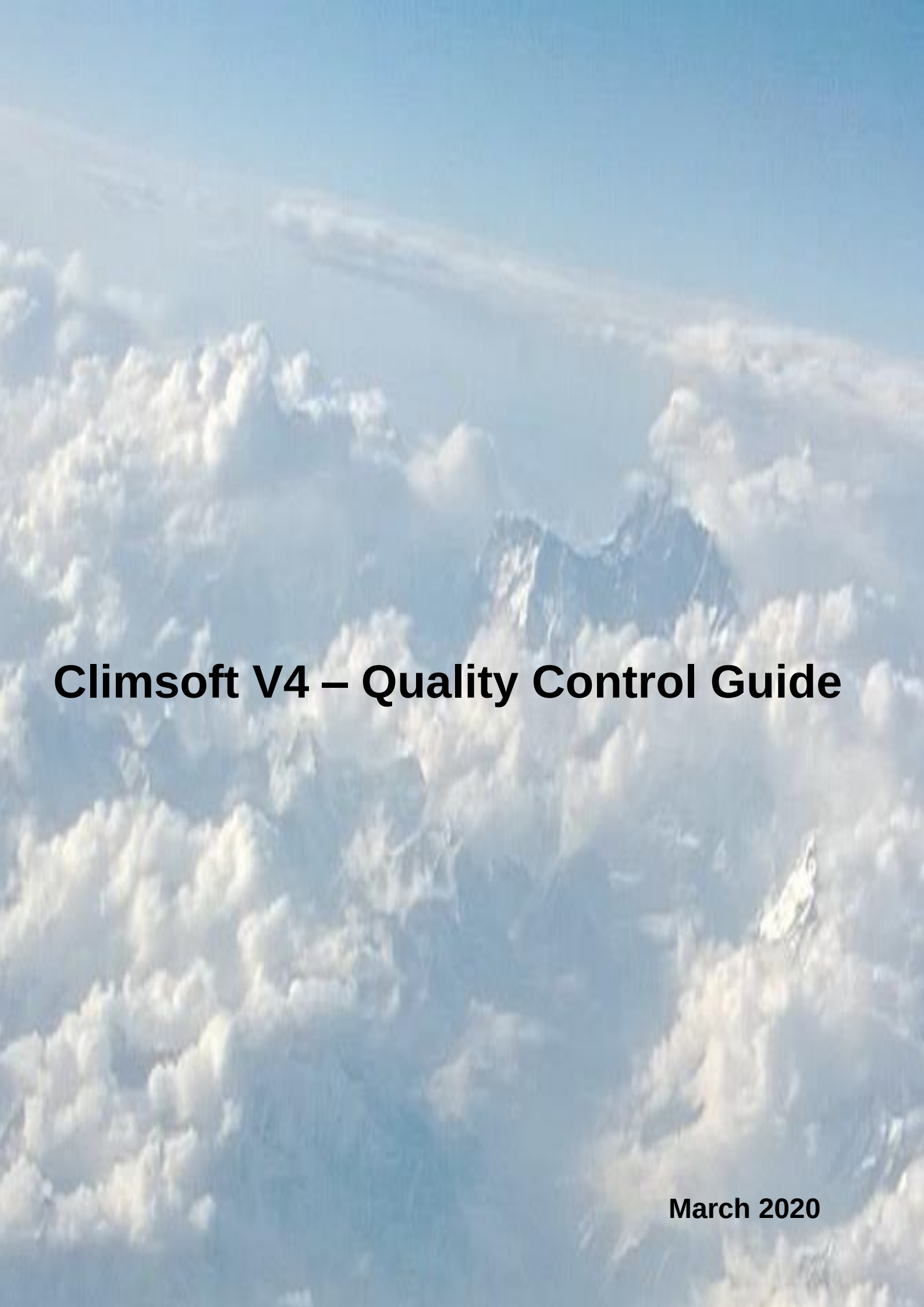


Climsoft V4 – Quality Control Guide

March 2020

Table of Contents

1. Introduction

Welcome to the Climsoft version 4 Quality Control guide. This guide will take you through two (2) levels of Quality Control checks required in Climsoft version 4. These are: Quality Control during Data Entry process and Post Key Entry Quality Control (QC) Checks performed on both data which has been entered via Climsoft data entry forms and external data imported or migrated into Climsoft through Climsoft data transfer facility.

2. Quality Control checks during Key Entry

When data are entered through the data entry forms, Climsoft performs validity checks as soon as the cursor move to the next value box or record. If there is a potential error or problem with data, Climsoft will display an error message and highlight the value box containing the error in question. If a value is entered and it is found to be outside the absolute limit set in the system (e.g. entering 3400 instead of 340 as a value for “daily temperature maximum”), a message box that includes the upper or lower limit allowed for this element will be displayed.

Figure 1 below shows a QC message that pops up after entering a value that has failed the QC check for upper limit when entering daily data. Click the "**OK**" button on the error message box to accept and place back the cursor into the data entry form value box to apply necessary correction.

