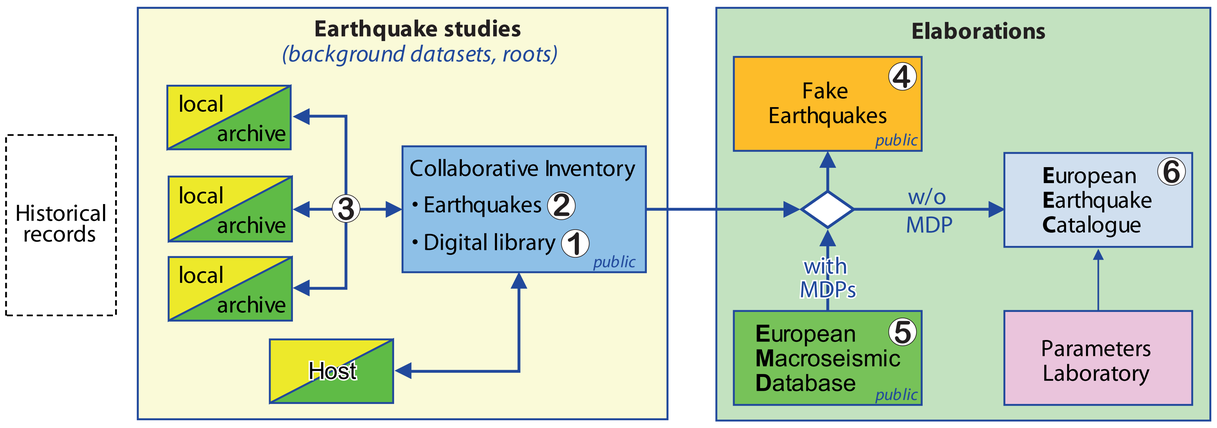
THE IT FRAMEWORK OF THE EUROPEAN ARCHIVE OF HISTORICAL EARTHQUAKE DATA (**AHEAD**)

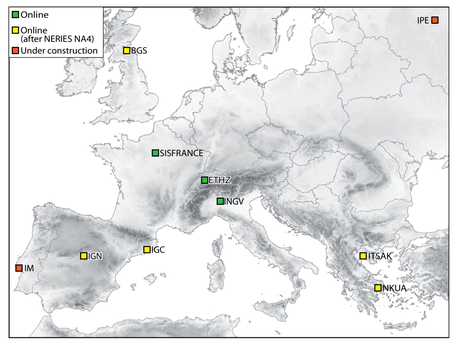
M. Locati (locati@mi.ingv.it), M. Stucchi, A. Rovida, P. Albini

SD12/P4/ID19



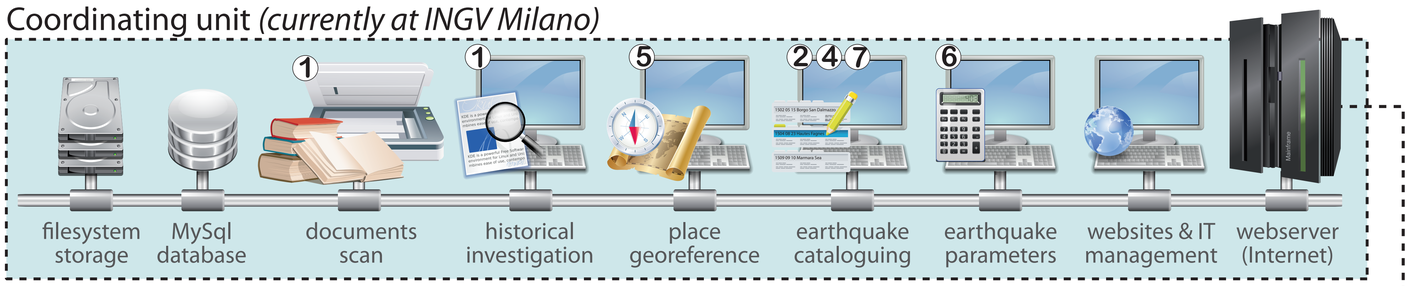
The European Archive of Historical EArthquake Data (**AHEAD**) has been developed in the frame of the **EU project NERIES** and maintained in the frame of the **EU project SHARE**. AHEAD makes available on the web the result of a **networked historical earthquake data research**, formalised in terms of studies (papers, reports, macroseismic data points, etc). It provides an **updated wealth of data** that are unique for many European events in the time-window 1000-1963.

