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# USER'S MANUAL OF THE NEW MED POL DATABASE

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## Preface

### *Definitions, Acronyms and abbreviations*

- ADO - ActiveX Data Objects
- ASP - Active Server Pages
- CRM – certified reference material
- CSV – Comma Separated Values
- DBMS - Database Management System
- EEA - European Environment Agency
- GIS – Geographic Information System
- HTML - Hypertext Mark-up Language
- HTTP - Hypertext Transfer Protocol
- ISAPI – Internet Server API
- MS – Microsoft
- MS IIS – Microsoft Internet Information Server
- ODBC- Open Database Connectivity
- SQL - Structured Query Language
- WWW - World Wide Web

## Chapter 1 Overview

### *What is the MED POL Database*

***MED POL Database*** has been developed for the specific needs of the MED POL Phase III Programme. It is designed for storing, exploring and presentation of MED POL Phase III Programme data and consists of:

- MS Access database including Data Management and Administration Module (file MEDPOL.mdb)
- Map Module for desktop database (file map.dll)
- Internet Module
- Map Module for Internet (file MEDPOLmap.dll)

First two items form desktop component, whereas last two items form Web component of ***MED POL Database****.*

### Database description

All MED POL Phase III Programme monitoring data are collected on monitoring stations, which are defined and fixed in Monitoring Agreements between country and MAP Unit. Samples for pollution parameters are taken regularly on each station, i.e. each station contains a set of samples. At least one analysis of each sample for pollution parameters is carried out, but in general several analyses can be done, for example, sediment sample can

be analysed as for Trace Metals as for Hydrocarbons. And finally, several pollution and background environmental parameters can be measured in analysis. Figure 1.1 represents hierarchical structure of MED POL monitoring data.

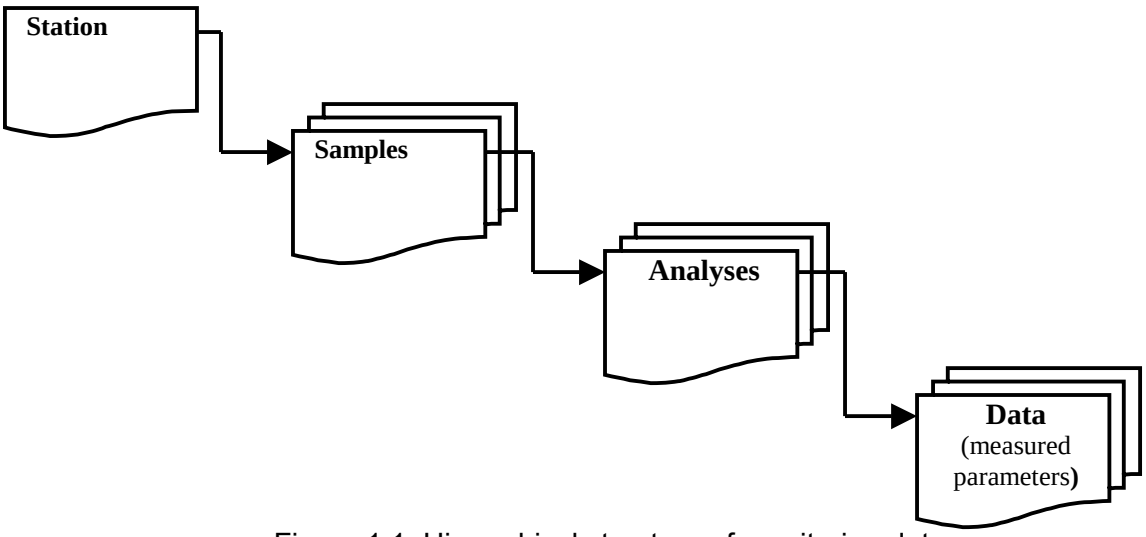



Figure 1.1. Hierarchical structure of monitoring data

Monitoring data are stored in tables. According to hierarchical structure, four main tables linked each other has been created**: Stations**, **Samples**, **Analyses**, and **Data**. In addition to main tables, ***MED POL Database*** contains in total 39 tables of 6 categories, which are listed in **Error! Reference source not found.**. Detailed structure of main Database tables is presented in **Annex 1**.

Main monitoring data tables (**Stations**, **Samples**, etc) contain special index, name of which starts with prefix “Unique”. These indexes ensure existence only unique stations in one area, only unique samples belonging to one station and so on. That means that user can’t occasionally create duplicates in the Database (i.e., duplicate stations, samples, etc), for example, loading data repeatedly by mistake.

**Table 1.1**. List of the ***MED POL Database*** tables

| Table name | Category |
|---|---|
| Stations | Monitoring data |
| Samples | Monitoring data |
| Sample Details | Monitoring data |
| Analyses | Monitoring data |
| Data | Monitoring data |
| Compliance Monitoring | Monitoring data |
| Areas | Monitoring program |
| Programme: Station Parameters | Monitoring program |
| Dictionary: Analysis Methods | Dictionaries |
| Dictionary: Biota Groups | Dictionaries |
| Dictionary: Countries | Dictionaries |
| Dictionary: CRM Codes | Dictionaries |
| Dictionary: Effluent Sources | Dictionaries |
| Dictionary: Individual Species | Dictionaries |
| Dictionary: Industrial Activity Groups | Dictionaries |
| Dictionary: Institutes | Dictionaries |
| Dictionary: Matrix Codes | Dictionaries |
| Dictionary: Monitoring Frequencies | Dictionaries |
| Dictionary: Parameter Groups | Dictionaries |
| Dictionary: Pollution Parameters | Dictionaries |
| Dictionary: Quality Codes | Dictionaries |
| Dictionary: Sample Parameters | Dictionaries |
| Dictionary: Station Types | Dictionaries |
| Dictionary: Tissue Types | Dictionaries |
| Format List | Formats |
| Format: ATM_DRY | Formats |
| Format: ATM_WET | Formats |
| Format: BIOMONITORING | Formats |
| Format: BIOTA_OC | Formats |
| Format: BIOTA_TM | Formats |
| Format: CRM | Formats |
| Format: LOADS | Formats |
| Format: Sea_Water | Formats |
| Format: SED_OC | Formats |
| Format: SED_TM | Formats |
| QA: CRM Analysis | Quality assurance data |
| QA: Laboratory Certification | Quality assurance data |
| Parameter Aliases | System |
| Switchboard items | System |

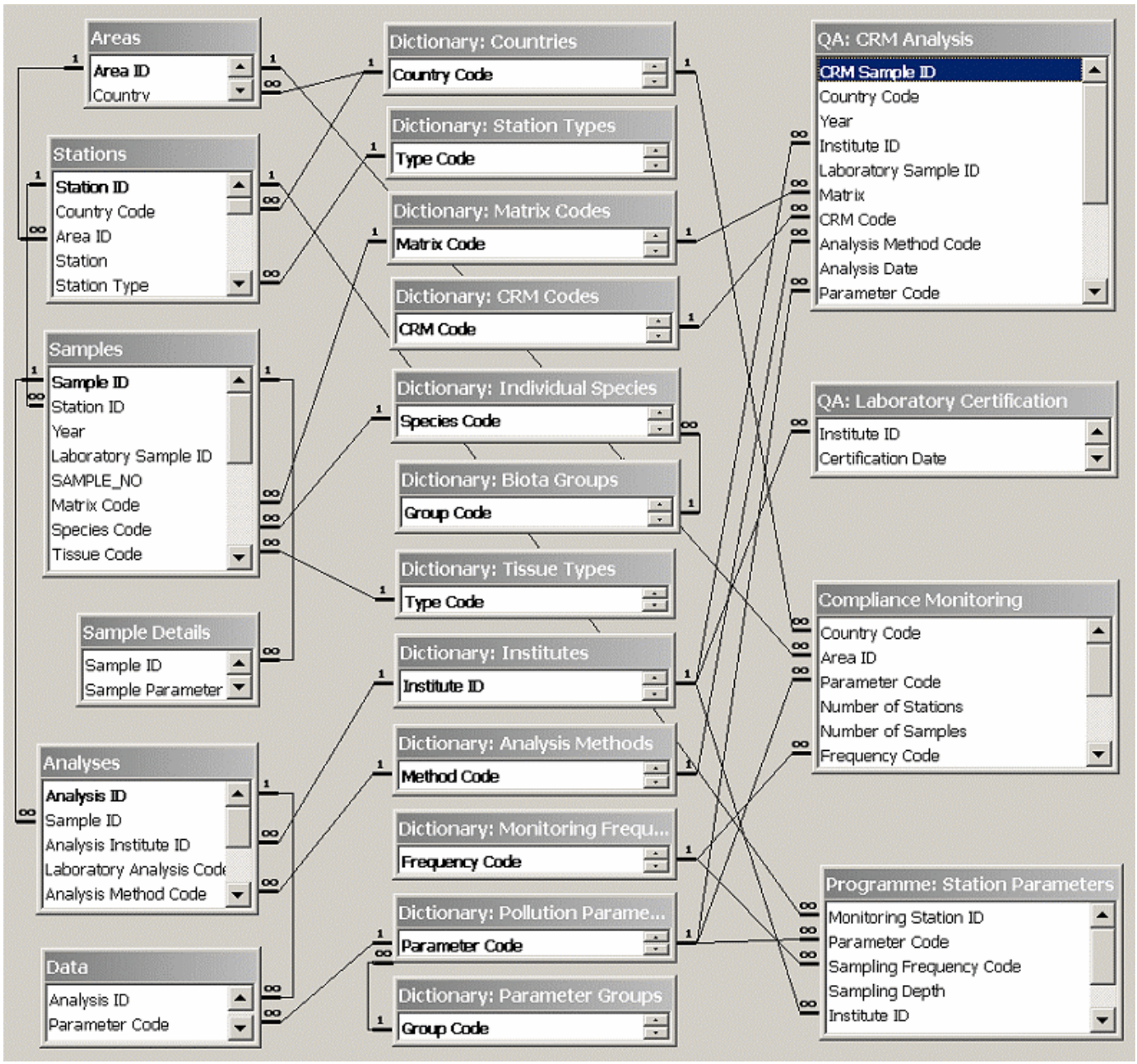



Figure 1.2. MEDPOL Database relationships

Relationship (links) between main tables has been established (see Figure 1.2) and referential integrity enforced to ensure that relationships between records in related tables are valid, and as result it is not possible accidentally delete or change related data. Established referential integrity includes cascade updating of related fields for all links, and in 4 cases it also includes cascade deleting of related records. These 4 cases are links between next tables: **Stations** and **Samples**, **Samples** and **Analyses**, **Samples** and **Sample Details**, **Analyses** and **Data**. Thereby, deleting one record in **Stations** table will force deleting of all related records in **Samples** table and so on down to **Data** table, ensuring impossibility of appearing dangling references, e.g. samples, which do not belong to any station, analyses, which do not belongs any sample and so on.

***Applications brief description***

The ***MED POL Database*** consists of the next applications:

- **Data Management and Administration Module**
- **Map Module for desktop database**
- **Internet Module**
- **Map Module for Internet**

**Data Management and Administration module** is essential part of the ***MED POL Database***. This is desktop application, which starts automatically when MEDPOL.mdb file is opened. It implements next functionality:

- Data loading
- Data browsing
- Data editing
- Selection of data on different criteria
- Visualization of data

**Data Management and Administration module** consists of set of MS Access forms, queries, reports and VBA modules. Special **Switchboard** form is developed for quick selection of necessary module component.

**Map Module for desktop database** (map.dll) is a special application for displaying a map of Mediterranean with positions of database stations. **Map Module** requires configuring of System Data Sources for connecting to proper .mdb file. Description of functionality of the **Map Module** is done in section
Stations ***Map***.

**Internet Module** is set of static HTML files and dynamic ASP files, developed for presentation of the ***MED POL Database*** information in Internet. The Database Snapshot is used for publishing Database information in Internet. Database Snapshot and **Internet Module** files have to be copied and installed on Web Server for publishing.

**Map Module for Internet** (MEDPOLMap.dll) is an ISAPI application designed for dynamical generation of images with map of Mediterranean and position of stations on it. Images are generated on request of Internet user and sent for displaying in user's Web Browser.

## Chapter 2 Installation

### *Technical requirements*

Technical requirements differ for desktop component and Web component of the ***MED POL Database***.

**Table 2.1. Basic technical requirements**

| | **Desktop component** ***MED POL Database*** with Data Management and Administration Module and Map Module | **Web component** Internet Module and Map Module for Internet |
|---|---|---|
| **Operation System** | Microsoft Windows 98/ME/NT/2000/XP | Microsoft Windows NT/2000/XP with IIS |
| **Office software** | Microsoft Office Professional 2000 or XP | - |
| **Web Browser** | - | Internet Explorer 5.01, Netscape Navigator 6.0 |
| **Hardware** | | |
| Processor | Pentium II 350 MHz | Pentium II 350 MHz |
| Memory | 128 MB | 128 MB |
| Free disk space | 50 MB[1] | 50 MB[1] |
| Monitor mode | 1024x768, TrueColor | - |

**Table 2.2. Recommended configuration**

| | **Desktop component** ***MED POL Database*** with Data Management and Administration Module and Map Module | **Web component** Internet Module and Map Module for Internet |
|---|---|---|
| **Operation System** | Microsoft Windows 2000/XP | Microsoft Windows 2000 Server with IIS 5 |
| **Office software** | Microsoft Office Professional 2000 or XP | - |
| **Web Browser** | - | Internet Explorer 5.5, Netscape Navigator 7.0 |
| **Hardware** | | |
| Processor | Pentium III 800 MHz | Pentium III 800 MHz |
| Memory | 128 MB | 128 MB |
| Free disk space | 50 MB[1] | 50 MB[1] |
| Monitor mode | 1024x768, TrueColor | - |

[1] The necessary free hard disk space depends on the volume of the database.

***Installation of the desktop component***

Installation procedure for desktop component of the ***MED POL Database*** is rather simple. It consists of 2 parts:

1. Copying of ***MED POL Database*** directory to the Client (destination) PC.
2. Installation of Map Module.

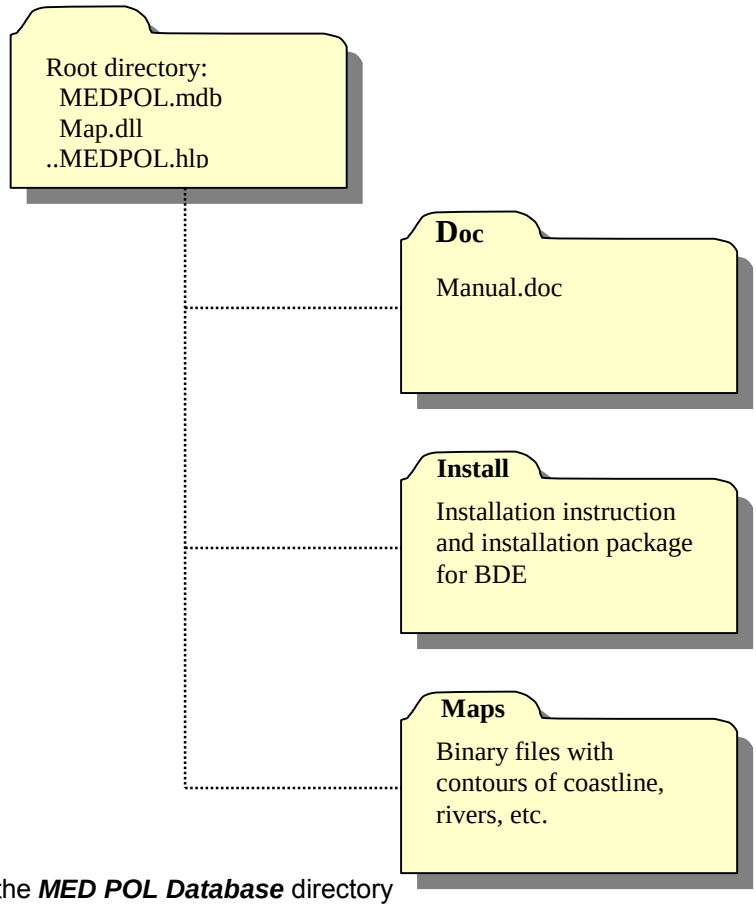



Figure 2.1. Structure of the ***MED POL Database*** directory

After copying, ***MED POL Database*** is ready for work - it is enough just open it with MS Access. All functionality of the database and **Data Management and Administration Module** will be available except mapping tool.

To install **Map Module** at the Client PC:

1. Open subdirectory Install
2. Run application SETUP.EXE.
3. Follow the prompts step by step: this will install BDE (Borland Database Engine) at the Client PC.
4. Create System Data Source for the ***MED POL Database***:
   a) Open ODBC Data Source Administrator using Start\Programs\Administrative Tools\Data Sources (ODBC)[1]
   b) Switch to System DSN panel
   c) Press [Add] button
   d) Select Microsoft Access Driver (*.mdb)

[1] Menu path is valid for Windows 2000. On Windows 98/ME/NT use Control Panel to open ODBC Data Source Administrator.

**e)** Press [Finish] button, and dialog for DSN setup will be opened
**f)** Type WorkMEDPOLDB as Data Source Name
**g)** Press [Select] button
**h)** Locate MEDPOL.mdb file in opened Select Database dialog
**i)** Select file and press [OK] button to close dialog
**j)** Press [OK] button to finish Data Source setup

***Installation of the Web component***

Installation procedure for Web component of the ***MED POL Database*** requires knowledge about Administration of MS Windows 2000 Server and Internet Information Server (IIS).

1. Copy Web component files and directories (see Figure ) to Web server computer.
2. Open subdirectory WebDB\Install
3. Run application SETUP.EXE.
4. Follow the prompts step by step: this will install BDE (Borland Database Engine) at the Web server, which is necessary for **Map Module**
5. Create System Data Source for the ***MED POL Database*** snapshot[1]
   **a)** Open ODBC Data Source Administrator using Start\Programs\Administrative Tools\Data Sources (ODBC)[2]
   **b)** Switch to System DSN tab
   **c)** Press [Add] button
   **d)** Select Microsoft Access Driver (*.mdb)
   **e)** Press [Finish] button, and dialog for DSN setup will be opened
   **f)** Type MEDPOLDB as Data Source Name
   **g)** Press [Select] button
   **h)** Locate ***MED POL Database*** Snapshot – file WebDB\Database\MEDPOL.mdb - in opened Select Database dialog
   **i)** Select file and press [OK] button to close dialog
   **j)** Press [OK] button to finish Data Source setup
6. Create new virtual directory for the MED POL Web site named, for example, MEDPOL
   **a)** Open IIS (Internet Information Server) console using Start\Programs\Administrative Tools\Internet Services Manager[3]
   **b)** Select desired Web site in IIS console
   **c)** In menu Action select New\Virtual Directory to open Virtual Directory Creation Wizard
   **d)** Type MEDPOL as virtual directory alias and press [Next] button
   **e)** Type [Browse] button, locate directory with Web com in Browse For Folder dialog, press [OK] button and then [Next] button
   **f)** Press finish to complete creation of virtual directory
7. Assign properties to newly created virtual directory and subdirectories
   **a)** Locate MEDPOL virtual directory in IIS console
   **b)** Click right mouse button on directory name to open popup menu
   **c)** Select Properties item to open MEDPOL directory properties
   **d)** Switch to Documents tab

[1] According to database model the ***MED POL Database*** *Snapshot* is used for publishing database information in Internet. *Database Snapshot* is a copy of the ***MED POL Database*** (i.e. copy of MEDPOL.mdb file) done at the moment when Database contains only verified data.
[2] Menu path is valid for Windows 2000. On Windows 98/ME/NT use Control Panel to open ODBC Data Source Administrator.
[3] Menu path is valid for Windows 2000. On Windows NT use Control Panel to open ODBC Data Source Administrator.

**e)** Press [Add] button, type index.htm in opened Add Default Document dialog and press [OK] button
**f)** Press [OK] button to save changes and close MEDPOL properties
**g)** Locate WebDB subdirectory and open its properties in the same way
**h)** Select Scripts and Executables in Execute Permissions field
**i)** Press [OK] button to save changes and close WebDB properties

**8.** Check security settings for the WebDB\Database directory. By default, Web directories on Web server have only Read security permissions for Internet Guest Account (IUSR). IUSR security permissions have to be set as Modify for this directory.

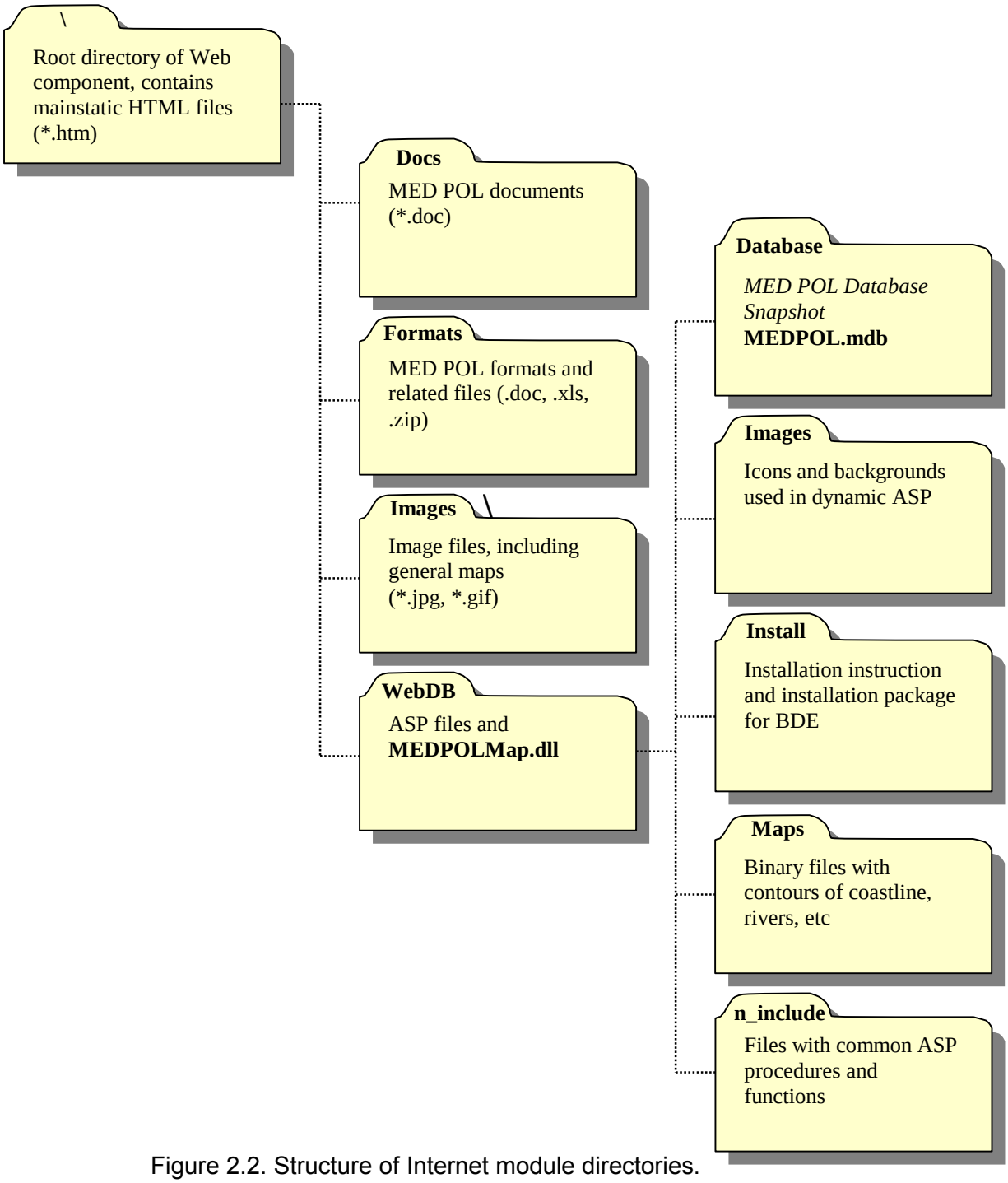



Figure 2.2. Structure of Internet module directories.

