledge derived from the available information and history of the region, which requires the appropriate specialist skills, invariably allowed an enormous increase in data, not only for known but in particular for previously unknown earthquakes.

Most of this information came from local historians and chroniclers. For the better-documented regions where ancient civilisations and developed cultures have flourished, information about earthquakes can go as far back as 2500 years ago. However, clearly, if such literary sources, which are written in both dead and living languages, are to be useful to modern science, they must be read and the evidence they provide must be subjected to a rigorous critical analysis, informed by an awareness of the nature of the evidence they provide and of the context in which they were written. If these sources tell us enough about past earthquakes, we can, using modern techniques, estimate their size and location and the likely effects should they happen again. In the same way, identifying the time intervals between destructive earthquakes can help to establish a continuous or clustered pattern for their occurrence and for the long-term seismicity in that region.

Naturally, the prime purpose was not so much to investigate only the historical implications of earthquakes for the social, political and economic life of past centuries. Historiography and linguistic problems are relevant when they have a direct bearing on the understanding of the earthquake(s) being described, for example by revealing any bias or unreliability of the author concerned, the quality of information and the use he made of the earlier sources available to him. Purely historiographical research, interesting though it is, is ancillary in this context and is not the main end in itself. When we consider the diversity of sources, the diverse languages involved and the paucity of libraries of the relevant types of material, it is clear that such research is extremely time-consuming. This is especially true with respect to the retrieval of earthquake-related material from oriental sources.

The book is written with the Earth scientist, engineering seismologist, economist and ‘decision maker’ in mind, and aims primarily at producing a corpus of original information regarding the long-term seismicity of the Eastern Mediterranean and of the Middle East, the area

bounded by 28° and 44° N, and 18° and 44° E, shown in Figure 5. Some readers may find it disappointing that the book does not deal much with recent earthquakes or with their effects on modern types of structures or with purely seismological and engineering questions, but I must say that the bias towards other material is intentional.

The book reviews the basic principles of engineering seismology and of active tectonics, the field evidence for coseismic surface faulting and the uniform reassessment of earthquake parameters for early and recent events and, in a separate chapter, presents in some detail macroseismic information on historical earthquakes before 1900, which is the principal objective. This information is brought together with twenty-first-century knowledge of tectonics and seismology and with field observations regarding the vulnerability, chiefly, of early, old or rural structures, distilling this diverse information, which can then be used to calibrate and compare present-day earthquake activity with the seismicity of the region in earlier times.

This comparison is then used to assess, in general terms, earthquake hazard, i.e. the frequency of occurrence of past earthquakes, two of the most important factors in describing seismicity. It is shown that this will be possible only when historical information is converted into numbers representing the epicentral location and magnitude of the events concerned, accompanied by an estimate of the reliability of their assessment. It is shown that this can be done, making it possible to address fundamental questions such as the following. How can accounts of ancient events contribute to our scientific understanding of earthquake activity? When and where have earthquakes happened in the past? Is the instrumental record of the twentieth century a guide to past seismicity and earthquake hazard, and sufficient to allow us to predict what might be expected in the future? Fortunately, the region covered by this study is one of the very few that lends itself to such a long-term perspective, northeast China and perhaps Japan being similarly good candidates (Gu Gongxu *et al*. 1983, Utsu 1990).

Earthquake risk

The results from this work are important not only for the Earth scientist but also for the engineering seismologist and physical planner who are interested in the mitigation of natural risks. It is important that the notion of earthquake risk be understood at the outset.

As we will see, earthquake risks are created not only by Nature but also by man, who chooses hazardous sites on which to build vulnerable structures. Earthquake risk is also closely connected with our technological development. Although these risks cannot be prevented, their magnitude and after-effects can be minimised. In order to mitigate risk one must first view the problem in its entirety, as originally defined by UNESCO in 1978 (Algermissen *et al*. 1979, Fournier d'Albe 1982). It is a multidisciplinary isssue, in its simplest form best portrayed by the relation

$$[\text{Earthquake Risk}] = [\text{Earthquake Hazard}] * [\text{Structural Vulnerability}] \times (\text{Value}) \quad (1)$$

This equation tells us that earthquake risk is made up of the earthquake hazard, the vulnerability of the structure and the value or loss, each of which involves a range of specialities. The definition of risk makes a clear distinction between earthquake hazard, which deals with tectonics, seismology and engineering seismology, specialities that belong to the Earth sciences, and vulnerability, which is concerned with building materials, foundations, structural engineering and retrofitting, subjects that belong to the field of earthquake engineering. Note that in equation (1) the [Earthquake Hazard] and [Structural Vulnerability] terms must be interdependent functions.

