**FROM MACROSEISMIC INTENSITY DATA TO EARTHQUAKE PARAMETERS**

**MIDOP - Macroseismic Intensity Data Online Publisher** — M. Locati (locati@mi.ingv.it), A. Cassera, D. Viganò, A. Gomez Capera

Within the activities of the NERIES Networking Activity 4 (NA4) module “Distributed Archive of Historical Earthquake Data” of the EU NERIES project (2006-2010), a massive quantity of historical earthquakes related data is being published online. Until now no dedicated software for online map publishing existed, and general purpose solutions were adopted.

The MIDOP software has been created, a specific tool that allows web-inexperienced researchers to easily transform unappealing tables into deeply customized interactive maps and share the results among the scientific community. MIDOP has been developed using Apache, MySql and PHP, a series of web softwares, capable of satisfying these key features: use of web standards, creation of a visual user interface, interactivity, low servers profiles, security and multiple output format.

The package comes with geographical layers covering Europe. Two tables only are required in order to publish interactive maps on the web: 1) the list of earthquakes and 2) the macroseismic intensity observations. Everything else is done automatically and the output folder can be safely published on the web; no worries over server security attacks (all pages are passive pre-generated files, no code executed on the server) or server performance issues (maps interactivity will use directly the client CPU).

### **DATA PROVIDERS**

<table>
<thead>
<tr>
<th>Required steps in order to publish macroseismic intensity data:</th>
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<tbody>
<tr>
<td>- macroseismic data standardization and formatting</td>
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<tr>
<td>- data upload to a local or remote MySql database</td>
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<tr>
<td>- customization of the final layout using the MIDOP GUI</td>
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<tr>
<td>- generation of the website (.html pages, tables, maps)</td>
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<tr>
<td>- upload of the generated code to the public server, or cdrom creation</td>
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</tbody>
</table>

Updates are made easy by re-generating the parts modified since the last upload.

### **USERS**

![Screenshot of the MIDOP GUI control panel](image)

#### **<QuakeML> macroseismic extension**

In order to publish exchangeable data on the web, MIDOP uses the QuakeML markup, which was easy to adopt for describing the main earthquake parameters, such as the date, the epicentral position, magnitude and the data supplier information.

Since QuakeML does not provide a markup for describing macroseismic intensity observations, while designing MIDOP, we tried to extend the QuakeML dictionary. The generated QuakeML data is used by MIDOP while importing already published websites on the web, making it an effective test-bed before officially submitting an extension to the QuakeML committee.

### **Availability**

MIDOP is released under an open source license to any institution interested, and the package (600MB) is available at request (contact locati@mi.ingv.it).

The online homepage address is: http://www.emidius.eu/MIDOP

The following resources are openly available:

- a comprehensive user manual;
- a discussion forum;
- a pre-configured web and data server for Windows;
- example input data tables.

MIDOP is based on well established standards and it is designed to be easily customized; users can change geographical layers, symbols and the layout can be changed with few clicks: go on, try it with your data!

### **Parametrizator - Automatic calculation of epicenter parameters**

The AHEAD archive processes macroseismic intensity datapoints (MDP) in order to obtain earthquake parameters such as the epicentral coordinates, the moment magnitude, an estimated depth, as well as their associated uncertainties.

Three softwares, coming from three different methods, are being used: Bakun and Wentworth (BW) 1997, Boxer (Gasperini et al., 1999) and MEEP (Musson and Jiménez, 2008).

The three methods have three different implementations, two are based on an open source code (BW and MEEP) and the other on a closed source code (Boxer), which comes as a pre-compiled MS Windows executable.

AHEAD data are intuitively batch-processed by "Parametrizator", a tool letting the users customize all possible aspects, ad hoc regional calibrations, numerical values associated to non-standard intensity estimates (“felt” or “damage”).

![Screenshot of the configuration user interface](image)