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Updating the Database

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This chapter describes how to increase the information available, or simply update the existing information, in the following *Structural* and *Support* tables:

- *Seismogenic Sources* of all types (section 4.1.);
- *Previous Fault Compilations* (section 4.2.);
- *Additional Geophysical/Seismological Data* (section 4.3.);
- *Tectonic Lineaments* (section 4.4.).

This chapter will allow any user to enter new seismogenic sources, modify existing ones, add new background information to them, and modify the content of the *Integrated Source Dataset* (§ 2.2.3.7.). It will also allow new or revised *Previous Fault Compilations*, new layers of relevant geophysical or seismological data, new or revised *Tectonic Lineaments* to be easily entered in the *Database* as soon as they become available (*e.g.*, following a new publication or the release of a new elaboration through the Internet).

The chapter <u>does not</u> describe how to update the information contained in most of the *Source Generic Support Tables* (§ 2.2.5.2.) and in all of the *Generic Support Tables* (§ 2.2.5.3.). The reasons for this decision are: 1) that the structure of this information, and hence of the associated tables, is rather complex, and 2) that the information contained in them is rather basic and is not likely to change significantly over the next few years. This condition applies to all seismological data, both historical and instrumental (§ 2.2.5.2.1., 2.2.5.2.2.), to the individual intensity data associated with the historical earthquakes, and to all *Geographic and Elevation Data* (§ 2.2.5.3.1.) and *Administrative Data* (§ 2.2.5.3.2.).

To update the *Database* the user will have to:
- use standard text editors and drawing programs to prepare the new or updated material;
- use the standard commands of the computer operating system to place the new or updated tables/ files in the appropriate location (§ 2.2.1.);
- use the standard commands and functions of MapInfo® to add new rows of data to the existing tables;
- use the standard commands and functions of MapInfo® to turn raster images into MapInfo® tables, and to georeference them if needed (for example, if the image is to become one of the *Previous Fault Compilations*);
- use the *Database* itself to perform the *Maintenance* (see section 4.5.), a routine that prepares and displays new graphic objects corresponding to the newly added information and updates the necessary software links.

Notice that the level of knowledge of MapInfo® and of its tools that is required to update the *Database* information varies greatly depending on the type of operation that should be performed. For

example, updating a text file requires very limited understanding of MapInfo®, of the structure of the *Database* and of the operating system of the computer used for the update operation. In contrast, adding new images or new *Surface Ruptures* to an existing source, adding a new source or adding a new *Previous Fault Compilation* requires substantial skills, not only to reach satisfactory results but also to avoid corrupting the *Database*.

4.1. ADDING INDIVIDUAL SOURCES

This section describes how to add a new seismogenic source to the *Database*, or to update/modify an existing one. At the end of the procedure described in this section the user must run the *Maintenance* (see section 4.5.) to allow the *Database* to create new graphic objects corresponding to the new/updated source. A new source corresponds to a new row of the relevant table and to a new graphic object automatically generated and associated with this new row of data during the *Maintenance*. Notice that no change in the graphical appearance of the *Database* will be visible before the *Maintenance* is correctly performed.

4.1.1. Entering source parameters

This section assumes that the user already knows all the parameters needed to represent the particular source type within the *Database*. For the sake of simplicity all our descriptions refer to the case of a new *Geologic/Geophysical* source being added to the *Database*. Therefore all the variables mentioned in the following section belong to the table **SourceGeol.tab** and must be entered directly in this table using standard MapInfo® procedures (*e.g.*, adding a new row of data, filling in the relevant variables, saving the updated table, etc.). Please refer to the scheme shown in § 2.2.3.1. for further details. Sources of different types require a subset of the operations described here, depending on the given source-type structure (§ 2.2.3.).