A series of IT solutions have been developed in order to support both the research and the networking activities carried out within the building process of AHEAD. The resulting framework is an equally balanced effort in both the back-end and front-end design and implementation, a key feature in a research approach very much human-centred, where the quantity of data is small if compared to terabytes of instrumental data. The building-up of such infrastructure will help the data exchange and the adoption of a common standard in both data-formats and procedures.

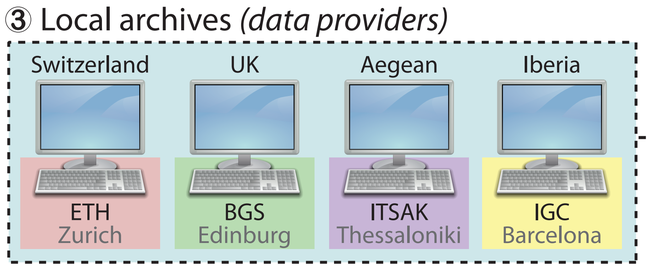


Online historical earthquake databanks.

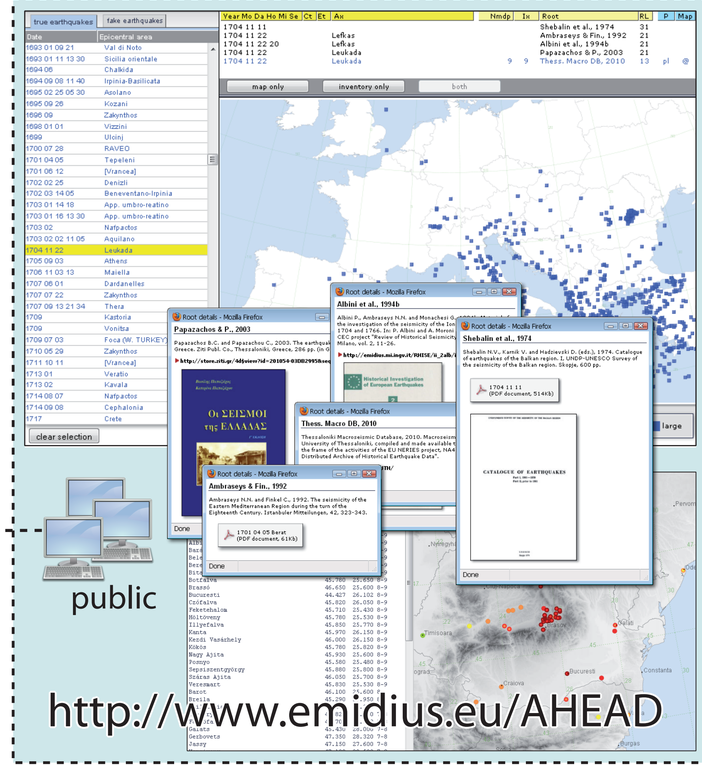
Coordinating unit *(currently at INGV Milano)*



③ Local archives *(data providers)*



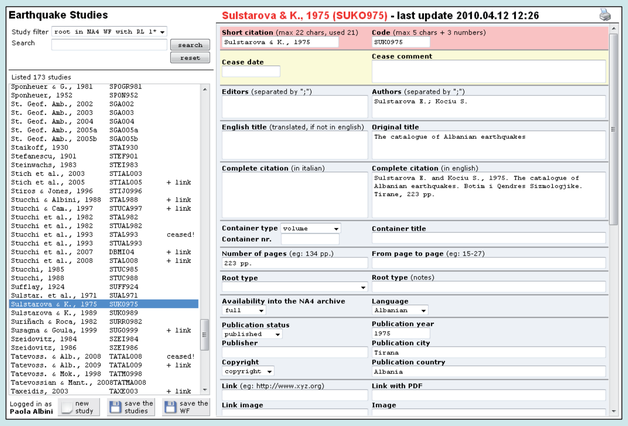
AHEAD support the establishing of locally maintained macroseismic databases.
So far, five European Institutions have created and published on the web their databases:
BGS (http://quakes.bgs.ac.uk), **IGN** (http://emidius.eu/IGN), **IGC** (http://www.igc.cat/web/ca/sismologia_bdmacrosis.html),
University of Thessaloniki (http://www.emidius.eu/AUTH), **University of Athens** (http://emidius.eu/NKUA).