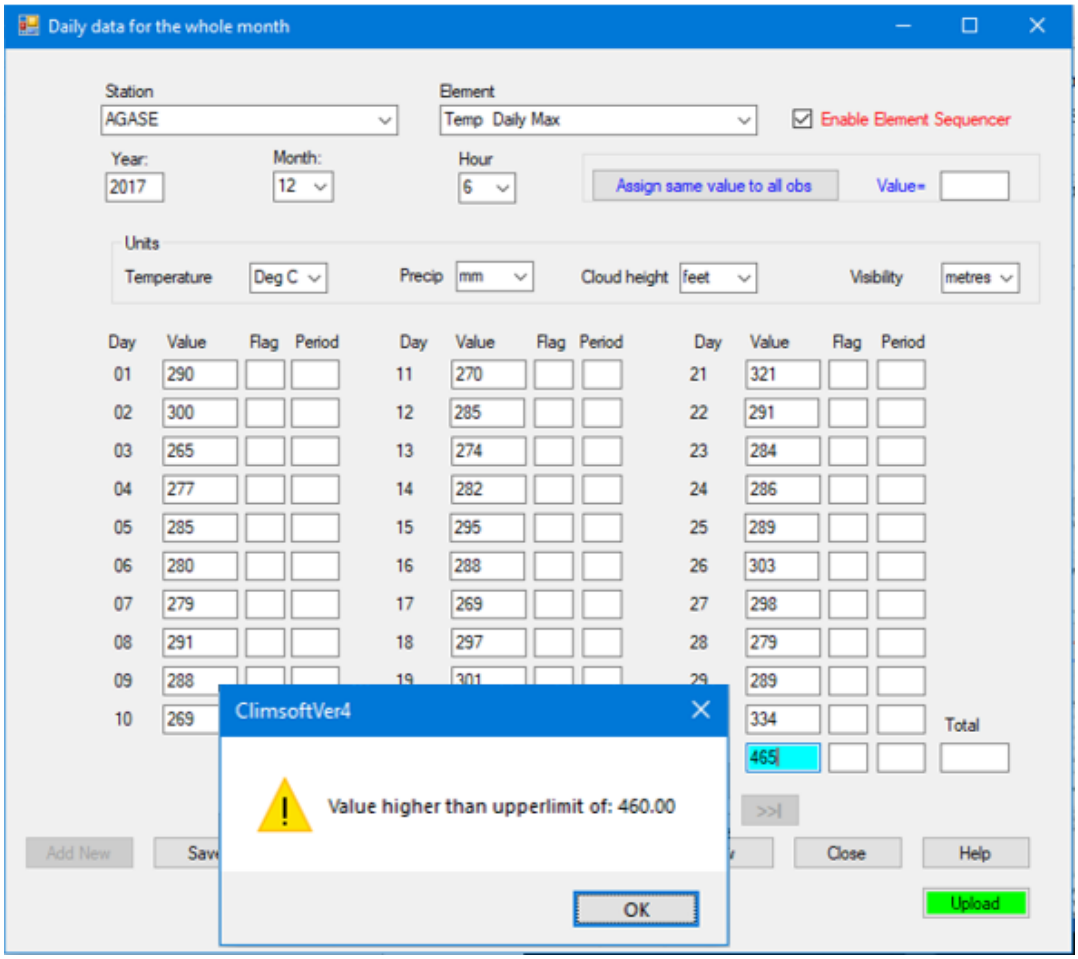


Figure1 - QC checks during Data entry

3. Post Key-Entry Quality Control (QC) Checks

Climsoft provides a facility for Quality Control checks of data that has been uploaded from Data entry forms tables or transferred using climsoft external data transfer facility into the "observationinitial" table.

Two options for QC checks currently available in Climsoft version 4 are "**Absolute limits checks**" and "**Inter-element comparison checks.**

All data uploaded from Data entry forms into observationinitial table or transferred through the climsoft external data transfer facility into the observationinitial table have the QCstatus equal to 0 **(qcStatus=0)** and cannot be transferred to observationfinal because they have not yet undergone through the Quality Control checks process .

Data that have not yet undergone Quality Control checks process are not allowed to be transferred into the observationfinal table where data products is being generated.

After performing the Quality Control checks operation on data, the QCstatus change from **0** to **1 (qcStatus=1),** in this case all data with QCstatus equal to **1** can be transferred to observationfinal table.

3.1 Absolute Limits QC Checks

Follow the steps below to perform "**Absolute limits QC checks**":

Step 1: Sign into **Climsoft** with the right privilege;
Step 2: click on "**Quality Control Checks**" icon, in the main menu window to open the quality control dialog box, by default "**Absolute limits checks**" is selected as shown in Figure 2 below;

Step 3: Specify the range of the Quality Control Checks (Beginning Year, Ending Year, Beginning Month and Ending Month);

Step 4: Select the specific **station(s)** and **element(s)** for QC by selecting or ticking the box before the station(s) and element(s) boxes (Figure 2).