For a source of the *Geologic/Geophysical* category with associated surface ruptures the essential information includes:
- geometric and kinematic parameters;
- length, width, minimum and maximum depth from the surface of the rectangle that represents the projection of the source onto the surface;
- coordinates of the rectangle that represents the projection of the source onto the surface;
- coordinates of the northern and southern tips of the intersection between the projection of the fault plane and the surface (for E-W faults the two sets of coordinates are interchangeable). Notice that this condition applies not only to blind faults proper, but also to surface-breaking faults following the assumption that the minimum depth of faulting can never be less than 1 km (this circumstance is further discussed in § 2.2.3.1.);
- map location and references of any associated surface ruptures.

The user is encouraged to take advantage of the Microsoft® Excel code *FaultMapper 3.2* (Basili, 2000) for:
- obtaining the full set of coordinates for a source of known geometry and size but for which the location is known only with reference to a single point (for example, only the location of a corner is known);
- testing the impact of different fault parameters, both geometric and spatial.

FaultMapper is available to all users on the same physical medium used to distribute the *Database*. It can also be downloaded from the Internet site of the Istituto Nazionale di Geofisica e Vulcanologia (*http://www.ingv.it/*).

4.1.1.1. Assigning a new identification code

Any new source requires the assignment of an individual, unequivocal `SourceName` and `IDSource` for table **SourceGeol.tab**, **SourceHistA.tab**, etc. (see detailed characteristics of these variables in § 2.2.3.). `SourceName` should identify concisely the geographic location of the source and should not generate ambiguities with respect to nearby sources. The code `IDSource` must be assigned following the conventions described in § 2.2.3.1. through 2.2.3.6. (*e.g.*, in the range 1-200 for sources of the *Geologic/Geophysical* category), provided that the code has not been already assigned to an existing source.

4.1.1.2. Entering spatial and geometric parameters

The four pairs of latitude and longitude coordinates of the rectangle representing the surface projection of the source and the two pairs of coordinates of its intersection with the topographic surface must be entered as `latn`, `lonn` (where n varies between 1 and 4) and as `latN`, `lonN`, `latS`, `lonS`, respectively. Latitudes and longitudes must be expressed in degrees (up to three digits) and thousandths of degree (three digits), separated by a point (*e.g.*, "43.976", "7.289"). The default for all coordinates is "N latitude" and "E longitude". Notice that all these coordinates must be analytically consistent with all the other source parameters.

`Length` and `Width` describe the source size in terms of distance between the farthest edges and of down-dip width and must be expressed in kilometers. The product `length` $\times$ `width` returns the total source area (which is larger than the area of the surface projection of the same source).

`Strike`, `Dip` and `Rake` are standard angles describing the geometry and kinematics of the source. Notice that for sources derived from historical data the field `Strike` may optionally contain also the uncertainty on its determination.

`Min_depth` and `Max_depth` describe the minimum and maximum depth of the plane representing the source from the topographic surface, in kilometers.

Notice that all variables described must contain valid, non-null values. Failure to enter any of the parameters will cause malfunctions during the subsequent *Maintenance* procedure or ambiguities in the use of the *Database*. In any case, the graphic representation of each source is governed entirely by the assigned geographic coordinates. The user is hence responsible for checking carefully their correctness and consistency before entering new data.

4.1.1.3. Entering descriptive parameters

Descriptive parameters form the non-analytical part of the information supplied with each source and are optional although recommended for preserving the integrity of the source schematisation proposed in the *Database*.

`Quality` describes the reliability of the source data and is expressed by one or two parameters. The criteria adopted for rating all source types in the first release of the *Database* are discussed in § 2.2.3.1. and 2.2.3.2.

`Evidence` describes in plain words the type of evidence used to identify and characterise the given source. The user is invited to refer to the definitions already used for existing sources to preserve homogeneity.

`Compiled_by` gives credit to the compiler(s) of all the information gathered for the given source and of all resulting estimates. Please remember that this implies that the compiler(s) share(s) with the editors of the *Database* full scientific responsibility for the given source.

Finally, the field `Preferred` is used during the *Maintenance* to decide whether the new source should or should not be included in the *Integrated Source Dataset* (§ 2.2.3.7.). Leaving this field empty defaults to "F" (False), which means that the source will not be included in the *Integrated Source Dataset*.

