



CLIMSOFT VERSION 4 USER MANUAL



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1. Introduction

What is Climsoft?

The Climsoft system is a suite of software which is specifically designed for storing climatic data in a secure and flexible manner, and for obtaining useful information using these data. Climsoft version 4 was developed using Microsoft Visual Basic.NET. The default database storage engine is the open source MariaDB which is a fork from MySQL.

The Climsoft system comprises:

- The database, which holds climatic data for multiple stations in a logical and flexible structure;
- A Key-entry component, to allow users to add new data to the database in a secure and controlled manner;
- Facilities for importing climatic data in various formats into the database e.g. Data from Automatic Weather Stations (AWS), CLICOM ASCII, NOAA GTS and Text Files;
- Facilities for exporting climatic data in formats ready for use by many climate applications (e.g.: RCLIMDEX, CPT, GEOCLIM, INSTAT, R- INSTAT, ENACTS, CDT, etc.);
- Management of images of paper records (paper archives) in support of Data Rescue (DARE);
- Quality Control checking of data that has been loaded into the database;
- A number of Products, application programs which use subsets of the data stored in the database to produce useful reports, summaries and diagrams; and
- System management facilities for managing user access, operations monitoring, administering the database and for tailoring the functions of the system to local needs.

2. Installation

2.1 System Requirements

Hardware:

The Climsoft system requires the following typical hardware specifications:

Computer with processor speed of 1 GHz, 2 GB RAM and enough disk space for installation of application software and storage of database. A minimum of 20 GB disk space is recommended. More disk space will be required for storage of AWS data and images of paper records for Data Rescue. However, it would be ideal to store images of paper records on removable storage media like external hard drives or Network Attached Storage (NAS).

Internet connection is also desirable.

Software:

- Microsoft Windows 7 or later, 64-bit Operating System (OS) is recommended for optimum performance of the database. Climsoft Version 4 is compatible with the following Windows Operating Systems: XP, Vista, Windows 7, Windows 8.x, Windows 10 and Windows 11;
- Microsoft Office with Excel spreadsheet is required since Excel spreadsheet application is the default application for displaying data products from Climsoft;
- Antivirus software;
- Minimum .NET Framework 4.5 is required. This version of the .NET framework is packaged with the Climsoft setup package;
- Climsoft installation setup. Can be downloaded from [met-eLearning site](#). Registration may be required.
- MariaDB/MySQL database system and Climsoft database scripts which are also supplied through Climsoft installer and will be copied into the subfolder called "dbase" in the installation path;
- WRPlot software for Windrose plotting which will be copied into subfolder called "Bin" in the installation path.

2.2 Installation Procedures

Please ensure that your PC meets the hardware and software requirements before you install Climsoft. **You must also have Windows Administrator privileges for you to be able to install Climsoft.**

There are two setup packages for Climsoft, one for 32-bit Windows Operating System (OS) and the other for 64-bit OS. Choose the setup package that matches your Operating System.

1. Run the setup executable file with elevated privileges. To do this, right click on the setup file and choose "**Run as Administrator**" on the pop-up menu.
2. "climsoftv4_bit32_setup.exe" is for 32 - bit OS and "climsoftv4_bit64_setup.exe" is for 64-bit OS. The setup Wizard will guide you through the installation process.
3. When the core Climsoft setup has been completed, a dialog with options for installing additional applications required by Climsoft will appear as shown in Figure 1 below.

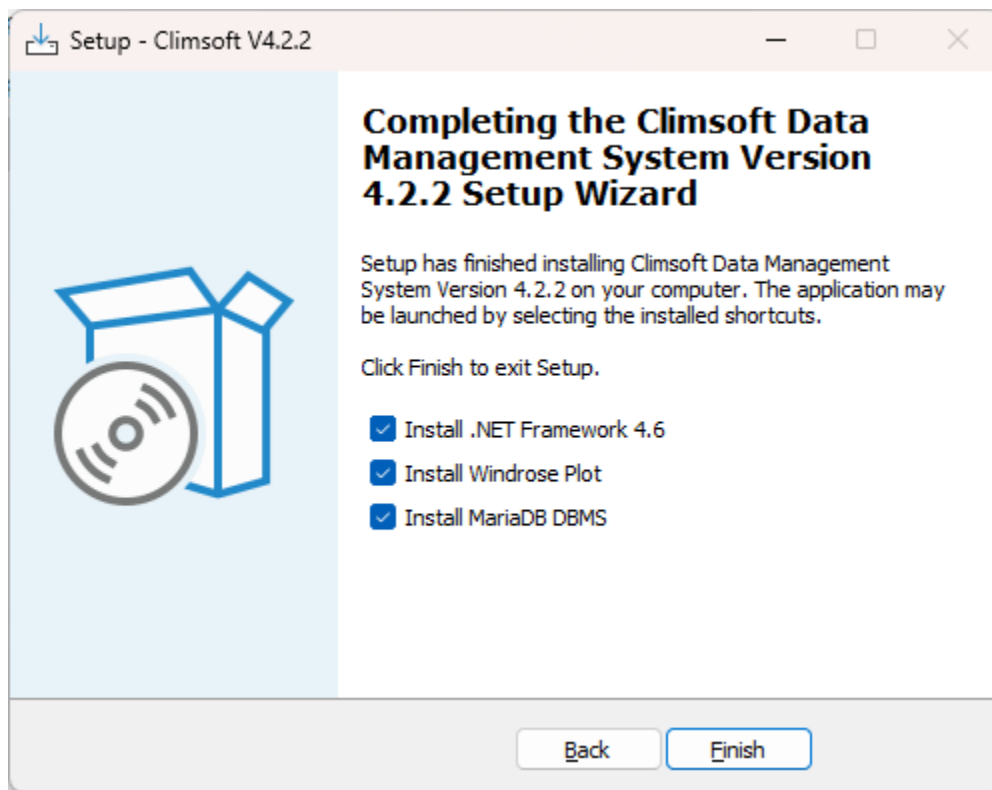


Figure 1(a): Installation of additional applications

You may uncheck the selected applications if they are already installed or you would wish to install them after Climsoft installation. If you choose to install them later then find their installers in the 'bin' folder of the installation path.

If you choose the default selections the applications listed in the above dialog will be installed automatically in the order they are listed on the above dialog. However, if the version of **Microsoft .Net Framework** on your computer is old and need to be upgraded, the system will prompt you to do the upgrade, below is an example of a typical error message you may get:

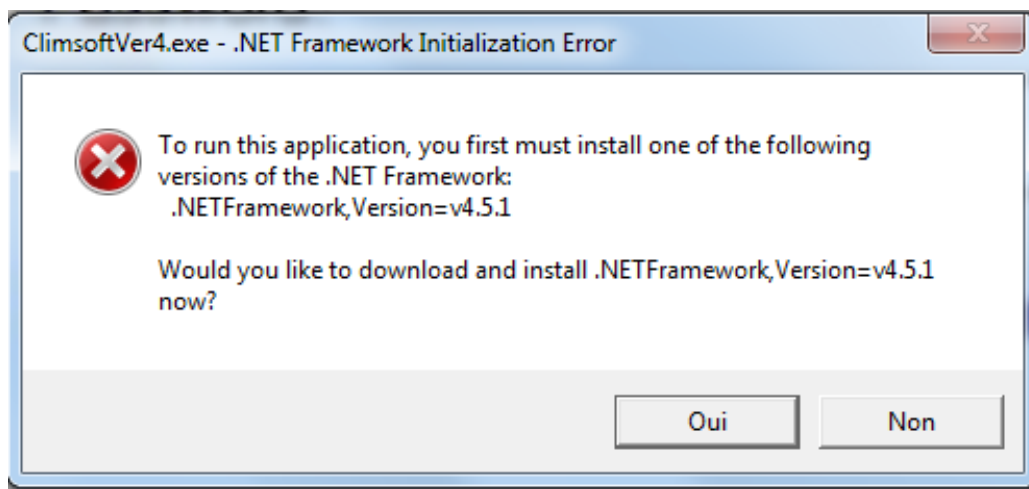


Figure 1(b): Dot Net Framework Initialisation Error

If you get a warning showing that you have a newer version of one of these applications already, click the **Close** button to continue with the installation of the next application.

When you get to the installation of MariaDB, and you reach the point of specifying the Port number for running the MariaDB Service, **it is strongly recommended that you choose the Port 3308**, this is the port number defined in the configuration file of Climsoft for connecting to the MariaDB database that comes with the Climsoft setup. If you choose a different number, you will need to reconfigure the connection to the database at the login dialog to make the port number the same as the one you have configured during the MariaDB setup.

It is also important to note that the password that you define during the installation and configuration of MariaDB will be required when you login to Climsoft for the first time.

NOTE: If prompted to restart the computer before all selected installations are complete, please choose "restart later" and then restart the computer when all installations are complete.

If the installation of WRPlot appears to take too long to complete, check for a second installation dialog that may be minimized on the bottom of the task bar requiring your input. If that dialog is there, open it and respond as appropriate.

Although WRPlot is a freeware, you need a license key to activate this application. An initial license key which is valid for one year is contained in the file "**WRPlot_license.txt**" in the sub folder "**Bin**" in the Climsoft installation folder. To renew the licence you will need to visit the "Lakes Environmental" website at <http://www.weblakes.com/>. This URL is also provided on the "About" box of the WRPlot application. The latest version of WRPLOT application can also be downloaded from this site.

If you need to install, or re-install MariaDB or WRPlot later, the installation files for these applications are contained in the "**Bin**" sub folder of the CLIMSOFT installation folder.

2.3 Creating Climsoft Database in MariaDB

After the successful installation of Climsoft and MariaDB (MySQL database engine), you need to run the script to create the Climsoft database at the MySQL Client prompt.

Follow the steps below to run the script:

- (i) Launch MariaDB Prompt from your **Start Windows** program by clicking on the **MySQL Client (MariaDB xx.x)** as illustrated in Figure 2. You can also type the name "**MariaDB**" in the search box. Dialogs obtained may look different, depending on your Version of Windows.

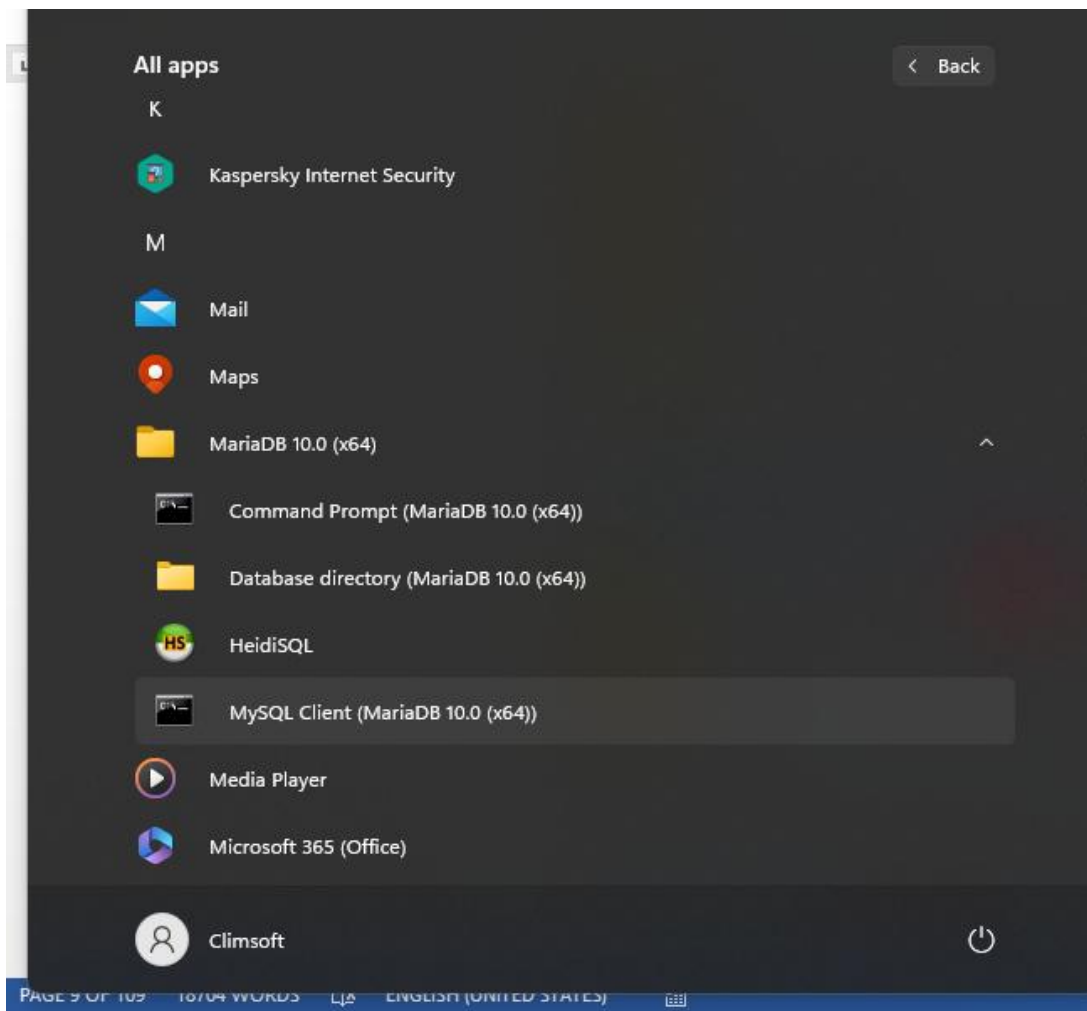


Figure 2: Launching the MariaDB Client

The dialog for entering the password then appears as shown in Figure 3.

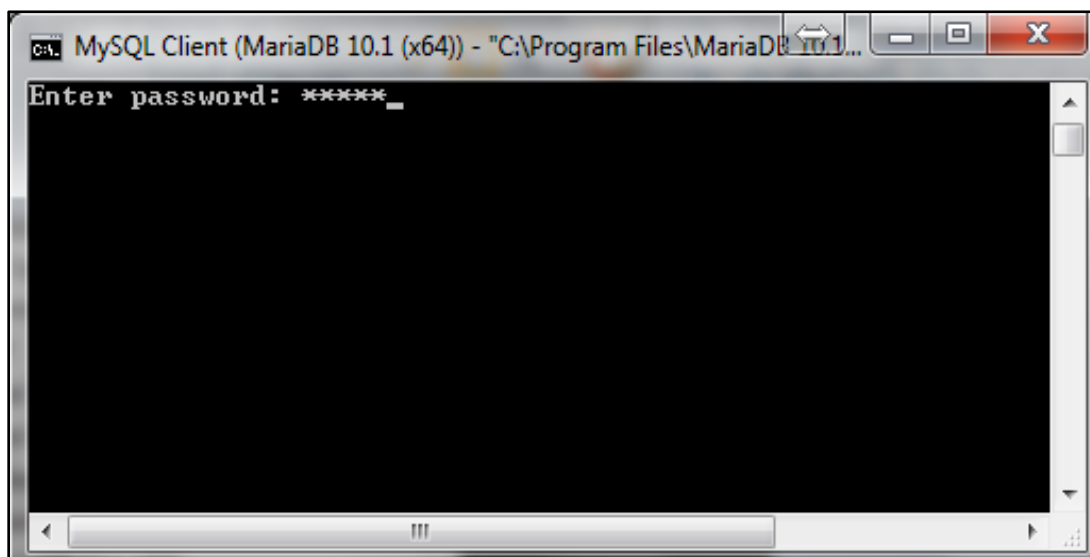


Figure 3: Entering the password on the MariaDB Client Prompt

Note that the user name is assumed to be “**root**”. (There is no provision for entering the username if you have launched the MariaDB Client Prompt as described above.)

If you have entered the correct password i.e. the same password that you entered during the installation and configuration of MariaDB, the **prompt** then appears as shown in Figure 4.

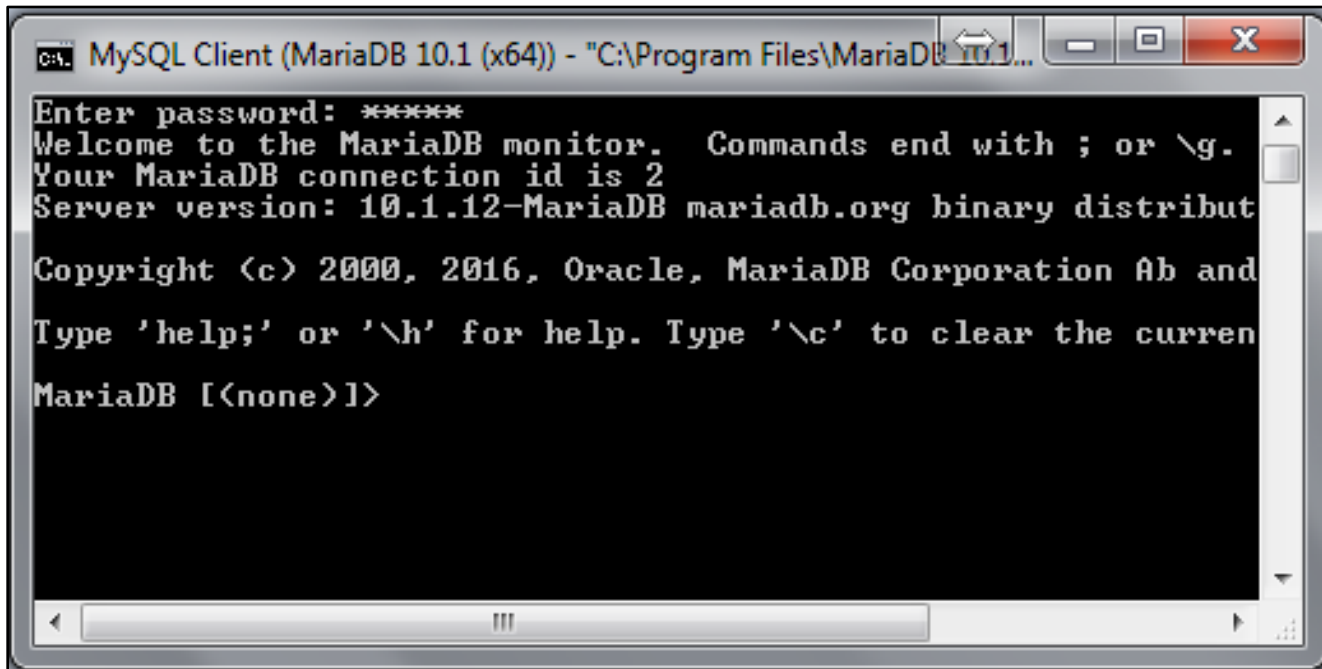


Figure 4: MariaDB Prompt after entering correct password

- (ii) Assuming the script file for creating the CLIMSOFT V4 database is in the Path “**C:\Program Files (x86)\ClimsoftV4\Dbase**”

Type the following command at the prompt:

“Source C:\Program Files (x86)\Climsoftv4\Dbase\mariadb_climsoft_db_v4_all.sql”

Then press the Enter key. (This assumes the script file for creating the Climsoftv4 database is in the Path “**C:\Program Files (x86)\Climsoftv4\Dbase**”)

If you have typed the command correctly, the script will create the Climsoft Version 4 databases; Two (2) databases are created, the operational database (**mariadb_climsoft_db_v4**) and the test database which contains data for training and testing purposes (**mariadb_climsoft_test_db_v4**).

- (iii) To check or verify that Climsoft Version 4 databases have been created in MariaDB database engine, type: “**Show databases;**” command at the MariaDB Client Prompt and press the **Enter Key**. The 2 Climsoft databases will then listed together with other database schemas that come with MariaDB as shown in Fig 4a.

```
MySQL Client (MariaDB 10.0) x
Enter password: *****
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 147
Server version: 10.0.19-MariaDB mariadb.org binary distribution

Copyright (c) 2000, 2015, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]> show databases;
+-----+
| Database |
+-----+
| information_schema |
| mariadb_climsoft_db_v4 |
| mariadb_climsoft_test_db_v4 |
| mysql |
| performance_schema |
| test |
+-----+
8 rows in set (0.03 sec)

MariaDB [(none)]> |
```

Figure 4a: List of databases (Schema) MariaDB database engine

2.4 Climsoft First Login for Climsoft

You are now ready to launch the Climsoft Version 4 application. Double click the Climsoft icon on the desktop to launch the Climsoft Version 4 application and login (Figure 6). On the first login, the User name must be “root” and the Password that was created during *MariaDB/MySQL* database engine installation. You may check the box **Remember username** so that the **User name** is remembered during the next login.

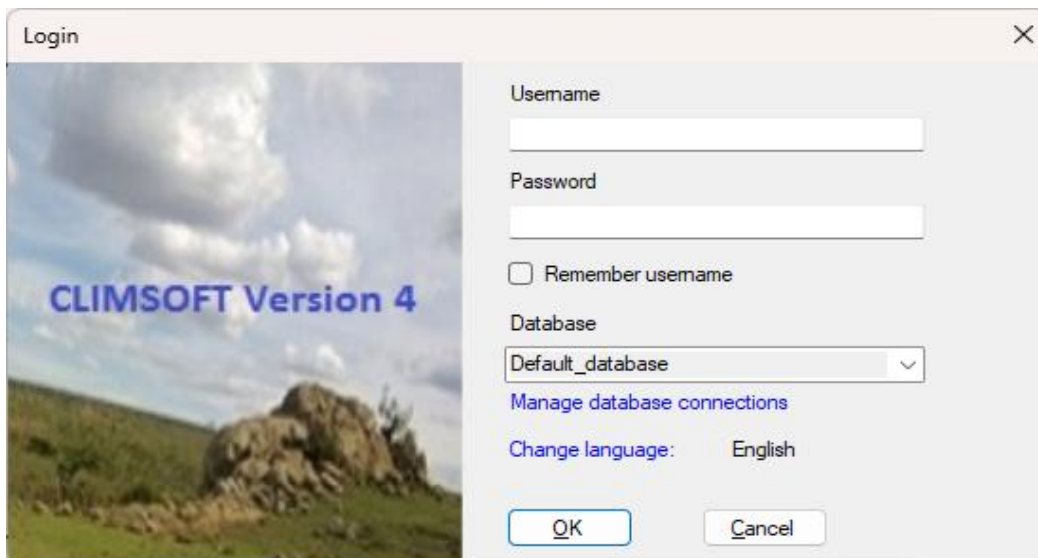


Figure 6: Climsoft Version 4 Login Dialog

- (iv) If you are sure you have typed the correct password but have been denied access, click on the blue label “**Manage database connections**” on the above dialog to check the database connection details and adjust accordingly. Then a dialog similar to **Figure 7** appears.

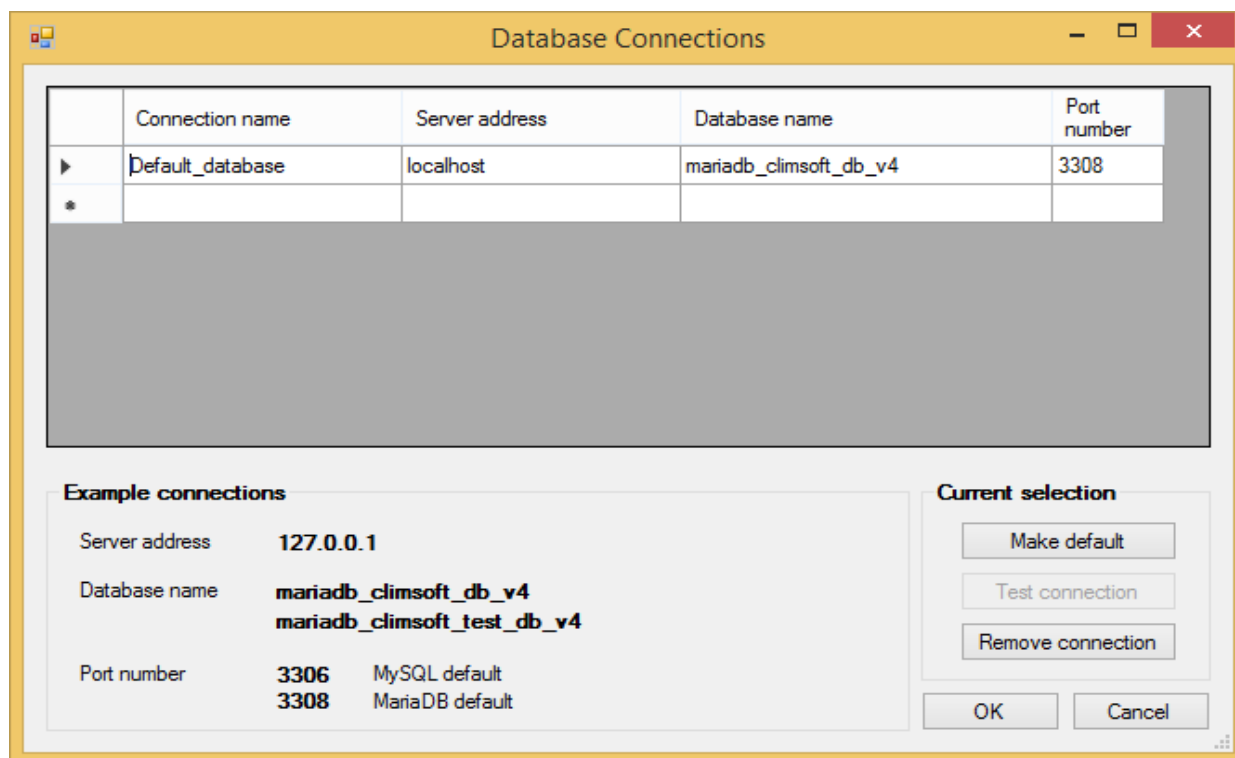


Figure 7: Database connection details

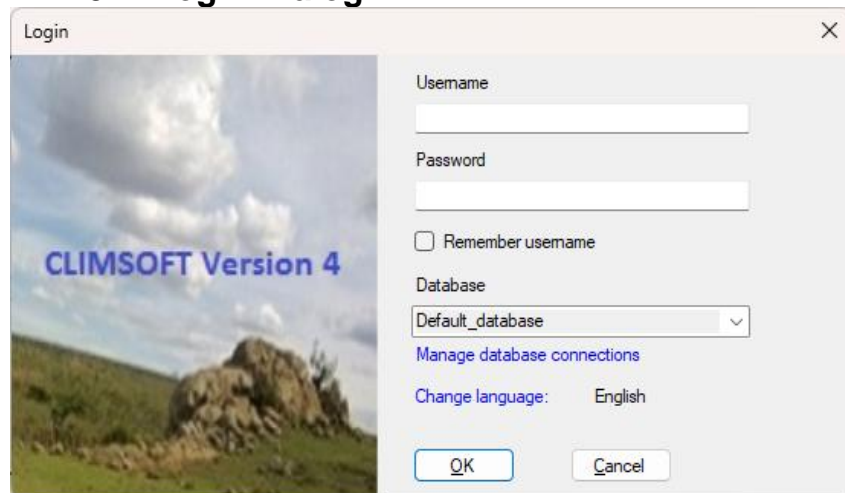
If the MariaDB database to which you want to connect is on your local computer then the server must be either “**localhost**” or “**127.0.0.1**”. If the port number you chose during the installation of MariaDB is different from “**3308**” as shown on the screenshot above, you will need to change the port number to the correct one and click **Ok**. More details on how to manage database connections are given in section **2.5.2** below.

After successful login, the Climsoft front-end will appear as shown (Figure 8). From the front-end, you can access all the components of the Climsoft CDMS, either through the top menu or by clicking the icons on the Welcome screen.

However, a user will be able to access only the features corresponding to the privileges associated with the user- group to which they belong.

2.5 Updated Climsoft Login and Database Connection

2.5.1 Login Dialog



The Login dialog box for Climsoft Version 4. It features a background image of a landscape with a large rock. The dialog contains fields for Username, Password, and Database (a dropdown menu currently showing 'Default_database'). There is a checkbox for 'Remember username' and a 'Change language' dropdown set to 'English'. At the bottom are 'OK' and 'Cancel' buttons. A link 'Manage database connections' is also present.

Figure 6a : Climsoft Login Dialog

To Login

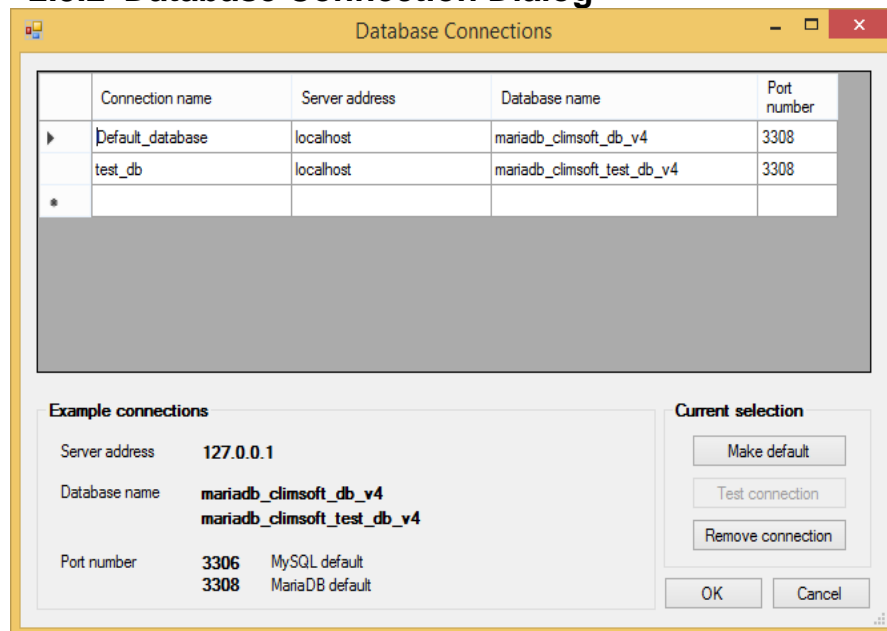
Enter user name in *User Name* box
Enter Password in *Password* box

To Change database connection Click on [Manage database connections](#) then follow dialog in Figure 7a

To remember user name in subsequent logins
Check the box *Remember username*

To Set the Language to use
Click on [Change Language](#) to select the appropriate language from the subsequent dialog

2.5.2 Database Connection Dialog



The Database Connections dialog box. It contains a table with columns: Connection name, Server address, Database name, and Port number. The table lists 'Default_database' and 'test_db'. A new row marked with an asterisk (*) is at the bottom for adding a new connection. Below the table is a section for 'Example connections' with fields for Server address (127.0.0.1), Database name (mariadb_climsoft_db_v4, mariadb_climsoft_test_db_v4), and Port number (3306, 3308). To the right is a 'Current selection' panel with buttons: 'Make default', 'Test connection', 'Remove connection', 'OK', and 'Cancel'.

| | Connection name | Server address | Database name | Port number |
|---|------------------|----------------|-----------------------------|-------------|
| ▶ | Default_database | localhost | mariadb_climsoft_db_v4 | 3308 |
| | test_db | localhost | mariadb_climsoft_test_db_v4 | 3308 |
| * | | | | |

To connect to any of the listed databases

- Select the database by clicking on the left most cell of that row,
- Click on the button *Make default*.
- Click OK to save changes and close the dialog.

To connect to a database that is not listed

- Enter the database details in the new row marked *,
- Follow the provided *Example connections* to fill all cells for that row,
- Click on the button *Make default*,
- Click OK to save changes and close the dialog.

Figure 7a: Database connection details

Note that Climsoft V4 installation comes with two databases; one as the operational database while the one as test database. The test database is populated with observational data and metadata obtained from different NMHSSs. In order to use the test database, it must be listed in the Database Connections as shown in Figure 7a and be selected at the Login dialog through the Database list box.

3. Climsoft Main Menu and Welcome Dialog

After a successful Login the main interface for Climsoft Version 4 displays (see Figure 8). It is referred to as the **Welcome** Dialog and consists of the Main Menu and icons through which all the functionalities are accessed.

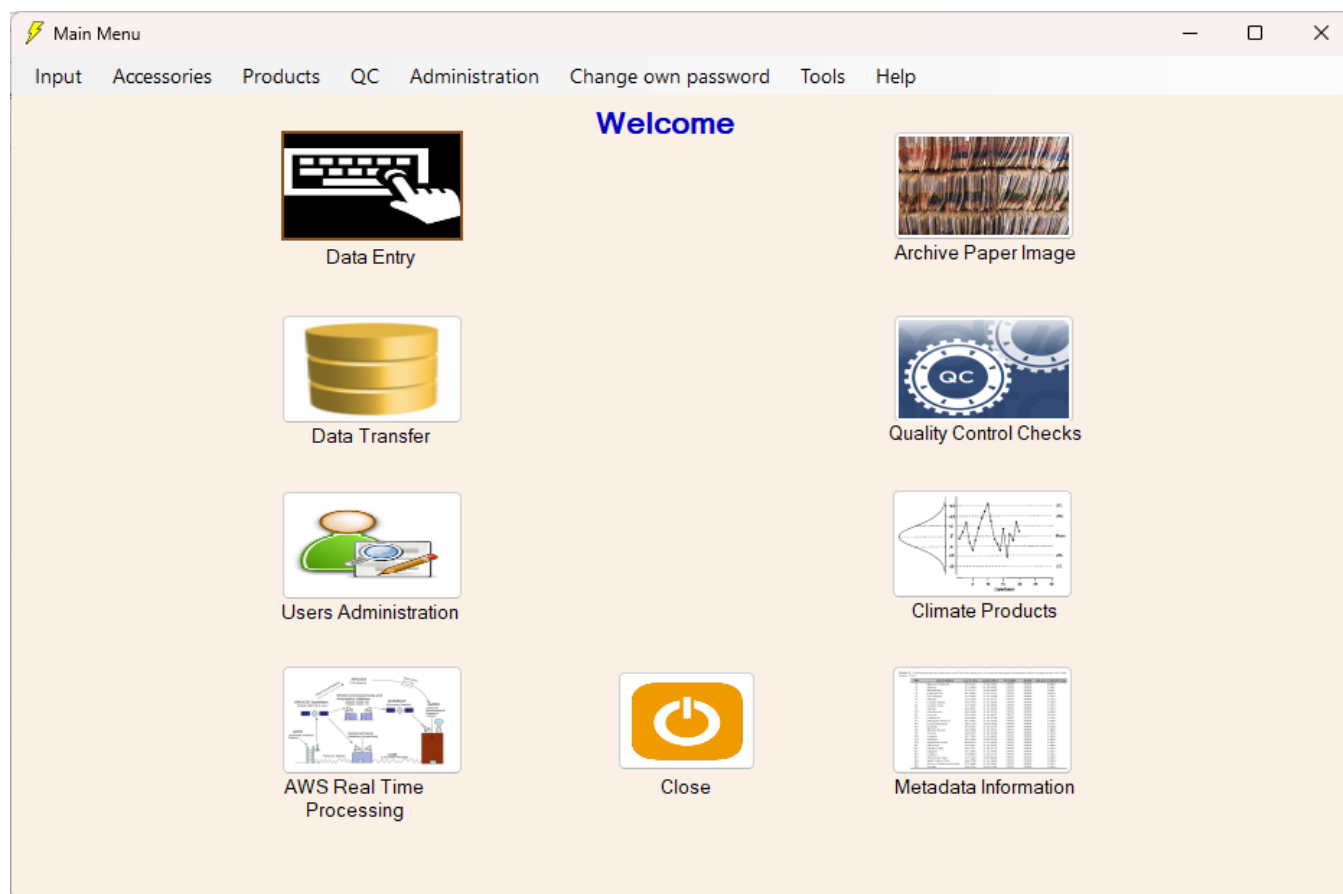


Figure 8: Welcome Dialog

The functions that are accessed from this dialog are as follows:

3.1 Menu Bar Items

- **Input** – Opens key entry forms and the paper archive dialog;
- **Accessories** – Opens the calculation of Relative Humidity and Dew point, given the Dry Bulb and Wet bulb temperatures;
- **Products** – Opens the Climate products development dialog;
- **QC** – Data quality control functions;
- **Administration** – Functions for administration of users and the database. This feature is only accessible to administrators;
- **Change own password** – Open the dialog for users to change their passwords;
- **Tools** – Opens dialogs for different operational settings;
- **Help** – About Climsoft V4 and online help on how to undertake various operations.

3.2 Main Menu Icons

- **Data Entry** – Lists key entry forms to enter climate data. Same as in the menu **Input**;
- **Data Transfer** – Opens a dialog for data upload, import (external data), backup and restore;
- **Users Administration** – Opens a dialog for adding users and updating their details. . Same as in the menu **Administration**;
- **AWS Real Time Processing** – Opens a dialog for setting up and managing Automatic Weather Station (AWS) data real time operations;
- **Archive Paper Image** - Opens a dialog for managing paper images. Same as in the **Menu**;
- **Quality Control checks** - Opens a dialog for quality control checks. Same as in the menu **Input**;
- **Climate Products** - Opens a dialog to extract climate products. Same as in the menu **QC**;
- **Metadata Information** - Opens the metadata management dialog;
- **Close** – For Climsoft Shut down.

4. User Management and Configuration Settings

4.1 User Management

The default user of the Climsoft CDMS is “**root**”. This is the super user of the system with access to all the features of the Climsoft CDMS. To allow other users to make use of the system, the “root” user must add new users and assign them to different user groups. The different user groups that have been pre-defined for Climsoft are shown in Table1:

| User Group | Summarized access rights |
|----------------------------|---|
| ClimsoftAdmin | All Climsoft features including creating and deleting other users |
| ClimsoftDeveloper | Modification of all Climsoft features |
| ClimsoftMetadata | Updating of metadata e.g. station information, instruments, etc. |
| ClimsoftOperator | Key-entry of observation data |
| ClimsoftOperatorSupervisor | Key-entry plus uploading key-entry data to observationinitial table |
| ClimsoftProducts | Extracting products from Climsoft |
| ClimsoftQC | Key-entry, upload to observationinitial and Quality Control |
| ClimsoftRainfall | Key-entry of only rainfall data |

Table 1: CLIMSOFT user roles

The “**root**” user or any other user with administrative privileges is able to access the user management dialog by clicking the “**User Management**” icon on the Welcome screen or via the “**Administration**” menu. The dialog for User Management is shown in Figure 9.

| userName | userRole | entry |
|----------|------------------|-------|
| admin | ClimsoftAdmin | 0 |
| climsoft | ClimsoftAdmin | 0 |
| data | ClimsoftOperator | 0 |
| jrc | ClimsoftOperator | 0 |
| nduri | ClimsoftOperator | 0 |
| QC | ClimsoftQC | 0 |

Figure 9: Climsoft user management

The user management dialog is self-explanatory. The “Add New” button is enabled after filling all the text boxes and picking the user role from the dropdown list.

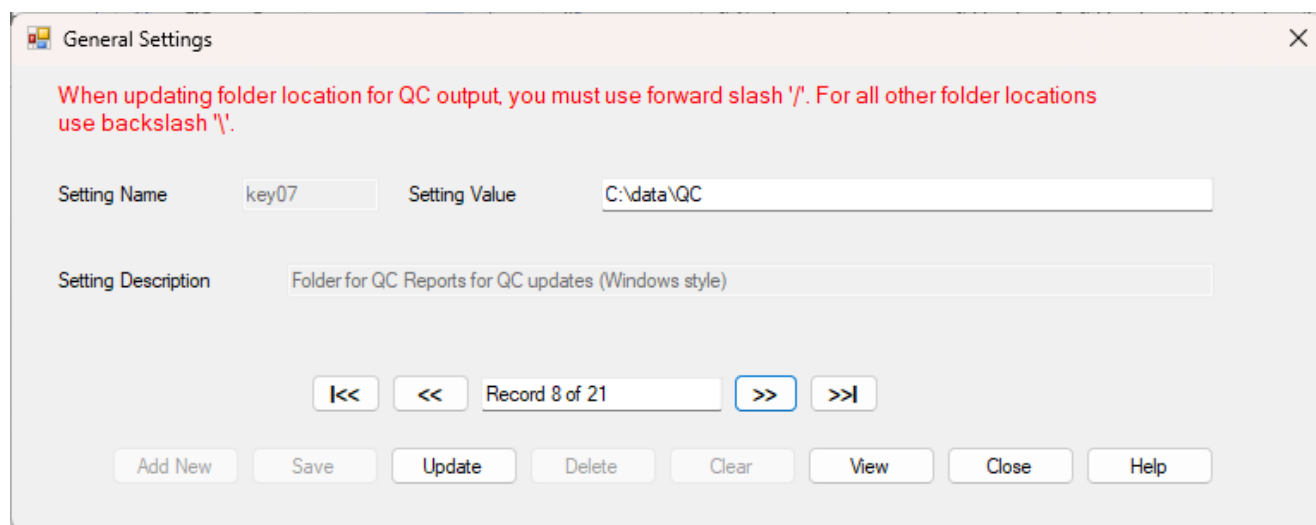
Apart from creating new users, the Climsoft administrator can change the Password and also the User Role of any user. To change the password for the selected user, the new password must be entered and confirmed in the **Password** and **Confirm Password** boxes respectively then click **Update** button. The user role is changed by selecting the new one from the **user Role** list box then click the buttons **Update** and **Refresh Privileges** in that order.

Any user can change his/her own password via the menu item “**Change own password**” on the **Welcome** form in Figure 8.

The **root** user is managed through the database engine tools but not through the **User Management** dialog.

4.2 Configuring General Settings

To customize Climsoft for local use, the Climsoft administrator must configure the system via **Tools >> General Settings** from the top menu on the Climsoft front-end. Figure 10a shows the dialog for configuring the general settings in a view displaying one record at a time.



The screenshot shows a window titled "General Settings" with a close button (X) in the top right corner. Inside the window, there is a red text instruction: "When updating folder location for QC output, you must use forward slash '/'. For all other folder locations use backslash '\\". Below this, there are two input fields: "Setting Name" with the value "key07" and "Setting Value" with the value "C:\data\QC". Underneath these is a "Setting Description" field with the text "Folder for QC Reports for QC updates (Windows style)". At the bottom of the dialog, there is a navigation bar with buttons: "Add New", "Save", "Update", "Delete", "Clear", "View", "Close", and "Help". Above the "Update" button, there is a record navigation section with buttons "I<<", "<<", "Record 8 of 21", ">>", and ">>I".

Figure 10a: General settings in a single record view mode

The Administrator must navigate through **all** the records in the dialog and change the contents in the text box to the right of the label “Setting Value” to suit the required local configuration. After changing any record click **Update** button before going to the next.

Alternatively, by clicking the “**View**” button, the settings can be viewed and edited in datasheet (table) view as shown in Figure 10b

| | keyName | keyValue | keyDescription |
|---|---------|--------------------|--|
| ▶ | key00 | 850 | Geopotential standard pressure level |
| | key01 | 6 | Morning time for recording tmin and precip |
| | key02 | 18 | Afternoon time for recording tmax |
| | key03 | 1 | Month for starting recording of Gmin |
| | key04 | 12 | Month for ending recording Gmin |
| | key05 | 3 | Number of digits for wind direction |
| | key06 | 3 | Number of digits for wind speed |
| | key07 | C:\data\QC | Folder for QC Reports for QC updates (Windows style) |
| | key08 | C:/data/QC | Folder for QC Reports for MariaDB output (Unix style) |
| | key09 | inches | Units for Precipitation |
| | key10 | Deg C | Units for Temperature |
| | key11 | feet | Units for Cloud hight |
| | key12 | C:\Image\Archive | Folder for Paper Archive image files |
| | key13 | 127.0.0.1 | Remote server |
| | key14 | metres | Units for Visibility |
| | key15 | feet | Units for Cloud hight |
| | key16 | C:\data\backup\... | Backup folder for keyentry form data (mapped on local) |
| | key17 | !?!UicoCq.YtNBY... | SSH key for generating outfile (DO NOT CHANGE THIS VALUE!) |

Figure 10b: General settings in datasheet view mode

You may increase the columns width in the data sheet to see more details by dragging the columns boundaries to the right. With administrative privileges the records may be updated but not deleting or adding. **Update** and **Delete** buttons are enabled after clicking the button **Edit Mode**. Values in the column “**KeyName**” should not be changed because they are used by Climsoft to reference the selected record.