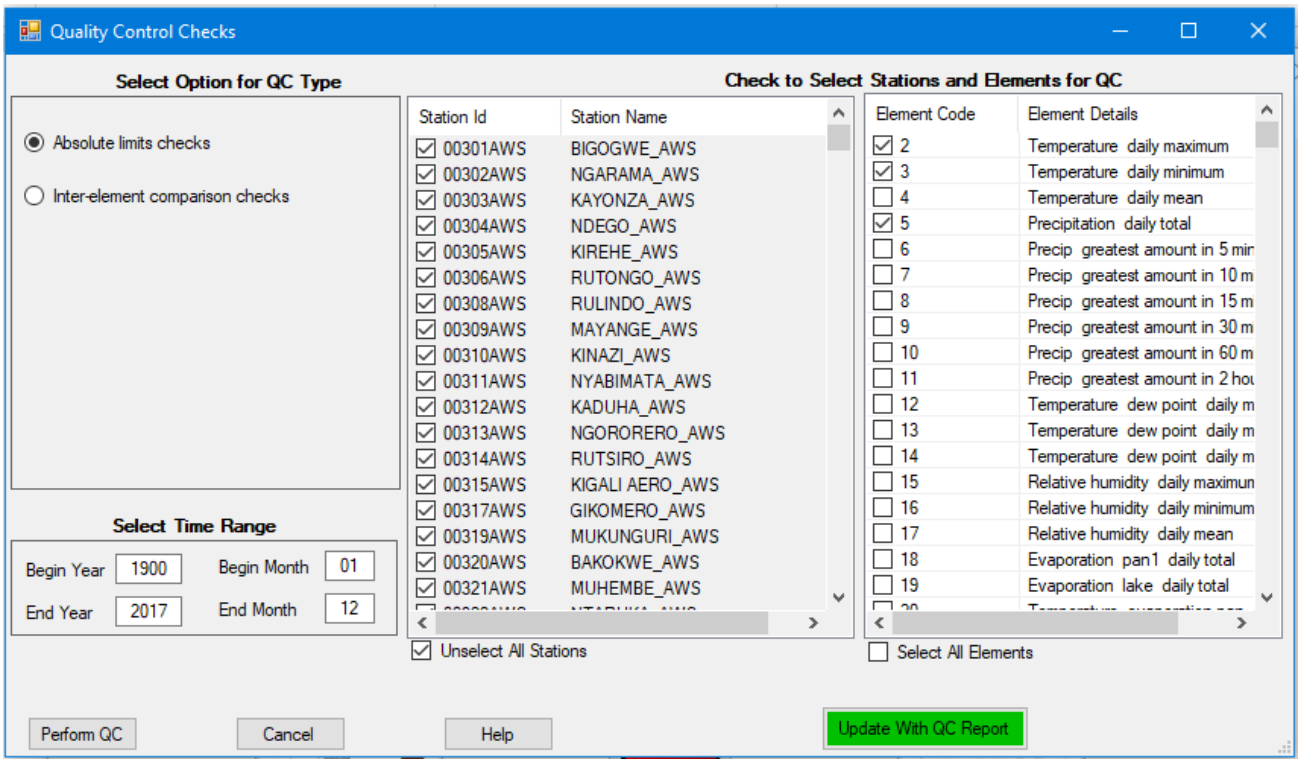


Figure 2 – Absolute limits Checks

Step 5: Click on "**Perform QC**" button to generate the QC report. QC checks will be performed on all the stations and elements selected within the period specified and the result will be sent in the QC folder. Two (2) Comma Separated Values (CSV) files will be generated and out in the QC folder, the file output for Upper Limit and the one for Lower limit (Figure 3):

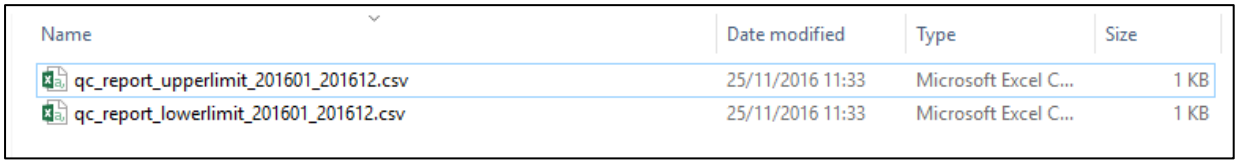


Figure 3 – Dialog showing an Example of QC output file name structure

Step 5: Double click the files (Figure 3) to see the file contents:

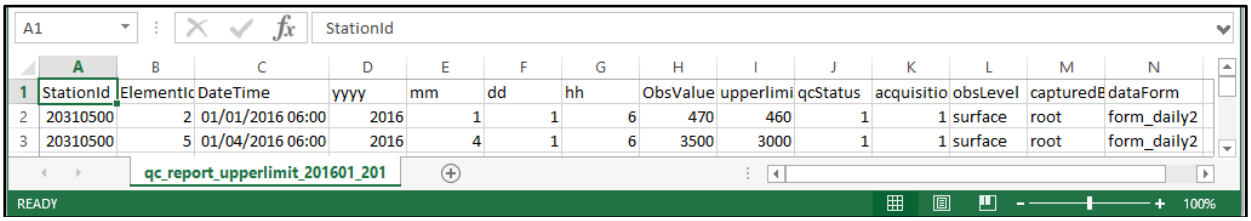


Figure 5 – Dialog showing an Example of the QC output file structure - Upper Limit

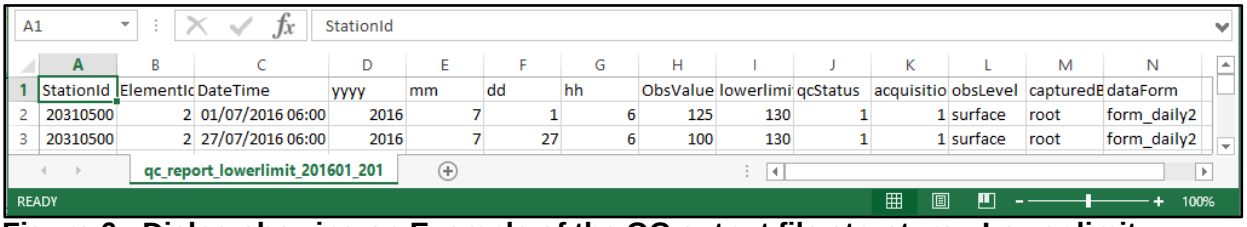


Figure 6 - Dialog showing an Example of the QC output file structure - Lower limit

3.2 Inter Element Comparison QC Checks

Inter Element *C*omparison Checks", is done on related elements e.g. Maximum and Minimum temperatures, Maximum and Dry bulb temperatures, Dry bulb and Minimum temperatures, Dry bulb and Wet bulb temperatures, and Wet bulb and Dew point temperatures, Table 1 show the elements relationship table:

	Element	Relationship	Element
1.	Maximum temperature	>=	Minimum temperature
2.	Maximum temperature	>=	Dry bulb temperature
3.	Dry bulb temperature	>=	Minimum temperature
3.	Dry bulb temperature	>=	Wet bulb temperature
4.	Wet bulb temperature	>=	Dew point temperature

Table 1- Relationship between elements

Follow the steps below to perform the "**Inter - element comparison QC checks**":

Step 1: Sign into **Climsoft** with the right privilege;
Step 2: click on "**Quality Control Checks**" icon, located in the welcome window to open the quality control dialog box, select "**Inter – element comparison checks**", By default, elements with relationships will be selected automatically by the system and the elements codes and elements details will not be active (**note:** user will not be able to select these manually since they are already selected automatically);

Step 3: Specify the range of the Quality Control Checks (Beginning Year, Ending Year, Beginning Month and Ending Month);

Step 4: Select the specific **station(s)** or ticking the box "Select All Stations to select all the stations (Figure7).