4.1.1.4. Entering surface ruptures

The user may want to represent in the cartographic interface one or more surface ruptures (§ 2.2.3.9.) that are thought to slip in conjunction with one or more sources of the *Geologic/Geophysical* category. Notice that the procedure described below requires mastering most of the fundamental functions of MapInfo® and is not recommended to inexperienced users.

To enter new surface ruptures you must first run the *Database* and locate the surface ruptures using the Digital Elevation Model, the drainage data, information contained in the *Additional Geophysical/Seismological Data*, or a raster image prepared and georeferenced expressly for this purpose (*e.g.*, the scanned version of a field map, a figure from a paper, a figure from the *Database* itself, etc.). You must then:

1) close the *Database* and go back to the standard MapInfo® tools;
2) click on the *Layer Control* button and turn the *Cosmetic Layer* to "editable";
3) open the table **FaultScarps.tab**;
4) draw a single uninterrupted surface rupture using the Polyline tool;
5) use the menu sequence *Map > Save Cosmetic Objects* to transfer the newly drawn surface rupture to **FaultScarps.tab**;
6) if you have more than one surface rupture to draw, or if the surface rupture must be represented by two separate fragments, go to (3) and cycle the steps (4) through (5) until needed (however, it is strongly recommended that you work on a limited number of fragments at a time);
7) click on one of the existing surface ruptures, select the "Style" button and take note of the standard style and colour used by the *Database* to represent them. The standard style is a continuous line with barbs marking the downthrown side of the rupture;
8) apply the same style and colour to the new surface ruptures. In doing so please notice that the style selected will cause the barbs to be on one side or on the other;
9) browse the table **FaultScarps.tab** and complete the information needed to identify each single strand of surface rupture:
   • the `IDSource` of the source that is thought to be connected with the given surface rupture;
   • a progressive `IDScarp`, valid only for the subset of surface ruptures connected to a single source;
   • the name of the relevant source (optional);
   • the name of the given fragment of surface rupture, possibly following the common usage found in the scientific literature concerning the given region (optional);
   • the reference of the paper where the given fragment was first described/established. The reference must appear among the references associated with the relevant source. Leaving this field blank indicates that the surface rupture was established by the compiler(s) of the relevant source.
10) Save **FaultScarps.tab** (this will overwrite the existing table; you must create a backup copy of it beforehand if you want to retain the original information) and run the *Maintenance* procedure.

Notice again that this procedure generates graphic objects unequivocally identified by their logic (but supposedly also physical!) link with an existing source. The *Database* stores the geographic location of all surface ruptures in its own internal format. The coordinates of a given fragment can hence be retrieved only using the MapInfo® standard tools.

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4.1.2. Adding explanatory texts for individual sources

This section describes:
- how to prepare the textual information that accompanies each source and how to name the text files correctly;
- where to put the new files and filenames.

4.1.2.1. Text content

In addition to the quantitative parameters, each source is described by two text files:

1) A *Summaries of the Main Studies on the Source* file that summarises in chronological order the papers that describe the source and its tectonic environment. This may include:
   - early papers on the field reconnaissance of the source;
   - papers that present the results of seismological or geodetic analyses of the last major earthquake generated by the source;
   - papers describing paleoseismological or geomorphological investigations;
   - papers presenting regional models that deal explicitly or implicitly with the specific source.

   Notice that the source parameters will be partly derived from papers referenced in the *Summary*. Also notice that the *Summary* is merely a synthetic description of published relevant work on the given source. As such, it should be as complete as possible but should not contain any comment or criticism by the compiler on any of the referenced papers.

2) A *Comments and Open Questions* file that separately summarises into two distinct sections the compiler's comments on the present level of knowledge of the given source (*Comments*) and on what still needs to be investigated or understood (*Open Questions*).
   The *Comments* section should:
   - justify the rating of the source;
   - acknowledge any existing competing models;
   - highlight any contradictions among papers and state which model/paper was preferred and why;
   - for any of the source parameters, explain from which paper, original observations or reasoning it was derived.