Through **Export** button the displayed records can be exported into a text (csv) file and saved as a backup data. The **Import** button does the reverse.

5. Metadata Management

Climsoft uses metadata to describe the data archived in its database. It is therefore important to manage the metadata well and ensure all metadata is in place before the data it describes is loaded into the Climsoft database. The dialog shown in Figure 11 below facilitates management of all metadata in the Climsoft database. Each tab opens a dialog for the management of each of the metadata type.

Metadata Management

Close Help

Station Element Station Element Instrument Station Location History Station Qualifier Schedule Class Physical Feature Paper Archive

Stations

Station Details

Search Station Name

Station Id

Station Name

Latitude

Longitude

Elevation(metres)

WMO Id

ICAO Id

WIGOS Id (WSI)

Country

Authority

Admin Region

Drainage Basin

Latitude and Longitude Decimal Degrees Computation

Degrees Minutes Seconds N/S

Degrees Minutes Seconds E/W

Qualifier

Opening Date

Closing Date

Geographical Method

Geographical Accuracy

Station Operational

Include WSI in GTS Encoding

AddNew Save Update Delete View Import

Figure 11: Metadata Management

The dialog in Figure 11 is for the station metadata. All other metadata dialogs have a similar structure.

The Station metadata dialog has the following controls:

- **Text boxes** – For the input of metadata values or showing the values for the selected record;
- **Scroll bar and buttons** – To navigate through the metadata records;
- **Searching records;**
 - **Search Station Name** list box – Searches station for the selected name and displays its details in the text boxes,
 - **Station Id** list box – Also searches a station record by selecting and clicking the station Id value from the list. Details of the selected station will be shown in their appropriate text boxes.
- **Latitude and Longitude** MUST be entered in decimal degrees. Where geographical coordinates are not available in decimal values but in degrees, minutes and seconds they may be entered in the provided boxes for conversion. They will get computed and filled into the appropriate boxes once the **N/S** or **E/W** is selected.

- **Command Buttons:**

- **AddNew** – Adds a new metadata record after details have been typed in. The Station Id is mandatory and must be unique in all records;
- **Save** – Adds and saves a new station record in the database whose details have been typed;
- **Update** – Updates the changes made on the selected record;
- **Delete** – Removes the selected and displayed record from the database;
- **View** – Displays the metadata records in a tabular form. The Export button will export the metadata file in csv format;
- **Import** – Opens a dialog through which stations metadata in a text (csv) can be imported into Climsoft. By clicking the **Import** Command button the dialog in Figure12 below appears;

5.1 Importing Station Metadata

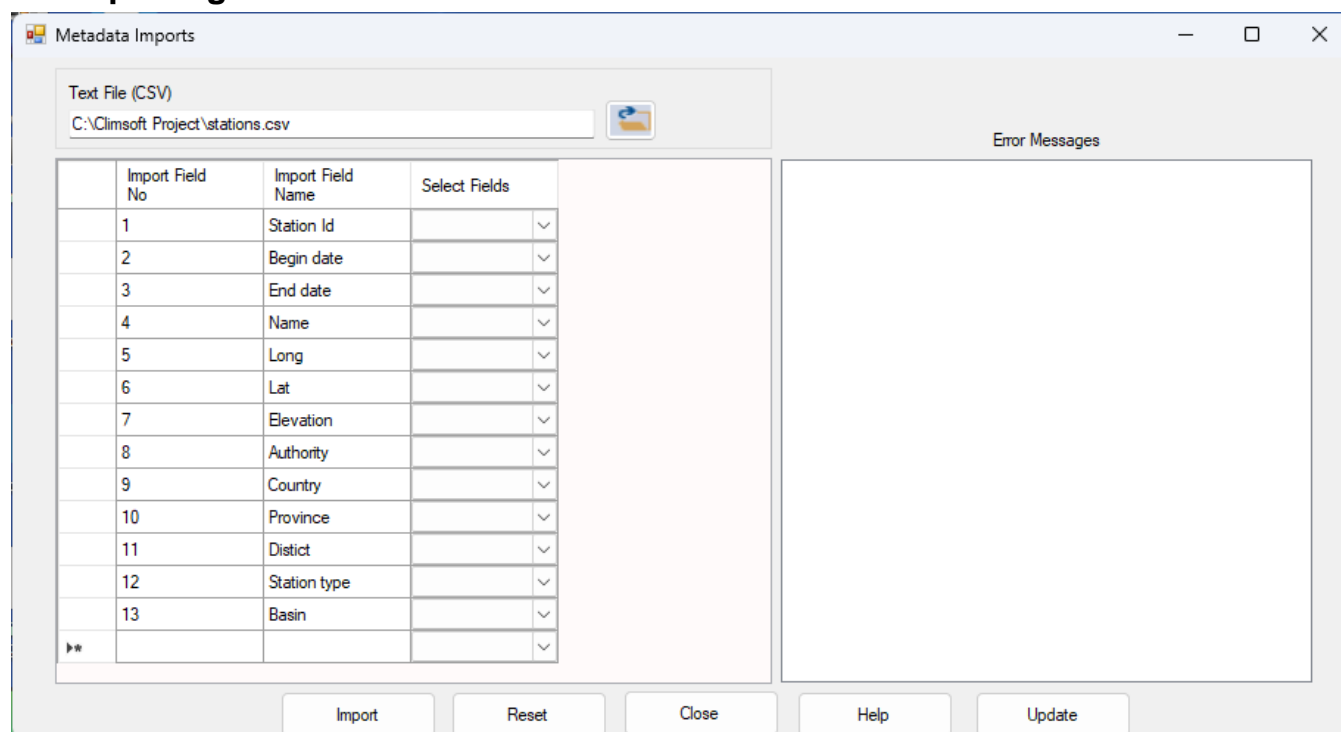


Figure 12: Importing stations metadata

The metadata import file can be created using EXCEL then saved as Comma Separated Values (CSV) with column headers. In EXCEL the structure is as shown in Figure 13;

| id | wmoid | aviationid | begin_datetime | end_datetime | station_name | district | country | qualifier | drainagebasin | latitude | longitude | elevation |
|---------|-------|------------|------------------|--------------|------------------------------------|----------|---------|-----------|---------------|----------|-----------|-----------|
| 8435001 | | | 01/01/1970 00:00 | | KIBISH POLICE POST | TURKANA | KENYA | RAINFALL | 2B | 5.23 | 35.85 | 547 |
| 8534000 | | | 01/01/1949 00:00 | | LOKICHOGGIO POLICE POST | TURKANA | KENYA | RAINFALL | 2B | 4.25 | 34.35 | 638 |
| 8534001 | | | 01/01/1985 00:00 | | LOKICHOGIO LOPANDING AMREF STATION | TURKANA | KENYA | RAINFALL | 2B | 4.2 | 34.4 | 638 |
| 8534002 | | | 01/01/1986 00:00 | | LOKICHOGIO A.I.C | TURKANA | KENYA | RAINFALL | 2B | 4.2 | 34.35 | 638 |
| 8534003 | | | 01/01/1987 00:00 | | LOKUDULE PRIMARY SCHOOL | TURKANA | KENYA | RAINFALL | 2B | 4.05 | 34.83 | 547 |
| 8535000 | | | 01/01/1932 00:00 | | LOKITAUNG D.O.'S OFFICE | TURKANA | KENYA | RAINFALL | 2B | 4.25 | 35.75 | 729 |
| 8535001 | | | 01/01/1948 00:00 | | TODENYANG POLICE POST | TURKANA | KENYA | RAINFALL | 2B | 4.53 | 35.91 | 395 |
| 8535003 | | | 01/01/1966 00:00 | | KOKURO POLICE POST | TURKANA | KENYA | RAINFALL | 2B | 4.66 | 35.71 | 608 |
| 8535004 | | | 01/01/1970 00:00 | | KAMATHIA POLICE POST | TURKANA | KENYA | RAINFALL | 2B | 4.9 | 35.35 | 760 |
| 8535005 | | | 01/01/1973 00:00 | | KALENG TRADING CENTRE | TURKANA | KENYA | RAINFALL | 2B | 4.38 | 35.55 | 730 |
| 8535006 | | | 01/01/1973 00:00 | | LOWARENGAK MISSION | TURKANA | KENYA | RAINFALL | 2B | 4.28 | 35.9 | 380 |
| 8535007 | | | 01/01/1985 00:00 | | LOKITAUNG SECONDARY SCHOOL | TURKANA | KENYA | RAINFALL | 2B | 4.28 | 35.78 | 730 |
| 8535008 | | | 01/01/1986 00:00 | | KAIKOR T. R. P. | TURKANA | KENYA | RAINFALL | 2B | 4.53 | 35.4 | 700 |
| 8535009 | | | 01/01/1986 00:00 | | KACHODA T. R. P. | TURKANA | KENYA | RAINFALL | 2B | 4.35 | 35.63 | 547 |
| 8535010 | | | 01/01/1990 00:00 | | TODENYANG A. P. POST | TURKANA | KENYA | RAINFALL | 2B | 4.61 | 35.93 | 410 |
| 8535011 | | | 01/01/1992 00:00 | | NACHUKUI PRIMARY SCHOOL | TURKANA | KENYA | RAINFALL | 2B | 4.08 | 35.91 | 410 |
| 8535012 | | | 01/01/1983 00:00 | | KOYASA A. P POST | TURKANA | KENYA | RAINFALL | 2B | 4.95 | 35.65 | 608 |
| 8536000 | | | 01/01/1948 00:00 | | SABAREI POLICE POST | MARSABIT | KENYA | RAINFALL | 2A | 4.35 | 36.9 | 760 |

Figure 13: structure of station metadata file in Excel

After saving in a text (csv) format the data appears as shown in Figure 14.

```

File Edit Format View Help
id,station_name,qualifier,country,district,authority,begin_datetime,end_datetime,longitude,latitude,elevation,drainagebasin
10101100,GITEGA,AGROMET/SYNOPTIC,RWANDA,NYARUGENGE,KIGALI CITY,01/01/1970,31/12/9999,30.06,-1.95,1474,NIL
10105200,BUTAMWA,CLIMATOLOGICAL,RWANDA,NYARUGENGE,KIGALI CITY,01/01/1970,31/12/9999,30.03,-2.01,1400,NIL
10106500,MUHIMA,RAINFALL,RWANDA,NYARUGENGE,KIGALI CITY,01/01/1970,31/12/9999,30.06,-1.93,1530,NIL
10107500,KABUSUNZU,RAINFALL,RWANDA,NYARUGENGE,KIGALI CITY,01/01/1970,31/12/9999,30.05,-1.96,1530,NIL
10108500,COLLEGE ST ANDRE,RAINFALL,RWANDA,NYARUGENGE,KIGALI CITY,01/01/1970,31/12/9999,30.06,-1.96,1550,NIL
10109500,LYCEE ND CITEAUX,RAINFALL,RWANDA,NYARUGENGE,KIGALI CITY,01/01/1970,31/12/9999,30.06,-1.95,1550,NIL
10109600,RUGUNGA,RAINFALL,RWANDA,NYARUGENGE,KIGALI CITY,01/01/1970,31/12/9999,30.08,-1.95,1420,NIL
10109700,RWAMPARA,RAINFALL,RWANDA,NYARUGENGE,KIGALI CITY,01/01/1970,31/12/9999,30.08,-1.96,1425,NIL
10201500,RUBUNGO,Rainfall,RWANDA,GASABO,KIGALI CITY,01/01/1970,31/12/9999,30.16,-1.92,1450,NIL
10202200,KABUYE SUGAR,Climatology,RWANDA,GASABO,KIGALI CITY,01/01/1970,31/12/9999,30.07,-1.89,1400,NIL
10306100,KIGALI AERO,AGROMET/SYNOPTIC,RWANDA,KICUKIRO,KIGALI CITY,01/01/1970,31/12/9999,30.11,-1.95,1490,NIL
10308500,MASAKA,RAINFALL,RWANDA,KICUKIRO,KIGALI CITY,01/01/1970,31/12/9999,30.21,-2,1550,NIL
10308600,RUBIRIZI,RAINFALL,RWANDA,KICUKIRO,KIGALI CITY,01/01/1970,31/12/9999,30.11,-1.98,1450,NIL
20101500,NYANZA,RAINFALL,RWANDA,NYANZA,SOUTHERN,01/01/1970,31/12/9999,29.75,-2.35,1700,NIL
20101600,GIHISI,RAINFALL,RWANDA,NYANZA,SOUTHERN,01/01/1970,31/12/9999,29.75,-2.36,1700,NIL
20101700,BUSASAMANA-NYANZA,CLIMATE,RWANDA,NYANZA,SOUTHERN PROVINCE,01/01/1970,31/12/9999,29.76,-2.35,1805,NIL
20102PLP,BUSORO,CLIMATOLOGICAL/AWS,RWANDA,NYANZA,SOUTHERN,01/01/1970,31/12/9999,29.91,-2.28,1478,NIL
20106500,MWEYA,RAINFALL,RWANDA,NYANZA,SOUTHERN,01/01/1970,31/12/9999,29.63,-2.33,2000,NIL
20107500,NYAMIYAGA,RAINFALL,RWANDA,NYANZA,SOUTHERN,01/01/1970,31/12/9999,29.86,-2.46,1800,NIL
20109700,RURANGAZI,Rainfall,RWANDA,NYANZA,SOUTHERN,01/01/1970,31/12/9999,29.65,-2.35,1512,NIL
20201200,CYILI,CLIMATOLOGICAL,RWANDA,GISAGARA,SOUTHERN,01/01/1970,31/12/9999,29.88,-2.48,1391,NIL
20201500,GIKONKO,Rainfall,RWANDA,GISAGARA,SOUTHERN,01/01/1970,31/12/9999,29.86,-2.48,1612,NIL
20203200,KANSI ECOLE,CLIMATOLOGICAL,RWANDA,GISAGARA,SOUTHERN,01/01/1970,31/12/9999,29.75,-2.7,1670,NIL
20203500,KANSI PAROISSE,RAINFALL,RWANDA,GISAGARA,SOUTHERN,01/01/1970,31/12/9999,29.75,-2.71,1670,NIL
20205200,KIGEMBE,CLIMATOLOGICAL,RWANDA,GISAGARA,SOUTHERN,01/01/1970,31/12/9999,29.7,-2.73,1700,NIL
20206500,GAKOMA,RAINFALL,RWANDA,GISAGARA,SOUTHERN,01/01/1970,31/12/9999,29.85,-2.71,1450,NIL
20209700,MUKINDO,RAINFALL,RWANDA,GISAGARA,SOUTHERN,01/01/1970,31/12/9999,29.91,-2.46,1542,CONGO
20213500,SAVE PAROISSE,RAINFALL,RWANDA,GISAGARA,SOUTHERN,01/01/1970,31/12/9999,29.76,-2.55,1725,NIL

```

Figure 14: structure of station metadata file in Notepad.

5.1.1 Station Metadata Import procedure

- From the Metadata Import dialog, Figure 12, open the text file containing the stations metadata;
- The column headers in the text file are listed in the **Import Field Name** column of the dialog;
- For each field in the list click twice (not double click) on the **Select Field** to select the corresponding field name from the database;
- Click the **Import** command. The metadata will then be imported and any station that fails to be imported will be listed in **Errors message** box with the cause of the failure. The summary of the importing will be listed below that box.
- Scroll through the error messages, correct the text file and repeat the exercise. Duplicate error messages should be ignored since they indicate the record already exists in the database.
- Click **Close** to exit the dialog.

5.2 Other Metadata

Other metadata types do not require importing but are typed since they are usually few.

5.2.1 Elements Metadata

Observation elements are many and are supplied with Climsoft. They can be edited after clicking the Element tab to display the Observation Element dialog. This dialog enables the characteristics of a new climatic element to be specified and those of existing elements modified. Generally the elements will be standard but modification to customize them according to the user requirements is necessary. If there are Elements observed in a NMHS and not listed they should be added.

The elements may be viewed and updated in either Element view, Figure 15, or in Table View, Figure 16. Click the View button in Figure 15 to move to the Table view. In Table View, Click the View Mode button to return to the Element view of Figure 15.

The screenshot shows the 'Metadata Management' window with the 'Element' tab selected. The 'Observation Elements' dialog is open, displaying a form for editing an element. The form fields are as follows:

| Field | Value |
|----------------|-------------------------------------|
| ID | 2 |
| Abbreviation | TMPMAX |
| Name | Tmax |
| Description | Temperature daily maximum |
| Scale | 0.10 |
| Upper Limit | 460 |
| Lower Limit | 120 |
| Unit | Degrees C |
| Type | "daily" |
| Selected | <input checked="" type="checkbox"/> |
| Total Required | <input type="checkbox"/> |

At the bottom of the dialog, there are buttons for 'AddNew', 'Save', 'Update', 'Delete', and 'View'. A status bar at the very bottom indicates '2 of 478'.

Figure 15: Elements dialog

The dialog in Figure 15 is used as follows:

(i) **Adding a new element record:**

- Click **AddNew** to obtain a blank form;
- Enter metadata values for the element;
 - Data for **ID** is mandatory and unique in all records,
 - **Scale** is the factor used in key entry for the decimal point. Therefore **Upper Limit** and **Lower Limit** values should take the scale into account,
 - **Type** is the frequency of observation e.g., minute, hourly, daily, AWS.
- Click **Save** to add the new record in database.

(ii) **Updating (editing) existing element record:**

- Use either **Search Element** box or **ID** to locate the required element record,
- Edit the desired values,
- Click **Update** to save the changes.

(iii) **Deleting elements**

- Use either **Search Element** box or **ID** to locate the required element record
- Click **Delete**

Alternatively move to Table View, Figure 16 and use the command buttons as described below;

| elementId | abbreviation | elementName | description | elementScale | upperLimit | lowerLimit | units |
|-----------|--------------|-----------------|-----------------------|--------------|------------|------------|-------------|
| 1 | TDLYMN | Temp daily mean | Daily mean temp | 0.1 | 300 | 100 | Deg celcius |
| 2 | TMPMAX | Temp daily max | Temperature dail... | 0.1 | 460 | 130 | Degrees C |
| 3 | TMPMIN | Temp daily min | Temperature dail... | 0.1 | 350 | -100 | Degrees C |
| 4 | TMPMN | Temp daily mean | Temperature dail... | 0.1 | | | Degrees C |
| 5 | PRECIP | Precip daily | Precipitation dail... | 0.1 | 3000 | 0 | Millimeters |
| 6 | PRMX5 | PRCP max 5 min | Precip greatest a... | 0.1 | | | Millimeters |
| 7 | PRMX10 | PRCP max 10 min | Precip greatest a... | 0.1 | | | Millimeters |
| 8 | PRMX15 | PRCP max 15 min | Precip greatest a... | 0.1 | | | Millimeters |
| 9 | PRMX30 | PRCP max 30 min | Precip greatest a... | 0.1 | | | Millimeters |
| 10 | PRMX60 | PRCP max 60 min | Precip greatest a... | 0.1 | | | Millimeters |
| 11 | PRMX2H | PRCP max 2 hour | Precip greatest a... | 0.1 | | | Millimeters |
| 12 | DPTMAX | Temp dew pt max | Temperature de... | 0.1 | | | Degrees C |
| 13 | DPTMIN | Temp dew pt min | Temperature de... | 0.1 | | | Degrees C |
| 14 | DPTMN | Temp dew pt mn | Temperature de... | 0.1 | | | Degrees C |
| 15 | RHMAX | RH daily max | Relative humidity ... | 1 | 100 | 0 | Percent |
| 16 | RHMIN | RH daily min | Relative humidity ... | 1 | 100 | 0 | Percent |
| 17 | RHMEAN | RH daily mean | Relative humidity ... | 1 | 100 | 0 | Percent |

Buttons: Delete, Update, Export, Import, View Mode, Close, Help

Figure 16: Elements in table view

Use the commands as follows;

- **Delete:** Delete the current record by selecting on clicking the left most cell,
- **Update:** Updates changes made on the current (selected) record,
- **View Mode:** Switches between View and Edit mode,
- **Export:** Exports all the elements metadata into a text CSV file,
- **Import:** Imports elements metadata file from an Export operation.
- **Close:** Closes the view table,
- **Help:** Online help on how to use this dialog.

(iv) Selected elements

This box is used to select elements that will be listed in various dialogs where element list is required. Use this box and check (tick) for the required elements and uncheck (untick) for those that are not required. Note that Climsoft dialogs for different operations that have boxes for elements selection will only list the selected elements. Remember to click the **Update** button whenever the box is checked or unchecked otherwise the action will not be saved.

(v) Total Required

By default this box is unchecked (unticked). The box is used to check for those elements whose sum for the observation values will require to be entered in the key entry forms. This action is purely for QC purposes where the sum of the entered values will be compared with the totals computed by the observer. Those other elements without computed totals for key entry forms should not be checked. Remember to click the **Update** button whenever the box is checked or unchecked otherwise the action will not be saved.

5.2.2 Station Element

The details of the elements observed at a particular station are entered here:

This dialog enables the editing and updating of element information as recorded at a particular station. Before adding a station element record in this dialog the *stationId*, *elementId*, *instrumentId* and *scheduleclass* that describes this element should first be entered in their respective tables through the provided dialogs (under the Tabs) in that order. The value for Instrument Type is a code that can be obtained from the WMO Code and Flag tables manual. Not all instruments that have codes. In that case the box is left blank. Some of the Instrument types described in Code and Flag table are for measurement of evaporation and wind.

Metadata Management

Close Help

Station Element Station Location History Station Qualifier Schedule Class Physical Feature Paper Archive

Station Element

Station Element Details

Station ID 10306100

Element ID 2

Instrument ID 2

Instrument Type 1 (Code Table)

Schedule Class 3

Height 1.25

Begin Date 01/01/1964

End Date 31/12/9999

AddNew Save Update Delete View

1 of 5

Figure 17: Station Element details

5.2.3 Instruments

This dialog enables the system administrator to specify the characteristics of a particular instrument used to record an element at a given station.

Metadata Management

Close Help

Station Element Station Location History Station Qualifier Schedule Class Physical Feature Paper Archive

Instrument

Instrument Details

Instrument ID 1

Name RAINGAUGE

Abbreviation RG

Station ID 10306100

Serial Number S001

Model

Manufacturer VAISALA

Uncertainty (%) 0

Installation Date 01/01/2015

Deinstallation Date 31/12/2015

Height 0.25

Image File C:/Program Files (x86)/Climsoft V4/Instruments_images/rain_ga Open

AddNew Save Update Delete View

1 of 4

Instrument Picture

Figure 18: Instrument details

5.2.4 Station Location History

The detailed history of the station locations are shown in the dialog in Figure 19.

The screenshot shows the 'Station Location History' dialog within the 'Metadata Management' application. The dialog has a menu bar with 'Close' and 'Help'. Below the menu bar is a tabbed interface with tabs for 'Station', 'Element', 'Station Element', 'Instrument', 'Station Location History' (selected), 'Station Qualifier', 'Schedule Class', 'Physical Feature', and 'Paper Archive'. The main content area is titled 'Station Location History' and contains a 'HistoryDetails' section. This section displays a list of fields for a specific station location history entry:

- Station: p0301AWS (dropdown)
- Station Type: AWS (text)
- GeogLocation Method: WGS84 (text)
- GeogLocation Accuracy: 0.1 (text)
- Opening Date: 01/01/2013 (dropdown)
- Closing Date: 31/12/9999 (dropdown)
- Latitude: -1.63 (text)
- Longitude: 29.42 (text)
- Elevation: 2392 (text)
- Authority: WESTERN (text)
- Administration Region: NYABIHU (text)
- Drainage basin: NIL (text)

Below the fields are five buttons: 'AddNew', 'Save', 'Update', 'Delete', and 'View'. At the bottom, there is a pagination bar showing '1 of 2' with navigation arrows.

Figure 19: Station Location History

5.2.5 Station Qualifier

The qualifiers for the stations are described through the dialog shown in Figure 20.

The screenshot shows the 'Station Qualifier' dialog within the 'Metadata Management' application. The dialog has a menu bar with 'Close' and 'Help'. Below the menu bar is a tabbed interface with tabs for 'Station', 'Element', 'Station Element', 'Instrument', 'Station Location History', 'Station Qualifier' (selected), 'Schedule Class', 'Physical Feature', and 'Paper Archive'. The main content area is titled 'Station Qualifier' and contains a 'Qualifier Details' section. This section displays a list of fields for a specific station qualifier entry:

- Qualifier: AGROMET (text)
- Station ID: 10101100 (dropdown)
- Begin Date: 01/01/1930 (dropdown)
- End Date: 31/01/9999 (dropdown)
- Time Zone: 1 (text)
- Network Type: AGROMETEOROLOGICAL (text)

Below the fields are five buttons: 'AddNew', 'Save', 'Update', 'Delete', and 'View'. At the bottom, there is a pagination bar showing '2 of 5' with navigation arrows.

Figure 20: Station Qualifier

5.2.6 Schedule Class

Various observation schedule classes can be defined in Climsoft as shown in Figure 21.

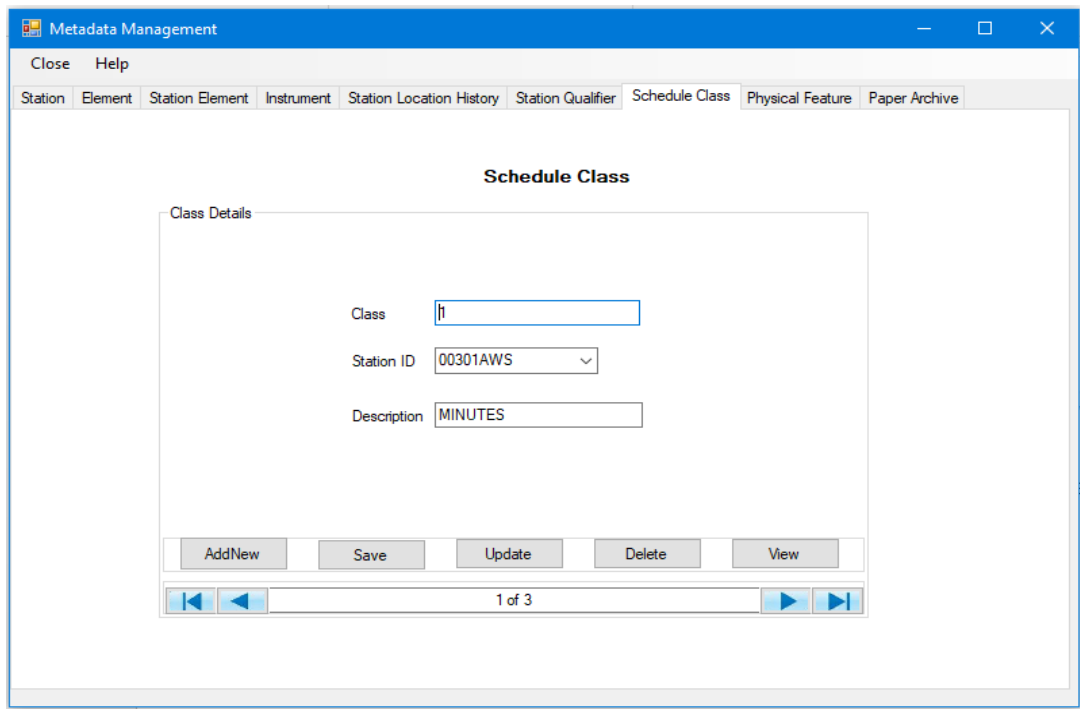


Figure 21: Schedule Class

5.2.7 Physical Feature

The detailed Physical features at the station's environment are shown in Figure 22.

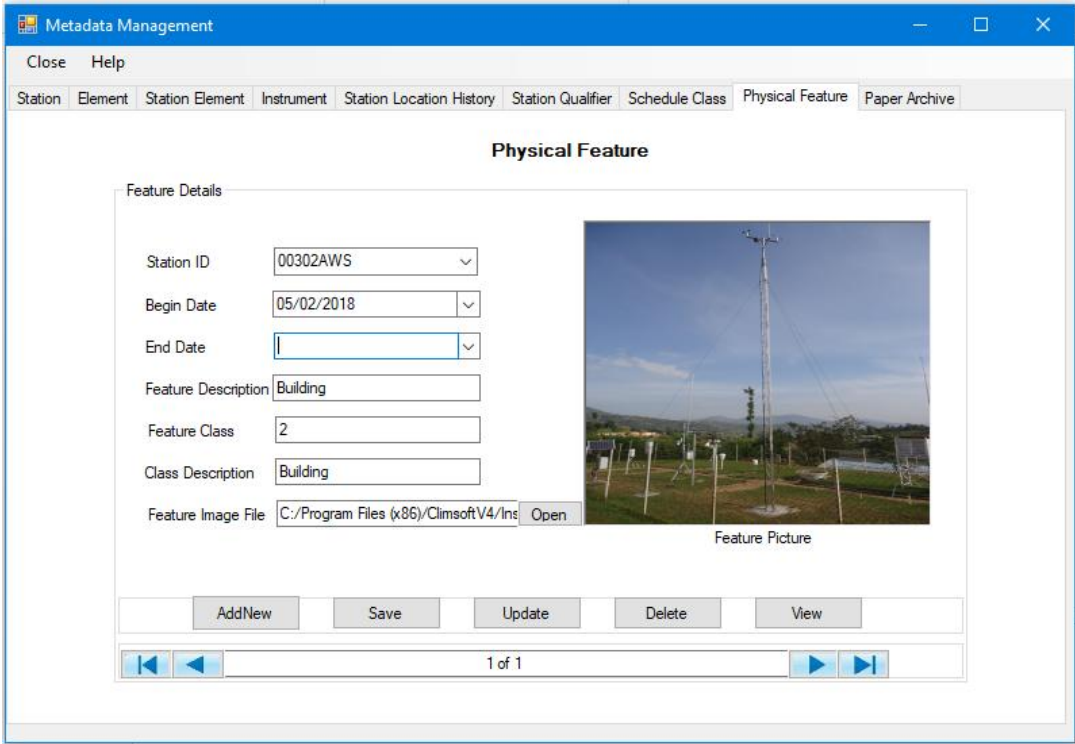


Figure 22: Physical Features

5.2.8 Paper Archive Definition

Metadata definitions of the paper images to be archived are shown in Figure 23. This information should be entered before the paper archive record can be added. Paper archiving operation is described in Chapter 12.

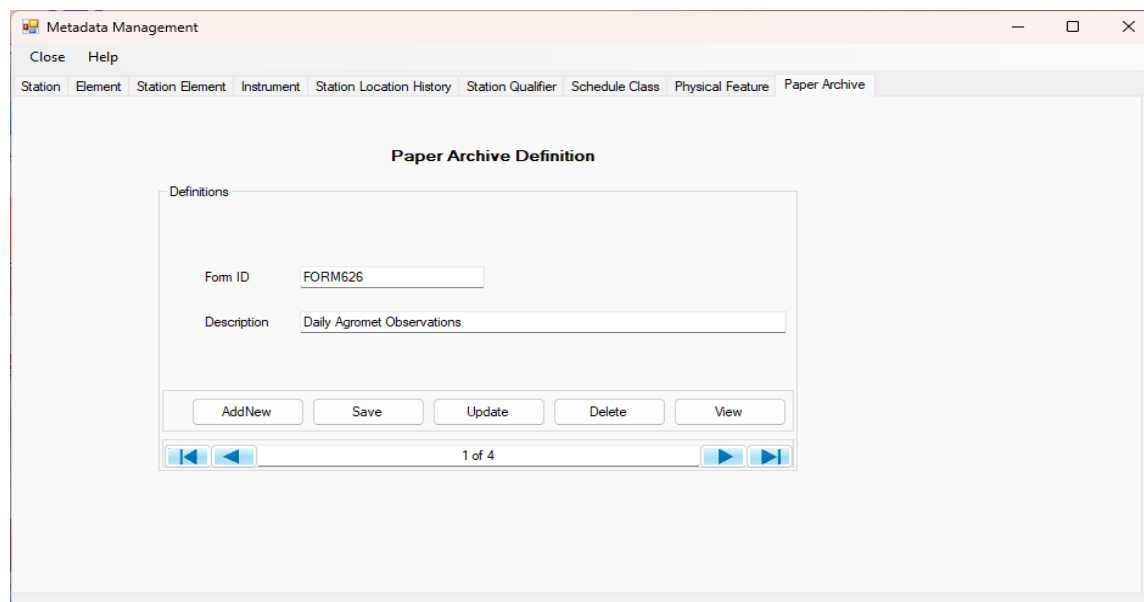
The screenshot shows a window titled "Metadata Management" with a menu bar containing "Close" and "Help". Below the menu bar is a tabbed interface with tabs for "Station", "Element", "Station Element", "Instrument", "Station Location History", "Station Qualifier", "Schedule Class", "Physical Feature", and "Paper Archive". The "Paper Archive" tab is selected. The main area of the window is titled "Paper Archive Definition". Inside this area, there is a section labeled "Definitions" which contains two input fields: "Form ID" with the value "FORM626" and "Description" with the value "Daily Agromet Observations". Below these fields are five buttons: "AddNew", "Save", "Update", "Delete", and "View". At the bottom of the "Definitions" section, there is a pagination bar showing "1 of 4" with navigation arrows.

Figure 23: Paper Archive Definition

6. Key Entry

Climsoft comes with a list of Key-entry forms for a user to choose the form that suits the set of data to be entered. To start, the Climsoft administrator selects only those forms required by the key entry operators. The following paragraph describes how the key entry administration and operations are undertaken.

6.1 Setting up Key Entry Forms List

To access the list of all available key-entry forms, login as administrator and follow the steps below;

- From the Welcome form click the menu **Administration** then **Data Forms** to obtain the dialog in Figure 24.

Data Key Entry Forms

Select the forms to activate:

| Form Name | Description |
|---|--|
| <input checked="" type="checkbox"/> form_agro1 | Kenya Agromet data |
| <input type="checkbox"/> form_bmet26 | Botswana Hourly Data for several elements for 24 hours(BMET26) |
| <input type="checkbox"/> form_climat | Data for monthly CLIMAT report |
| <input checked="" type="checkbox"/> form_daily1 | Data for some elements for one day |
| <input checked="" type="checkbox"/> form_daily2 | Daily data for the whole month |
| <input checked="" type="checkbox"/> form_hourly | Hourly data |
| <input checked="" type="checkbox"/> form_hourly2 | Hourly data for the whole month |
| <input checked="" type="checkbox"/> form_hourlywind | Hourly wind data |
| <input checked="" type="checkbox"/> form_monthly | Monthly data |
| <input type="checkbox"/> form_synoptic1 | Synoptic data for one hour for one element for the whole month |
| <input type="checkbox"/> form_synoptic2 | Synoptic data for many elements for one observation time |

Apply Cancel Help

Figure 24: Key Entry Forms Settings

- Check the boxes for those forms to be shown and uncheck for those to hide,
- Click **Apply** to save the changes and **Cancel** to close the dialog.

6.2 Opening a Key Entry Form

- From the Welcome form click on the icon **Data Entry** to obtain the dialog shown in Figure 25;

Data Key Entry Forms

Select the entry form to open:

| Form Name | Form Description |
|---------------------|---|
| formSynoptic2RA1 | Synoptic data for input into TDCF form for RA1 |
| form_agro1 | Kenya Agromet data |
| form_daily1 | Data for some elements for one day |
| form_daily2 | Daily data for the whole month |
| form_hourly | Hourly data |
| form_hourly2 | Hourly data for the whole month |
| form_hourlywind | Hourly wind data |
| form_monthly | Monthly data |
| form_synoptic2_TDCF | Synoptic data for many elements for one observation time - TDCF |
| form_upperair1 | Upper air data for several elements for one day |

Open Cancel Help

Figure 25: Key Entry forms opening

- Double click on the required form or select the form. Press the Enter key to open it,
- Clicking **OK** also opens the selected form,
- Select **Cancel** to close the dialog.

6.3 Key Entry Forms Layout

All key-entry forms in Climsoft have the same general layout. Figure 26 shows a sample screenshot of the form for entering hourly data.

Just below the title bar, there are controls for header information associated with an observation, typically station identifier, date/time information and element identifier.

Below the header area are text boxes for entering observation values, and near the bottom of the key-entry form is a data control for navigating through key-entry records.

Further down are buttons for triggering various key-entry actions e.g. the action to enter a new record.

When the “**Add New**” button is clicked, the header information for a selected form automatically moves to the next record to be entered.

| Hour | Value | Flag | Hour | Value | Flag |
|------|-------|------|------|-------|------|
| 00 | 190 | | 12 | 260 | |
| 01 | 188 | | 13 | 300 | |
| 02 | 185 | | 14 | 310 | |
| 03 | 180 | | 15 | 315 | |
| 04 | 180 | | 16 | 316 | |
| 05 | 185 | | 17 | 315 | |
| 06 | 190 | | 18 | 300 | |
| 07 | 195 | | 19 | 265 | |
| 08 | 200 | | 20 | 230 | |
| 09 | 215 | | 21 | 221 | |
| 10 | 230 | | 22 | 201 | |
| 11 | 250 | | 23 | 195 | |

Figure 26: Key Entry form for hourly data

6.4 Key Entry Sequencer

Assuming that the next element for which observation data will be entered is “**Temp wet bulb**” which is short form for wet-bulb temperature, then the value in the element list box will automatically change to “**Temp wet bulb**”. When the “**Add New**” button is clicked, the order in which the element abbreviation changes on the element list box is controlled by what is called a

“**sequencer**” in Climsoft. There is therefore need to customize the order or sequence in which the element name changes on the element list box. The name of the sequencer for the key-entry form is displayed in the text box below the key-entry buttons on the key-entry form.

For Hourly data, the required sequencer configuration is done on the appropriate dialog which is accessed via the top menu on the Climsoft front-end by clicking on **Tools >>Sequencer configuration >>hourly**. Figure 27 shows a screenshot of the dialog for configuring the sequencer for hourly data. The dialog is intuitive, with some guidelines in the top part of the form. Only **element_code** values that are typed in and the **seq** values filled by Climsoft.

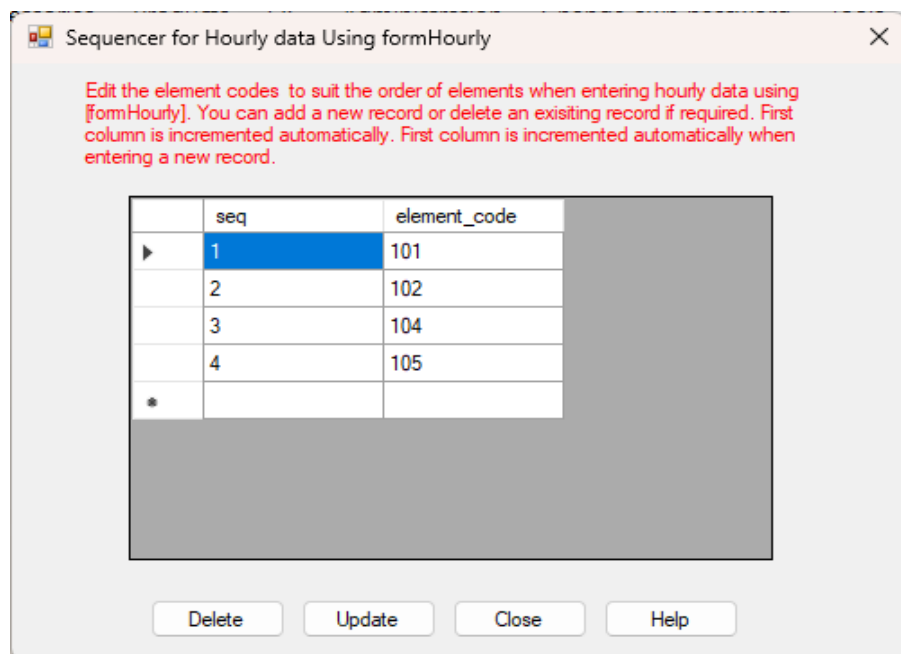


Figure 27: Dialog for configuring the sequencer for hourly data

The dialog for configuring the sequencer for daily data is accessed via **Tools >> Sequencer configuration >> Daily**. A screenshot of the dialog is shown in Figure 28.

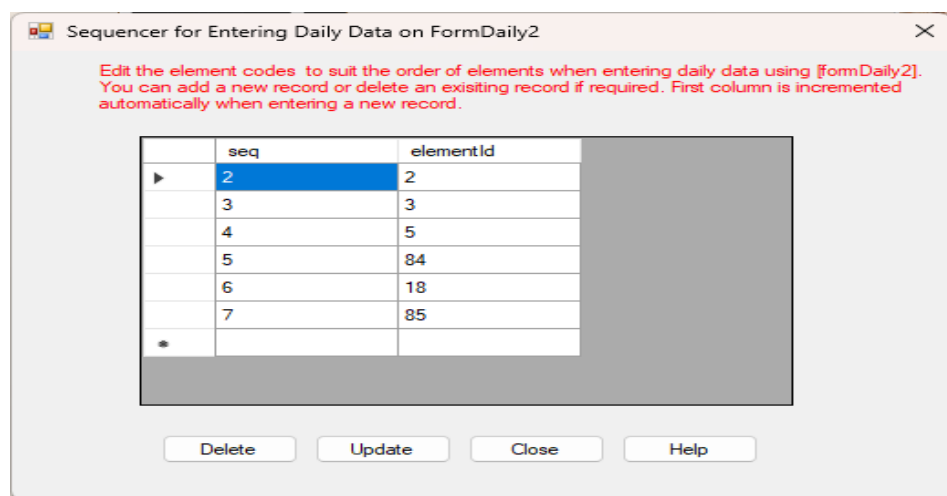


Figure 28: Dialog for configuring sequencer for daily data

Similarly, the dialog for configuring the sequencer for monthly data is accessed via **Tools >> Sequencer configuration >> Monthly**. A screenshot of the dialog is shown in Figure 29.