Hazard, in its simplest definitions, is the chance of a damaging earthquake happening within a specific period of time and given area. Earthquake hazard is beyond human control, but an accurate knowledge of it, of its spatial distribution and, as far as possible, of its fluctuations in time, is essential for any rational assessment of risk. An important obstacle to the assessment of hazard at present is the lack of information about old earthquakes. Assessment of earthquake hazard is the subject matter of Earth sciences.

Vulnerability is the degree of structural damage or loss resulting from an earthquake of a given magnitude and is the subject matter of earthquake engineering. Vulnerability is determined by the physical characteristics of structures; it can therefore be controlled and reduced by appropriate action, though sometimes at a cost that must be justified by a diminished probability of loss.

However, while it is possible to control the vulnerability of new structures, it is difficult to estimate the vulnerability of existing buildings in which the great majority of people in seismic areas will have to live and work for a considerable time to come. Furthermore, the vulnerability of human settlements depends not only on that of individual buildings but also on that of all the essential services, such as transport, communications and water supply, which allow it to function. A further complication in seismic regions is the assessment of the vulnerability, which for man-made structures increases with time due to damage caused by near or distant earthquakes, improperly executed repairs and badly designed strengthening.

Measures to reduce vulnerability can be thought of either as long-term, e.g. earthquake-resistant design and construction, appropriate physical planning of settlements, or as short-term action in response to the post-earthquake exceptional hazard. The decision to undertake such measures will presumably be based on assessments of the risk to the community and on judgement as to whether these risks are acceptable,

Value may be taken either in the sense of capital value or in terms of the production capacity of a vulnerable element, such as lives and property, exposed to the hazard.

Area of study

The study is concerned with a relatively large area defined by the coordinates 28°–43° N in latitude and 18°–45° E in longitude, Figure 5. This area includes Albania, part of Armenia, Bulgaria, Cyprus, upper Egypt, a part of Georgia, Greece, part of Iraq, Israel, Jordan, Lebanon, Macedonia, Montenegro, Palestine, Syria and Turkey, a region of high seismicity and well-developed tectonic activity, offering thus the opportunity for extensive field studies.

In studying this region from a long-term historical perspective one has to deal with more than a dozen languages but also with a relatively well-documented history for which there is a variety of source materials. The same applies to secondary sources, such as specialist studies on its history, geography and archaeology, and to scientific publications.

A note on transliteration

Place names are often spelt as they are written in the script of the country in which they are located; this generally involves a transliteration. Because of the fluctuating demarcation of boundaries over the long period covered, and because places formerly in one country were once in another, it is in practice necessary to refer to places as they were known in the historical context in which they were cited. Their equivalents are given as identified, together with other modern names conforming to the current indigenous spelling. In some areas names are given a standard spelling, chosen arbitrarily for its familiarity.

A note on chronology

Several calendars have been used to date earthquakes recorded in the Eastern Mediterranean region and in the Middle East, notably the Indiction (Ind.), Annus Mundi Alexandrian (A.M.Alx.), Annus Mundi Byzantine (A.M.Byz.), Armenian with variations (Ar.), Muslim hijra (a.H.), Old Style (O.S.) and New Style (N.S.).

Details of these and others less frequently employed can be found in Grumel (1958), Freeman-Granville (1963), Altinay (1930) and Unat (1984), which have been used to convert dates in the Christian era. The Muslim Hijra calendar is lunar and began on 16 July AD 622. Conversions are calculated from the tables of Cattenoz (1961).

Throughout the book, dates are given in AD unless otherwise indicated.

In England the change from Julian or Old Style to Gregorian, New Style dating took place in September 1752. The Old Style system continued to be used by Greek Orthodox countries as late as the first decades of the twentieth century.

If the year of an event is given in an early calendar, the conventional year of the event shown at the head of an entry is the year which covers the greater part of the year.