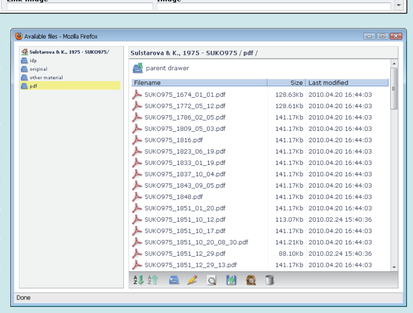
The AHEAD website offers to the public all the data collected among the Data Providers in a coherent visual solution.
The published data have been homogenized and well-organized to better exploit the advantage of a unique European platform where anyone interested in earthquakes of the past can find the state-of-the-art on the subject.
Users can browse the Consensus Inventory of earthquakes, together with the background information in terms of studies and macroseismic intensity data point (MDP) maps. Studies are available as downloadable PDF files if allowed by the copyright, or as a link to the publisher site, if copyright protected. Selections can be made by event-time or intuitively on the map. A dedicated area will allow users to feed AHEAD submitting comments, new studies and material.

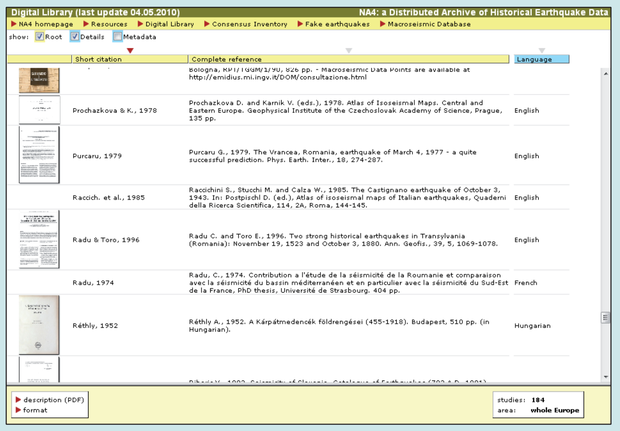
In order to support AHEAD research activities, a series of mutually dependent supporting tools have been created. All these components are restricted, and are available on the Web because the involved researchers live in various European countries.
Every action can be commented and the author's changes are kept. AHEAD trace circa 800 macroseismic studies, most of them retrieved in form of PDF files. Each described earthquake has a dedicated PDF and the system now reach roughly 5000 PDFs.
This huge amount of material is partially of "Public Domain". When copyright and licensing restrictions are in force, in the public version of AHEAD, only a link to the publisher is presented.
The heart of the system is the "Consensus Earthquake Inventory", a site where every published macroseismic study is examined and links are made among them. This technically simple tool allows researchers to a huge step forward in creating an updated and truly cross-border catalogue, overcoming national limits, enlightening clearly the strong and weak point of each study. Detailed information is reachable using intuitive links to all the availabe resources, such as interactive macroseismic intensity maps, PDFs, researcher comments and external web links.

① Digital Library

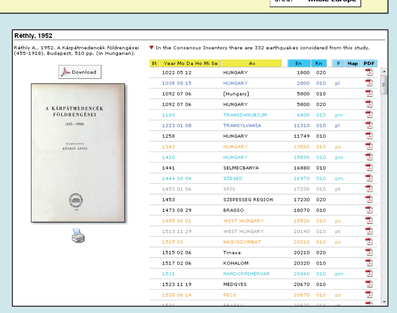


A tool for managing and organizing the retrieved studies. It is possible to compile bibliographical data and link scanned PDFs to both the study entry and to each mentioned earthquake.

