



INQUA Project #0811

“A global catalogue of Earthquake Environmental Effects”

## **Guidelines for the EEE Catalogue Web Implementation**

### **Preface**

This document is aimed at supporting participants to the 0811 INQUA TERPRO Project “A global catalogue of Earthquake Environmental Effects” in the compilation of the EEE Catalogue.

The main aim of the EEE Catalogue will be to collect in a standard format the wealth of information of environmental / geological effects induced by a seismic event, in order to bridge a gap between recent, historical (e.g. data derive from historical sources) and paleoearthquakes (e.g. data derive from paleoseismic investigations) and to allow a more objective comparison among them, taking advantage from the application of the ESI scale.

Participants to the compilation of the EEE Catalogue (“compilers”) are recommended to provide all data available on the effects induced by a seismic event including also historical and paleoearthquakes. Each dataset completed in terms of available information will be welcome since it will provide the most complete picture, although not exhaustive, of the entire scenario of earthquake environmental effects.

Of course, the quality of the available database is expected to be very different according to the earthquake date, in terms of completeness, reliability, and resolution of locations. However, the EEE Catalogue is aimed at collecting earthquake environmental effects as data input for seismic intensity evaluation, beyond their differences in data quality. In fact, previous studies have clearly shown that effects documented in historical sources are frequently the most remarkable effects (i.e. the most diagnostic) and therefore can be conveniently used for intensity evaluation. Similarly, considering paleoearthquakes, the dataset deriving from paleoseismic investigations cannot be representative of the entire scenario, but includes anyhow significant data (i.e. local coseismic fault displacements) which are very helpful for a minimum measure of the earthquake energy.

### **General information about the EEE Catalogue**

The EEE Catalogue is designed in PHP format. Two different interfaces have been developed:

1) *Web Implementation interface*, <http://www.eeecatalog.sinanet.apat.it/admin/login.php>

This Web Implementation interface is developed to support the remote compilation of the EEE Catalogue. Therefore the access is restricted to compilers.

In order to start the Web Implementation, you are kindly requested to:

- 1) go to <http://www.eeecatalog.sinanet.apat.it/admin/login.php> and register for log-in (choose a username and a password);
- 2) send an email to the EEE Scientific Secretary ([inquascale@apat.it](mailto:inquascale@apat.it)) reporting your username and the list of earthquakes that you are going to compile, specifying date, epicentral area,

data sources for EEEs, and list of authors (i.e. compilers) of each earthquake record (not more than 2).

The Scientific Secretary will add a specific record for each earthquake (a unique Earthquake code) and authorize the compiler to editing this earthquake record. Only one compiler will be authorized for each earthquake record. Therefore, in case more than one Author will contribute to compile the same earthquake record, they are expected to share the same username.

At the end of the Web Implementation phase, compilers are requested to send an email to the Scientific Secretary ([inquascale@apat.it](mailto:inquascale@apat.it)) asking for validation and publication. Data collected in each earthquake record will be verified by the Scientific Committee in terms of technical (i.e. standardization) and scientific quality.

*Public Viewing interface*, <http://www.eeecatalog.sinanet.apat.it/earthquakelist.php>

Only earthquake records validated by the Scientific Committee will be added to the public version of the EEE catalogue.

From this interface, it will be possible to view the distribution of localities (labels: locality name; ESI local intensity) and sites (labels: site name; type of effect, image). Moreover, it will be possible to export data in .XLS for plotting on your own PC through a GIS.

## **Structure of the EEE Catalogue**


The EEE Catalogue is structured to collect information at three levels of progressive details (Earthquake, Locality, Site), corresponding to three different tables.


1. The Earthquake Table will contain general information about the seismic event.
2. The Locality Table contains information about the characteristics of a specific locality where some EEEs have occurred. The local intensity assessment (from ESI or traditional scales) must be provided at this level.
3. The Site Table contains information at the site of each EEE including detailed characteristics on the type of earthquake.

