

# Online Help

Vaisala DigiCORA® Sounding System  
**MW41**



**VAISALA**

PUBLISHED BY

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# 1. About this document

## 1.1 Version information

Table 1 Document versions

Document code	Date	Description
M211428EN-W	September 2020	Updated for MW41 sounding software version 2.17. Removed references to RS92, GC25, and OIF92, as they are no longer supported.
M211428EN-V	May 2019	Updated for MW41 sounding software version 2.15. Added information on the new BUFR message configurations and WIGOS identifier in Station configuration.
M211428EN-U	February 2019	Updated for MW41 sounding software version 2.14.

## 2. Basics of MW41

### 2.1 Welcome to Vaisala DigiCORA Sounding System MW41

Vaisala DigiCORA Sounding System MW41 processes, analyses, archives, and relays sounding data. The system consists of a computer (sounding workstation) that runs the sounding software and is connected to a sounding processing subsystem via a network adapter. The sounding processing subsystem contains the processor units for PTU (Pressure, Temperature and Humidity) and wind finding, and appropriate connections to the required antennas.

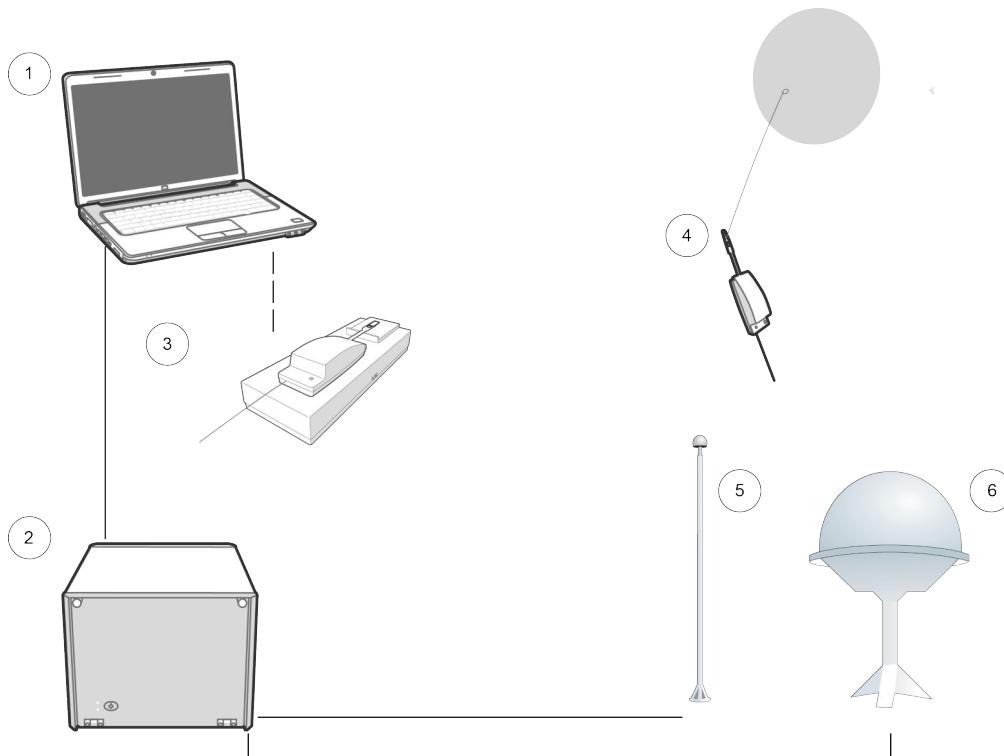


Figure 1 DigiCORA Sounding System MW41 setup

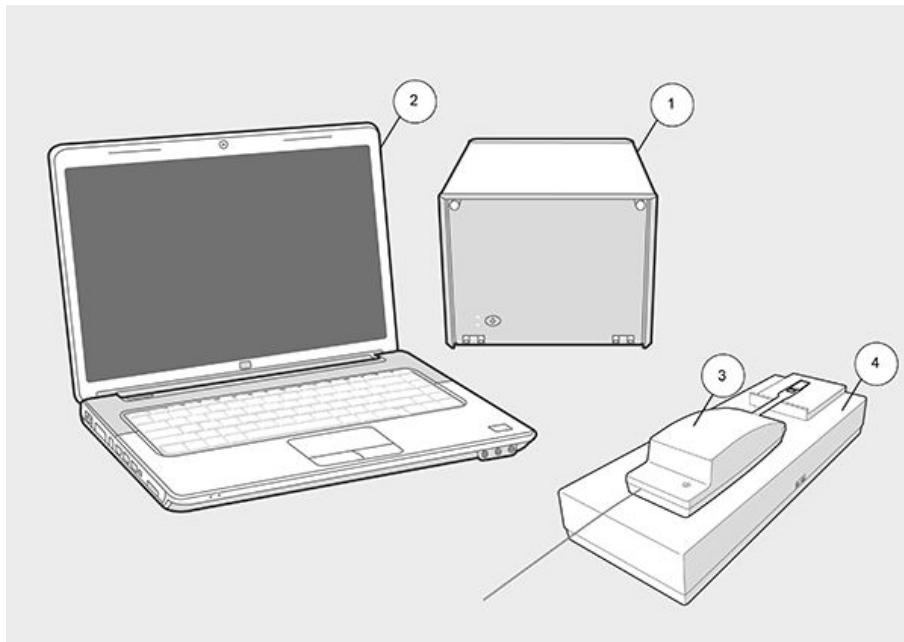
- 1 Sounding workstation
- 2 Sounding Processing Subsystem SPS3xx
- 3 Ground Check Device RI41
- 4 Radiosonde RS41
- 5 GPS antenna
- 6 UHF antenna

**Table 2 Compatibility**

<b>Item</b>	<b>Description</b>
Radiosondes	Vaisala Radiosonde RS41-SG Vaisala Radiosonde RS41-SGP Vaisala Radiosonde RS41-SGM Vaisala Radiosonde RS41-D RS41 refers to all Radiosonde RS41 models.
Sounding processing subsystems	Vaisala Sounding Processing Subsystem SPS311G Vaisala Sounding Processing Subsystem SPS341AG SPS3xx refers to both SPS311G and SPS341AG.
Ground check devices	Vaisala Ground Check Device MWH322 Vaisala Ground Check Device RI41 Vaisala Ground Check Device RI41-B with a barometer module. RI41 refers to both RI41 and RI41-B.
Wind finding	Vaisala Radiotheodolite RT20 Vaisala Radiotheodolite RT20A Vaisala Radiotheodolite RT20M RT20 refers to all the above.
Printing sounding data	Printer options: <ul style="list-style-type: none"><li>• Matrix printer 23</li><li>• Inkjet printer 24</li><li>• Portable thermal printer</li></ul>
Remote monitoring	Vaisala Observation Network Manager NM10 software

All MW41 documentation referred to in this online help is available on the MW41 installation media.

## 2.2 Sounding procedure



- 1 Sounding Processing Subsystem SPS3xx
- 2 Sounding workstation
- 3 Radiosonde RS41
- 4 Ground Check Device RI41

A typical sounding procedure with Vaisala DigiCORA® Sounding System MW41 consists of the following phases:

- ▶ 1. Turning on Sounding Processing Subsystem SPS3xx.
- 2. Turning on the sounding workstation and starting the sounding software.
- 3. Preparing the radiosonde for the sounding, for example, with Ground Check Device RI41.
- 4. Launching the radiosonde.
- 5. Entering surface observation values.
- 6. Monitoring the sounding and obtaining sounding data.
- 7. Terminating the sounding, in case the sounding does not end automatically.
- 8. Turning off SPS3xx.

## More information

- Starting the software and logging in (page 17)
- Preparing Radiosonde RS41 for sounding (page 21)
- Launching the radiosonde (page 43)
- Viewing and editing surface observation values (page 47)
- Monitoring a sounding (page 52)
- Terminating a sounding (page 103)

## 2.3 Recommended browsers

This software works best with the latest versions of the following web browsers: Microsoft Edge, Mozilla Firefox, and Google Chrome.

## 2.4 MW41 user interface

### 2.4.1 Application header

Application header displays the following information:

- Name of the sounding system



- Name of the station and time in UTC (Coordinated Universal Time)



- Information on the user's degree of control over the system, a control button for audio, information on the number of active sessions and users, and the **Log out** button.



## More information

- Types of user control (page 11)
- Sounding audio notifications (page 176)

### 2.4.2 Application toolbar

Application toolbar contains the different window options and access to the system Help pages.

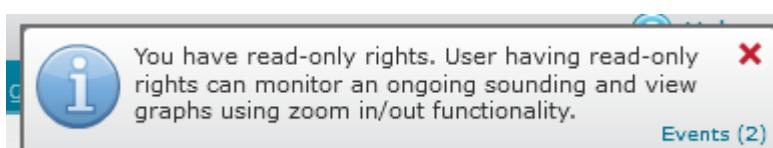
The main windows in the user interface are:

- **Sounding**, containing the **Radiosonde Selection, Preparation, Monitoring**, and **Messages** tabs. See [Monitoring a sounding \(page 52\)](#) for more information.
- **Archive**, see [Archive sounding data \(page 133\)](#) for more information.
- **Events**, see [Viewing events \(page 72\)](#) for more information.
- **Administration**, containing the following tabs.
  - **Devices and Systems**
  - **Sounding**
  - **Report Templates and Scripts**
  - **System Backup and Restore**
  - **Diagnostics**
  - **Advanced** configuration.

Information on the Advanced configuration is available in *Vaisala DigiCORA Sounding System MW41 Technical Reference*, included on the installation media.

### 2.4.3 Notifications

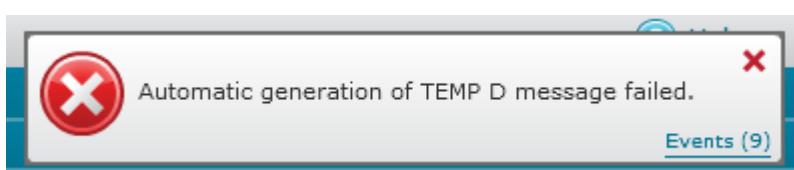
On the top right side of the display, you can see notifications displayed on the system or sounding status:



The notification displays the number of events that have occurred. If there are several notifications, the next notification will be displayed once you close the one on top by clicking the **Delete** icon .

Click the **Events** text link to view the **Sounding events** window with more information on the notification.

When several notifications appear, errors are always displayed on the top:



After errors, warnings and information notifications are displayed in this order, that is, warnings on top of information notifications.

The notification will fade out and disappear after a while, but it will appear again when you point to it with the mouse.

The symbols in the notifications indicate the following:

	Error
	Warning
	Information

#### 2.4.4 General conventions

Missing numeric information is indicated with slashes: ////.

## 2.5 User control

### 2.5.1 Types of user control

Several users can log in into the MW41 sounding software simultaneously to monitor the sounding, but only one user at a time can have control of the system; other users have read-only rights.

When you log in into the sounding software, the information message displayed shows the type of user control and what you can do with the current rights.

#### Full control

You have full control of the system when you are the first one to log in. If other users log in after you, they have read-only rights.

#### Read-only rights

You have read-only rights when you log in after the first user. Information on read-only rights is also displayed on the login page where the **Read-only** check box is selected.

### 2.5.2 Active users and sessions

The application header displays information on the number of users currently logged in into the system, and the number of sessions open:



### 2.5.3 Changing user control

The item list that appears when you click the user control button on the application header contains the following alternatives:



- **Release control:** Available when you have full control. Use this command to release the control of the UI and to give it to another user. After releasing the control, you have read-only rights to the UI.
- **Request control:** Use this command to request the control of the UI from another user.
- **Take control:** Use this command to take over the control of the UI.

### 2.5.4 Releasing control

- 1. Release the control of the UI by opening the drop-down menu on the header and selecting **Release control**, or by logging out of the system.  
An information message about the release is displayed. Another user can now take the control of the UI by selecting **Take control**.

### 2.5.5 Taking control

- 1. Take over the control from another user by opening the menu on the header and selecting **Take control**.  
A notification is displayed to the other user and they hand over the control by clicking **Yes**.  
If the user currently in control does not react to the request, the control is transferred after some time, and a confirmation message is displayed to the user now in control.

### 2.5.6 Taking control by force

If the other user does not want to release the control when requested and clicks **No** when prompted, you can still take over the control if you are logged in as a higher-level user than the user currently in control.

- 1. To take the control by force, click **Yes** when prompted about a forced takeover.

## 2.6 User management

MW41 user management takes place in the **User Management** application.

In **User Management**, a user with the **User Administrator** role can manage the MW41 users: add, edit and delete users.

For information on how to get started with managing users, see *Vaisala DigiCORA Sounding System MW41 Getting Started Guide*.

For detailed instructions on managing users and editing existing users when updating the MW41 sounding software to the new version including the **User Management** application, see *Vaisala DigiCORA Sounding System MW41 Technical Reference*.

### 2.6.1 MW41 user roles

In MW41, users are categorized into four groups with different privileges.

**Table 3 MW41 user roles**

Role	Description
<b>User Administrator</b>	Has the rights to manage users in the <b>User Management</b> application.
<b>MW41 Administrator</b>	Has full access rights to the system, including the Advanced configuration.
<b>MW41 Manager</b>	Has extended operator rights. Allowed to perform system configuration.
<b>MW41 Operator</b>	Has normal sounding rights. Not allowed to delete a sounding from the archive or upload or download a sounding, or perform system configuration.



**CAUTION!** Make sure that the system has **User Administrator** and **MW41 Administrator** at all times. Without **User Administrator**, you are unable to do user management tasks. Without **MW41 Administrator**, you are unable to do system configuration tasks, and may need to reinstall the MW41 software.