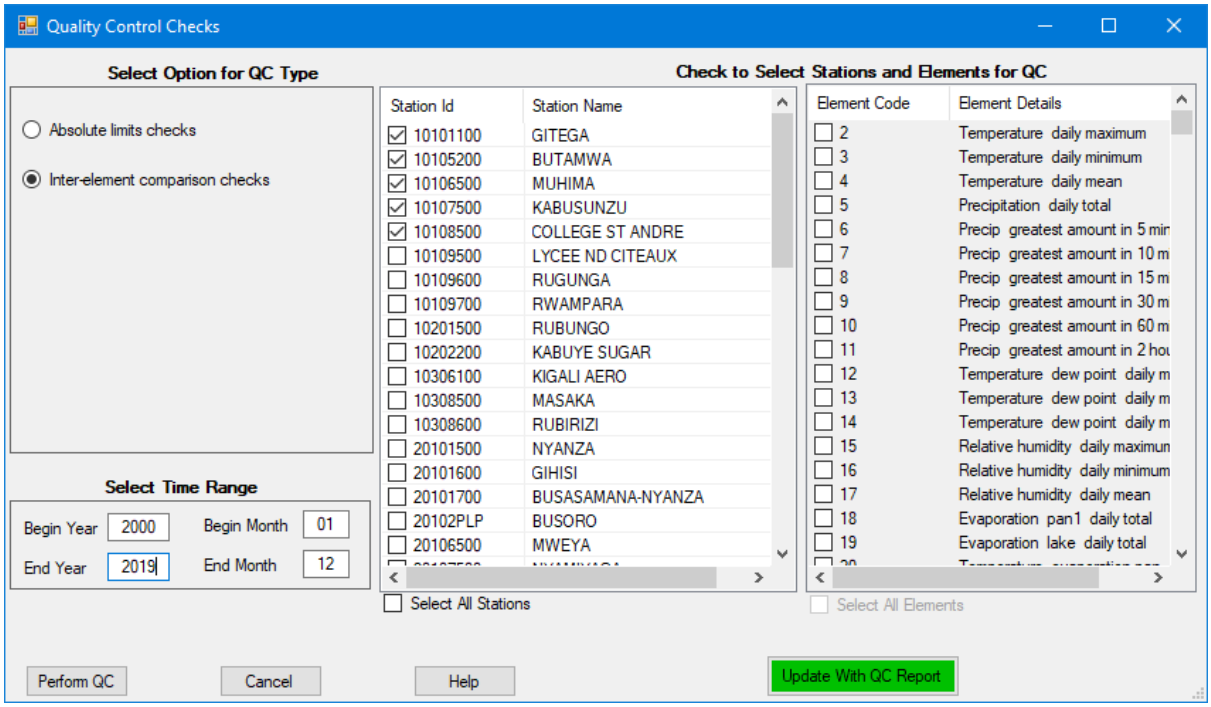


Figure 7 – Inter - elements comparison Checks

Step 5: Click on "**Perform QC**" button to generate the QC report. QC checks will be performed on selected stations or on all the stations (if the box Selected All Stations was selected) and inter-related elements only predefined in the system (see the list of predefine inter-related elements in the table 1 above) selected within the period specified and the result will be sent in the QC folder (Figure 8):

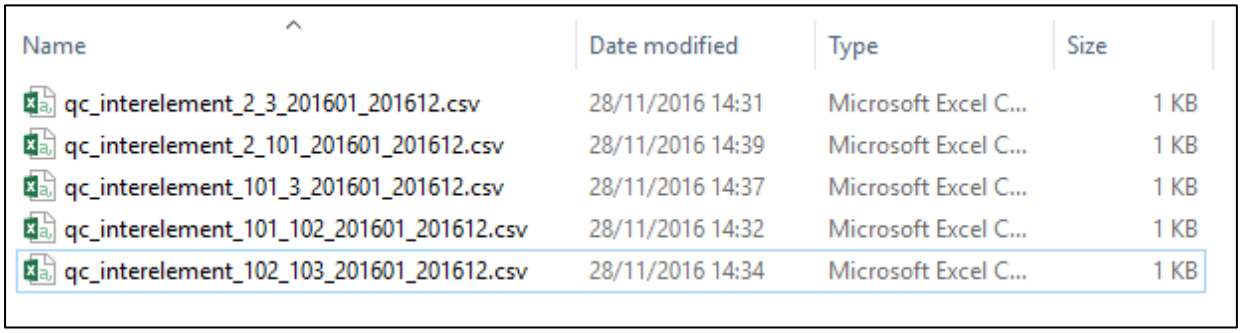
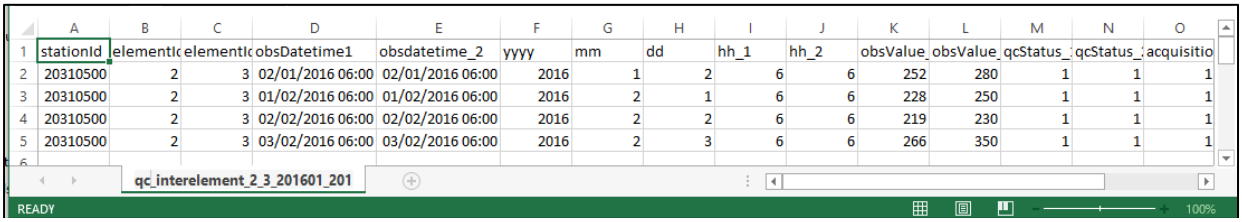


Figure 8 - List of inter- element QC report output files

Step 6: Double click the files one at a time (Figure 8 above) to open the file and view the file contents:



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	stationId	elementId	elementId	obsDatetime1	obsdatetime_2	yyyy	mm	dd	hh_1	hh_2	obsValue_	obsValue_	qcStatus_	qcStatus_	acquisitio
2	20310500	2	3	02/01/2016 06:00	02/01/2016 06:00	2016	1	2	6	6	252	280	1	1	1
3	20310500	2	3	01/02/2016 06:00	01/02/2016 06:00	2016	2	1	6	6	228	250	1	1	1
4	20310500	2	3	02/02/2016 06:00	02/02/2016 06:00	2016	2	2	6	6	219	230	1	1	1
5	20310500	2	3	03/02/2016 06:00	03/02/2016 06:00	2016	2	3	6	6	266	350	1	1	1

qc_interelement_2_3_201601_201

READY

Figure 9 - Dialog showing an Example of the QC output file comparing Max and Min temperature.