   The *Open Questions* section should summarise the questions still open about the identification and characterisation of the source, pointing out investigations that have never been done, observations that should be made and considerations on the relationships between the given source and the adjoining ones, with possible suggestions concerning future research efforts. An optional section termed "Links to other seismogenic sources" may be freely be added to the *Comments and Open Questions* file to highlight the relationships among neighbouring sources in better detail.

The *Summaries of the Main Studies on the Source* and *Comments and Open Questions* files for non *Geologic/Geophysical* sources (*i.e.*, all intensity-based sources) normally includes only a reference to the historical seismicity catalogue from which the given source was derived. The only exceptions are represented by the sources of the two categories *Historical - Well Constrained with Geological Background* and *Historical – Poorly Constrained with Geological Background* (§ 2.2.3.2. and 2.2.3.4.), for which a full literature background is supplied.

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4.1.2.2. Text format and other conventions

The two files containing the *Summaries of the Main Studies on the Source* and *Comments and Open Questions* should be written as plain text files with line breaks using Word or any simple text editor and according to the following format specifications:

- single line spacing;
- references written as: .... this was suggested by Black (1997), ... (Black, 1997), ... (Black and White, 1998), ... (Black et al., 1999);
- text width set at 17 cm maximum (corresponding to the width of the relevant dialog box).

No specific font or style (*e.g.*, italic) can be used because plain text files do not retain the font information. Use the font that is most convenient for preparing the texts and then let the editor choose its pre-set one when the file is saved.

4.1.2.3. Naming and placing the text files in the *Database*

All the names of the text files have the same structure. Use the following examples to understand how to name files:

- **S-ITA007.txt** (for the "*Summaries of the Main Studies on the Source*" file)
- **Q-ITA007.txt** (for the "*Comments and Open Questions*" file)

where "S" and "Q" indicate that the file contains a "*Summaries of the Main Studies on the Source*" or "*Comments and Open Questions*" text for the given source, "ITA" stands for the country the source is in (Italy, in this case), "007" is the conventional three-digit ID of the given source.

The **S-ITA*.txt** file must be placed in the **Previous_Studies** subfolder of the **Source_Literature** folder, while the **Q-ITA*.txt** file must be placed in the **Open_Questions** subfolder of the **Source_Literature** folder.

4.1.2.4. Updating the assign studies and assign questions tables

Finally, the names of the new files must be manually entered as new rows of the **Assign_Studies.tab** (for the **S-ITA*** file) and **Assign_Questions.tab** (for the **Q-ITA*** file). For both tables the information to be entered is the following:

- IDSource > conventional ID of the source to which the text is assigned;
- FileName > name of the file that contains the text.

Notice that these tables do not need to be sorted after appending new rows and that no *Maintenance* is required after having entered new text files.

4.1.3. Adding pictures and captions for individual sources

This section describes:

- How to select pictures to be associated with a given source;
- How to prepare the pictures and their captions;
- How to choose the picture titles;
- How to create MapInfo® tables to display pictures;
- How to name picture files correctly;
- Where to put the picture and caption files;
- How to update the relevant *Instrumental Table* (**Assign_Pictures.tab**).

Notice that entering new pictures in a new release of the *Database* to be published requires permission by the copyright holder, if the picture is covered by copyright. Specific permission was obtained for all of the pictures contained in the first version of the *Database* that were shown to be covered by copyright.

