

### 1.3.3 NA4 : Distributed Archive of Historical Earthquake Data

Participant number	11	14	20	3	16				
Participant short name	INGV	BGS	IGC	ETHZ	ITSAK				<b>Total</b>
Person-months	30.25 (20.25)	24	10	4 (0)	12				<b>80.25 (20.25)</b>

#### Summary

After the first year in which general and methodological issues were the main concern, the second year was fully devoted to the implementation of the varied components of the Archive. A first general meeting was held in Milan on September 2007, open to researchers from non partners' countries. A business meeting of the partners was then held in Zurich in April 2008. Regional meetings were also held. Consensus was sought through these meetings, mail exchanges and polls performed through documents shared via web. In the occasion of the Zürich meeting the possibility of expanding the work to the XX century was also explored; one reason is that the first part of the XX century shows good historical data together with somehow weak instrumental ones.

#### Task 1. Inventory of the existing data

The key of the Archive of Historical Earthquake Data is represented by the inventory of the earthquakes and related historical studies, also called Working File. The compilation of such a file requires agreeing on common standard and, in some case, to recompile national data according to those standard; moreover, this is an ongoing activity in the view of keeping the inventory as update as possible. To allow the multiplicity and the evolution of the earthquake studies to be stored and displayed, a web tool has been designed where the WF can be viewed by all partners and data or comments can be entered according some procedures by partners. The WF has been updated for events in the time-window 1000-1600 (D1), while the preparatory work for the time-window 1601-1900 has already started. All partners contributed to this item.

#### Task 2. Collecting and qualifying the data

The next item is the distributed archive of the earthquake studies (papers, volumes, unpublished material, etc.). The collection and preservation of such studies is crucial for: a) preserving material which is difficult to find and in some cases at risk, b) having this material available for earthquake parameters assessment. The provisional version of the software, developed in the first year and based on the well known D-Space open source software, was further developed and tested by INGV. The conclusion was that such software is too rigid with respect to what is required. Consequently, the goal (D2) needs to be revised, the available material will either be linked or made available through the WF web site. This activity was mainly addressed by INGV.

#### Task 3. Implementing database mining tools and homogenization of the macroseismic intensity database

The compilation of the European Intensity Database proceeds from the selected earthquakes and related studies listed in the WF. This goal also requires that the data are compiled according to standard criteria, which is not always the case from a national database to another; moreover, in many cases national databases do not exist or are not accessible. To improve this situation, first of all software was designed to allow intensity data points to be stored, viewed and, possibly, published. This software was made available to partners and non partners. Next, the collection of data started, trying to solve at the same time the issue of compiling the data according to a standard, compatible format. The foreseen demo version 1000 to 1600, M>5.5 is available (D4) through a dedicated website. The work related to the next time-window (1601-1900) is in progress. All partners contribute to it.

#### Task 4. Merging and homogenization of the European parametric earthquake catalogue

The goal of assessing procedures for earthquake parameters determination was mainly tackled with respect to earthquakes with intensity datapoints. While many local procedures have been proposed

and adopted at a national level, in the present project the intention is to derive a set of standard procedures that can be used in a more or less consistent and homogeneous manner across the whole of Europe. In addition, the solution proposed must be able to cope reasonably well with the very common cases where the amount of data is extremely small (perhaps only a single point). A method was explored and developed based on a physical model of earthquake perceptibility, in which templates of isoseismals expected from different magnitude events are compared to the actual IDP data, retaining the overall principle of seeking the lowest misfit to a theoretical model. This procedure is based on physical parameters such as  $Q$ , and it was hoped that local application could be made largely using previously-known values. In practice though, it appears that local calibration remains an issue. The methodology, called MEEP, was written up as a report, accompanied by working software, which was distributed to all members of the project in fulfilment of D3. BGS was the lead partner in producing D3; partners helped with data and blind tests. A massive test of MEEP (more than 400 events, many of which concerning events with instrumental data, too) has been performed by INGV; the results concerning about 100 events have been made available to the partners through a dedicated website.

### Problems and remedies

The main deviation certainly concerns D2 where, beside the intrinsic difficulty of the problem, the partners have difficulties in networking regional contributions (with one exception). D3, which is a research tool requiring less interaction beyond the consortium, has been successful. The other, time-consuming deliverables, such as D1 and D4, are subject to delay due to, among others, long negotiations on reaching consensus on some key issues foreseen by the working programme. Again a returning issue is the limited number of partners of the module with respect to the number of European countries and institutions necessary to involve to reach the ambitious objectives of the activity. This problem has been partly tackled by the initiative and separate funding of INGV, but it has not completely solved. Proposals are being made to give this module more compatible goals with the available resources.

### Milestones and Deliverables

No	Deliverable/Milestone Name	Work-package /Task No	Lead Contractor	Planned (in months)	Achieved (in months)	Nature
D2	Electronic archive of earthquake studies, demo version	1	INGV	18	Delayed, modification planned	database
D3	Procedures for earthquake parameters determination	4	BGS	24	24	Report
D4	European intensity database, demo version, 1000 to 1600, $M > 5.5$	2-3	INGV	24	24	database
M2	Electronic archive of earthquake studies, demo version	1	INGV	18	Delayed	
M3	Procedures for earthquake parameters determination tested and agreed	4	BGS	24	24	
M4	Demo version European Intensity database 1000 – 1600 $M > 5.5$	2, 3	INGV	24	24	

### Workshops and Meetings

Date	Title/subject of meeting /workshop	Location	Number of attendees	Website address
2.10-4.10 2007	NA4 Workshop	Milano	20	

Activity report

3.4- 4.4.2008	NA4 business meeting	ETHZ	10	
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