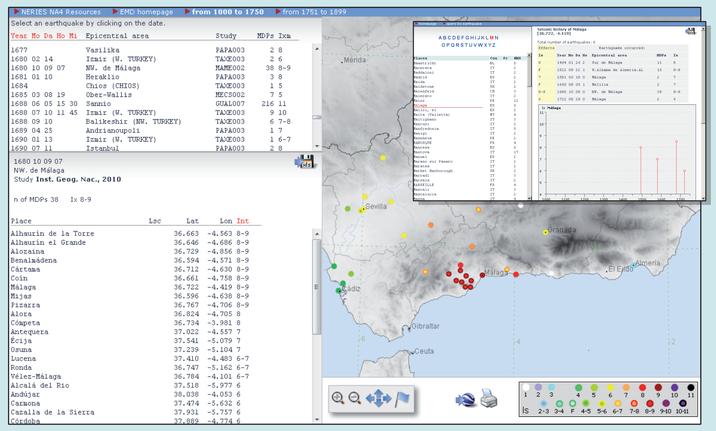




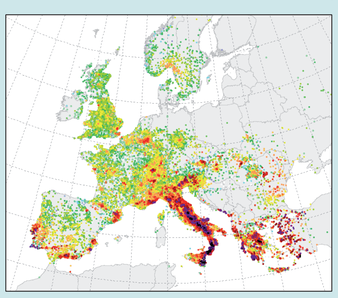
It is possible to browse the entire collection of studies and obtain for each study the list of earthquakes. It is based on a series of cross-section database queries with the Consensus Inventory (2).



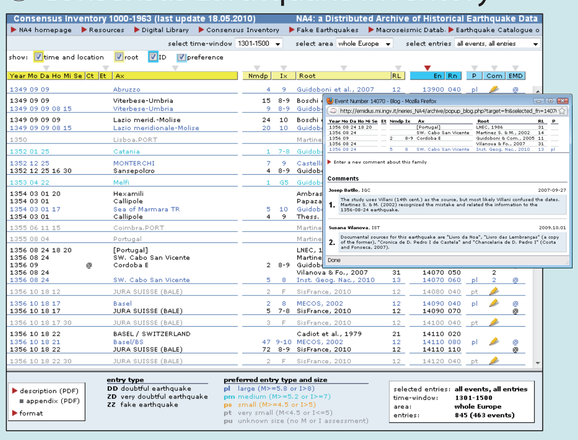
⑤ European Macroseismic Database (EMD)



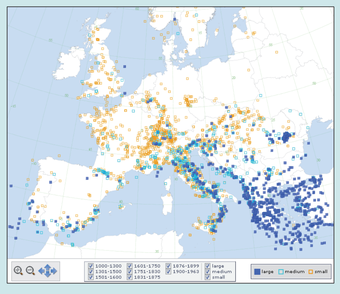
EMD contains all the macroseismic data points retrieved from the studies and homogenized by the AHEAD Coordinating Unit in terms of place georeferencing quality and data format. EMD is querable by earthquake or by place. The website is dynamically generated using the internally developed tool "MIDOP" (see poster SD12/P3/ID18).



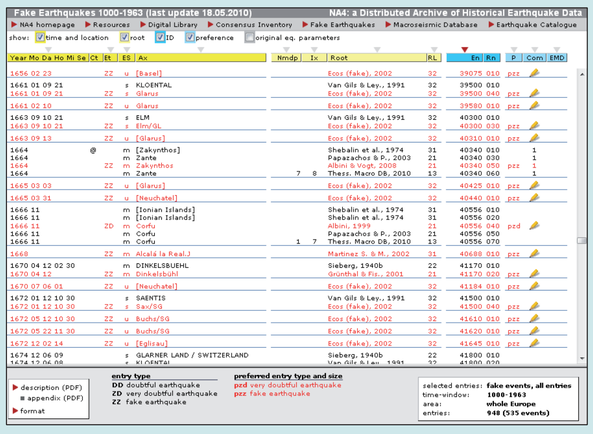
② Consensus Earthquake Inventory



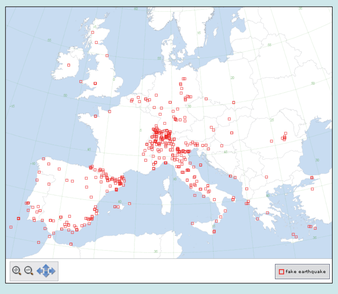
This is the core component that reasearchers use in order to establish the relationship between existing studies, and lets them decide which is the preferred one.