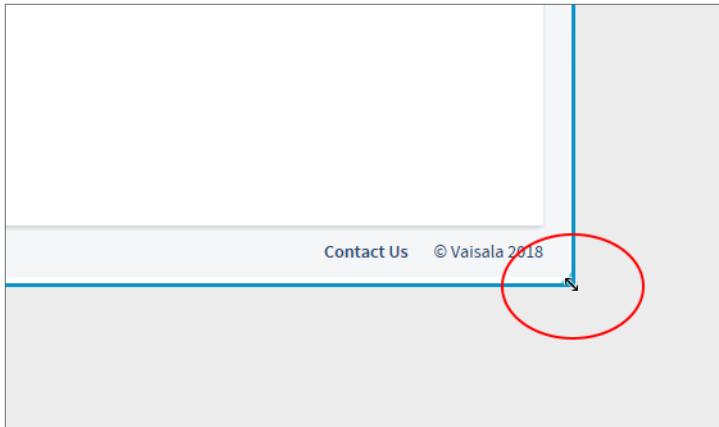
The same user may have roles for both AUTOSONDE and MW41 software and log in to both. For example, it may be convenient that administrator-level users have both **AS41 Administrator** and **MW41 Administrator** roles.

Vaisala recommends assigning one software-specific user role per a user. If a user is assigned more than one of the MW41 user roles, only the role with the most extensive privileges is active.

## 3. Using MW41 help

### 3.1 Accessing help

- ▶ 1. Click the **Help** button on the application toolbar.
- 
2. The Help pages are displayed on top of the application window. You can resize the **Help** window by dragging it from the bottom right corner. Point to the corner and wait until a two-headed arrow appears and drag the window from the corner:



3. To move the **Help** window, point to the title bar and press the mouse button down. Drag and drop the window to a new position.



Do not place the **Help** window under the application header bar on top of the application, where you cannot close it. If you place the **Help** window under the header bar by accident, the only way to close it is to close the application.

4. Some parts of the MW41 software contain links to specific parts of the system Help where you can obtain information for a specific part of the sounding software. Click the Help icon  to access the Help in these parts of the software. The correct topic page is automatically opened.
5. Close the **Help** window by clicking the cross in the title bar.

### 3.2 Browsing online help contents

- ▶ 1. If the contents panel is not displayed, click the  icon at the top of the page.

2. The contents panel displays initially only the main topics. To show more topics, click the topic headings marked with the arrow icons: 
3. Open a topic by clicking the topic name in the contents panel.
4. To navigate between topics, you can also use the navigation links and buttons at the top and bottom of the pages.

Home > Monitoring a Sounding > Viewing Sounding Status



The navigation path is only displayed when the browser window is wide enough.

### 3.3 Using search in help

- 1. Type the word in the **Search** field at the top of the page and press **ENTER**.



If the **Search** field is not displayed, click the  icon.

- A list of the help pages where the word occurs is displayed.
  - If you search for several words, a list of help pages where all the searched words occur is displayed.
  - The pages with higher relevance are displayed at the top of the list.
2. Click the page titles to view the topic page. The selected page is displayed with the searched word(s) highlighted.



This online help covers only some typical standard options and selections, for example, for items that you can select from lists. Depending on your organization and your user rights in the organization, you may have customer-specific options available that are not covered in this online help.

## 3.4 Changing language of MW41 user interface



You need **MW41 Administrator** rights to MW41 software to change the user interface language.

- ▶ 1. Select **Administration > Advanced > User interface > Locale**.
- 2. Select **Edit**.
- 3. Select the appropriate language from the drop-down list and then **Save**.

The language of the user interface has now been changed.

# 4. Getting started

## 4.1 Starting the software and logging in

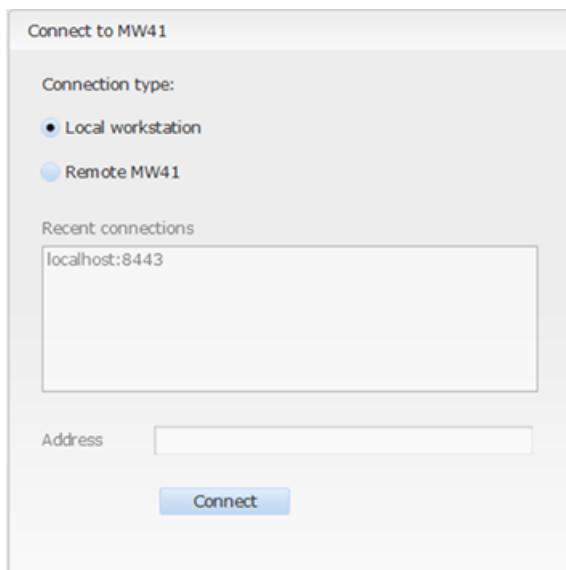


For a normal sounding, you need the **MW41 Operator** rights.

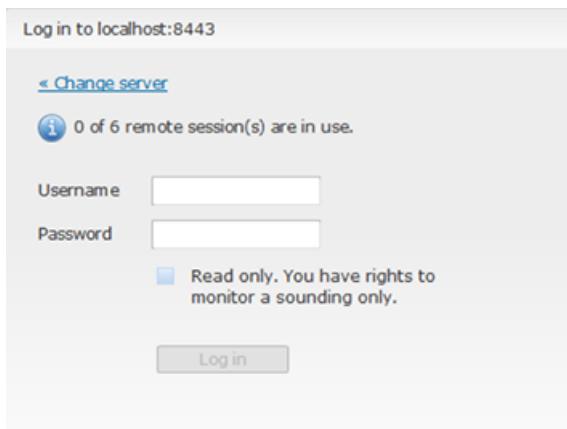
- ▶ 1. Power on Sounding Processing Subsystem SPS3xx before turning on the computer with the MW41 sounding software.
- 2. Turn on the computer.
- 3. Click the icon on the desktop to start the MW41 sounding software.



- 4. Make sure **Local workstation** is selected, and click **Connect**.



5. Log in with your username and password.



- The number of concurrent user sessions available depends on the type of the software license. The local user is always able to access the software. Local user here means a user who started the software on the local workstation where the software is installed, and who is performing the sounding.
  - If the **Read-only** check box is selected, you have read-only rights to the system, not full control. The check box is selected if another user already has full control of the system when you log in.
  - When a login message has been configured in the MW41 **Advanced** settings, you can see a notification message under the login window. For more information, see *Vaisala DigiCORA Sounding System MW41 Technical Reference*.
6. If you are logging in for the first time, change your password in **User Management** application.
- a. Type the old password, the new password, confirm the new password, and select **Change**.
7. Log in to MW41 sounding software with your new password.  
All MW41 services are automatically started and a message is displayed to indicate that the system is starting.

**More information**

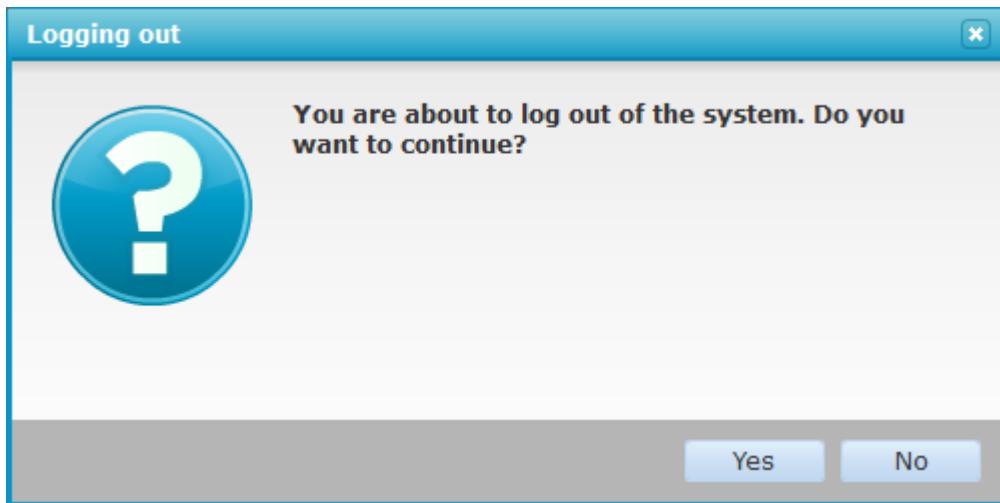
- [Sounding procedure \(page 8\)](#)

## 4.2 Logging out

- ▶ 1. To log out of the sounding software, click the **Log out** button in the application header.



A confirmation message is displayed.



## 4.3 Configuring the sounding software



You need **MW41 Administrator** rights to be able to configure the MW41 sounding software.

When you first start the MW41 sounding software, the system prompts you to make the necessary configurations to the sounding system. Click the text links on the bottom of the window to directly access the settings you need to configure. At minimum, you must configure the station position settings and Sounding Processing Subsystem SPS3xx IP address before you can start a sounding.

If you have already made all the necessary configurations during a previous session, the software opens directly to the **Radiosonde Selection** tab.

Before you start a sounding, set the following in the **Administration** window:

- ▶ 1. In **Devices and Systems > Sounding Processing Subsystem**, give an IP address for SPS3xx.
- 2. In **Devices and Systems > Radiosonde - workstation connection**, set a serial port for the ground check device or the cable.

3. In **Soundings > Station**, set the station parameters:
  - WMO station name
  - WMO station number (3 digits; in case of a ship or a mobile station, enter 0.)
  - WMO block number (2 digits; in case of a ship or a mobile station, enter 0.)
  - WMO region number
  - Message type
  - Station position
4. In **Soundings > Messages**:
  - a. Set WMO message destinations.
  - b. Modify WMO message headers and footers.
5. In **Soundings > Radiosonde selection mode**, select the radiosonde preparation mode, if necessary.

For advanced-level configurations, see *Vaisala DigiCORA Sounding System MW41 Technical Reference*.

#### More information

- [Configuring sounding processing subsystem \(page 141\)](#)
- [Configuring radiosonde - workstation connection \(page 143\)](#)
- [Station \(page 146\)](#)
- [Messages \(page 151\)](#)
- [Setting radiosonde selection mode \(page 172\)](#)

# 5. Preparing Radiosonde RS41 for sounding



In this online help,

- RS41 refers to radiosonde models RS41-SG, RS41-SGP, and RS41-SGM, unless otherwise mentioned.
- RI41 refers to both RI41 and RI41-B, unless otherwise mentioned.
- SPS3xx refers to all Sounding Processing Subsystem models (SPS311G and SPS341AG), unless otherwise mentioned.



For information on performing a sounding with RT20, RS41-D, and MW41, see *Radiotheodolite RT20 and DigiCORA Sounding System MW41 User Guide*. The user guide is available on the MW41 installation media.

Before you start the radiosonde preparation, select the mode with which the radiosonde is prepared for the sounding in **Administration > Devices and Systems > Radiosonde - workstation connection**.

You can connect radiosonde RS41 to the system in the following ways:

- Using a ground check device, see [Connecting the radiosonde with Ground Check Device RI41 \(page 23\)](#) and [Connecting the radiosonde with Ground Check Device MWH322 \(page 28\)](#).
- Selecting a radiosonde that the system has detected automatically, see [Selecting the radiosonde from the radio spectrum \(page 35\)](#).

For advanced-level configurations, see *Vaisala DigiCORA Sounding System MW41 Technical Reference*.

You can start the radiosonde preparation when the **System state** field at the bottom of the **Radiosonde Selection** tab displays the message **Waiting for radiosonde**. The **Software** and **Radio** statuses must be **OK**.

## More information

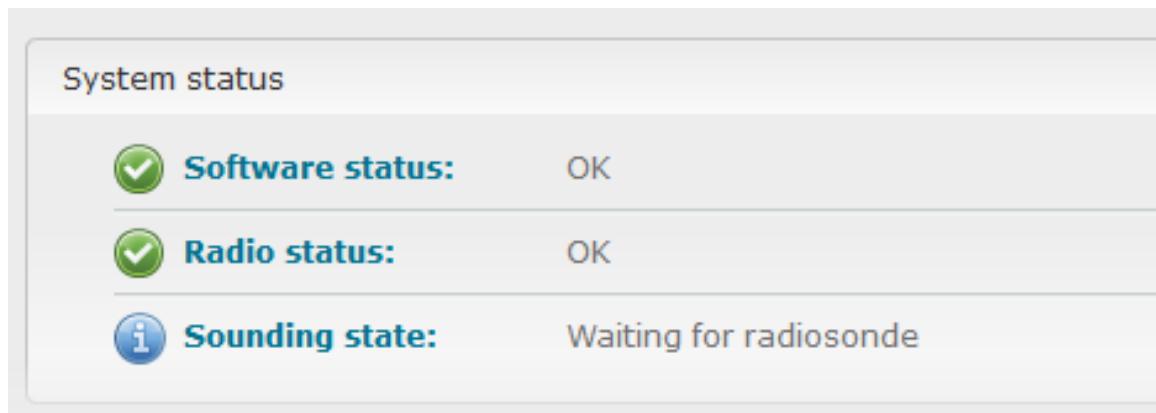
- [Sounding procedure \(page 8\)](#)

## 5.1 Displaying system status



During the radiosonde preparation phase, you cannot access other parts of the software.

You can start the radiosonde preparation when the **System state** field at the bottom of the **Radiosonde Selection** tab displays the message **Waiting for radiosonde**. The **Software** and **Radio** statuses must be **OK**.