4.1.3.1. Selecting pictures

The choice of the pictures to be associated with any given source is entirely up to the compiler. Suitable pictures include scanned figures or photographs from published papers, original (*i.e.*, unpublished) raster images prepared by the compiler, original (*i.e.*, unpublished) photographs taken by the compiler or for which informal permission has been granted by the author. A picture may also be created by assembling pictures and photographs from different sources. The main requirement is that the picture be representative of one or more of the main features of the source, including its location or field appearance, trench logs, elaborations of source parameters, earthquake recurrence properties, etc. The size and quality of the original must be sufficient to grant readability even after scanning and compression. To improve the readability of pictures taken from journals or books it is often advisable to retain their original caption (in addition to the *Database* caption). This may involve: 1) scanning a larger area to include the original caption, or 2) mounting the original caption over the figure using empty space. In either case one should verify that even the finest print of the caption is fully readable after the picture has been entered in the *Database*.

Some publishers require that their copyright be explicitly marked on the image to be reproduced (*e.g.*, © 1998 American Geophysical Union). In the *Database* this procedure was always followed when explicitly requested by the publishers, but also in the case of journals that do not enforce a strict copyright policy.

4.1.3.2. Preparing a new picture

To generate appropriate picture files you need a graphic software to manipulate the raster ("bitmap") images to be entered in the *Database*, and MapInfo® to create the new tables associated with the pictures.

Composing the picture

Scanned images should be first saved in any of the common graphic formats (*.tif* format recommended) with a resolution in the range 200-400 dpi depending on the size of the picture, on the size of the smallest characters or symbols in it, and on its general appearance. Since MapInfo® displays only raster images, any original images available in vectorial format must be first converted into raster. The saved graphic file must then be opened to create additional blank space for the caption, either at the bottom of the figure or on its right-hand side. The amount of space varies depending on the size of the caption, but is normally in the order of about 2 cm for horizontal captions below the picture and 5-6 cm for vertical captions next to the picture. The space should be enough to contain 254 characters written in Helvetica 14. The extended image must then be saved as a .jpg file with a compression factor in the range 70-100%, depending on the size of the figure and on the complexity of its information content. If no additional space is prepared MapInfo® will place the caption over the image. This is generally undesirable, but in some instances it could be done on purpose (*e.g.*, when the image is big but the graphic information in it is not very dense).

Naming the picture file

All the names of picture files have the same structure. Use the following example to understand how to name files:

F1_Pezza_scarp.jpg

A picture file name is composed of:
- a capital letter "F" for "figure";
- the conventional identification number of the source to which the picture refers, followed by the underscore ("_");
- the picture name, with words separated by the underscore ("_");
- the extension associated with the graphic format of the picture file.

The picture name can be composed using the name of the author(s), the year of publication, a significant characteristic of the picture, or any combination of all these elements (for example: Pantosti_etal_1993, Subsurf_geology, Montello_section). The maximum number of characters for a picture file name is 31, of which 4 are reserved for the suffix "_CAP" used for the caption corresponding to each picture and 4 for the suffix ".tab". Special characters like "." (dot) and "/" (slash) are not allowed by MapInfo®.

Preparing a MapInfo® table with a picture

Once your picture is properly formatted and named, you can turn it into a MapInfo® table ready to be entered in the *Database*. To do this please follow these steps:
- run MapInfo® and go to the menu *File > Open Table*: an *Open Table* dialog box will appear;
- select *Raster Image* in the *Format* pop-up window that appears at the bottom of the dialog box;
- open the picture to be entered in the *Database*;
- when prompted by the system, select *Display*. This will make the picture appear centred on the window and will create a MapInfo® table with the same name of the original picture except for the extension (.tab instead of .jpg, .tif, etc.). The new table will be placed in the same folder as the original picture. This is also the time to verify the presence of the blank space previously allocated for the caption;
- close the new table by clicking *Close All* from the menu *File*.

The last step of this procedure is to open the relevant folder and verify that the file has been correctly placed and named. For a picture called

F1_Pezza_scarp.jpg

MapInfo® will have created a table called

F1_Pezza_scarp.tab

If the picture file name has the correct MapInfo® icon but does not contain the extension ".tab" (this may depend on the computer you are using), you must add it manually to match the conventional file name established through the **Assign_Pictures.tab** (§ 4.1.3.5.).