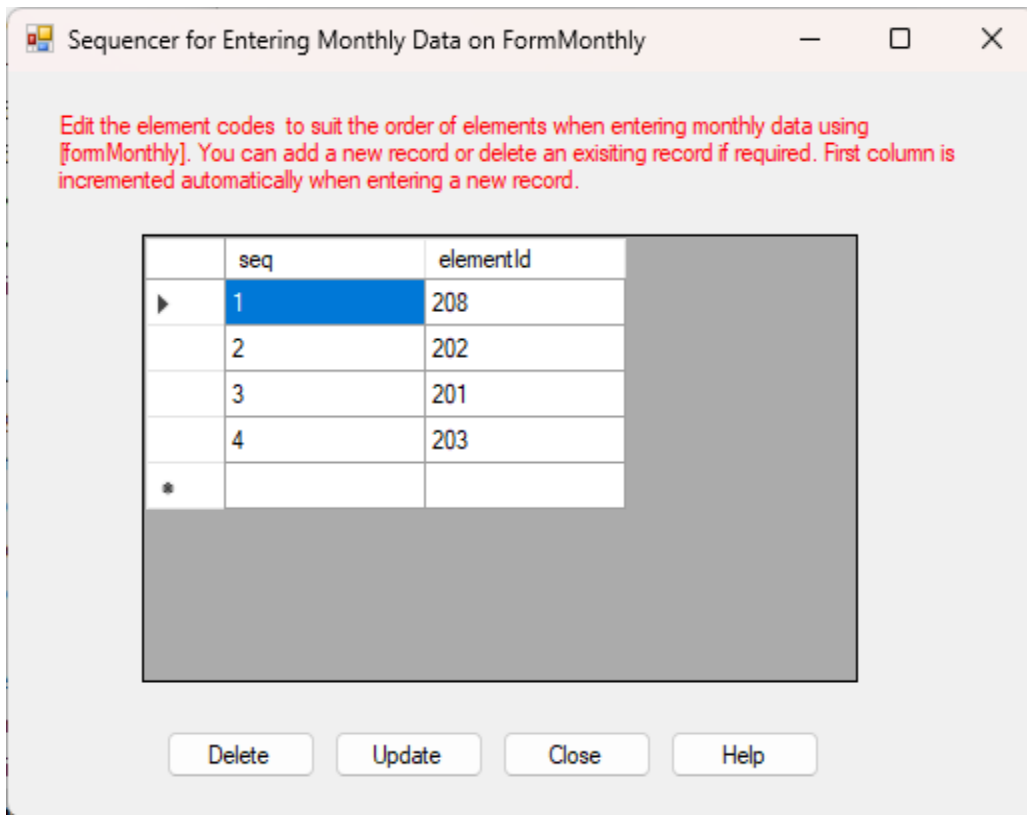
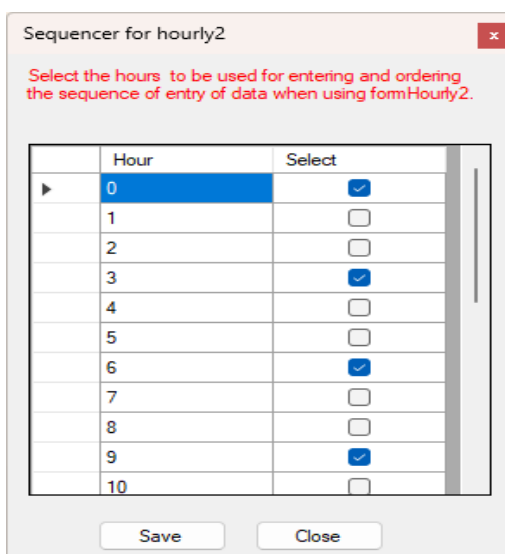


Figure 29: Dialog for configuring sequencer for monthly data

The dialog for configuring the sequencer for hourly data for the whole month is accessed via **Tools >> Sequencer configuration >> Hourly2**. A screenshot of the dialog is shown in Figure 29a.



The **form_hourly2** allows key entry for hourly data that is organized in hourly columns for the whole month. The sequencer is configured as shown in **Figure 29a**. Hours that are described in the data columns are selected as demonstrated in the configuration dialog. If there is data for all hours then all the hours are selected by checking every box in the **Select** column

Figure 29a: Dialog for configuring sequencer for monthly data

In addition to the sequence of the elements, the date/time sequence is also changed automatically. This sequence does not require customization since it is the same for any location.

6.5 Configuring synoptic hours for key entry

The form for hourly data can also be used for entering data for selected hours. This is done by disabling the text boxes for only the hours with data by clicking the button “**Enable Selected hours only**”. This button is located just below the header information. Figure 30 shows the hourly form when key-entry is enabled for synoptic hours data entry. To ignore the hours selection and enter data for all hours click again on the same button while it reads “**Enable all hours**”

The screenshot shows the 'Hourly Data' form with the following details:

- Station:** Zinder
- Element:** Relative Humidity
- Year:** 2023
- Month:** 1
- Day:** 1

Buttons: **Enable all hours** (highlighted), Assign same value to all obs, Value=

| Hour | Value | Flag | Hour | Value | Flag |
|------|-------|------|------|-------|------|
| 00 | 48 | | 12 | 72 | |
| 01 | | | 13 | | |
| 02 | | | 14 | | |
| 03 | 60 | | 15 | 65 | |
| 04 | | | 16 | | |
| 05 | | | 17 | | |
| 06 | 70 | | 18 | 57 | |
| 07 | | | 19 | | |
| 08 | | | 20 | | |
| 09 | 76 | | 21 | 51 | |
| 10 | | | 22 | | |
| 11 | | | 23 | | |

Total:

Navigation: |<< << New Record >> >>|

Buttons: Add New, Save, Update, Delete, Clear, Cancel, View, Push, Close, Help

Repeat Entry: ☐ Sequencer: seq_element Upload

Figure 30: Hourly form enabled just for synoptic hours

When the button “**Enable selected hours only**” has been clicked, its label immediately changes to “**Enable all hours**”, so it allows toggling between “all hours” and “selected hours”. The dialog for configuring the selected hours that would be enabled is accessed via **Tools >> FormHourly time selection**. A screenshot of the dialog is shown in Figure 31. From this dialog any set of hours can be selected for data entry. For instance for those NMHs that operate for 12 hour only say from 06 – 18 may wish to enable those hours only for data entry. Always remember to click the button “**Enable selected hours only**” if not all hours are used (i.e not 0....23)

If you require to use the hourly form for entering only selected hours e.g. synoptic hours, then set the selection for those hours to one [1] and the rest to zero [0]. You can toggle to all hours on the hourly form when required.

| hh | hh_selection |
|----|--------------|
| 0 | 1 |
| 1 | 0 |
| 2 | 0 |
| 3 | 1 |
| 4 | 0 |
| 5 | 0 |
| 6 | 1 |
| 7 | 0 |
| 8 | 0 |

Update Close Help

Figure 31: Configuring synoptic hours to be enabled on hourly form

6.6 Key Entry Operation

It is a strict requirement in Climsoft to enter station information in the station table before any key entry operation is done. The same requirement applies to importing of external data. Hence update the station information before attempting any of these operations. See the metadata section for the necessary instructions.

For key entry, it is also important to check the element information which comes with the Climsoft setup to ensure that all required elements are clearly defined, elements limits for QC are adjusted and any other properties where necessary, to meet local needs.

To start key entry, click on the “**Data Entry**” icon on the Climsoft “Welcome” screen. Select the key entry form that corresponds to the data to be entered and double-click on the selected form.

The use of the key entry forms is quite intuitive, so there is no need for detailed guidelines except to highlight the common aspects that apply to all key-entry forms, and some features related to specific forms.

- After selecting a value from a dropdown list e.g. a station name, or entering a value in a text box, the **Enter** key must be pressed for the value to be registered on the form and for the cursor to move to the next cell.
- Some key entry forms have a provision for entering the “**Total**” for elements that require the sum of values for a particular column of observation data. The Climsoft administrator must configure the metadata in the element table to enforce the requirement for the total to be entered for the elements that need a total to be entered during key entry.
- Some buttons are enabled or disabled depending on the situation. For example, the “**Save**” button is enabled only after clicking the “**Add New**” button to enter a new record.

Then the same “**Add New**” button is automatically disabled until the “**Save**” button has been clicked to save data for the newly added record.

- When the cursor leaves a particular text box or dropdown list after pressing the “**Enter**” key, quality control (QC) checks are carried out on the value that has just been entered. Figure 32 shows a QC message after entering a value that has failed the QC check for upper limits when entering daily data.

Daily data for the whole month

Station: KIN BINZA Element: Precip - 24Hr ☒ Enable Element Sequencer Assign same value to all obs Value=

Year: 2012 Month: 1 Hour: 6 Units Temperature: Deg C Precip: mm Cloud height: feet Visibility: metres

| Day | Value | Flag | Period | Day | Value | Flag | Period | Day | Value | Flag | Period |
|-----|-------|------|--------|-----|-------|------|--------|-----|-------|------|--------|
| 01 | 0 | | | 11 | 0 | | | 21 | 0 | | |
| 02 | 0 | | | 12 | 0 | | | 22 | 0 | | |
| 03 | 0 | | | 13 | 0 | | | 23 | 0 | | |
| 04 | 0 | | | 14 | 0 | | | 24 | 0 | | |
| 05 | 20 | | | 15 | 0 | | | 25 | 0 | | |
| 06 | 3007 | | | 16 | 0 | | | 26 | 0 | | |
| 07 | 0 | | | 17 | 0 | | | 27 | 0 | | |
| 08 | 0 | | | 18 | 0 | | | 28 | 0 | | |
| 09 | 0 | | | 19 | 0 | | | 29 | 0 | | |
| 10 | 0 | | | 20 | 0 | | | 30 | 0 | | |
| | | | | | | | | 31 | 0 | | |

Record 58945 of 58947

Add New Save Update Delete Clear Cancel View Push Close Help

☐ Repeat Entry Sequencer seq_daily_element Upload

Error

! This number must be: >= 0 and <= 3000

OK

Figure 32: QC checks during key entry

- All key-entry forms have an “**Upload**” button for transferring data from a key-entry table into a common table named “**observationinitial**” where more QC checks are carried out.
- The **Upload** button is not enabled for a user with the role of operator, but is enabled for users with the role of operator supervisor, QC and administrator,
- All key-entry forms have a “**View**” button for viewing the data that has been entered in datasheet view, **Figure 32**. To facilitate locating a required record, the rows are in ascending order by station ID, element ID, and date/time attributes,
- In the datasheet view, a key-entry operator can delete or update own records in the data entry table using the **Delete** or **Update** command button if the “**Edit Mode**” is active. To activate the “**Edit Mode**” simply click the command button “**Edit Mode**”,
- The “**Export**” command button exports all the records entered in the data entry form in a csv file for further processing,
- The “**Import**” command button is used to import data that had been saved into a text file through the **Export** command. Together Export and Import operations can act as backup

and restore of data in key entry forms. They can also be used to transfer data between Climsoft servers,

- An important feature of the datasheet view functionality is that in a network arrangement where multiple key-entry operators enter data into the same key-entry table from different workstations, a key-entry operator can only view and make changes to the data records that he/she has entered. The Administrator will be able to view all data records and make changes

| stationId | elementId | yyyy | mm | hh | day01 | day02 | day03 |
|-----------|-----------|------|----|----|-------|-------|-------|
| 8435001 | 5 | 2019 | 1 | 9 | 0 | 0 | 0 |
| GZ008032 | 1 | 2019 | 1 | 9 | 278 | 307 | 250 |
| GZ008032 | 2 | 2019 | 1 | 9 | 315 | 341 | 257 |
| GZ008032 | 3 | 2019 | 1 | 9 | 225 | 250 | 240 |
| GZ008032 | 4 | 2019 | 1 | 9 | 270 | 296 | 248 |
| GZ008032 | 5 | 2019 | 1 | 9 | 0 | 0 | 16 |
| GZ008032 | 19 | 2019 | 1 | 9 | 38 | 41 | 36 |
| GZ008032 | 27 | 2019 | 1 | 9 | 0 | 0 | 0 |
| GZ008032 | 49 | 2019 | 1 | 9 | 10140 | 10106 | 10122 |
| GZ008032 | 50 | 2019 | 1 | 9 | 10106 | 10089 | 10118 |
| GZ008032 | 51 | 2019 | 1 | 9 | 10105 | 10128 | 10135 |
| GZ008032 | 67 | 2019 | 1 | 9 | 8 | 8 | 8 |
| GZ008032 | 85 | 2019 | 1 | 9 | 0 | 17 | 15 |
| GZ008032 | 86 | 2019 | 1 | 9 | 0 | 360 | 180 |
| GZ008032 | 87 | 2019 | 1 | 9 | 11 | 22 | 11 |
| GZ008032 | 88 | 2019 | 1 | 9 | 135 | 180 | 180 |
| GZ008032 | 89 | 2019 | 1 | 9 | 11 | 20 | 0 |

Figure 33: Key entry datasheet view

6.6.1 Some special features for specific key entry forms

- Just below the header area of the form for daily data shown in Figure 22, there is a section indicating units of measurement for some elements. This is to accommodate entering historical data over different periods where the units of measurement for those elements have changed. For example, old historical paper records in some National Meteorological and Hydrological Services (NMHSs) had units of degrees Fahrenheit for temperature which were later changed to degrees Celsius. Similarly, old records for precipitation could have units of inches which were later changed to millimeters.
- The form for daily data is designed for entering different elements, with the next element being changed automatically after clicking the “**Add New**” button, being controlled by the sequencer. However, sometimes only a single element is entered, especially for data from rainfall stations. In such cases, the element sequencer can be turned off by unchecking the “**enable element sequencer**” checkbox.

- (iii) The form for daily data has text boxes for entering observations values for each day from day 1 up to a maximum of day 31. If the value of the month entered in the header section of the month has a maximum number of days less than 31, text boxes associated with day numbers beyond the maximum number of days for that month are disabled. This applies to months with 30 days and also for February with 29 days for a leap year and 28 days for a non-leap year.
- (iv) The daily form and the hourly form have a provision to assign the same value for all observation days for a particular element. This is most appropriate especially when entering rainfall values of zero for the whole month, thereby reducing the number of key strokes substantially.
- (v) As described under the section on “**Configuring selected hours for key entry**”, the hourly form can be configured for entering observation data for all hours or for selected hours.
- (vi) The form for entering hourly wind data provides for fast entering of wind direction and speed as one number in the same text box with the direction and speed automatically separated into different text boxes. The splitting of the combined wind value into direction and speed is based on the configured number of digits for direction and speed. This configuration described under “**Tools => general settings**”. This form also has provision for entering wind data for all hours or for selected synoptic hours, similarly to the configuration available on the hourly form.
- (vii) The form for entering synoptic data for an observation made up of many elements at the same hour of observation, shown in Figure 35, provides for the automatic calculation of derived elements, namely, mean sea level pressure, geopotential height, dew-point temperature and relative humidity.

NOTE: *The automatic calculation of mean sea level pressure and geopotential height require station elevation data to be available in the station metadata table.*

- (viii) Any key entry form will not accept data for future dates. A message will be prompted if the date selected manually or by the sequencer is beyond the current date.

Key entry form for hourly wind speed and direction

Hourly wind data

Station:
Rawisonde Station
Year:
2019
Month:
1
Day:
3

☐ Enable synoptic hours only
Number of digits:- direction
2
Number of digits:- speed
3

| Hour | ddff | dd | ff | Flag | ddff | dd | ff | Flag |
|------|-------|----|-----|------|------|-------|----|------|
| 00 | 30000 | 30 | 000 | | 12 | 12012 | 12 | 012 |
| 01 | 01010 | 01 | 010 | | 13 | 13013 | 13 | 013 |
| 02 | 02020 | 02 | 020 | | 14 | 14014 | 14 | 014 |
| 03 | 03030 | 03 | 030 | | 15 | 15015 | 15 | 015 |
| 04 | 04025 | 04 | 025 | | 16 | 16016 | 16 | 016 |
| 05 | 05005 | 05 | 005 | | 17 | 17017 | 17 | 017 |
| 06 | 06006 | 06 | 006 | | 18 | 18018 | 18 | 018 |
| 07 | 07007 | 07 | 007 | | 19 | 19019 | 19 | 019 |
| 08 | 08008 | 08 | 008 | | 20 | 20020 | 20 | 020 |
| 09 | 05005 | 05 | 005 | | 21 | 21021 | 21 | 021 |
| 10 | 10010 | 10 | 010 | | 22 | 22022 | 22 | 022 |
| 11 | 11011 | 11 | 011 | | 23 | 23023 | 23 | 023 |

Total [ff]

I<<
<<
Record 1 of 2
>>
>>I

Add New
Save
Update
Delete
Clear
Cancel
View
Push
Close
Help

☐ Repeat Entry
Sequencer:
seq_month_day
Upload

Figure 34: Key entry form for hourly wind

Key entry form for Synoptic observations

Synoptic Data For Many Elements For WMO - RA1
— □ ×

Station Identifier KAMEMBE AERO ▾
Year: 2017
Month: 12 ▾
Day: 12 ▾
Hour: 6 ▾

| | | |
|---|---|---|
| Station Level Pressure-Po 8765 | Vertical Significance 1 6 | PresentWx 6 |
| Pressure Reduced to MSL-P 10738 | Cloud Amt Lvl1-N1 1 | PastWx1 7 |
| 3hr Pessure Change-P3 1 | Cloud Type Lvl1-C1 7 | PastWx2 4 |
| 3hr Pressure Characteristic 4 | Cloud Ht Lvl1-HsHs1 1200 | Tmax 290 |
| 24hr Pessure Change-P24 5 | Vertical Significance 2 M | Tmin 180 |
| Standard Pressure Level -a 850 | Cloud Amt Lvl2-N2 M | Grass Min Temp 180 |
| Geopotential Height-hhh 1542 | Cloud Type Lv2-C2 M | Evaporation 50 |
| DryBulb Temp-TTT 235 | Cloud Ht Lvl2-HsHs2 M | SSS-24Hr 61 |
| Wetbulb Temp-TwTwTw 211 | Vertical Significant 3 M | SSS-1Hr 35 |
| DewPoint Temp-TdTdTd 200 | Cloud Amt Lvl3-N3 M | Precip-24Hr 200 |
| Relative Humidity-U 75 | Cloud Type Lvl3-C3 M | Precip-3Hr 12 |
| Horizontal Visibility-VV 40000 | Cloud Ht Lvl3-HsHs3 M | Wind Direction-dd 120 |
| Low Cloud Hght-h 78 | Vertical Significance 4 M | Wind Speed -fff 8 |
| Total Cloud Cover- N 6 | Cloud Amt Lvl4-N4 M | Insolation - Rad 232 |
| Vertical Significance 8 | Cloud Type Lvl4-C4 M | |
| Low Lvl Clouds Amount-Nh 6 | Cloud Ht Lvl4-Hshs4 M | |
| Low Lvl Clouds Type-CL 15 | | |
| Medium Lvl Clouds Type-CM 24 | | |
| High Lvl Clouds Type-CH 33 | | |

I<<
<<
Record 1 of 1
>>
>>I

Add New
Save
Update
Delete
Clear
View
TDCF
Close
Help

Sequencer seq_month_day_synoptime
Upload

Figure 35: Key entry form for many elements observed at the same time

Key entry form for Upper Air observations

The form for entering upper air observations is made up of many elements at the standard pressure levels namely *Surface, 1000, 925, 850, 700, 500, 400, 300, 250, 200, 150, 100, 70, 50, 30, 20, 10* shown in Figure 35a. The key entry is sequenced in the order of *Levels, Day, Month and Year*. At the metadata configuration the observation elements for the upper air data should be configured as detailed in **Table 2** below. However, the QC limits and units should be set according to the observation practice at the given centre.

Figure 35a: Key entry form for upper air observations at standard levels

| Element Id | Abbreviation | Element Name | Description | Element Type |
|------------|--------------|--------------------------------|--|--------------|
| 301 | PRESS | Pressure Level | Pressure level | Upper Air |
| 302 | HEIGHT | Height of Pressure Level | Height of pressure level | Upper Air |
| 303 | TEMPDB | Temp at Press Lvl | Temperature at pressure level | Upper Air |
| 304 | DPTDEP | Dew Point Depress at Press Lvl | Dew point depression at pressure level | Upper Air |
| 305 | WNDDIR | Wind Dir at Press Lvl | Wind direction at pressure level | Upper Air |
| 306 | WNDSPD | Wind Spd at Pressure Lvl | Wind speed at pressure level | Upper Air |
| 307 | WNDSHR1B | Wind Shear 1km lyr blw | Wind shear 1km layer below | Upper Air |
| 308 | WNDSHR1A | Wind Shear 1km lyr abv | Wind shear 1km layer above at pressure level | Upper Air |
| 309 | LATHDISP | Lat displ at pressure lvl | Latitude Displacement at Pressure Level | Upper Air |
| 310 | LONGHDISP | Lon Displ at press lvl | Longitude Displacement at Pressure Level | Upper Air |
| 311 | ACCTMDISP | Time Displ at press lvl | Time Displacement at Pressure Level | Upper Air |
| 312 | ACCVERSIG | Vert Signf at press lvl | Vertical Significant at Pressure Level | Upper Air |
| 313 | RELHUM | RH at Press Lvl | Relative Humidity at Pressure Level | Upper Air |

Table 2: Upper observation elements details – To be configured in Elements Metadata

6.7 Emptying Key Entry Tables

This operation facilitates emptying of key entry tables. This is necessary to avoid records growing to a point of slowing key entry and data uploading processes. However, it should be ensured that, before emptying any table the data therein has been uploaded, quality controlled, errors corrected, uploaded to the final database table and is ready for products generation.

This operation is undertaken through the dialog shown in Fig 36 as follows:

- (i) From the Main Menu click **“Administration”** -> **“Empty Key Entry Forms”**,
- (ii) On the Forms List check the box(es) for the form whose data is to be emptied,
- (iii) Select the records within the selected form that are to be deleted. Choose either the option **“All Records”** or **“Selected Records”**. In case of **“Selected Records”** enter the required time range in the relevant boxes,
- (iv) By default all the records that have not been uploaded to either **“observationinitial”** or **“observationfinal”** table but are within the selected option will not be deleted from the key entry table. But if it is felt that they must be deleted and re-entered later then uncheck the box **“Skip Records Not Uploaded”**.

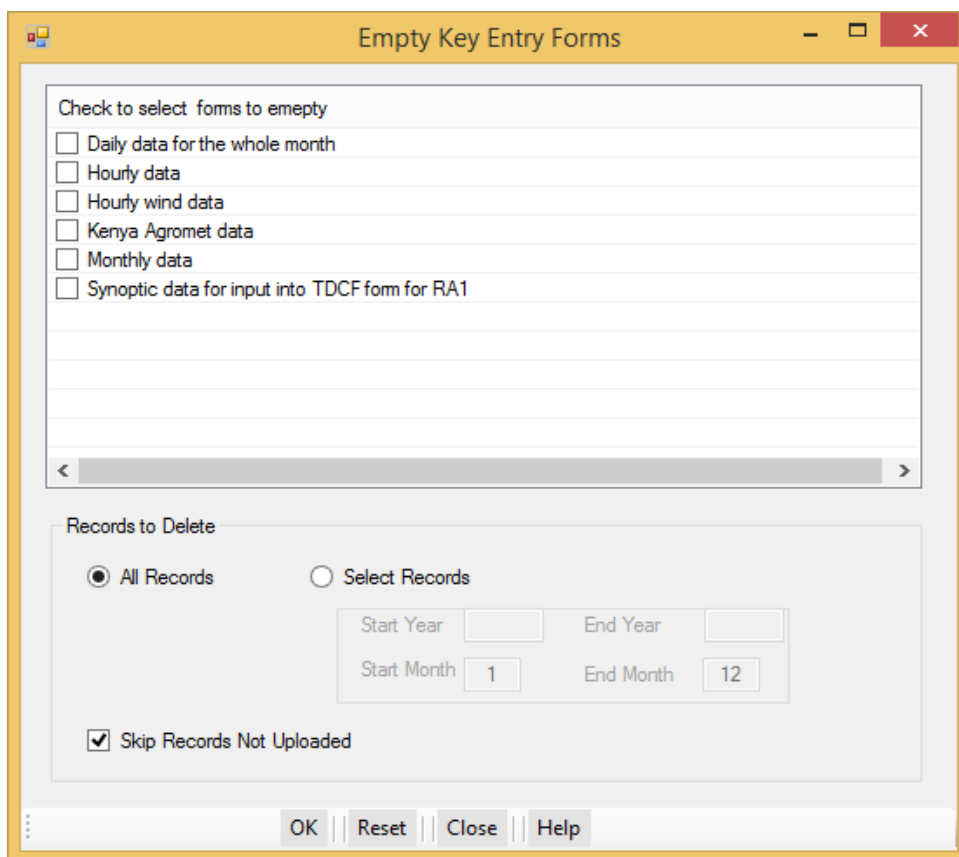


Figure 36: Dialog for Emptying Key Entry Forms

6.8 Operational Monitoring

During the key entry operation, details of the operator are captured. They are *login name* and *entry date time*. These details can be used to monitor data entered by any operator. The monitoring operation is started through **“Administration”** -> **“Operations Monitoring”** to obtain the dialog similar to Figure 36. The tabs on the dialog describe the different processes undertaken in the monitoring operation. They are:

- (i) **User Records:** See Figure 37. The Administrator can monitor records for a single operator or for all operators combined depending on the option selected. Any operator can monitor own records through **Accessories -> User Records**. In this case only the records for the current login operator that will be displayed. The Start Date and End Date should be appropriately selected then click **View Records**.
- (ii) **Settings:** The other 2 operations namely *Performance Monitoring* and *Double Key Entry Verifications* require some prior settings before they are undertaken. This is done through the tab “**Settings**” as described in **section 6.8.2**.

6.8.1 Users Records

Operations Monitoring

Users Records | Performance Monitoring | Double Key Entry Verification | Settings

Users Records

☒ User root ▼ Start Date 01 November 2018 ▼

☐ All Users End Date 30 November 2018 ▼

View Records

Close Total Records = 33 Help

| Login | Station | Year | Month/Code | Form | Entry DateTime |
|-------|----------|------|------------|-------------|---------------------|
| root | 10306100 | 2018 | 1 | form_daily2 | 26/11/2018 20:54:57 |
| root | 10306100 | 2018 | 1 | form_daily2 | 26/11/2018 20:56:03 |
| root | 10306100 | 2018 | 1 | form_daily2 | 26/11/2018 20:57:28 |
| root | 10306100 | 2018 | 2 | form_daily2 | 26/11/2018 20:58:15 |
| root | 10306100 | 2018 | 2 | form_daily2 | 26/11/2018 20:58:44 |
| root | 10306100 | 2018 | 2 | form_daily2 | 26/11/2018 20:59:49 |
| root | 10306100 | 2018 | 3 | form_daily2 | 26/11/2018 21:00:56 |
| root | 10306100 | 2018 | 3 | form_daily2 | 26/11/2018 21:01:17 |
| root | 10306100 | 2018 | 3 | form_daily2 | 26/11/2018 21:01:57 |
| root | 10306100 | 2018 | 4 | form_daily2 | 26/11/2018 21:02:21 |
| root | 10306100 | 2018 | 4 | form_daily2 | 26/11/2018 21:02:43 |
| root | 10306100 | 2018 | 4 | form_daily2 | 26/11/2018 21:03:20 |
| root | 10306100 | 2018 | 5 | form_daily2 | 26/11/2018 21:03:47 |
| root | 10306100 | 2018 | 5 | form_daily2 | 26/11/2018 21:04:12 |
| root | 10306100 | 2018 | 5 | form_daily2 | 26/11/2018 21:04:37 |
| root | 10306100 | 2018 | 6 | form_daily2 | 26/11/2018 21:05:00 |

Figure 37: Operations monitoring dialog

6.8.2 Settings

Operations Monitoring

Users Records | Performance Monitoring | Double Key Entry Verification | **Settings**

Settings

☒ Targets Records

☐ Data Entry Mode
0 for Single Data Entry
1 for Double Key Entry

View Update

Close Total Records = 0 Help

Figure 38: Operations monitoring settings dialog

To undertake any of the operation in this dialog select the required settings option and click **View** to obtain a grid table from where the values are set as follows:

(i) Target Records

Settings

☒ **Targets Records**

☐ **Data Entry Mode**
0 for Single Data Entry
1 for Double Key Entry

View **Update**

| | User | Target_Records |
|--|-----------|----------------|
| | root | 100 |
| | operator1 | 600 |
| | operator2 | 600 |
| | | |

Figure 39: Target records setting

Enter the target value for each operator against which the performance for the selected period will be measured then click **Update**.

(ii) Data Entry mode:

Settings

☐ **Targets Records**

☒ **Data Entry Mode**
0 for Single Data Entry
1 for Double Key Entry

View **Update**

| | form_name | description | entry_mode |
|--|------------------|--------------------------------------|------------|
| | formSynoptic2... | Synoptic data for input into TDCF... | 0 |
| | form_agro1 | Kenya Agromet data | 0 |
| | form_daily2 | Daily data for the whole month | 0 |
| | form_hourly | Hourly data | 0 |
| | form_hourlywind | Hourly wind data | 0 |

Figure 40: Data entry mode settings

If any of the listed forms requires to be set to double key entry status then the entry mode should be set to **1** in the column “entry_mode” and click **Update**. On reverse it should be set to **0**. While in double entry mode, data entered will be compared with the previous entry. Where the 2 entries conflict the operator will be prompted for a repeat entry. A form that is set for double key entry will not accept any data that has not been previously entered. To enter new data the key entry mode has to be set back to **0** (single data entry).

6.8.3 Performance Monitoring

Performance monitoring can be done on monthly basis or for a selected period of time. Select the appropriate option then click “**Compute Performance**”. Click “**Save Output**” to save the performance output to a CSV file. See the dialog in Figure 41.

Operations Monitoring

Users Records Performance Monitoring Double Key Entry Verification Settings

Users Performance Monitoring

☐ Monthly Month Year

☒ Range From To

Compute Performance Save Output

Close Total Records = 1 Help

| User | Records | Target | Performance % |
|------|---------|--------|---------------|
| root | 33 | 100 | 33 |

Figure 41: Data entry mode settings

6.8.4 Double Key Entry Verification

Where key entry has been set to double entry mode it becomes necessary to verify which records have been repeated or otherwise. See Figure 42. The verification can be done for single form or all of them combined. From the dialog make the selections correctly then click “**Retrieve**”. The records that suit the selected criteria will be listed. Click “**Save**” to output the records in CSV file and opened in EXCEL.

Operations Monitoring

Users Records Performance Monitoring Double Key Entry Verification Settings

Double Key Entry Verification

☒ Key Entry Form

☐ All Forms

Begin Year Begin Month

End Year End Month

Selection Type

☒ NOT Verified Records

☐ Verified Records

Retrieve Save

Close Total Records = 987 Help

| Station | Element | Year | Month | Form | Login |
|----------|---------|------|-------|-------------|-------|
| 10306100 | 2 | 2018 | 1 | form_daily2 | root |
| 10306100 | 2 | 2018 | 1 | form_daily2 | root |
| 10306100 | 2 | 2018 | 1 | form_daily2 | root |
| 10306100 | 2 | 2018 | 1 | form_daily2 | root |
| 10306100 | 2 | 2018 | 1 | form_daily2 | root |
| 10306100 | 2 | 2018 | 1 | form_daily2 | root |
| 10306100 | 2 | 2018 | 1 | form_daily2 | root |
| 10306100 | 2 | 2018 | 1 | form_daily2 | root |
| 10306100 | 2 | 2018 | 1 | form_daily2 | root |

Figure 42: Double key entry verification

7. Post Key Entry Quality Control Checks

Climsoft provides a facility for further Quality Control (QC) checks on data that has been uploaded from key-entry tables or imported from external sources into the “**observationinitial**” table. The dialog for these QC checks, shown in Figure 43, is accessed by clicking the icon “**Quality Control Checks**” on the Welcome screen.

Quality Control Checks

Select Option for QC Type

☒ Absolute limits checks

☐ Inter-element comparison checks

☐ Diurnal range check

☐ Consecutive days consistency check

☐ Consecutive hours consistency check

Select Time Range

Begin Year: Begin Month:

End Year: End Month:

Check to Select Stations and Elements for QC

Select Station:

| Station Id | Station Name |
|-----------------------------------|-----------------------|
| <input type="checkbox"/> 9035047 | CHEMELILMAIN |
| <input type="checkbox"/> 9035140 | KIBIGORI |
| <input type="checkbox"/> 9035244 | TIMBILIL |
| <input type="checkbox"/> 9035281 | CHEMASE |
| <input type="checkbox"/> 9035290 | AWASISCHOOL |
| <input type="checkbox"/> 9035308 | ACHEGO |
| <input type="checkbox"/> 9035309 | GODABUORO |
| <input type="checkbox"/> 9035315 | MAKINDU |
| <input type="checkbox"/> 9035316 | OgenSchool |
| <input type="checkbox"/> 9036261 | NAKURU MET STATION |
| <input type="checkbox"/> 9036285 | AKIRA |
| <input type="checkbox"/> 91 | La Digue Desalination |
| <input type="checkbox"/> 91310020 | BUKOB |
| <input type="checkbox"/> 91330000 | MUSOMA |
| <input type="checkbox"/> 9134009 | MOHURUBAY |
| <input type="checkbox"/> 9134011 | SOTIK |

☐ Select All Stations

Select Element:

| Element Code | Element Details |
|-----------------------------|---------------------------------|
| <input type="checkbox"/> 1 | Temperature daily mean |
| <input type="checkbox"/> 2 | Temperature daily maximum |
| <input type="checkbox"/> 3 | Temperature daily minimum |
| <input type="checkbox"/> 4 | Temperature daily mean |
| <input type="checkbox"/> 5 | Precipitation daily total |
| <input type="checkbox"/> 6 | Precip greatest amount in 5 min |
| <input type="checkbox"/> 7 | Precip greatest amount in 10 m |
| <input type="checkbox"/> 8 | Precip greatest amount in 15 m |
| <input type="checkbox"/> 9 | Precip greatest amount in 30 m |
| <input type="checkbox"/> 10 | Precip greatest amount in 60 m |
| <input type="checkbox"/> 11 | Precip greatest amount in 2 hou |
| <input type="checkbox"/> 12 | Temperature dew point daily m |
| <input type="checkbox"/> 13 | Temperature dew point daily m |
| <input type="checkbox"/> 14 | Temperature dew point daily m |
| <input type="checkbox"/> 15 | Relative humidity daily maximum |
| <input type="checkbox"/> 16 | Relative humidity daily minimum |

☐ Select All Elements

Perform QC Cancel Help Update With QC Report

Figure 43: Quality Control Checks

QC operations in Climsoft are carried out by first selecting the option for the required QC type and then providing all other information as shown in the dialog in Figure 43 above. This dialog is simple and self-explanatory. Stations and Elements can be selected either through the list box or checking on the boxes in front of their Ids or Codes respectively. As many stations and elements can be selected as necessary. If any required item (station or element) is not shown scroll bars can be used so that they are displayed and selected

Perform QC button is used to start the process and any data that fails the QC test will be saved in text (CSV) file and displayed in EXCEL once the operation is completed. The generated files usually referred as the QC Report files are saved in the folder that had been configured in General Settings as described in Section 4.2 and Figure 10a above. .

Following are the details of each QC type:

(i) Absolute limits checks

This is the default option and this QC is mandatory on all new data in Climsoft. It checks for data values that exceeds the element limits that have been set in the elements metadata. Two (2) report files are generated one for data that exceeds the upper limits and the one for the lower limits. The files names are automatically generated and structured according to the limit type and the data period e.g. **qc_report_upperlimit_202101_202112.csv** and **qc_report_lowerlimit_202101_202112.csv**.

The report on the screenshot in Figure 44 shows two values of maximum temperature, 6.6 and 6.4 that are below the lower limit of 12.0 for maximum temperature. The other useful information displayed is the station ID, element ID, date/time, the username of the person who entered the data and the key-entry form used for entering the data.

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
|---|-----------|-----------|------------------|------|----|----|----|----------|------------|----------|-----------------|-----------|------------|---------------------|
| 1 | StationId | ElementId | DateTime | yyyy | mm | dd | hh | ObsValue | lowerlimit | qcStatus | acquisitionType | obsLevel | capturedBy | dataForm |
| 2 | 67774010 | 2 | 01/01/2002 12:00 | 2002 | 1 | 1 | 12 | 66 | 120 | 1 | | 1 surface | amhanda | form_synoptic_2_ra1 |
| 3 | 67774010 | 2 | 01/01/2002 15:00 | 2002 | 1 | 1 | 15 | 64 | 120 | 1 | | 1 surface | amhanda | form_synoptic_2_ra1 |
| 4 | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | |

qc_report_lowerlimit_200001_200

Figure 44: QC report showing values below lower limit

(ii) Inter-element comparison checks

The QC under this option, different types of temperature data for every day in the selected time range and from selected stations are compared. The compared temperature observations are *maximum*, *minimum*, *dry bulb*, *wet bulb* and *dew point*. In this operation, the elements are predetermined by Climsoft hence the Elements window in the dialog is disabled. Data that fail the comparison test is saved in report files located in the QC folder. Five output files in csv format are generated. Each file contains the report on related elements and the file names are structured such that the element codes and time period are included as listed below and also in Figure 45

- (a) Maximum and Minimum temperatures = *qc_interelement_2_3_202101_202112.csv*
- (b) Dry and Wet bulb temperatures = *qc_interelement_101_102_202101_202112.csv*
- (c) Wet bulb and Dew point temperatures = *qc_interelement_102_103_202101_202112.csv*
- (d) Maximum and Dry bulb temperatures = *qc_interelement_2_101_202101_202112.csv*
- (e) Dry bulb and Minimum temperatures = *qc_interelement_101_3_202101_202112.csv*.

| Name | Date modified | Type |
|---|------------------|-----------------|
| qc_interelement_101_3_200101_200312.csv | 27/12/2015 20:52 | Microsoft Excel |
| qc_interelement_101_102_199001_201012.csv | 27/12/2015 13:45 | Microsoft Excel |
| qc_interelement_101_102_199001_201012_updated.csv | 27/12/2015 14:03 | Microsoft Excel |
| qc_interelement_101_102_200101_200312.csv | 27/12/2015 20:52 | Microsoft Excel |
| qc_interelement_102_103_199001_201012.csv | 27/12/2015 13:45 | Microsoft Excel |
| qc_interelement_102_103_200101_200312.csv | 27/12/2015 20:52 | Microsoft Excel |
| qc_report_lowerlimit_199001_201012.csv | 27/12/2015 13:43 | Microsoft Excel |
| qc_report_lowerlimit_199001_201012_updated.csv | 27/12/2015 19:53 | Microsoft Excel |
| qc_report_lowerlimit_200001_200112.csv | 27/12/2015 20:23 | Microsoft Excel |
| qc_report_lowerlimit_200001_200212.csv | 27/12/2015 20:51 | Microsoft Excel |
| qc_report_lowerlimit_201001_201012.csv | 27/12/2015 21:16 | Microsoft Excel |
| qc_report_upperlimit_199001_201012.csv | 27/12/2015 19:53 | Microsoft Excel |

File name: qc_report_upperlimit_199001_201012.csv CSV files (*.csv) Open Cancel

Figure 45: List of QC report files

Figure 46 shows a QC report for inter-element comparison. The report shows maximum temperatures (2) below dry bulb temperatures (101) for the same day.

| | A | B | C | D | E | F | G | H | I | J | K | L |
|---|-----------|-------------|-------------|------------------|------------------|------|----|----|------|------|------------|------------|
| 1 | stationId | elementId_1 | elementId_2 | obsDatetime_1 | obsDatetime_2 | yyyy | mm | dd | hh_1 | hh_2 | obsValue_1 | obsValue_2 |
| 2 | 67774010 | 2 | 101 | 01/01/2002 12:00 | 01/01/2002 12:00 | 2002 | 1 | 1 | 12 | 12 | 66 | 121 |
| 3 | 67774010 | 2 | 101 | 01/01/2002 15:00 | 01/01/2002 12:00 | 2002 | 1 | 1 | 15 | 12 | 64 | 121 |
| 4 | 67774010 | 2 | 101 | 01/01/2002 12:00 | 01/01/2002 15:00 | 2002 | 1 | 1 | 12 | 15 | 66 | 141 |
| 5 | 67774010 | 2 | 101 | 01/01/2002 15:00 | 01/01/2002 15:00 | 2002 | 1 | 1 | 15 | 15 | 64 | 141 |
| 6 | | | | | | | | | | | | |

qc_interelement_2_101_200101_20

Figure 46: QC Report for inter-element comparison

(iii) Diurnal range check

The QC in this option checks for days whose data is very high or low as compared to the rest in a given month. For every element that is selected statistical values for upper and lower limits are computed (limitValue) for each month. All data that exceed those limits fail the QC check and are saved in a report file for confirmation and corrections where necessary. The QC report file name includes the selected time period e.g. *qc_report_diurnalRange_198003_198005.csv*. Figure 46a shows data that fail the diurnal check QC for Maximum (2), Minimum (3), Dry bulb (101) and Wet bulb (102) temperatures. Diurnal range check process may take long to complete if a big time period is used. It is therefore recommended that shorter time periods say few months be considered.

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
|----|-----------|-----------|------------------|------|----|----|----|----------|------------|----------|-------------|----------|-------------|----------|
| 1 | StationId | ElementId | Datetime | YYYY | mm | dd | hh | obsValue | limitValue | qcStatus | acquisition | obsLevel | captureDate | dataForm |
| 2 | 1036 | 2 | 04/06/1980 06:00 | 1980 | 6 | 4 | 6 | 290 | 346 | 1 | 2 | surface | | |
| 3 | 1036 | 3 | 30/06/1980 06:00 | 1980 | 6 | 30 | 6 | 210 | 244 | 1 | 2 | surface | | |
| 4 | 1036 | 101 | 01/06/1980 15:00 | 1980 | 6 | 1 | 15 | 412 | 363 | 1 | 2 | surface | | |
| 5 | 1036 | 101 | 16/06/1980 15:00 | 1980 | 6 | 16 | 15 | 430 | 363 | 1 | 2 | surface | | |
| 6 | 1036 | 101 | 16/06/1980 18:00 | 1980 | 6 | 16 | 18 | 424 | 363 | 1 | 2 | surface | | |
| 7 | 1036 | 101 | 20/06/1980 15:00 | 1980 | 6 | 20 | 15 | 412 | 363 | 1 | 2 | surface | | |
| 8 | 1036 | 101 | 20/06/1980 18:00 | 1980 | 6 | 20 | 18 | 408 | 363 | 1 | 2 | surface | | |
| 9 | 1036 | 101 | 22/06/1980 15:00 | 1980 | 6 | 22 | 15 | 410 | 363 | 1 | 2 | surface | | |
| 10 | 1036 | 101 | 22/06/1980 18:00 | 1980 | 6 | 22 | 18 | 406 | 363 | 1 | 2 | surface | | |
| 11 | 1036 | 101 | 30/06/1980 15:00 | 1980 | 6 | 30 | 15 | 218 | 278 | 1 | 2 | surface | | |
| 12 | 1036 | 101 | 30/06/1980 21:00 | 1980 | 6 | 30 | 21 | 232 | 278 | 1 | 2 | surface | | |

Figure 46a: QC Report for Diurnal range check

(iv) Consecutive days consistency checks

The QC in this option compares change in observation values between the current day and the previous one at the same hour. If the difference is higher than the expected statistical change data for both days fail the QC check and are saved in a report file for confirmation and corrections where necessary. The QC report file name includes the selected time period e.g. *qc_report_consecutivedays_198006_198006.csv*. Figure 46b shows data that fail the consecutive days consistency QC for Dry bulb (101) and Wet bulb (102) temperatures.

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
|---|-----------|-----------|------------------|------|----|----|----|----------|------------|----------|------------|----------|-----------|----------|
| 1 | StationId | ElementId | Datetime | YYYY | mm | dd | hh | obsValue | obsPrevDay | qcStatus | acquisitio | obsLevel | capturedE | dataForm |
| 2 | 1036 | 101 | 30/06/1980 15:00 | 1980 | 6 | 30 | 15 | 218 | 364 | 1 | 2 | surface | | |
| 3 | 1036 | 101 | 30/06/1980 18:00 | 1980 | 6 | 30 | 18 | 240 | 348 | 1 | 2 | surface | | |
| 4 | 1036 | 102 | 11/06/1980 12:00 | 1980 | 6 | 11 | 12 | 220 | 270 | 1 | 2 | surface | | |
| 5 | 1036 | 102 | 12/06/1980 12:00 | 1980 | 6 | 12 | 12 | 264 | 220 | 1 | 2 | surface | | |
| 6 | 1036 | 102 | 30/06/1980 15:00 | 1980 | 6 | 30 | 15 | 210 | 254 | 1 | 2 | surface | | |
| 7 | | | | | | | | | | | | | | |

NOTE:

The QC reports are saved in the folder configured for the QC reports under “**General Settings**”. Hence make sure that the folder for QC reports has been configured correctly.

The name of the QC report file generated is based on the type of QC selected and the specified period for the QC.

After analyzing a QC report and making any changes, the report with updated values should be saved with a different name. What is recommended is to add a suffix “**_updated**”. Both files should be maintained with data in the original one remaining unchanged. Data in the updated file can be edited as many times as the corrections are found necessary.