The system status symbols indicate the following:

	This symbol stands for information.
	No problems detected.
	Balloon is ascending.
	Balloon is descending.
	Balloon is ascending. The sounding continues in the degraded mode if the mode has been enabled in the <b>Advanced</b> configuration.
	Balloon is descending. The sounding continues in the degraded mode if the mode has been enabled in the <b>Advanced</b> configuration.
	Warning

	The system has detected an error.
--	-----------------------------------

If the sounding cannot be started, you are prompted to check the system status:

**To start sounding...**

MW41 sounding system is not ready for sounding. Check the reason from system status below.

## 5.2 Connecting the radiosonde with Ground Check Device RI41



In this online help,

- RS41 refers to radiosonde models RS41-SG, RS41-SGP, and RS41-SGM, unless otherwise mentioned.
- RI41 refers to both RI41 and RI41-B, unless otherwise mentioned.
- SPS3xx refers to all Sounding Processing Subsystem models (SPS311G and SPS341AG), unless otherwise mentioned.

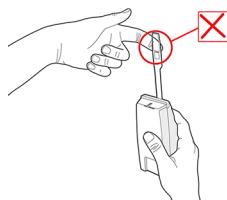
Before you connect the radiosonde to the ground check device, connect the ground check device to the sounding system via a USB cable and turn on the PC. For installation instructions, see *Vaisala DigiCORA Sounding System MW41 Getting Started Guide*.



**CAUTION!** Do not touch the radiosonde sensors. They are fragile and can be easily contaminated.



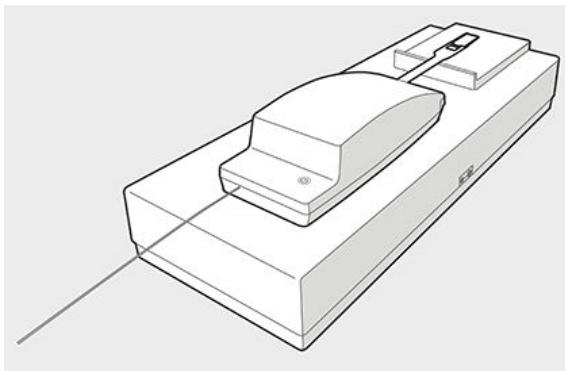
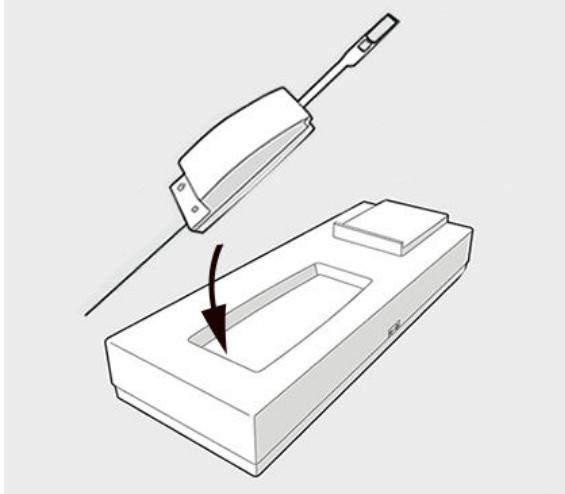
During humidity sensor reconditioning, the temperature of the sensor boom is about 150 °C for three (3) minutes.



- 1. Place the radiosonde on RI41 carefully. Make sure that you place the radiosonde on RI41 so that you place the radiosonde's back end (antenna end) on the device first.



**CAUTION!** Make sure that the radiosonde sensor boom does not hit the support plate on RI41, as this might damage the sensor boom.



The radiosonde is automatically switched on when placed on RI41.

2. The sounding software automatically detects the radiosonde and begins the preparations.

During the radiosonde preparations, the sounding software performs several steps. These consist of ground check procedures for sensors, as well as optional features for setting the radiosonde inflight operation parameters, such as a timer for turning the radiosonde power off after a desired time, pressure, or altitude. The preparation procedure depends on the radiosonde and ground check device model.

While the sounding software is preparing the radiosonde, you can do the following tasks on the **Preparations** tab:

- You can tune the radiosonde transmitter frequency or, alternatively, apply the station's default frequency.

- You can set termination triggers for the sounding.
- For RS41-SGM, you can define a trigger for radio silence height and/or time. This trigger sets the height and/or the time after which the radio silence ends and the radiosonde starts transmitting data.

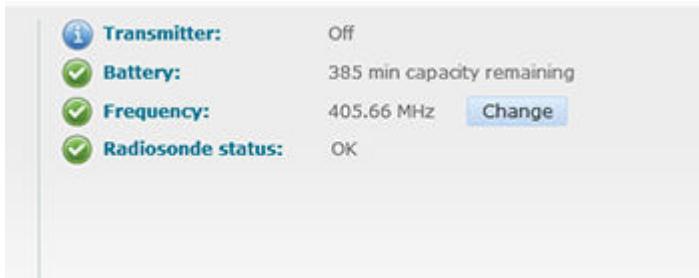
#### More information

- [Setting termination triggers \(page 32\)](#)
- [Setting radio silence for Radiosonde RS41-SGM \(page 33\)](#)

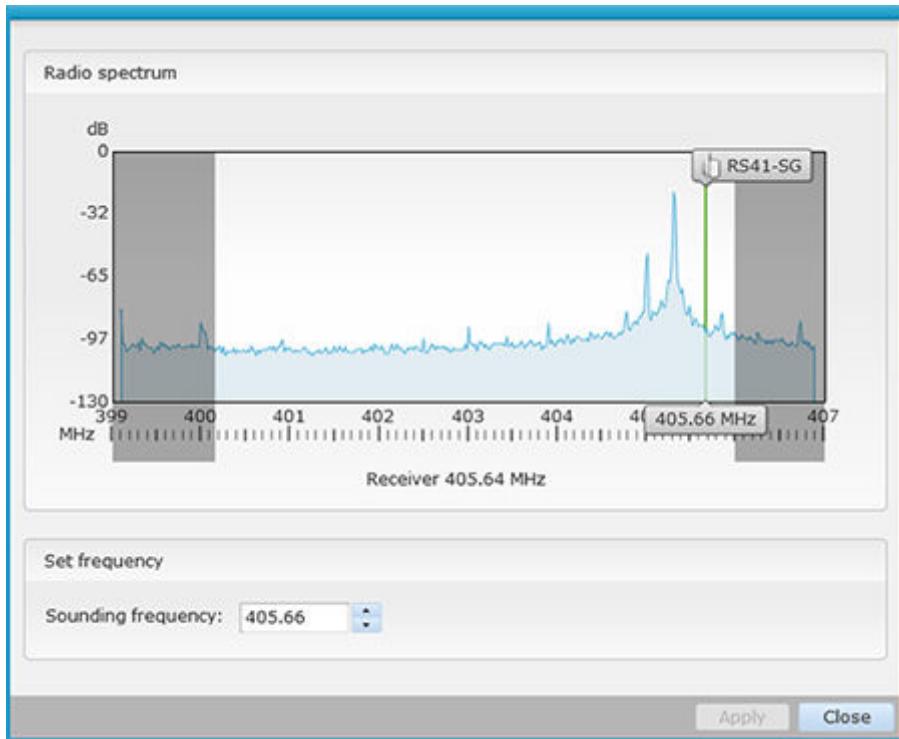
### 5.2.1 Tuning the radiosonde frequency

If needed, you can tune the radiosonde frequency while the sounding software is preparing the radiosonde.

- 1. In the **Preparation** tab, click **Change**.



2. The **Radio spectrum** window opens. Set the new frequency in the text box by using the arrow buttons and click **Apply**.  
Or tune the frequency by pointing to the correct place in the radio spectrum and clicking the mouse.



In the radio spectrum, forbidden frequencies are indicated with red icons and the forbidden frequency area is colored grey.

If you try to place the frequency indicator in that area, a message **selected frequency not allowed** is displayed. Forbidden frequencies are defined in the **Administration** part of the sounding software.

#### More information

- [Adding pre-selected or forbidden frequencies \(page 142\)](#)

### 5.2.2 Displaying ground check status for RS41-SG, RS41-SGM and RI41



The ground check phases are slightly different depending on the radiosonde model and the ground check device.

When you have placed the radiosonde on the ground check device, the sounding software goes through reconditioning and ground checking. The status is clearly indicated with a progress bar.



During the ground check, the following preparation steps are performed for the radiosonde:

- **T check:** The radiosonde performs an in-built functional temperature check.
- **Reconditioning:** Preparation of humidity sensor.
- **Cooling** after reconditioning
- **U check:** The radiosonde performs a physical zero humidity check.
- **Updating radiosonde:** The parameters and RI41 results are updated to the radiosonde.

### 5.2.3 Displaying ground check status for RS41-SGP and RI41 or RI41-B



The ground check phases are slightly different depending on the radiosonde model and the ground check device.

When you have placed the radiosonde on the ground check device, the sounding software goes through reconditioning and ground checking. The status is clearly indicated with a progress bar.

If the ground check device you are using to prepare RS41-SGP does not include a pressure sensor, you must enter the reference pressure manually during the preparation. Click **Apply** after entering the value. If the pressure sensor is included, it is obtained automatically.



During the ground check, the following preparation steps are performed for the radiosonde:

- **T check:** The radiosonde performs an in-built functional temperature check.
- **Reconditioning:** Preparation of humidity sensor.
- **Cooling** after reconditioning
- **U check:** The radiosonde performs a physical zero humidity check.

- **Stabilizing:** Waiting for the pressure sensor to stabilize. Enter the pressure reference value from your own reference source or, with RI41-B, retrieve the pressure reference value automatically from the barometer module in RI41-B.
- **Ground check:** Once the conditions have stabilized, that is, the PTU values are steady, ground check is performed.
- **Updating radiosonde:** The parameters and RI41 results are updated to the radiosonde.

## 5.2.4 Starting monitoring

After the ground check is finished, the sounding software indicates the results with a message.

- ▶ 1. Remove the radiosonde from RI41.

## 5.2.5 Returning to preparation phase

Before the radiosonde is launched, you can return to the preparation phase anytime.

- ▶ 1. Restart the ground check by replacing the radiosonde on the ground check device.  
The sounding software automatically returns to the ground check phase.

## 5.3 Connecting the radiosonde with Ground Check Device MWH322



To provide extra protection for the radiosonde, for example, when performing a sounding outdoors, Vaisala recommends that the radiosonde is prepared in the cardboard box.  
Remove the foil bag before the preparations.

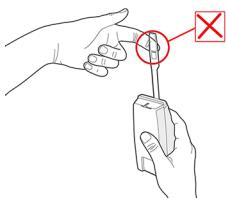
Before you connect the radiosonde to the ground check device, connect the ground check device to the sounding system via a USB cable and turn on the PC. For installation instructions, see *Vaisala DigiCORA Sounding System MW41 Getting Started Guide*.



**CAUTION!** Do not touch the radiosonde sensors. They are fragile and can be easily contaminated.



During humidity sensor reconditioning, the temperature of the sensor boom is about 150 °C for three (3) minutes.



- ▶ 1. Place the radiosonde on the ground check device. If you are preparing the radiosonde in the cardboard box, check the markings on the cardboard box and the ground check device for the correct placement of the radiosonde.
- 2. Pull the strap over the radiosonde. The radiosonde is switched on automatically. To interrupt the sounding preparations at this point, remove the strap.
- 3. The sounding software automatically detects the radiosonde and begins the preparations.

During the radiosonde preparations, the sounding software performs several steps. These consist of ground check procedures for sensors, as well as optional features for setting the radiosonde inflight operation parameters, such as a timer for turning the radiosonde power off after a desired time, pressure, or altitude. The preparation procedure depends on the radiosonde and ground check device model.

While the sounding software is preparing the radiosonde, you can do the following tasks on the **Preparations** tab:

- You can tune the radiosonde transmitter frequency or, alternatively, apply the station's default frequency.
- You can set termination triggers for the sounding.
- For RS41-SGM, you can define a trigger for radio silence height and/or time. This trigger sets the height and/or the time after which the radio silence ends and the radiosonde starts transmitting data.

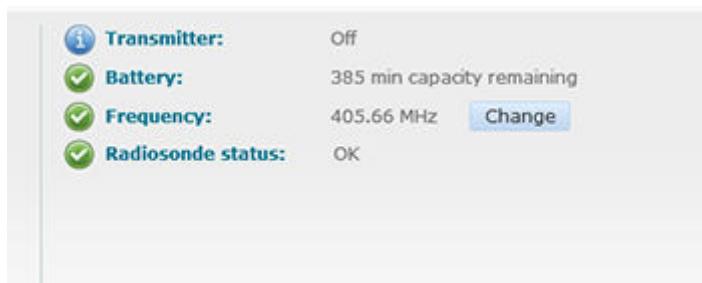
#### More information

- ▶ [Setting radio silence for Radiosonde RS41-SGM \(page 33\)](#)

### 5.3.1 Tuning the radiosonde frequency

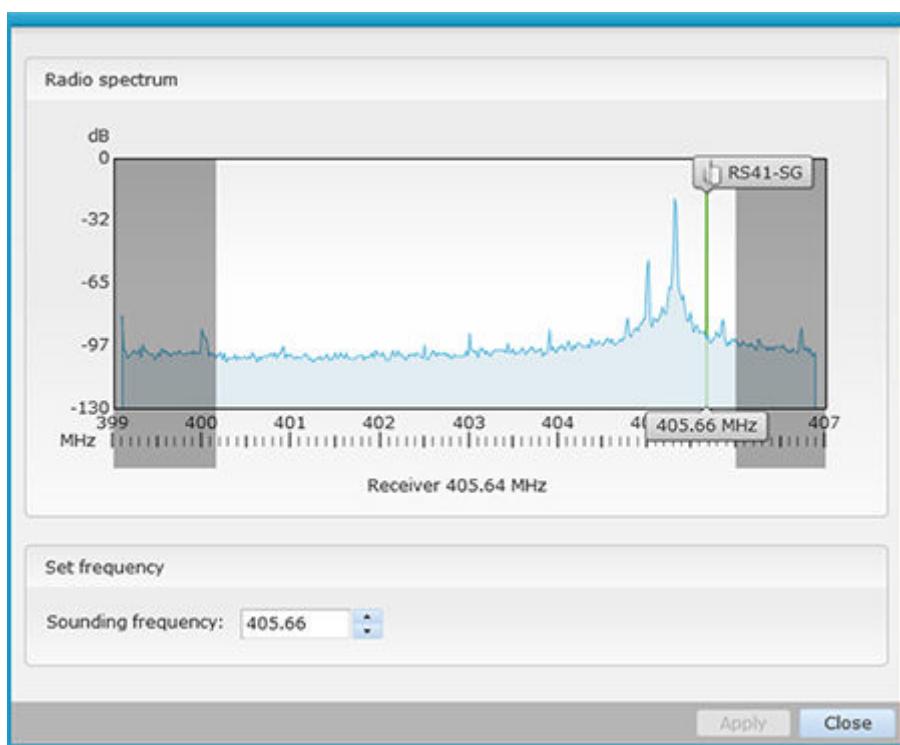
If needed, you can tune the radiosonde frequency while the sounding software is preparing the radiosonde.