4.1.3.3. Creating captions

Captions are created using a text editor or using MapInfo® directly. The caption must describe very briefly the content of the picture, or the portions of the picture that are relevant to the specific seismic

source, and must give appropriate credit to its author(s). The caption must be succinct also because MapInfo® allows a maximum of 254 characters to be displayed all at once. Use the text editor to count the characters of your caption, or proceed by trial-and-error. The reference to the author(s) must be made in one of the following ways: ...(from Black and White [2000]), ...(from Black et al. [1999]), ...(from Black et al. [1999], modified), ...(photo courtesy of John Smith). If no credit is given it is assumed that the figure was entirely prepared, or the photographs taken, by the compiler.

When the caption is ready in your text editor make a copy of it in the clipboard and then:
- run MapInfo®;
- open the MapInfo® table to which the caption refers and maximise it (full screen);
- click on the *Layer Control* button and turn the *Cosmetic Layer* to "editable";
- click on the *Text* button of the MapInfo® *Drawing* or *Standard* buttonpads (marked by an "A") and place the cursor where you want to start writing the caption (below the image or next to it, depending on how the additional blank space was laid out);
- type a single character to create the graphic object that will contain the caption, then edit it by double-clicking it with the pointer tool from the buttonpad. This will open a *Text Object* dialog box. Place the cursor in the empty box indicated by "text" and paste the text stored in the clipboard;
- set the *Line Spacing* at 1.5 and the *Style* to Helvetica;
- set the *Font Size* to 16-18 pt, depending on the space available for the caption. Notice that the font size is a function of the screen size. This description assumes that you are using a 1024×768 pixel screen; smaller screens will require a proportionally smaller font;
- close the dialog box by pressing OK and look at the outcome of the operation. If the caption does not fit under the figure you must re-edit it and introduce line breaks in-between words to force the alignment. This procedure is normally cycled 2 or 3 times until the appearance of the caption is satisfactory.

The caption is now ready and stored in the *Cosmetic Layer*. To save in a disk file go to *Map* menu and activate the command *Save Cosmetic Objects*. Press *SAVE* in the dialog box that will appear and enter the name of the caption file in the appropriate space. This name must be formed combining the full name of the picture with the suffix "_CAP", followed by ".tab". For example, the picture

```
F1_Pezza_scarp.jpg
```

will be contained in a MapInfo® table named

```
F1_Pezza_scarp.tab
```

and will have its caption in a MapInfo® table named

```
F1_Pezza_scarp_CAP.tab
```

To conclude the operation, close the new table by clicking *Close All* from the menu *File*. Then open the relevant folder and verify that the file has been correctly placed and named. By now MapInfo® should have created and placed in the same folder four different files:

```
F1_Pezza_scarp_CAP.tab
F1_Pezza_scarp_CAP.MAP
F1_Pezza_scarp_CAP.ID
F1_Pezza_scarp_CAP.DAT
```

In case of mistake, the caption file names can be changed only from inside MapInfo® (*menu Table > Maintenance > Rename table*). Please keep in mind that changing MapInfo® file names manually ruins them permanently.

4.1.3.4. Giving a title to a picture

Each picture is identified by a title that appears in the *Pictures* dialog box (from the menu *Source Info* >). The title has a maximum length of 50 characters and must be informative without redundancy. The same title cannot be assigned to more than one picture because the *Database* uses the titles as an identifier to retrieve the picture files. Notice that the title of the picture and the name of the picture file have quite different scopes. While the former informs the user on the content of the picture, the latter is mainly used by the system.

4.1.3.5. Updating the table assign pictures

The last step of this procedure is to enter the information concerning the new pictures into the table `Assign_Pictures.tab`. This is done manually by creating new rows and entering the picture information:

- `IDSource` > conventional ID of the source to which the picture is assigned;
- `Title` > title of the picture;
- `Picture` > name of the picture file;
- `Caption` > name of the caption file.

Notice that these tables do not need to be sorted after appending new rows and that no *Maintenance* is required after having entered new pictures.