7.1 Updating the database from a QC report

To update the database from the QC report, the “**Update With QC Report**” button on the QC main dialog shown in Figure 43 should be clicked. When the “**Update With QC Report**” button has been clicked, the dialog in Figure 47 will appear, with provision to browse for the original QC report file and the updated report file. After clicking the “**OK**” button, the database is updated with the changes made in the QC report.

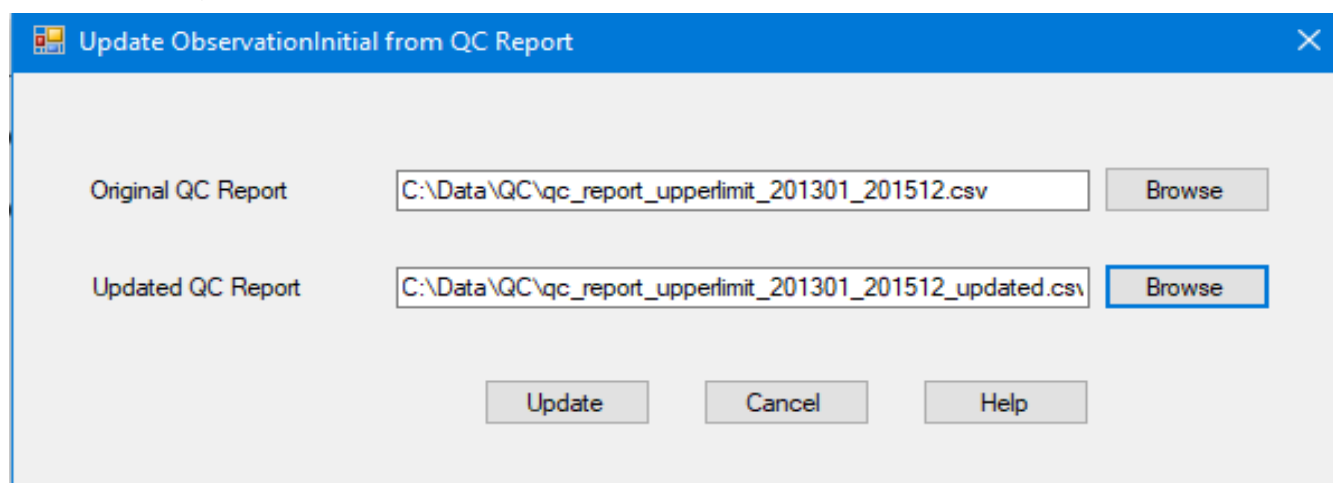


Figure 47: Dialog for updating database from a QC report

7.2 Transferring Data from “observationinitial” to “Observationfinal” table

After quality control of the data in the “**observationinitial**” table, the QC’d data can be transferred to the “**observationfinal**” table from which products can be derived. The dialog for transferring data to the “**observationfinal**” table is accessed from the Welcome screen by clicking the “**Data Transfer**” icon, followed by clicking the menu “**Upload**” then “**ObsInitial to Final**” to open the dialog shown in Figure 48.

Upload to ObservationFinal

Select Station: **BAINES DRIFT POLICE STN.**

| Station Id | Station Name |
|---|--------------------------|
| <input type="checkbox"/> 000002AWS | GACURABWENGE |
| <input checked="" type="checkbox"/> 002-BAIN | BAINES DRIFT POLICE STN. |
| <input type="checkbox"/> 00301AWS | BIGOGWE_AWS |
| <input type="checkbox"/> 00326AWS | Rwanda AWS326 |
| <input type="checkbox"/> 01013WA- | 01013WA Ghana |
| <input type="checkbox"/> 033-FRAN | Francistown Met |
| <input type="checkbox"/> 035-SSKA | S.S.K. AIRPORT |
| <input type="checkbox"/> 039-GANT | GANTSI AIRPOT |
| <input type="checkbox"/> 0409337_9 | Nhlangano met |
| <input checked="" type="checkbox"/> 0409759_X | Jericho |
| <input type="checkbox"/> 041-G002 | GOODHOPE MET. STATION |
| <input checked="" type="checkbox"/> 0410556_X | Lavumisa |
| <input type="checkbox"/> 0413158X | Namibia 0413158X |
| <input type="checkbox"/> 04191829 | 04191829 |
| <input type="checkbox"/> 0444703_7 | Musi Clinic |
| <input type="checkbox"/> 0445274_5 | Malkems |
| <input type="checkbox"/> 0445568_X | Hlatikhulu |
| <input type="checkbox"/> 0445578_7 | Nyonyane Clinic |
| <input type="checkbox"/> 0445732_3 | Moti Clinic |

☐ Select All Stations

Select Element:

| Element Code | Element Details |
|---------------------------------------|--------------------------------------|
| <input type="checkbox"/> 1 | Temperature daily mean |
| <input checked="" type="checkbox"/> 2 | Temperature daily maximum |
| <input checked="" type="checkbox"/> 3 | Temperature daily minimum |
| <input type="checkbox"/> 4 | Temperature daily mean |
| <input checked="" type="checkbox"/> 5 | Precipitation daily total |
| <input type="checkbox"/> 6 | Precip greatest amount in 5 minutes |
| <input type="checkbox"/> 7 | Precip greatest amount in 10 minutes |
| <input type="checkbox"/> 8 | Precip greatest amount in 15 minutes |
| <input type="checkbox"/> 9 | Precip greatest amount in 30 minutes |
| <input type="checkbox"/> 10 | Precip greatest amount in 60 minutes |
| <input type="checkbox"/> 11 | Precip greatest amount in 2 hours |
| <input type="checkbox"/> 12 | Temperature dew point daily maximum |
| <input type="checkbox"/> 13 | Temperature dew point daily minimum |
| <input type="checkbox"/> 14 | Temperature dew point daily mean |
| <input type="checkbox"/> 15 | Relative humidity daily maximum |
| <input type="checkbox"/> 16 | Relative humidity daily minimum |
| <input type="checkbox"/> 17 | Relative humidity daily mean |
| <input type="checkbox"/> 18 | Evaporation pan1 daily total |
| <input type="checkbox"/> 19 | Evaporation lake daily total |

☐ Select All Elements ☐ Update existing records

Begin Year: **2021** Begin Month: **1**

End Year: **2021** End Month: **12**

Data transfer in progress

Upload **Cancel** **Help**

Figure 48: Upload data to observationfinal table

Data for the selected **Stations** and **Elements** for the period specified in the time range (*Begin Year, End Year, Begin Month and End Month*) will be transferred into the “**observationfinal**” table. The dialog is self-explanatory on how to select data to upload. Stations and Elements can be selected from the list box or the displayed view. The selected items will have the box to the left of the Id or Code checked.

Click the “**Upload**” button to start the data transfer. The progress of data transfer will be shown in the progress box.

Data that had been previously uploaded can be overwritten by checking the box “**Update existing records**”. Otherwise duplicate data will be ignored if uploaded.

*Only data that have gone through QC are uploaded to the “**observationfinal**” table.* Observation records that have not yet been QC’d have a QC status flag of zero “**0**” while records that have been QC’d have a QC status flag of one “**1**”. That have been changed through QC update have QC status flag “**2**”. Therefore data with QC status flag “**0**” will not be uploaded to “**observationfinal**”

7.3 Update Observations

The **Update Observations** facility in Climsoft Version 4 enables users with administrative privileges to view and update data in the intermediate and final stages of the archiving process. The administrator is able to use the “**Update Observations**” dialog to view and modify (edit,

update and delete) selected records in the database. The dialog is in two pages (Tabs) one for selecting the records; Figure 49a and the other for listing the selected records in a grid table; Figure 49b. The dialog is intuitive and easy follow.

View and Update Observations
Selection Details | View Records

| Select Station | Station Name |
|----------------|--------------|
| 1017 | Bilma |
| 1036 | Tillabery |
| 1052 | Namey_Aero |
| 1090 | Zinder |

| Select Element | Element Id | Element Abbrev | Element Details |
|----------------|------------|----------------|---------------------------|
| | 5 | PRECIP | Precipitation daily total |
| | 3 | TMPMIN | Temperature daily minimum |
| | 2 | TMPMAX | Temperature daily maximum |

Clear Selected Station Select All Clear List Clear Selected Elements Select All Clear List

Backup to Remote Close Help

Tables
☐ Observation initial ☒ Observation Final

Period
Start Date: 01 January 1940 Hour: 00 Minute: 00
End Date: 05 March 2025 Hour: 23 Minute: 00

☒ Advanced Selection

Data Grouping
☒ QC Status: 0, 1
☐ Flags: M Missing Data, T Trace Rainfall, E Estimated Value
☐ Acquisition Type: Unknown, Key Entry Forms, CLICOM, Climsort V3
☐ Key Entry Forms: form_synoptic_2_r, form_agro1, form_daily1, form_daily2, form_hourly, form_hourly2

Stations Grouping
☒ Country: NIGER, RWANDA
☐ Authority:
☒ Qualifier: SYNOPTIC
☐ Basin:
☐ Admin Region1:
☐ Admin Region2:
☐ Admin Region3:
☐ Admin Region4:

Figure 49a: Update Observations Dialog – Select records

View and Update Observations
Selection Details | View Records

| Station Id | Station Name | Element Id | Element Abbrev | Element Details |
|------------|--------------|------------|----------------|---------------------------|
| 1017 | Bilma | 5 | PRECIP | Precipitation daily total |
| 1036 | Tillabery | 3 | TMPMIN | Temperature daily minimum |
| 1052 | Namey_Aero | 2 | TMPMAX | Temperature daily maximum |
| 1090 | Zinder | | | |

Clear Selected Station Select All Clear List Clear Selected Elements Select All Clear List

Backup to Remote Close Help

Tables
☐ Observation initial ☒ Observation Final

Period
Start Date: 01 January 1940 Hour: 00 Minute: 00
End Date: 05 March 2025 Hour: 23 Minute: 00

☒ Advanced Selection

Data Grouping
☒ QC Status: 0, 1
☐ Flags: M Missing Data, T Trace Rainfall, E Estimated Value
☐ Acquisition Type: Unknown, Key Entry Forms, CLICOM, Climsort V3
☐ Key Entry Forms: form_synoptic_2_r, form_agro1, form_daily1, form_daily2, form_hourly, form_hourly2

Stations Grouping
☒ Country: NIGER, RWANDA
☐ Authority:
☒ Qualifier: SYNOPTIC
☐ Basin:
☐ Admin Region1:
☐ Admin Region2:
☐ Admin Region3:
☐ Admin Region4:

Figure 49b: Update Observations Dialog – View Selected records

The view dialog is operated as follows:

(v) Modify observations

To modify an observation value, click on the particular cell and edit the data value therein to the correct one. Then click the “**Update**” button in order to save the changes after every modification. Note that only the observation value that can be modified in the entire row.

(vi) Delete records

Click “**Delete**” button to remove all the selected and displayed records from the selected table i.e. observation initial or observation final. A delete confirmation message will be prompted to ensure that “**Delete**” button was not clicked by mistake. If “**Yes**” button on the message box is clicked, the record deletion will be completed without any other warning. Clicking “**No**” will cancel the delete action.

(vii) Export records

All the selected and displayed records will be exported into text (csv) file that will be saved in a location and filename to be selected by the Climsoft user.

Select the “**Close**” button to close entire dialog and “**Help**” button to get more help on the “**Update Observations**” procedures.

8. Data Transfer Operations

Data transfer involves the operations described below:

- (i) **Upload:** Transfers quality controlled data from the table “*observationinitial*” to “*observationfinal*”. More details in Section 7.2,
- (ii) **External Data:** Imports text data files in formats such as; CLICOM, Automatic Weather Station (AWS), NOAA GTS and any other text data in delimited texts files. Backup files from earlier Climsoft versions will also be imported through a process called “**Data migration**”. More details are given in Sections 8.1 through 8.5,
- (iii) **Backup:** Makes a backup of all data in table “*observationfinal*” to text files. More details in Section 9.1,
- (iv) **Restore:** Restores Climsoft version 4 backup files back to the database. More details in Section 9.2.

8.1 Data from Climsoft V3 – Data migration

From the Welcome dialog click on the icon “**Data Transfer**” then “**External Data**” and “**Data Migration**” to obtain the dialog in Figure 50.

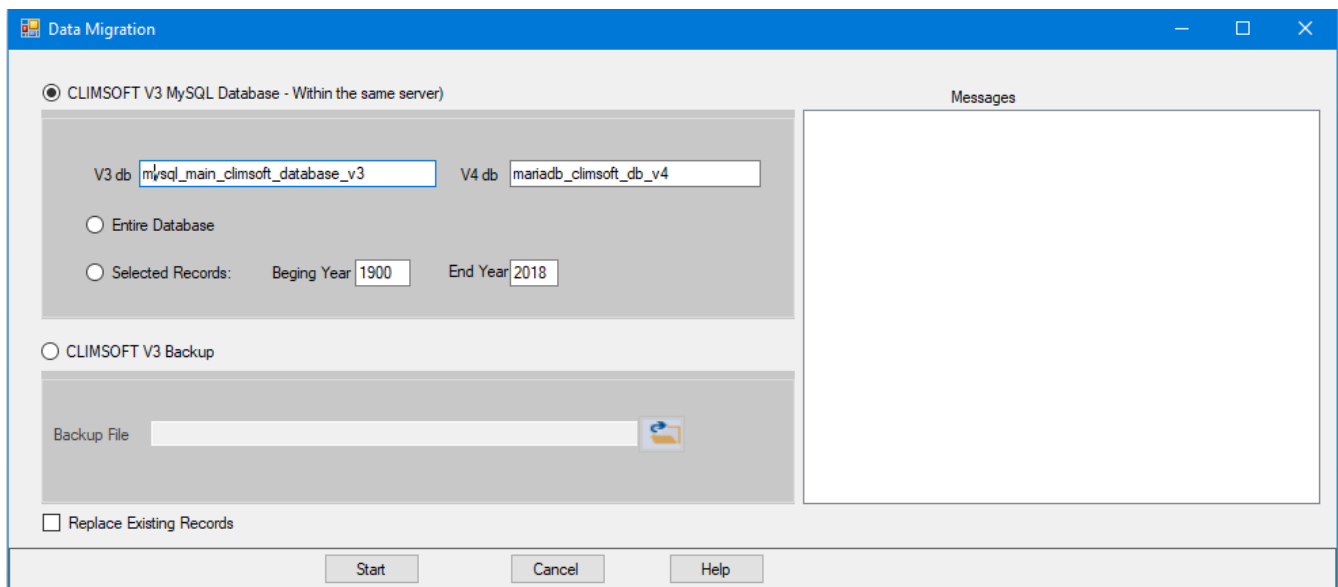


Figure 50: Data migration dialog

8.1.1 Importing from Climsoft Version 3 MySQL Database

This operation requires both Climsoft Version 3 database and Climsoft Version 4 database be installed in the same server.

Data migration from V3 to V4 will then be carried out in the following steps;


Ensure the database names for both V3 and V4 are correctly typed (See Figure 50 above);

- (ii) Select the option “**Entire Database**” if the entire database is to be migrated,
- (iii) Select the option “**Selected Records**” if only a range of data is to be migrated and provide the starting and the ending years appropriately,
- (iv) Check the box “**Replace Existing Records**” if any existing similar records are to be replaced. If Unchecked the duplicate records will be skipped,
- (v) Click **Start** command to start the process,
- (vi) Observe any message reported in the Messages box and address them accordingly.

8.1.2 Importing from CLIMSOFT V3 Backup

Climsoft Version 3 backup files archived in text (csv) files are imported through this operation.

The steps to be followed are:

- (i) Select the option “**Climsoft V3 Backup**” (see Figure 50 above),
- (ii) Through the explorer button  select the text backup file. The file name is then displayed in the box “**Backup File**” but wait for the messages; “**Climsoft V3 Backup converted to Climsoft V4 Structure**”,
- (iii) Check or uncheck the box “**Replace Existing Records**” appropriately,
- (iv) Click “**Start**” command to start the process,
- (v) Observe any message reported in the Messages box and address them accordingly.

8.2 Importing CLICOM data

From this operation the three CLICOM data formats namely *CLICOM Daily*, *CLICOM Synop* and *CLICOM Hourly* will be imported into Climsoft version 4.

Figure 51 shows a screenshot of sample *CLICOM* daily data. The data format is similar to that for CLIMBASE. Users with data from CLIMBASE can follow the same procedure to import CLIMBASE data into CLIMSOFT.

Figure 51: Sample CLICOM daily data

CLICOM Daily

Open File

Delimiters ☒ Comma ☐ TAB ☐ Other:

Start Row Default Observation Hour

☒ Remove Scaling Station ID

View Data Load Data Clear Close Help

Columns Header Settings

Select Column No Select Field Name

Save Header Specs Load Header Specs

Figure 52: Importing CLICOM daily data

then click **“Load Data”**. Wait for the process shown in *Figure 53* to complete with a message **“Data import process completed”**. **CLICOM Synop** and **CLICOM Hourly** data are similarly imported.

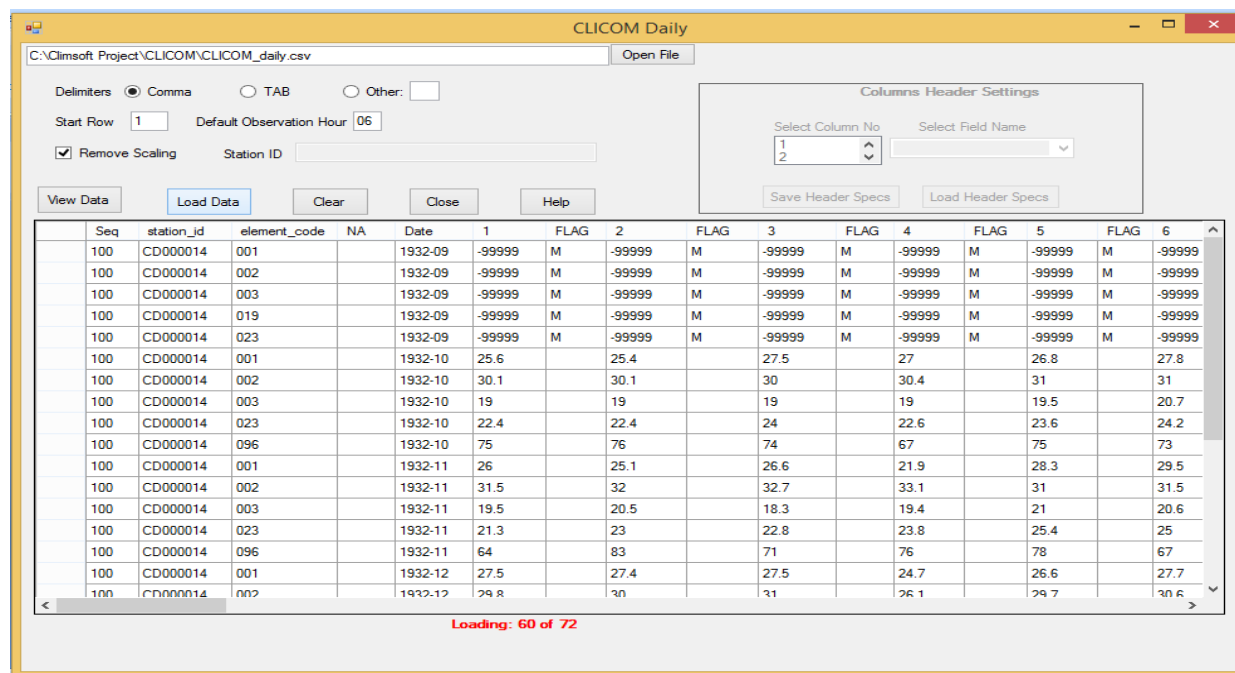


Figure 53: CLICOM daily data import process

8.3 Importing Automatic Weather Station (AWS) data

Before importing AWS data, it is important to note the structure of the AWS data file. Many Automatic Weather Stations (AWS) are configured to produce data output files in ASCII format. However, AWS systems from different suppliers tend to have different observation data outputs depending on the sensors available and configuration of the output file. Figure 54 shows a screenshot of sample data from an AWS site installed in Rwanda. The first row contains the field (column) headings representing different meteorological elements. In most cases, not all fields are required for data ingestion into Climsoft database.

| | |
|----|--|
| 1 | station_id,date_time,Field3,H,Field5,Field6,Field7,TMIN,Amb T Inst,TMAX,Field1 |
| 2 | 20402AWS,10/11/2012 14:30:00,67.72,68.84,69.92,0.60,100,20.42,20.52,20.69,0.00 |
| 3 | 20402AWS,10/11/2012 14:40:00,64.38,68.03,69.71,1.50,100,20.50,20.82,21.32,0.00 |
| 4 | 20402AWS,10/11/2012 14:50:00,60.79,63.40,66.31,1.74,100,21.16,21.97,22.56,0.45 |
| 5 | 20402AWS,10/11/2012 15:00:00,60.60,62.23,64.66,1.26,100,22.11,22.39,22.61,0.00 |
| 6 | 20402AWS,10/11/2012 15:10:00,52.64,56.87,62.63,3.12,100,22.74,23.23,23.42,0.00 |
| 7 | 20402AWS,10/11/2012 15:20:00,50.87,54.43,56.93,1.91,100,22.72,23.00,23.52,0.00 |
| 8 | 20402AWS,10/11/2012 15:30:00,55.49,56.40,57.75,0.82,100,22.36,22.52,22.71,0.00 |
| 9 | 20402AWS,10/11/2012 15:40:00,55.24,56.46,58.18,0.95,100,22.65,22.71,22.81,0.00 |
| 10 | 20402AWS,10/11/2012 15:50:00,55.04,56.62,58.33,1.11,100,22.74,22.89,23.03,0.00 |
| 11 | 20402AWS,10/11/2012 16:00:00,56.55,57.95,59.70,0.93,100,22.29,22.48,22.70,0.00 |
| 12 | 20402AWS,10/11/2012 16:10:00,57.07,58.86,60.56,1.17,100,22.18,22.29,22.44,0.00 |
| 13 | 20402AWS,10/11/2012 16:20:00,58.31,59.48,61.33,0.96,100,21.90,22.04,22.20,0.00 |
| 14 | 20402AWS,10/11/2012 16:30:00,59.06,60.01,60.95,0.59,100,21.97,22.02,22.06,0.00 |
| 15 | 20402AWS,10/11/2012 16:40:00,60.40,61.19,63.61,0.92,100,21.95,22.02,22.13,0.00 |
| 16 | 20402AWS,10/11/2012 16:50:00,60.64,61.52,62.87,0.65,100,21.83,21.93,21.98,0.00 |

Figure 54: Sample observation data from an AWS

8.3.1 Selecting the import file and viewing the data

Procedures:

- (i) Select the “**Data Transfer**” Icon from the main menu **Welcome** dialog,
- (ii) Select “**External Data**” form the Database utilities menu,
- (iii) Select “**AWS**” to open import dialog shown as shown in *Figure 55*,
- (iv) Click on “**Open File**” to browse for the file to import,
- (v) After the file has been located, click “Open” in the file open dialog. The filename with its full path will then be shown in the Import File text box. See *Figure 55*,
- (vi) Select the “*Delimiter*” option that matches the data separator in the selected file. Selecting a wrong delimiter option will result in data *not being properly imported*. If data the delimiter is neither Comma nor Tab the click on the option **Other** and type the delimiter character e.g. “;” for semicolon.
- (vii) If some header rows are to be skipped while importing then, enter the row number where importing will start in the box “**Start Row**”. (*Start Row: 2* is the default i.e. data starts at row 2 when it is only row 1 that contains headers for the data columns),
- (viii) “*Remove Scaling*” is checked by default i.e. if data in the file has been scaled to some decimal points then the decimal point will be removed during the transfer into “observationinitial” table. If the data in the file is not scaled to decimal points then the “*Remove Scaling*” box should be unchecked.
- (ix) If all the data belongs to one station and that it does not have a column with station IDs, then type the ID for the station in the box “**Station ID**”,
- (x) After completing above steps click “**View Data**” to populate the grid view with the selected data. Note that only the first 100 rows of data from the selected file will be displayed in the grid table. This is meant enable viewing to confirm that the right data has been selected. However, the entire file will be imported if everything is well selected.

Note that the column headers in the grid table will be serialized with numbers from 1 up to the last column of that data. The following section outlines how to rename the column headers with the element codes for the observations they represent.

AWS Data Import

File Path: C:\Climsoft Project\NMHS\vwanda\aws_data\Bigogwe_aws_rema.csv Open File

Delimiters: ☒ Comma ☐ TAB ☐ Other:

Start Row:

☒ Remove Scaling

Station:

Missing Data Flag:

View Data Load Data Clear Close Help

Columns Header Settings

Select Column No

1

2

Save Header Specs

Select Field Name

station_id
 element_code
 date_time
 date
 time
 hh
 mm
 ss
 value
 NA
 1-TPMN
 2-TMPMAX
 3-TMPMIN
 4-TMPMN
 5-PRECIP
 6-PRMX5
 7-PRMX10
 8-PRMX15
 9-PRMX30
 10-PRMX60
 11-PRMX2H
 12-DPTMAX
 13-DPTMIN
 14-DPTMN
 15-RHMAX
 16-RHMIN
 17-RHMEAN
 18-EVAPPN1
 19-EVAPLK
 20-MXTPAN

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
|----------|------------------|--------|---------------|--------|----------------|--------|------------------|--------|-------|
| Station | date_time | Field3 | AWS Soil Temp | Field5 | AWS Baro Press | Field7 | AWS Wind Dir Avg | Field9 | |
| 00301AWS | 19/09/2013 14:10 | 17-Jan | 40.3 | 17-Feb | 764.8 | 17-Mar | 230.1 | 17-Jul | |
| 00301AWS | 19/09/2013 14:20 | 17-Jan | 30.3 | 17-Feb | 764.9 | 17-Mar | 246.9 | 17-Jul | |
| 00301AWS | 19/09/2013 14:30 | 17-Jan | 30.5 | 17-Feb | 764.9 | 17-Mar | 243.7 | 17-Jul | |
| 00301AWS | 19/09/2013 14:40 | 17-Jan | 33.5 | 17-Feb | 0 | 17-Mar | 227.9 | 17-Jul | |
| 00301AWS | 19/09/2013 14:50 | 17-Jan | 42 | 17-Feb | 764.8 | 17-Mar | 243.9 | 17-Jul | |
| 00301AWS | 19/09/2013 15:00 | 17-Jan | 45.5 | 17-Feb | 764.7 | 17-Mar | 223.1 | 17-Jul | |
| 00301AWS | 19/09/2013 15:10 | 17-Jan | 48.6 | 17-Feb | 764.5 | 17-Mar | 260.2 | 17-Jul | |
| 00301AWS | 19/09/2013 15:20 | 17-Jan | 50.4 | 17-Feb | 0 | 17-Mar | 251.3 | 17-Jul | |
| 00301AWS | 19/09/2013 15:30 | 17-Jan | 51 | 17-Feb | 764.6 | 17-Mar | 240.2 | 17-Jul | |
| 00301AWS | 19/09/2013 15:40 | 17-Jan | 54.3 | 17-Feb | 764.5 | 17-Mar | 263.9 | 17-Jul | 261.5 |
| 00301AWS | 19/09/2013 15:50 | 17-Jan | 54.7 | 17-Feb | 764.7 | 17-Mar | 156.7 | 17-Jul | 241.8 |
| 00301AWS | 19/09/2013 16:00 | 17-Jan | 42.3 | 17-Feb | 764.9 | 17-Mar | 261.9 | 17-Jul | 201.1 |
| 00301AWS | 19/09/2013 16:10 | 17-Jan | 45.2 | 17-Feb | 765.2 | 17-Mar | 308 | 17-Jul | 210.1 |
| 00301AWS | 19/09/2013 16:20 | 17-Jan | 40.9 | 17-Feb | 765.3 | 17-Mar | 305.5 | 17-Jul | 240.1 |

Figure 55: AWS Data Import

8.3.2 Configuring column headers and uploading data into Climsoft database

- (i) Under “**Columns Header Settings**”, select the *column number* and the *field name* that describes data in that column. Do that for each column until all of them are done. Make sure the correct field names are selected in order for the data to be appropriately mapped into the database. If any column contains data that does not need to be imported then “**NA**” should be selected for *field name*. See *Figure 55*,
- (ii) If the step (i) above is correctly completed, then the configured header specifications can be saved in a text file to be used later in importing a similar file without going through that process again. To save the specifications click “**Save Header Specs**” button and choose a convenient location (i.e. folder) and filename. Note that the file will be automatically allocated file extension of *.sch* e.g. *aws1.sch* and the file with its path displayed below that button. See *Figure 56*,
- (iii) If the header specs had been saved earlier click “**Load Header Specs**” and select the header specs file. If correctly selected the columns in the displayed data table will be automatically labeled with the header specs. Note that after the header specs file has been save or loaded, the button “**Load Data**” becomes enabled.

If satisfied that the columns are correctly named and the button “**Load Data**” is enable then click it to start the uploading process. Wait until the busy mouse pointer changes to default. A message will be displaying at the bottom of the dialog in red showing the data transfer progress.

It should be noted that station IDs and element codes used must described in the metadata. If not, data described by them will not be imported. Station IDs and Element Codes not found in metadata will be listed at the bottom of the dialog.

The screenshot shows the 'AWS Data Import' window. The file path is 'C:\Climsoft Project\NMHS\vwanda\aws_data\Bigogwe_aws_rema.csv'. The 'Delimiters' are set to 'Comma'. 'Start Row' is 2. 'Remove Scaling' is checked. The 'Station' dropdown is empty. The 'Missing Data Flag' is empty. The 'Columns Header Settings' panel shows 'Select Column No' with values 1 and 2, and 'Select Field Name' with a dropdown. Buttons for 'Save Header Specs' and 'Load Header Specs' are present. The data table below has 11 columns: station_id, date_time, NA, 900, NA, 884, NA, 895, NA, 894, and a final column with values like 17-Jan, 17-Feb, 17-Mar, 17-Jul.

| station_id | date_time | NA | 900 | NA | 884 | NA | 895 | NA | 894 | |
|------------|------------------|--------|------|--------|-------|--------|-------|--------|-------|--------|
| 00301AWS | 19/09/2013 14:10 | 17-Jan | 40.3 | 17-Feb | 764.8 | 17-Mar | 230.1 | 17-Jul | 244.1 | 17-Jul |
| 00301AWS | 19/09/2013 14:20 | 17-Jan | 30.3 | 17-Feb | 764.9 | 17-Mar | 246.9 | 17-Jul | 257.7 | 17-Jul |
| 00301AWS | 19/09/2013 14:30 | 17-Jan | 30.5 | 17-Feb | 764.9 | 17-Mar | 243.7 | 17-Jul | 282 | 17-Jul |
| 00301AWS | 19/09/2013 14:40 | 17-Jan | 33.5 | 17-Feb | 0 | 17-Mar | 227.9 | 17-Jul | 253 | 17-Jul |
| 00301AWS | 19/09/2013 14:50 | 17-Jan | 42 | 17-Feb | 764.8 | 17-Mar | 243.9 | 17-Jul | 258.7 | 17-Jul |
| 00301AWS | 19/09/2013 15:00 | 17-Jan | 45.5 | 17-Feb | 764.7 | 17-Mar | 223.1 | 17-Jul | 279.8 | 17-Jul |
| 00301AWS | 19/09/2013 15:10 | 17-Jan | 48.6 | 17-Feb | 764.5 | 17-Mar | 260.2 | 17-Jul | 285 | 17-Jul |
| 00301AWS | 19/09/2013 15:20 | 17-Jan | 50.4 | 17-Feb | 0 | 17-Mar | 251.3 | 17-Jul | 279.5 | 17-Jul |
| 00301AWS | 19/09/2013 15:30 | 17-Jan | 51 | 17-Feb | 764.6 | 17-Mar | 240.2 | 17-Jul | 272.9 | 17-Jul |
| 00301AWS | 19/09/2013 15:40 | 17-Jan | 54.3 | 17-Feb | 764.5 | 17-Mar | 263.9 | 17-Jul | 261.5 | 17-Jul |
| 00301AWS | 19/09/2013 15:50 | 17-Jan | 54.7 | 17-Feb | 764.7 | 17-Mar | 156.7 | 17-Jul | 241.8 | 17-Jul |
| 00301AWS | 19/09/2013 16:00 | 17-Jan | 42.3 | 17-Feb | 764.9 | 17-Mar | 261.9 | 17-Jul | 201.1 | 17-Jul |
| 00301AWS | 19/09/2013 16:10 | 17-Jan | 45.2 | 17-Feb | 765.2 | 17-Mar | 308 | 17-Jul | 210.1 | 17-Jul |
| 00301AWS | 19/09/2013 16:20 | 17-Jan | 40.9 | 17-Feb | 765.3 | 17-Mar | 305.5 | 17-Jul | 240.1 | 17-Jul |

Figure 56: Configured column headers

8.4 Importing data from text files with different structures

8.4.1 Hourly and Daily Data Import

Daily/Hourly observation values arranged in one or many columns can be ingested easily into Climsoft version 4. The data should be in delimited text files. *Figure 57* and *58* are sample data files with data organized in different structures:

| | A | B | C | D | E | F | G | H |
|----|-----------|---------|------|-------|-----|------|------|---|
| 1 | StationId | Element | Year | Month | Day | Hour | Rain | |
| 2 | 10101100 | 5 | 1981 | 1 | 1 | 6 | 0 | |
| 3 | 10101100 | 5 | 1981 | 1 | 2 | 6 | 8.8 | |
| 4 | 10101100 | 5 | 1981 | 1 | 3 | 6 | 1.1 | |
| 5 | 10101100 | 5 | 1981 | 1 | 4 | 6 | 0.6 | |
| 6 | 10101100 | 5 | 1981 | 1 | 5 | 6 | 0 | |
| 7 | 10101100 | 5 | 1981 | 1 | 6 | 6 | 11.1 | |
| 8 | 10101100 | 5 | 1981 | 1 | 7 | 6 | 0 | |
| 9 | 10101100 | 5 | 1981 | 1 | 8 | 6 | 0 | |
| 10 | 10101100 | 5 | 1981 | 1 | 9 | 6 | 0 | |

Figure 57: Sample file with observations in one column labeled G

| | | | | | | | | | | | | | | |
|-----|------------|---------|------|-------|------|-----|------|------|------|------|------|------|-----|--|
| A16 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | A | B | C | D | E | F | G | H | I | J | K | L | M | |
| 1 | station_id | element | Year | Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 2 | 10101100 | 5 | 1930 | 10 | 0 | 0 | 24 | 9.1 | 9.6 | 12.1 | 1 | 12.9 | 0 | |
| 3 | 10101100 | 5 | 1930 | 11 | 14.5 | 1 | 0 | 5.7 | 11.4 | 3 | 4 | 0 | 1 | |
| 4 | 10101100 | 5 | 1930 | 12 | 0 | 0 | 7 | 6.5 | 7.5 | 7.5 | 0 | 3 | 0 | |
| 5 | 10101100 | 5 | 1931 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 6 | 10101100 | 5 | 1931 | 2 | 19 | 0 | 2.4 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 7 | 10101100 | 5 | 1931 | 3 | 0 | 0 | 0 | 9.4 | 0 | 7.8 | 0 | 0 | 0 | |
| 8 | 10101100 | 5 | 1931 | 4 | 0 | 6.8 | 0 | 11.4 | 0 | 1.3 | 0 | 0 | 1.4 | |
| 9 | 10101100 | 5 | 1931 | 5 | 10.9 | 2.1 | 2 | 1.5 | 3 | 10.5 | 9 | 4.5 | 2.5 | |
| 10 | 10101100 | 5 | 1931 | 6 | 0 | 0 | 0 | 12.2 | 0 | 0 | 0 | 0 | 0 | |
| 11 | 10101100 | 5 | 1931 | 7 | 0 | 0 | 0 | 3.4 | 0 | 0 | 0.7 | 0 | 0 | |
| 12 | 10101100 | 5 | 1931 | 8 | 0 | 0 | 0 | 0 | 0 | 11.5 | 0 | 0 | 0 | |
| 13 | 10101100 | 5 | 1931 | 9 | 0 | 0 | 11.1 | 0 | 0 | 0 | 0 | 0 | 1.2 | |
| 14 | 10101100 | 5 | 1931 | 10 | 0 | 0 | 0 | 1.4 | 8.4 | 0 | 4.2 | 0 | 0 | |
| 15 | 10101100 | 5 | 1931 | 11 | 0 | 0 | 0 | 4.5 | 0 | 0 | 0 | 12.2 | 0 | |
| 16 | 10101100 | 5 | 1931 | 12 | 8.6 | 7.8 | 5.2 | 9.1 | 4 | 22.3 | 35.4 | 2.4 | 0 | |

Figure 58: Sample file with observations in many columns starting at column E (day 1)

Follow the steps below to transfer Hourly/Daily data with one or many columns structure into Climsoft version 4:

- Select “**Data transfer**” icon from the **Welcome** form,
- Select “**External Data**” and select “**Text Files**” and then “**Hourly or Daily**” option, *Figure 59*,

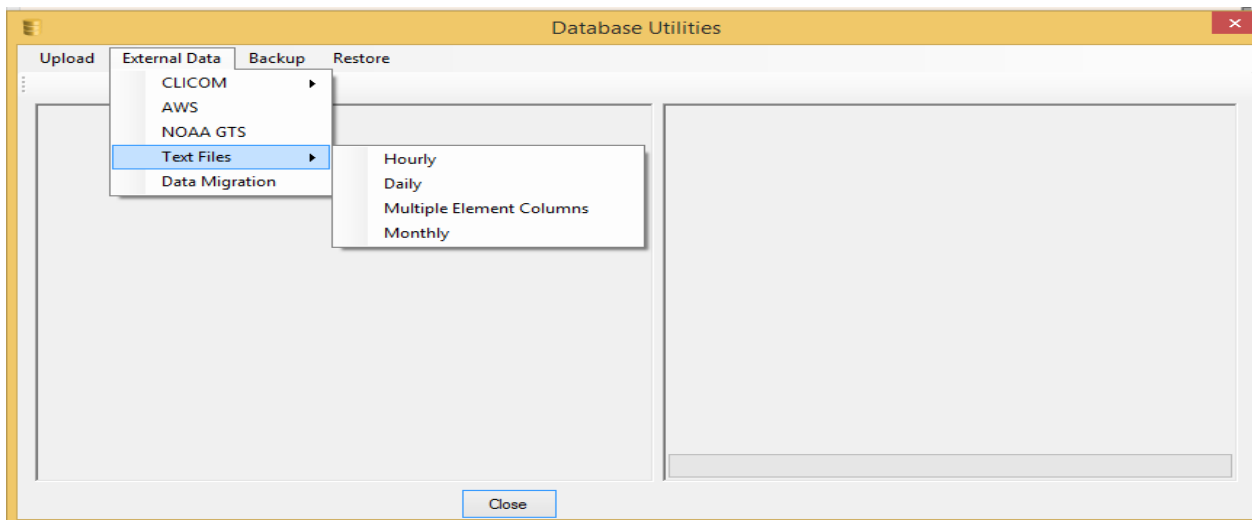


Figure 59: Import External Data Dialog

- After selecting “**Hourly or Daily**”, the dialog in *Figure 60* opens up. Click on “**Open File**” to browse and select the file containing data to transfer, specify the “**delimiter**” of the file to import e.g. comma (default), TAB or Others (type in the delimiter character). Check/uncheck the “**remove scaling**” box appropriately to ensure data is imported into “*observationinitial*” table without the decimal points. Click “**View Data**” button to view the data in a grid view (tabular form),
- Set the column headers by matching each data column by its corresponding field name then click the button “**Save Header Specs**” to have the dialog shown in *Figure 61*,

Hourly Data Import

C:\Climsoft Project\NMHS\KMD\data\hourly1_data.csv Open File

Delimiters ☒ Comma ☐ TAB ☐ Other:

Start Row

☒ Remove Scaling

Station Element

Missing Data Flag

View Data Load Data Clear Close Help

☐ Convert to UTC

Columns Header Settings

Select Column No

Select Field Name

Save Header Specs Load Header Specs

| 1 | 2 | 3 | 4 | 5 | 6 |
|------------|------|----|----|----|------|
| station_id | yyyy | mm | dd | hh | WDSP |
| 63980 | 1972 | 1 | 1 | 0 | 12 |
| 63980 | 1972 | 1 | 1 | 1 | 12 |
| 63980 | 1972 | 1 | 1 | 2 | 12 |
| 63980 | 1972 | 1 | 1 | 3 | 12 |
| 63980 | 1972 | 1 | 1 | 4 | 9 |
| 63980 | 1972 | 1 | 1 | 5 | 12 |
| 63980 | 1972 | 1 | 1 | 6 | 12 |
| 63980 | 1972 | 1 | 1 | 7 | 10 |
| 63980 | 1972 | 1 | 1 | 8 | 13 |
| 63980 | 1972 | 1 | 1 | 9 | 10 |
| 63980 | 1972 | 1 | 1 | 10 | 14 |
| 63980 | 1972 | 1 | 1 | 11 | 14 |
| 63980 | 1972 | 1 | 1 | 12 | 16 |
| 63980 | 1972 | 1 | 1 | 13 | 16 |
| 63980 | 1972 | 1 | 1 | 14 | 16 |

Figure 60: Importing Hourly Data

Hourly Data Import

C:\Climsoft Project\NMHS\KMD\data\hourly1_data.csv Open File

Delimiters ☒ Comma ☐ TAB ☐ Other:

Start Row

☒ Remove Scaling

Station Element

Missing Data Flag

View Data Load Data Clear Close Help

☐ Convert to UTC

Columns Header Settings

Select Column No

Select Field Name

Save Header Specs Load Header Specs

C:\Climsoft Project\NMHS\KMD\data\hourly1.sch

| station_id | yyyy | mm | dd | hh | value |
|------------|------|----|----|----|-------|
| station_id | yyyy | mm | dd | hh | WDSP |
| 63980 | 1972 | 1 | 1 | 0 | 12 |
| 63980 | 1972 | 1 | 1 | 1 | 12 |
| 63980 | 1972 | 1 | 1 | 2 | 12 |
| 63980 | 1972 | 1 | 1 | 3 | 12 |
| 63980 | 1972 | 1 | 1 | 4 | 9 |
| 63980 | 1972 | 1 | 1 | 5 | 12 |
| 63980 | 1972 | 1 | 1 | 6 | 12 |
| 63980 | 1972 | 1 | 1 | 7 | 10 |
| 63980 | 1972 | 1 | 1 | 8 | 13 |
| 63980 | 1972 | 1 | 1 | 9 | 10 |
| 63980 | 1972 | 1 | 1 | 10 | 14 |
| 63980 | 1972 | 1 | 1 | 11 | 14 |
| 63980 | 1972 | 1 | 1 | 12 | 16 |
| 63980 | 1972 | 1 | 1 | 13 | 16 |
| 63980 | 1972 | 1 | 1 | 14 | 16 |

Figure 61: Columns Header Settings

- (v) Click the “**Load Data**” button to load the data into the “*observationinitial*” table. Then observe the records uploading count and finally the process completion message at the bottom of the dialog. In case the upload fails a message will pop up accordingly.

Note: To avoid setting the columns headers each time a similar file is to be imported, save the columns header specifications by selecting the “**Save Header Specs**” button. Note the file extension (e.g. header1_specs.sch).

To retrieve and use the saved columns headers click the “ **Load Header Specs**” button and navigate to select the appropriate file.