After installation check Web component in Web Browser typing its Web address in Address Bar as follows:

http://[Web server name]/[Web directory name], where:

- [Web server name] – domain (Internet) name or IP-address of the Web server
- [Web directory name] – name of virtual directory where Web component is installed

Follow links to check Web components functionality or type in Address Bar:

- http://[web server name]/[Web directory name]/WebDB/index.htm– for direct checking dynamic Active Server Pages

- http://[web_server_name]/[Web_directory_name]/WebDB/medpolmap.dll/getfullmap – for direct checking Map Module for Internet

## Chapter 3 Data Management and Administration Module

### *Before you start*

It is earnestly recommended to learn next basic MS Access Help section:

- Working with data
  - Ways to work with data in a table's datasheet
  - Ways to work with data in a query's datasheet
  - Adding or Editing data in Datasheet or Form
- Working with Datasheets and Subdatasheets
- Queries
- Reports and Report Snapshots

### *Default start screen*

**Data Management and Administration Module** is embedded into ***MED POL Database*** file MEDPOL.mdb. It consists of set of MS Access forms, queries, reports and VBA modules. Special **Switchboard** form is developed for quick selection of necessary module component. **Main Switchboard** form starts automatically when user opens file MEDPOL.mdb in MS Access.

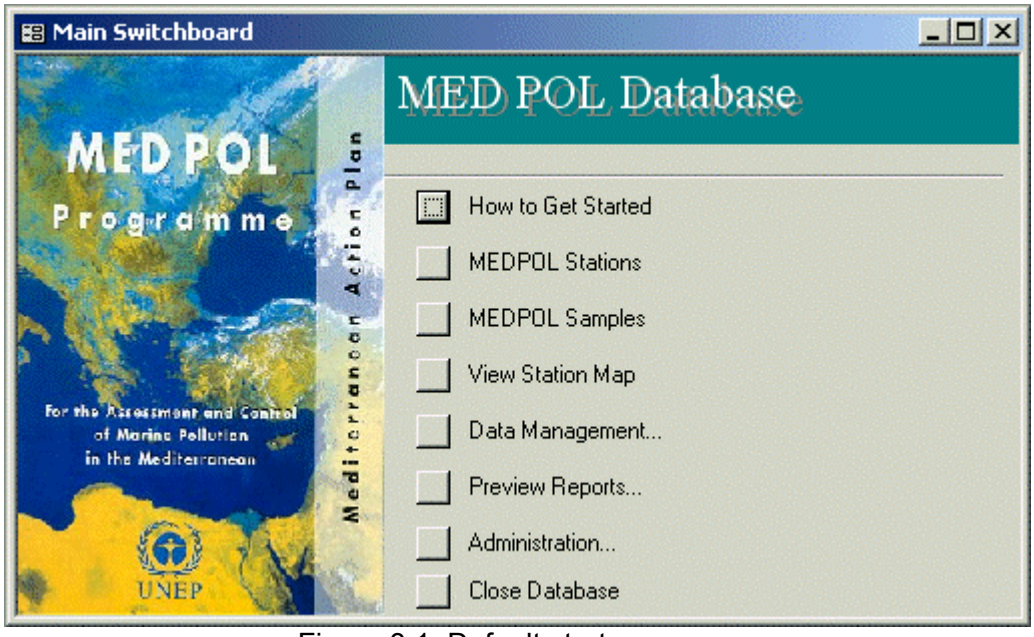



Figure 3.1. Default startup screen

User can click the buttons on the **Main Switchboard** form to go to the other parts of the application. In case button text ends on "…" (three dots), clicking it will open slave switchboard combining tasks with similar functionality such as data management or reports preview. **Main Switchboard** provides quick access to next tasks:

- **MEDPOL Stations** – opens form with MEDPOL stations
- **MEDPOL Stations** – opens form with samples stored in the database
- **View Stations Map** – open window with **Stations Map**
- **Data Management…** - switches to **Data Management Switchboard**
- **Preview Reports…** – switches to **Preview Reports Switchboard**

- **Administration…** - switches to **Administration Switchboard**
- **Close Database**

The rest of tasks are available from slave switchboards. Following paragraphs contain description of each **Data Management and Administration Module** task.

***How to Get Started***

[How to get Started] button of the **Main Switchboard** opens Windows Help application with ***MED POL Database*** Help. Help mainly contains information from the current manual and is context sensitive.

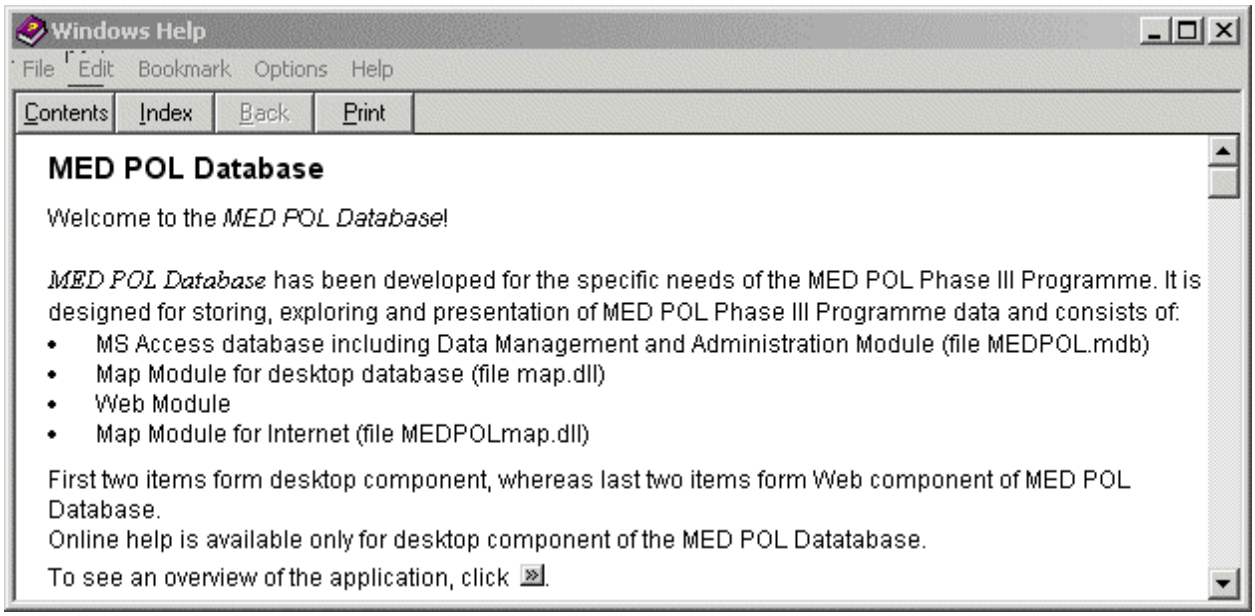



Figure 3.2. ***MED POL Database*** Help screen

***MEDPOL Stations***

**[**MED POL Stations**]** button of the **Main Switchboard** opens form for browsing stations stored in the database.

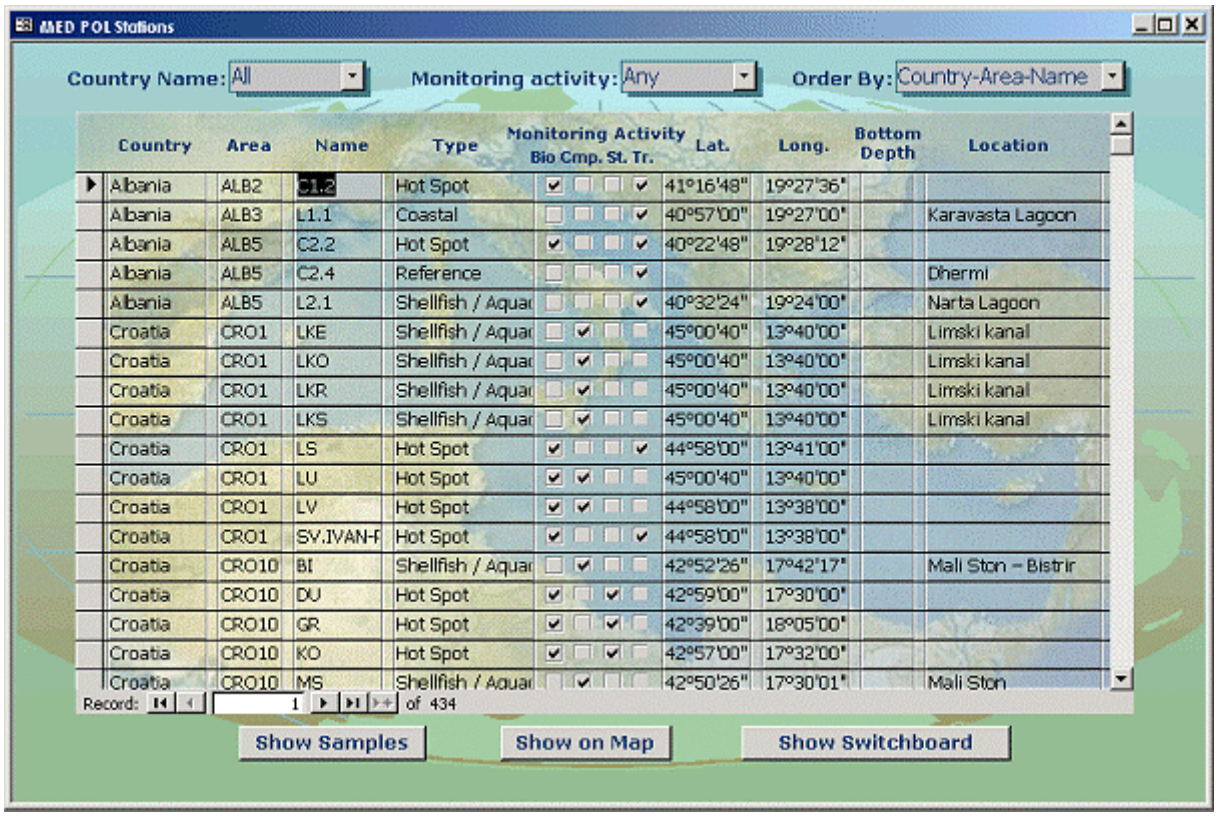



Figure 3.3. **MED POL Stations** form

Form contains station table with most common stations characteristics, such as: country name, area name, station name, monitoring activity, coordinates, etc. It also contains controls at the top of form for filtering and sorting stations, and action buttons at the bottom of form. User can navigate station table using vertical scroll-bar on its right side, or record selector at the bottom of table. Form displays all stations by default. User can assign country name and type of monitoring activity for filtering stations, and select one from 8 predefined sort modes for sorting stations. Filter and sorting order are applied immediately after changing control value, and data in station table are refreshed. User can edit station characteristics except coordinates[1].

Station table contains 4 columns with checkboxes, which are situated below common title "Monitoring Activity". Each column corresponds to one possible monitoring type, in particular:

- Column named "Bio" corresponds to monitoring of bio-effects
- Column named "Cmp." corresponds to compliance monitoring
- Column named "Tr." corresponds to trend monitoring
- Column named "St." corresponds to state monitoring

If checkbox is ticked off, the corresponding monitoring activity has place on this station.
Buttons at the bottom of MEDPOL Stations form have next functionality:

- Button [Show Samples] opens Samples form, which contains samples from current station. Samples form is synchronized with **MEDPOL Stations** form: moving to another record in **MEDPOL Stations** form will automatically refresh Samples form.

[1] Coordinates are originally stored in decimal form but transformed into geographical form for presentation thereby being disconnected from database table. For changing coordinates user has to open database stations table using [Browse Tables] button in **Data Management Switchboard**.

- Button [Show on Map] will bring to top **Stations Map** window with blinking marker of current station.
  Note: it is recommended to open **Stations Map** window preliminary with [View Station Map] button of the **Main Switchboard**.
- Button [Show Main Switchboard] just brings to top **Main Switchboard** window for quick switching to another task.

***MEDPOL Samples***

[MED POL Samples] button of the **Main Switchboard** opens form for browsing samples stored in the database.

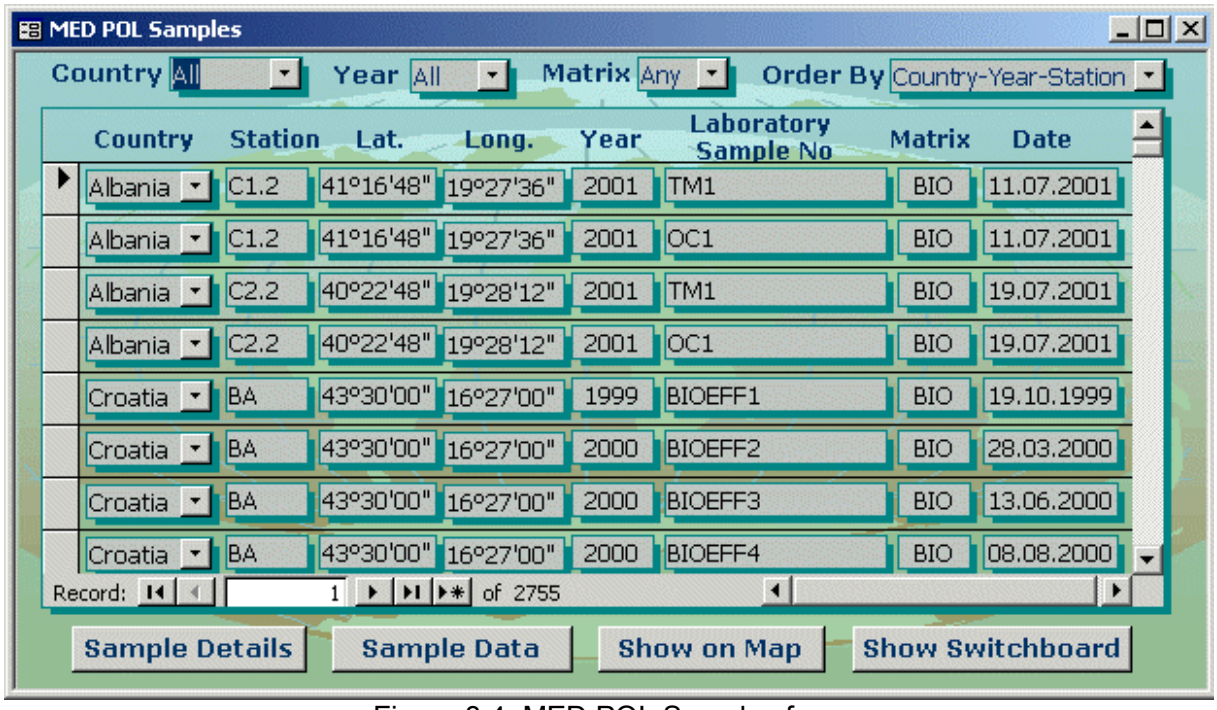


Figure 3.4. MED POL Samples form

Form contains sample table with most common sample characteristics: country name, station name, station coordinates, Laboratory Sample ID, matrix and date. It also contains controls at the top of form for filtering and sorting samples, and action buttons at the bottom of form. User can navigate sample table using vertical scroll-bar on its right side, or record selector at the bottom of table. Form displays all samples by default. User can assign country name, year and matrix for filtering stations, and select one from 3 predefined sort modes for sorting samples. Filter and sorting order are applied immediately after changing control value, and data in sample table are refreshed. User can edit sample characteristics except coordinates[1].

Buttons at the bottom of **MEDPOL Samples** form have next functionality:

- Button [Show Sample Details] opens **Sample Details** form, which contains additional characteristics of current sample. **Sample Details** form is synchronized with **MEDPOL Samples** form: moving to another record in samples form will automatically refresh Sample Details form.

[1] Coordinates are originally stored in decimal form but transformed into geographical form for presentation thereby being disconnected from database table. For changing coordinates user has to open database stations table using [Browse Tables] button in **Data Management Switchboard**.

- Button [Show Sample] data opens **Sample Data** form, which contains analyses and data of current sample. Sample Data form is synchronized with **MEDPOL Samples** form: moving to another record in **MEDPOL Samples** form will automatically refresh **Sample Data** form.
- Button [Show on Map] will bring to top **Stations Map** window with blinking marker of station which current sample is belonging to.
  Note: it is recommended to open **Stations Map** window in advance with [View Station Map] button of the **Main Switchboard**
- Button [Show Main Switchboard] just brings to top **Main Switchboard** window for quick switching to another task

**Sample Details** form contains table with 2 columns, first of which is sample parameter name, and second - its value. User can navigate **Sample Details** form using vertical scroll-bar on its right side, or record selector at the. User can edit, add or delete sample details data.

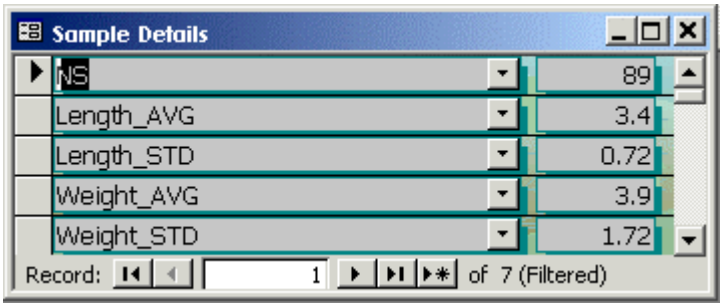



Figure 3.5. Samples Details form

**Sample Data** form contains 2 Datasheets, first one with analyses details, and second one with sample data. User can navigate sub-datasheets using vertical scroll-bar on its right side. User can edit, add or delete records in datasheets. Note: new record in **Data Datasheet** can be added after parent record in **Analyses Datasheet** is saved.