Headings in square brackets indicate a spurious event.

Acknowledgements

It would be impossible to mention here the names of all the people and institutes that have provided information, facilities, or financial assistance over the years to carry out this work.

Initially this work included field studies, which were supported by the UN/USECO, consisting of well-designed fact-finding and follow-up missions of long duration after earthquakes. These missions had the advantage that because of their international character they enjoyed the full participation of scientists from host countries, transportation facilities and minimal restrictions on movement in the field.

Then followed an equally long period of low-budget field and desk studies, sponsored by the Natural Environment Research Council, UK (NERC), and the Engineering and Physical Sciences Research Council, UK (EPSRC), that also provided support for the analytical study of field observations such as local tectonics, assessment of strong ground motions, ground liquefaction, slope stability and post-earthquake planning.

My participation in major UN (UNDRO) reconstruction projects after earthquakes, such as of the city of Skopje over a period of six years, of Managua and shorter missions elsewhere in the region, added to the collection of additional field data about another, equally important aspect of earthquakes, that is, their impact on social and economic life, particularly in developing countries.

The late Dr Michael Fournier d'Albe of UNESCO, an Oxford scientist with an absurd sense of humour, did so much to make this work possible during its early and difficult stages that he must be mentioned before any other. Equally, I must admit that this book could not have been written without the great help I had over the years from Charles Melville, a Persian scholar in Cambridge, who once described his contribution to the project as that of a foster parent growing a child, from Caroline Finkel, a SOAS Ottoman historian who spent a long time digging into Ottoman archives in Istanbul, and in particular from my old collaborator Dominic, a Cambridge polymath classicist, now Fr. Dominic White OP.

The help I had in my field work from Dr John Tchalenko, a colleague from Imperial and an excellent organiser whose opinion commanded respect, was invaluable. I must also thank Rafi Freund, Ian Alpan and those alumni of Imperial College who helped in the field.

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I would like to thank James Jackson particularly for always being prepared to have his brain picked and also for his critical comments and contribution to some of the chapters of this book, particularly the chapter on tectonics.

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Finally, I find it rather embarrassing to see now that this work is loaded with a large number of references to my own work. I can assure the reader, however, that this was not done on purpose, or as a pretext to publicise the importance of my work.

The Academy of Athens provided final support for putting on record the results of this work, and I thank Cambridge University Press for publishing it.

Abbreviations

AAE	Archives du Ministère des Affaires Etrangères
AAE AA	Archives des Affaires Etrangères, Paris
AAE CCC	Correspondance Consulaire et Commerciale
AAO	Archivio Arcivescovile di Otranto, Otranto
ACCM	Archives de la Chambre de Commerce de Marseille
ACP	*Annales de Chimie et de Physique*
Act. Mor.	*Actes relatifs à la principauté de Morée*, Perrat Longnon, 1967
ADVN	*Arşivi Divan*, Istanbul
AE	Archives Nationales, Archives des Affaires Etrangères, Paris
AG	Archivo General de Simancas, Sección de Estado, Valladolid
AGAH	Archives du Ministère de la Guerre, Archives Historiques, Paris
AGS	Archivo General de Simancas, (S. Est) Sección de Estado
AMH	Archaeological Museum of Heraklion, Crete
AN	Archives Nationales, Paris.
AN AE	Archives Nationales, Paris. AE: Affaires Etrangères
AN BI	Archives Nationales, Paris. AE: Correspondance Consulaire
AN AMAE	Archives Diplomatiques, Nantes: Ministère des Affaires Etrangères
AN CADN	Centre des Archives Diplomatiques de Nantes
AND	Archives Diplomatiques, Nantes
Anecd. Brux.	*Anecdota Bruxelliensia*, Brussels
ANK	Kadi Sicilleri, Ankara
ANM	Archives Nationales, Marine, Paris