8.4.2 Multiple Element Columns

Figure 62 shows a text (csv) file (opened in Excel) with 4 columns for *StationID*, *Year*, *Month*, *Day* and 5 columns for values of different Elements namely. Tmax, Tmin, RAIN, RAD and EVAP. This file can be easily imported in Climsoft V4 through the procedure described below:

| | A | B | C | D | E | F | G | H | I | J | K | L |
|----|--------|------|-------|-----|------|------|------|-------|------|---|---|---|
| | ID | YEAR | MONTH | DAY | Tmax | Tmin | RAIN | RAD | EVAP | | | |
| 1 | 893702 | 2018 | 7 | 1 | 23.5 | 10.2 | 0 | 20.88 | 4.5 | | | |
| 2 | 893702 | 2018 | 7 | 2 | 21.4 | 8.8 | 0 | 17.54 | 4 | | | |
| 3 | 893702 | 2018 | 7 | 3 | 24.4 | 10.3 | 0 | 20.28 | 5 | | | |
| 4 | 893702 | 2018 | 7 | 4 | 20.8 | 11.8 | 0 | 18.53 | 5 | | | |
| 5 | 893702 | 2018 | 7 | 5 | 23.2 | 8.7 | 0 | 22.27 | 5.5 | | | |
| 6 | 893702 | 2018 | 7 | 6 | 23.5 | 11 | 0 | 20.8 | 6 | | | |
| 7 | 893702 | 2018 | 7 | 7 | 22.3 | 11.2 | 0 | 20.88 | 6.5 | | | |
| 8 | 893702 | 2018 | 7 | 8 | 22.7 | 12 | 0 | 20.8 | 5 | | | |
| 9 | 893702 | 2018 | 7 | 9 | 23.4 | 12.1 | 0 | 21.05 | 6.5 | | | |
| 10 | 893702 | 2018 | 7 | 10 | 23.5 | 9.8 | 1 | 19.04 | 5.5 | | | |
| 11 | 893702 | 2018 | 7 | 11 | 22.4 | 10.6 | 0 | 17.76 | 5.5 | | | |
| 12 | 893702 | 2018 | 7 | 12 | 23.5 | 10.8 | 0 | 19.13 | 5 | | | |
| 13 | 893702 | 2018 | 7 | 13 | 24.8 | 10.2 | 0 | 18.06 | 4 | | | |
| 14 | 893702 | 2018 | 7 | 14 | 23.5 | 12.4 | 0 | 19.3 | 5 | | | |
| 15 | 893702 | 2018 | 7 | 15 | 23.5 | 10.5 | 0 | 20.67 | 5.5 | | | |
| 16 | 893702 | 2018 | 7 | 16 | 21.6 | 8 | 0 | 21.05 | 7.5 | | | |
| 17 | 893702 | 2018 | 7 | 17 | 25.5 | 7.5 | 0 | 20.41 | 5 | | | |
| 18 | 893702 | 2018 | 7 | 18 | 23.5 | 10.5 | 0 | 15.92 | 4.5 | | | |
| 19 | 893702 | 2018 | 7 | 19 | 23.5 | 10.3 | 0 | 19.68 | 6 | | | |
| 20 | 893702 | 2018 | 7 | 20 | 22.1 | 10.5 | 0 | 16 | 4.5 | | | |
| 21 | 893702 | 2018 | 7 | 21 | 20.6 | 10.1 | 0 | 16 | 4 | | | |
| 22 | 893702 | 2018 | 7 | 22 | 22 | 11.5 | 0 | 20.11 | 6 | | | |
| 23 | 893702 | 2018 | 7 | 23 | 20.6 | 9.8 | 0 | 12.97 | 3.5 | | | |
| 24 | 893702 | 2018 | 7 | 24 | 22 | 8.1 | 0 | 18 | 4 | | | |
| 25 | 893702 | 2018 | 7 | 25 | 22.5 | 8 | 0 | 17.46 | 5 | | | |
| 26 | 893702 | 2018 | 7 | 26 | 21.6 | 10 | 0 | 15.02 | 4 | | | |
| 27 | 893702 | 2018 | 7 | 27 | 23.6 | 9.8 | 1.2 | 14.93 | 2.7 | | | |
| 28 | 893702 | 2018 | 7 | 28 | 25.4 | 9.8 | 1.5 | 16.69 | 3.5 | | | |
| 29 | 893702 | 2018 | 7 | 29 | 24.8 | 8.8 | 2.8 | 14.16 | 2.3 | | | |
| 30 | 893702 | 2018 | 7 | 30 | 26.2 | 8 | 10.7 | 18.83 | 4.7 | | | |

Figure 62: Sample data with multiple columns

The procedure to import this file is as follows:

a) Selecting the import file and viewing the data

- (i) Select the “**Data transfer**” icon from the welcome dialog,
- (ii) Select “**External Data**”, then “**Text Files**” followed by “**Multiple Element Columns**” as shown in Figure 59,

- (iii) Select **Open File** to browse the file to import,
- (iv) After the file has been located, click **Open** in the file open dialog. The filename with its path will then be shown in the “**Open File**” box. See *Figure 63*,
- (v) Select the **Delimiter** option according to the data separator for the selected file (comma, tab or others).
- (vi) If some rows are to be skipped while importing e.g. column headers then enter the row number where importing will start in the “**Start Row**” box. Row 2 is the default which is also the case in this example,
- (vii) If the data does not contain the observation hour column, fill the “**Default Observation Hour**” box with the hour used for the daily data. The value 06 has been set as default as it is the case with most observations,
- (viii) If the data in the file is scaled to some decimal points, then ensure the box “**Remove Scaling**” is checked,
- (ix) When all the above steps have been completed click “**View Data**” button. The table in the dialog is then populated with the data from the selected file. The column headers will be serialised with numbers from 1 up to the last column of that data, as shown in *Figure 63*.
- (x)

Daily Data Import

C:\KMD\dps\data\Daily_Data.csv Open File

Delimiters: ☒ Comma ☐ TAB ☐ Other:

Start Row: Default Observation Hour:

☒ Remove Scaling

Station: Element:

Missing Data Flag:

View Data Load Data Clear Close Help

Columns Header Settings

Select Column No:

Select Field Name:

Save Header Specs Load Header Specs

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|--|--------|------|-------|-----|------|------|------|-------|------|
| | ID | YEAR | MONTH | DAY | Tmax | Tmin | RAIN | RAD | EVAP |
| | 893702 | 2018 | 7 | 1 | 23.5 | 10.2 | 0 | 20.88 | 4.5 |
| | 893702 | 2018 | 7 | 2 | 21.4 | 8.8 | 0 | 17.54 | 4 |
| | 893702 | 2018 | 7 | 3 | 24.4 | 10.3 | 0 | 20.28 | 5 |
| | 893702 | 2018 | 7 | 4 | 20.8 | 11.8 | 0 | 18.53 | 5 |
| | 893702 | 2018 | 7 | 5 | 23.2 | 8.7 | 0 | 22.27 | 5.5 |
| | 893702 | 2018 | 7 | 6 | 23.5 | 11 | 0 | 20.8 | 6 |
| | 893702 | 2018 | 7 | 7 | 22.3 | 11.2 | 0 | 20.88 | 6.5 |
| | 893702 | 2018 | 7 | 8 | 22.7 | 12 | 0 | 20.8 | 5 |
| | 893702 | 2018 | 7 | 9 | 23.4 | 12.1 | 0 | 21.05 | 6.5 |
| | 893702 | 2018 | 7 | 10 | 23.5 | 9.8 | 1 | 19.04 | 5.5 |
| | 893702 | 2018 | 7 | 11 | 22.4 | 10.6 | 0 | 17.76 | 5.5 |
| | 893702 | 2018 | 7 | 12 | 23.5 | 10.8 | 0 | 19.13 | 5 |
| | 893702 | 2018 | 7 | 13 | 24.8 | 10.2 | 0T | 18.06 | 4 |
| | 893702 | 2018 | 7 | 14 | 23.5 | 12.4 | 0 | 19.3 | 5 |
| | 893702 | 2018 | 7 | 15 | 23.5 | 10.5 | 0 | 20.67 | 5.5 |
| | 893702 | 2018 | 7 | 16 | 21.6 | 8 | 0 | 21.05 | 7.5 |

Figure 63: Multiple column data Import

b) Configuring column headers and uploading the data

- (i) Under “**Columns Header Settings**”, select the column number then click on the corresponding field name from the list box. For the data columns, the selected field name should be the element code for that data. Repeat for each column. Make sure the correct field names are selected in order for the data to be appropriately mapped in the database,

- (ii) Once step (i) is completed, the created header specifications can be saved in a text file to be used later for a similar file without going through the same process again. To save the header specifications follow the procedure described in **Section 8.3.2 (ii)** above,
- (iii) If the header specs had earlier been saved then click “**Load Header Specs**” and select the file containing those header specs. If the correct file is selected, the columns for the displayed data table are labelled automatically as shown in *Figure 64*,
- (iv) Once the columns are correctly named click “**Load Data**” to start the uploading process. Wait until the busy mouse pointer changes to the default. A message is then displaying at the bottom of the dialog in red showing the data transfer progress.

More details on the Command buttons for the data import dialog are as follows:

Save Header Specs - To save the created header specification to a file for future use;

Load Header Specs - To load header specification that had been saved for a file with the same structure;

View Data - To view data from the selected file in a table view;

Load Data – To start data uploading process from the selected text file to the “**observationinitial**” table;

Clear – To clear the grid view of the displayed data;

Close - To close the dialog;

Help - Click **Help** to get more information on the dialog;

The screenshot shows the 'Multiple Columns Data Import' dialog box. At the top, the file path 'C:\KMD\dps\data\Daily_Data.csv' is entered, with an 'Open File' button. Below this, there are options for 'Delimiters' (Comma, TAB, Other) and 'Summarized Data Import' (Dekadal, Monthly). A 'Columns Header Settings' panel on the right allows selecting a column number (8) and a field name (18-EVAPPN1). The main area displays a table of data with columns: station_id, yyyy, mm, dd, 2, 3, 5, 137, 18. The table contains 16 rows of data for station 893702 in July 2018.

| station_id | yyyy | mm | dd | 2 | 3 | 5 | 137 | 18 |
|------------|------|-------|-----|------|------|------|-------|------|
| ID | YEAR | MONTH | DAY | Tmax | Tmin | RAIN | RAD | EVAP |
| 893702 | 2018 | 7 | 1 | 23.5 | 10.2 | 0 | 20.88 | 4.5 |
| 893702 | 2018 | 7 | 2 | 21.4 | 8.8 | 0 | 17.54 | 4 |
| 893702 | 2018 | 7 | 3 | 24.4 | 10.3 | 0 | 20.28 | 5 |
| 893702 | 2018 | 7 | 4 | 20.8 | 11.8 | 0 | 18.53 | 5 |
| 893702 | 2018 | 7 | 5 | 23.2 | 8.7 | 0 | 22.27 | 5.5 |
| 893702 | 2018 | 7 | 6 | 23.5 | 11 | 0 | 20.8 | 6 |
| 893702 | 2018 | 7 | 7 | 22.3 | 11.2 | 0 | 20.88 | 6.5 |
| 893702 | 2018 | 7 | 8 | 22.7 | 12 | 0 | 20.8 | 5 |
| 893702 | 2018 | 7 | 9 | 23.4 | 12.1 | 0 | 21.05 | 6.5 |
| 893702 | 2018 | 7 | 10 | 23.5 | 9.8 | 1 | 19.04 | 5.5 |
| 893702 | 2018 | 7 | 11 | 22.4 | 10.6 | 0 | 17.76 | 5.5 |
| 893702 | 2018 | 7 | 12 | 23.5 | 10.8 | 0 | 19.13 | 5 |
| 893702 | 2018 | 7 | 13 | 24.8 | 10.2 | 0 | 18.06 | 4 |
| 893702 | 2018 | 7 | 14 | 23.5 | 12.4 | 0 | 19.3 | 5 |
| 893702 | 2018 | 7 | 15 | 23.5 | 10.5 | 0 | 20.67 | 5.5 |
| 893702 | 2018 | 7 | 16 | 21.6 | 8 | 0 | 21.05 | 7.5 |

Figure 64: Multiple column data Import with column headers specification

8.5 Importing Summarized Data

Data that is summarized on Dekadal or monthly basis can be imported into Climsoft. In practice this is done when the raw data for those summaries is not available. Otherwise it is advisable to import the actual observation values because Climsoft is capable of producing those summaries whenever required. After importing, the summarized values will be placed in the appropriate day of the month and then allocated a period value that is equivalent to the number of days used in the summary. For instance, monthly summary values will be placed on the last day of the month and the period value will be the number of days in that month.

Following are examples of the summarized data with layouts:

| StationID | Year | Month | DEKAD | TMIN | TMAX | PRECIP |
|-----------|------|-------|-------|------|------|--------|
| 9136130 | 1984 | 1 | 1 | 13 | 25.1 | 0.8 |
| 9136130 | 1984 | 1 | 2 | 13.5 | 26.1 | 0.0 |
| 9136130 | 1984 | 1 | 3 | 13.2 | 26.7 | 0.0 |
| 9136130 | 1984 | 2 | 1 | 13 | 27.5 | 0.0 |
| 9136130 | 1984 | 2 | 2 | 11.7 | 28.5 | 0.0 |
| 9136130 | 1984 | 2 | 3 | 13.8 | 27.8 | 0.2 |
| 9136130 | 1984 | 3 | 1 | 13.4 | 27.5 | 0.1 |
| 9136130 | 1984 | 3 | 2 | 15.2 | 27.7 | 0.3 |
| 9136130 | 1984 | 3 | 3 | 15.4 | 27.4 | 0.2 |
| 9136130 | 1984 | 4 | 1 | 16 | 28.4 | 0.9 |
| 9136130 | 1984 | 4 | 2 | 16 | 26.9 | 2.1 |
| 9136130 | 1984 | 4 | 3 | 15.3 | 25.9 | 5.8 |
| 9136130 | 1984 | 5 | 1 | 14.4 | 25.9 | 0.0 |
| 9136130 | 1984 | 5 | 2 | 14.1 | 25.7 | 0.1 |
| 9136130 | 1984 | 5 | 3 | 13.5 | 25.6 | 0.0 |
| 9136130 | 1984 | 6 | 1 | 12.4 | 24.6 | 0.4 |
| 9136130 | 1984 | 6 | 2 | 12.4 | 24.4 | 0.1 |
| 9136130 | 1984 | 6 | 3 | 12 | 24.5 | 0.0 |
| 9136130 | 1984 | 7 | 1 | 12.2 | 23.2 | 0.0 |
| 9136130 | 1984 | 7 | 2 | 12.3 | 22.5 | 0.8 |
| 9136130 | 1984 | 7 | 3 | 13 | 21.2 | 0.5 |
| 9136130 | 1984 | 8 | 1 | 11.6 | 21.3 | 1.3 |
| 9136130 | 1984 | 8 | 2 | 11.9 | 21.9 | 0.0 |
| 9136130 | 1984 | 8 | 3 | 12.3 | 24.7 | 0.0 |

Figure 64a Dekadal data – Multiple Elements columns

| StationID | Code | Year | Month | 1 | 2 | 3 |
|-----------|------|------|-------|------|------|------|
| 9136130 | 3 | 1984 | 1 | 25.1 | 26.1 | 26.7 |
| 9136130 | 3 | 1984 | 2 | 27.5 | 28.5 | 27.8 |
| 9136130 | 3 | 1984 | 3 | 27.5 | 27.7 | 27.4 |
| 9136130 | 3 | 1984 | 4 | 28.4 | 26.9 | 25.9 |
| 9136130 | 3 | 1984 | 5 | 25.9 | 25.7 | 25.6 |
| 9136130 | 3 | 1984 | 6 | 24.6 | 24.4 | 24.5 |
| 9136130 | 3 | 1984 | 7 | 23.2 | 22.5 | 21.2 |
| 9136130 | 3 | 1984 | 8 | 21.3 | 21.9 | 24.7 |
| 9136130 | 3 | 1984 | 9 | 26.3 | 25.9 | 26.5 |
| 9136130 | 3 | 1984 | 10 | 23.7 | 25.5 | 22.8 |
| 9136130 | 3 | 1984 | 11 | 22.5 | 23.4 | 23.2 |
| 9136130 | 3 | 1984 | 12 | 25 | 22.8 | 23.7 |
| 9136130 | 3 | 1984 | 1 | 13 | 13.5 | 13.2 |
| 9136130 | 3 | 1984 | 2 | 13 | 11.7 | 13.8 |
| 9136130 | 3 | 1984 | 3 | 13.4 | 15.2 | 15.4 |
| 9136130 | 3 | 1984 | 4 | 16 | 16 | 15.3 |
| 9136130 | 3 | 1984 | 5 | 14.4 | 14.1 | 13.5 |
| 9136130 | 3 | 1984 | 6 | 12.4 | 12.4 | 12 |
| 9136130 | 3 | 1984 | 7 | 12.2 | 12.3 | 13 |
| 9136130 | 3 | 1984 | 8 | 11.6 | 11.9 | 12.2 |
| 9136130 | 3 | 1984 | 9 | 11.8 | 13.2 | 13.1 |
| 9136130 | 3 | 1984 | 10 | 14.8 | 13.6 | 14.7 |

Figure 64b Dekadal data– Single Element column

| StationID | Year | Month | PRECIP |
|-----------|------|-------|--------|
| 9136130 | 1984 | 1 | 0.76 |
| 9136130 | 1984 | 2 | 0.16 |
| 9136130 | 1984 | 3 | 0.53 |
| 9136130 | 1984 | 4 | 8.73 |
| 9136130 | 1984 | 5 | 0.16 |
| 9136130 | 1984 | 6 | 0.5 |
| 9136130 | 1984 | 7 | 1.28 |
| 9136130 | 1984 | 8 | 2.24 |
| 9136130 | 1984 | 9 | 1.39 |
| 9136130 | 1984 | 10 | 14.48 |
| 9136130 | 1984 | 11 | 12.39 |
| 9136130 | 1984 | 12 | 8.56 |

Figure 64c Monthly data– Multiple Elements columns

| StationID | Code | Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|-----------|------|------|------|------|-------|-------|-------|------|------|------|------|-------|-------|-------|
| 9136130 | 5 | 1981 | 0.37 | 0.2 | 10.63 | 32.34 | 14.49 | 3.07 | 0.96 | 3.04 | 4.39 | 4.17 | 4.02 | 5.99 |
| 9136130 | 5 | 1982 | 0.24 | 1.41 | 3.12 | 19.29 | 16.44 | 0.84 | 1.35 | 0.31 | 1.59 | 18.64 | 22.01 | 18.89 |
| 9136130 | 5 | 1983 | 0.18 | 12.8 | 4.34 | 13.71 | 3.8 | 3.1 | 2.25 | 2.98 | 0.36 | 6.36 | 2.24 | 22.57 |
| 9136130 | 5 | 1984 | 0.76 | 0.16 | 0.53 | 8.73 | 0.16 | 0.5 | 1.28 | 2.24 | 1.39 | 14.48 | 12.39 | 8.56 |
| 9136130 | 5 | 1985 | 0 | 9.12 | 8.8 | 18.88 | 5.97 | 3.24 | 5.02 | 0.31 | 2.25 | 2.06 | 6.75 | 10.5 |

Figure 64d Monthly data – Single Element column

The import procedures will depend on the layout of the summarized data as follows:

(viii) Data in multiple Elements Columns - **Figure 64a** and **64c**

From **Welcome** dialog follow:

Data Transfer -> External Data ->Text File->Multiple Element Columns. Then check the option **Dekadal** or **Monthly** for type of **Figure 64a** or **64c** respectively.

(ix) Dekadal data in single Elements Column - **Figure 64b**

From **Welcome** dialog follow:

Data Transfer -> External Data ->Text File->Daily. Then check option “**Dekadal**”.

(x) Monthly data in single Elements Column - Figure 64d

From **Welcome** dialog follow:

Data Transfer -> External Data ->Text File->Monthly.

Notes on Daily Data Import

Trace Rainfall – Should be typed as **0T**

Missing Data – Should be left as blank. Any value that is not numeric will be regarded as missing data.

Cumulated data – Cumulated data should be type with C e.g. **200C**. Values for preceding days should be left blanks.

8.6 Importing Upper Air data

Importing procedures for upper air data that has been digitized through other applications and archived in delimited text files is similar to the files with surface observations data. The appropriate menus will be used depending on the layout of data in the files. The suitable menus are those for daily or multiple columns for elements. The only additional procedure is to indicate that the file contains upper air data by checking the box; **Upper Air Data** and entering date and time the balloon was launched in the format given. See **Figure 64e** below.

The screenshot shows the 'Multiple Columns Data Import' dialog box. The file path is 'C:\KMD\upper air\stand_levels_01022020.CRA'. The 'Delimiters' are set to 'TAB'. The 'Start Row' is 2 and 'Default Observation Hour' is 0. The 'Summarized Data Import' section has 'Monthly' selected. The 'Upper Air Data' checkbox is checked. The 'DateAndTime' is '02/01/2020 00:00:00'. The 'Station' is 'DAGORETTI CORNER METEOROLOGICAL STATION'. The 'Missing Data Flag' is empty. The 'Columns Header Settings' section shows 'Select Column No' with values 1 and 2, and 'Select Field Name' with a dropdown. The 'Save Header Specs' and 'Load Header Specs' buttons are present. The 'View Data' button is also visible. Below the dialog, a table of imported data is shown.

| NA | time_disp | 302 | level | 303 | 304 | 313 | 306 | 305 | NA |
|----------|-----------|----------|--------|--------|--------|-------|---------|-------|------|
| Date | Time | Alt | P(hPa) | T(°C) | DP(°C) | RH(%) | WF(kts) | WD(°) | ind. |
| 2/1/2020 | 000030 | 00763.54 | 0925.0 | 08.01 | 07.32 | 095.4 | 23.66 | 258 | S |
| 2/1/2020 | 000192 | 01453.39 | 0850.0 | 03.17 | 02.78 | 097.3 | 24.60 | 268 | S |
| 2/1/2020 | 000501 | 03004.34 | 0700.0 | -04.52 | -07.64 | 078.7 | 31.81 | 266 | S |
| 2/1/2020 | 001037 | 05609.43 | 0500.0 | -17.09 | -17.09 | 100.0 | 43.26 | 290 | S |
| 2/1/2020 | 001364 | 07245.90 | 0400.0 | -29.20 | -36.75 | 047.6 | 51.34 | 299 | S |
| 2/1/2020 | 001749 | 09231.01 | 0300.0 | -45.65 | -47.26 | 083.4 | 67.84 | 301 | S |
| 2/1/2020 | 001968 | 10417.16 | 0250.0 | -56.10 | -58.92 | 069.9 | 73.31 | 305 | S |
| 2/1/2020 | 002246 | 11820.09 | 0200.0 | -60.30 | -63.79 | 062.8 | 52.58 | 301 | S |
| 2/1/2020 | 002627 | 13628.43 | 0150.0 | -57.20 | -68.79 | 020.9 | 38.06 | 297 | S |
| 2/1/2020 | 003205 | 16193.34 | 0100.0 | -57.76 | -82.51 | 002.6 | 13.79 | 299 | S |
| 2/1/2020 | 003702 | 18432.06 | 0070.0 | -60.00 | -89.46 | 000.3 | 11.93 | 283 | S |
| 2/1/2020 | 004142 | 20531.76 | 0050.0 | -61.02 | -90.17 | 000.3 | 15.40 | 296 | S |
| 2/1/2020 | 004781 | 23714.41 | 0030.0 | -60.09 | -89.52 | 000.3 | 08.25 | 308 | S |
| 2/1/2020 | 005248 | 26273.74 | 0020.0 | -55.60 | -86.41 | 000.3 | 08.72 | 292 | S |
| 2/1/2020 | 006014 | 30732.48 | 0010.0 | -50.38 | -82.83 | 000.3 | 12.10 | 306 | S |

Figure 64e: Multiple element columns data Import for upper air data file

8.7 Upload failures

The data upload process may fail due to various reasons. Error messages will be given in each case. As much as possible the messages should be studied carefully and the problems described therein addressed. In case of station or element in the data that had not been defined in the metadata the affected records will be skipped then their stations/elements are listed at the bottom of the import dialog. The data should therefore be corrected accordingly and reloaded.

8.8 Importing GTS data downloaded from NOAA – NCEI

The NOAA-NCEI site has a huge archive of GTS daily observation data from all synoptic stations around the globe. Most of the data dates back to the early 1970s. The data goes through some QC at NOAA-NCEI and is updated on a daily basis. Data in this site is organized in summaries for different range of time and put in different datasets. The dataset for daily data that is suitable for Climsoft import is called Global Surface Summary of the Day (GSOD)

The data is publicly available in text (csv) files. Climsoft is able to import these files through the external data import dialog. Figure 65 below shows a screenshot of sample data downloaded from the NOAA-NCEI site:

| STATION | DATE | LATITUDE | LONGITUDE | ELEVATION | NAME | TEMP | TEMP_ATT | DEWP | DEWP_ATT | SLP | SLP_ATTR | STP | STP_ATTR | VISIB | VISIB_ATT | WDSP | WDSP_ATT | MXSPD | GUST | MAX | MAX_A | MIN | MIN_ATTR | PRCP | PRCP |
|-------------|------------|-----------|-----------|-----------|------------|------|----------|------|----------|--------|----------|-------|----------|-------|-----------|------|----------|-------|-------|------|-------|------|----------|-------|------|
| 63714099999 | 01/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 66.2 | 7 | 57.1 | 7 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 7 | 1.1 | 7 | 8 | 999.9 | 75.2 | * | 57.2 | | 0.71 | G |
| 63714099999 | 02/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 69.9 | 7 | 49.2 | 7 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 7 | 6.3 | 7 | 15 | 999.9 | 79.7 | * | 54.5 | | 0 | I |
| 63714099999 | 03/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 69.3 | 7 | 46.4 | 7 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 7 | 5.7 | 7 | 15 | 999.9 | 78.8 | * | 53.6 | | 0 | I |
| 63714099999 | 04/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 68.8 | 7 | 46.3 | 7 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 7 | 5 | 7 | 9.9 | 999.9 | 78.8 | * | 51.4 | | 0 | I |
| 63714099999 | 05/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 69 | 7 | 49.1 | 7 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 7 | 4.8 | 7 | 9.9 | 999.9 | 79.7 | * | 50 | | 0 | I |
| 63714099999 | 06/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 70 | 7 | 47.5 | 7 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 7 | 2.7 | 7 | 14 | 999.9 | 80.1 | * | 54 | | 0 | I |
| 63714099999 | 07/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 67.1 | 7 | 47.2 | 7 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 7 | 1.9 | 7 | 8 | 999.9 | 81 | * | 52.2 | | 0 | I |
| 63714099999 | 08/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 69.3 | 7 | 48.7 | 7 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 7 | 4 | 7 | 9.9 | 999.9 | 82 | * | 51.8 | | 0 | I |
| 63714099999 | 16/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 72 | 5 | 51.1 | 5 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 5 | 1.2 | 5 | 6 | 999.9 | 77.9 | * | 65.3 | * | 99.99 | |
| 63714099999 | 17/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 68.8 | 8 | 52.9 | 8 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 8 | 3.1 | 8 | 13 | 999.9 | 79.2 | * | 58.1 | * | 0 | I |
| 63714099999 | 20/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 74.3 | 4 | 41.9 | 4 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 4 | 2.5 | 4 | 9.9 | 999.9 | 83.8 | * | 64 | * | 0 | I |
| 63714099999 | 21/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 67.5 | 8 | 47.8 | 8 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 8 | 3.7 | 8 | 9.9 | 999.9 | 82 | * | 51.8 | | 0 | I |
| 63714099999 | 22/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 70.6 | 7 | 51.1 | 7 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 7 | 3.6 | 7 | 15 | 999.9 | 77.9 | * | 55.4 | | 0 | I |
| 63714099999 | 23/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 67.9 | 8 | 52.5 | 8 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 8 | 4 | 8 | 12 | 999.9 | 80.6 | * | 58.1 | | 0 | I |
| 63714099999 | 24/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 65.8 | 7 | 52.3 | 7 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 7 | 5 | 7 | 15.9 | 999.9 | 78.8 | * | 50 | | 99.99 | |
| 63714099999 | 25/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 68.4 | 8 | 50.8 | 8 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 8 | 5 | 8 | 15 | 999.9 | 81.5 | * | 52.2 | | 0.04 | G |
| 63714099999 | 26/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 68.7 | 8 | 47.9 | 8 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 8 | 5 | 8 | 15 | 999.9 | 80.6 | * | 49.1 | | 0 | G |
| 63714099999 | 27/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 68.9 | 8 | 42 | 8 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 8 | 4.4 | 8 | 12 | 999.9 | 82.4 | * | 46.4 | | 0 | I |
| 63714099999 | 28/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 68.1 | 8 | 46.2 | 8 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 8 | 2.4 | 8 | 13 | 999.9 | 82.4 | * | 49.1 | | 0 | I |
| 63714099999 | 29/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 68 | 6 | 48.1 | 6 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 6 | 2 | 6 | 7 | 999.9 | 80.6 | * | 50.9 | | 0 | I |
| 63714099999 | 30/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 68.8 | 8 | 45.6 | 8 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 8 | 4.6 | 8 | 9.9 | 999.9 | 82.8 | * | 51.8 | | 0 | I |
| 63714099999 | 31/01/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 67.9 | 8 | 39.1 | 8 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 8 | 4.9 | 8 | 12 | 999.9 | 83.3 | * | 48 | | 0 | I |
| 63714099999 | 01/02/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 67.2 | 8 | 36.2 | 8 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 8 | 2.5 | 8 | 9.9 | 999.9 | 83.7 | * | 45.5 | | 0 | I |
| 63714099999 | 02/02/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 67.2 | 7 | 39.9 | 7 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 7 | 1.9 | 7 | 8 | 999.9 | 81.9 | * | 47.8 | | 0 | I |
| 63714099999 | 03/02/2021 | -0.266667 | 36.1 | 1901 | NAKURU, KE | 69.3 | 8 | 50.3 | 8 | 9999.9 | 0 | 999.9 | 0 | 18.6 | 8 | 1.5 | 8 | 7 | 999.9 | 79.7 | * | 52 | | 0 | I |

Figure 65: Sample data from NOAA-NCDC

To import GTS daily data from NOAA-NCEI;

- Select “**Data Transfer**” icon on the CLIMSOFT Welcome screen,
- Select “**External Data**” menu;
- Select “**NOAA GTS**” to open the dialog and browse the data file as shown in Figure 66 below.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|-------------|------------|------------|-----------|-----------|------------|------|-----------------|------|----------------|----|
| STATION | DATE | LATITUDE | LONGITUDE | ELEVATION | NAME | TEMP | TEMP_ATTRIBU... | DEWP | DEWP_ATTRIB... | SI |
| 63714099999 | 2021-01-01 | -0.2666667 | 36.1 | 1901.0 | NAKURU, KE | 66.2 | 7 | 57.1 | 7 | 95 |
| 63714099999 | 2021-01-02 | -0.2666667 | 36.1 | 1901.0 | NAKURU, KE | 69.9 | 7 | 49.2 | 7 | 95 |
| 63714099999 | 2021-01-03 | -0.2666667 | 36.1 | 1901.0 | NAKURU, KE | 69.3 | 7 | 46.4 | 7 | 95 |
| 63714099999 | 2021-01-04 | -0.2666667 | 36.1 | 1901.0 | NAKURU, KE | 68.8 | 7 | 46.3 | 7 | 95 |
| 63714099999 | 2021-01-05 | -0.2666667 | 36.1 | 1901.0 | NAKURU, KE | 69.0 | 7 | 49.1 | 7 | 95 |
| 63714099999 | 2021-01-06 | -0.2666667 | 36.1 | 1901.0 | NAKURU, KE | 70.0 | 7 | 47.5 | 7 | 95 |
| 63714099999 | 2021-01-07 | -0.2666667 | 36.1 | 1901.0 | NAKURU, KE | 67.1 | 7 | 47.2 | 7 | 95 |
| 63714099999 | 2021-01-08 | -0.2666667 | 36.1 | 1901.0 | NAKURU, KE | 69.3 | 7 | 48.7 | 7 | 95 |
| 63714099999 | 2021-01-16 | -0.2666667 | 36.1 | 1901.0 | NAKURU, KE | 72.0 | 5 | 51.1 | 5 | 95 |
| 63714099999 | 2021-01-17 | -0.2666667 | 36.1 | 1901.0 | NAKURU, KE | 68.8 | 8 | 52.9 | 8 | 95 |
| 63714099999 | 2021-01-20 | -0.2666667 | 36.1 | 1901.0 | NAKURU, KE | 74.3 | 4 | 41.9 | 4 | 95 |
| 63714099999 | 2021-01-21 | -0.2666667 | 36.1 | 1901.0 | NAKURU, KE | 67.5 | 8 | 47.8 | 8 | 95 |
| 63714099999 | 2021-01-22 | -0.2666667 | 36.1 | 1901.0 | NAKURU, KE | 70.6 | 7 | 51.1 | 7 | 95 |
| 63714099999 | 2021-01-23 | -0.2666667 | 36.1 | 1901.0 | NAKURU, KE | 67.9 | 8 | 52.5 | 8 | 95 |

Figure 66: Importing data from a text file downloaded from NOAA-NCEI site

Notes on NOAA-NCEI data:

- b) Since the GTS data would have gone through QC at NOAA-NCEI, it may be transferred straight to the “**observationfinal**” table. However, if it is desired to be subjected to QC again then it should be transferred to the “**observationinitial**” table by checking on the option “**Observation Final**”.
- c) The required data can be downloaded from the site:
<https://www.ncei.noaa.gov/access/search/dataset-search>

8.9 Selecting Station and Element on the Import Dialog

Where Station and/or Element columns are missing in the file to be imported they should be provided in the import dialog. They are selected from Station and Element list boxes accordingly. These boxes allow selection by station and element names or by entering the station id or element code the press Enter Key respectively. See Figure 6a

Figure 66a: Stations and Element Selection

9. Data Backup and Restore

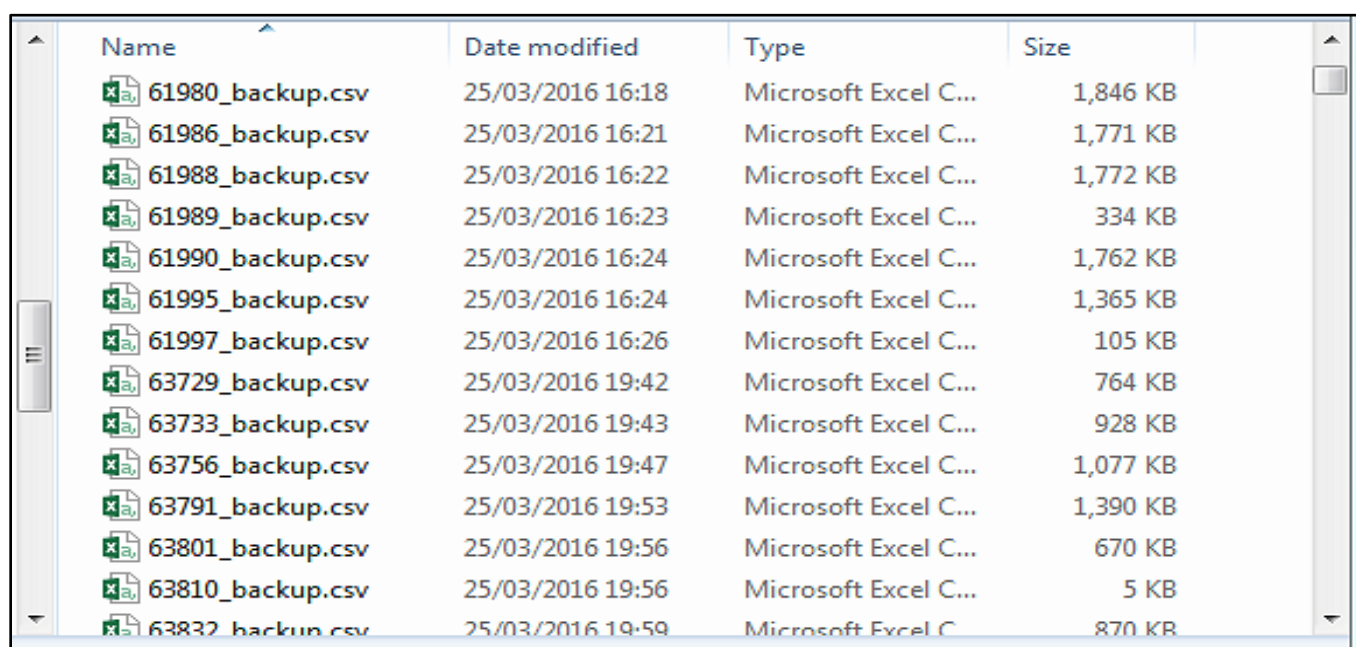
Data backup and restore are essential operations in data management.

9.1 Data Backup

9.1.1 Data backup by station

Climsoft Version 4 has a facility for a complete backup of all the observation data in the “**observationfinal**” table by making individual backup files for each station.

This process is fast and minimizes the computer memory resources. In addition it provides a quick view of the list of backup files in Windows File Explorer with the relative amount of data for each station by examining the file sizes, without the extra effort of doing a detailed inventory report (Figure 67).



| Name | Date modified | Type | Size |
|------------------|------------------|----------------------|----------|
| 61980_backup.csv | 25/03/2016 16:18 | Microsoft Excel C... | 1,846 KB |
| 61986_backup.csv | 25/03/2016 16:21 | Microsoft Excel C... | 1,771 KB |
| 61988_backup.csv | 25/03/2016 16:22 | Microsoft Excel C... | 1,772 KB |
| 61989_backup.csv | 25/03/2016 16:23 | Microsoft Excel C... | 334 KB |
| 61990_backup.csv | 25/03/2016 16:24 | Microsoft Excel C... | 1,762 KB |
| 61995_backup.csv | 25/03/2016 16:24 | Microsoft Excel C... | 1,365 KB |
| 61997_backup.csv | 25/03/2016 16:26 | Microsoft Excel C... | 105 KB |
| 63729_backup.csv | 25/03/2016 19:42 | Microsoft Excel C... | 764 KB |
| 63733_backup.csv | 25/03/2016 19:43 | Microsoft Excel C... | 928 KB |
| 63756_backup.csv | 25/03/2016 19:47 | Microsoft Excel C... | 1,077 KB |
| 63791_backup.csv | 25/03/2016 19:53 | Microsoft Excel C... | 1,390 KB |
| 63801_backup.csv | 25/03/2016 19:56 | Microsoft Excel C... | 670 KB |
| 63810_backup.csv | 25/03/2016 19:56 | Microsoft Excel C... | 5 KB |
| 63832_backup.csv | 25/03/2016 19:59 | Microsoft Excel C... | 870 KB |

Figure 67: List of individual station backup files

The backup dialog shown in Figure 68 is accessed by clicking the “**Data Transfer**” icon on the Welcome screen, followed by clicking the menu item “**Backup**”.

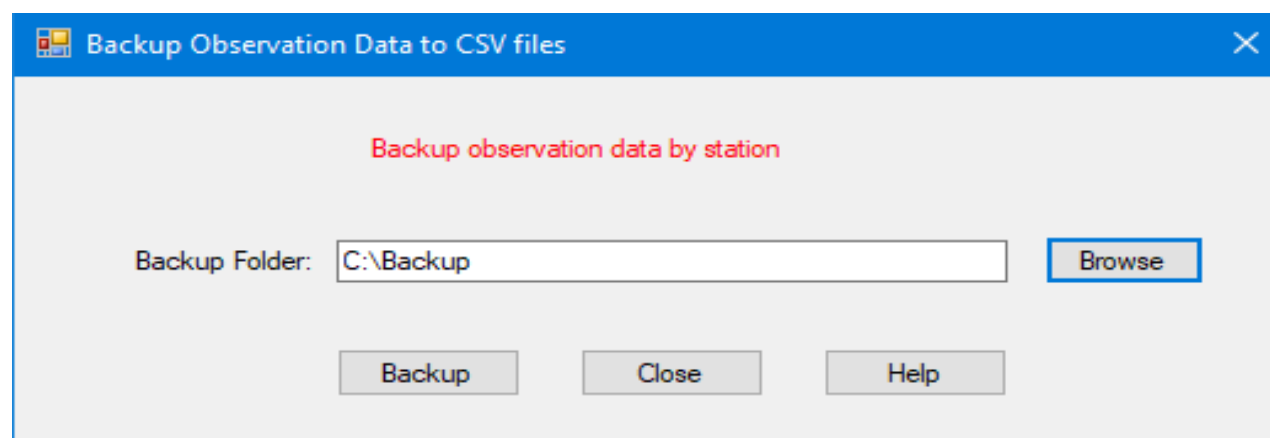


Figure 68: Data backup

Browsing for the backup folder from the database server, then click the “**Backup**” button, for the backup process to start. The progress of the backup process is displayed.

9.1.2 Complete database backup

In Climsoft Version 4, the recommended tool for backing up of the whole database is HeidiSQL. This is a graphical interface for managing databases that comes bundled with the MariaDB DBMS installation. HeidiSQL is easy to configure and use.

Launch HeidiSQL either from the desktop shortcut or from the Windows Start menu under MariaDB program group. This displays the “**Session Manager**” as shown in Figure 69.

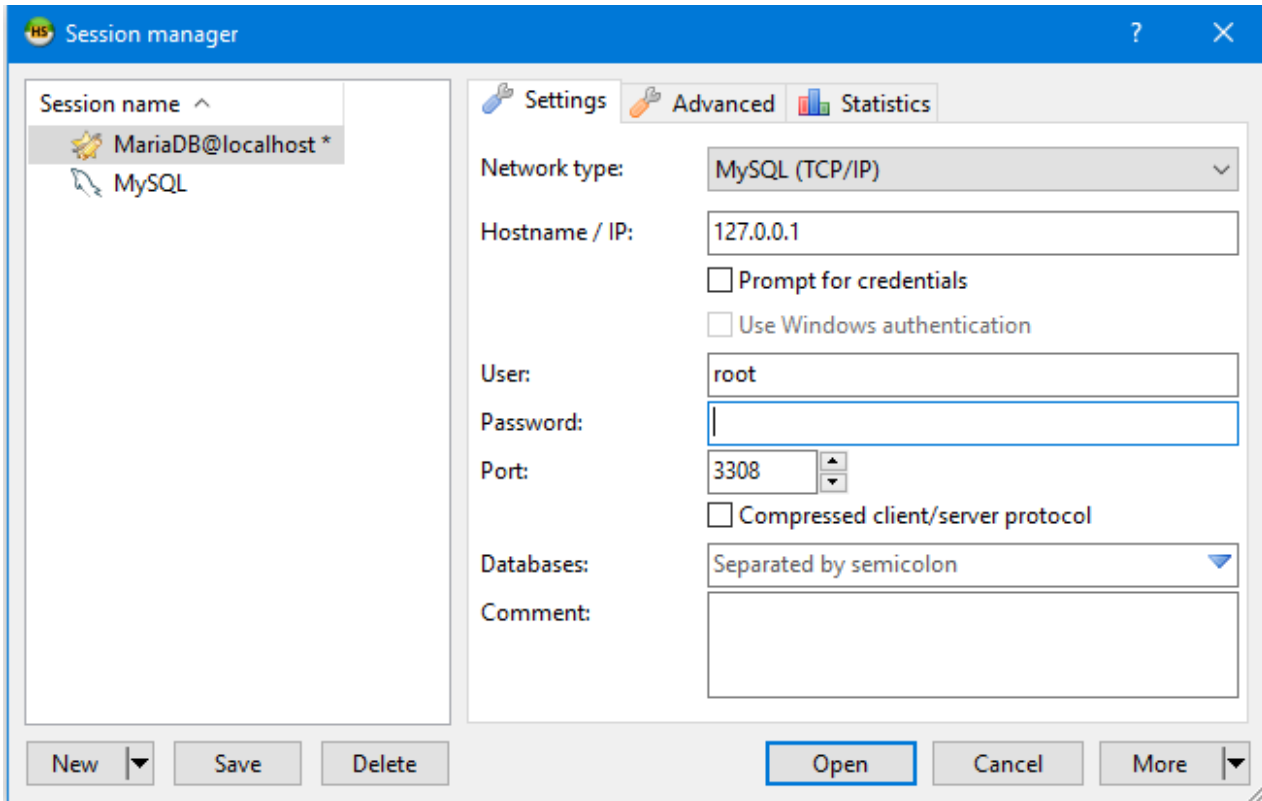


Figure 69: HeidiSQL Session Manager

The Session Manager in Figure 62 is to configure a connection to the MariaDB server. To setup a new connection, click on the “**New**” button on the bottom left corner of the dialog;

After editing the “**Session**” name on the left panel of the dialog, specify the connection details on the right panel of the dialog. The required details include the IP address of the computer (server) where MariaDB is installed, the Port number, the user name and password.