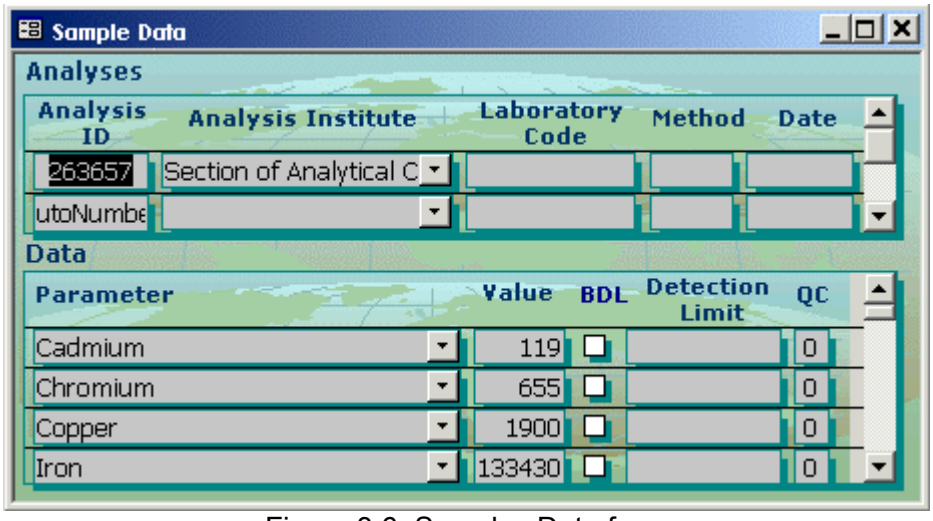
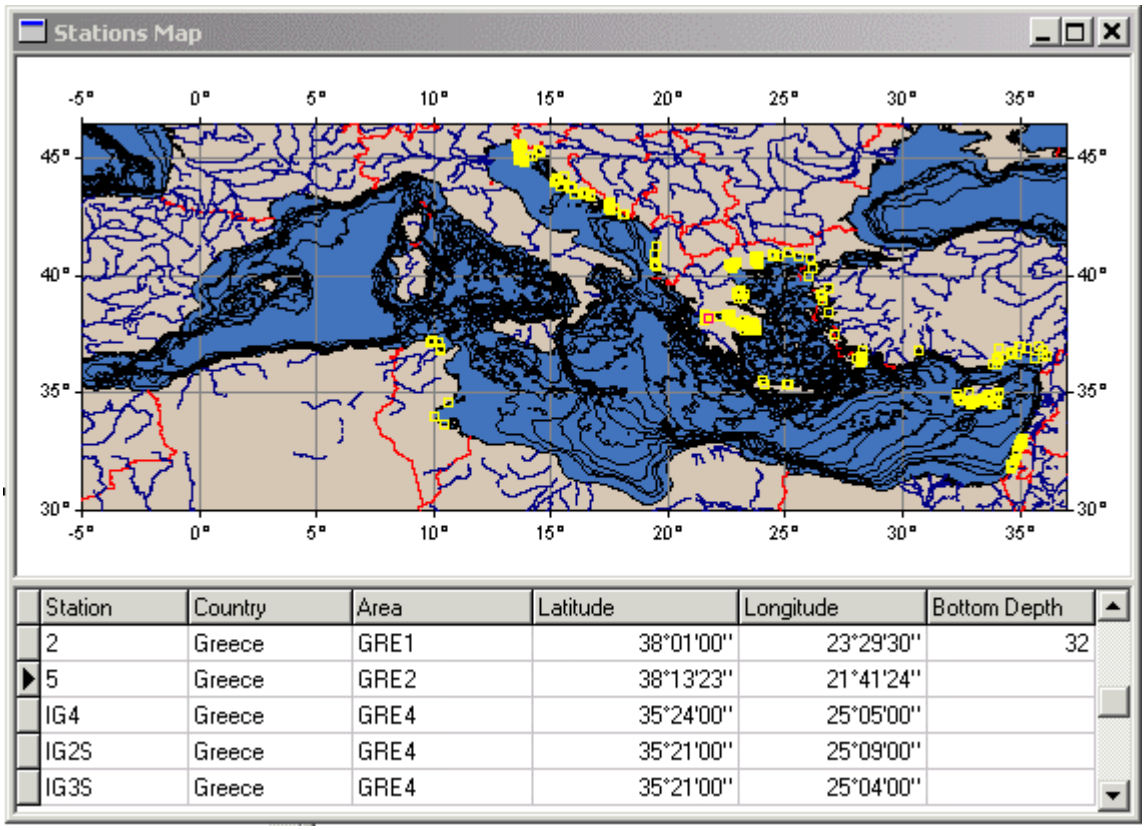



Figure 3.6. Samples Data form

***Stations Map***

**Stations Map** can be opened by pressing [View Stations Map] button in **Main Switchboard** or by pressing [Show On Map] button in **MEDPOL Stations** or **MEDPOL Samples** form. **Stations Map** is external application provided by **Map Module** in file map.dll, which has to be properly installed and configured on User's computer. Once opened **Station Map** window will retain in application memory is ready for using even being closed.




| Station | Country | Area | Latitude | Longitude | Bottom Depth |
|---|---|---|---|---|---|
| 2 | Greece | GRE1 | 38°01'00'' | 23°29'30'' | 32 |
| 5 | Greece | GRE2 | 38°13'23'' | 21°41'24'' | |
| IG4 | Greece | GRE4 | 35°24'00'' | 25°05'00'' | |
| IG2S | Greece | GRE4 | 35°21'00'' | 25°09'00'' | |
| IG3S | Greece | GRE4 | 35°21'00'' | 25°04'00'' | |

Figure 3.7. Stations Map form

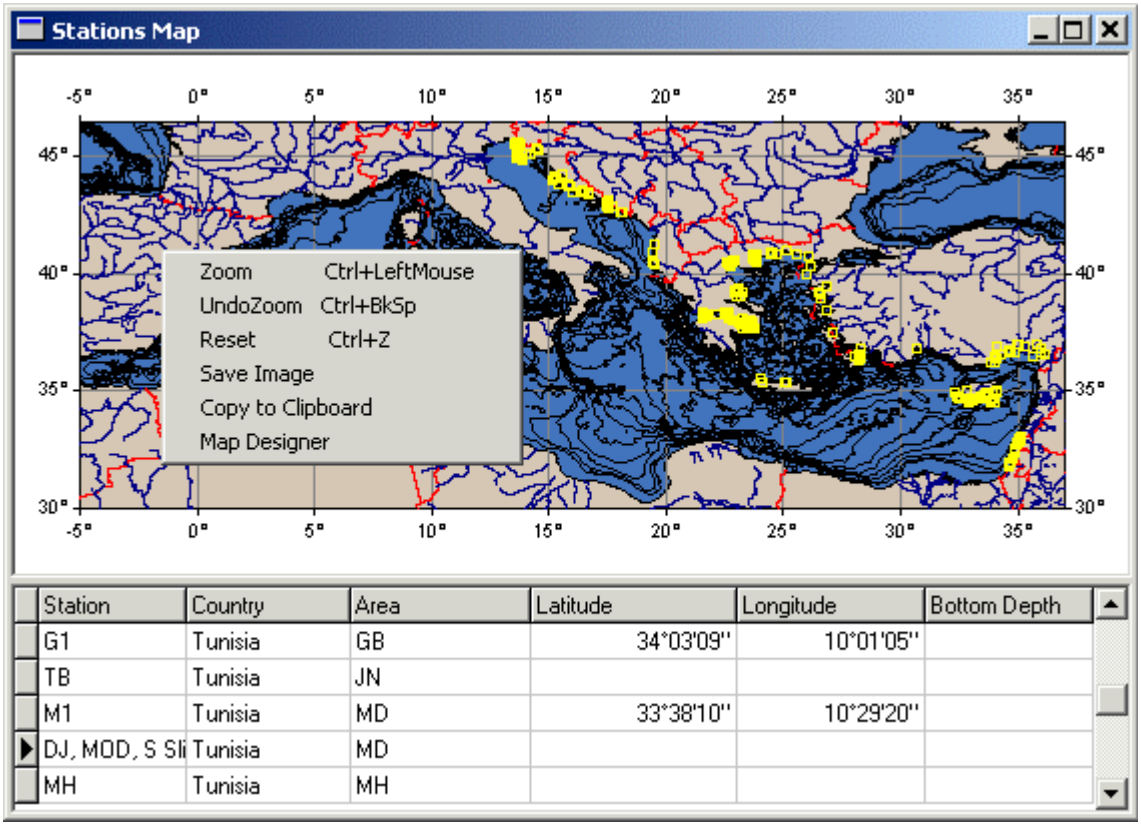
**Stations Map** form consists of image of map image and stations table.
Map image contains:

- Mediterranean coastline and isobaths (source: "GEBCO Digital Atlas CD-ROM")
- Country borders (source: CIA World DataBank II)
- Contours of main rivers (source: CIA World DataBank II)
- Markers of map positions

By default station markers are have yellow colour. Marker of current station in stations table is blinking. Map and station are synchronized: when user moves to another record in station table, blinking marker on the map change its position correspondingly, and when user click by mouse left button on station marker on the map, the record selector in station table immediately “jumps” to corresponding station.

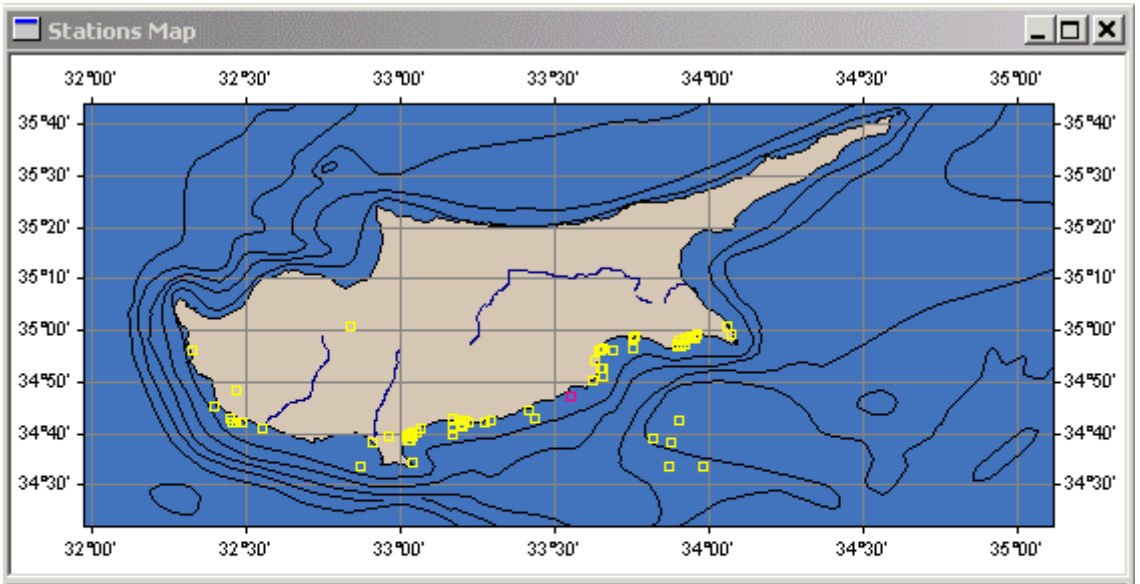
When user click with right mouse button on the map, the popup menu will appear (Figure 3.8). It provides access to next functions:

- **Zoom** – starts map zooming action (Figure 3.9)
- **UndoZoom** – undo previous zooming action
- **Reset** – reset all zooms, i.e. restores map original dimensions
- **Save image** – invokes Save Image dialog for saving map image as bitmap (.bmp file)
- **Copy to Clipboard** – copies map image into Windows Clipboard, where from it can be pasted into any MS Office application, such as MS Word
- **Map Designer** – opens special tool for adjusting map settings, such as colours, markers etc (Figure 3.10)




| Station | Country | Area | Latitude | Longitude | Bottom Depth |
|---|---|---|---|---|---|
| G1 | Tunisia | GB | 34°03'09'' | 10°01'05'' | |
| TB | Tunisia | JN | | | |
| M1 | Tunisia | MD | 33°38'10'' | 10°29'20'' | |
| DJ, MOD, S Sli | Tunisia | MD | | | |
| MH | Tunisia | MH | | | |

Figure 3.8. **Stations Map** form with popup menu




| Station | Country | Area | Latitude | Longitude | Bottom Depth |
|---|---|---|---|---|---|
| PTR6 | Cyprus | CY1 | 34°33'28'' | 33°58'33'' | |
| PTR7 | Cyprus | CY2 | 34°44'20'' | 33°25'00'' | |
| PTR8 | Cyprus | CY2 | 34°47'23'' | 33°33'01'' | |
| PTR9 | Cyprus | CY2 | 34°51'13'' | 33°39'05'' | |
| SAGRO2 | Cyprus | CY4 | 34°42'48'' | 32°26'53'' | |

Figure 3.9. **Stations Map** form after zooming

**Map Designer** contains 3 tabs: **General**, **Colors** and **Station Markers**. On **General** tab user can switch on/off flooding sea, showing grid lines and bathymetry contours, select isobaths to be shown and set up map axes font.

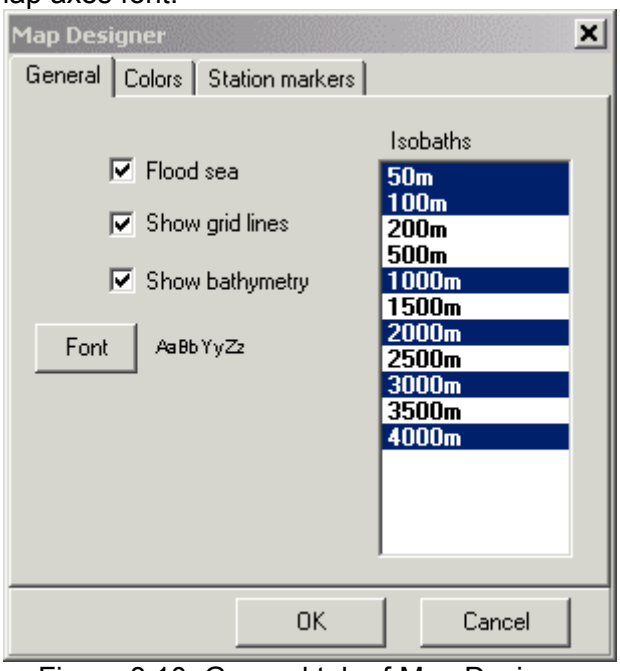



Figure 3.10. General tab of Map Designer

On **Colors** tab user can set colours for all elements of map. Note: “Current data set” feature is not used in **Stations Map**.

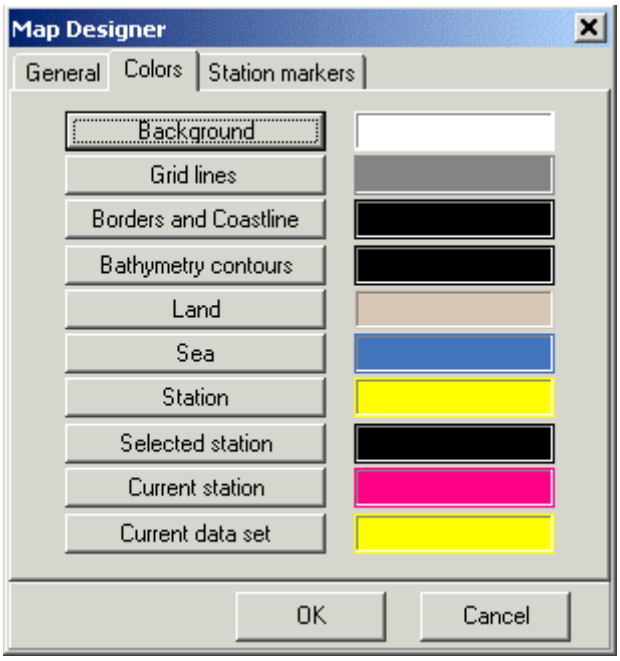



Figure 3.11. Colors tab of Map Designer

On **Station Markers** tab user can adjust shape and size of markers, set blinking time interval for current station marker.

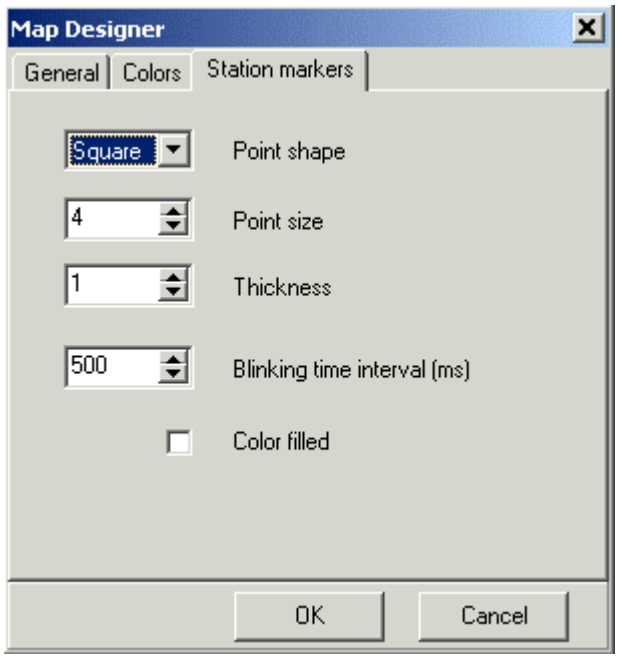



Figure 3.12. Colors tab of Map Designer

New map settings are applied when user presses [OK] button of **Map Designer**. These map setting are valid till closing ***MEDPOL Database***.

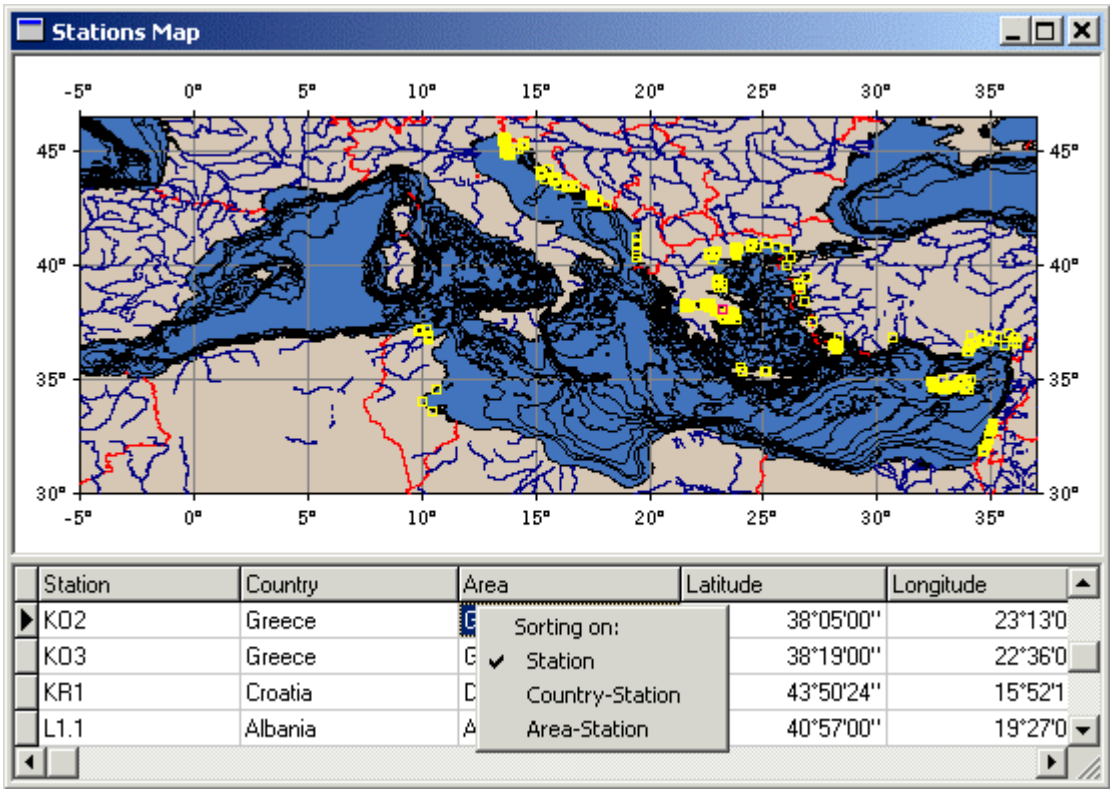



Figure 3.13. **Stations Map** form with popup menu for sorting records

Stations table contains main stations characteristics such as station name, country name, area, coordinates, etc. Stations table is read only. User can navigate records and change sorting order of records in the table with the help of popup menu by right mouse button click.

***Data Management Switchboard***

When user presses [Data Management…] button on the **Main Switchboard**, it is replaced with the **Data Management Switchboard**.

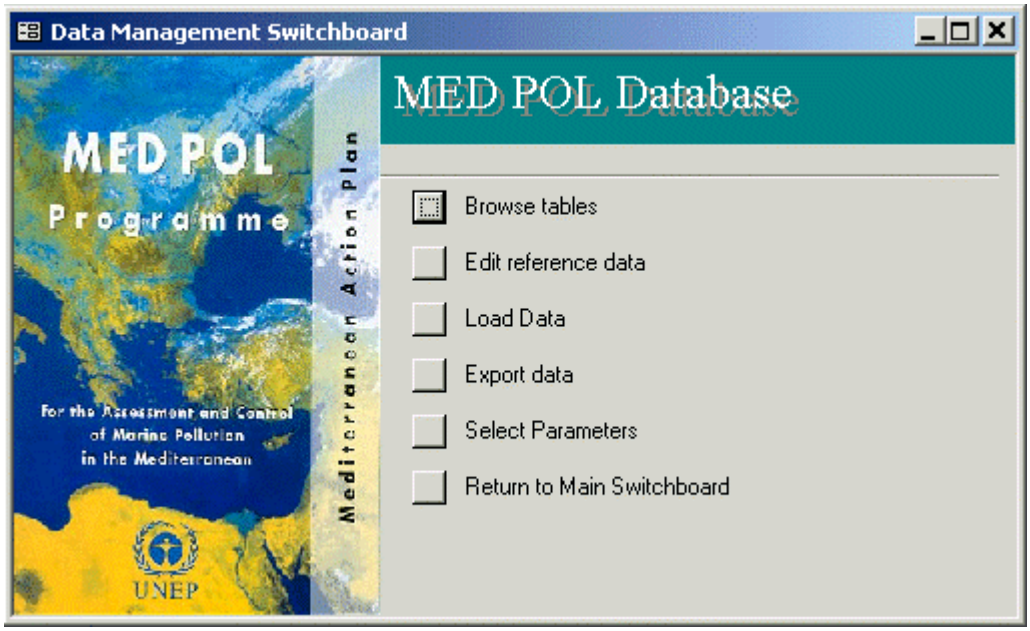



Figure 3.14. **Data Management Switchboard**

**Data Management Switchboard** provides quick access to next data management tasks:

- **Browse tables** – opens dialog for selection and opening database tables for browsing
- **Edit reference data** – opens dialog for selection and opening forms for editing Dictionaries and other reference tables
- **Load Data** – runs data loading tool
- **Export Data** -opens tool for exporting data
- **Select Parameters** – opens tool for selection of monitoring parameters
- **Return to main switchboard**

***Browse tables***

When user presses the [Browse tables] button on **Data Management Switchboard** the dialog for selection of table is opened.

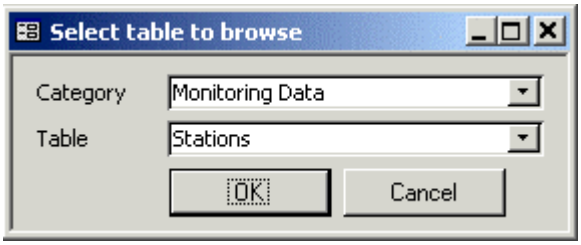



Figure 3.15. Select table dialog

Dialog contains 2 controls:

- Category combobox – for selection of table category form 5 possible ones: Monitoring Data, Dictionaries, Program Data, Quality Assurance Data, and System
- Table combobox – for selection of table from corresponding category

Upon selection of table user presses [OK] button to open it in standard MS Access Datasheet view (see MS Access Help - Working with Datasheets and Subdatasheets). Figure 3.16 shows database Stations table in Datasheet view. Stations table is the main table of the database. Since database relationships are established, subdatasheets are already attached to Datasheet. To open slave tables subdatasheets user has to click on "+" sign just right from the record selector. Figure 3.17 shows Stations table Datasheet with Subtasheets of Samples, Analyses and Data tables. With subdatasheets hierarchical tree it is easy to find necessary data.