ANSC	*Correspondences des consuls de France au Levant*; BLW.P.D.482 & 482/1, and Svoronos, Paris, 1951
ARG	Allgemeen Rijksarchief te s'Gravenhage, The Hague
ASM	*Archivio ducale Visconteo-Sforzesco, potenze estere, Turchia; miscel.*
ASV	Archivio di Stata di Venezia, Senato, Dispacci, Provveditori da Terra e da Mar
ASV(P)	Archivio di Stato di Venetia, Provveditori da Terra e da Mar, Venice
AtsGVI	Fond Tsentral'nogo Gosudarstvennogo Voenno-istoricheskogo Arkhiv, Moscow
BAAS	British Association for the Advancement of Science, Seismology Reports
BAP	Bundesarchiv, Potsdam
BASOR	Bulletin of the American School of Oriental Research
BBA	Başbakanlik Osmanli Arşivi, Istanbul
BBA A AMD	Başbakanlik Osmanli Arşivi, Bab-i Asafi, Amedi Kalemi
BBA AE	Başbakanlik Osmanli Arşivi, Ali Emiri Tasnifi
BBA CA	Başbakanlik Osmanli Arşivi, Cevdet-Askeriye
BBA CB	Başbakanlik Osmanli Arşivi, Cevdet-Belediye
BBA CD	Başbakanlik Osmanli Arşivi, Cevdet-Dahiliye
BBA CE	Başbakanlik Osmanli Arşivi, Cevdet-Evkaf
BBA CM	Başbakanlik Osmanli Arşivi, Cevdet-Maliye
BBA CS	Başbakanlik Osmanli Arşivi, Cevdet-Saray
BBA CT	Başbakanlik Osmanli Arşivi, Cevdet-Tezakir
BBA D BŞM	Başbakanlik Osmanli Arşivi, Bab-i Defteri, Başmuhasebe Kalemi
BBA D BŞM BNE	Başbakanlik Osmanli Arşivi, Bab-i Defteri, Bina Emini
BBA ID	Başbakanlik Osmanli Arşivi, Irade Dahiliye
BBA IE	Başbakanlik Osmanli Arşivi, Ibnülemin Tasnifi
BBA IMV	Başbakanlik Osmanli Arşivi, Irade Meclis-i Vala
BBA MD	Başbakanlik Osmanli Arşivi, Mühimme Defter
BBA MMD	Başbakanlik Osmanli Arşivi Maliyeden Müdevver Defterler
BBA ŞD	Başbakanlik Osmanli Arşivi, Şikayet Defteri
BBA Y	Başbakanlik Osmanli Arşivi, Mtv.
BBA YA	Başbakanlik Osmanli Arşivi, Hus
BBL	Breisgau Badisches Landesarchiv, Breisgau
BC	Biblioteca del Museo Civico Correr, Venice
BCH	*Bulletin de Correspondance Hellénique, Paris*
BDP	Deutsche Presseforschung, Universitätsbibliothek, Bremen
BEO	Bulletin d'Etudes Orientales, Damascus
BHA	Bayerisches Hauptstaatsarchiv, Munich
BIFAO	Bulletin de l'Institute Français d'Archéologie Orientale, Cairo
BL	Bayazit Library, Istanbul
BM	British (Museum) Library, London
BMC	British Museum Catalogue of Coins of the Roman Empire, 1923–, London
BMCCV	Biblioteca del Museo Civico Correr di Venezia, Venice
BMV	Biblioteca Nazionale Marciana, Venice
BN	Bibliothèque Nationale, Paris
BNCF	Biblioteca Nazionale Centrale, Florence
BNL	Biblioteca Nacional, Lisbon
BRG	Bibliotheek Rijksuniversiteit Gent, Ghent
BRT	Biblioteca Reale di Torino, Turin
BSB	Bayerische Staatsbibliothek, Munich
BSGRT	Bibliotheca Scriptorum Graecorum et Romanorum Teubneriana, Leipzig
BSN	*Bulletin des Sciences Naturelles*
BSSI	*Bolletino della Società Sismologica Italiana*, Rome
BV	Bibliothek Vadiana, St Gall
BVI	*Bolletino Volcanologia Italiana*
CIG	Corpus Inscriptionum Graecarum, Berlin
CIL	Corpus Inscriptionum Latinarum, Rome
CMS	Church Missionary Societies Archives, Birmingham
CNL	Cairo National Library, Cairo
CRAI	*Comptes rendus de l'Académie des Inscriptions Belles-lettres*
CRAS	*Comptes rendus de l'Académie des sciences*, Paris