- 1. In the **Preparation** tab, click **Change**.



2. The **Radio spectrum** window opens. Set the new frequency in the text box by using the arrow buttons and click **Apply**.

Or tune the frequency by pointing to the correct place in the radio spectrum and clicking the mouse.



In the radio spectrum, forbidden frequencies are indicated with red icons and the forbidden frequency area is colored grey.

If you try to place the frequency indicator in that area, a message **Selected frequency not allowed** is displayed. Forbidden frequencies are defined in the **Administration** part of the sounding software.

#### More information

- [Adding pre-selected or forbidden frequencies \(page 142\)](#)

### 5.3.2 Displaying ground check status



The ground check phases are slightly different depending on the radiosonde model and the ground check device.

When you have placed the radiosonde on the ground check device, the sounding software goes through reconditioning and ground checking. The status is clearly indicated with a progress bar.



During the ground check, the following preparation steps are performed for the radiosonde:

- **T check:** The radiosonde performs an in-built functional temperature check.
- **Reconditioning:** Preparation of humidity sensor.
- **Cooling** after reconditioning
- **U check:** The radiosonde performs a physical zero humidity check.
- **Updating radiosonde:** The parameters and MWH322 results are updated to the radiosonde.

### 5.3.3 Starting monitoring

After the ground check is finished, the sounding software indicates the results with a message.

- 1. Remove the radiosonde from the ground check device.  
If radio silence is set, the radiosonde starts to buffer sounding data without transmitting it and MW41 waits for transmission from the radiosonde. The radio silence trigger you set activates data transmission at the appropriate moment and the radiosonde starts transmitting buffered data.  
MW41 begins to render the transmitted data. When the transmission of buffered data is finished, transmission continues with real-time sounding data.

### 5.3.4 Returning to preparation phase

Before the radiosonde is launched, you can return to the preparation phase anytime.

- 1. Restart the ground check by replacing the radiosonde on the ground check device.  
The sounding software automatically returns to the ground check phase.

## 5.4 Setting termination triggers



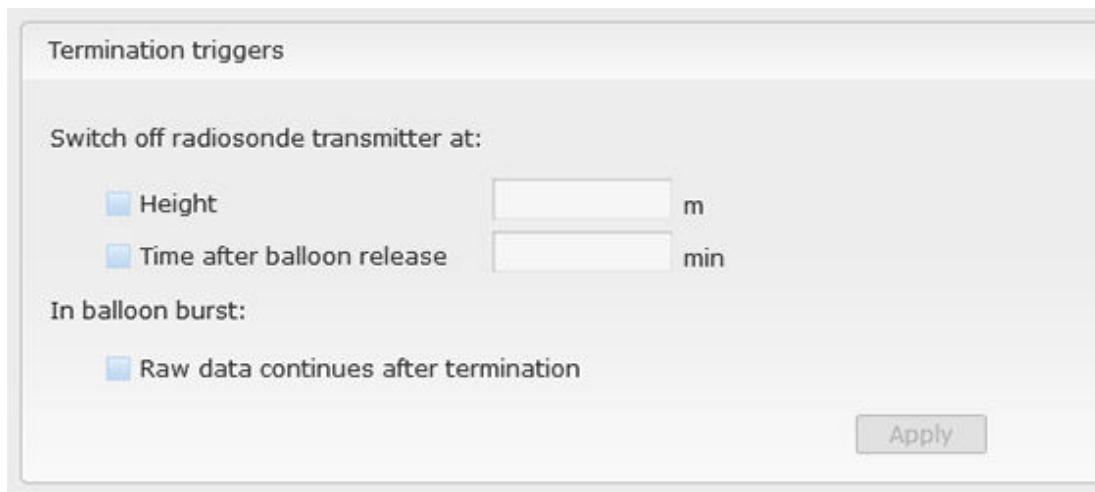
Setting termination triggers must first be enabled at **Administration > Sounding > Setting the termination criteria**. This makes the **Termination triggers** window available to the operator.

When preparing the radiosonde with a ground check device, you can set triggers to terminate the sounding calculations. The triggers switch the radiosonde transmitter off at a certain point of the sounding.



If you cannot see this part of the **Preparation** tab completely, use the scroll bar on the right to scroll the bottom half of the tab.

- 1. In the **Termination triggers** window, select the desired termination triggers. You can select the following termination triggers for a sounding with RS41:



- **Switch off radiosonde transmitter at:** Possible selections are **Height** (meters) and **Time after balloon release** (minutes).
- **Raw data continues after termination:** This trigger defines that after the balloon has burst and the sounding has terminated, EDT calculation is finished, but raw data is still received.

When the criteria set as the termination trigger for the radiosonde has been met, the message **Radiosonde termination condition met** is displayed.

### More information

- [Setting termination criteria \(page 174\)](#)
- [Terminating a sounding \(page 103\)](#)

## 5.5 Setting radio silence for Radiosonde RS41-SGM

With Radiosonde RS41-SGM, you can start the sounding in radio silence. This means that the radiosonde transmitter is not switched on until a specified height or time from launch has been reached.

Data is recorded during the radio silence and transmitted to the ground equipment when the radio silence ends. It is also possible to encrypt the data. See *Vaisala DigiCORA Sounding System MW41 Technical Reference* for more information on the parameter settings.

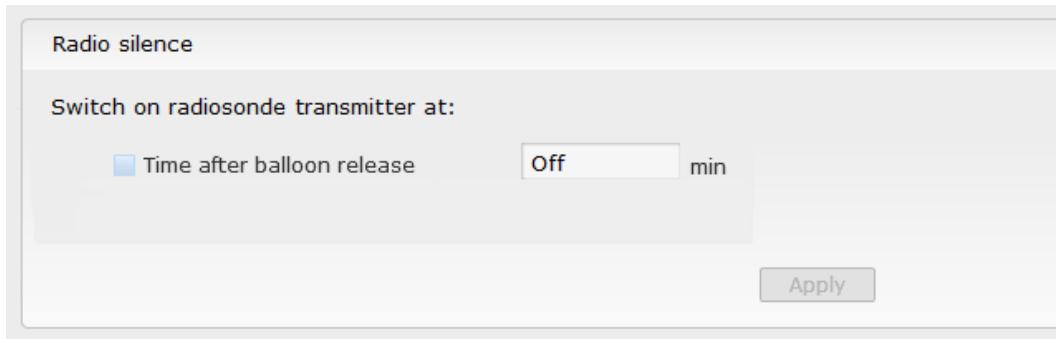
You can set or change the radio silence values until the end of the radiosonde preparations, but after they have been sent to the radiosonde, you must first switch off the radiosonde and start the preparations again if you wish to edit the values. The radio silence controls are inactive (greyed out) when the values are being sent to the radiosonde.

If the previous sounding was made with RS41-SGM, the values used in the previous sounding are automatically entered, unless you have set the radio silence parameter as disabled. If another type of radiosonde was used in the previous sounding, the default values are displayed.

- ▶ 1. To make the **Radio Silence** option visible in the **Preparations** tab, make the selection in **Administration > Advanced > Sounding > Radiosonde**.

2. Select one of the following options. The figures below show you the corresponding options in the **Preparations** tab.

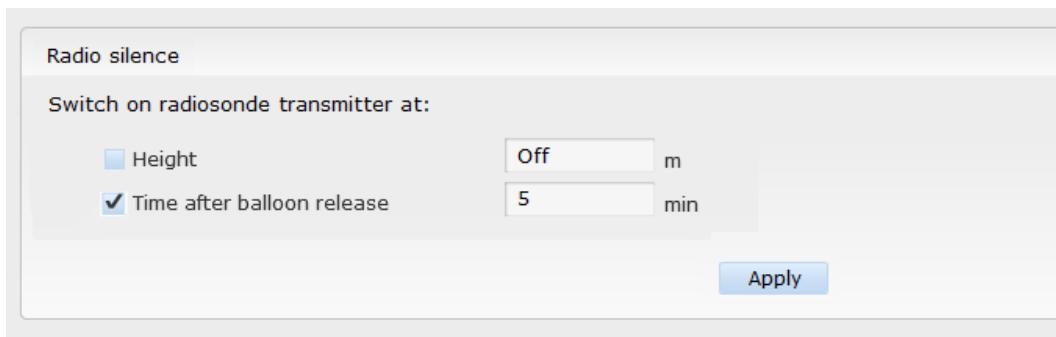
- **Time:** Range is 1 ... 20 minutes from launch. Value 0 is allowed, but it sets radio silence off. If you enter value 0, **Off** is displayed.



- **Height:** Range is 1 ... 5000 meters from launch. Value 0 is allowed, but it sets radio silence off. If you enter value 0, **Off** is displayed.



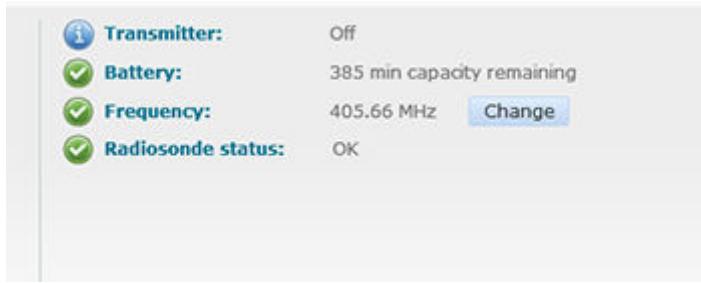
- **Both:** Transmitting data starts after the first trigger value set has been met.



- **Disabled:** If radio silence is configured as disabled, the radio silence controls are not displayed.

The **Apply** button becomes active when you have selected a checkbox and entered a value.

Information on the transmitter is displayed in the window during the preparations.

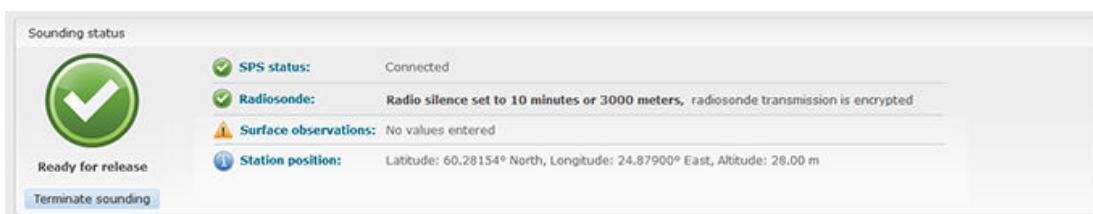


When the radio silence ends, information on the radiosonde is displayed in the **Sounding status** view.

### 5.5.1 Setting data encryption

You can encrypt data transmission from RS41-SGM.

- ▶ 1. To make the selection, go to **Administration > Advanced > Sounding > Radiosonde**. The **Sounding status** view displays information on both radio silence and radiosonde transmission. Information on radio silence is also displayed in the **Telemetry link status** view.