The Session Manager allows configuration of connections to more than one MariaDB installation on different computers. If MariaDB is installed on the local computer then the IP address should be “127.0.0.1” or “localhost” as shown in Figure 69.

Completing the required connection details then clicking the “**Open**” button (Figure 69), a screen appears with details of the database(s) and objects for the specified Port number, Figure 70.

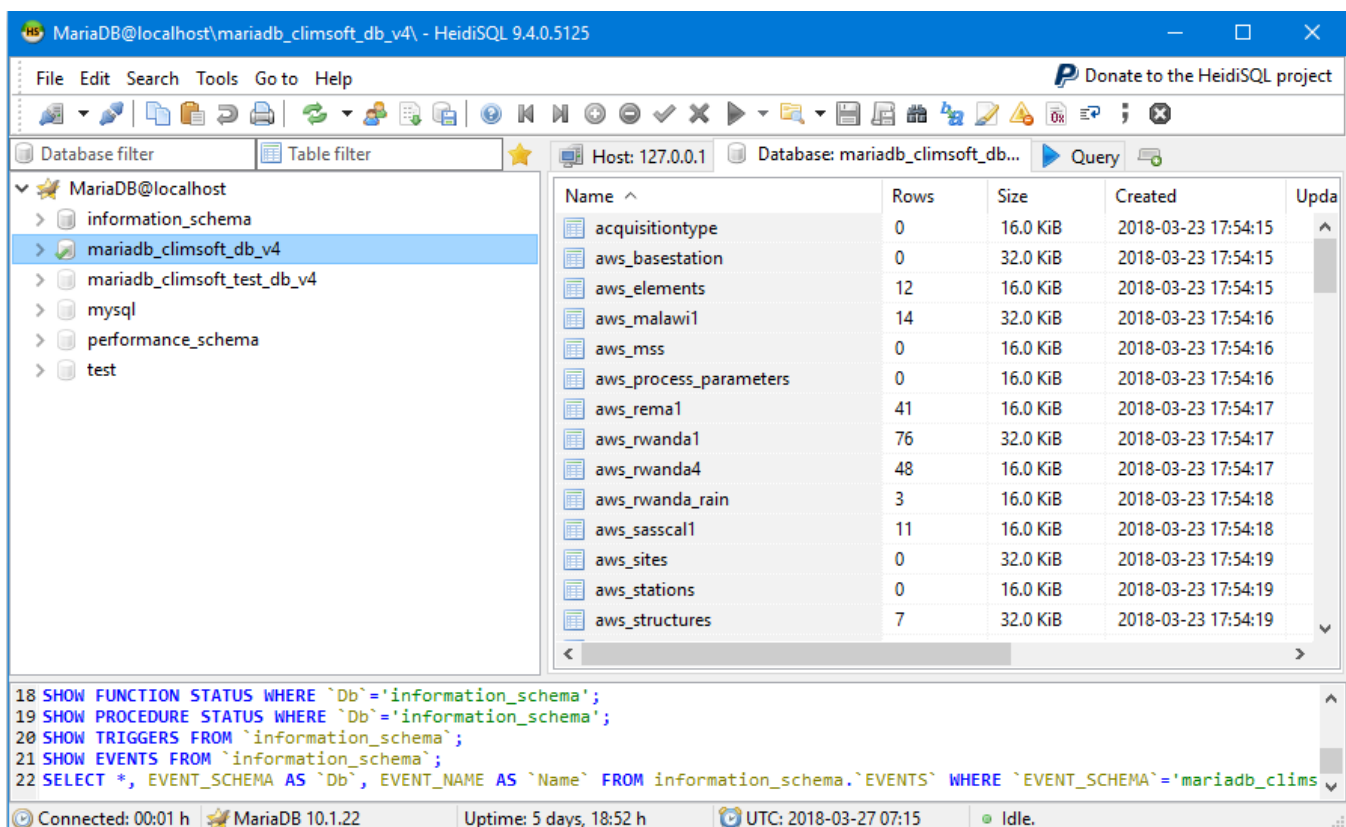


Figure 70: HeidiSQL interface showing database information

To carry out a complete backup of a required database, right click on the database name on the left panel of the dialog in Figure 70;

A pop-up menu appears, click on the menu item “**Export database as SQL**”; this displays a new dialog to specify details for the backup as shown on Figure71.

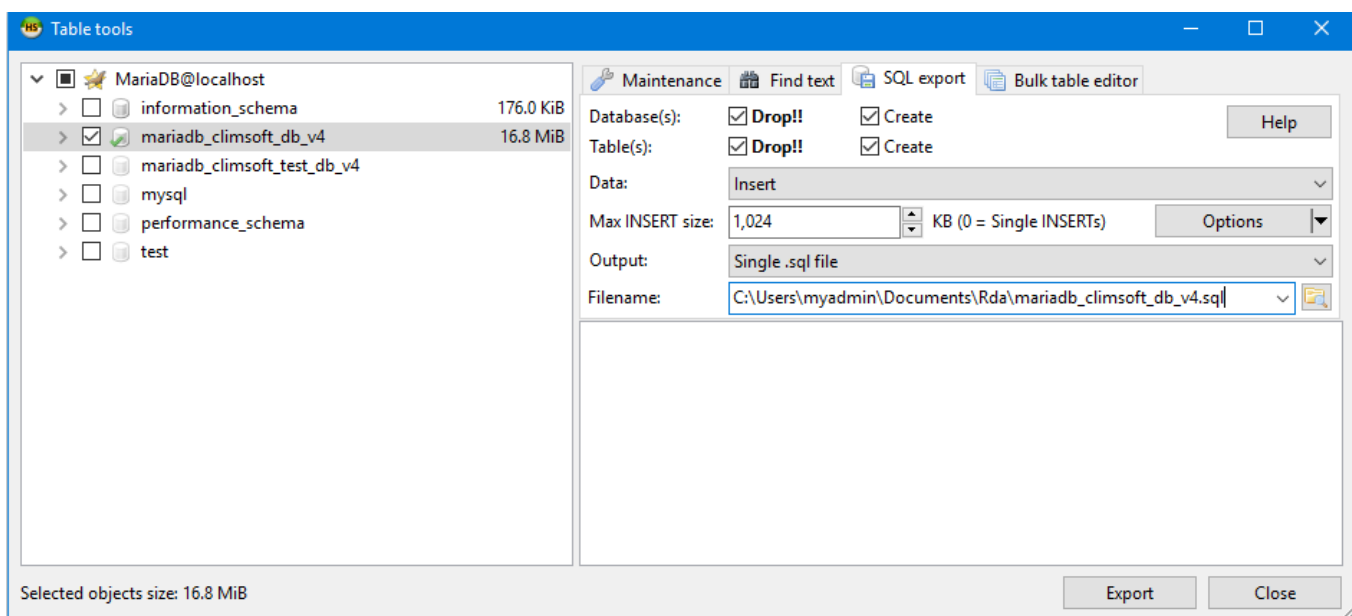


Figure 71: HeidiSQL Dialog for database backup

Click on the icon to the right of the filename to browse for the location and specify the filename for the backup.

To create a new database structure with all the tables and data, check all the boxes on the right panel and select **INSERT** on the **Data** dropdown list.

Click the **Export** button, then backup process starts and saves the backup file with the specified name (and the extension .sql), in the specified location.

To restore the database (script file) click on **File** then **Load SQL file...**. Select the backup script file then click **Open** on windows explorer dialog and follow the subsequent dialogs.

9.2 Data restore

9.2.1 Data restore by Station

The dialog for restoring data from individual station backup files is shown in Figure 72. This is accessed by clicking the icon **Data Transfer** on the Welcome screen followed by clicking on the menu item **Restore**.

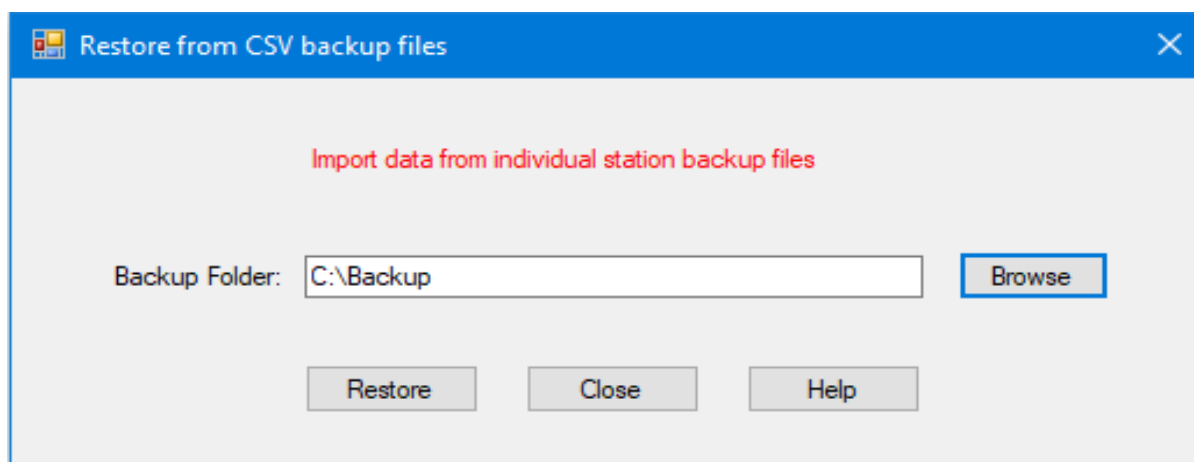


Figure 72: Data restore

Browsing for the backup folder, then click the **Restore** button. The data restore process starts, showing the progress of the restore process.

9.2.2 Complete Database Restore

To recreate and restore the entire database from a complete backup, run the script of the backup file following the steps similar to those for creating a new database in MariaDB as described under Topic 2, section 2.3 (Creating Climsoft Database in MariaDB and First Login). It is important to specify the exact name of the backup file in place of the name of the script file used for creating Climsoft Version 4 database at the first installation.

10. Climate Products

10.1 Standard Products

Climsoft version 4 provides a number of standard products which produce commonly required reports or diagrams using data contained in the “**observationfinal**” table. Products are obtained as follows.

From the **Welcome** Dialog, click on the icon **Climate Products** or select **Products on the main menu**. The resulting dialog is shown in Figure 73.

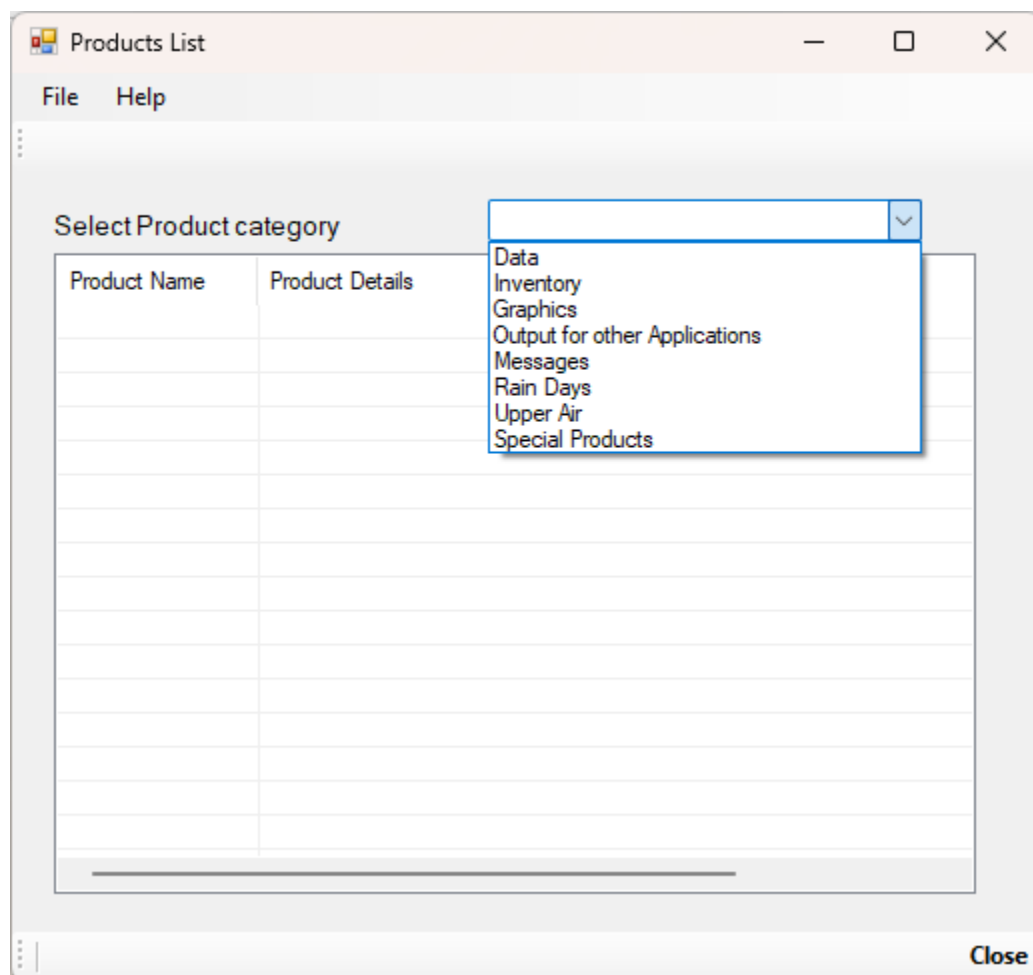


Figure 73: Products category list

The categories of the products are listed after clicking on the list box. When a product category is selected then all products under that category are then listed.

For instance if category **Data** is selected, the products list under that category will be as shown in Figure 74;

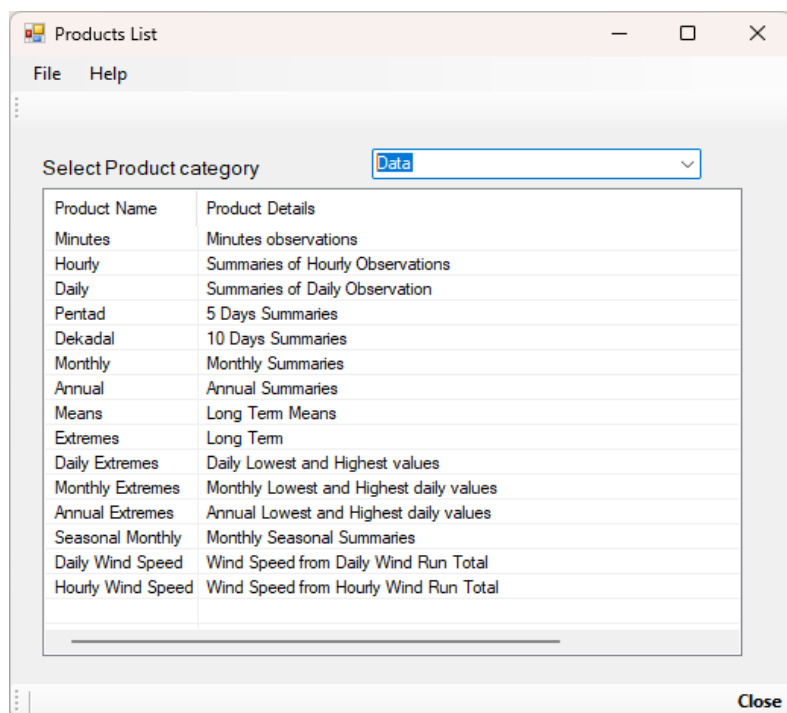


Figure 74: Data Product list

Details of different products type are listed in **Table 3**;

| No | Products Category | Product Types | Details |
|----|-------------------------------|---------------------------|---|
| | Data | Minute | Minutes observations |
| | | Hourly | Summary of hourly observations |
| | | Daily | Summary of daily observations |
| | | Pentad | 5 Days summary |
| | | Dekadal | 10 Days summary |
| | | Monthly | Monthly summaries |
| | | Annual | Annual summaries |
| | | Means | Long term means |
| | | Extremes | Long term extremes (i.e. highest, lowest, dates of occurrences) |
| | | Daily Extremes | Daily Lowest and Highest values |
| | | Monthly Extremes | Monthly Lowest and Highest values |
| | | Annual Extremes | Annual Lowest and Highest values |
| | | Seasonal Monthly | Monthly Seasonal Summaries |
| | | Daily Wind Speed | Wind Speed from Daily Wind Run Total |
| | | Hourly Wind Speed | Wind Speed from Hourly Wind Run Total |
| | Graphics | Windrose | Windrose picture |
| | | TimeSeries | Time Series Chart |
| | | Histograms | Histograms Chart |
| | Inventory | Inventory | Details of Data Records |
| | | Missing Data | Inventory of Missing Data |
| | | Stations Records | Time Series Chart for total Observing Stations |
| | | Yearly Elements Observed | Yearly Time Series Chart per Station |
| | | Monthly Elements Observed | Monthly Time Series Chart per Station |
| | Messages | CLIMAT | CLIMAT Messages |
| | Output for other Applications | Instat | Daily data for Instat |
| | | Rclimdex | Daily data for Rclimdex |
| | | CPT | Data for CPT |
| | | GeoCLIM Monthly | Monthly Data for GeoCLIM |

| No | Products Category | Product Types | Details |
|----|-------------------|-----------------------------|---|
| | | GeoCLIM Dekadal | Dekadal Data for Geoclim |
| | | GeoCLIM Daily | Daily Data for Geoclim |
| | | CDT Dekadal | Dekadal Data for CDT |
| | | CDT Daily | Daily Data for CDT |
| | | Climate Station | Data for Climate Station Tool |
| | Rain Days | Dekadal, Monthly and Annual | Counts of rain days with a specified threshold value |
| | Upper Air | Daily, Monthly and Annual | Summaries for upper air observations at standard levels |
| | Special Products | Mean Water Level | Hydrological Mean Water Level |

Table 3: Climate Products.

Once the product type is selected, a dialog appears from where details of the desired product are specified. For instance if **Monthly** product is selected the dialog obtained is as shown in **Figure 75**.

Figure 75: Data selection dialog

The **Station (s)** and **Element (s)** are selected from the respective list boxes each one at a time. Deletion of undesired selections can be carried out for one item or the entire list using the commands provided at the bottom of each box.

The relevant **Summary Type** and **Period** are then selected. The command “**Start Extraction**” is used to produce the selected product.

The **Period** specifies the time range for the selected product. Default period is from *01/01/2000* to the *current date*.

The “**Transpose Values**” box if checked, the products will be displayed in a horizontal layout where date components (days, dekads or months) become the column headers for the data values.

The “**Advanced Products Select**” box if checked, a set of stations under a specified group are selected and listed on the Stations panel. All those stations will then be included in the extracted product. The station groups are based on the metadata descriptions such as; *Type (Qualifier)*, *Authority*, *Admin region*, *Drainage basin* and a *specified Geographical* location. For instance if under the Qualifier option SYNOPTIC is selected then all synoptic stations will automatically selected and listed on the Station view box

Figures 76(a), 76(b), 76(c) and 76(d) below give examples of data products output;

Monthly TMax and TMin

| StationID | Lat | Lon | Elev | Year | Month | TMPMAX | TMPMIN |
|-----------|------|-------|------|------|-------|--------|--------|
| 8635000 | 3.11 | 35.61 | 505 | 2000 | 1 | 36.66 | 20.65 |
| 8635000 | 3.11 | 35.61 | 505 | 2000 | 2 | 37.92 | 20.38 |
| 8635000 | 3.11 | 35.61 | 505 | 2000 | 3 | 37.78 | 24.01 |
| 8635000 | 3.11 | 35.61 | 505 | 2000 | 4 | 37.31 | 25.59 |
| 8635000 | 3.11 | 35.61 | 505 | 2000 | 5 | 36.53 | 25.99 |
| 8635000 | 3.11 | 35.61 | 505 | 2000 | 6 | 34.91 | 24.81 |
| 8635000 | 3.11 | 35.61 | 505 | 2000 | 7 | 34.07 | 24.29 |
| 8635000 | 3.11 | 35.61 | 505 | 2000 | 8 | 34.41 | 24.57 |
| 8635000 | 3.11 | 35.61 | 505 | 2000 | 9 | 35.58 | 25.03 |

Figure 76(a): Monthly products

Extreme Values

| Station | Element | Lat | Lon | Elev | Lowest | Highest |
|--------------------------------|---------|------|-------|------|--------|---------|
| ELDORET METEOROLOGICAL STATION | TMPMAX | 0.53 | 35.28 | 2120 | 3.1 | 39 |
| ELDORET METEOROLOGICAL STATION | TMPMIN | 0.53 | 35.28 | 2120 | 2.1 | 23.1 |
| EMBU METEOROLOGICAL STATION | TMPMAX | -0.5 | 37.45 | 1494 | 11.1 | 32.6 |
| EMBU METEOROLOGICAL STATION | TMPMIN | -0.5 | 37.45 | 1494 | 8.7 | 19.8 |
| MERU METEOROLOGICAL STATION | TMPMAX | 0.08 | 37.65 | 1524 | 10.1 | 30.9 |
| MERU METEOROLOGICAL STATION | TMPMIN | 0.08 | 37.65 | 1524 | 6.8 | 21.1 |
| NAROK METEOROLOGICAL STATION | TMPMAX | -1.1 | 35.86 | 1585 | 11.9 | 27.9 |
| NAROK METEOROLOGICAL STATION | TMPMIN | -1.1 | 35.86 | 1585 | 7.3 | 18.5 |

Figure 76(b): Extreme Values

Extreme Maximum Values

| Station | Element | Day | Month | Year | MaxValue |
|--------------------------------|---------|-----|-------|------|----------|
| NAROK METEOROLOGICAL STATION | TMPMAX | 3 | 1 | 1980 | 27.9 |
| NAROK METEOROLOGICAL STATION | TMPMIN | 5 | 1 | 1999 | 18.5 |
| MERU METEOROLOGICAL STATION | TMPMAX | 14 | 3 | 1986 | 30.9 |
| MERU METEOROLOGICAL STATION | TMPMIN | 28 | 2 | 1995 | 21.1 |
| EMBU METEOROLOGICAL STATION | TMPMAX | 23 | 3 | 2009 | 32.6 |
| EMBU METEOROLOGICAL STATION | TMPMIN | 12 | 4 | 1992 | 19.8 |
| ELDORET METEOROLOGICAL STATION | TMPMAX | 15 | 9 | 1977 | 39 |
| ELDORET METEOROLOGICAL STATION | TMPMIN | 14 | 8 | 1998 | 23.1 |

Figure 76(c): Extreme Maximum Values and Date of Occurrence

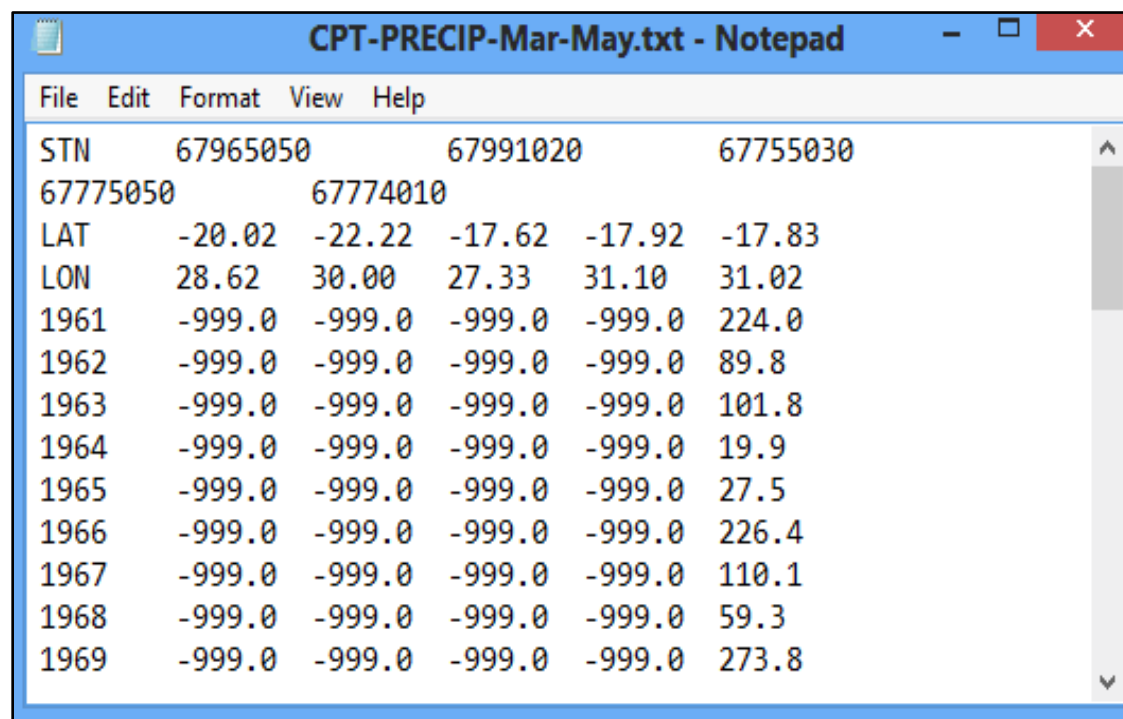
Extreme Minimum Values

| Station | Element | Day | Month | Year | MinValue |
|--------------------------------|---------|-----|-------|------|----------|
| NAROK METEOROLOGICAL STATION | TMPMAX | 13 | 7 | 1997 | 11.9 |
| NAROK METEOROLOGICAL STATION | TMPMIN | 4 | 1 | 1999 | 7.3 |
| MERU METEOROLOGICAL STATION | TMPMAX | 19 | 7 | 1996 | 10.1 |
| MERU METEOROLOGICAL STATION | TMPMIN | 24 | 8 | 2001 | 6.8 |
| EMBU METEOROLOGICAL STATION | TMPMAX | 9 | 8 | 2010 | 11.1 |
| EMBU METEOROLOGICAL STATION | TMPMIN | 29 | 8 | 1992 | 8.7 |
| ELDORET METEOROLOGICAL STATION | TMPMAX | 29 | 2 | 1988 | 3.1 |
| ELDORET METEOROLOGICAL STATION | TMPMIN | 5 | 1 | 2000 | 2.1 |

Figure 76(d): Extreme Minimum Values and Date of Occurrence

10.2 Data Products for Other Applications

10.2.1 Data for CPT



| STN | 67965050 | 67991020 | 67755030 |
|----------|----------|----------|----------|
| 67775050 | 67774010 | | |
| LAT | -20.02 | -22.22 | -17.62 |
| LON | 28.62 | 30.00 | 27.33 |
| 1961 | -999.0 | -999.0 | -999.0 |
| 1962 | -999.0 | -999.0 | -999.0 |
| 1963 | -999.0 | -999.0 | -999.0 |
| 1964 | -999.0 | -999.0 | -999.0 |
| 1965 | -999.0 | -999.0 | -999.0 |
| 1966 | -999.0 | -999.0 | -999.0 |
| 1967 | -999.0 | -999.0 | -999.0 |
| 1968 | -999.0 | -999.0 | -999.0 |
| 1969 | -999.0 | -999.0 | -999.0 |

Figure 77: Output data for CPT

10.2.2 Data for GEOCLIM

| Country | Name | Source | Latitude | Longitude | Elevation | ID | Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|----------|------------------|--------|----------|-----------|-----------|----------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Zimbabwe | HARARE BELVEDERE | -999 | -17.83 | 31.02 | 1471 | 67774010 | 1961 | 25.31 | 25.94 | 26.77 | 26.80 | 26.40 | 22.51 | 21.43 | 22.49 | 27.60 | 30.46 | 25.66 | 27.31 |
| Zimbabwe | HARARE BELVEDERE | -999 | -17.83 | 31.02 | 1471 | 67774010 | 1962 | 26.14 | 26.77 | 26.27 | 25.52 | 22.39 | 24.02 | 21.83 | 24.79 | 27.79 | 30.57 | 27.33 | 24.04 |
| Zimbabwe | HARARE BELVEDERE | -999 | -17.83 | 31.02 | 1471 | 67774010 | 1963 | 25.94 | 23.64 | 25.39 | 24.14 | 22.19 | 21.10 | 22.41 | 24.26 | 27.07 | 28.96 | 27.48 | 25.92 |
| Zimbabwe | HARARE BELVEDERE | -999 | -17.83 | 31.02 | 1471 | 67774010 | 1964 | 25.76 | 26.68 | 28.68 | 26.94 | 23.06 | 21.72 | 20.16 | 23.20 | 26.81 | 29.29 | 27.44 | 25.19 |
| Zimbabwe | HARARE BELVEDERE | -999 | -17.83 | 31.02 | 1471 | 67774010 | 1965 | 24.92 | 26.68 | 26.06 | 26.12 | 23.02 | 22.00 | 22.01 | 24.22 | 25.38 | 26.75 | 27.07 | 27.29 |
| Zimbabwe | HARARE BELVEDERE | -999 | -17.83 | 31.02 | 1471 | 67774010 | 1966 | 27.25 | 25.21 | 25.68 | 24.60 | 23.78 | 21.24 | 21.95 | 24.48 | 27.31 | 29.23 | 28.46 | 27.73 |
| Zimbabwe | HARARE BELVEDERE | -999 | -17.83 | 31.02 | 1471 | 67774010 | 1967 | 25.72 | 25.70 | 25.64 | 26.51 | 23.55 | 21.87 | 19.96 | 22.42 | 25.95 | 28.93 | 28.11 | 27.01 |
| Zimbabwe | HARARE BELVEDERE | -999 | -17.83 | 31.02 | 1471 | 67774010 | 1968 | 28.32 | 25.96 | 27.03 | 25.79 | 24.45 | 21.15 | 22.91 | 25.46 | 27.62 | 30.86 | 25.15 | 26.22 |
| Zimbabwe | HARARE BELVEDERE | -999 | -17.83 | 31.02 | 1471 | 67774010 | 1969 | 25.94 | 27.34 | 25.55 | 25.97 | 23.18 | 22.35 | 21.62 | 23.72 | 27.39 | 27.98 | 28.39 | 24.68 |
| Zimbabwe | HARARE BELVEDERE | -999 | -17.83 | 31.02 | 1471 | 67774010 | 1970 | 27.07 | 26.74 | 27.35 | 25.56 | 25.36 | 21.72 | 23.13 | 24.93 | 29.06 | 29.25 | 26.93 | 26.88 |

Figure 78: Output data for GEOCLIM

10.2.3 Data for Instat

| 1 | Y1961 | Y1962 | Y1963 | Y1964 | Y1965 | Y1966 | Y1967 | Y1968 | Y1969 | Y1970 |
|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 41 | 35.8 | 0 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0 | 2.3 |
| 42 | 0 | 3.6 | 8.1 | 0 | 0 | 1.8 | 15.5 | 14.2 | 0 | 0 |
| 43 | 7.9 | 6.4 | 19.6 | 6.4 | 0 | 5.3 | 19.6 | 4.3 | 0 | 0 |
| 44 | 3.6 | 4.3 | 53.8 | 7.4 | 1.5 | 5.3 | 9.7 | 6.4 | 0 | 0 |
| 45 | 0 | 0 | 9.4 | 3 | 12.4 | 8.6 | 22.9 | 4.6 | 1.3 | 0 |
| 46 | 63.2 | 24.4 | 11.7 | 0 | 3 | 0 | 3.6 | 4.8 | 18.3 | 0 |
| 47 | 11.7 | 12.4 | 8.9 | 46.5 | 0 | 0 | 49.3 | 2 | 7.1 | 0.3 |
| 48 | 0 | 2.3 | 102.1 | 2.3 | 0 | 1 | 1 | 1 | 0 | 3 |
| 49 | 0 | 1.3 | 3.8 | 0 | 0.5 | 0 | 0 | 27.2 | 0 | 10.7 |
| 50 | 0 | 12.7 | 0 | 0 | 1.8 | 3.6 | 0 | 0 | 0 | 0 |
| 51 | 0 | 0 | 0.5 | 58.4 | 0 | 57.2 | 1 | 0 | 1 | 0 |
| 52 | 0 | 1 | 18.8 | 1 | 0 | 10.9 | 0 | 0 | 0 | 0 |
| 53 | 0 | 1.5 | 15.5 | 0 | 0 | 7.4 | 0 | 0 | 3.3 | 0 |
| 54 | 2 | 5.8 | 0.3 | 0 | 0 | 15 | 0 | 0 | 5.1 | 0 |
| 55 | 26.2 | 0 | 0.8 | 0 | 0 | 10.9 | 0.3 | 0 | 0 | 0 |
| 56 | 0.5 | 7.9 | 3.8 | 0 | 0 | 1.8 | 0.3 | 0 | 0 | 6.1 |
| 57 | 1 | 0 | 24.4 | 0 | 0 | 26.2 | 18 | 0 | 4.6 | 0.5 |
| 58 | 0 | 3 | 0.3 | 0 | 2.8 | 18 | 0.5 | 0 | 0 | 0.5 |
| 59 | 16.8 | 7.9 | 0.3 | 0 | 0 | 12.2 | 57.9 | 0 | 0 | 0.5 |
| 60 | 8.9 | 0 | 0 | 0 | 0 | 6.1 | 34.8 | 0.3 | 0 | 0 |
| 61 | 9988 | 9988 | 9988 | 0 | 9988 | 9988 | 9988 | 0 | 9988 | 9988 |

Figure 79: Output data for Instat

10.2.4 Data for Rclimindex

67774010_Rclimindex.txt - Notepad

| File | Edit | Format | View | Help | |
|------|------|--------|-------|-------|-------|
| 1962 | 1 | 1 | 1.50 | 27.90 | 16.10 |
| 1962 | 1 | 2 | 0.00 | 26.70 | 16.20 |
| 1962 | 1 | 3 | 0.00 | 27.90 | 13.10 |
| 1962 | 1 | 4 | 0.00 | 28.40 | 12.80 |
| 1962 | 1 | 5 | 0.00 | 29.60 | 14.00 |
| 1962 | 1 | 6 | 0.00 | 29.20 | 15.50 |
| 1962 | 1 | 7 | 0.50 | 28.40 | 15.20 |
| 1962 | 1 | 8 | 5.30 | 28.40 | 17.00 |
| 1962 | 1 | 9 | 0.00 | 28.70 | 16.10 |
| 1962 | 1 | 10 | 30.20 | 27.20 | 16.30 |
| 1962 | 1 | 11 | 31.20 | 27.40 | 16.00 |
| 1962 | 1 | 12 | 9.10 | 25.10 | 16.20 |
| 1962 | 1 | 13 | 33.30 | 23.10 | 16.30 |
| 1962 | 1 | 14 | 15.70 | 23.60 | 16.30 |
| 1962 | 1 | 15 | 2.50 | 25.50 | 15.80 |
| 1962 | 1 | 16 | 2.30 | 26.80 | 17.80 |
| 1962 | 1 | 17 | 6.10 | 23.20 | 16.10 |
| 1962 | 1 | 18 | 0.80 | 25.70 | 16.30 |
| 1962 | 1 | 19 | 0.00 | 27.40 | 17.40 |
| 1962 | 1 | 20 | 3.80 | 29.10 | 16.90 |
| 1962 | 1 | 21 | 0.00 | 27.50 | 16.40 |
| 1962 | 1 | 22 | 0.80 | 24.00 | 14.40 |
| 1962 | 1 | 23 | 1.30 | 22.70 | 13.90 |
| 1962 | 1 | 24 | 13.00 | 21.40 | 15.70 |
| 1962 | 1 | 25 | 3.60 | 25.30 | 15.90 |
| 1962 | 1 | 26 | 11.90 | 25.30 | 16.70 |
| 1962 | 1 | 27 | 17.50 | 26.20 | 15.70 |
| 1962 | 1 | 28 | 2.30 | 22.30 | 16.30 |
| 1962 | 1 | 29 | 1.00 | 23.80 | 14.70 |
| 1962 | 1 | 30 | 1.80 | 25.10 | 15.40 |
| 1962 | 1 | 31 | 0.00 | 27.30 | 17.10 |

Figure 80: Output data for Rclimindex

10.3 Windrose Plot

Windrose is plotted after selecting **“Graphics”** from the list of climate products category shown in Figure 73 above;

The next step is to choose **“Windrose”** from the list, followed by the station. It is recommended that only one station is selected for each windrose plot. The system selects the wind speed and direction elements automatically. Specify the period range for the data to be used for the windrose plot.

Click **“Start Extraction”** to generate the windrose plot as shown in Figure 81.

Before the windrose picture is generated, a message pops up with the question, *“Is the wind data from AWS?”* This is because wind data from AWS has a different element code from that of manned station.

Climsoft uses a third party application called WRPLot to produce the windrose picture. This application is a free software but requires a licence that must be renewed annually.

It is important to check that WRPLot was installed as part of the Climsoft installation and the licence for the application was registered. If WRPlot has not yet been installed, it can be installed using the setup file and the first licence file available in the **“Bin”** subfolder of the Climsoft installation folder.

To renew the license visit the Lakes Environmental website at <https://www.weblakes.com/products/wrplot/registration.html>. Once you register your details and apply for the activation code, it will be sent to your email shortly.

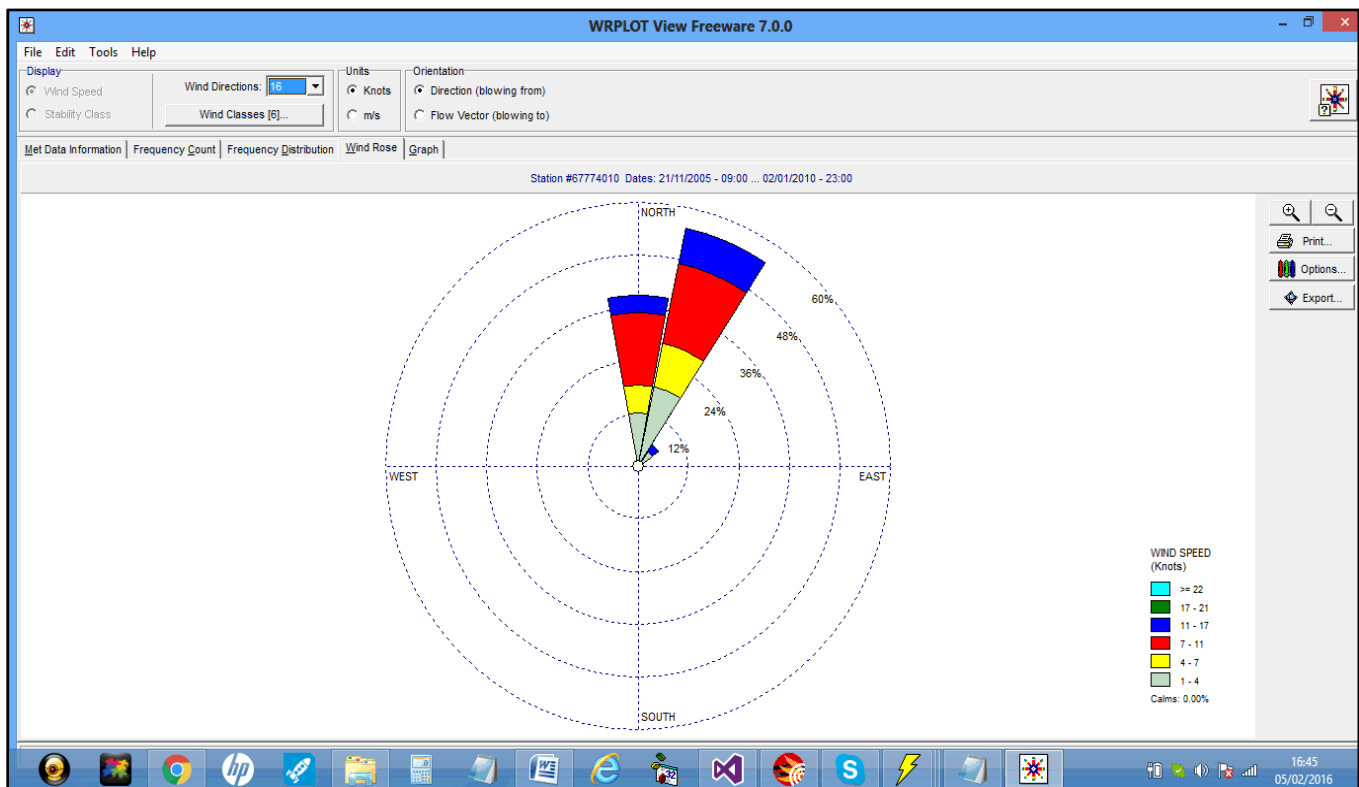


Figure 81: Windrose plot

10.4 Plotting Charts

Simple and basic charts can be plotted through the charts menu. There are two types of charts that can be produced namely, Time **Series** and **Histograms**.

The charts are produced through the same procedures used in other products. It is recommended that each chart be plotted for data from 1 station only.

After Extracting data required for the chart, a plotting dialog will be displayed from where the required chart details can be provided.

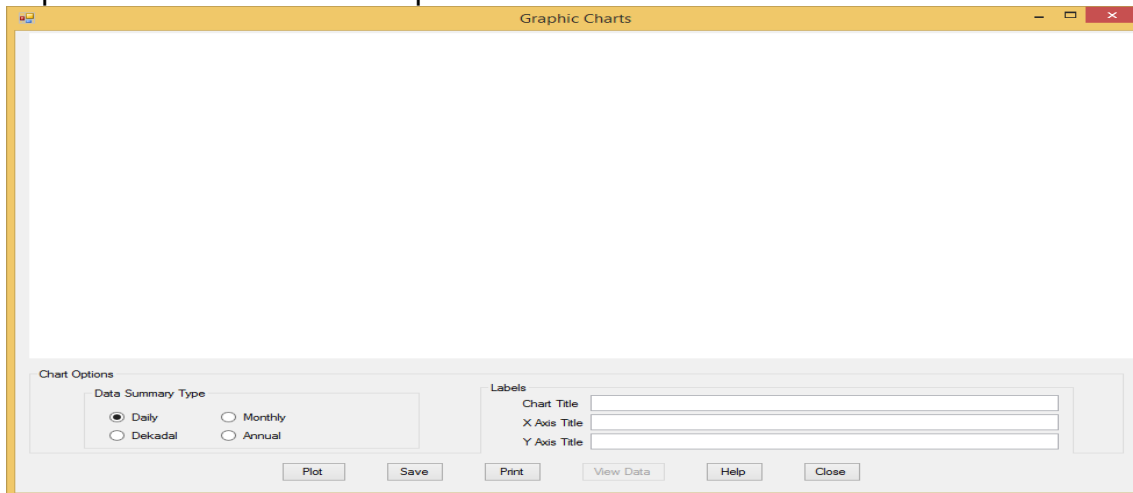


Figure 82: Charts Plotting Dialog

For example to plot a Histogram chart, for monthly temperatures (Tmax and Tmin) from Wilson Airport, Kenya for the year 1988 do the following:

- Select the option **Monthly**,
- Click the button **Plot** and obtain the chart below.
- The plotted chart can be formatted for **Labels**, **Colours** and **Axis Interval** values as shown in Figure 83.