Important:

*The QC reports will be sent to the folder that would have been configured for the QC reports under "**General Settings**" (Figure 10). It is therefore important to make sure that the folder for QC reports has been configured correctly by the Climsoft administrator.*

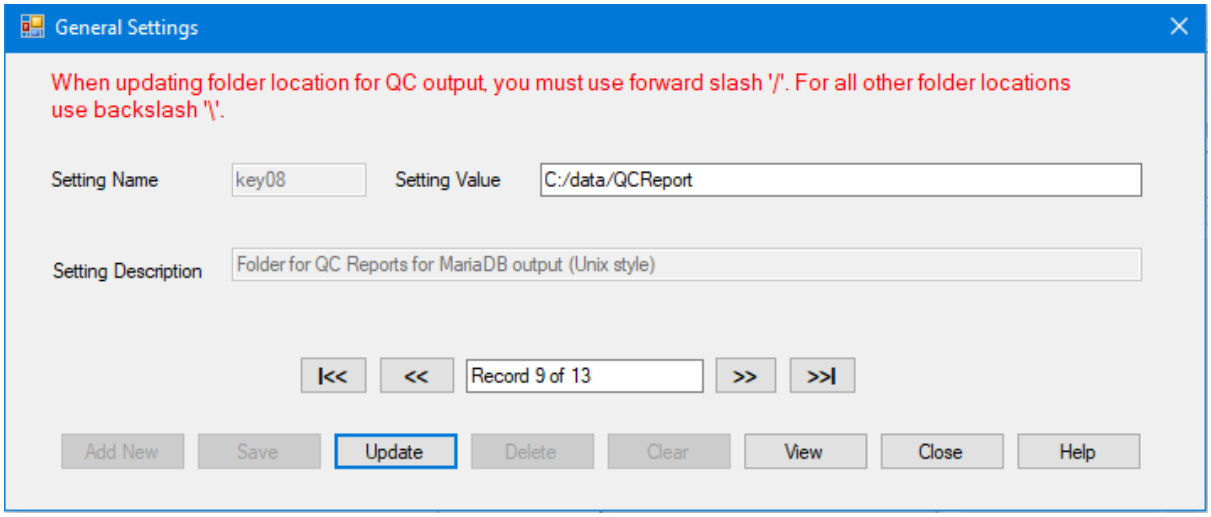


Figure 10 - Configuration of the QC report folder

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

*For Absolute limits QC checks, the report file of data that fails the QC checks will specify whether it is upper or lower limit and the specific period range for QC (example: "**qc_report_upperlimit_201601_201612.csv", qc_report_lowerlimit_201601_201612.csv**").*

*For the case of inter-element comparison checks, the codes of the elements that would have failed the QC checks will also be included in the file name (example: "**qc_interelement_101_3_200101_200312.csv**") for inter-element comparison checks between dry bulb temperature and minimum temperature for the mentioned period.*

Note: Data which are undergone QC Checks (*Absolute limits or inter-element comparison QC checks)* will change the qcStatus in the database from **qcStatus=0** to **qcStatus=1**). It should be noted that data that satisfy preset conditions for global and inter element comparison check, will not appeared in the QC report output file (s). In case all the data satisfy preset conditions for global and inter-element comparison check during the QC process, a message box with "**No QC errors found"** message will be displayed (Figure11).

