In troubled times, in a divided country: the 1789 Alta Valtiberina earthquake.

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Abstract
Our perception of the September 30, 1789 earthquake (Io = VIII-IX MCS, M = 5.8 according to the latest Italian catalogue) is blurred by two major disturbance factors: it occurred across a political frontier and at a time of high political unrest. Its having been experienced by two independent countries (the Grand-Duchy of Tuscany and the Papal States) means that the 1789 earthquake provoked two independent official responses, embodied in a huge mass of records (letters, forms and reports concerning enquiries, damage surveys, relief measures, financial accounts et cetera), afterwards destined to be stored in different ways and places and therefrom to undergo intricate vicissitudes that led, in some cases, to their final or temporary loss. Its having occurred in the autumn of 1789, means that this earthquake did not attract as much interest, from the media and the scientific world, as it would probably have got had it happened in less troubled times. The Bastille had been stormed, the Declaration of the Rights of Men had been issued and Europe was still reeling under the shock. In Italy, professional journalists and cultured dilettanti alike were either too enthused or too outraged by the French goings on and their repercussions on international politics, to devote more than a perfunctory attention to an inland earthquake whose highest effects affected country villages and provincial towns in a secluded corner at the heart of the peninsula. Consequently, the 1789 earthquake rated only a few mentions in contemporary Italian gazettes, and none of the scientifically-minded took time to write treatises on its subject. Digging up the details of what actually happened in the Upper Tiber valley on September 30, 1789 earthquake is therefore far from easy, especially as parts of the original puzzle are probably lost for good. However, is it still worthwhile to spend time looking for them as the findings of a careful search allows to considerably improve the picture of this earthquake, as the necessary preliminary to a re-assessment of its epicentral parameters.

1. A poorly known earthquake?
In the late morning of September 30, 1789, an Mm5.8, Io VIII-IX MCS earthquake occurred in central Italy. It affected an area, Alta Valtiberina or the upper reaches of the Tiber, whose long seismic record (Fig. 1) includes at least nine Io≥ VII MCS earthquakes listed from the Middle Ages onwards by the latest Italian catalogue (CPTI Working Group, 2004) (Tab. 1). The CPTI Working Group (2004) parameters for the 1789 earthquake were assessed from a data base of 28 intensity data points (Fig. 2) originally put together by Castelli et al. (1996). To say that an 18th century earthquake is poorly known because it has only 28 intensity data points to its name could seem excessively pessimistic. In fact, however, the same catalogue lists several 18th century earthquakes with larger data bases (Tab. 2). Moreover, the 1789 intensity map seems less well defined than one could wish it to be, for example with regard to the areas affected by lesser damage.

Why things stand as they currently do, in this particular case? And is there any room for improvement?
2. A complex historical and geopolitical setting
Intensity data points are created by elaborating raw evidence of earthquake effects. For an 18th century earthquake, raw evidence means, chiefly, contemporary written records, whose production and preservation can have been influenced (i.e. furthered or hindered) by countless historical factors. In the particular case of the 1789 earthquake two major disturbance factors could have oriented - and possibly distorted - the perception of its macroseismic effects by future observers. There is a geopolitical factor: the 1789 earthquake occurred across the frontier between two independent countries (the Grand-Duchy of Tuscany and the Papal States). And there is an historical factor: the earthquake occurred at a time of great European unrest.

2.1. Geopolitics and the production of contemporary earthquake records
By affecting two independent countries the 1789 earthquake put in motion two separate official responses. Each of the rulers concerned, Pope Pius VI and Grand Duke Pietro Leopoldo I, started a separate course of action aimed at dealing with the emergency and bringing the affected areas back to normality. Each acted according to his own lights, prior experiences (both Tuscany and the Papal States countries had been affected by several strong earthquakes in the last decades), administrative routines (Tuscany’s being far more up-to-date and efficient than the Papal States’) and, above all, financial means: the Pope, a benevolent man, was hideously indebted; the Grand Duke was careful with money. In the following months (and years) public and private initiatives crisscrossed across Alta Valtiberina and a huge amount of written records started piling up in both involved countries. Letters went to and fro between the earthquake affected areas and the two capitals, Rome and Florence; forms were filled, reports penned, damage surveys carried out in the affected provinces, relief measures decided upon, restoration work undergone, financial accounts totted up et cetera. Each of these actions left some written traces, destined in their turn to be stored in different ways and places, part in Valtiberina, part in Florence and Rome, there to undergo all the intricate vicissitudes which can affect archival papers and which, in some cases, led to the temporary or even final loss of big portions of the 1789 earthquake records.

2.2. History and the production of contemporary earthquake records
The Valtiberina earthquake did not attract as much attention, from the contemporary mass media and the scientific world, as recent earthquakes occurred in other corners of the Papal States had received. The 1779 Bologna earthquake (Io 6/7 MCS), the 1785 Piediluco and 1786 Rimini ones (Io 8 MCS) not only had been widely reported by Italian and European gazettes but had stimulated a lively scientific debate (Augusti, 1779; Augusti, 1780; Canterzani, 1779; Cavalli, 1785a-1785b; Gilii, 1786; Discorso..., 1787; Parere..., 1787; Saggio...; 1787; Vannucci, 1787).