4.1.3.6. Placing the picture and caption files in the *Database*

Any new picture concerning an existing source must be placed in the `F*` sub-subfolder of the `Pictures` subfolder of the `Source_Literature` folder. If the source has not been already established, the user must create a new empty folder named `F*`, where `*` is the `IDSource` to be assigned to the new source (§ 4.1.1.1.). Six new files must appear in the selected folder at the end of this procedure: two for the picture itself and four for the caption. For the usual picture called `F1_Pezza_scarp.jpg`, we will find:

```
F1_Pezza_scarp.jpg
F1_Pezza_scarp.tab

F1_Pezza_scarp_CAP.tab
F1_Pezza_scarp_CAP.MAP
F1_Pezza_scarp_CAP.ID
F1_Pezza_scarp_CAP.DAT
```

4.1.4. Adding references for individual sources

New references for existing or new sources or lineaments can be manually entered in the *Database* as new rows of the `Assign_References.tab`. See § 2.2.4.4. for the structure of this table and see existing references for details about the format (for example, the convention adopted to list the authors of a given article, map, book or manuscript).

In consideration of the large number of references that may be handled by the *Database*, it is strongly recommended that the `Assign_References.tab` table is not updated directly but rather

through a twin-file prepared with Microsoft® Excel, Microsoft® Word or any editor that may exchange files with MapInfo®. Notice that any new reference must be uniquely identified with the `Code_ReferenceID`, which is the code assigned to the given article, map, book or manuscript within the physical database of printed papers available at Istituto Nazionale di Geofisica e Vulcanologia in Rome. Resorting to a Microsoft® Excel copy of the references table allows an easier check of the existing codes and a safer assignment of a new one. At any rate, **`Assign_References.tab`** does not need to be sorted after entering new references and no *Maintenance* is required at the end of this procedure.

4.2. ADDING PREVIOUS FAULT COMPILATIONS

New or updated *Previous Fault Compilations* can be easily entered in the *Database* as soon as they become available. The procedure for entering a new *Previous Fault Compilation* involves adding a new row to the **`Compilations.tab`** table and filling-in the various fields comprising the table. See § 2.2.5.2.3. for the structure of this table and see existing references for details about the format (for example, the convention adopted to list the authors of the given *Previous Fault Compilation*).

The preparation of the actual graphic file containing the *Previous Fault Compilation* to be entered in the *Database* follows a procedure that is largely similar to that already described for the preparation of new pictures (§ 4.1.3.2.). Also in this case you must first generate appropriate picture files using a graphic software to manipulate the raster ("bitmap") images to be entered in the *Database*, and MapInfo® to create the new tables associated with the pictures. The main difference here is that the *Previous Fault Compilations* must also be accurately georeferenced using standard MapInfo® procedures. Please see sub-section "Composing the picture" in § 4.1.3.2. for all details concerning the image resolution and format.

There is no specific scheme form naming a new *Previous Fault Compilation*. The user may follow the general rules already discussed in the section on *Preparing a new Picture - Naming the Picture File* (§ 4.1.3.2.), except that no prefix is needed such as the "F*" used to identify all pictures related to the * source. Nevertheless it is recommended that the title begins with a geographic reference such that the compilations will appear listed in some geographically ordered fashion (refer to the existing table for further details).

4.3. ADDING ADDITIONAL GEOPHYSICAL/SEISMOLOGICAL DATA

New or updated layers of *Additional Geophysical/Seismological Data* can always be added to the *Database* at the user's convenience. Similarly to the case of the *Previous Fault Compilations*, the procedure for entering one of these layers involves adding a new row to the **`Additional_Data.tab`** table and filling-in the various fields comprising the table. See § 2.2.5.2.4. for the structure of this table and see existing references for details about the format (for example, the convention adopted to list the authors of the given layer of *Additional Geophysical/Seismological Data*).