CSCO	Corpus Scriptorum Christianorum Orientalium
CSEL	Corpus Scriptorum Ecclesiasticorum Latinorum
CSHB	Corpus Scriptorum Historiae Byzantini, Bonn, 1828–1897
CSO, Ar.	Corpus Scriptorum Orientalium, Scriptores Arabici
CUL	University Library, Cambridge
CWLV	*Correspondenzblatt des Württembergischen Landwirtschlichen Vereins*, Stuttgart
DAW	Deutsche Akademie der Wissenschaften, Berlin, J. Schmidt Nachklaß 1859–1877
DBM	Dijon Bibliothèque Municipale, Dijon
DMA	Deniz Müzesi Arşivi, Istanbul
DSB	Deutsche Staatsbibliothek (E), Berlin
EI	*The Encyclopaedia of Islam*, Brill, 1960–
EXP	*L'Exploration*, Paris, 1880
EZB	Evangelisches Zentralarchiv, Berlin
FGrH	*Fragmente der griechischen Historiker*, ed. F. Jacoby, Leiden, 1923–
FHG	*Fragmenta historicorum graecorum*, ed. Muller, Langlois, Paris, 1883
FHTA	*Fragmenta historica Tusculana*, ed. Migne, PG 85
FO (PRO)	Foreign Office, London
FO SP (PRO)	Foreign Office, Special Papers
GDI	*Sammlung der griechischen Dialekt-Inschriften*, ed. Collitz & Bechtel
HHL	Holkham Hall Library, Norfolk (before 1970)
HHW	Haus-, Hof- und Staatsarchiv, Vienna
ID	*Inschriften von Didyma*
IG	*Inscriptiones Graecae*, ed. Fraenkel, Berlin, 1902– (14 volumes)
IGR	*Inscriptiones Graecae ad res Romanas pertint*, Cagnat, Paris, 1906–11
IGSKl	*Inschriften griechischer Städte aus Kleinasien*, Merkelbach, 1972
IHB	*Inscriptions historiques de Byzance*, ed. Feissel, 1985, Berlin (1941)
ILS	*Inscriptiones Latinae Selectae*, ed. Dawson, Berlin, 1872–1916
ISC	International Seismological Centre, Edinburgh/Thatcham
IUL	Istanbul University Library, Istanbul
JHS	*Journal of Hellenic Studies*, London
JOAI	*Jahreshefte des Österreichischen Archaeologischen Instituts*
JSAH	*Journal of Social and Architectural History*
LAS	*L'Astronomie*, Paris/Bruxelles
LBS	Landesbibliothek, Stuttgart
LCL	Loeb Classical Library, London
LNL	Lenin Library, Zapiski Otdela Rukopisy, Moscow
MAT	Matenadaran Library, Yerevan
MGHS (MGS)	*Monumenta Germaniae Historica Scriptores*, Berlin 1877–1898
MIFAO	*Mémoires de l'Institut Français d'Archéologie Orientale*
MKA	Milli Kütüphane, Ankara
MKA KS	Milli Kütüphane, Kadi sicilleri
MLI	Millet Library, Istanbul
NH	*Neos Hellinomnimon*, Athens, 1904–1930
ODB	*Oxford Dictionary of Byzantium*, Kazhdan *et al*. (eds), OUP, 1991
PAA	Politisches Archiv des Auswärtigen Amts, Bonn
PAA	*Amsterdamsche Argus*, Amsterdam
PAAZ	*Augsburger Allgemeine Zeitung*, 1860–
PAC	*Akropolis*, Athens, 1883–1899
PAI	*Aion*, Athens, 1838–
PAK	*Akhbar*, Algiers, 1870
PAM	*Amaltheia*, Smyrna, 1838–1922
PAN	*Ankara*, Ankara, 1870
PAOP	*Augsburger Ordinari Postzeitung* 1805–
PAR	Annual Register, London 1757–
PAT	*Anatolikos Tachidromos* (& *Astir*), Constantinople, 1861–1891
PATH	*Athena*, Athens, 1831–
PAU	*Augsburger Allgemeine Zeitung*, 1861–
PAV	*Avgi*, Athens, 1858–
PAZ	*Allgemeine Zeitung*, 1850–
PBL	*Bulgaria*, Sofia, 1859
PBM	Agamennone, G. (1894–6)
PBS	*Basiret*, Istanbul, 1870–
PBT	*Bombay Times* 1851
PBU	*Biulgariia*, Constantinople, 1843–1864
PBW	*Bremer Wochenblatt*, Bremen, 1812
PCB	*Correspondenzblatt*, Stuttgart, 1830
PCF	*Courrier Français*
PCH	*Ceride-yi Havadis*, Istanbul, 1841–
PCM	*Cosmos*, 1886–
PCO	*Courrier d'Orient*, Constantinople, 1865–
PCP	*La Constitutionnel*, Paris, 1766–1834
PCR	*La Croix*, 1887
PCS	*Le Courier de Smyrne*, Smyrna, 1829
PCU	*Le Courier Universel*, Paris, 1862–
PCZ	*Casseler Zeitung*, Kassel, 1829
PDA	*Das Ausland*, 1835
PDE	*Diarium Europei*