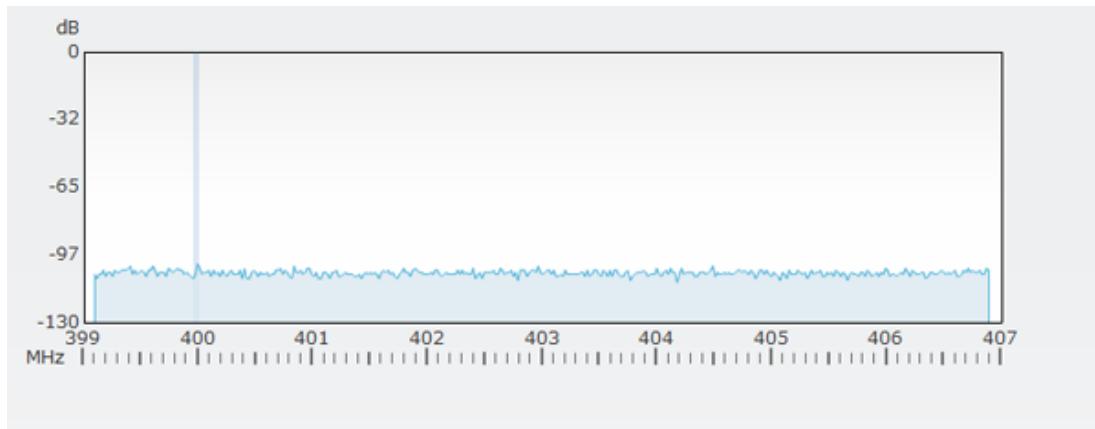


## 5.6 Selecting the radiosonde from the radio spectrum

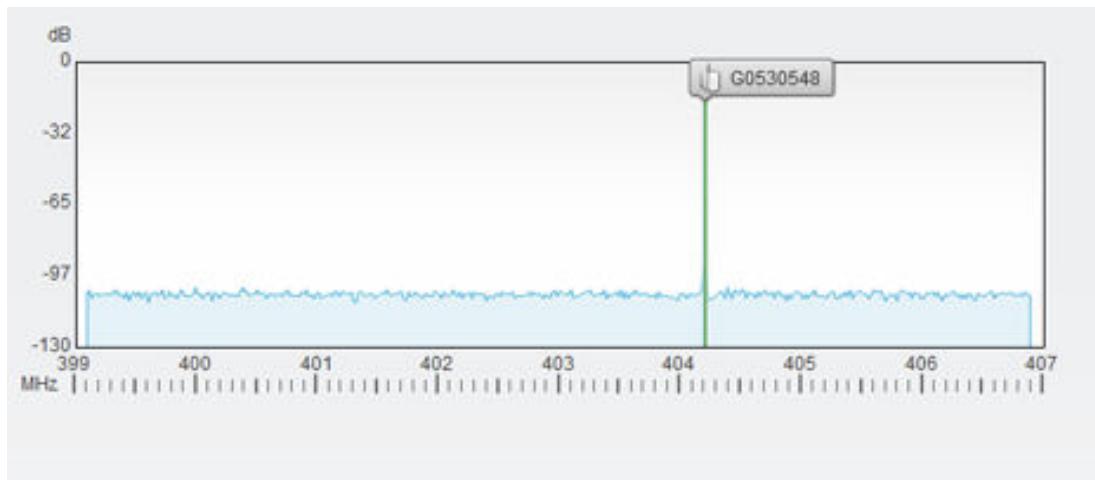
When you use the radio spectrum to select the radiosonde for the sounding, the system automatically scans the radio spectrum to find the sending radiosondes. You only need to check that the radiosonde signal received is correct.

This option is set in **Administration > Sounding > Radiosonde selection mode**.

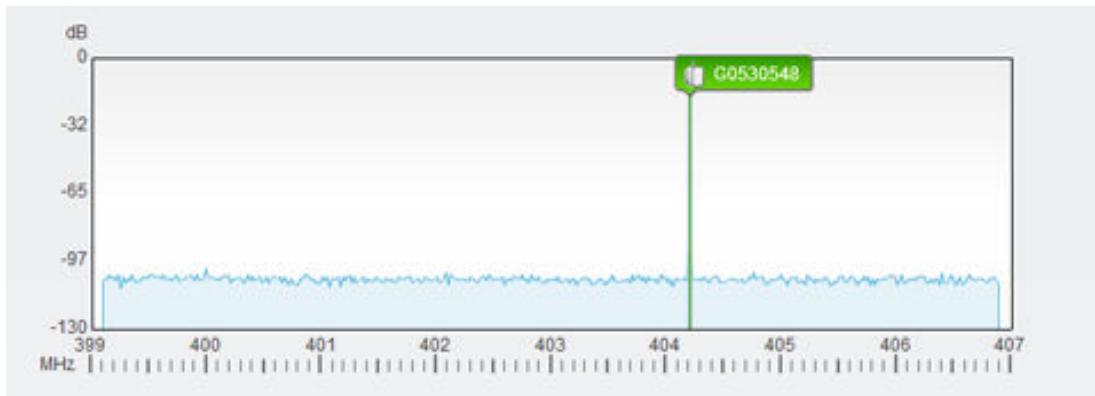
- 1. The grey line moving in the radio spectrum indicates that the system is scanning for frequencies.



2. When a radiosonde is found, its serial number is displayed on top of the line. Check the serial number to see that it matches with your radiosonde.



- When you point to the serial number field, the field turns green to indicate that the radiosonde has been selected.



Next, start monitoring the selected radiosonde.

#### More information

- Setting radiosonde selection mode (page 172)

### 5.6.1 Starting monitoring

- 1. Do one of the following options:
- Option 1: Click the radiosonde icon and **Start**.
  - Option 2: Type a frequency in the text box and click **Start**. When the system detects the frequency, it will automatically start monitoring the radiosonde.

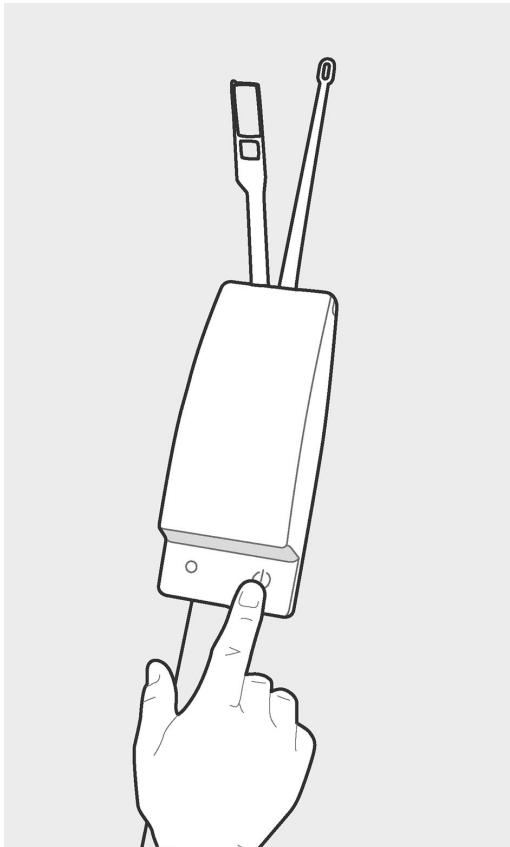
The surface observation values are displayed.



Some of the frequencies might be forbidden and cannot be used in a sounding. In such a case, you must enter the radiosonde frequency manually.

## 5.7 Switching the RS41 power on or off

- ▶ 1. If there is any delay in starting the sounding, for example, if you must wait before releasing the radiosonde balloon, you can switch the radiosonde off by pushing the power switch. When you are ready to release the balloon, switch the radiosonde back on.



## 5.8 Checking the RS41 LED light

- 1. After preparing the radiosonde for the sounding, check the radiosonde status by checking the LED light on the radiosonde cover.  
When the green LED light is steady, the radiosonde is ready for the release. The LED light will switch off automatically after the launch.

**Table 4 RS41 LED lights**

LED light	Meaning
Green LED is blinking.	When the green LED is blinking, the reconditioning of the humidity sensor and sensor checks are in progress and/or the radiosonde is not receiving GPS signal. To receive the GPS signal, take the radiosonde outside with line of sight to GPS satellites.
Green LED is steadily lit.	<ul style="list-style-type: none"> <li>a. The radiosonde is ready and works fine, determined by the radiosonde in-built diagnostics. The diagnostics cover, for example, temperature and humidity sensors.</li> <li>b. GPS satellites are detected. Once GPS signal has been found after radiosonde start up, the LED light becomes steady green. The LED may start blinking again due to possible GPS blind spots (for example, inside a balloon shelter), indicating that the radiosonde should be taken outside with line of sight to GPS satellites before launch.</li> <li>c. The steady green LED indicates that the telemetry from RS41 is working.</li> </ul> <div style="background-color: #e0e0e0; padding: 10px; margin-top: 10px;">  Even though the radiosonde LED light is steady green and the telemetry is working, it does not indicate that the sounding software receives data from the radiosonde. Check from the sounding software that the sounding software receives the data.     </div>
Red LED is lit.	<p>Error. Check the sounding software for any error messages.</p> <p>MW41 gives an error message in the following situations:</p> <ul style="list-style-type: none"> <li>• Low battery capacity.</li> <li>• Parameter setup has not been done.</li> <li>• Transmitter initialization has failed.</li> <li>• Transmitter is not in TX state.</li> <li>• No additional sensor data.</li> <li>• Flash write, erase or checksum error, or backup register write failure (even once).</li> <li>• PTU measurement has failed.</li> <li>• GPS initialization has failed.</li> <li>• GPS messages have been consecutively invalid during the last 5 cycles.</li> <li>• GPS messages have been consecutively missing during the last 5 cycles.</li> <li>• Radiosonde temperature sensor check has failed. Air temperature: {1}, humidity sensor temperature: {2}, limit: {0}.</li> <li>• Radiosonde humidity sensor check has failed. Limit: {0}, difference: {1}.</li> <li>• Regeneration temperature did not reach {0}.</li> <li>• Pressure module has not been detected.</li> <li>• Radiosonde temperature sensor check has failed.</li> <li>• Radiosonde humidity sensor check has failed.</li> </ul>

## 5.9 Performing several soundings

MW41 can monitor one radiosonde frequency at a time.

If you need to have more than one radiosonde transmitting at the same time, the radiosondes must be set to transmit at different frequencies during the ground check phase. You can configure the system to set the radiosonde frequency either automatically or manually.

The recommended minimum frequency difference between radiosondes is 200 kHz.



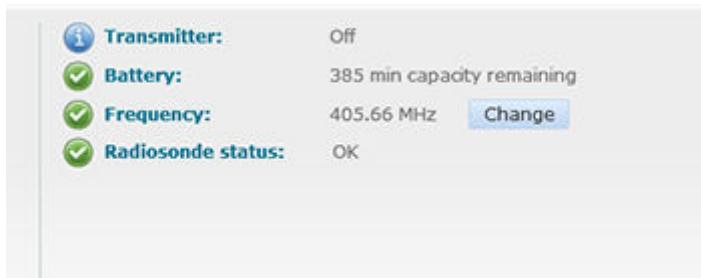
If MW41 receives a signal from another radiosonde during the ground check phase, the warning **Telemetry parser has received a frame from wrong radiosonde** will appear. In such cases, you must change the transmitting frequency of the radiosonde in ground preparation to an available frequency.

If you must start a new sounding while the current sounding is still active, you can terminate the sounding by clicking **Terminate sounding**.

### 5.9.1 Changing radiosonde frequency manually

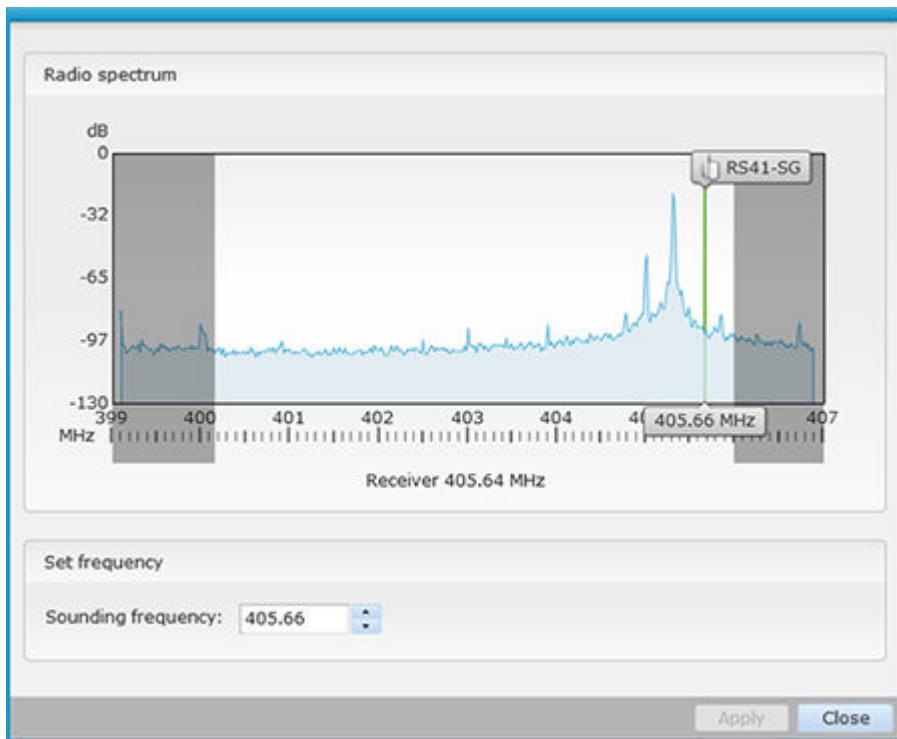
To manually change the radiosonde frequency during radiosonde preparation:

- ▶ 1. In the **Preparations** tab, click **Change**.



2. The **Radio spectrum** window opens. If there is a transmission peak in the spectrum, for example, 405.66 in the example figure below, select another frequency away from the peak. The recommended minimum frequency difference between radiosondes is 200 kHz.

If the spectrum is flat and there are no peaks in the spectrum, you can set the radiosonde to any frequency.



3. Set the new frequency in the text box by using the arrow buttons and click **Apply**.  
 • Or: tune the frequency by pointing to the correct place in the radio spectrum and clicking.

### 5.9.2 Changing radiosonde frequency automatically

You can set preselected frequencies for the radiosonde from which the radiosonde automatically selects the available frequency.

- ▶ 1. Select **Administration > Devices and Systems > Sounding Processing Subsystem: SPS**, and click **Edit**.
- 2. Enter the desired pre-selected frequency, and click **Add**. The frequency is shown in the list of pre-selected frequencies.
- 3. Add another frequency, if you wish. Click **Save** to apply the changes.

When the preselected frequency has been set, the radiosonde and the receiver frequencies are automatically tuned to the next available pre-selected frequency in case MW41 detects another radiosonde or high spectral noise in the default frequency during the ground check phase.