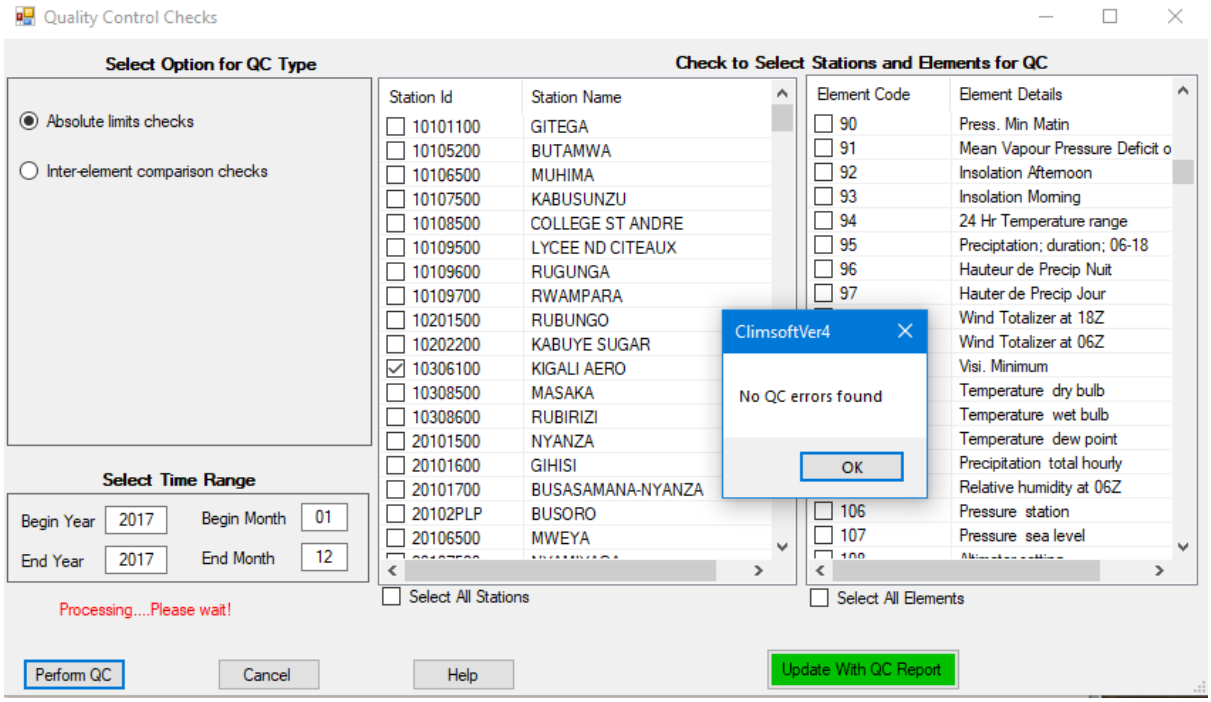


Figure 11 - QC Message Box

3.3 Renaming Updated QC Report File (s)

After performing the Quality Control Checks on data, all data are checked and change their qcStatus from 0 to 1 and data with errors are output in the QC folder for further investigation and correction.

After checking the output report file(s) and applying all the necessary correction, the file is saved with the same name as the previous file(s) **plus** the suffix "**updated**" (e.g. "**qc_report_upperlimit_201601_201612_updated.csv**" for the absolute limits check and "**qc_interelement_101_3_200101_200312_updated.csv"** for the inter-element comparison check). A suffix "**Updated**" is added manually by the QC Officer to the file (s) name to show that the values in the QC report have been modified (updated) and is different with the original one (s) in the same QC folder.

3.4 Updating observationinitial table with the updated QC report file.

3.4.1 Case of Absolute limit Check

Step1: After analyzing a QC report file (s) and update both upper and lower limit report files, save changes to the report with updated values as instructed above by adding a suffix "**updated**" to the file name (Figure 12).

Figure 12 - Dialog showing an Example of how to rename the updated QC report files

Step 2: Under Quality Control Dialog, select "**Update With QC Report**" option (green button) and browse for the original QCd and then the updated QCd files (Figure 13);

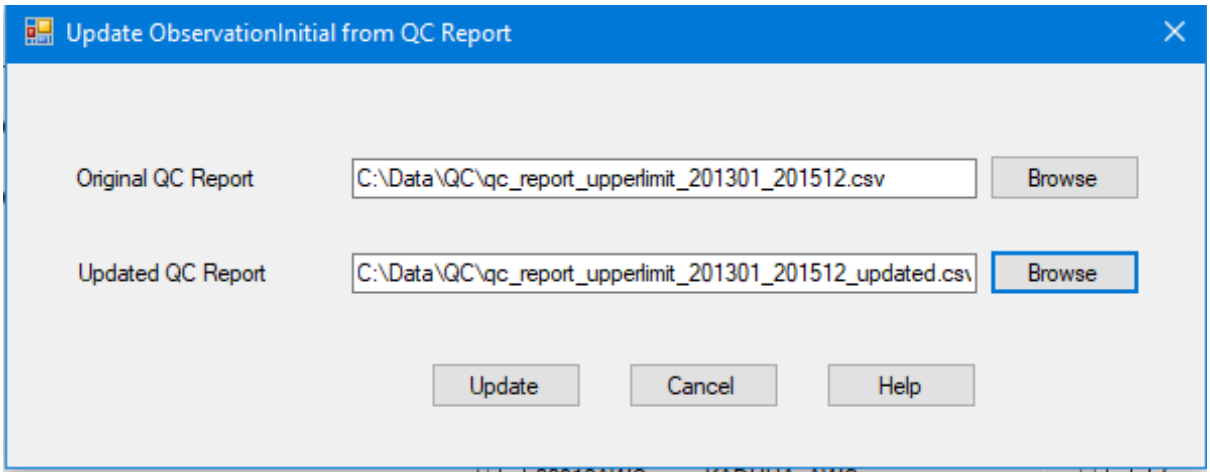
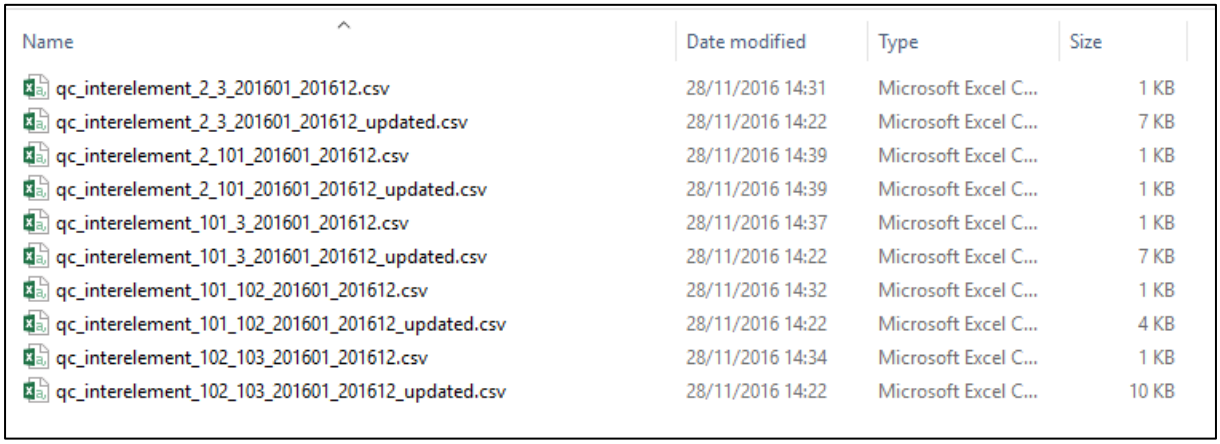