A spatial component of the EEE catalogue has been developed using the Google Maps platform. For each earthquake record it will be possible to display the location of the epicentre (a yellow star), Localities (red points) and Sites (orange points).

For the implementation of the spatial component, it will be mandatory to fill the Coordinates fields. The system will use only geographic coordinates (latitude and longitude) in decimal degrees. Please use “.” to separate integers. If your data are in Degree, Minute, Second (DMS) system you are kindly requested to convert into decimal degrees. An helpful tool for this conversion is the Coordinates Converter developed in Excel, available in the home page main menu.

## Moving into the EEE Catalogue

All the compilers are allowed to view the collected data. For each table only some selected fields are displayed. By clicking the Lens button  it will be possible to open the entire table.

Earthquake records can be edited only by authorized compilers: by clicking on the Edit button  it will be possible to modify data and save them with the Edit button, located at the bottom of the mask.

For some fields, compilers will be requested to select from a menu. In case you will not find the right term, you can add it to the list of options (button: [Add](#)).

## Table Earthquake

**Earthquake Code:** it is composed by 11 digits. It is the primary key (univocal) for the table “Earthquake”. It is defined by the Scientific Secretary according to the following:

*For recent and historical earthquakes:*

2 digits country code = the initial letters of the country (please refer to the epicenter);

8 digits for date (yyyymmdd);

1 digit according to the type of shock (M = main shock; a = aftershock; f = foreshock).

Example: GR20041211m

*For paleoearthquakes:*

2 digits for country code;

5 digits for year (0yyyy if lower than 10,000 years)

3 digits for “pal”

1 digit for progressive integer (in case of two events of the same age in the same country);

Example: IT17500pal1; SP06540pal2

**Year, Month, Day:** dates are referred to the Christian calendar division, where AD = Positive; BC = Negative. Only Year is mandatory.

**Date Uncertainties:** It is an estimate, in years, of the degree of uncertainty of the date. It is a mandatory field for paleoearthquakes which are affected by a dating uncertainty. It can be used also for historical earthquakes in case of important uncertainties in date (> than 1 year). In case of exact date, this field can be empty.

**Hour, Min, Sec:** These are optional fields.

**Epicentral Area:** This is a mandatory field.

**Country:** This is a mandatory field.

**Epicentral Latitude and Longitude:** Coordinates of the epicentres. Mandatory fields.

**SRL:** Surface Rupture Length = the total length of coseismic surface faulting, in km.

**MaxD:** the Maximum Displacement, in m.

**Slip Type:** select between the options (optional field);

**Total area of Secondary Effects:** this field should be filled at the end of the compilation of the record. The measure unit is km<sup>2</sup>. This is a mandatory field for the ESI epicentral intensity assessment.

**Number of Effects:** This field should be filled at the end of the compilation of the record as a measure of the wealth of information behind the ESI intensity assessment.

**Damage based Epicentral Intensity and Intensity Type:** These two fields record the epicentral intensity values and type using traditional damage-based macroseismic scales. These are mandatory fields for recent and historical earthquakes (of course, empty for paleoearthquakes).

**Magnitude and Magnitude Type:** These two fields record magnitude values and types. These are optional fields (of course, empty for paleoearthquakes).

**ESI epicentral intensity:** This mandatory field records the ESI epicentral intensity value based on the total distribution of surface faulting and/or the total area of secondary effects. In case available data do allow this assessment, this field should be filled with the maximum value among ESI local intensities (see next).

**Authors:** the Authors of the compilation of this record. Not more than 2 authors are allowed to compile the same earthquake record. This field is filled by the Scientific Secretary.

## Table Locality

**Locality Name:** the name of the locality (es. village) representing an area linked to a specific local intensity assessment. It is a mandatory field.

**Town / District:** the name of a town or a district representing a geographic area which includes more than one localities (es. province). It is a mandatory field.