PDGA	*Dresdnische Gelehrte Anzeigen*, Dresden, 1756
PEB	*Echo du Parliament Belge*, Brussels, 1867–
PEF	*Ephimeris*, Athens 1879–1892
PEH	*Extraordinaire Harlemse Donderdaegse Courant*, Amsterdam, 1688–
PEL	*Eleftheria*, Larisa, 1981–88
PELP	*Elpis*, Athens
PEM	*Europische Mercurius* (*Nederlandsch Gedenkboek*) 1719–1766
PEMS	*Echo du Monde Savant*, Paris, 1831–
PEO	*Echo de l'Orient*, Constantinople, 1841–46
PEP	*Ephimeris tis Prousis*, Prusa (Bursa), 1872–
PEPB	*L'Echo de Parlement Belge*, Brussels, 1870
PEPT	*Epitheorisis*, Athens, 1878–1900
PES	*Europische Staats-Secretaris*, 1754–
PEST	*Estia*, Athens, 1891–
PESY	*Ephimeris Syzitiseon*, Athens, 1890–
PET	*Ethnophylax*, Athens. 1866–
PETH	*Ethnophylax*, Athens, 1860
PEXR	*Extraordinariae Relationes*, Cologne
PEZ	*Ephimeris ton Syzitiseon*, Athens, 1867–
PG	*Patrologia Graeca*, ed. J.-P. Migne, Paris 1857–1906
PGB	*Gazzetta di Bologna*
PGC	*Gazzette de Cologne*, Cologne, 1767–
PGF	*Gazette de France*, Paris, 1660–1855
PGFU	*Gazetta di Fuligno* 1691
PGG	*Gazzetta di Genova*, Genova, 1820–
PGI	*Giornale d'Italia*, 1766–
PGLO	*Gazeta de Lisboa Occidental*, Lisbon
PGM	*Grazer Morgenbladt*, Graz, 1800
PGM	*Gentleman's Magazine*, London
PGMD	*Gazette de Midi*, 1841
PGMT	*Gazzetta di Mantova*, Mantova, 1710
PGRM	*Gazetta di Roma*, Rome, 1636
PGRS	*Giornale del Regno delle due Sicilie*, Naples, 1854–
PGS	*Giornale del Regno delle due Sicilie* 1854–
PGU	*Gazette d'Utrecht*, Utrecht, 1769
PGUV	*Gazzetta Uffiziale di Venezia*, Venice
PGV	*Gazzetta di Venezia*, Venice, 1625
PGZ	*Gothaische Zeitung*, Gotha, 1826
PHB	*Historischer Bildersaal*
PHC	*Hamburger Correspondenz-Blatt*, Hamburg, 1830–
PHCH	*Hellenika Chronika*, Mesolongi, 1824–1826
PHH	*Hollandsche Historische Courant*, Stadsarchief, Delft, 1754–
PHL	*Illustrated London News*, London 1867–
PHR	Historiae Relationis/Continuatio = PRHS
PHZ	*Havazelet*, Jerusalem, 1872–
PIL	*L'Illustration*, Paris 1894
PILN	*Illustrated London News*, London, 1894, no. 2876
PIM	*L'Impartial*, Smyrna, 1848–1879
PIN	*Iran-i Nau*, Tehran, 1909–
PIP	*L'Institut*, Paris, 1860–
PIR	*Iran*, Tehran, 1880–
PIZ	*Illustrierte Zeitung*, Hamburg 1849–
PJC	*Journal de Constantinople*, Constantinople, 1843–
PJD	*Journal des Débats*, Paris, 1791–1869
PJH	*Journal Historique*, Paris, 1708–1783
PJOJ	*Jackson's Oxford Journal* 1780–
PJS	*Journal de Smyrne*, Smyrna, 1834–1838
PJT	*Journal de Salonique*, Thessaloniki
PKA	*Karteria*, Syros, 1873–
PKM	*Die katholische Missionen*, 1872–1905
PKRZ	*Keiserliche Reichsoberpostamtszeitung*, Cologne, 1766–
PKV	*Kavkaz*, Tbilisi, 1852–1883
PKZ	*Kölnische Zeitung*, Cologne, 1822–42
PL	*Patrologia Latina*, ed. J.-P. Migne, Paris 1844–1952
PLC	*The London Chronicle*, London, 1790–
PLD	*Leydse Courant*, Leyden, 1728–1732
PLE	*Logios Hermes*, Vienna 1815–
PLH	*Levant Herald*, Constantinople, 1874–1914
PLI	*L'Institut*, Paris, 1843–
PLM	*al-I'lam*, Cairo, 1886–
PLN	*La Nature*, Paris, 1880–
PLS	*Lisan al-Hal*, Beirut, 1877–1932
PLT	*Levant Times*, Constantinople, 1874–
PLZ	*Leipziger* (*Illustrierte*) *Zeitung*, Leipzig, 1829–
PMA	*Moniteur Algérien*, Algiers 1855–
PMC	*Les Missions Catholiques*, Paris, 1869–
PMdF	*Mercure de France*, Paris, 1718–1790
PME	*Mercurio de España*, Madrid, 1785–
PMF	*Mercure Français*, Paris, 1612–1640
PMG	*Naval and Military Gazette*, Malta, 1850–