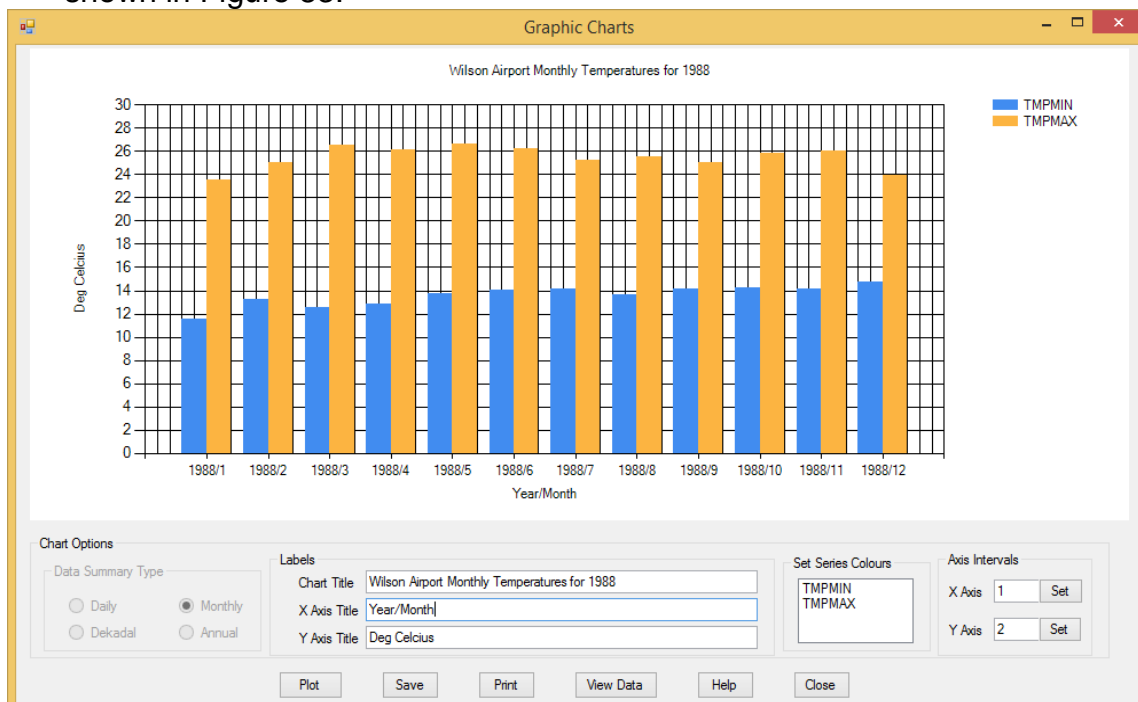


Figure 83: Temperatures Histograms

Similarly a Histogram chart for daily rainfall from Wilson Airport, Kenya for the period 2005-2014 can be plotted as below.

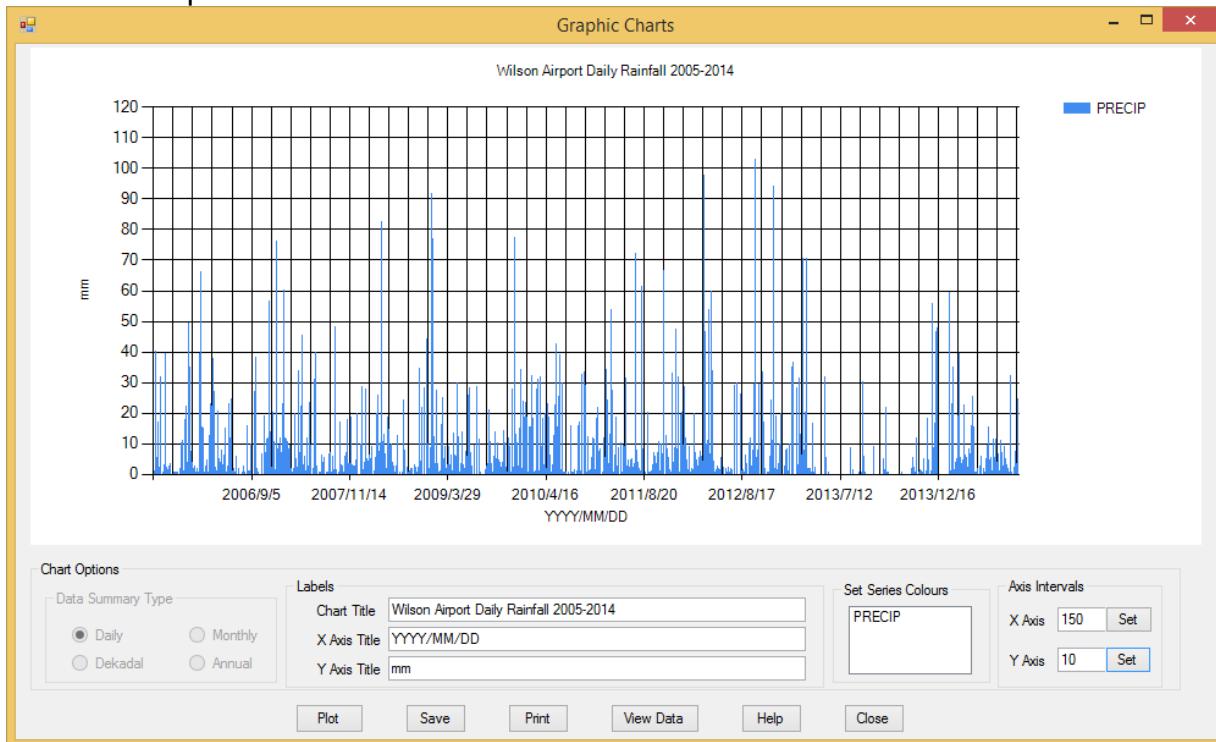


Figure 84: Rainfall Histogram

Managing the Chart dialog

In order to have a presentable chart that can be used in the intended purposes, the following formatting can be done:

Labels

Labels that clearly describe the chart should be typed in the correct boxes. They will appear on the chart area as the typing continuous;

Series colours

Clicking on any of the listed series names a colour palate dialog appears from where a suitable colour can be selected.

Axis Intervals

The suitable intervals for both X-Axis and Y-Axis should be entered into the appropriate boxes so that the data is clearly interpreted.

Commands

Save - Saves the chart picture as a file in the desired graphic format e.g., JPEG, PNG, WMF etc.

Print - Prints the chart picture through the default printer,

View data – Click to view and export the data used in plotting the chart

Help - Click to learn more about the current chart,

Close – Closes the dialog

10.5 Inventory Products

The inventory product retrieves details of the climatic elements that have been recorded at a particular station. When you click on the menu item **Products -> Inventory** or the icon **Climate Products -> Inventory** on the **Welcome** dialog, the following dialog is displayed:

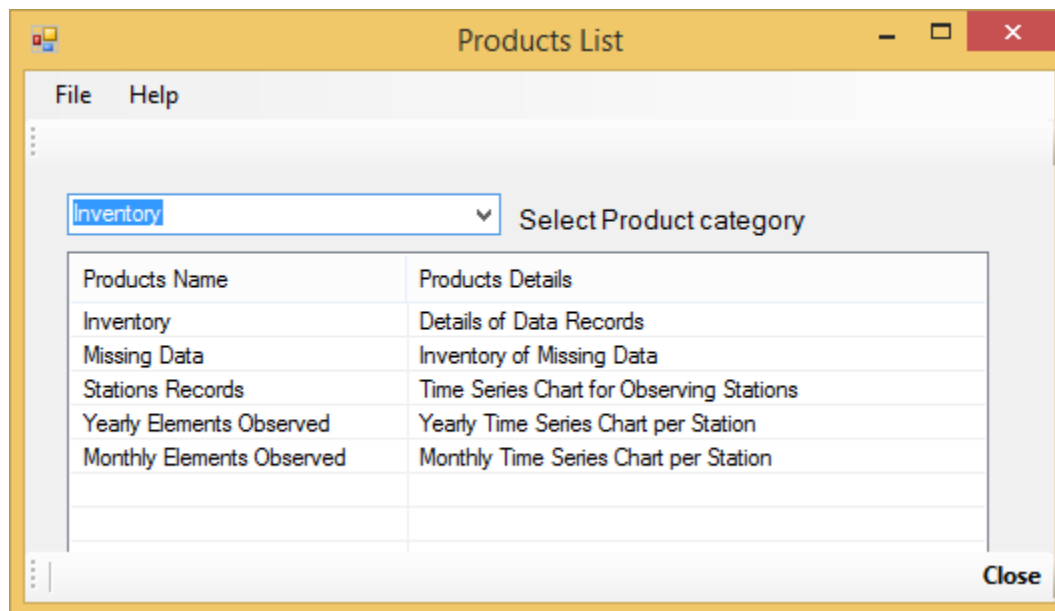


Figure 85: Inventory Products dialog

There are 5 types of outputs that can be obtained from the **Inventory** product. They are;

- (i) **Details of Data Records** - Gives a tabulated output where a missing observation is represented by **M** and available observation by **X**. The procedure searches the database for the appropriate information and produces an Excel Spreadsheet as shown in **Figure 87**.
- (ii) **Inventory of Missing Data** – Gives the total number of missing observation records for a selected parameter in a given period of time. The output is displayed in graphical form as shown in **Figure 87a**.
- (iii) **Time Series Chart for Observing Stations** – Produces a time series chart for yearly total stations whose data has been archived in the database as shown in **Figure 87b**.
- (iv) **Yearly Elements Observed** – Produces a time series chart for total observations per year for the selected elements from a given station. See **Figure 87c**
- (v) **Monthly Elements Observed** – Produces a time series chart for total observations per month for the selected elements from a given station. See **Figure 87d**.

To produce any of these inventories select the required station(s) and element(s) from their respective list boxes as shown in **Figure 87e**.

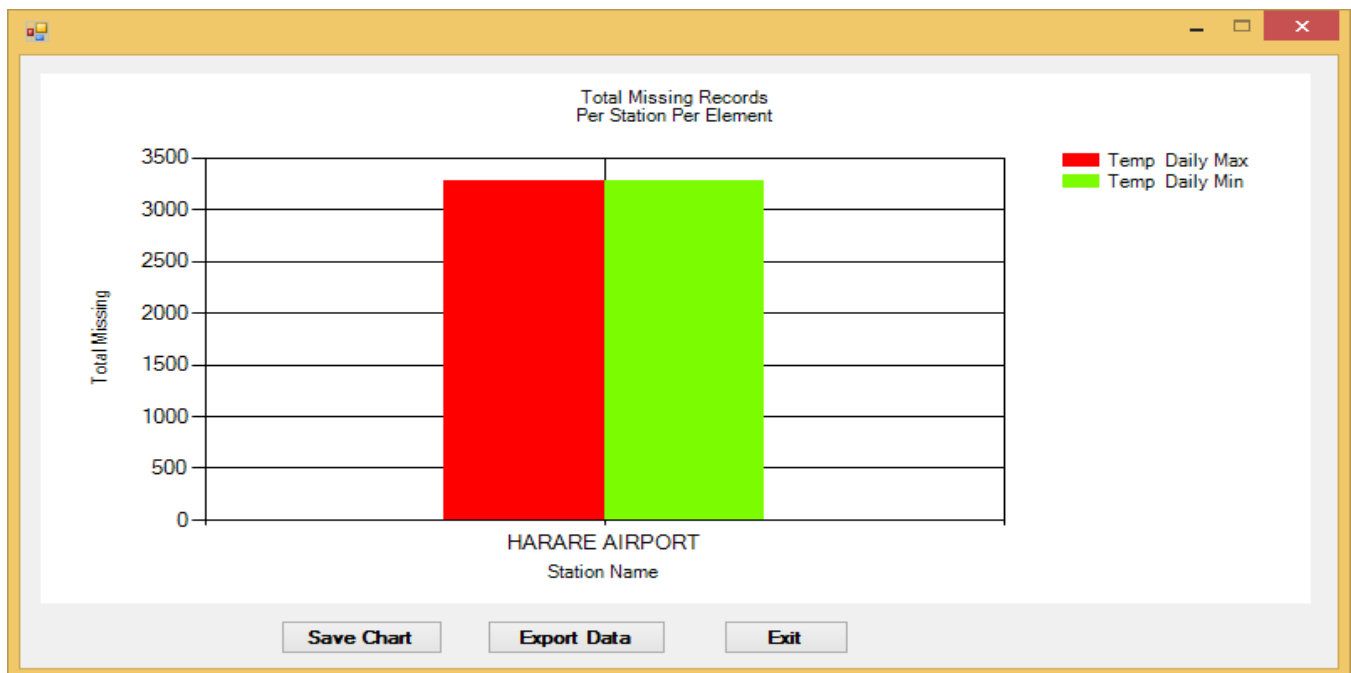


Figure 87a: Total missing data records

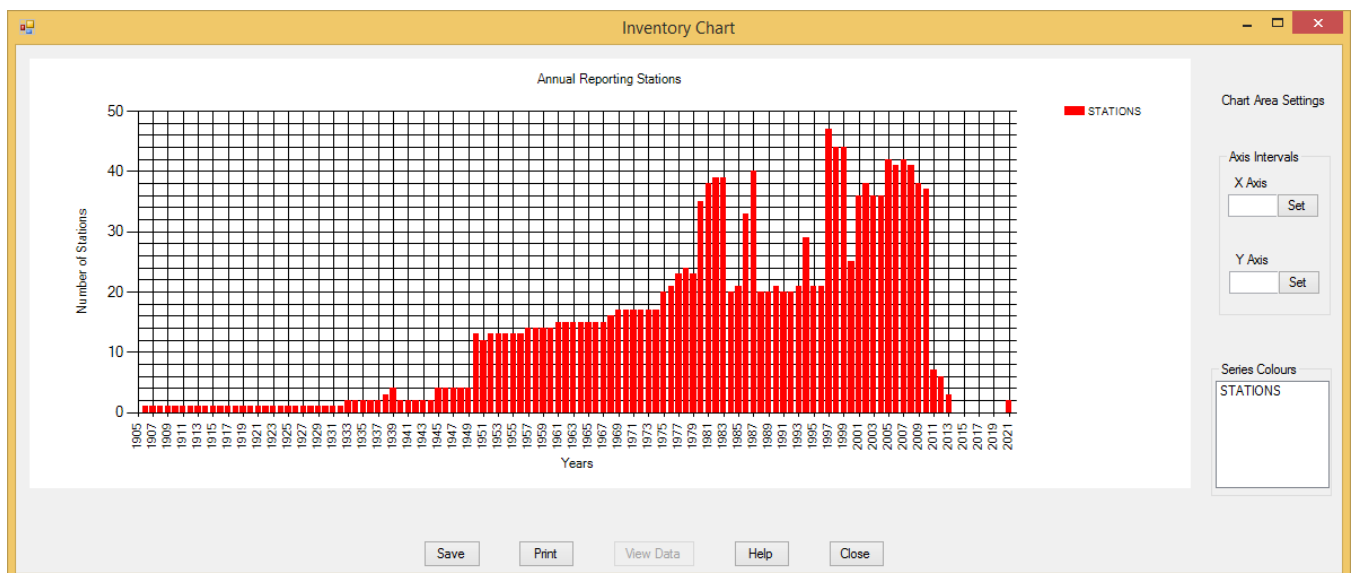


Figure 87b: Total annual reporting stations

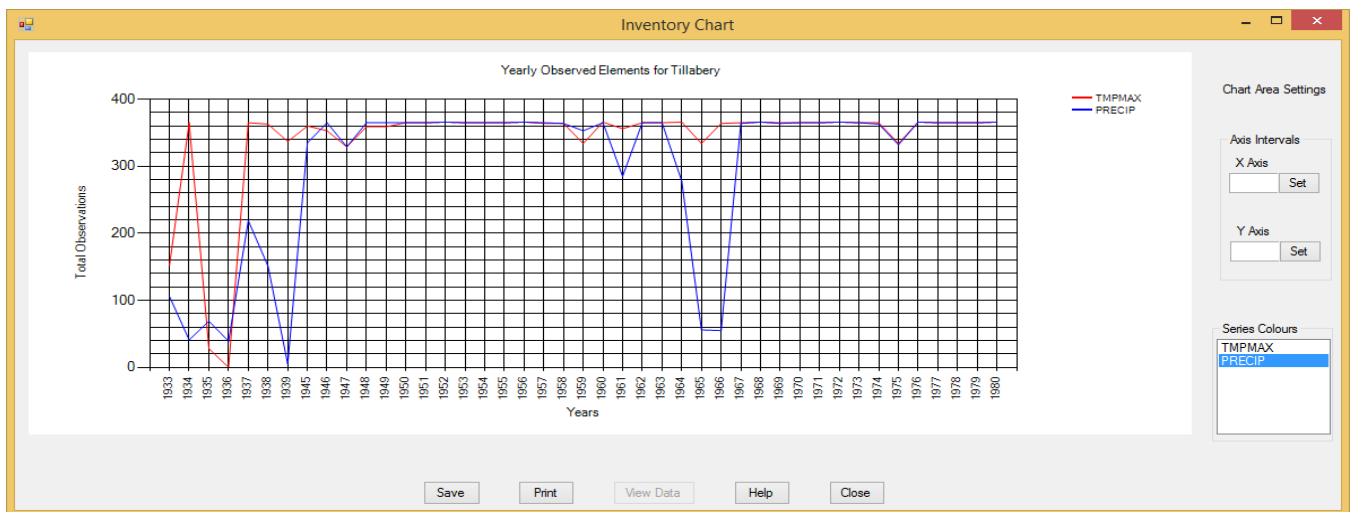


Figure 87c: Total annual observed station elements

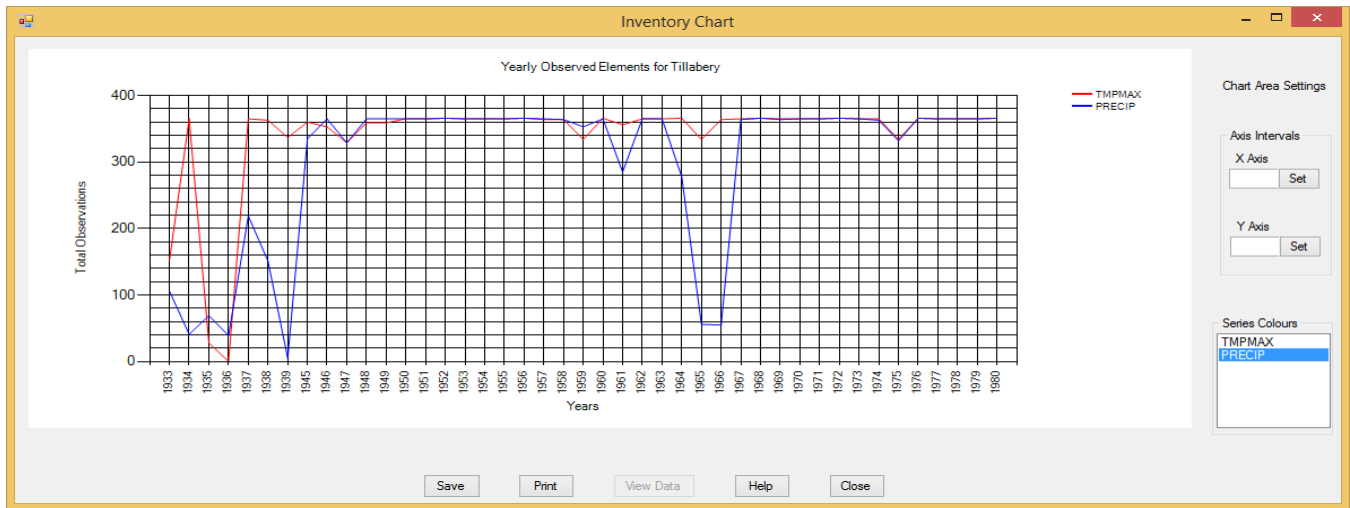


Figure 87d: Monthly observed station elements

10.6 Products from Upper Air Observations

Dialog for products from Upper Air observations is obtained as follows:

From the **Welcome** Dialog, click on the icon **Climate Products** or select **Products on the main menu** to obtain the products category dialog as shown in **Figure 73**. From the listed items Click on Upper Air to obtain the list of the available Upper Air data summaries as shown in **Figure 88**.

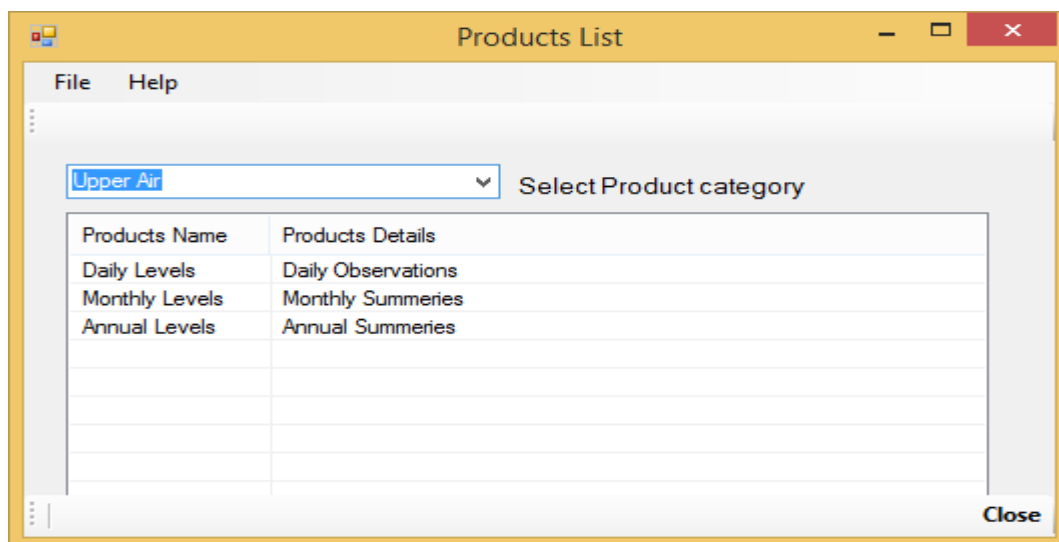


Figure 88: List of Upper Air data summaries

If any of listed products say **Monthly Levels** is selected (click) the following dialog is obtained.

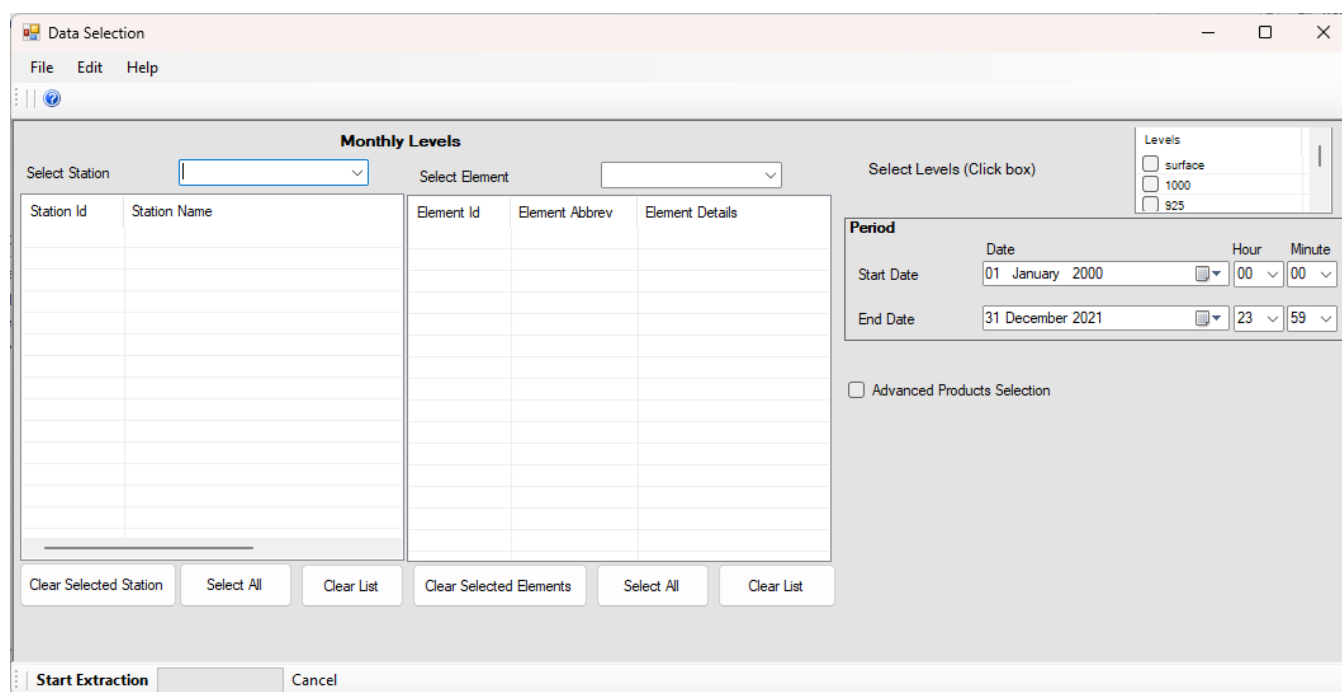


Figure 88a: Dialog for Monthly Upper Air data summaries

The dialog shown in **Figure 88a** is similar to those for surface observations but with an additional list of upper air standard pressure levels. Any number of levels may be selected as necessary.

Note that without selecting any Level no product will be obtained.

10.7 CLIMAT Messages

CLIMAT message can be encoded from quality controlled data that has been uploaded to the final table of Climsoft database.

Dialog for encoding CLIMAT messages is obtained as follows:

From the **Welcome** dialog follow the menu

Climate Products => Messages => CLIMAT. The dialog shown in Figure 88b is then obtained

Figure 88b: Dialog for encoding CLIMAT message

The dialog is used as follows:

- (i) **Select Stations** – Stations whose CLIMAT message is required should be selected from the drop down list by clicking one station at a time. A station can also be selected by entering its *station id* then pressing ENTER key. The selected stations will be listed in the view list. Note that only stations with WMO identifications will be available for selection.
- (ii) **CLIMAT message period** –When the dialog opens the period is set to the previous month of the current date. It is assumed that data for the previous month has been processed and ready for encoding. However, month for the required message should be correctly set.
- (iii) **Climate statistics base period**– *Begin Year* and *End Year* of the period with sufficient data to compute the climate statistics should be entered. A minimum of 30 years and the latest period defined by WMO is recommended. On Clicking **OK** button the statistics for the selected period will be computed and stored in the database. It's not necessary to compute them again unless base period has been updated.
- (iv) **Optional Sections** – If required any of these sections can be included in the message when selected. Note **Section 222** requires that sufficient data to compute normals for the specified base period is available.
- (v) **Command buttons**
 - i. **Encode CLIMAT** – Starts the encoding process according to the selections made.

- ii. **Clear** – Clears all the input including the produced CLIMAT message
- iii. **Close** – Closes the dialog
- iv. **Send** – Sends the the encoded message to the message switching server for GTS transmission.
- v. **Help** – Gives a guide on how to use the dialog
- vi. **Settings** – Opens the dialog through where the required settings for CLIMAT message encoding are done. Only users with administrative privileges can open and operate the Settings dialog
- (vi) **CLIMAT Message File** – Encoded CLIMAT message will be saved in the indicated file. It's a text file that can be sent via email as an attachment or its text copied and pasted into the message body of and email.
- (vii) **CLIMAT message encoding settings** – The Settings button opens the Settings dialog as shown in **Figure 88c**. The dialog has two tabs; **Parameter** and **FTP** for setting the element codes for data used in CLIMAT encoding and details of the server where the mesage will be sent respectively. The dialogs for these settings are easy to follow

| | Nos | Element_Name | Element_Abbreviation | Element_Code | Bufr_Element | unit |
|---|-----|-----------------------------------|----------------------|--------------|--------------|--------|
| ▶ | 1 | Pressure at station | PRESST | 884 | 010004 | hpa |
| | 2 | Pressure MSL | PRESSL | 891 | 010051 | hpa |
| | 3 | Geopotential height daily average | GPM | 478 | 010009 | gpm |
| | 4 | Temperature daily mean | TMPMN | 881 | 012101 | dec 'c |
| | 5 | Temperature daily maximum | TMPMAX | 2 | 012111 | dec 'c |
| | 6 | Temperature daily minimum | TMPMIN | 3 | 012112 | dec 'c |
| | 7 | Vapour Pressure | VAPPSR | 166 | 013004 | hPa |
| | 8 | Daily precipitation | PRECIP | 892 | 013023 | mm |
| | 9 | Sunshine hours daily total | SUNSHN | 84 | 014031 | hrs |
| | 10 | Snow depth daily total | SNWDEP | 50 | 013013 | mm |
| | 11 | Wind speed daily average | WNDSPD | 111 | 011002 | m/s |
| | 12 | Visibility horizontal distance | VISBY | 110 | 020001 | m |
| | 13 | Thunder daily occurence | DYTHND | 30 | 008052 | code |
| | 14 | Hail daily occurence | DYHAIL | 31 | 008052 | code |

Figure 88c: CLIMAT message Parameters (elements) settings

Message Headers Details

Header (T1T2A1A2i CCCC) UTC Time Difference

Message Server Details

Server Address/Name

FTP Mode

Input Folder

User Name

Password

Confirm Password

Figure 88d: CLIMAT message FTP settings

11. AWS Real Time Data Operations

This operation starts from the **Welcome** form dialog. Click the icon **AWS Real Time Processing** to obtain the main dialog for Real Time Automatic Weather Station (AWS) data operations (Figure 89).

The screenshot shows the 'AWS Real Time' application window. On the left is a sidebar with buttons: 'Processing' (highlighted), 'Servers', 'Sites', 'Data Structures', 'Encoding Options', 'Help', and 'Close'. The main content area is divided into three main sections: 'Settings', 'Processing Information', and 'Processing Status'.
The 'Settings' section at the top has a 'Restart' radio button and a selected 'Stop' radio button. Below are input fields: 'Retrieval Interval (Minutes)' set to 60, 'Hour Offset (Minutes)' set to 10, 'Retrieve Last' set to 999 Hours, 'Encode Last' set to 4 Hours, and 'Timeout Period (Seconds)' set to 999. There is a checkbox 'Delete Input File After Processing' which is unchecked, and a 'Save Changes' button.
The 'Processing Information' section is split into two columns: 'Input' and 'Output'. Each column has fields for 'FTP Server' and 'Folder', and a list box for 'Input Files' (under Input) and 'Message Files' (under Output).
The 'Processing Status' section on the right shows 'Current Date Time' as 06/03/2025 00:10:32. It has fields for 'Last Processed' and 'Next Processing'. The 'Status' is displayed as 'Stopped'.
At the bottom of the main area is a large text box labeled 'Error Messages'.

Figure 89: AWS real time processing settings dialog

Follow the steps below to configure Climsoft for automatic processing AWS data.

11.1 Server Settings

Click the command “**Servers**” then **Base Station** tab to obtain dialog shown in Figure 90.

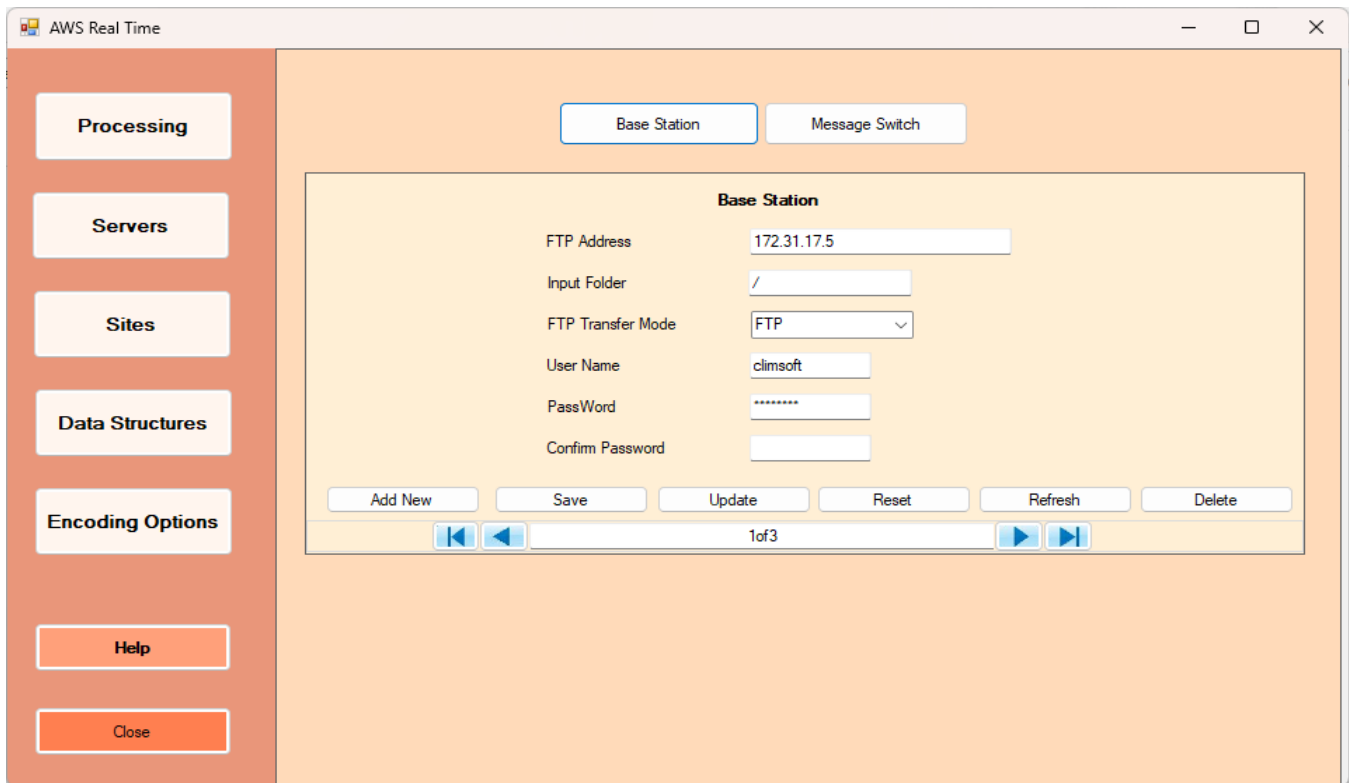


Figure 90: AWS server settings

These settings are for the servers that play the roles of **AWS base station** and **message switching system** that connects to the Global Telecommunication System (GTS). The commands “**Base Station**” and “**Message Switching**” are used to switch between the two server settings. Details required should be obtained from the respective servers’ administrators and then entered. Multiple servers can be configured where AWS sites are connected to different base station servers.

Click **Save** to effect the changes.

The details should be entered as follows;

FTP Server Address – The FTP address e.g. **40.73.196.133** or the server network name;

Input Folder:

This is the subfolder in the FTP home directory of the server where data are located in the case of the **AWS base station** or where it will be copied to in the **message switching system**. If the subfolder is not in the root, the relative path should be indicated in according to the operating system rules. For example; **AWS\input** in windows and **AWS/input** in Unix/Linux;

FTP Data Transfer Mode

This is the login method allowed for data transfer by the target server. MS Windows based servers allow use of FTP. Some Linux based servers prefer the use of more secure data transfer methods such as SFTP. The method indicated by the target server should be entered here;

User Name – Login name used to logon into the server,

Password – Password for the user name provided,

Confirm Password – The entered password to be confirmed. The Password is not saved until correctly confirmed.

11.2 Sites Settings

The stations whose data is to be processed are configured as follows;

- Click the command **Sites** to give the dialog in Figure 91,

The screenshot shows the 'AWS Real Time' application window. On the left is a sidebar with buttons: 'Processing', 'Servers', 'Sites' (highlighted), 'Data Structures', 'Encoding Options', 'Help', and 'Close'. The main window displays the 'Sites' configuration form. Fields include: 'Site ID' (4423107), 'Site Name' (Atsimo-Andrefana Betioky PULSONIC), 'Input Data file' (MG/pulsonicreplicatorcsv/data/MG_E), 'Data Structure' (aws_mg_pulsonic), 'Missing Data Flag' (-999), 'AWS Server IP' (localhost), 'GTS Msg Header' (empty), 'Operational' (checked), and 'Encode for GTS' (unchecked). There are also checkboxes for 'Files name prefix' and 'Adjust Archival Hours (+/-)' with a value of 2. At the bottom are buttons: 'AddNew', 'Save', 'Update', 'Delete', and 'View/Update'. A status bar at the bottom shows '12of115'.

Figure 91: AWS server settings

Site details:

- Site ID or Name** as provided by the Met Service or obtained from **WMO Vol A** if already listed there,
- Input Data file** is the name of text file in the AWS base station containing data for the station listed in that current record. It should be ensured that the name matches the station's AWS data file,
- Files name prefix** if the data is in multiple files with a common prefix, the box before the "File name prefix" should be checked and the prefix filled in the text box. Otherwise, this should not be checked.

In some special cases where filenames have date components, a date structured *file name prefix* may be used to select files with observations for a day, month or year. For instance for a date structured filename such as **000001202008290000.txt** the prefix will be entered as follows:

yyyymmdd – To select all files for the current day's observations

yyyymm – To select all files for the current month's observations

yyyy – To select all files for the current year's observations

For a filename such as **000001-2020-08-29-00-00.txt** the prefix will be entered as follows:

yyyy-mm-dd – To select all files for the current day's observations

yyyy-mm – To select all files for the current month's observations

yyyy – To select all files for the current year's observations

- **Data Structure** is the name of the structure for the data output file in the AWS base station server. This is created by the user and should correspond to the data being transferred. Details on how to undertake this task are listed in Section **11.3.2**,
- **Missing Data Flag** is the value that represents missing data from the specified AWS server. This value will be obtained from files in the base station server;
- **AWS Server IP** is the IP address or host name of the server;
- **GTS Msg Header** is the Global Telecommunication System message header (e.g. HKNC for Nairobi) in case AWS Data are meant for sharing with others countries through the regional or global centres,
- **Operational** if a site has been created in the Climsoft database but has no operational AWS installed the box **Operational** should be unchecked,
- **Encode for GTS** if a site has been created in the Climsoft database but does not send AWS to GTS, the box **Encode for GTS** should be unchecked.

Commands:

- To create new station in the database click **Add New**, enter all the details then click **Refresh**,
- **Update** is used to save changes made on the details of an existing station,
- **Delete** is used to remove the current station from the database,
- **View/Update** enables viewing the sites in a table view. Editing can be done from there.

11.3 Data Structure Settings

Click the command **Data Structures** to obtain the dialog for updating or adding new AWS data structures used by Climsoft.

Select any of the existing data structures e.g. *aws_toa5_mg2* from the list box. Details of that structure are displayed as shown in Figure 92. Any desired changes will be done on the table. The changes made will be saved automatically.

| Cols | Element_Abbreviati | Element_Name | Element_Details | Climsoft_Element | Bufr_Element | unit |
|------|--------------------|-----------------|----------------------|------------------|--------------|------|
| 1 | Date/time | Date/time | Date and time | | | |
| 2 | RECORD | RECORD | Record number | | | |
| 3 | AirTemp_1m | AirTemp_1m | Air Temperature ... | 881 | 012103 | °C |
| 4 | AirTemp_1m_Err | AirTemp_1m_Err | Air Temperature ... | | | |
| 5 | TEMP_MAX_24... | TEMP_MAX_24... | TEMP MAX for 2... | 882 | 012111 | °C |
| 6 | TEMP_MAX_24... | TEMP_MAX_24... | TEMP MAX for 2... | | | |
| 7 | TEMP_MAX_24... | TEMP_MAX_24... | TEMP MAX for 2... | | | |
| 8 | TEMP_MIN_24HR | TEMP_MIN_24HR | TEMP MIN for 24... | 883 | 012112 | °C |
| 9 | TEMP_MIN_24H... | TEMP_MIN_24H... | TEMP MIN for 24... | | | |
| 10 | TEMP_MIN_24H... | TEMP_MIN_24H... | TEMP MIN for 24... | | | |
| 11 | DB_1m | DB_1m | Dry bulb, 1 minut... | | | |
| 12 | DB_1m_Err | DB_1m_Err | Binary Quality Flags | | | |
| 13 | DB2_1m | DB2_1m | DB2_1m | | | |

Figure 92: AWS data structure settings

To carry out the task of data structure settings, basic skills in BUFR and Climsoft elements are necessary. Configuration of the data structure is done as follows;

11.4 Updating existing structures

Changes can be made as may be desired. Real time processing of AWS data is based on structure of the data.

This includes;

- (iv) **Updating Bufr_Element** – Only those elements whose BUFR element descriptors are entered will be encoded into BUFR messages. In case a new sensor is added and new observation started, its BUFR descriptor should be included. BUFR descriptors can be found in **WMO BUFR Table B**,
- (v) **Updating Climsoft_Element** – If an observation from any AWS element requires to be archived in Climsoft database, its Climsoft element code should be included. Climsoft element codes are contained in **obselement** table in the Climsoft database,
- (vi) **Adding observation elements (record)**

To add a new element (a new sensor may be installed or activated) in the same structure, scroll on the table to the end of list and enter the details in the blank record. The values will be saved automatically,

- (vii) **Delete Record**

Select the record by clicking at the left most cell of the record. It will become highlighted. Then press **Delete** key on the keyboard. The record will be deleted without any warning.

- (ix) **Structure Name, Delimiter Type, Total Header Rows** and **Text Qualifier Character** may also be updated where necessary. In this case click **Update** to save changes.

11.5 Creating a new structure

Data from different AWS sites may come with different file structures. All the different data structures should be created in Climsoft and allocated a name so that the received data is correctly mapped in the database. After studying the structure of a data file from a given site it is easy to create its structure in Climsoft as follows;

Study and understand the new AWS input text file. Suggest an appropriate name for the new structure then enter the details in the text boxes in **Figure 93** as follows;

- (xi) **Structure Name** – Name under which the structure will be known,
- (xii) **Delimiter Type** – The character that separates data values e.g., Tab, comma etc. Select from the list,
- (xiii) **Total Header Rows** – The number of header rows above the observation values,
- (xiv) **Text Qualifier Character** – Where a character is used to qualify text values e.g. “”, then it should be entered here.

Click the command button **Create**. A table is then displayed as shown in **Figure 90a**, from where details for the data columns in the AWS input file can be entered.

| | Cols | Element_abbreviati | Element_Name | Element_Details | Climsoft_Element | Bufr_Element | unit |
|---|------|--------------------|--------------|-----------------|------------------|--------------|------|
| * | | | | | | | |

Figure 93a: Dialog for creating a data structure

Enter the necessary details in the table. Details of each data column in the input file should be entered as a record (row) in the table. The first column should have value 1 in field **Cols**. All the details of the data should be entered in the different fields of that record (row). The next row should similarly start with value 2 in the field **Cols**. This procedure is followed until each column

of the data from the output text file is described in this table. Information required in each record is as follows;

- **Cols** - Position (1,2...) of the column (from the left side) describing the data in the file,
- **Element_abbreviation** – Abbreviation for the name describing data in the column.

Users are free to use any abbreviation that conveniently describes the data except for the column with date and time values. The following abbreviations **SHOULD** be strictly used while abbreviating the date and time in the circumstances described below;

Date/time - Date and time are in one column e.g. *21/03/2000 12:30:00*

Date - Date is in a column of its own e.g. *21/03/2000*.