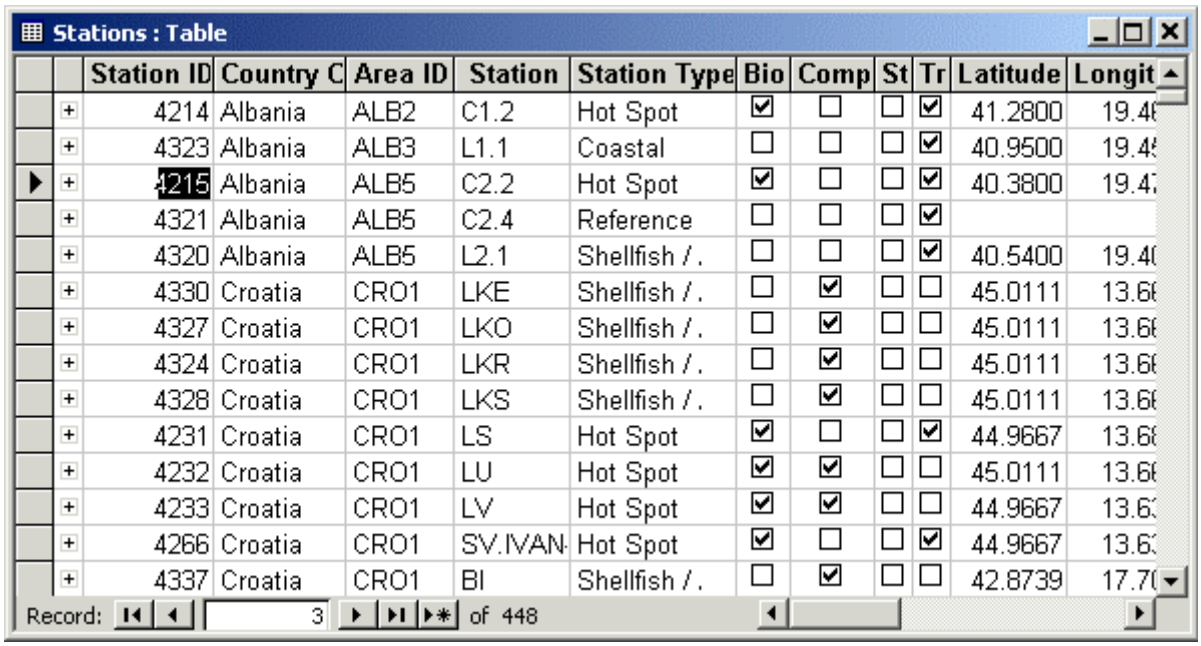


Figure 3.16. Browsing stations table

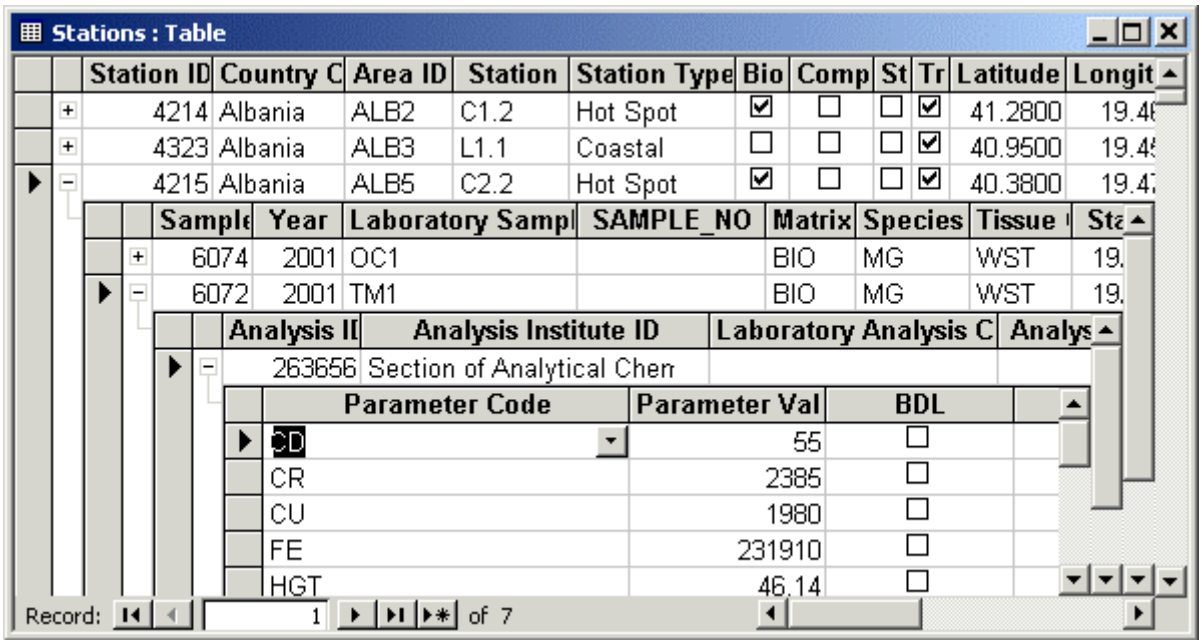


Figure 3.17. Stations table Datasheet with Subtasheets

MS Access provides wide set of operations with data, when table is displayed in Datasheet view. It is possible to edit, add, delete data, sort data using combinations of different columns, filter data etc. .

Notes for data editing:

- If table field refers to field in other table, the combobox with available values of referred field will be opened automatically when user will try to change value of such field.
- Station coordinates are stored in the database in decimal form, so when entering new values user has to transform coordinates from geographical form to decimal.
- Cascade Delete relationships are enforced between Monitoring Data tables – Stations, Samples, Sample Details, Analyses and Data. Deleting records in Stations table will enforce deleting related records in all slave table, deleting record in Samples table will enforce deleting related records in Sample Details, Analyses and Data tables and so on. User will be asked to confirm delete action.

***Edit reference data***

Database tables, which contain reference data (mainly Dictionaries), have predefined forms for convenient data editing. **Edit reference data** task of the **Data Management Switchboard** provides quick access to these forms.

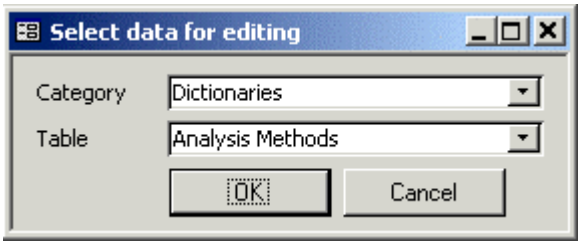



Figure 3.18. Dialog for selection of reference data

As in **Select table** dialog user has to select Category of data and Table and press [OK] button to open form for data editing. Example of such form is presented on Figure 3.19.

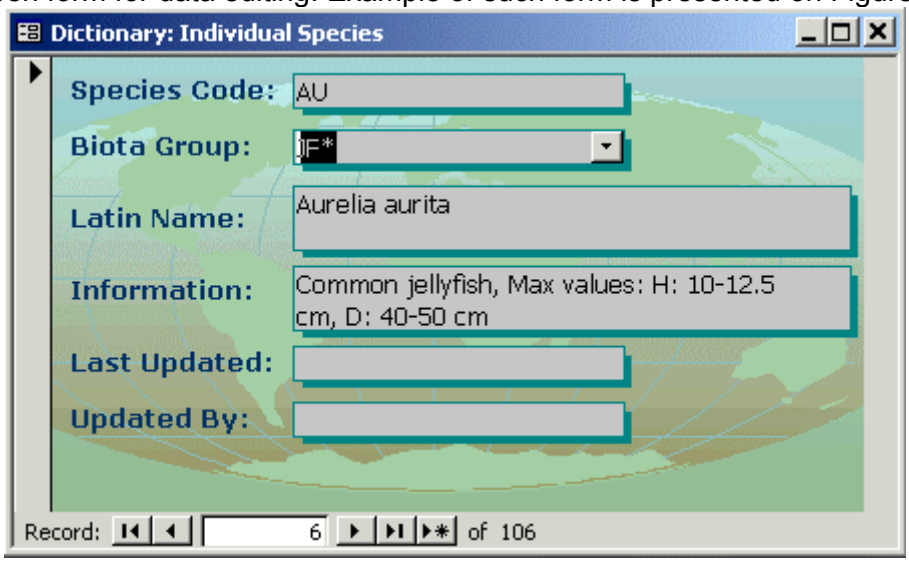



Figure 3.19. Form for editing data in Dictionary

Usually form contains table's fields as pairs name-value, and record selector at the bottom of form window. For entering new data user has to press button of record selector – this will create new record in the table. Some fields of this new record fields will be filled with default values (is assigned), for example Last Updated field will be filled with current date, and Updated By field will be filled with the name of current user.

Format tables are opened in MS Access Design view, in which table structure can be viewed and changed. Format tables serve as templates of standard MEDPOL data reporting formats. They do not contain any data and are used in process of data loading. User can edit structure of format table if changes in reporting format took place.

***Load Data tool***

**Load Data tool** is used for loading data in standard formats. **Load Data tool** is opened by pressing [Load Data] button in **Data Management Switchboard**.

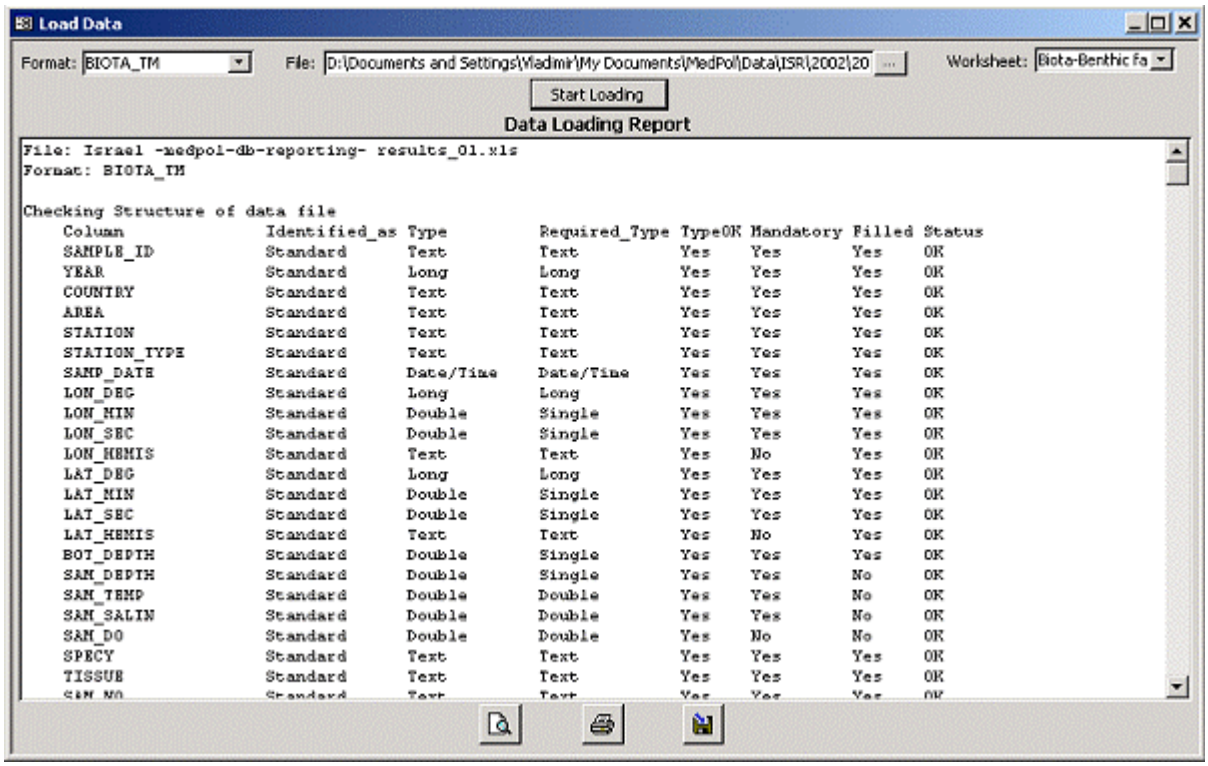



Figure 3.20. Load Data tool

**Load Data tool** form contains next controls:

- **Format** combobox – for selecting standard MEDPOL reporting format
- **File** textbox – for inputting Excel data file name or selecting it in **Open File** dialog, when button from its right side is pressed
- **Worksheet** combobox – for selecting Excel file worksheet
- **[Start Loading] button** – to start loading procedure
- Big **Data Loading Report** textbox – for outputting report in process of data loading
- Buttons at the bottom of form for preview, saving and printing Data Loading Report

**Load Data tool** works on next scenario:

- User selects Excel data file using **Open File** dialog of **File** textbox
- File is analysed and list of worksheets appears in the **Worksheet** combobox (it can take time for big files on slow computers)

- User selects data format in **Format** combobox and corresponding worksheet, if file contains multiple worksheets with different monitoring data types
- User presses [Star Loading] button to start processing of Excel data file
- **Load Data tool** creates temporary tables with the same structure as database monitoring data tables. New data will be loaded into temporary tables. If all checking procedures will be successful, data will be transferred into the database.
- During all process of work **Load Data tool** generates report and writes it into **Data Loading Report** text box. Report consists of sections. Each section starts with description of task, which is being fulfilled, and continues with results of task fulfilment and warning or error messages. Description of all **Load Data tool** messages is given in Table
- **Load Data tool** transfer data from Excel file into temporary table using standard MS Access function. If some errors were encountered on this stage, **Load Data tool** stops loading with corresponding message and displays errors in report. User has to analyse and correct errors in Excel file and continue loading.
- **Load Data tool** analyses correspondence of Excel file (worksheet) structure to format with the help of corresponding format table of the database
- If serious misfit of format was found, **Load Data tool** stops processing with error message. User has to correct data in Excel file and try repeating loading.
- **Load Data tool** checks monitoring parameters for presence of all columns (CONC, BDL, DL, UNIT), correspondence units, etc.
- If unknown parameter code is discovered, **Load Data tool** firstly proposes to enter parameter alias, and in case of user refusal proposes to enter new parameter code into **Dictionary: Pollution Parameters**.
- If errors found in format and parameters are not critical, **Load Data tool** display warning message with request to continue loading. When request is displayed on screen, user has possibility to go through loading report and make decision on continuation of loading. Loading report at that moment contains results of 2 tasks: “Checking Structure of data file” and “Checking parameters”
- Loading procedure continues with checking MEDPOL codes used in Excel data file
- If unknown codes are discovered, **Load Data tool** displays error message and propose user to enter new code into the corresponding database dictionary. If user answers [Yes], the corresponding entry form is opened for entering new code into the dictionary. User has 2 choices: enter new code of cancel operation.
- In case no wrong codes were found or user entered new codes into dictionaries (when unknown codes were found), the **Load Data tool** continues processing file, otherwise it stops work with error message. New section in report “Checking using of MEDPOL codes” contains results of fulfilment this task.
- If wrong codes were found, user has make corrections in Excel file and continue loading
- **Load Data tool** loads data from Excel file to temporary tables
- **Load Data tool** checks stations and adds new section into report “Checking stations” with list of stations and description of misfits if found.
- If some serious misfits in stations are found, **Load Data tool** displays corresponding message with request to continue loading or not. User has to analyse report and make decision on continuation of loading.
- **Load Data tool** checks samples and adds new section into report “Checking samples” with list of samples and description of misfits and errors if found.
- If errors in samples are found, **Load Data tool** stops loading with corresponding message. User has to analyse report, make corrections in Excel file and try load data again.
- **Load Data tool** displays message with proposal to make simple quality control of data. If user answers [Yes], the form “Setup rules for assigning quality codes for loading parameters” will appear on the screen (Figure 03.21). User has to assign

Min/Max diapasons and appropriate quality codes for parameters. Meaning of quality codes is done in table **Dictionary: Quality Codes** (see Figure 3.22). When user closes form, the **Load Data tool** fulfils checking parameters with setting quality codes.

- Finally data are checked and ready for transferring into the database. **Load Data tool** displays request for data transferring and transfers new data into the database in case of positive answer.
- **Load Data tool** deletes temporary tables and finishes loading procedure. User can preview, print or save final **Data Loading Report**.
-

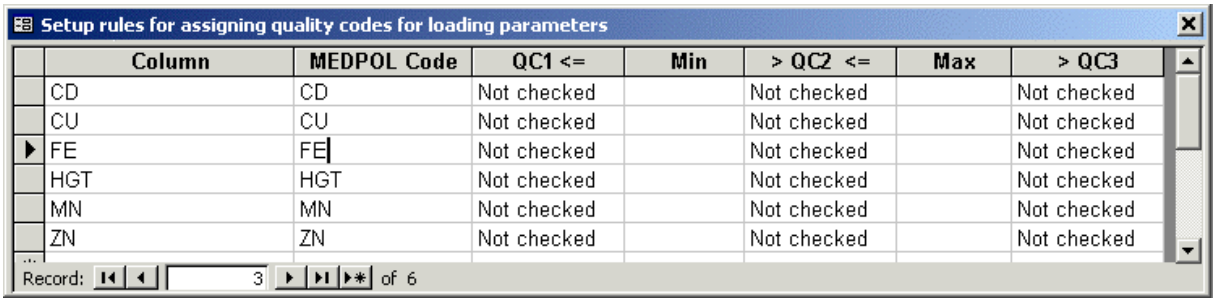



Figure 03.21. Form for setting rules of quality checking

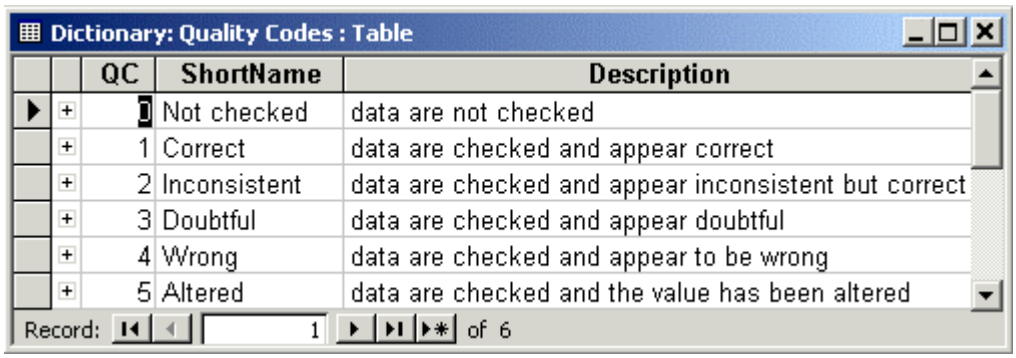



Figure 3.22. Quality Codes

Data loading goes as series of attempts, when user presses [Start Loading] button, receives report with errors, correct these errors in Excel file, again presses [Start Loading] and repeat this cycle till positive result will be achieved, i.e. when all errors will be corrected and data finally loaded into the database. User must know MEDPOL codes and be familiar with unit transformation.

Annex contains description of all **Load Data tool** messages. It is recommended to print it and use as instruction in data loading and error correction.

***Export Data tool***

**Export Data tool** is used for exporting data from the database. **Export Data tool** is opened by pressing [Export Data] button in **Data Management Switchboard**.

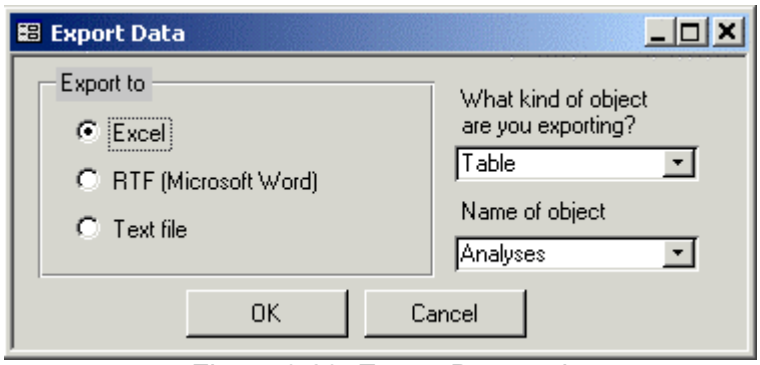



Figure 3.23. Export Data tool

**Export Data** tool window contains format selector (Excel, RTF or text file), and comboboxes for selection of object to be exported. Next types of objects can be exported: tables, queries, and reports. Exported file is stored in the database directory and has the same name as object and extension corresponding to format. Objects exported in Excel or RTF format are automatically opened in MS Excel of MS Word application.

For exporting monitoring data in standard MEDPOL reporting formats user must preliminary select data in standard format using **Select Parameters** task from the **Data Management Switchboard**. When data are selected they are available for exporting. In **Export Data tool** user must select Query - Select Parameters: standard formats (as it shown on Figure 3.24) and press [OK] button.

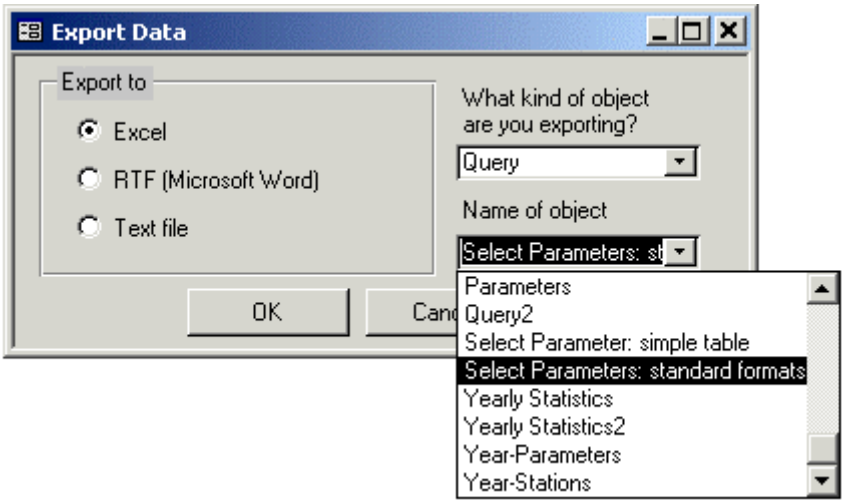



Figure 3.24. Export monitoring parameters in standard format

Notes:

- Do not try export tables with >16000 records in Excel format (for the moment of document writing this is Data table)
- Exporting of big tables will take long time
- MS Access doesn't support exporting of graphics embedded into reports

***Select Parameters tool***

**Select Parameter tool** provides possibility for querying database and selection of monitoring parameters on different criteria. **Export Data tool** can be launched by pressing [Select Parameters] button in **Data Management Switchboard**.