PMH	*Mercurius Historicus*, 1712
PMHp	*Mercure Historique* (*et Politique*), Paris, 1692–1791
PMHP	*Mercurio Historico y Politico*, Madrid, 1760–1782
PMK	*al-Muktataf*, Cairo, 1877–
PMN	*Messiniaka Nea*, Athens, 1967
PMO	*Moniteur Ottoman*, Constantinople, 1832–1841
PMSH	*Missionary Herald*, 1835–1882
PMT	*The Malta Times*, Malta, 1850–
PMU	*Moniteur Universel* (*Moniteur*), Paris, 1790–1863
PMV	*Moskovskoe Videnie*, Moscow, 1839–
PMZ	*Mamuret al-Aziz*, Istanbul, 1882
PNA	*Neologos tis Anatolis* (*Constantinopleos*), 1867–1899
PNAV	*Nouvelles Annales des Voyages*
PNC	*Neologos Constantinoupoleos*, 1870–
PNB	*Der neue Weltbote*, 1727
PND	*Nederlandsch Mercurius*, The Hague, 1766–
PNDM	*Notizie del Mondo*, 1768–
PNE = PNEX	*Nouvelles Extraordinaires*, 1762
PNEE	*Nea Ephimeris*, 1886–
PNF	*Nea Efimeris*, Athens, 1883–1892
PNH	*Natur und Heilkunde*, Weimar, 1833–
PNL	*Neologos*, Athens, 1874–
PNM	*Nordischer Merkur*, Hamburg, 1667–
PNP(R)	*Nederlandscher Postryder*, 1749–
PNT	*Nature*, London, 1871–
PO	*Patrologia Orientalis*, various editions, Turnhout
POB	*Oesterreichischer Beobachter*, 1817
POH	*Oprechte Harlemse Saturdaegse Courant*, Amsterdam, 1688–
PON	*Opinion Nationale*, 1835
POR	*Ora*, Athens, 1880–1885
PORR	*Ordinariae Relationes*, Köln, 1766
PPA	*Pandora*, Athens, 1850–
PPL	*Paligenisia*, Athens, 1870–
PPO	*Press d'Orient*, Constantinople, 1854–
PPR	*Parnassos*, Amfissa 1867
PPS	*Preußische Staatszeitung*, 1825
PPV	*Pravitel'stvennii Vestnik*, Saint Petersburg, 1883–
PPY	*Pythia*, Amfissa, 1871
PRCH	*Ruzname-y Ceride-y Havadis*, Istanbul, 1860–
PRD	*Ruznameh-yi daulat-i 'aliyyeh-yi Iran*, Tehran, 1860–1871
PRG	*Rumeli Vilayet Gazetesi*, 1872–
PRGV	*Rumeli Vilayet Gazetesi*, 1870
PRH	*Ruzname-y Ceride-y Havadis*, Istanbul, 1868–
PRHS	*Relationis Historiae Semestrialis/ Continuatio* 1598–1737
PRO	Public Records Office, Chancery Lane/Kew
PRO PR	Public Records Office, Kew
PRV	*Ruznameh-yi vaqa'i-yi ittifaqiyyeh*, Tehran, 1851–1860
PSA	*Samos*, Samos, 1872–1875
PSB	*Sabah*, Istanbul 1894–
PSC	*S'Gravenhaege Courant*, The Hague, 1756
PSO	*Stoa*, Athens, 1879–1884
PST	*Stambul*, Constantinople, 1876–1893