Figure 13 – Process of updating the observationinitial table with the updated QC report file

Step 3: Click **Update** to validate and send changes from the updated QC report file into the observationInitial table.

3.4.2 Case of the inter-element comparison check

Step 1: After analyzing a QC report and update the inter-element comparison QC report files, any changes to the report with updated values should be saved with a different name. What is recommended is to add a suffix "**updated**" see below (Figure 14).



Name	Date modified	Type	Size
qc_interelement_2_3_201601_201612.csv	28/11/2016 14:31	Microsoft Excel C...	1 KB
qc_interelement_2_3_201601_201612_updated.csv	28/11/2016 14:22	Microsoft Excel C...	7 KB
qc_interelement_2_101_201601_201612.csv	28/11/2016 14:39	Microsoft Excel C...	1 KB
qc_interelement_2_101_201601_201612_updated.csv	28/11/2016 14:39	Microsoft Excel C...	1 KB
qc_interelement_101_3_201601_201612.csv	28/11/2016 14:37	Microsoft Excel C...	1 KB
qc_interelement_101_3_201601_201612_updated.csv	28/11/2016 14:22	Microsoft Excel C...	7 KB
qc_interelement_101_102_201601_201612.csv	28/11/2016 14:32	Microsoft Excel C...	1 KB
qc_interelement_101_102_201601_201612_updated.csv	28/11/2016 14:22	Microsoft Excel C...	4 KB
qc_interelement_102_103_201601_201612.csv	28/11/2016 14:34	Microsoft Excel C...	1 KB
qc_interelement_102_103_201601_201612_updated.csv	28/11/2016 14:22	Microsoft Excel C...	10 KB

Figure 14 - QCd and updated inter-element QC report files

Step 2: Under "**Quality Control"** select "**inter-element comparison checks**" and select "**Update With QC Report"** (green button) and browse for the original QCd and then the updated QCd files (Figure15);

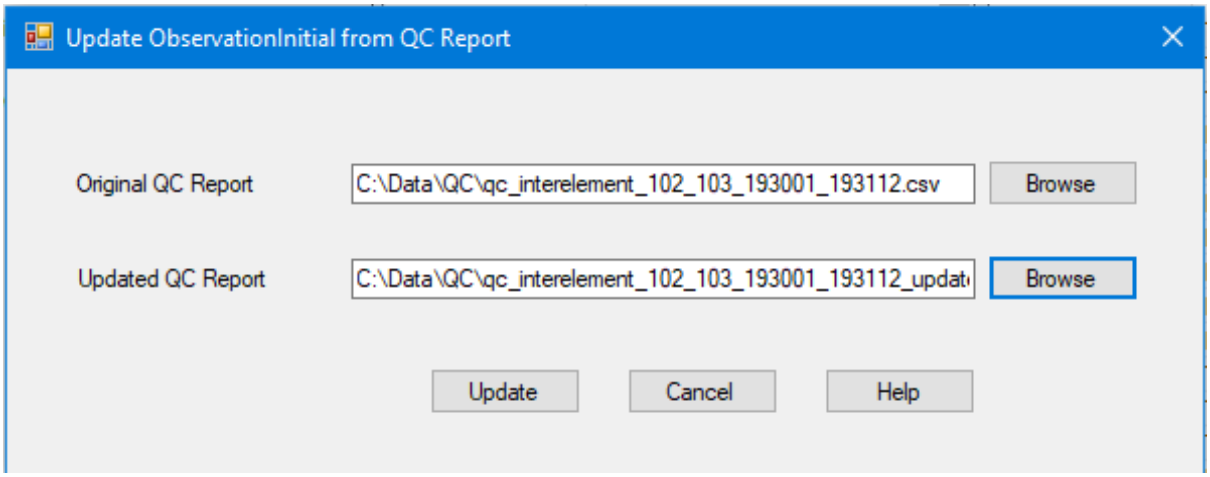


Fig 15 - Process of updating the observationinitial table with the updated QC report file

Step 3: Click **Update** to validate and send changes from the updated QC report file into the observationInitial database table.

Important

It should be noted that only data that would have gone through QC will be uploaded to the "**observationfinal**" table. Observation records that have not been QC'd will have a QC status "**0**" while records that have been QC'd will have a QC status "**1**".

Note: For any question or further clarifications, contact the Climsoft Helpdesk: support@climsoft.org