The year 1789, however, was a special one: only two month and a half before the Valtiberina earthquake a Paris mob had stormed the Bastille. Then, in quick succession, the French King was forced to to bow down to the French National Assembly, waves of panic swept through France, and the
Declaration of Rights of Man and Citizen was issued. Europe and Italy were still reeling under the shock. Journalists and cultured dilettanti alike were either too enthused or too outraged by the French goings-on - and their repercussions on local politics - to give much attention to an inland earthquake affecting a couple of provincial towns and obscure villages. Beside the 1789 main focus of interest, France, the politically-minded of Italy had two other international theatres to keep tabs on: the Balkans, where Russia and Austria in alliance were waging war against Turkey, and the Austrian Netherlands which had rebelled against Austrian rule. News from these regions feature prominently in the Gazzetta di Mantova, printed in a town then belonging to the Austrian Empire.

Non-Italian gazettes - in former years very attentive to Italian news - were even less interested; only the monthly Mercurio de España appears to have covered the 1789 event at some length in its October and November issues (Mercurio de España 1789a-1789b). The Gazette de France printed only a short, garbled report in November (Gazette de France, 1789). The Gazette d’Amsterdam did not report any Italian news at all in October-December 1789, bar a single item of international politics, dated from Trieste on December 5, which figured in the December 25 issue.

All Italian gazettes known to have covered the 1789 earthquake were produced well outside the earthquake-affected area (Fig. 3). The earliest reports, by Florentine and Roman gazettes, were based on information sent by letter from the affected areas. These gazettes followed the story over several issues and would, in their turn, become a source for other gazettes.

3. The 1789 earthquake in the eye of posterity

From mid-19th century onwards the 1789 earthquake has become a subject for historical reconstruction: first by the Città di Castello historiographer Muzi (1842), later on by historical seismologists (Baratta, 1901; Boschi et al., 1995) and architecture historians (Giovanetti ed., 1992). The common feature of all these reconstructions is that, insofar as contemporary sources are concerned, they rely almost exclusively on journalistic materials. Contemporary Italian journalism painted a comprehensive but slightly lopsided image of the 1789 earthquake. A Tuscan newspaper (Gazzetta Toscana, 1789b) and an Umbrian pamphlet (Genuina e distinta Relazione..., 1789) were particularly influential in this image-creating role. On October 17, 1789 the Gazzetta Toscana (1789b) published the impressions of an anonymous gentleman (possibly the abbé Lampredi, a member of the Tuscan intelligentsia), who on October 1 crossed the Tuscan-Papal border on foot, reached Città di Castello and gone back to write a long description of the situation in that town (“…unrecognizable…”) and its district (“a mournful sight…a painful Iliad”). Later on, in November-December 1789, the Municipality of Città di Castello had a pamphlet printed (Genuina e distinta Relazione..., 1789), ostensibly to “set right many errors seen in previous reports”, possibly to remind Roman authorities of its sad plight. Both stories agree in presenting the 1789 earthquake as a shocking drama of sudden death, destruction and destitution which has afflicted the Valtiberina countryside, but above all Città di Castello, the disarray of whose main public and private buildings was extensively and even ostentatiously described. In short, journalistic data are likely to have undergone considerable literary elaboration, summarization and overdramatization, and relying
exclusively on them could lead to making partial or even wrong assumptions in the assessment of the macroseismic effects of the 1789 earthquake.

The first recent study to make an extensive use of the large set of contemporary archive records produced in the wake of the 1789 earthquake was Castelli et al. (1996). A merely quantitative comparison between the macroseismic data bases put together by Castelli et al. (1996) and by the latest study based mostly on journalistic sources (Boschi et al., 1995) shows the advantages of this choice (Fig. 4a-b).

Using archival sources has a price, however. Spotting exactly which records were produced after an historical earthquake and, above all, discovering their present whereabouts requires time and even the most careful historian has to strike a balance between thoroughness and the meeting of deadlines. Castelli et al. (1996) struck this balance by giving priority to the more easily traceable archive records, namely those (letters, reports, account books) dealing with Papal territories, produced/collected by Roman ministries and now preserved at the Archivio di Stato di Roma (ASRM, 1789-1795). Unfortunately, it had not been possible to do the same on the Tuscan side, the Florentine archives having been severely damaged by the great 1966 flood. Worse still, no trace had been found in the Roman archives of a very special kind of record, the damage surveys executed for the whole Governship of Città di Castello by a quartet of architects, shortly after the earthquake.

It has been only recently, thanks to the unremitting work of local archivists and to one of those lucky flukes with which earthquake historians are sometimes and undeservedly presented, that parts of the original damage surveys made in the Papal States, and a summary of those carried out in Tuscany have suddenly become available (ASCC, 1790; ASCS, 1789-1791). The input of these data allows to add another 45 previously unknown affected sites to the data base of macroseismic observations for the 1789 earthquake (Fig. 5, Tab. 3).

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