PSV/PSVG	*Selaniki Vilayet Gazertleri*, Solun, 1868–
PSW	*Der Schweizerbote*, 1815–
PSX	*Salpinx*, Larissa 1890–
PTA	*Tercuman-i Ahval*, Istanbul, 1862–
PTE	*Theatrum Europaeum*, Frankfurt, 1617–1721
PTH	*Tercuman-Hakikat*, Istanbul, 1881–
PTI	*Theatis*, Athens, 1936–
PTL	*Tilegraphos tou Vosporou*, Constantinople
PTM	*The Times*, London
PTS	*Tasvir-i Efkar*, Istanbul, 1863–
PTT = PT	*The Times*, London, 1790–
PTV	*Takvim-i Vekayi*, Istanbul, 1833–
PUB	*L'Union Bourguignonne*, 1859–
PUZ	*Ulmer Zeitung*, Ulm, 1930
PVE	*Veltiosis*, Athens, 1860–
PVI	*Vaqai Ittifaqiyyeh*, Tehran, 1851–
PWB	*Wöchentliche Bönnische Anzeige*, Bonn, 1766–
PWD	*Wieneriches Diarium*, Vienna, 1750–
PZM	*Zhurnal Ministerstvo Vnutrennosti Del'*, Saint Petersburg, 1840–
PZOM	*Zeitschrift Österreichischen Gesellschaft für Meteorologie*, Vienna
QCO	The Queen's College Library, Oxford
RDSV	*Regestes des Délibérations du Sénat de Venise*, Thiriet, Paris, 1961
RHC	*Recueil des historiens des Croisades*, Académie des Inscriptions Belles-lettres, Paris
RHG	*Recueil des historiens des Gaules et de la France*, Paris
RIS	*Rerum Italicarum Scriptores*, ed. L. Muratori, Milan, 1723–1751
ROC	*Revue de l'Orient chrétien*
SAH	Staatsarchiv, Hamburg
SAW	Staatsarchiv, Wiesbaden
SBB	Staatsbibliothek, Berlin
SEG	*Supplementum Epigraphicum Graecum*, Leiden, 1923–

SGUA	*Sammelbuch griechischer Urkunden aus Ägypten*, Preisigke, 1926	SSB	Staats- und Stadtbibliothek, Augsburg
SHA	*Scriptores Historiae Augustae* (LCL)	T. Cam.	*Tituli Camirenses*, ed. S. & P. Caratelli, Rome, 1952
SL	Süleymaniye Library, Istanbul	TKSA	Topkapi Sarayi Archives, Istanbul
SLRI	*Scriptores Rerum Langobardicarum et Italicarum*	TKSL	Topkapi Sarayi Library, Istanbul
SOAS	School of Oriental and African Studies Library, University of London	UD	Universitätsbibliothek Düsseldorf
SOC	*Scriptores originum Constantinopolitarum*, ed. Preger, Leipzig, 1907	UML	University of Malta Library, Msida
SRG	*Scriptores rerum Germanicorum*	WIL	Wellcome Institute Library, London
		WLB	Württembergische Landesbibliothek, Stuttgart
		ZL = VZ	Zagora Library, Zagora
		ZZB	Zürcher Zentralbibliothek, Zurich