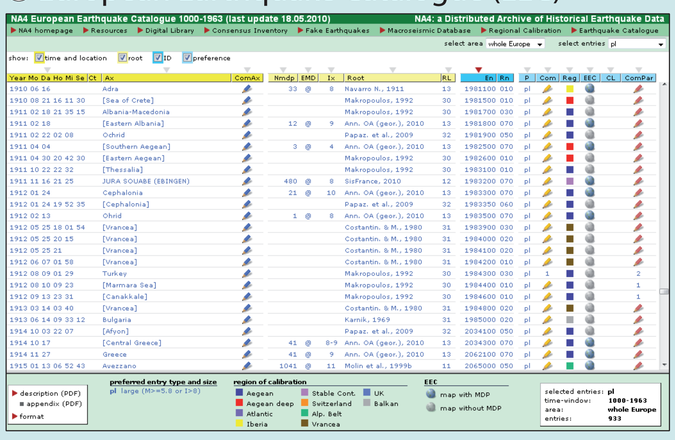
④ Fake Earthquakes



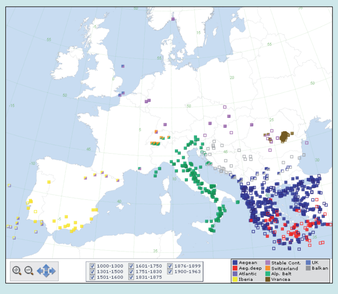
This area help keeping trace of the well known fake earthquakes, significantly relocated in time and space as well as resized. It helps researchers avoid repeating of past historical interpretation errors.



⑥ European Earthquake Catalogue (EEC)



The European Earthquake Catalogue is where the results of the entire research process are assembled and parameters are assessed. The Catalogue can be sorted, filtered by area or time-window, maps consulted and studies retrieved. Researchers can interact commenting and discussing every aspect .



The NERIES NA4 "a Distributed Archive of Historical Earthquake Data" deliverables are downloadable from **http://emidius.mi.ingv.it/neries_NA4/**:

D1. Reference catalogue and guidelines "Working File 1000-1600";
D2. Electronic archive of historical earthquake studies, June 2009;
D3. Macroseismic estimation of earthquake parameters, November 2008;
D4. European Macroseismic Database (demo version) 1000-1600, M>5.0, October 2008;
D5. The European Earthquake Catalogue (demo version) 1000-1600 Part 1 The NA4 Calibration Initiative, April 2009;
D6. The Comprehensive NA4 Working File 1000-1750, June 2009 *(D6 incorporates and expands D1);*
D7. European Macroseismic Database 1000-1750, M>5.0, June 2009 *(D7 incorporates and expands the previous D4);*
D8. European Earthquake Catalogue 1900-1963, M>5.8, June 2010;
D9. European Macroseismic Database 1000-1963, M>5.8, June 2010;
D9 Appendix - Improved Macroseismic Web Mapping Tool, MIDOP manual, June 2010;
D10. NA4 European Earthquake Catalogue 1000-1963, M>5.8, June 2010;
D11. Long-term implementation plan and vision of the European "Archive of Hitorical EArthquake Data" (AHEAD), June 2010.

Related presentations at ESC 2010, session SD4 "Compiling the earthquake history of the European Mediterranean area":
SD4/MO/O8 - The European Archive of Historical Earthquake Data (AHEAD): compilation, results, and perspectives, A. Rovida and the NERIES NA4 WG;
SD4/TU/O3 - Calibration methods for parameterising earthquakes 1000-1963 from MDPs in Europe, A. Gomez Capera and the NERIES NA4 WG;
SD4/TU/O5 - The NERIES NA4 European Earthquake Catalogue (M=5.8), M. Stucchi and the NERIES NA4 WG.