You can also set forbidden frequency bands. This feature is commonly used when the radiosonde frequency is set manually before each launch. When the forbidden bands are set, it is not possible to manually tune the radiosonde transmitting frequency to the forbidden bands during the ground preparation phase.

### 5.9.3 Monitoring radiosonde signals

If several radiosondes are flying at the same time, Vaisala recommends that you enable the radio spectrum feature in **Administration > Sounding > Radiosonde Selection Mode**. This selection adds a spectrum window to the MW41 start window, and you can use it to select which radiosonde to start monitoring without ground preparation.

When the sounding is active, you can monitor the received radiosonde signal and radio spectrum in **Sounding > Monitoring > GPS and Telemetry view**.

# 6. Launching the radiosonde



**WARNING!** Take extreme caution when handling the inflated balloon. Read the Safety Instructions for Balloon Operators before you start preparing the balloon.

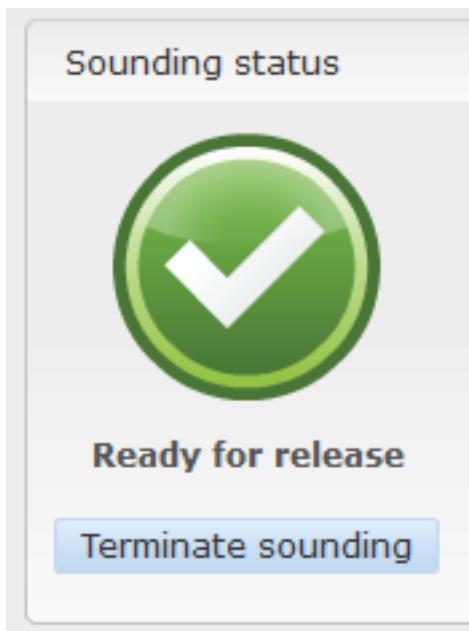
The sounding start mode depends on the settings done in **Administration > Sounding > Sounding start mode**.

## More information

- [Sounding procedure \(page 8\)](#)
- [Safety instructions for balloon operators \(page 50\)](#)

## 6.1 Automatic sounding start

When the radiosonde is ready for launch, the message **Ready for release** appears in the **Sounding status** field.



You can now release the radiosonde balloon and the sounding starts automatically.

## 6.2 Manual sounding start

When this setting has been selected as the sounding start mode in **Administration**, the sounding starts automatically when the balloon is released, but you can also start it manually by clicking the **Manual start** button as you release the balloon.

The automatic sounding start cannot be disabled, even if you have set the sounding start mode as manual. This way, the sounding will start even if you forget to click the **Manual start** button.

## 6.3 Returning to preparation phase

Before the radiosonde is launched, it is still possible to return to the preparation phase and make changes, if necessary.

After the radiosonde launch, you can no longer return to the preparation phase.

## 6.4 Displaying sounding status after launch

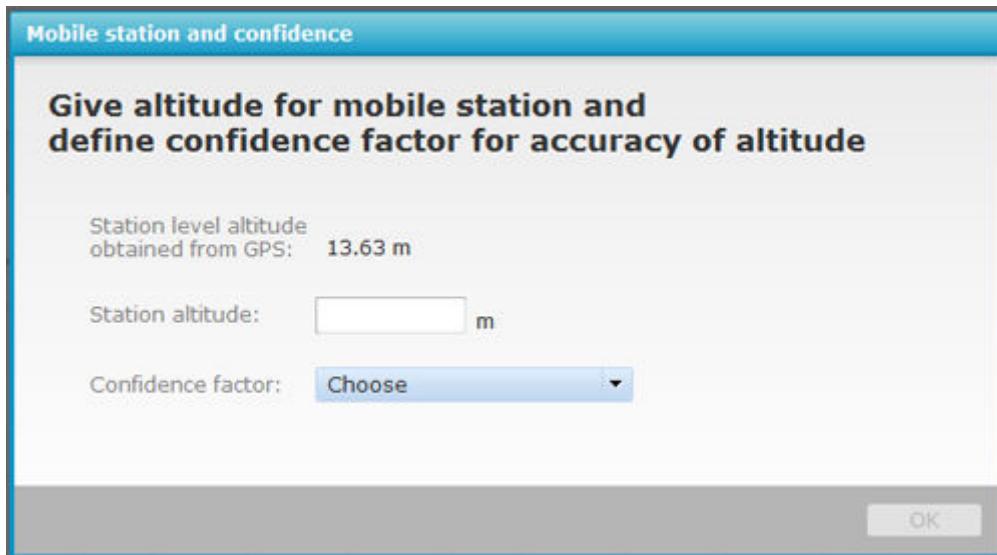
After you have launched the radiosonde, the **Sounding status** field displays the message **Ascending** and an icon.



For more information on the sounding accessories used with the radiosonde and on other sounding preparations, see the Radiosonde User Guides and *Vaisala Guide to Sounding Preparations Technical Reference*, included on the MW41 installation media.

## 6.5 Entering station altitude and confidence factor

When you select **Mobile** as the message type in the **Station** settings, you must enter the **Station altitude** and **Confidence factor** values before launching the radiosonde.



- ▶ 1. Type a value for **Station altitude**. The **Station level altitude obtained from GPS** value gives you an estimate of the station level altitude.
- 2. Select a confidence factor from the drop-down list. The options are the following for either meters or feet. The unit is selected in **Administration > Advanced**.
  - Options for Meters:

Altitude accuracy in meters	Confidence
Within 3 meters	Excellent
Within 10 meters	Good
Within 20 meters	Fair
More than 20 meters	Poor

- Options for Feet:

Altitude accuracy in feet	Confidence
Within 10 feet	Excellent
Within 30 feet	Good
Within 60 feet	Fair
More than 60 feet	Poor

- 3. Click **OK** to proceed.

After entering the station altitude and confidence factor values, you are required to enter the surface observation values.

**More information**

- [Viewing and editing surface observation values \(page 47\)](#)

# 7. Entering surface observation values and metadata

## 7.1 Obtaining surface observations from AWS

If an Automatic Weather Station (AWS) has been installed as part of the sounding system, you can configure MW41 Sounding System to fetch the surface observation values automatically from the AWS.

- ▶ 1. To check the instant AWS values, select **Administration > Diagnostics**.  
2. Click **Copy** to copy the AWS values as surface level observation values.

## 7.2 Obtaining surface pressure from RI41-B with RS41-SG

To obtain surface observation pressure from RI41-B when using radiosonde RS41-SG:

- ▶ 1. Select **Administration > Sounding > Surface observations input**.  
2. Set the surface observation input mode as **Manually from radiosonde** or **Automatically from radiosonde**.

## 7.3 Viewing and editing surface observation values

You can configure the surface observation values to be entered before or after the launch, but note that the system can only start calculating EDT data after the surface observation values have been entered.

- ▶ 1. Select **Sounding > Monitoring > Sounding Status**.  
2. At the bottom of the **Sounding Status** window, click the **Show [+]** tab   
3. Enter the surface observations values. To edit the values, click the appropriate text box and enter a new value.  
If you enter a value that is not valid, the text box borders turn red and the **Apply** button becomes inactive.  
4. Enter the additional surface observation values, if necessary. The additional surface observation values can be configured in **Administration > Sounding > Surface observations input** and are not always visible.

5. For wind speed, you can enter the value as either meters or knots per second. You can select the unit in **Administration > Sounding > Surface observations input**.
6. When you have filled in all the necessary information, click **Apply**. MW41 regenerates all messages.
7. To close the tab, click **Hide [-]**.

#### More information

- [Sounding procedure \(page 8\)](#)
- [Viewing sounding status \(page 52\)](#)

## 7.4 Editing surface observation values during sounding

You can edit all surface level observation values during a sounding except the launch site pressure value. You can also edit the values in an archived sounding.

- 1. Select **Sounding > Monitoring > Sounding Status**.
2. At the bottom of the **Sounding Status** window, click the **Show [+]** tab .
3. Enter the new information in the text field and click **Apply**.
4. Click **Recalculate**.

MW41 starts recalculating the data and a progress bar is displayed.



Recalculation takes some time and you cannot use MW41 during recalculation.

- When you are editing surface level observation values during a sounding, MW41 recalculates the data up until the current status of the ongoing sounding.
- When you are editing surface level observation values in an archived sounding, MW41 recalculates all data and creates a new archived sounding.

5. To close the tab, click **Hide [-]**.

## 7.5 Viewing and editing metadata values

- 1. Select **Sounding > Monitoring > Sounding Status**.
2. At the bottom of the **Sounding Status** window, click the **Show [+]** tab .

3. Enter the metadata values necessary. Metadata values consist of information on the observation, the radiosonde, the balloon, and other information.
  - **Observation**
    - **Date and Time:** MW41 automatically fills in the date and time for the sounding.
    - **Observer Initials**
    - **Ascension/Flight Number:** MW41 keeps track of the number of soundings performed. You can modify the numbering at any point. MW41 will then use the number you added as the new starting point.
    - **Release Number:** The release number means the number of soundings within the release and it is 1, 2, or 3.
  - **Radiosonde**
    - **Type and Serial Number:** MW41 automatically enters the radiosonde type and serial number and you cannot edit the information.
  - **Balloon**
    - **Type**
    - **Weight**
    - **Manufacturer**
    - **Date of Manufacture**
    - **Balloon Age:** After you have entered the balloon's date of manufacture, MW41 automatically counts the age of the balloon in months.
    - **Manufacture Lot Number**
    - **Nozzle Lift**
    - **Gas type**
    - **Gas volume**
  - **Other**
    - Enter information on the train length and select **Yes** or **No** for **Train Regulator**, **Lighting Unit**, and **Parachute**, depending on whether they are in use or not.
    - In the **Free text** box, you can write your own notes. The number of characters left is displayed under the text box. The information entered is displayed in the sounding archive data, in column **Comment**.
4. When you have filled in all the necessary information, click **Apply**.  
MW41 regenerates all messages containing metadata.
5. To close the tab, click **Hide [-]**.

#### More information

- [Viewing sounding status \(page 52\)](#)

## 8. Safety instructions for balloon operators

Photocopy these instructions and place the list in clear view in the balloon filling shed and in the sounding compartment.



**WARNING!** New operator! Carefully study the instructions for using the hydrogen generator and for the correct method of inflation.

- ▶ 1. No smoking or naked flame allowed.
- 2. If possible, avoid wearing clothing made of nylon or other synthetic fibers to prevent a build-up of static charges. Do not wear shoes with rubber soles.
- 3. Wear protective glasses.
- 4. Regularly check that the gas tube fits securely to the gas cylinder or generator nozzle and to the balloon inflation nozzle.
- 5. Take care to prevent a gas leak in the shed when interrupting inflation to replace a gas cylinder.
- 6. Never use a repaired balloon.
- 7. Should a leak develop in the balloon during inflation, do not let gas escape from the balloon inside the shed if possible. Instead, release the defective balloon without load. It is not advisable to deflate the balloon, even outside the shed.
- 8. Do not touch the balloon with bare hands except when holding it by the neck. Wear soft cotton gloves.
- 9. Ensure that there are no pointed objects in the shed. Nails, hooks, hinges, padlocks, etc., are dangerous as they might scratch the inflated balloon. The balloon film is only 0.05 ... 0.1 mm thick upon launch; the slightest scratch could cause the balloon to burst prematurely.
- 10. Keep the doors of the shed shut while inflating the balloon on a windy day. However, ensure that the shed is properly ventilated.
- 11. No unauthorized person shall be allowed admittance to the shed while the hydrogen generator is in operation or balloon inflation is going on.
- 12. Ensure that all tools and other implements not essential for balloon inflation have been removed from the shed.
- 13. Do not take any electrical devices (cell phone etc.) to the balloon filling shed or close to the balloon inflated with hydrogen. Safe distance when outdoors is typically 1.5 meters.

14. Always keep the radiosonde at least 50 cm below the level of the gas nozzle and the inflated balloon, and at least 1.5 meters away from the gas cylinder/hydrogen generator, connectors, and tubing. Avoid taking the radiosonde inside the balloon filling shed, if possible.
15. Follow all regulations concerning hydrogen safety.

**More information**

- ▶ [Launching the radiosonde \(page 43\)](#)

# 9. Monitoring a sounding

The **Monitoring** tab shows information on the sounding and the radiosonde. The tab opens for viewing when the sounding preparations have been completed, or when you open an archived sounding for viewing.

The **Monitoring** tab contains the following tabs:

- **Sounding Status**
- **GPS and Telemetry**
- **Sounding Summary**
- **Extended Monitoring**
- **Thermodynamic Graphs**

## More information

- [Sounding procedure \(page 8\)](#)

## 9.1 Viewing sounding status

- 1. On the application toolbar, select **Sounding > Monitoring > Sounding Status**.  
The general sounding status is clearly indicated with an icon. The icon is visible even if you open graphics or tabular data in fullscreen mode.

	This symbol stands for information.
	No problems detected.
	Balloon is ascending.
	Balloon is descending.
	Balloon is ascending. The sounding continues in the degraded mode if the mode has been enabled in the <b>Advanced</b> configuration.
	Balloon is descending. The sounding continues in the degraded mode if the mode has been enabled in the <b>Advanced</b> configuration.

	Warning
	The system has detected an error.

The window shows details on the sounding status and station position. The information displayed varies according to the sounding system configuration and the sounding phase:

	<b>SPS status:</b>	Connected
	<b>Radiosonde</b>	Type: RS92-SGP, S/N: G0540179
	<b>Release:</b>	Release done, Release time: 2012-06-11 11:52 (UTC 2012-06-11 10:52) Launch detection: Automatic
	<b>Surface observations:</b>	Surface observations entered. Pressure: 1012.29 hPa, Launch site pressure: 1012.29 hPa, Temperature: 1.82 °C, Humidity: 85.5 %RH, Wind direction: 45°, Wind speed: 2.0 m/s
	<b>Station position:</b>	Latitude: 60.28244° North, Longitude: 24.87714° East, Altitude: 31.93 m

When radio silence has been set in a sounding with RS41-SGM, information on radiosonde is displayed after radio silence has ended.