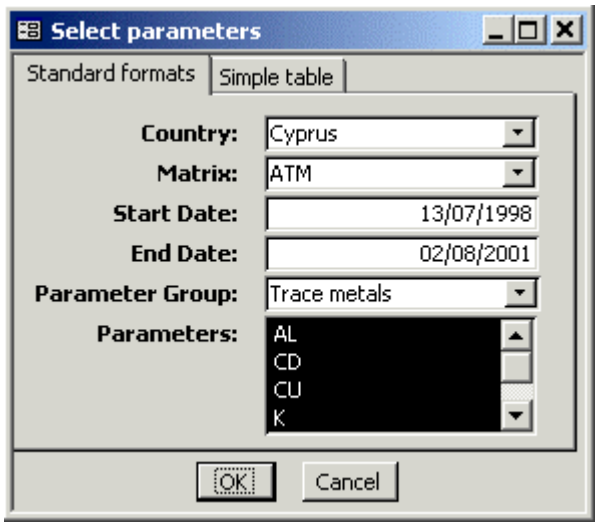



Figure 3.25. Select Parameters tool

Window of **Select Parameters tool** consists of 2 tabs. First one is designed to define search criteria for selecting several monitoring parameters from the database and presenting query result in standard MEDPOL format, used for reporting data. Second tab is designed for defining search criteria for selecting one parameter from and presenting result in form of simple table. Both tabs are very similar and contain controls for defining country, matrix, start and end date of time period, parameter group, and parameters to be selected. It is recommended assign control values starting from topmost one, i.e. Country combobox. Country combobox contains list of countries having data in the database. All database content is available if no country is selected, i.e. if combobox is blank. When user selects country, all comboboxes situated below are filtered in order to correspond database content for this country. When user selects matrix, parameter comboboxes are filtered in order to correspond database content for this matrix and so on. So, filling comboboxes in this order (from top to bottom) will ensure compatibility of selection conditions.

When selection criteria are formulated, user presses [OK] button to query database and obtain result. At least one parameter has to be selected to start query. **Select Parameter tool** prepares SQL statement according to search criteria, then saves this statement into **Select Parameters: standard formats** Query, and finally executes query by opening it.

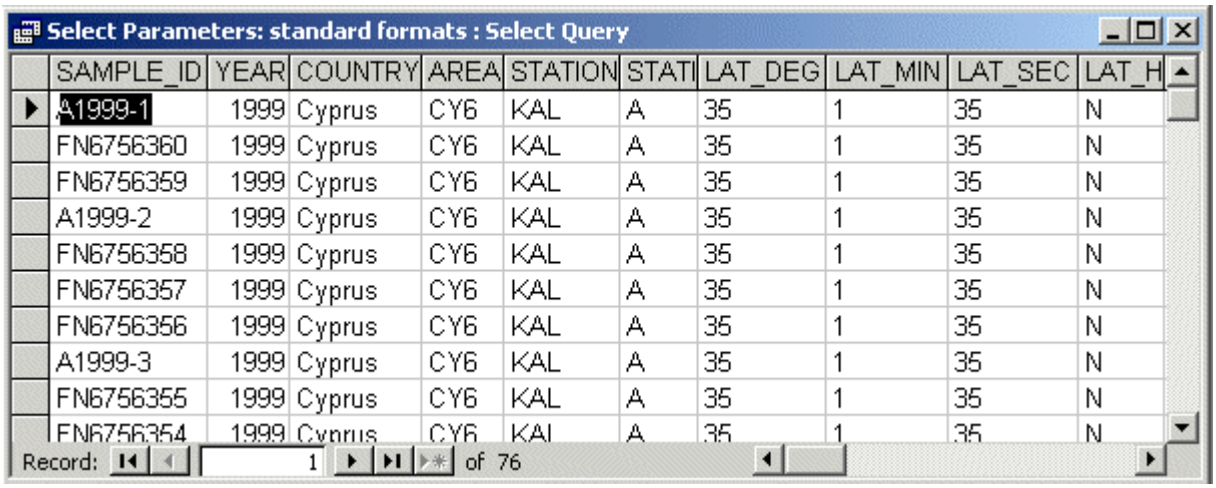



Figure 3.26. Result of parameter selection in standard format

Query result is opened in Datasheet view. User can customize query (see MS Access Help – Queries) or export it using **Export Data tool**.

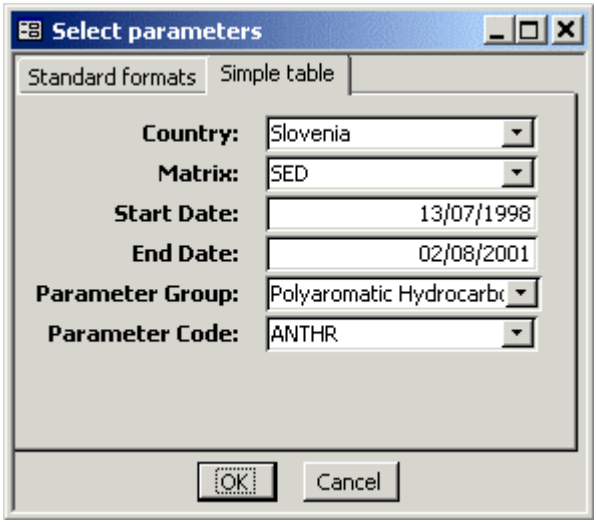



Figure 3.27. Select Parameters tool: Simple table tab

Selection of parameter into Simple table is very similar to selection in standard format. Main difference between 2 approaches is in type of result: in second case result is editable MS Access Query. Editable query ha live links to database tables. User can edit data in query Datasheet, and all changes will automatically apply to data in the database. In case of Simple table format SQL statement is stored in **Select Parameter: simple table** query.

Select Parameter: simple table : Select Query

| Country | Station | Year | Laborato | Matrix | Start Date | Parameter | Value | BDL | DL | Units |
|---|---|---|---|---|---|---|---|---|---|---|
| Slovenia | 0024/1 | 1999 | S1999-1 | SED | 15/09/1999 | ANTHR | 34 | ☐ | | ng/g |
| Slovenia | 0024/2 | 1999 | S1999-1 | SED | 15/09/1999 | ANTHR | 131 | ☐ | | ng/g |
| Slovenia | 00TM/1 | 1999 | S1999-1 | SED | 15/09/1999 | ANTHR | 71 | ☐ | | ng/g |
| Slovenia | 00TM/2 | 1999 | S1999-1 | SED | 15/09/1999 | ANTHR | 108 | ☐ | | ng/g |
| * | | | | | | | | ▩ | | |

Record: 1 of 4

Figure 3.28. Result of parameter selection in simple table format

Query result in **Simple table** format contains most common stations and samples characteristics and parameter data: parameter code, value, BDL (Below Detection Limit) indicator, detection limit (DL), and units. User can customize query in Design view.

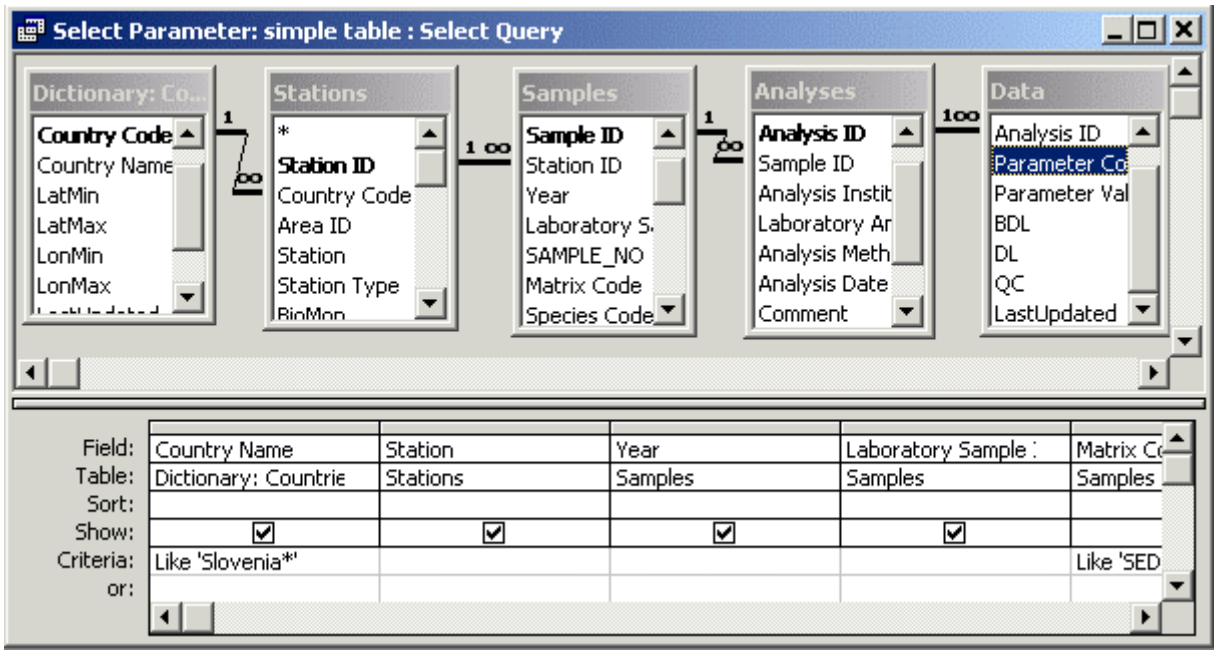



Figure 3.29. Design view of **Select Parameter: simple table** query

In case user needs to keep customized query for future using, he (she) must find **Select Parameter: simple table** query among MS Access Queries objects (on Queries tab of Database window), make its copy and rename the copy as desired. The same is valid for **Select Parameters: standard formats** query.

***Reports Switchboard***

When user presses [Reports Preview…] button on the Main Switchboard, it is replaced with the **Reports Switchboard**.

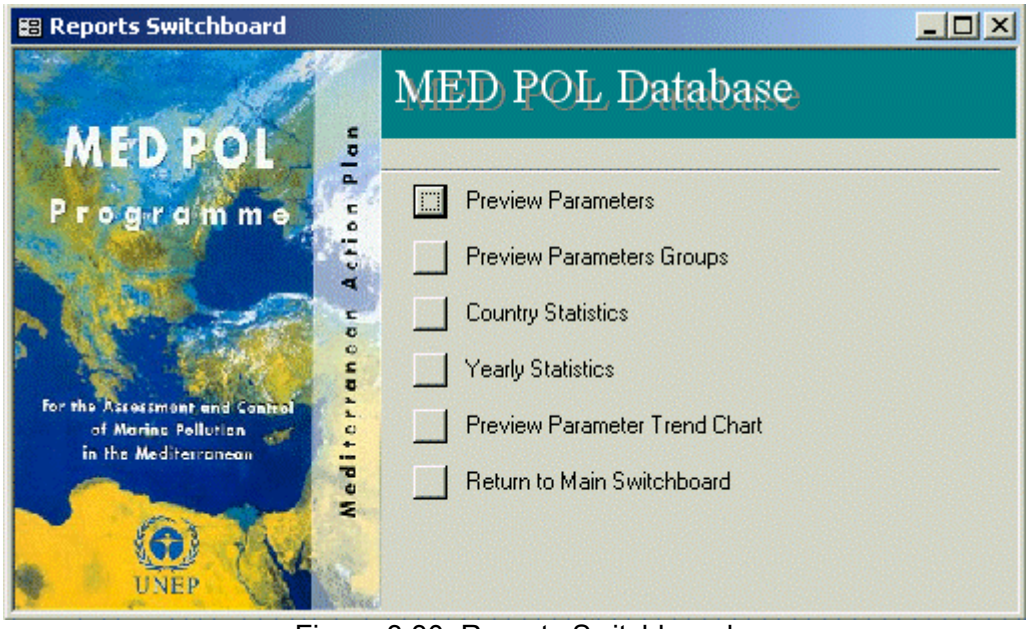



Figure 3.30. Reports Switchboard

**Reports Switchboard** provides quick access to next predefined reports:

- **Preview Parameters** – opens report with full list of parameters from **Dictionary: Pollution Parameters**

- **Preview Parameter Groups** – opens report with list of Parameter Groups
- **Country Statistics** – opens report number of stations, samples etc. per country
- **Country Statistics** – opens report with number of stations, samples etc. per year
- **Preview Parameter Trend Chart** –opens report with graphic presenting parameter trend
- **Return to main switchboard**

Number of reports is not big for the moment of document writing, but it will grow as database will be developing. Every report is based on some table or query as a rule. For customizing and developing new reports see MS Access Help – Reports and Report Snapshots. Most important reports are described in next sections.

***Country Statistics report***

**Country Statistics** report is opened when user presses [Country Statistics] button on the **Reports Switchboard**. **Country Statistics** report is looking simple but it is based on quite complex **Country Statistics** query.

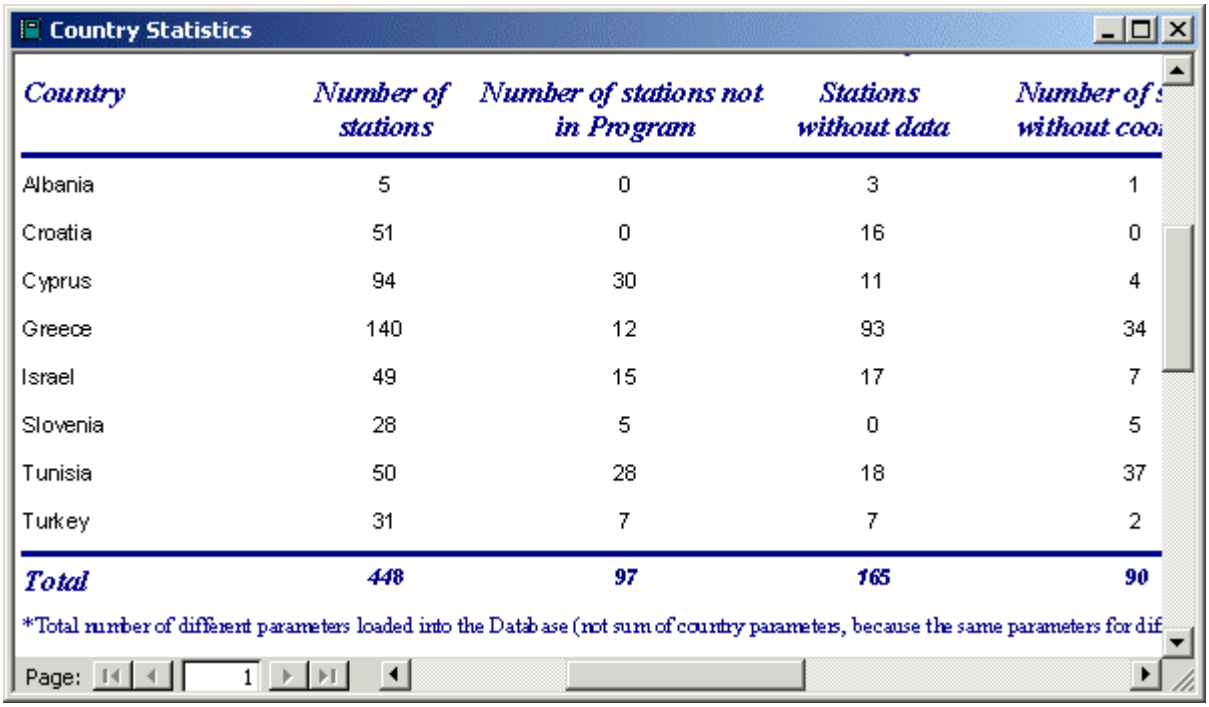



Figure 3.31. Preview of Country Statistics report

Report can be printed or saved in MS Word format from the preview window using MS Access menu or toolbar.

***Parameter Trend Chart***

When user presses [Preview Parameter Trend Chart] button on the **Reports Switchboard**, the **Select Station and Parameter** dialog is opened.

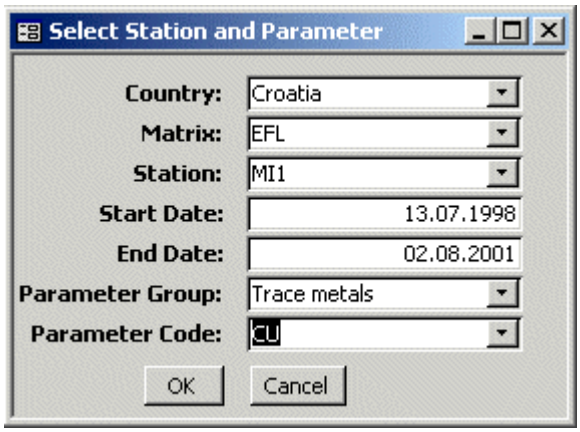



Figure 3.32. Select Station and Parameter dialog

Dialog contain controls for defining country, matrix, station start and end date of time period, parameter group, and parameter to be selected. It is recommended assign control values starting from topmost one, i.e. Country combobox. Country combobox contains list of countries having data in the database. All database content is available if no country is selected, i.e. if combobox is blank. When user selects country, all comboboxes situated below are filtered in order to correspond database content for this country. When user selects matrix, all comboboxes situated below are filtered in order to correspond database content for this matrix and so on. So, filling comboboxes in this order (from top to bottom) will ensure compatibility of selection conditions.

Upon finishing formulating search criteria user presses [OK] button and report with **Parameter Trent Chart** is opened for preview.

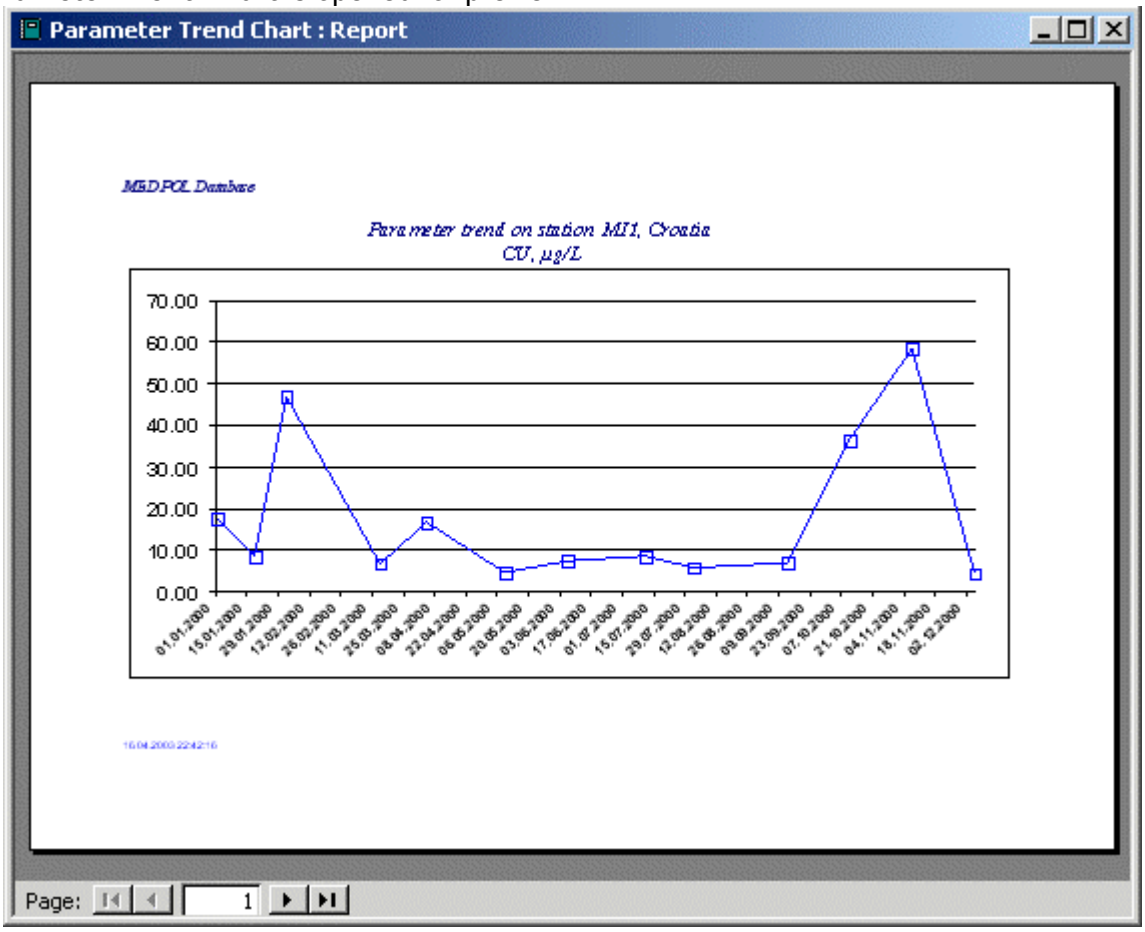



Figure 3.33. Preview of Parameter Trend Chart

Report can be printed from the preview window using MS Access menu or toolbar. Unfortunately, MS Access doesn't provide possibility to export report graphics into MS Word or Excel.

***Administration Switchboard***

When user presses [Administration…] button on the **Main Switchboard**, it is replaced with the **Administration Switchboard**. For the time of document writing **Administration Switchboard** contains only 3 items:

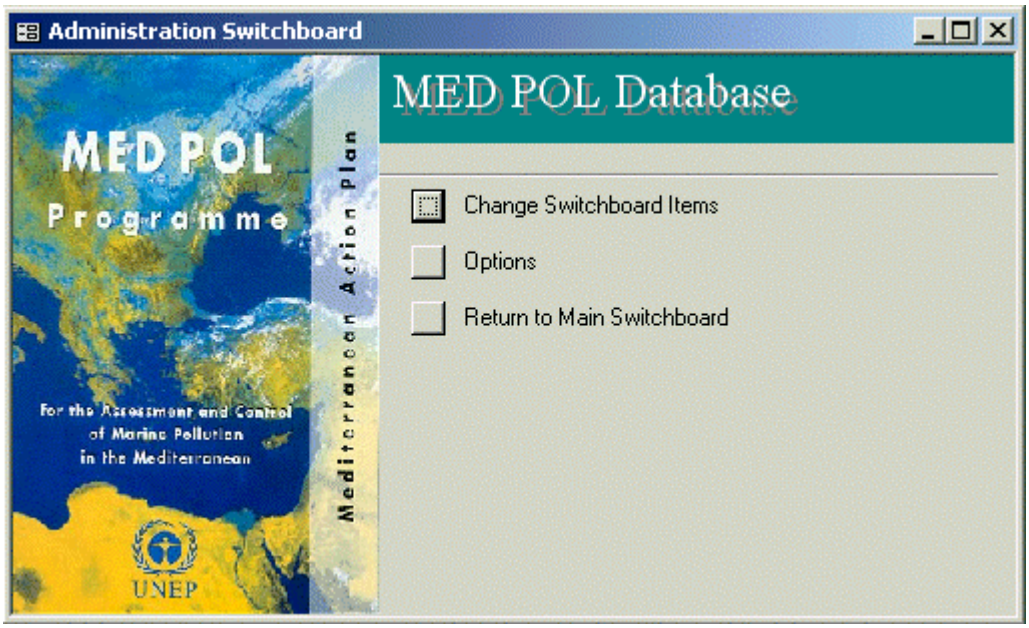



Figure 3.34. Administration Switchboard

For the time of document writing **Administration Switchboard** contains only 3 items:

- **Change Switchboard Items**– opens MS Access **Switchboard Manager** for customizing switchboard
- **Options**– opens form with database administration options
- **Return to main switchboard**

It is planned to extend set of administration tasks in future.