**Local Latitude and Longitude:** Coordinates of the locality. Mandatory fields.

**Locality altitude:** An average value of the altitude of the locality in meters. It is a mandatory field.

**Local PGA:** Local measure of Peak Ground Acceleration, when available. It is an optional field.

**Geomorphological setting:** describe the geomorphological setting of the locality focusing on where EEEs have been recorded. It is a mandatory field.

**Damage based local intensity:** Local intensity value based on traditional macroseismic scales. It is an optional field.

**ESI local intensity:** Local intensity value based on ESI scale. Mandatory field.

## Table Site

**Site Name:** the toponym of the site where a specific EEE has occurred. It is a mandatory field.

**Site Latitude and Longitude:** coordinates of the site. Mandatory fields.

**Site Altitude:** The altitude of the site in meters. It is an optional field.

**Site geomorphologic Setting:** describe the geomorphological setting of the site. It is an optional field.

**Type Of Effects:** Select from the menu: Surface faulting; Slope movements; Ground settlements; Ground cracks; Hydrological anomalies; Anomalous waves; Other effects. It is a mandatory field.

**EEE Description:** A synthetic description of the EEE (not more than 250 characters). It is a mandatory field.

**References For Description:** Cite one or more references (contemporary report, scientific paper) for the source of the above description. It is a mandatory field.

**Image:** It is possible to upload an image of the effect (photographs, draws, sketches, etc.). To this end only JPEG formats at screen resolution (about 72 DPI) will be accepted. In any case, the size of the image must be lower than 1 M. The procedure for uploading requires to rename the file as "IdSite" which is the first field of the table Site (example: the image of the Site 109 should be renamed as 109.jpeg) and then to upload the file into the database.

## Details on EEEs

If you have more detailed information about the characteristics of the EEE you are describing you are kindly requested to record them, by clicking on the detailed tables of each type of effects (from the Table sites, in editing mode).

Although these fields are not mandatory: however, it is recommended to fill them whenever it is possible since these are basic data for ESI intensity evaluation.

### Surface faulting

**Strike, Dip and Slip Vector:** provide the local orientation in degrees of the fault rupture.

**Type Of Movement:** select from the menu the prevalent movement.

**Vert Local Offset and Horiz Local Offset.** The amount of local offset in meters.

**Displaced Features:** type what feature has been displaced.

**Scarp** Select between single or multiple scarp.

**Other Features:** indicate other features related to surface faulting.

**Length Of Fault Segment:** the local length of the fault segment. This value should not be confused with the total rupture length (see table Earthquake).

### Slope movements

**Type** select from the menu

**Max Size Of Blocks** in meters

**Total Volume (km<sup>3</sup>)** in km<sup>3</sup>

Width and Slip Amount the size of the slope movement

Linear Density and Areal Density In case a site is characterized by several slope movements

Humidity select from the menu

Time Delay in hours

### **Ground settlements**

Type select from the menu

Max Diameter in cm

Max Lowering /uplift in cm

Liquefactions Linear Density & Areal Density In case a site is characterized by several liquefactions

Liquefactions Shape select from the menu

Liquefactions Humidity select from the menu

Depth Of Water Table in m

Water Ejection Y/N

Sand Ejection Y/N

### **Ground cracks**

Origin select from the menu

Humidity select from the menu

Strike & Dip provide the local orientation in degrees of the ground crack

Areal Density In case a site is characterized by several ground cracks

Shape select from the menu

Max Opening in cm

Length in m

### **Hydrological anomalies**

Surface Waters Effects & Groundwater Effects select from the menu

Temperature Change in °C;

Discharge Change in l/s

Chemical Anomaly Y/N

Change Chemical Components type the chemical component

Gas Emission Y/N

Gas Element type the gas element

Duration Of Anomaly in days

Time Delay in hours

### **Anomalous waves**

Max Wave Height in m

Width of inundated area in m

Length Of Affected Coast in km

Time Delay in hours

### **Other effects**

Three Shaking Y/N

Dust Clouds Y/N

Jumping Stones Y/N

Other type the name of the other effect

Note additional field for notes