Time - Time is in different column from Date e.g. *12:30:00*

yyyy - Year is in a column of its own e.g. *2000*

mm - Month is in a column of its own e.g. *03*

dd - Day is in a column of its own e.g. *21*

hh - Hour is in a column of its own e.g. *12*

nn - Minute is in a column of its own e.g. *30*

ss - Second is in a column of its own e.g. *00*

yyyymmddhhnnss - Date and time has this structure e.g. *20000321123000*

ddmmyyyyhhnnss - Date and time has this structure e.g. *21032000123000*

- **Element Name** – An appropriate name should be entered,
- **Climsoft_Element** and **Bufr_Element** to correspond with the Climsoft and BUFR Element codes as described in their manuals respectively. Where no value is put in these fields, data in the affected column will not be processed for Climsoft archival or TDCF encoding accordingly.
- **Unit** – This is the unit of measurement of the values in the column. If the unit cannot be determined, it is left blank,
- **Lower_Limit** and **Upper_Limit** – These values are used for Quality Control purposes so that Climsoft can flag outlier values for confirmation at a later time,
- **Obsv** – Nothing to be entered in this field. It is used by Climsoft when processing the observation data.

Figure 93b shows data from an AWS text output file whose format is CSV with the character “ , as the text data qualifier.

```

"TIMESTAMP","RECORD","WS_1m","WS_1m_Err","WD_1m","WD_1m_Err","WS_2m","WS_2m_Err","WD_2m","WD_2m_Err","WS_10m","WS_10m_Err"
1/9/2015 00:00:00,180925,0,1024,0,1024,0,1024,0,1024,0,1024,0,1024,0,1/1/1990 00:00:00,0,0,1/1/1990 00:00:00,0,0,1/1/1990
1/9/2015 01:00:00,180985,0,1024,0,1024,0,1024,0,1024,0,1024,0,1024,0,1/1/1990 00:00:00,0,0,1/1/1990 00:00:00,0,0,1/1/1990
1/9/2015 02:00:00,181045,0,1024,0,1024,0,1024,0,1024,0,1024,0,1024,0,1/1/1990 00:00:00,0,0,1/1/1990 00:00:00,0,0,1/1/1990
1/9/2015 03:01:00,181106,0,1024,0,1024,0,1024,0,1024,0,1024,0,1024,0,1/1/1990 00:00:00,0,0,1/1/1990 00:00:00,0,0,1/1/1990
1/9/2015 04:00:00,181165,0,1024,0,1024,0,1024,0,1024,0,1024,0,1024,0,1/1/1990 00:00:00,0,0,1/1/1990 00:00:00,0,0,1/1/1990
1/9/2015 05:00:00,181225,0,1024,0,1024,0,1024,0,1024,0,1024,0,1024,0,1/1/1990 00:00:00,0,0,1/1/1990 00:00:00,0,0,1/1/1990
1/9/2015 06:00:00,181285,0,1024,0,1024,0,1024,0,1024,0,1024,0,1024,0,1/1/1990 00:00:00,0,0,1/1/1990 00:00:00,0,0,1/1/1990
1/9/2015 07:00:00,181345,0,1024,0,1024,0,1024,0,1024,0,1024,0,1024,0,1/1/1990 00:00:00,0,0,1/1/1990 00:00:00,0,0,1/1/1990
1/9/2015 08:00:00,181405,0,1024,0,1024,0,1024,0,1024,0,1024,0,1024,0,1/1/1990 00:00:00,0,0,1/1/1990 00:00:00,0,0,1/1/1990
1/9/2015 09:00:00,181465,0,1024,0,1024,0,1024,0,1024,0,1024,0,1024,0,1/1/1990 00:00:00,0,0,1/1/1990 00:00:00,0,0,1/1/1990
1/9/2015 10:00:00,181525,0,1024,0,1024,0,1024,0,1024,0,1024,0,1024,0,1/1/1990 00:00:00,0,0,1/1/1990 00:00:00,0,0,1/1/1990
1/9/2015 10:59:00,181584,0,1024,0,1024,0,1024,0,1024,0,1024,0,1024,0,1/1/1990 00:00:00,0,0,1/1/1990 00:00:00,0,0,1/1/1990
1/9/2015 12:00:00,181645,0,1024,0,1024,0,1024,0,1024,0,1024,0,1024,0,1/1/1990 00:00:00,0,0,1/1/1990 00:00:00,0,0,1/1/1990
1/9/2015 13:00:00,181705,0,1024,0,1024,0,1024,0,1024,0,1024,0,1024,0,1/1/1990 00:00:00,0,0,1/1/1990 00:00:00,0,0,1/1/1990
1/9/2015 14:00:00,181765,0,1024,0,1024,0,1024,0,1024,0,1024,0,1024,0,1/1/1990 00:00:00,0,0,1/1/1990 00:00:00,0,0,1/1/1990
1/9/2015 15:00:00,181825,0,1024,0,1024,0,1024,0,1024,0,1024,0,1024,0,1/1/1990 00:00:00,0,0,1/1/1990 00:00:00,0,0,1/1/1990
1/9/2015 16:00:00,181885,0,1024,0,1024,0,1024,0,1024,0,1024,0,1024,0,1/1/1990 00:00:00,0,0,1/1/1990 00:00:00,0,0,1/1/1990
1/9/2015 17:00:00,181945,0,1024,0,1024,0,1024,0,1024,0,1024,0,1024,0,1/1/1990 00:00:00,0,0,1/1/1990 00:00:00,0,0,1/1/1990
1/9/2015 18:00:00,182005,0,1024,0,1024,0,1024,0,1024,0,1024,0,1024,0,1/1/1990 00:00:00,0,0,1/1/1990 00:00:00,0,0,1/1/1990
1/9/2015 19:00:00,182065,0,1024,0,1024,0,1024,0,1024,0,1024,0,1024,0,1/1/1990 00:00:00,0,0,1/1/1990 00:00:00,0,0,1/1/1990

```

Figure 93b: AWS Output Text File

11.6 Coding Settings

| Element | Name | Unit |
|---------|-------------------------|------------|
| 002176 | Method of state o... | Code table |
| 002177 | Method of snow ... | Code table |
| 002178 | Method of liquid ... | Code table |
| 002179 | Type of sky cond... | Code table |
| 002180 | Main present we... | Code table |
| 002181 | Supplementary pr... | Flag table |
| 002182 | Visibility measure... | Code table |
| 002183 | Cloud detection s... | Code table |
| 002184 | Type of lightning ... | Code table |
| 002185 | Method of evapo... | Code table |
| 002186 | Capability to dete... | Flag table |
| 002187 | Capability to dete... | Flag table |
| 002188 | Capability to dete... | Flag table |
| 002189 | Capability to discr... | Flag table |
| 008002 | Vertical significan... | Code table |
| 008010 | Surface qualifier (...) | Code table |
| 008021 | Time significance... | Code table |
| 008023 | First order statistics | Code table |
| 010002 | Characterization of | Code table |

Figure 94: Dialog for setting TDCF message parameters

The dialog in Figure 94 shows the settings required in BUFR message encoding. Most of the default values are automatically set at installation, but some are set by the user to meet the requirements for a particular NMHS. To undertake these settings knowledge of **Table Driven**

Code Forms (TDCF) is necessary. *WMO Manual on Codes* is the main reference used for setting up the values here.

11.7 Data Acquisition and Processing Dialog

The screenshot shows the 'AWS Real Time' dialog box. On the left is a sidebar with buttons: 'Processing' (highlighted), 'Servers', 'Sites', 'Data Structures', 'Encoding Options', 'Help', and 'Close'. The main panel is titled 'AWS Real Time' and contains three main sections:

- Settings:** Includes radio buttons for 'Restart' and 'Stop' (selected). Below are input fields: 'Retrieval Interval (Minutes)' (60), 'Hour Offset (Minutes)' (10), 'Retrieve Last' (999) Hours, 'Encode Last' (4) Hours, and 'Timeout Period (Seconds)' (999). There is a checkbox 'Delete Input File After Processing' and a 'Save Changes' button.
- Processing Information:** Divided into 'Input' and 'Output' sections. Each has fields for 'FTP Server' and 'Folder', and a large text area for 'Input Files' and 'Message Files' respectively.
- Processing Status:** Shows 'Current Date Time' as '06/03/2025 00:10:32', 'Last Processed', 'Next Processing', and 'Status' as 'Stopped'.

At the bottom of the main panel is an 'Error Messages' section with a large empty text area.

Figure 95: Dialog for Data Acquisition and processing

The AWS data processing is controlled from the dialog shown in **Figure 95** and the information on the processing status is displayed. Before the process is started it is important that the user understands the role of each control shown in the dialog. Details are as follows;

Controls Details

- **Settings:**
 - **Restart** – Starts/Restarts the processing schedule,
 - **Stop** – Stops the processing schedule,
 - **Retrieval Intervals** – The frequency in minutes at which data will be retrieved from AWS server and processed. Where encoding is required for Synoptic messages the interval will be entered as 180 minutes.
 - **Hour Offset** – Time delay in minutes to start encoding after the time set for data downloading from AWS data logger,
 - **Timeout Period** – The longest period in seconds that attempts to connect to the AWS server can be made before timing out the connection. If no time out period is desired a value of **999** should be entered. But in that case there is a risk of holding the process

indefinitely if connection is not achieved at all. If connection speed is the cause of the delay then a reasonable time out period should be entered e.g. 60 seconds.

- **Delete Input File After Processing** - When checked, the files containing AWS data, will be deleted from the base AWS server after processing,
- **GMT Diff +/-** – The time difference between GMT and the time for the AWS data. A positive difference may not require entering a + sign but a negative one is mandatory,
- **Save Changes** – Updates the changes made.
- **Processing information**
 - **Input FTP Server** - AWS Base station from where data is retrieved for processing,
 - **Input Files** – List of the retrieved AWS text files,
 - **Output FTP Server**– Message Switching System to where encoded messages have been sent,
 - **Output Folder** – Folder containing output files,
 - **Message Files** – List of the encoded and transmitted files.
- **Processing Status**
 - **Current Date and Time** – Computer clock time. It should always be correctly set,
 - **Retrieve last** – Hours of data to be retrieved for encoding at each encoding interval,
 - **Last Processed** – Date and time of the previous encoding process,
 - **Next Processing** – Date and Time of the next encoding process,
 - **Status** – The current activity.
- **Error Messages**

Errors encountered during processing are listed here together with their time of occurrence. They are also logged into a file named **aws_error** located in the subfolder **data** in the path “C:\ProgramData\Climsoft4”.

12. Paper Image Archiving

Images of scanned paper records can be archived in Climsoft and later retrieved when required. The operation starts by first creating the metadata for the paper image archives then the folder where the image files will be archived. The archived image files may occupy large amount of storage space hence it is necessary to choose a folder where sufficient space is available. The folder may reside in the local server or in a network connected server or Network Attached Storage (NAS). Where the archiving is done on network folder it is recommended that it be mapped as a drive on the local server for convenience of accessing the image files.

The procedures for creating paper archive metadata are as follows;

From the **Welcome** form click on the icon **Metadata Information** then on the tab **Paper Archive** in the **Metadata Information** dialog and subsequently obtain the dialog shown in **Figure 96**.

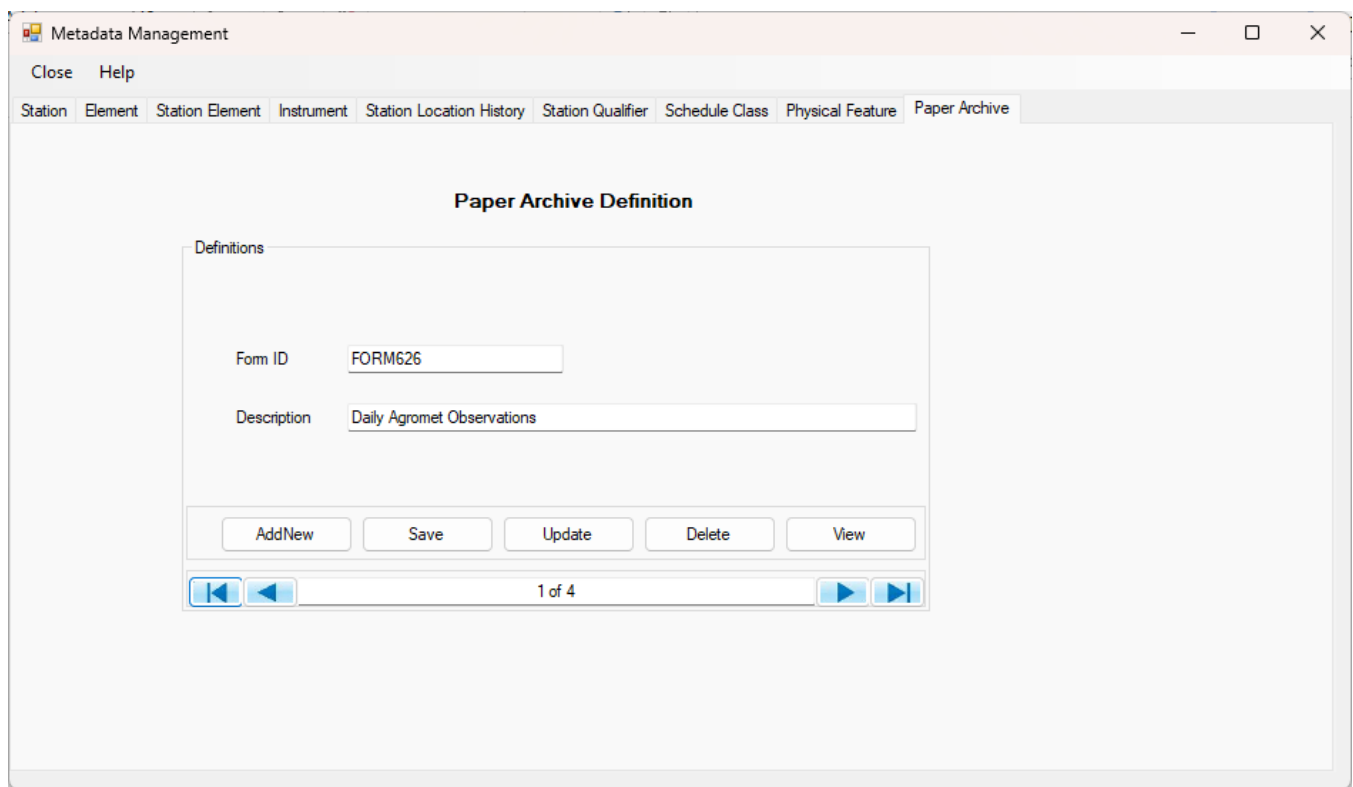
The screenshot shows a software window titled "Metadata Management" with a standard Windows-style title bar (minimize, maximize, close buttons). Below the title bar is a menu bar with "Close" and "Help". A tabbed interface is present, with tabs for "Station", "Element", "Station Element", "Instrument", "Station Location History", "Station Qualifier", "Schedule Class", "Physical Feature", and "Paper Archive". The "Paper Archive" tab is selected. The main content area is titled "Paper Archive Definition". Inside this area, there is a section labeled "Definitions" containing two text input fields: "Form ID" with the value "FORM626" and "Description" with the value "Daily Agromet Observations". Below these fields is a row of five buttons: "AddNew", "Save", "Update", "Delete", and "View". At the bottom of the "Definitions" section, there is a pagination control showing "1 of 4" with navigation arrows on either side.

Figure 96: Dialog for creating paper archive metadata

- Click **AddNew** button to clear the form and enter details of a new metadata record,
- The metadata to be entered are the **Form ID** which is the identification allocated by the NMHS for that particular paper form. Details of the type of data contained in that form are entered in the **Description** box,
- Click **Save** button to save the metadata record,
- Other commands used are as follows;
 - **Update** – Saves changes made on a metadata record,
 - **Delete** – Removes a metadata record from the database if no image has been archived under that Form ID,
 - **View** – Displays all the metadata records in a tabular form.

It is required that the location (full path) for archiving the image files be configured in the general settings of Climsoft. Follow the steps below to achieve that;

- From the main bar of **Welcome** dialog click **Tools -> General Settings** and browse the records until the “**Setting Description**” box displays the value; “**Folder for Paper Archive image files**”. See **Figure 97**,

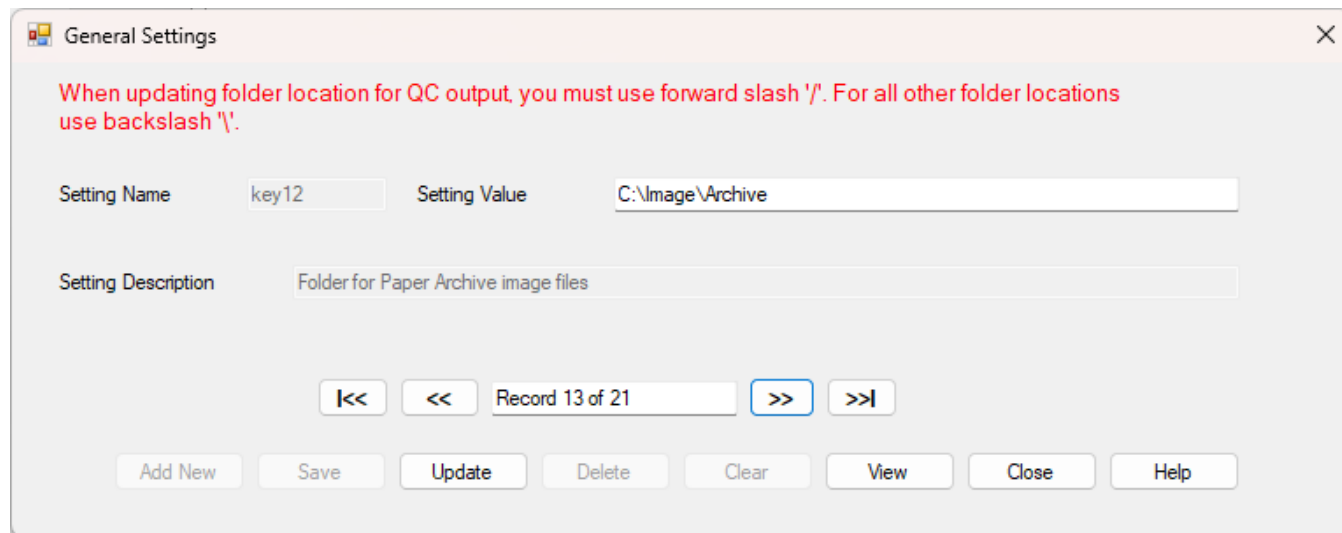


Figure 97: General Setting Dialog

- Type the full path of the folder to be used for the image files e.g. **C:\PaperArchive\Images** then click the **Update** button. If the path specified does not exist it will be created once the process of image archiving starts. When no folder has been setup archiving will still be possible but in a default folder that is in the path of the Climsoft installation. A message will be provided to that effect until the folder has been changed from the default.

12.1 Archiving Images

The filenames for the archived images are structured such that they describe the data contained in the image. Therefore, Climsoft maintains a standard filename structure for the archived image files. Image files having the standard filename structure are archived straight away while the others first required to be renamed before archiving. The following sections describe how images with different filename structures are archived.

12.2 Archiving Images with Standard Filename Structure

The Climsoft standard image filename is structured as; **StnID-FormId-YYYYMMDDHH**. The filename components are described as follows;

- **StnID** – Station identification code for the station whose data is contained in that image,
- **FormId** – Identification code for the paper form as described in the metadata,
- **YYYYMMDDHH** – Date, time and other special descriptions for the image as follows;
 - **YYYY**=Year, **MM**=Month in 2 digits, **DD** = Day of the month in 2 digits,
 - If the image contains daily data for the whole month **DD**=Last day of that month, and **HH**=Hour for the daily observations e.g. 06,
 - If the image contains hourly or synoptic data for one day **HH**=00,
 - If one particular observation is contained in different pages hence different image files then **HH** will instead be used as page numbers in 2 digits starting with 01.

The procedure for archiving images with standard filename structure is as follows;

- (i) From the **Welcome** dialog, click on the icon **Paper Archive** to obtain the dialog shown in **Figure 98**,
- (ii) Click on the explorer button and select the folder containing images to be archived. All image files in that file will then be listed as shown in the dialog,
- (iii) Uncheck the boxes for the image files that are not required.
- (iv) Click the command **Archive** to complete the process.

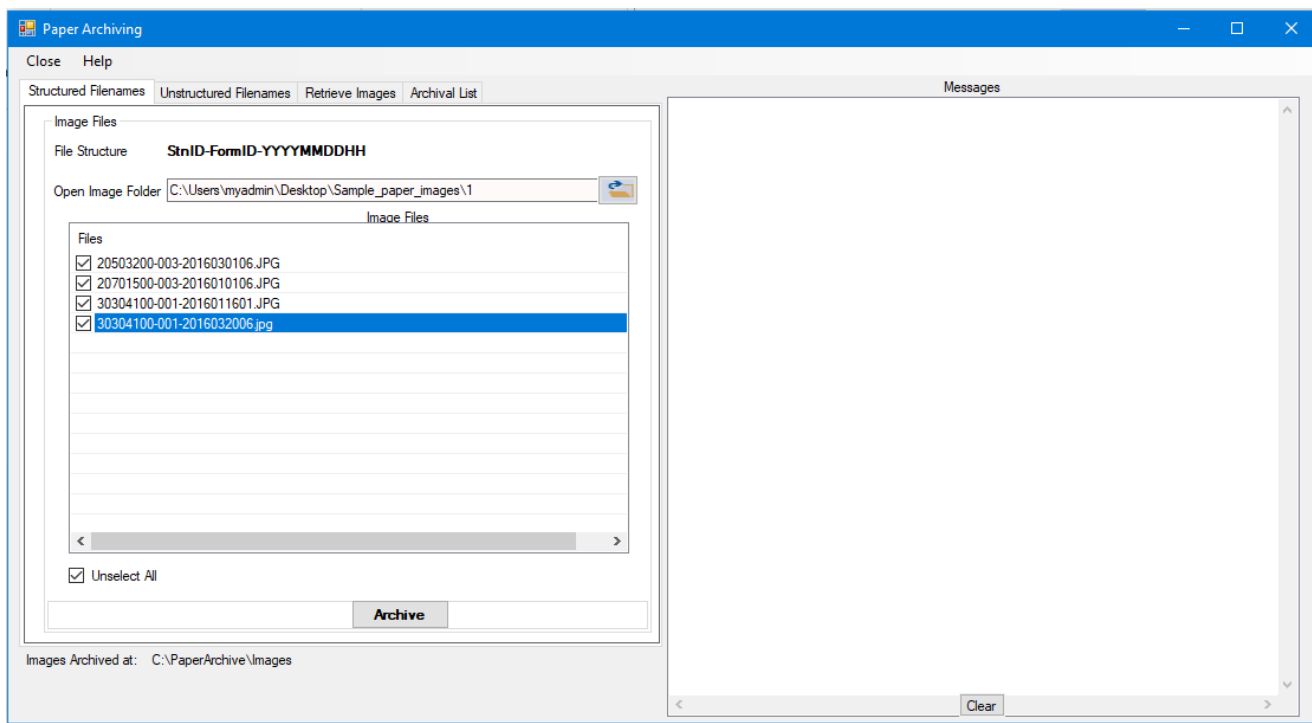


Figure 98: Archiving images with standard filename structure

12.3 Archiving Images without Standard Filename Structure

From the Paper Archive dialog shown in Figure 98 click the tab “**Unstructured Filenames**” to obtain the dialog shown in **Figure 99**:

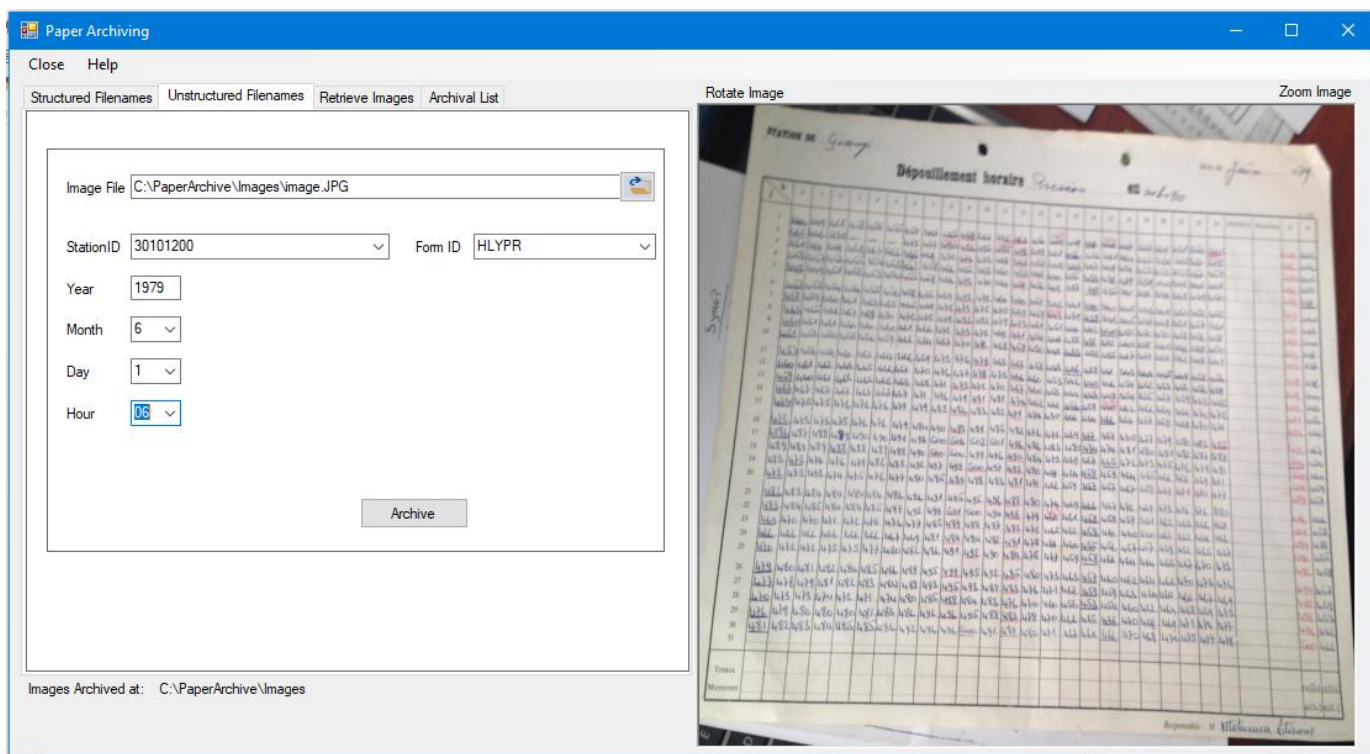


Figure 99: Dialog for archiving images with unstructured file names

- (i) Use the explorer button to select, open the image file and the image gets displayed as shown above.
- (ii) Enter the details for the content of that image in their respective boxes in the dialog,
- (iii) The image may be rotated or zoomed so that the details are clearly seen.
- (iv) Click **Archive** to structure the filename and archive the image,
- (v) Repeat the process for all the images to be archived.

12.4 Retrieving and Viewing Archived Images

Through Climsoft, records of the archived images can be browsed, opened, updated or deleted. Images saved in pdf format can also be viewed but through a pdf reader. To perform these tasks follow the procedures below;

From the Paper Archiving dialog click the tab “**Retrieve Images**” to obtain the dialog shown in **Figure 100**;

- (i) Browse through the records as desired,
- (ii) Edit the records where necessary and click “**Update**” to save the changes,
- (iii) Select the “**View Image**” to open or view the image for the current record.

13. TDCF Synoptic data Encoding Operations

13.1 Form for Synoptic data key entry and encoding

Climsoft provides key entry form for synoptic observations. The form also facilitates encoding and sending the encoded messages to the message switch server for forward transmission to GTS. The structure of the form is shown in **Figure 102**.

Figure 102: Synoptic Data for many elements for one observation time - TDCF Form

Rules for entering data in the Synoptic forms with the aim of encoding into TDCF messages can be obtained from: *WMO manual on codes, Code tables, TDCF Templates and Common tables*. Data is then entered as follows:

- (i) **Pressure Data** – In Hpa and multiplied by 10 to remove the decimal point,

They are:

- Station Level Pressure (SLP)
 - Seal Level Pressure (MSL). To be entered as missing in stations above 500 M altitude and ;
 - Pressure Change (3Hr and 24Hr) – To be entered as missing when not observed
- (ii) **Three (3) Hr pressure change characteristic** - Code figure to be entered as described in the Manual on Codes.
- Code figure 2 shall be used for positive tendency;

- Code figure 7 for negative tendency; and
 - Code figure 4 for no change
- (iii) **Standard Pressure Level** – In Hpa as a whole number and NOT multiplied by 10 e.g. 850
- (iv) **Geopotential Height** – In whole number of geopotential metres (gpm),
- (v) **Temperatures** – In degree Celcius and multiplied by 10 to remove the decimal point,

They are:

- Dry bulb - observed at synoptic hours,
 - Wet bulb - observed at synoptic hours,
 - Dew point - observed at synoptic hours,
 - Minimum - recorded at the hour for daily data observations e.g. 06Z,
 - Maximum – recorded daily but the hour varies with NMHS e.g. 18Z,
 - Grass minimum – recorded at the same hour with minimum temperature,
- (vi) **Relative Humidity** – In whole number of percentages,
- (vii) **Visibility** – In meters rounded into tens,
- (viii) **Total Cloud Cover** – Oktas. Climsoft will encode value into percentage of total cloud cover,
- (ix) **Vertical Significance** – Code figure for the appropriate vertical significance,
- (x) **Low level Cloud Amount (Nh)** – Code figure for the amount of lowest cloud level,
- (xi) **Cloud Base Height (h)** – Height in tens of metres for the base lowest cloud level,
- (xii) **Low Level Cloud Type (CL)** – Code figure for Low Level clouds type,
- (xiii) **Medium Level Cloud Type (CM)** – Code figure for Medium Level clouds type,
- (xiv) **High Level Cloud Type (CH)** - Code figure for High Level clouds type,
- (xv) **Individual Cloud Layers** – Vertical significance, amount, type and height of individual cloud layers that qualify to be considered should be entered in their appropriate boxes in the order they occur. When less than 4 layers are reported the remaining boxes should be left untouched or flag value M be used,
- (xvi) **Present Weather, Past Weather (1) and (2)** – Code figure for the appropriate weather description,
- (xvii) **Evaporation** – Kgm/M-2 multiplied by 10 to remove decimal point,
- (xviii) **24hr Sunshine** – Number of hours multiplied by 10 to remove decimal point,
- (xix) **1Hr Sunshine** – Number minutes in whole numbers,
- (xx) **3hr Rainfall** – Amount accumulated for the last 3 hrs in Kgm/M-2 multiplied 10 to remove decimal point,
- (xxi) **24Hr Rainfall** – Amount accumulated for the last 24hrs in Kgm/M-2 multiplied 10 to remove decimal point,
- (xxii) **Wind Direction** – Degree from True North in whole numbers,
- (xxiii) **Wind Speed** – M/S multiplied by 10 to remove decimal point,
- (xxiv) **Radiation** – MJ/M-2 multiplied by 100 to remove decimal point.

13.2 TDCF Settings

From Synoptic key entry form, click the button **TDCF** then the tab **Settings** to obtain the dialog shown below:

The screenshot shows the 'TDCF BUFR Encoding' dialog box with the 'Settings' tab selected. The 'Headers' section shows 'Template' as 'TM_307080' and 'Message Header' as 'ISMH01 HKNC'. The 'Indicators' section lists various BUFR fields with their corresponding values: BUFR edition Number (04), Originating/Generating Centre (00014), Originating/Generating Sub-Centre (0), Update Sequence Number (0), Optional Section Inclusion (unchecked), Data Category (0), International Data Sub Category (0), Local Data Sub-Category (0), Masters Table Version Number (13), and Local Tables Version Number (0). The 'Message Switch Details' section includes fields for Server Address/Name (localhost), FTP Mode (dropdown), Input Folder (GTS), User Name (climsoft), Password (masked with asterisks), and Confirm Password. At the bottom, there are buttons for 'AddNew', 'Update', and 'Close'.

Figure 103: TDCF Settings

The settings in the dialog shown in **Figure 103** need to be in place before the encoding and sending of messages is done. To successfully configure Climsoft for this operation basic knowledge on WMO Table Driven Code Forms (TDCF) is required. Visit the WMO site for more details. The most useful reference documents are;

- (i) *WMO manual on codes,*
- (ii) *Code tables,*
- (iii) *TDCF Templates and Common tables.*

On the dialog select the right encoding template from the list box **Template** and enter the message header according to the data type (T₁T₂A₁A₂ii) and originating center (CCCC). Enter the Message Switching System (AMSS) details where the messages will be routed to. Click **Update** to save changes in each case.

13.3 Climsoft TDCF Encoding in BUFR

When data entry for the synoptic hour is finished and TDCF settings as described in section **13.2** done, click the button **TDCF** to obtain the TDCF processing dialog shown in **Figure 104**. Station and date for the current key entry record will then be displayed in their appropriate text boxes. Confirm whether that is the observation that is intended for encoding. If not then select the correct station and dates. **Note that the encoded message will include data for all stations that have been observed on the same date and time.**

Click **Encode** button to encode the data into BUFR codes that will be displayed as shown in **Figure 104**. The encoded message binary file will be saved in the file shown in the text box "Encoded Message File".

Click **Send** button to send the binary file to message switching server for forward transmission to GTS. You can also view the content of your message from the text (csv) file by clicking the button **View Descriptors**.

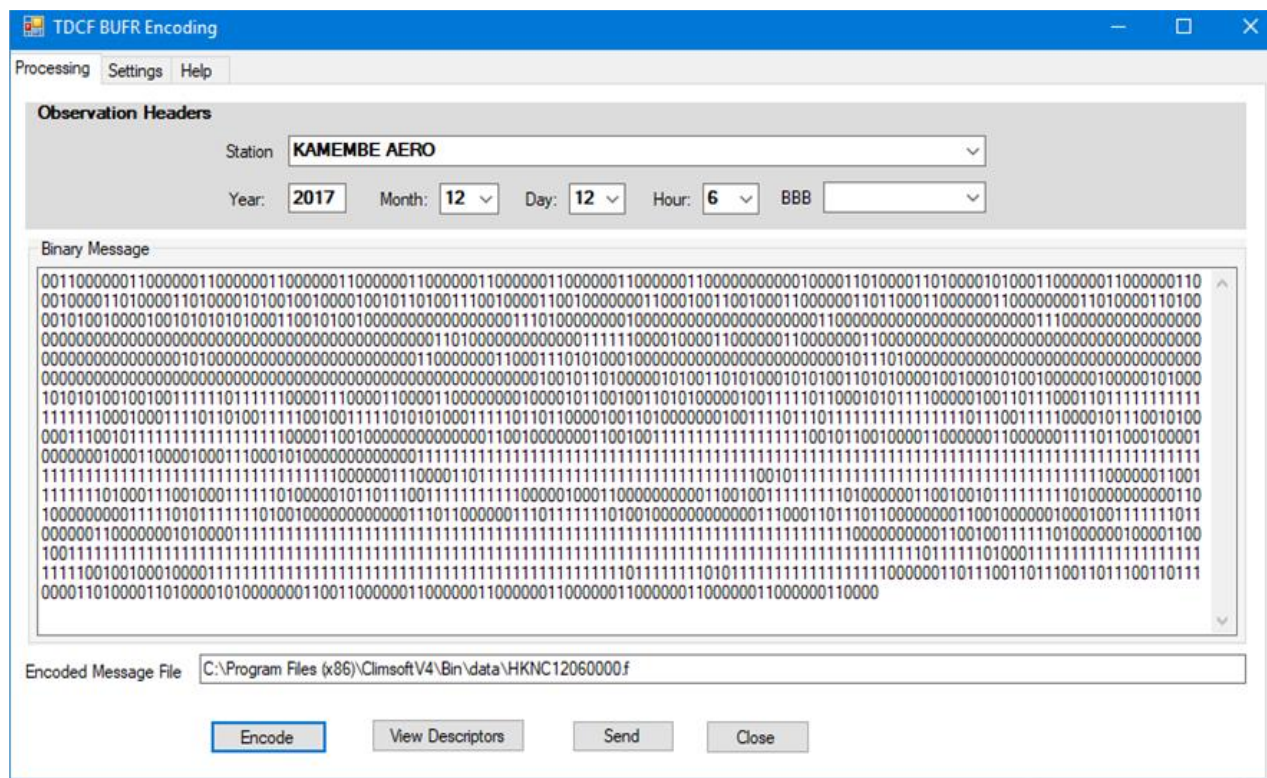


Figure 104: TDCF Processing

14. Climsoft Versions Upgrade

Whenever a new version of Climsoft is released, an upgrade setup file is provided to help users upgrade their earlier versions. This is different from setup file for new installation. The upgrade file is run on all client computers that already had Climsoft installed and is currently operational.

The Climsoft installation and upgrade setup files can be downloaded from the link: <https://www.met-elearning.org/course/view.php?id=58#section-2>. An upgrade setup file looks like **ClimsoftV422_upgrade.exe** where **V22** means it will upgrade the Climsoft installation to *version 4.2.2*.

The following paragraphs describe how a Climsoft installation can be upgraded.

14.1 Upgrading Climsoft Interface

- (i) Download the upgrade setup file and copy it in to a folder that can be easily located;
- (ii) Close any Climsoft session running in the client computer;
- (iii) Run the upgrade setup file as a Windows administrator to start the upgrade wizard as shown in Figure 105;

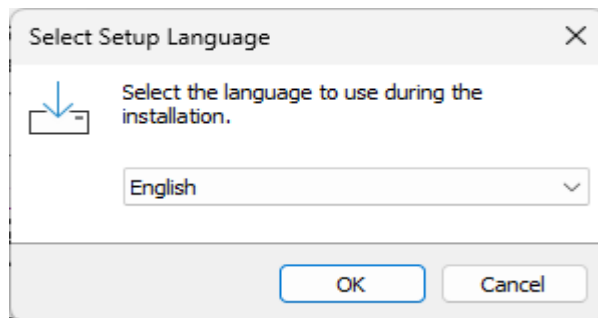


Figure 105: Climsoft version upgrade

- (iv) Choose the language to be used in the wizard dialogs. The default language is *English*;
- (v) The wizard dialogs are very intuitive and easy to follow. Ensure that the path where Climsoft was installed is correctly selected e.g. *C:\Program Files (x86)\ClimsoftV4*;
- (vi) The final dialog will be as shown in Figure 106:

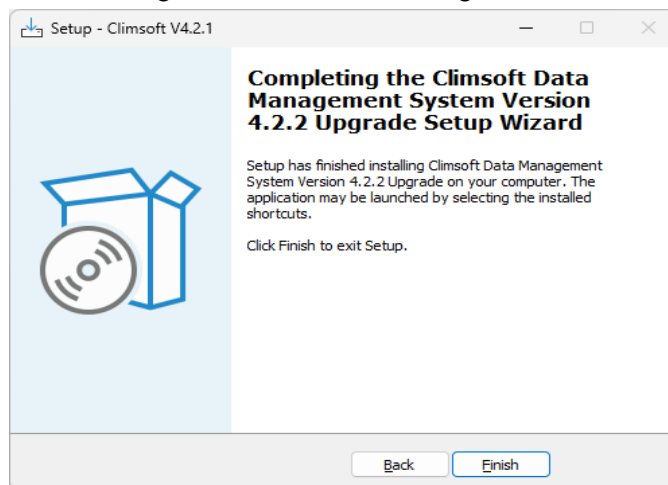


Figure 106: Climsoft version upgrade

- (vii) Click **Finish** to complete the process.
- (viii) This process should be repeated in all Climsoft client desktops that have older versions.

14.2 Upgrading Climsoft Database

Where the version upgrade involves changes in the database, an SQL script is included in setup file which requires to be run immediately after upgrading the interface. During the upgrade process the script file is copied into the “**Dbase**” folder of Climsoft installation path. The script file name is ***mariadb_climsoft_db_v4_all.sql***. This script file is run to upgrade the database in the server as follows:

- (i) Start Climsoft from any client desktop after it has been successfully upgraded to the latest version. The version number is shown on the splash screen during the start process;
- (ii) From Welcome dialog click **Tools => Update db with Script File** as shown in Figure 106

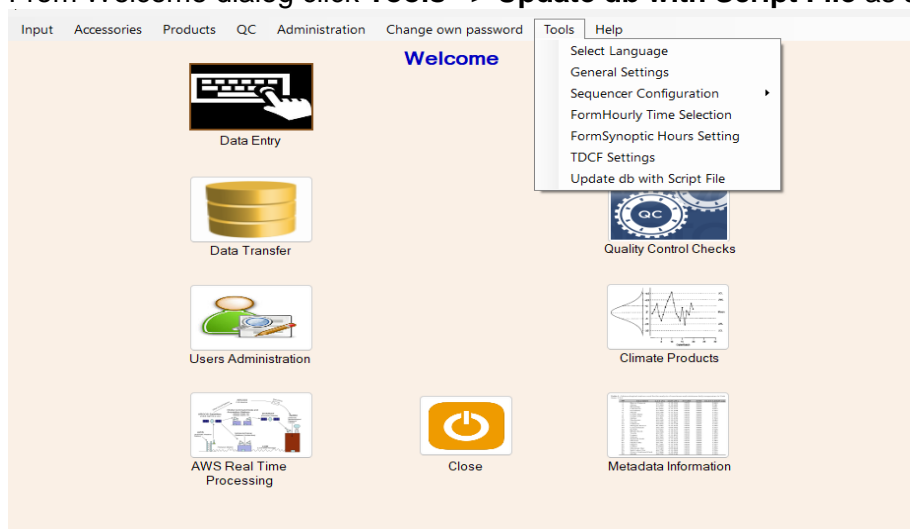


Figure 106: Climsoft version upgrade Menu

- (iii) Select the script file and click **Open** as shown in Figure 107;

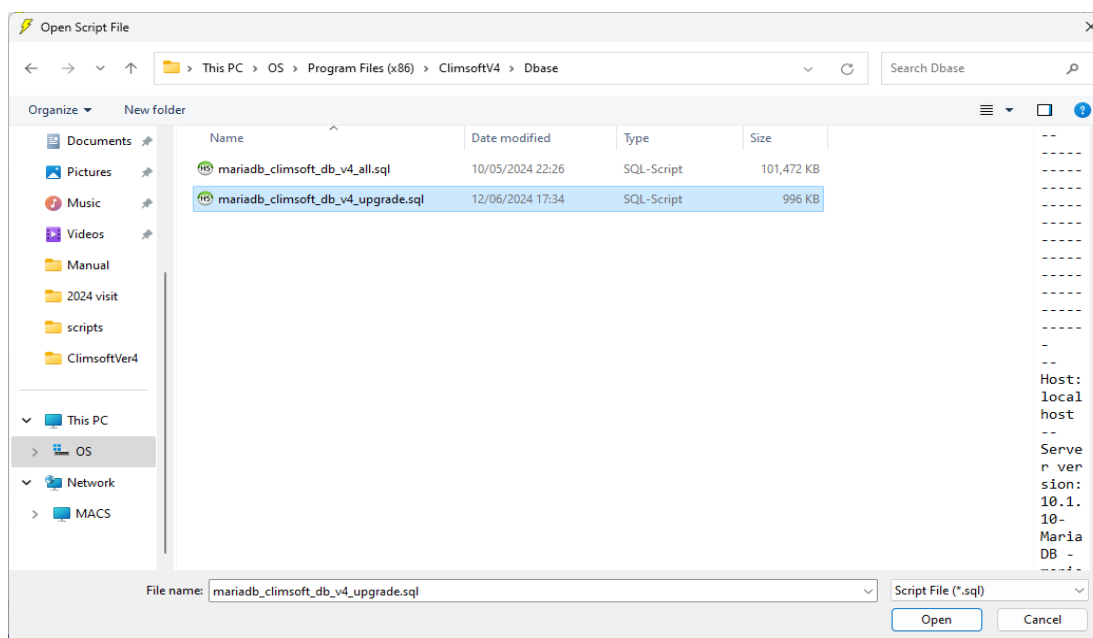


Figure 107: Climsoft version upgrade script file opening

- (iv) Wait for the message “**Finished updating the database**”. Click **Open** to complete the process.

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