***Switchboard Manager***

The **Switchboard Manager** is opened when user presses [Change Switchboard Items] button of the **Administration Switchboard**.

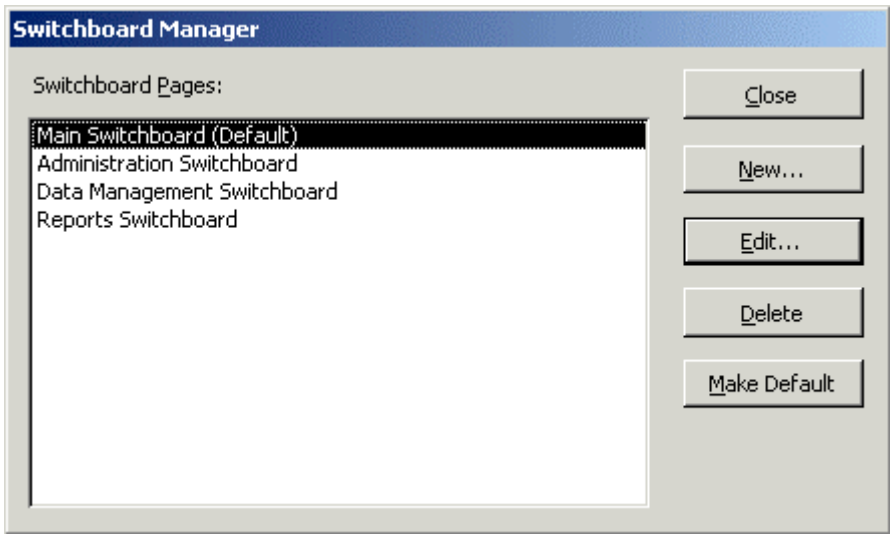



Figure 3.35. Switchboard Manager

The Switchboard Manager is standard MS Access Wizard. It is fairly self help compatible. User opens end edits switchboard pages and items step by step, as it is presented on Figure 3.36, Figure 3.37.

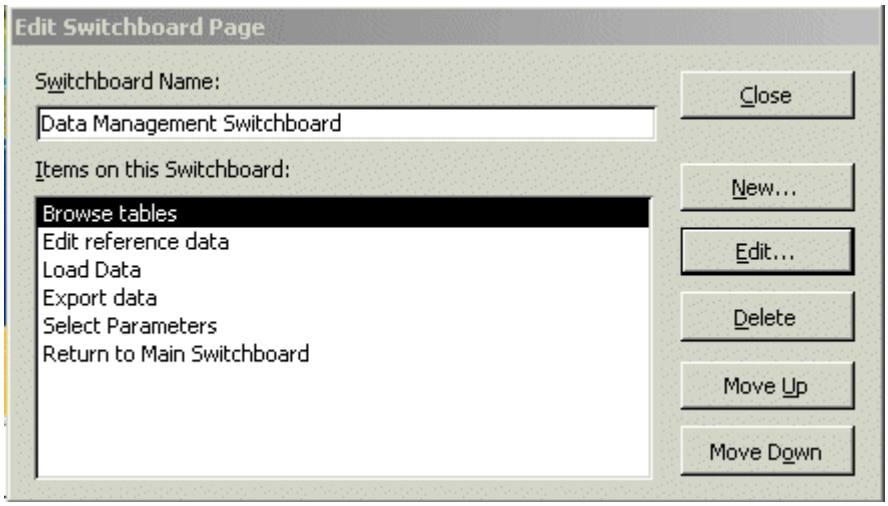



Figure 3.36. Switchboard Manager: Edit Switchboard Page

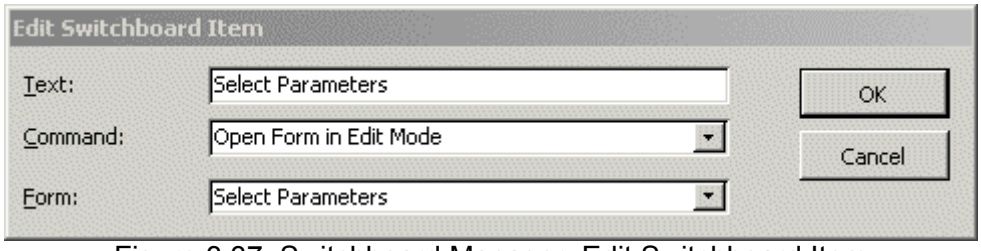



Figure 3.37. Switchboard Manager: Edit Switchboard Item

### *Administration Options*

**Administration Options** form is opened when user presses [Options] button of the **Administration Switchboard.**

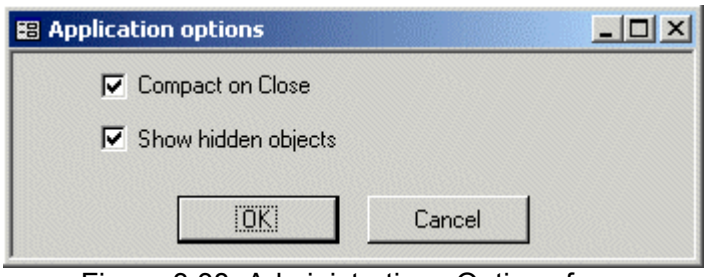



Figure 3.38. Administrations Options form

2 options are available for the moment of document writing:

- **Compact on Close**
- **Show hidden objects**

When user works with the database intensively – loads and deletes data, creates and executes queries, etc – the size of the database file is increasing because MS Access doesn't remove deleted data or objects automatically. This results lower performance of the database To ensure optimal performance it is necessary compact and repair Microsoft Access file on a regular basis. It can be done manually from MS Access menu Tools\Database Utilities\Compact and Repair Database… The option **Compact on Close** permits automatically compact database file when it is closed. The disadvantage of this automation is long closing time, so it is recommended switch this option on only in period of intensive database update/loading.

Database contains some objects (tables, queries, forms) marked having property "hidden". These objects are parts of different database tools and tasks. As independent objects they are usually unusable. The property "hidden" was assigned to these objects in order to avoid its unintentional using and make view of database objects tabs more clear. User has to switch this option on if he intends to modify database tools and tasks and needs all database objects be available.

## Chapter 4 Internet Module

### *Working with static HTML pages*

After installation of the Web component (see Chapter 2) on Web Server it is ready for using. Internet user just needs to type Web address in its Internet Browser to start exploring Internet module:

http://[Web server name]/[Web directory name], where:

- [Web server name] – domain (Internet) name or IP-address of the Web server
- [Web directory name] – name of virtual directory where Web component is installed

It will open main Web page with description of MED POL Phase III Activities.

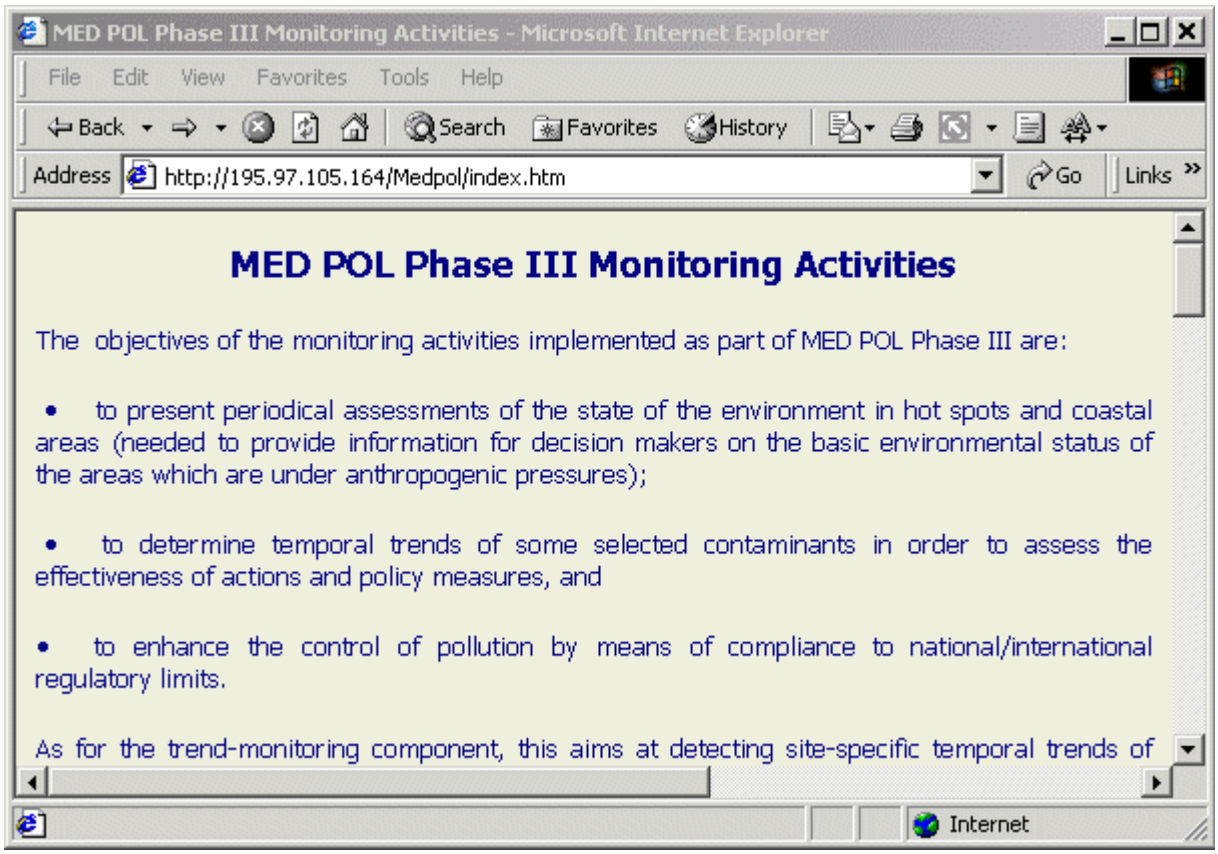
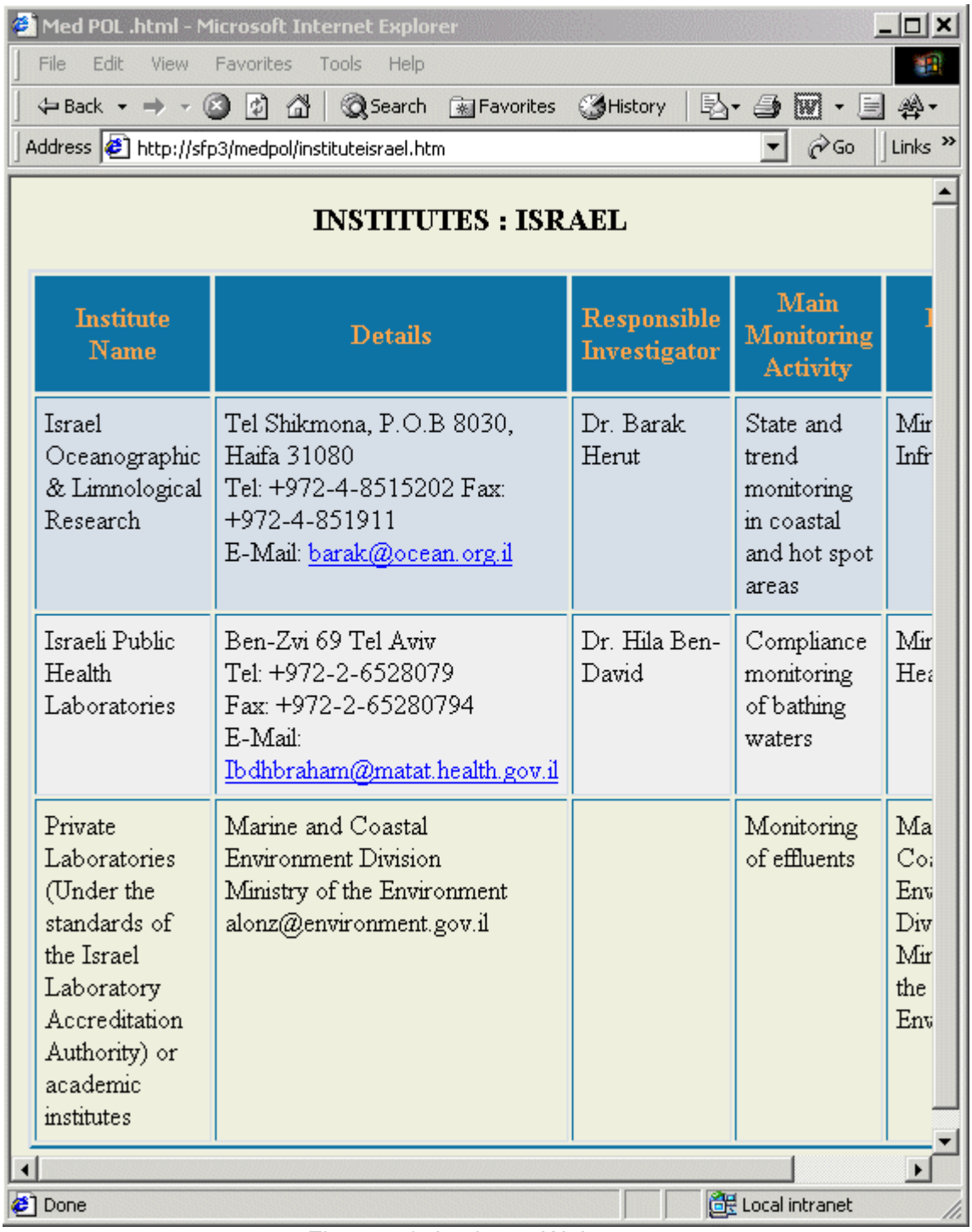



**Figure 4.1.** Main Web page

From main Web page user can follow links and see:

- Web pages with list of participating institutions for countries which has signed Agreement with MED POL unit (Figure 4.2)
- Web pages with list and map of monitoring stations for countries which has signed Agreement with MED POL unit (Figure 4.3)
- Web page with standardized MEDPOL reporting formats (Figure 4.4)
- Web page with general thematic maps (Figure 4.5)

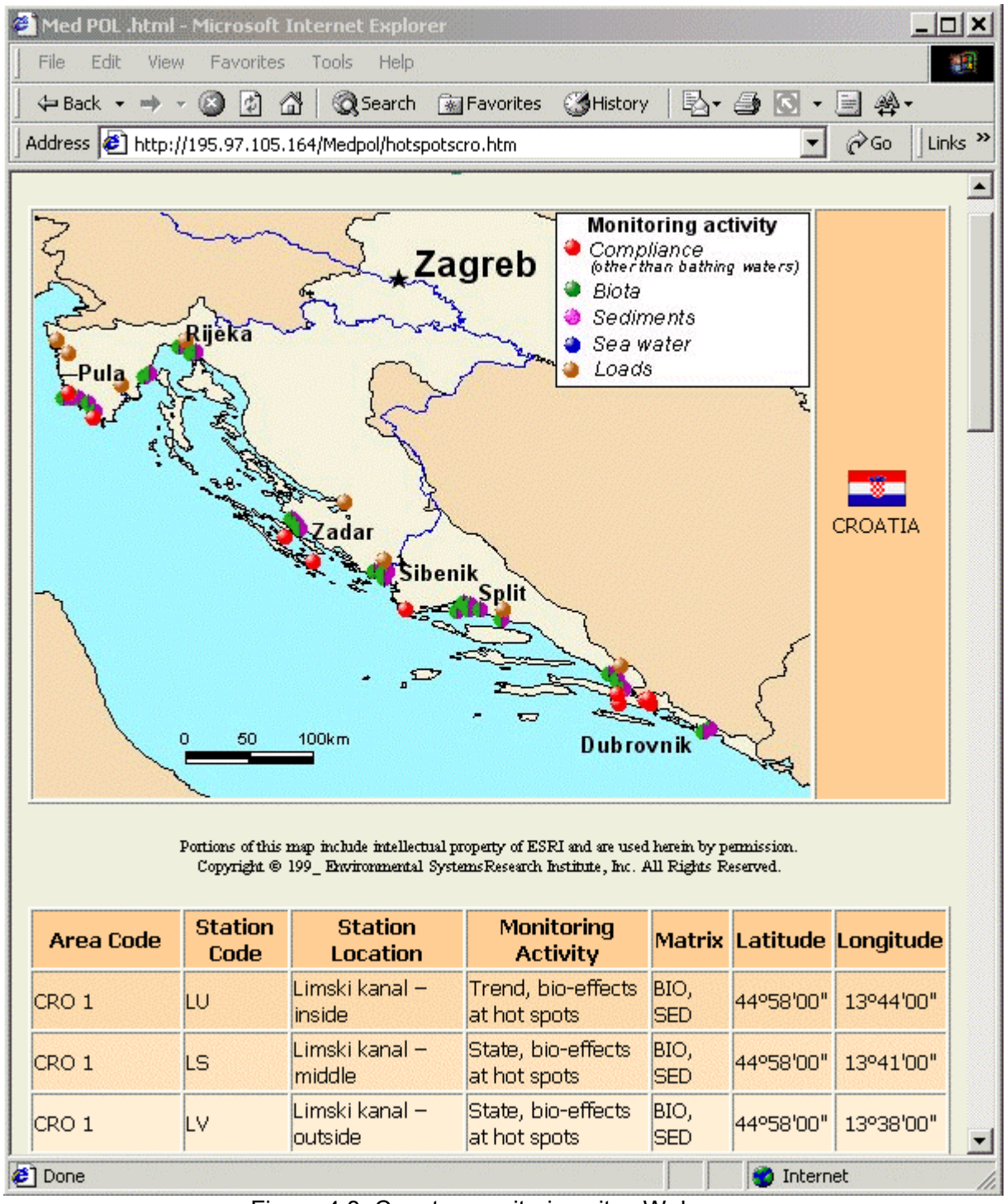
At the bottom of the main Web page user can find links to explore database stations and samples through dynamic Active Server Pages. Functionality of dynamic Active Server Pages is described in section **Working with dynamic Active Server Pages.**




## INSTITUTES : ISRAEL

| Institute Name | Details | Responsible Investigator | Main Monitoring Activity | I |
|---|---|---|---|---|
| Israel Oceanographic & Limnological Research | Tel Shikmona, P.O.B 8030, Haifa 31080<br>Tel: +972-4-8515202 Fax: +972-4-851911<br>E-Mail: barak@ocean.org.il | Dr. Barak Herut | State and trend monitoring in coastal and hot spot areas | Mir Infr |
| Israeli Public Health Laboratories | Ben-Zvi 69 Tel Aviv<br>Tel: +972-2-6528079<br>Fax: +972-2-65280794<br>E-Mail: Ibdhbraham@matat.health.gov.il | Dr. Hila Ben-David | Compliance monitoring of bathing waters | Mir Hea |
| Private Laboratories (Under the standards of the Israel Laboratory Accreditation Authority) or academic institutes | Marine and Coastal Environment Division<br>Ministry of the Environment<br>alonz@environment.gov.il | | Monitoring of effluents | Ma Co Env Div Mir the Env |

Figure 4.2. Institutes Web page.




| Area Code | Station Code | Station Location | Monitoring Activity | Matrix | Latitude | Longitude |
|---|---|---|---|---|---|---|
| CRO 1 | LU | Limski kanal – inside | Trend, bio-effects at hot spots | BIO, SED | 44°58'00" | 13°44'00" |
| CRO 1 | LS | Limski kanal – middle | State, bio-effects at hot spots | BIO, SED | 44°58'00" | 13°41'00" |
| CRO 1 | LV | Limski kanal – outside | State, bio-effects at hot spots | BIO, SED | 44°58'00" | 13°38'00" |