If there are not enough satellites received for measuring the GPS calculation, a warning is shown. This warning does not prevent the start of the sounding. The warning is displayed, for example, when the radiosonde is ready for release and taken to the balloon-filling shed before the release.

	<b>GPS satellites:</b>	Radiosonde: 0 GPS satellites tracked. Local: 0 GPS satellites tracked.
--	------------------------	--

The window also contains information on the raw PTU and EDT data, and displays the radiosonde trajectory view.

At the bottom of the window, you can view and edit the surface level values and metadata by clicking the **Show [+]** tab. 

At any point, you can terminate the sounding by clicking the **Terminate sounding** button.

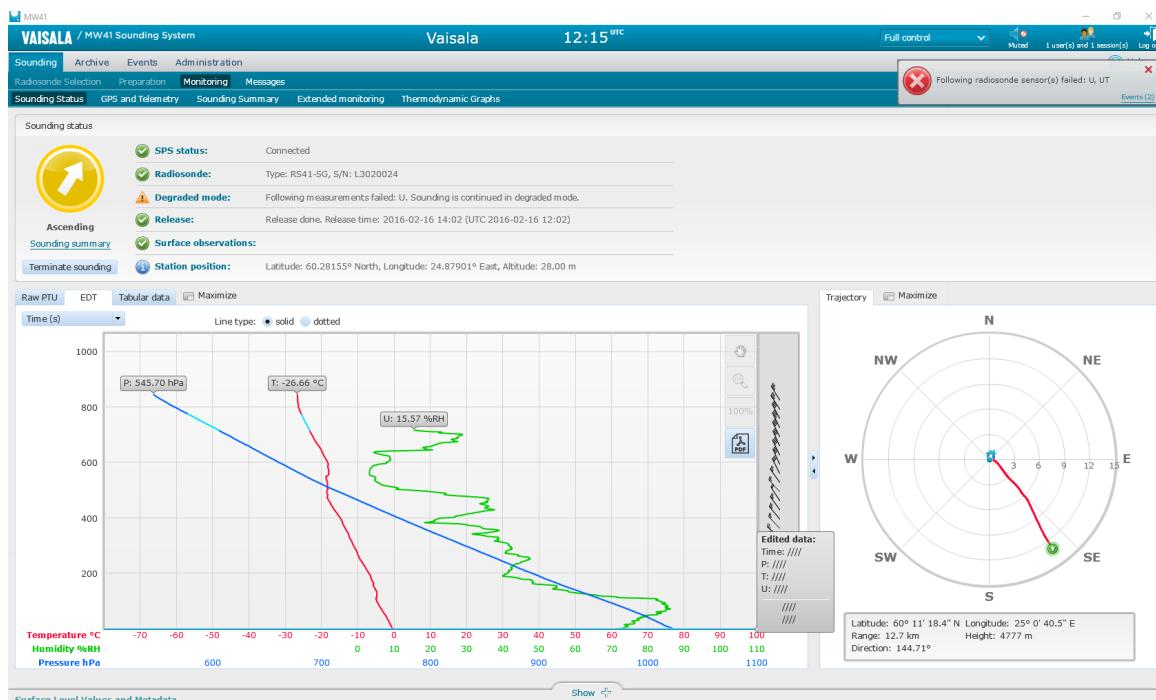
#### More information

- [Viewing and editing surface observation values \(page 47\)](#)
- [Viewing and editing metadata values \(page 48\)](#)
- [Terminating a sounding \(page 103\)](#)

## 9.1.1 Degraded sounding

If one or more radiosonde sensors get broken or the GPS calculation fails during a sounding, but it is still possible to continue the profiling of some parameters, MW41 switches to the degraded mode. The degraded mode is enabled in the **Advanced** configuration.

MW41 continues the sounding in the degraded mode after the maximum interpolation time is exceeded for the failed measurement(s). The **Sounding status** view shows a warning stating the reason for switching to the degraded mode.



For more information on the parameters reported by MW41 in the degraded mode, see *Vaisala DigiCORA Sounding System MW41 Technical Reference*.

## 9.1.2 Viewing raw PTU data

Raw PTU data (PTU = pressure, temperature, humidity) is the unprocessed pressure, temperature and humidity data received during the sounding.

The raw pressure data is always data from the pressure sensor. If the pressure data is generated from the GPS height data, the raw pressure values are not available.

The **Raw PTU** window visualizes the raw PTU values during the entire data receiving.

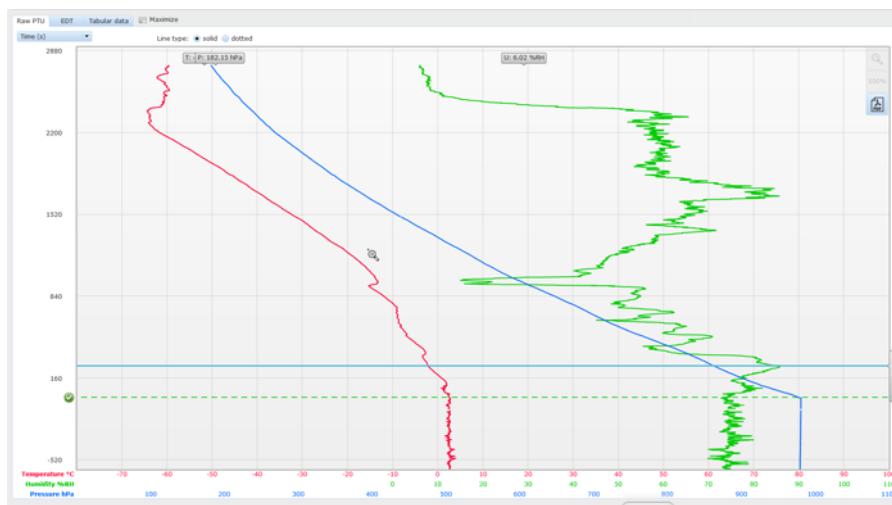
- ▶ 1. To view the raw PTU data, click **Monitoring > Sounding Status** on the application toolbar.

In the graphic, the different line colors indicate the following:

- Red line indicates temperature (T).
- Blue line indicates pressure (P).

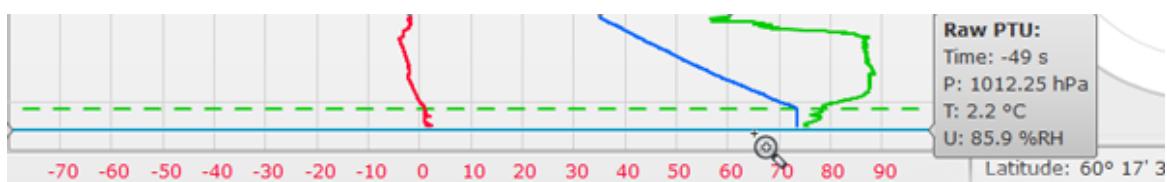
- Green line indicates humidity (U).

The current values are displayed on top of the curves.



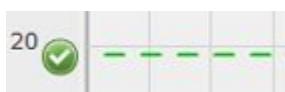
To view values at different stages of the sounding, point to a line in the graphic.

Information on the raw PTU values received during the sounding will be displayed on the right:



The symbols in the graphic indicate the following:

- Balloon launch time is indicated with a green tick and a dotted green line:



- Balloon burst is indicated with a blue symbol and a dotted blue line:

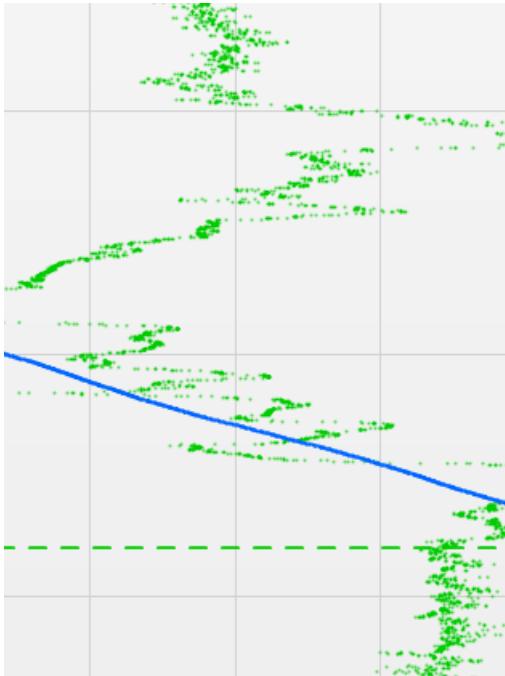


### 9.1.2.1 Choosing the graphic line type

- ▶ 1. To view the lines in the graphic either as solid lines or as dotted lines, select the appropriate option on top of the graphic:

Graph line type:  solid  dotted

The dotted line shows missing data as gaps, see the green line in the example:



### 9.1.2.2 Viewing the graphic in fullscreen mode

- ▶ 1. Click **Maximize** on top of the graphic.  
The other tabs (**EDT** and **Tabular data**) are now also displayed in fullscreen mode.
- 2. To exit the fullscreen mode, click **Exit fullscreen**.

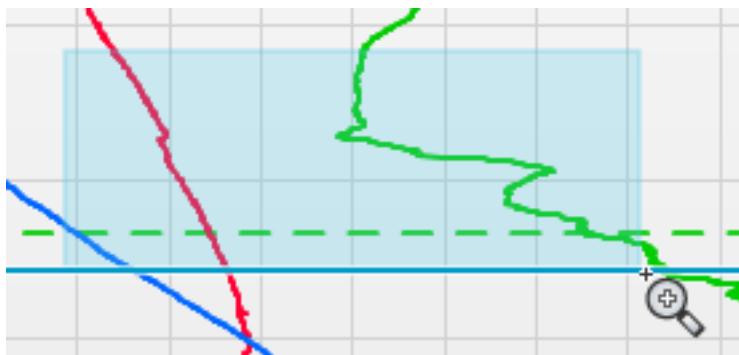
### 9.1.2.3 Zooming and panning

When you point to the graphic, the mouse pointer turns into a magnifying glass:



Keep the mouse button pressed down and drag the mouse on the graphic to select an area. A blue rectangle appears on the area you are selecting.

Release the mouse button to zoom in on the area you selected. To zoom in further, select another area and release the mouse button again.



Click the magnifier glass icon to zoom out step by step or click **100%** to immediately go back to the normal view.



When you zoom in, you can move the graphic by selecting the hand icon.



In the **Extended monitoring** window, both graphics are zoomed in and out simultaneously.

In the **Thermodynamic Graphs** window, when **Wind Shear** is active in **Hodograph**, you cannot zoom in.

#### 9.1.2.4 Save as PDF

- 1. To save the graphic as a PDF file and to print it, click the PDF icon.



You can either print the whole graphic, or the zoomed in part of it.

### 9.1.2.5 Adjusting the graphic size

- 1. To make the Raw PTU graphic wider or narrower, point to the arrows on the right side of the graphic:



2. Wait until the mouse pointer turns into a two-headed arrow:



3. Drag and drop the image border as you wish by holding the mouse button down and then releasing it.

### 9.1.3 Viewing EDT data

EDT data are the edited (calculated) data values from which deviations have been filtered out.

If the pressure data is generated using GPS height data, the EDT pressure data is calculated from the GPS height data.

If the radiosonde includes a pressure sensor, the EDT pressure data is received from the pressure sensor.

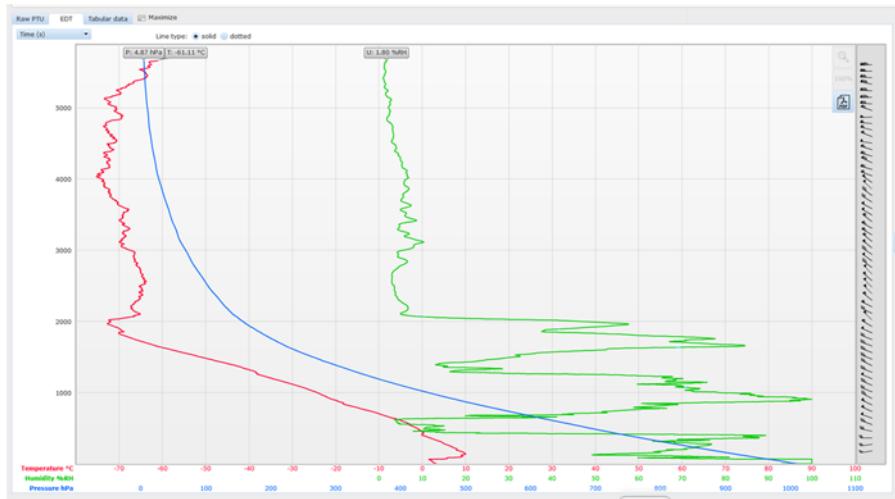
The **EDT** window visualizes the EDT data during the entire sounding.

- 1. To view the EDT data, click **Monitoring > Sounding Status** on the application toolbar.