The preparation of the file containing the new layer of *Additional Geophysical/Seismological Data* to be entered in the *Database* varies depending on whether the information is supplied as a vector file or as a raster image.

For vector-type information no special preparation is required, and the user is entirely in charge of deciding the style of representation (symbol type, symbol size, line thickness, colours, etc.) that best suits the *Database*. In deciding a style of representation, however, the user will have in mind the graphical contrast needed for representing the newly entered information over the existing *Database* tables such as Digital Elevation Model.

For raster information the procedure is similar to that already described for the preparation of *Previous Fault Compilations* (see section 4.2.).

The name of a new table of *Additional Geophysical/Seismological Data* is not governed by any convention such as the "F*" used to identify all pictures related to the * source. The name will simply describe at its best the content of the table or its authors.

A new vector-type table of *Additional Geophysical/Seismological Data* can be accompanied by as much information as it is available to the user. Once it is open, a table of this category follows the standard rules of MapInfo®. In particular, the information associated with the graphic objects can be retrieved through the *Object Info* tool from within the *Database*. More standard MapInfo® tools (*e.g.*, statistics, find/query, etc.) become available when the *Database* is closed and control is fully returned to MapInfo®.

4.4. ADDING TECTONIC LINEAMENTS

The procedure for updating the *Tectonic Lineaments* is very similar to that already described for updating the surface ruptures (§ 4.1.1.4.). To enter a new *Tectonic Lineament* you must first run the *Database* and locate it using the Digital Elevation Model, the drainage data, information contained in the *Additional Geophysical/Seismological Data*, or a raster image prepared and georeferenced expressly for this purpose (*e.g.*, the scanned version of a satellite image, a figure from a paper, a figure from the *Database* itself, etc.). You must then:

1) close the *Database* and go back to the standard MapInfo® tools;
2) click on the *Layer Control* button and turn the *Cosmetic Layer* to "editable";
3) open the table **Tectonic_Lineaments.tab**;
4) draw a single uninterrupted lineament using the Line or Polyline tool;
5) use the menu sequence *Table > Append Rows to Table* to append the newly drawn *Tectonic Lineament* to the existing ones;
6) click on one of the existing lineaments and take note of the standard style and colour used by the *Database* to represent them;
7) apply the same style and colour to the new lineament;
9) browse the table **Tectonic_Lineaments.tab** and complete the information needed to identify each single lineament:
   - the Name of the lineament as it was established by the literature;
   - a progressive ID that identifies it unequivocally. In assigning the ID the user should make sure to pick a code has not been already assigned to an existing lineament;
   - the name of the relevant source (optional);
   - the type of lineament, whether *Transverse* ("T") or *Generic* ("G");
   - the Reliability of the lineament, expressed with an adjective (*e.g.*, poor, very good, etc.; max. 16 characters);
   - the Evidence of the lineament, expressed with a description (the user is invited to refer to the definitions already used for existing lineaments to preserve homogeneity; max. 80 characters);
   - the Notes, a field that describes facts and open questions concerning the given lineament (max. 250 characters);
10) Save the table **Tectonic_Lineaments.tab** (this will overwrite the existing table; you must create a backup copy of it beforehand if you want to retain the original information) and run the *Maintenance* procedure.

Notice that a *Tectonic Lineament* can be associated with specific references following the same procedure as that seen for seismogenic sources of all types (§ 2.2.4.4. and 4.1.4.).

4.5. *DATABASE* MAINTENANCE

Once all the material concerning a new or updated source or lineament has been created and entered in the *Database*, you must run the menu *Maintenance > Updating Sources* to allow the *Database* to create new links and graphic objects corresponding with the current information. Wait for a completion message (*"Update Sources OK"*) and then check the results of your work. During this process the *Database*:

- creates the boxes, circles and hexagons associated with the different types of sources;
- links the surface ruptures to the sources;
- creates the *Integrated Source Dataset* (§ 2.2.3.7.) by merging all the sources that exhibit a "T" in the Logical field `Preferred` of all the tables containing seismogenic sources.