Figure 4.3. Country monitoring sites Web page

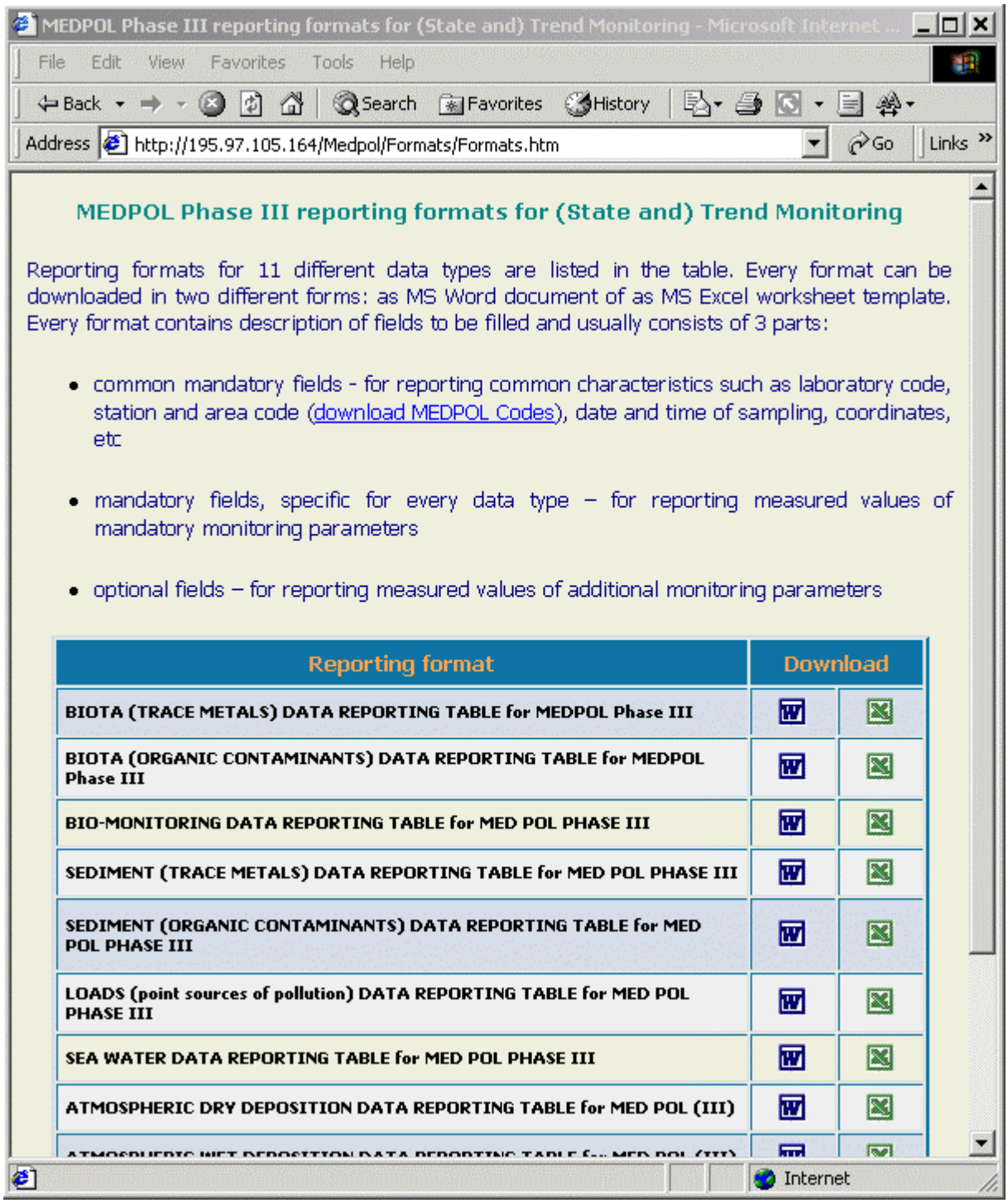



Figure 4.4. Formats Web page

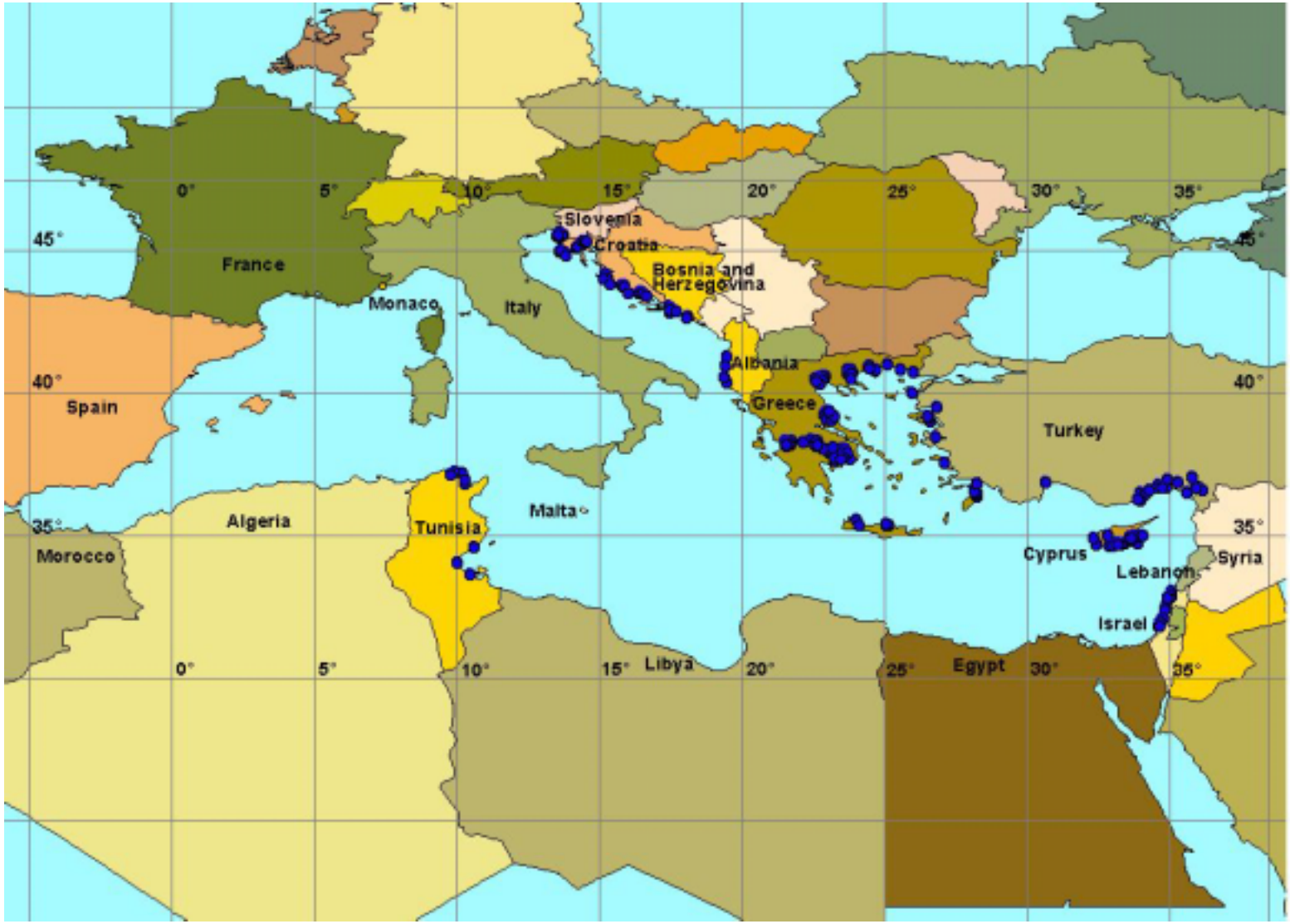



Figure 4.5. Map of all monitoring stations for compliance, state and trend monitoring

***Working with dynamic Active Server Pages***

ASP files are developed for presentation of the ***MED POL Database*** information in Internet. The Database Snapshot is used for publishing Database information in Internet. User can start work with Active Server Pages if he (she) clicks on link to **Stations** or **Samples** query form found at bottom of the main Web page.

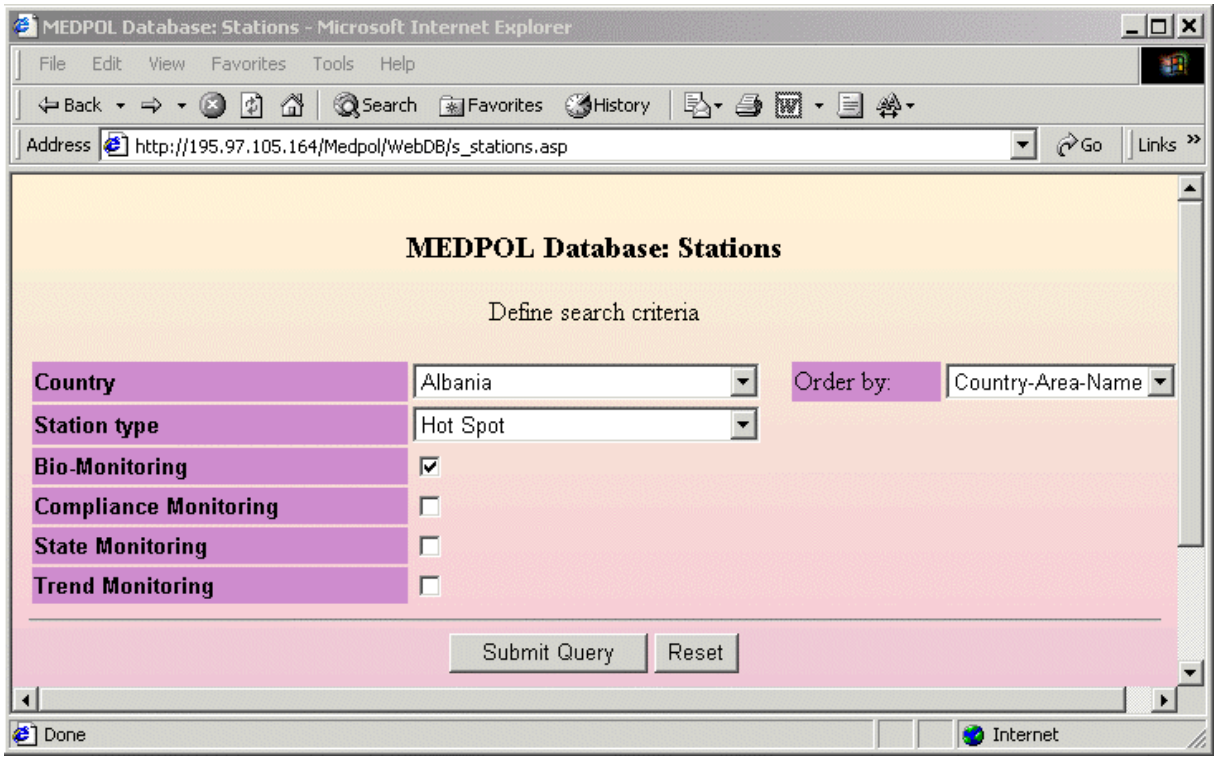



Figure 4.6. Stations query form

**Stations** query form contains controls to define criteria for searching stations in the Database. User can select country name and station type, mark type of monitoring, and also select sorting mode. After filling form user presses [Submit Query] button, and request is sent to server. Server processes user request and returns Web page with result.
Result Web page contains table with found stations and stations map. Total number of found stations and range of currently displayed stations is shown above top-left corner of the table. If number of found stations exceed 20, table will contain only first 20 stations. User has to press link “Next page” for browsing next 20 stations and so on.
Table contains most important characteristics of stations: Country, Area Code, Name, and coordinates. Last two columns of table contain icons with magnifying glass and retort. If user click on first icon the window with station details fill opened (Figure 4.8) and clicking on second icon will open window with table of samples belonging to the current station.
Samples table (Figure 4.9) contain most common characteristics of samples: Country, Year, Station Name, Matrix, Date and coordinates of station. Clicking on icon in last column will open Sample Details window (Figure 4.10), which also contains list of parameters being sampled.
The map image of found station (Figure 4.7) is placed below stations table. All found stations are displayed as rectangle markers of yellow color, whereas stations from the current table are displayed as markers of green color. If some country was defined in search criteria, the map image will cover only region for this country. In none country was included into search criteria, the full map of Mediterranean will be produced.
The map image is interactive. When user moves mouse cursor above image, it is changed to hand pointer, and tool tip “Click above marker to identify object” is displayed. When user clicks above station marker, the request is sent to server for searching stations with

coordinates corresponding to mouse click position. The result of identification is displayed in separate window as table of stations (Figure 4.11).

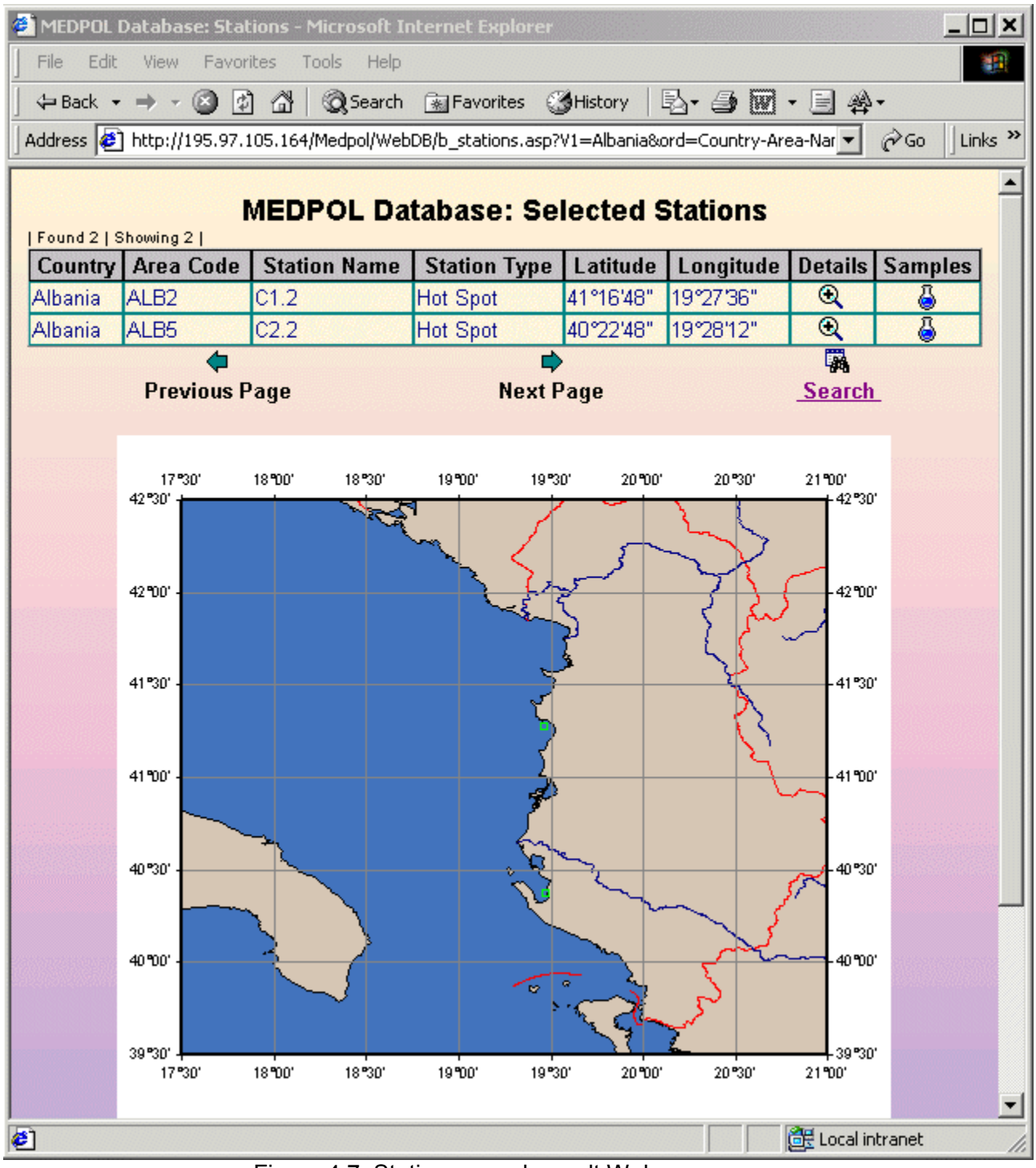



Figure 4.7. Stations search result Web page.

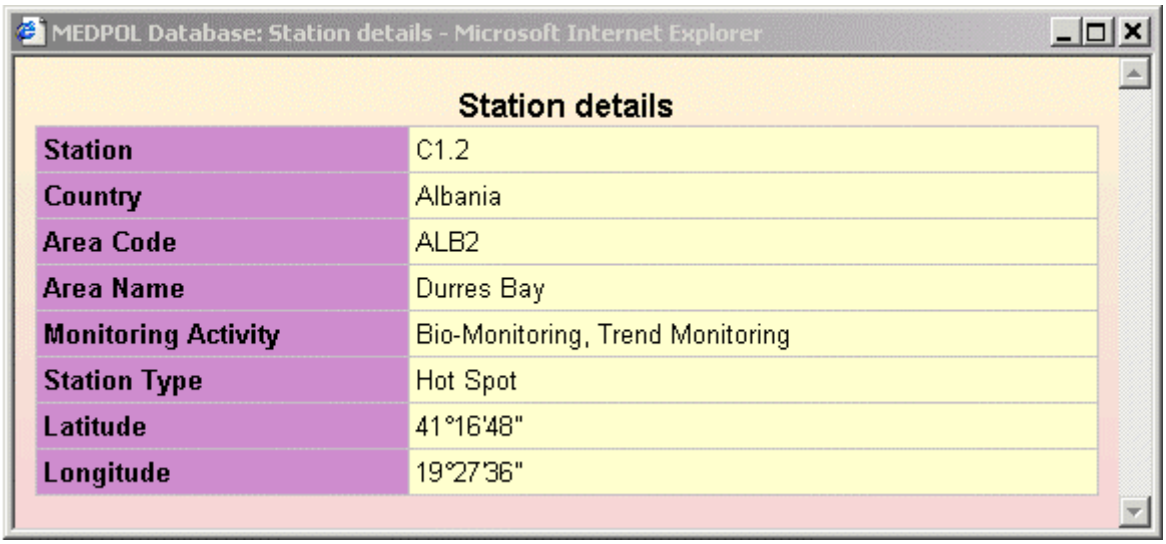



Figure 4.8. Station Details window.

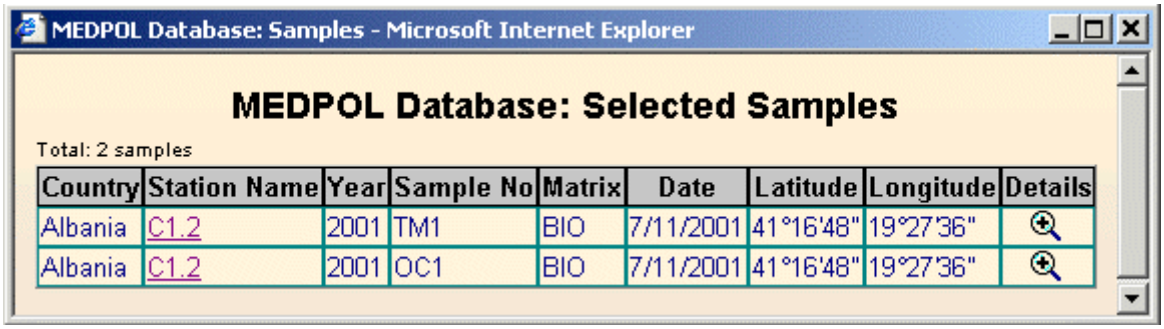



Figure 4.9. Window with Samples table.

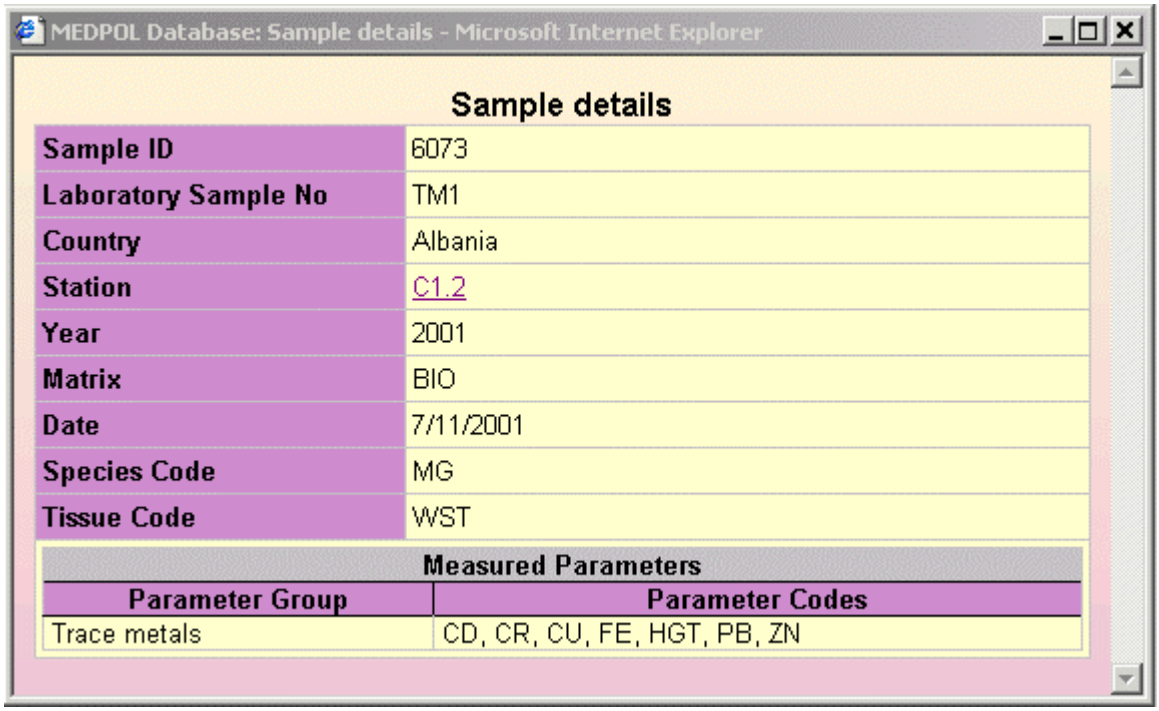



Figure 4.10. Sample details window

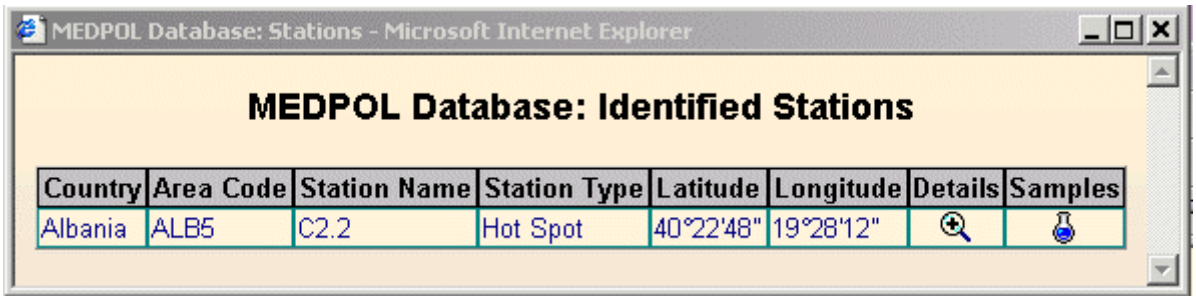



Figure 4.11. Window with identified stations.

Exploring of Database samples is similar to work with stations so it is not described in this document. It has to be noted, that at the current stage of MEDPOL Database development access to real values of measured parameters is closed for Internet user.

# ANNEX I

# STRUCTURE OF DATABASE TABLES

**Structure of Database tables**

Abbreviations: **I** – Indexed, **PK** – Primary Key, **R** – Required.

**Table 1**
**Stations**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Station ID | Long Integer | √ | √ | √ | Table internal ID, participates in relationships (links) with ***Samples*** table |
| Country Code | Text (3) | | √ | | Reference to record in ***Countries*** table |
| Area ID | Long Integer | | | √ | Reference to record in ***Areas*** table |
| Station Name | Text (20) | | | | |
| Station Type | Text (1) | | | | Reference to record ***Station Types*** table |
| Bio Monitoring | Yes/No | | | | [Yes] if station includes into Bio monitoring |
| Compliance Monitoring | Yes/No | | | | [Yes] if station includes into Compliance monitoring |
| StMon | Yes/No | | | | [Yes] if station includes into State monitoring |
| Trend Monitoring | Yes/No | | | | [Yes] if station includes into Trend monitoring |
| Latitude | Double | | | | Negative (-) for Southern Hemisphere |
| Longitude | Double | | | | Negative (-) for Western Hemisphere |
| Bottom Depth | Single | | | | For coastal and sea stations only |
| Distance to shore | Single | | | | For meteo stations |
| Height | Single | | | | Height from the ground (for atmospheric stations only) |
| Altitude | Single | | | | Altitude/elevation above sea level (for atmospheric stations only) |
| Meteo-distance | Single | | | | Distance to nearest meteorological station (for atmospheric stations only) |
| Location | Text (255) | | | | |
| Comment | Text (255) | | | | |
| Is In Program | Yes/No | | | | [Yes] if station includes into Agreement |
| Last Updated | Date/Time | | | | |
| Updated By | Text | | | | |

Special indexes:

| Name | Fields |
|---|---|
| Unique Station | Station, Country Code, Area ID, Latitude, Longitude |

**Table 2**
**Samples**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Sample ID | Long Integer | √ | √ | √ | Table internal ID, participates in relationships (links) with ***Analyses*** and ***Sample Header*** tables |
| Station ID | Long Integer | | √ | | Reference to record in ***Stations*** table |
| Year | Integer | | | | |
| Laboratory Sample ID | Long Integer | | | √ | Sample reference code given by the laboratory |
| SAMPLE_NO | Integer | | | | Sample No (1,...n) ("n" as used in trend objectives of the programme) |
| Matrix Code | Text (3) | | √ | √ | Reference to record in ***Matrix Codes*** table |
| Species Code | Text(3) | | | √ | Reference to record in ***Individual Species*** table (**only for Biota Matrix** samples) |
| Tissue Code | Text(3) | | | √ | Reference to record in ***Tissue Types*** table (**only for Biota Matrix** samples) |
| Start Date | Date/Time | | | | |
| Start Time | Date/Time | | | | |
| End Date | Date/Time | | | | For most samples (except atmospheric) it is the same as Start Date |
| End Time | Date/Time | | | | For most samples (except atmospheric) it is the same as Start Time |
| Source File | Text (100) | | | | |
| Comment | Memo | | | | |
| OrgID | Long Integer | | | √ | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

Special indexes:

| Name | Fields |
|---|---|
| Unique Sample | Laboratory Sample ID, Station ID |

**Table 3**
**Sample Details**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Sample ID | Long Integer | | | √ | |
| Sample Parameter ID | Long Integer | | | | |
| Value | Double | | | | |
| Last Updated | Date/Time | | | | |

Special indexes:

| Name | Fields |
|---|---|
| Unique Par | Sample ID, Sample Parameter ID |

**Table 4**
**Analyses**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Analysis ID | Long Integer | √ | √ | √ | Table internal ID, participates in relationship (link) with ***Data*** table |
| Sample ID | Long Integer | | | | Reference to record in ***Samples*** table |
| Analysis Institute ID | Long Integer | | | √ | Reference to record in ***Institutes*** table |
| Laboratory Analysis Code | Text (50) | | | | |
| Analysis Method Code | Text (5) | | | √ | Reference to record in ***Analysis Methods*** table |
| Analysis Date | Date/Time | | | | |
| Comment | Memo | | | | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

Special indexes:

| Name | Fields |
|---|---|
| Unique Analysis Code | Sample ID, Laboratory Analysis Code |

**Table 5**
**Data**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Analysis ID | Long Integer | | √ | √ | Reference to record in ***Analyses*** table |
| Parameter Code | Text (5) | | √ | √ | Reference to record in ***Pollution parameters*** table |
| Parameter Value | Double | | | | |
| BDL | Yes/No | | | | Indicate **Yes** if parameter concentration is below of detection level |
| DL | Double | | | | Detection level (limit) value |
| QC | Integer | | | | Parameter Quality Code |
| Last Updated | Date/Time | | | | |

Special indexes:

| Name | Fields |
|---|---|
| Unique Parameter | Analysis ID, Parameter Code |

**Table 6**
**Compliance Monitoring**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Country Code | Text (3) | | √ | √ | |
| Area ID | Long Integer | | | √ | |
| Parameter Code | Text (5) | | | √ | |
| Number of Stations | Integer | | | | |
| Number of Samples | Integer | | | | |
| Frequency Code | Text (1) | | | | |
| Nst International | Single | | | | |
| Nst National | Single | | | | |
| Remarks | Memo | | | | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

**Table 7**
**Areas**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Area ID | Long Integer | √ | √ | √ | |
| Country Code | Text (3) | | √ | | |
| Area Code | Text (10) | | √ | √ | |
| Area Name | Text (50) | | | | |
| Description | Memo | | | | |
| CompMonEFL-Nst | Integer | | | | |
| CompMonHS-Nst | Integer | | | | |
| CompMonBW-Nst | Integer | | | | |
| CompMonO-Nst | Integer | | | | |
| TrendMonR-Nst | Integer | | | | |
| TrendMonHS-Nst | Integer | | | | |
| TrendMonL-Nst | Integer | | | | |
| TrendMonBE-Nst | Integer | | | | |
| Start Date | Date/Time | | | | |
| End Date | Date/Time | | | | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

Special indexes:

| Name | Fields |
|---|---|
| Unique Area | Country, Area Code |

**Table 8**
**Programme: Station Parameters**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Monitoring Station ID | Long Integer | | | √ | |
| Parameter Code | Text (5) | | | √ | |
| Sampling Frequency Code | Text (1) | | | | |
| Sampling Depth | Single | | | | |
| Institute ID | Long Integer | | | | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

**Table 9**
**Dictionary: Analysis Methods**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Method Code | Text (10) | √ | √ | √ | |
| Description | Text (200) | | √ | √ | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

**Table 10**
**Dictionary: Biota Groups**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Group Code | Text (3) | √ | √ | √ | |
| Description | Text (30) | | √ | √ | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

**Table 11**
**Dictionary: Countries**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Country Code | Text (5) | √ | √ | √ | |
| Country Name | Text (40) | | √ | √ | |
| LatMin | Single | | | | |
| LatMin | Single | | | | |
| LonMin | Single | | | | |
| LonMax | Single | | | | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

**Table 12**
**Dictionary: CRM Codes**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| CRM Code | Text (40) | √ | | √ | |
| Description | Text (250) | | | | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

**Table 13**
**Dictionary: Effluent Sources**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Source Code | Text (2) | √ | √ | √ | |
| Description | Text (40) | | √ | √ | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

**Table 14**
**Dictionary: Individual Species**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Species Code | Text (3) | √ | √ | √ | |
| Biota Group | Text (3) | | | | |
| Latin Name | Text (100) | | √ | √ | |
| Information | Text (150) | | | | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

**Table 15**
**Dictionary: Industrial Activity Groups**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Group Code | Text (1) | √ | √ | √ | |
| Description | Text (70) | | √ | √ | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

**Table 16**
**Dictionary: Institutes**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Institute ID | Long Integer | √ | √ | √ | |
| Country Code | Text (3) | | | √ | |
| Institute Code | Text (6) | | | √ | |
| Institute Name | Text (100) | | | | |
| Address | Text (100) | | | | |
| Responsible investigator | Text (50) | | | | |
| e-mail | Text (50) | | | | |
| Main Monitoring Activity | Text (250) | | | | |
| Higher Body | Text (50) | | | | |
| Comments | Text (250) | | | | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

Special indexes:

| Name | Fields |
|---|---|
| Unique Institute | Country Code, Institute Code |

**Table 17**
**Dictionary: Matrix Codes**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Matrix Code | Text (3) | √ | √ | √ | |
| Description | Text (30) | | √ | √ | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

**Table 18**
**Dictionary: Monitoring Frequencies**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Frequency Code | Text (1) | √ | √ | √ | |
| Number of Samplings | Long Integer | | | √ | |
| Description | Text (40) | | √ | √ | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

**Table 19**
**Dictionary: Parameter Groups**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Group Code | Text (5) | √ | √ | √ | |
| Description | Text (50) | | √ | √ | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

**Table 20**
**Dictionary: Pollution Parameters**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Parameter Code | Text (5) | √ | √ | √ | |
| Parameter Group Code | Text (5) | | | √ | |
| Standard | Yes/No | | | | |
| Description | Text (60) | | √ | √ | |
| Air units | Text (10) | | | | |
| Biota units | Text (15) | | | | |
| Effluent units | Text (10) | | | | |
| Plankton units | Text (10) | | | | |
| Precipitation units | Text (10) | | | | |
| Seashore units | Text (10) | | | | |
| Sediment units | Text (10) | | | | |
| Suspended matter units | Text (10) | | | | |
| Sea water units | Text (10) | | | | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

**Table 21**
**Dictionary: Quality Codes**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Quality Code | Long Integer | √ | √ | √ | |
| Short Name | Text (50) | | | | |
| Description | Text (100) | | √ | | |

**Table 22**
**Dictionary: Sample Parameters**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Parameter ID | Long Integer | √ | √ | √ | |
| Parameter Name | Text (50) | | | | |
| Units | Text (20) | | | | |
| Aliases | Text (50) | | | | |
| Description | Text (40) | | | | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

**Table 23**
**Dictionary: Station Types**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Type Code | Text (5) | √ | √ | √ | |
| Type | Text (30) | | | | |
| Description | Text (50) | | √ | √ | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

**Table 24**
**Dictionary: Tissue Types**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Type Code | Text (3) | √ | √ | √ | |
| Description | Text (50) | | √ | √ | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

**Table 25**
**QA: CRM Analysis**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| CRM Sample ID | Long Integer | √ | √ | √ | |
| Country Code | Text (3) | | | | |
| Year | Long Integer | | | | |
| Institute ID | Long Integer | | √ | | |
| Laboratory Sample ID | Text (50) | | √ | | |
| Matrix | Text (3) | | | | |
| CRM Code | Text (40) | | √ | | |
| Analysis Method Code | Text (10) | | | | |
| Analysis Date | Date/Time | | | | |
| Parameter Code | Text (5) | | | | |
| Sample No | Long Integer | | | | |
| Expected Value | Double | | | | |
| Parameter Value | Double | | √ | | |
| Source File | Text (100) | | | | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

Special indexes:

| Name | Fields |
|---|---|
| Unique CRM | Country Code, Institute ID, Laboratory Sample ID, Parameter Code |

**Table 26**
**QA: Laboratory Certification**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Institute ID | Long Integer | | | √ | |
| Certification Date | Date/Time | | | | |
| Certification Code | Text (50) | | | √ | |
| Last Updated | Date/Time | | | | |
| Updated By | Text (30) | | | | |

**Table 27**
**Parameter Aliases**

| Field | Data Type | PK | R | I | Description |
|---|---|---|---|---|---|
| Parameter Code | Text (5) | | √ | √ | |
| Alias | Text (25) | | √ | √ | |

# ANNEX II

# LOAD DATA TOOL MESSAGES

- **Load Data tool messages**

| Message | Meaning | User action |
|---|---|---|
| **Dialog messages** | | |
| Select format please. | User didn't select format | Select format and start loading |
| Set file name please. | User didn't assign file name | Assign file name and start loading |
| Can't open file FILE_NAME | Wrong name of Excel file was typed | Correct file name and start loading |
| Form FORM_NAME has to be closed before loading. | Forms based on monitoring data tables must be closed before loading | Close form FORM_NAME and start loading again |
| Report REPORT_NAME has to be closed before loading. | Reports based on monitoring data tables must be closed before loading | Close report REPORT_NAME and start loading again |
| Errors were encountered while importing the WORKSHEET_NAME worksheet to Access. Check Excel worksheet for data abnormalities. | MS Access couldn't import all data from worksheet to temporary table. List of errors is placed in Data Loading Report. | There could be several reasons for such error:<br>1) Data types are mixed in the same column for example, column contains numeric and text values. It can take place, if provider reported BDL values as "<0.00"1 (less than something) instead reporting BDL and DL in separate columns. In this case it is recommended create BDL and DL columns and correct situation<br>2) Column contains numeric data but has text format. Set proper column format in Excel worksheet.<br>Repeat loading after correction of errors. |
| Serious errors in data format were found. Loading can't be performed. | Excel worksheet doesn't correspond to required format. Loading stopped. | Analyse report for error messages, correct errors and repeat loading. |
| Some inaccuracy in data format was found. (Please sea loading report)<br>Continue loading? | Misfits in data format are not critical. User can continue loading. While message is displayed on the screen, user has possibility to go through report. | Analyse report for warnings: if they are not significant, press [Yes] button to continue loading, otherwise correct mistakes in Excel file and repeat loading. |
| Parameter PARAMETER_CODE was not found in dictionary and among aliases.<br>Open form for adding parameter as alias? | Unknown parameter code was found.<br>Load Data tool considers all unknown column names (i.e. not described in format) as parameter codes and tries to find this code in dictionary and in Parameter Aliases table. If such parameter code was not | Press [No] to ignore the message if this is not real parameter code (wrong column name), or<br>Press [Yes] to add column name (considered as PARAMETER_CODE) into Parameter Aliases table. The Parameter Aliases entry form will be opened. Find Parameter Code |

| Message | Meaning | User action |
|---|---|---|
| | found, this message appears. | corresponding to alias in the dictionary and press OK. |
| Open form for adding parameter into the dictionary? | User didn't add parameter alias into the Parameter Aliases table, so this message appeared. | Press [No] to ignore the message if this is not real parameter code, or<br>Press [Yes] to add column name (considered as PARAMETER_CODE) into the dictionary. Dictionary entry form will be opened. Fill (all) fields in the form and Parameter Code corresponding to alias in the dictionary and press OK |
| Column COLUMN_NAME: value XXX was not found in the table DICTIONARY_NAME. Open form for adding value into the table?" | Column COLUMN_NAME must contain only standard MEDPOL codes from DICTIONARY_NAME, but non-standard-value XXX was found. | Press [Yes] to add new standard value into the dictionary. In this case dictionary entry form will be opened. Fill it and press OK.<br>Press [No] to skip this error message, or press "No to All" to skip all the same messages. In last 2 cases Load Data tool will continue checking used codes and stop loading after completing the check. |
| Error: some code values were not found in the Database dictionaries. Loading can't be performed. | User didn't enter new non-standard codes into dictionaries, and Load Data tool stopped loading. | Analyse report, correct errors and repeat loading |
| Column COLUMN_NAME: value XXX is not in the list. | Some columns must contain only standard values, for example, in column FW_DW only values "F" or "D" are allowed.<br>Load Data tool stops loading. | Correct errors in Excel file and repeat loading. |
| **Errors were encountered when transferring data to temporary tables. Loading can't be performed.** | Non-standard situation -internal error in Load Data tool. | Loading of this file is impossible. If file looks OK, inform database developers. |
| **Stations with the same name but differences in coordinates or bottom depth. Loading these stations will result creating of duplicate in the database.** Duplicates are strongly not recommended. Continue loading? | According to data model monitoring stations are unique in terms of Country-Area-Name, and station coordinates are fixed. In this case Load Data tool discovered, that coordinates of the same station differs in Excel file. | Press [Yes] to continue loading. In this case all stations will be loaded into the database. Database will contain several stations with the same name instead one. As a result, it will create difficulties for interpretation of statistics and for trend analysis.<br>Press [No], correct coordinates in Excel file and repeat loading. |
| Errors in samples were | Errors in samples were found. | Analyse report, correct errors and |

| Message | Meaning | User action |
|---|---|---|
| found. Loading can't be performed. | | repeat loading. |
| Some samples already exist in the Database (please see report), so you have to select appropriate loading mode.<br>• Load new samples only<br>• Load new samples and data and append new data to existing samples | It is non-standard situation. Usually samples data are reported and loaded at once. | If this situation really takes place (i.e. different parameter groups for the same samples were reported in different Excel files) select second option, otherwise select first option.<br>After loading analyse report: may be sample date or year or Laboratory Sample ID is wrong. If such mistakes are discovered, correct them and repeat loading. |
| Do you want to fulfil data quality checking during loading? | Data are ready for loading. It is possible to assign quality codes to data during loading. | Press [No] to refuse.<br>Press [Yes] to assign quality codes. The special form with title “Setup rules for assigning quality codes for loading parameters” will be opened. Assign Min/Max diapasons and appropriate quality codes for parameters and close form. As a result, data checking will be performed. |
| Data are checked and ready to be transferred into the Database. Transfer data? | The same as message. | Press [Yes] to transfer data, or [No] to refuse. |
| Loading completed. | | Just close message box. |
| **Error and warning messages in Data Loading Report** | | |
| Errors were encountered while importing the WORKSHEET_NAME worksheet to Access. Check Excel worksheet for data abnormalities. | See the same message in previous section | See the same message in previous section |
| Wrong units: must be XXX | This message usually appears in “Checking structure of data file” section. It means, that units in current column are non-standard. | It can be typing mistake or real mistake.<br>In case of typing mistake just correct it in Excel file.<br>In case of real mistake replace units in _UNIT column and recalculate data in corresponding data columns.<br>Required units for sample details can be found in **Dictionary: Sample Parameters** |
| Wrong data type | This message usually appears in “Checking structure of data file” section. It means, that data type of current column is wrong. | Check column data in Excel file. If column seems to be empty, some cells still may contain spaces, which are invisible. |

| Message | Meaning | User action |
|---|---|---|
| | | Simply try to delete data in empty cells.<br>See also explanation of first error in this table section. |
| Error: data in some columns have wrong data type. | Summarizing message for data type errors. | Analyse “Checking structure of data file” section of report. Find and correct errors in Excel file. |
| Error: next mandatory columns are absent: LIST_OF_COLUMNS | It can be because wrong format was selected in **Format** combobox, wrong worksheet was selected in **Worksheet** combobox, or really Excel file has wrong format. Sometime space in column name can cause this error. | Correct file format according to standard. |
| Error: next mandatory columns must be filled: LIST_OF_COLUMNS | Listed columns really are not filled (have some empty cells), or Excel worksheet contains some comment below all data rows. | Fill mandatory columns in Excel file.<br>Remove all comments below data rows. |
| Warning: next standard columns are absent: LIST_OF_COLUMNS | Format of Excel file is not exactly the same as required, but loading can be continued. | Analyse LIST_OF_COLUMNS. If presence of some of them is required on your opinion, add these columns to Excel file manually. |
| Warning: next standard columns are not filled: LIST_OF_COLUMNS | Some standard columns are not filled or filled partially. | Analyse LIST_OF_COLUMNS. If some of them must have data on your opinion, fill these columns to Excel file manually. |
| Error: COLUMN_SUFFIX has wrong data type | This message appears in “Checking parameters” section, if parameter CONC or BDL or DL column has wrong data type. | For possible reasons of this errors see explanation to other data type errors in this table.<br>Find and correct error in Excel file. |
| Error: units must be XXX | Parameter units are wrong. | It can be typing mistake or real mistake.<br>In case of typing mistake just correct it in Excel file. For example, µg/L units are often typed in Excel file as mg/L but visible as µg/L using Symbol font. Correct units must be used.<br>In case of real mistake replace units in _UNIT column and recalculate data in corresponding _CONC and _DL.<br>Required units can be found in **Dictionary: Pollution Parameters** |
| Error: different units in the same column | | Recalculate data to proper units and correct units in _UNIT column. |
| No parameter data found (CONC or BDL) | Probably mistake in column name, for example spaces | Correct error in Excel file. |

| Message | Meaning | User action |
|---|---|---|
| found (CONC or BDL) | name, for example space between character and underscore: NH4_CONC and NH4_ UNIT (here it is difficult to recognize space between underscore and "U" in second case) | |
| Parameter not identified | Load Data tool considered current column name as non-standard parameter, but user didn't add this name into database as parameter of parameter alias. It can be mistake in column name. | Correct mistake in Excel file, or add new parameter into the **Dictionary: Pollution Parameters** |
| Warning: some parameters were not identified. | Summarizing message for "Parameter not identified" error. | Analyse report to find "Parameter not identified" error. For correction of error see previous row. |
| Error: no one ready for loading parameter was found. | Parameter columns contain errors or no one parameter column was found. | Analyse report and correct errors. |
| Error: no one analysis was found. | Analyses columns must be present but not found, or no one analysis column is filled (INST, METH, DATE) | Add at least analysis institute data into the Excel File |
| Serious errors in data format were found. Loading can't be performed. | Summarizing message for all previous errors. | Analyse report and correct errors. |
| Column COLUMN_NAME: value XXX was not found in the DICTIONARY_NAME. | Column COLUMN_NAME must contain only standard MEDPOL codes from DICTIONARY_NAME, but non-standard-value XXX was found, and user didn't add this value into the dictionary. | Correct value XXX in Excel file or add it into the dictionary. |
| Error: some code values were not found in the Database dictionaries. | Summarizing message for errors of previous type. | Analyse report and correct errors. |
| Warning: some samples already exist in the Database. Existing data for these samples will not be updated during loading. Only new data can be appended. | Non-standard situation. Usually sample data are loaded at once. | If user wants to replace old sample data in the database with new data, he (she) must delete these samples from the database at first. |
| Error: not all samples were transferred into temporary table. | Sample duplicates exist in the Excel file. It can be typing error. It also can happen, when reporting worksheet was combined from 2 or more | Check Excel worksheet for sample duplicates (combination of values in SAMPLE_ID - STATION – AREA columns). Correct errors if found or combine |

| Message | Meaning | User action |
|---|---|---|
| | worksheets with different parameters but the same samples. | the same sample data from 2 rows into 1 row, or split worksheet in 2 parts and load them one by one. |