In the graphic, the different line colors indicate the following:

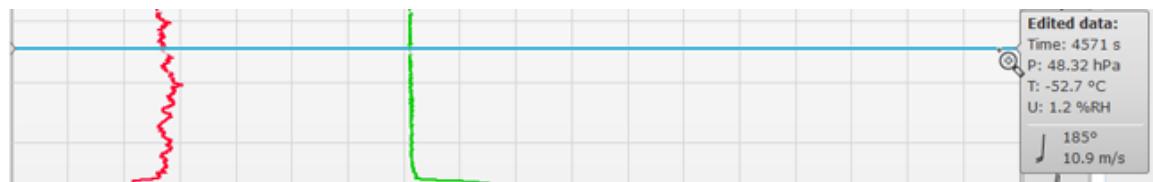
- Red line indicates temperature (T).
- Blue line indicates pressure (P).
- Green line indicates humidity (U).

The current values are displayed on top of the curves.



To view values at different stages of the sounding, point to a line in the graph.

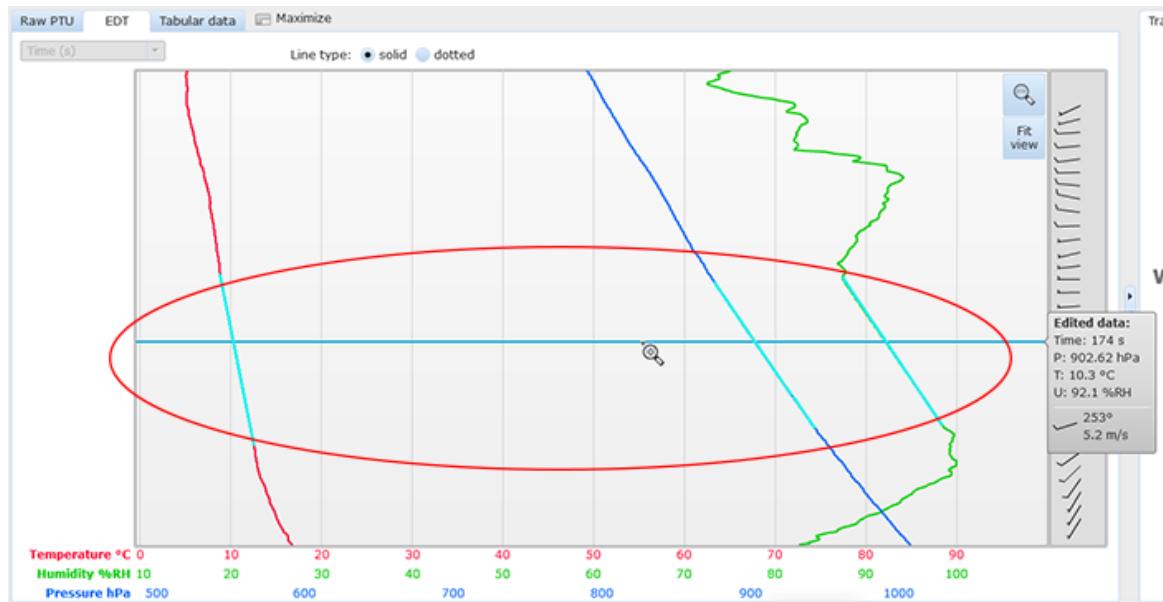
Information on the EDT values received during the sounding will be displayed on the right.



You can use the EDT graphic (for example, zoom in) in the same way as the raw PTU data graphic.

### 9.1.3.1 Interpolated data

Interpolated data is displayed with light blue color.



### 9.1.3.2 Wind barbs

The wind barbs on the right side of the graphic represent wind speed and direction:

- The wind barb points to the direction in which the wind is blowing.
- A full line on the wind barb represents 10 knots speed, a half line 5 knots.
- A flag represents 50 knots.

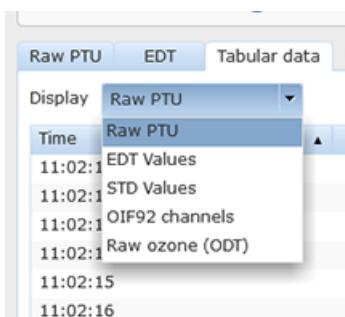
	Wind is blowing from the west at 75 knots.
	Wind is blowing from the northeast at 25 knots.

	Wind is blowing from the south at 5 knots.
	Calm winds.

### 9.1.4 Viewing radiosonde tabular data

The radiosonde data displayed in tabular format consists of:

- Raw PTU
  - EDT values
  - STD values
  - Additional sensor values: OIF92 channels and Raw ozone (ODT)  
Additional sensor values are only displayed if an additional sensor is used in the sounding and if you have the special sensor license.
- 1. Select the appropriate option from the drop-down menu on top of the table to display real-time data as numerical values.



#### 9.1.4.1 Raw PTU data

Raw PTU data (PTU = pressure, temperature, humidity) is the unprocessed pressure, temperature and humidity data received during the sounding.

The data is divided into the following columns:

- Time of measurement: The format is hours:minutes:seconds, for example, 23:34:12.
- Ascent rate: Displays the radiosonde ascent rate. Descending values are marked with a minus ( - ) sign.

- Temperature: The format is TTT.TT.
- Humidity: The format is UUU.UU.



The RAW pressure column is only displayed if the radiosonde has a pressure sensor. If the radiosonde has no pressure sensor, the column is omitted.

#### 9.1.4.2 EDT values

EDT data are the edited (calculated) data values from which deviations have been filtered out.

The data is divided into the following columns:

- Time of measurement: The format is hours:minutes:seconds, for example, 23:34:12.
- Elapsed time
- Geopotential height
- Pressure
- Temperature
- Dew point temperature
- Humidity
- Wind direction
- Wind speed

#### 9.1.4.3 STD values

STD values are the data values at standard pressure levels defined by the WMO (World Meteorological Organization).

The data is divided into the following columns:

- Time of measurement: The format is hours:minutes:seconds, for example, 23:34:12.
- Elapsed time
- Geopotential height
- Pressure
- Temperature
- Dew point temperature
- Humidity
- Wind direction
- Wind speed

#### 9.1.4.4 Sorting tabular data

- 1. To sort the item order, click the arrow in the column headings. If the arrow is not visible, click the column heading.

- To sort in the opposite order, click the arrow again. The arrow indicates the sorting order.

Time
09:13:39
09:18:50
09:20:15
09:20:29

- To freeze the tabular display on a specific row, click **Hold** when the desired row is highlighted.



You can now scroll through the previous measurements with the scroll bar on the right side of the table.

- Click **Continue**.



The levels measured while the tabular display was frozen are spooled to the table.

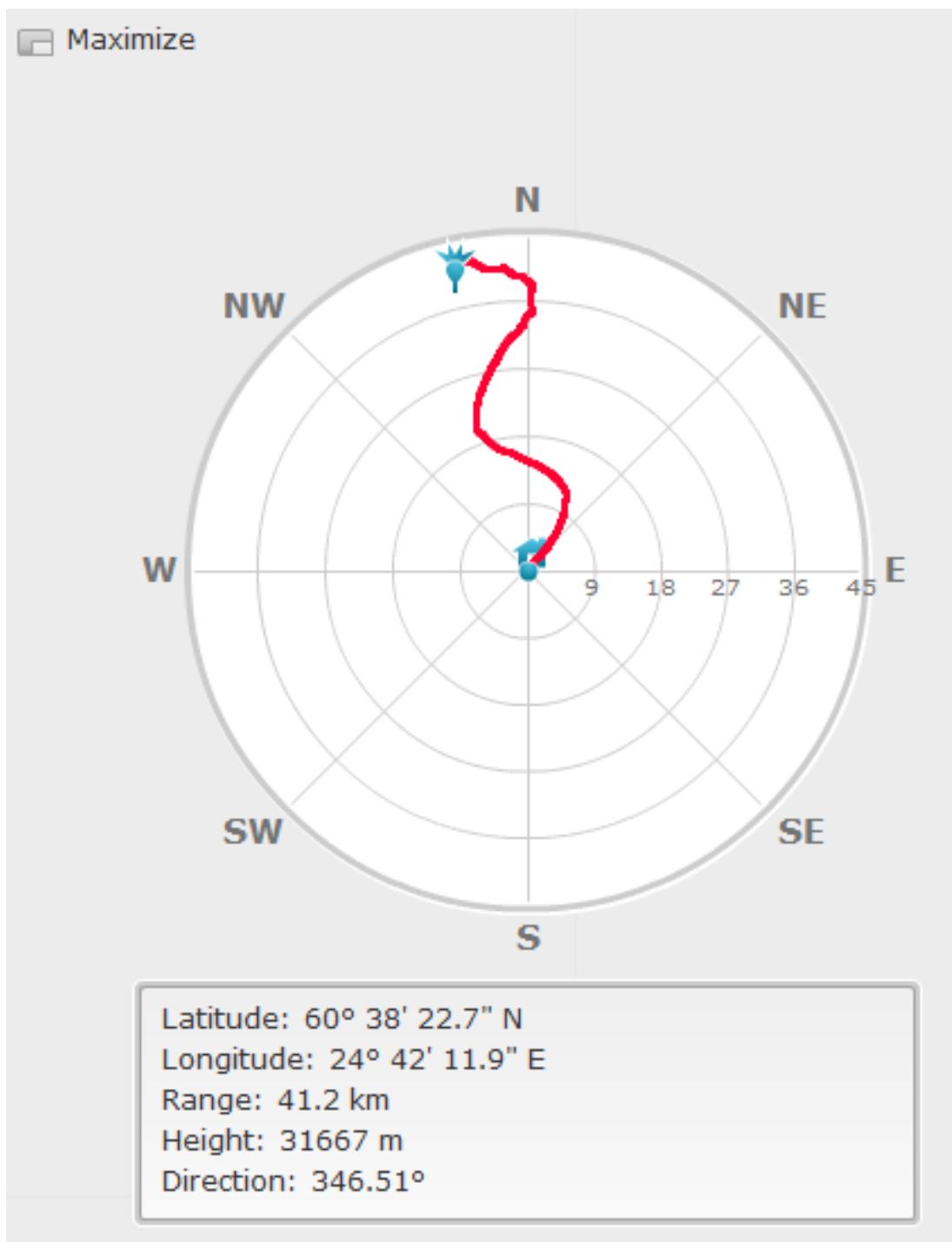
#### 9.1.4.5 Viewing tabular data in fullscreen mode

- ▶ 1. Click **Maximize**.
- 2. To exit the fullscreen mode, click **Exit fullscreen**.

#### 9.1.5 Viewing radiosonde trajectory

Radiosonde trajectory visualizes the radiosonde movement by showing the direction and range from the sounding station to the radiosonde, and also the latitude and longitude of the radiosonde.

- 1. To view the radiosonde trajectory, click **Monitoring > Sounding status** on the application toolbar.



The radiosonde trajectory displays the following information:

- Information on radiosonde latitude, longitude, range, height, and direction are displayed at the bottom of the graphic.
- The sounding station is displayed in the center of the graphic.

- The sounding trajectory curve starts from the location from which the radiosonde was launched.
- The icon at the end of the trajectory curve provides the following information:

	When the arrow points up, the balloon is ascending.
	When the arrow points down, the balloon is descending.
	No connection to radiosonde. An error has occurred or the sounding has terminated.
	Balloon has burst.

#### 9.1.5.1 Viewing radiosonde trajectory in fullscreen mode

- 1. Click **Maximize**.  
 2. To exit the fullscreen mode, click **Exit fullscreen**.

#### 9.1.5.2 Adjusting the radiosonde trajectory size

- 1. To get more space for the trajectory, point to the arrows on the left side of the graphic.



2. Wait until the mouse pointer turns into a two-headed arrow.



3. Drag and drop the border as you wish by holding the mouse button down and then releasing it.

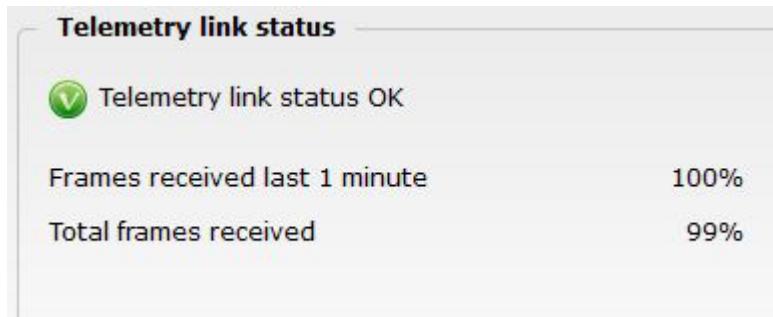
## 9.2 Viewing telemetry status

You can verify the status of the telemetry during the sounding.

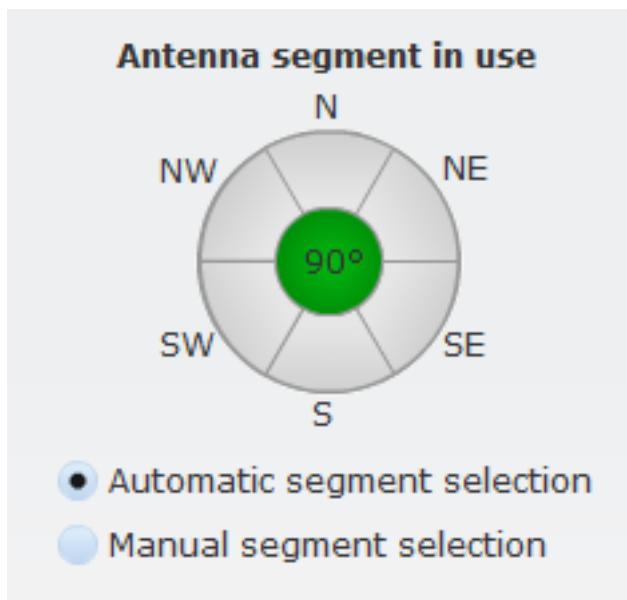
- 1. On the application toolbar, select **Sounding > Monitoring > GPS and Telemetry**.

The following information is displayed:

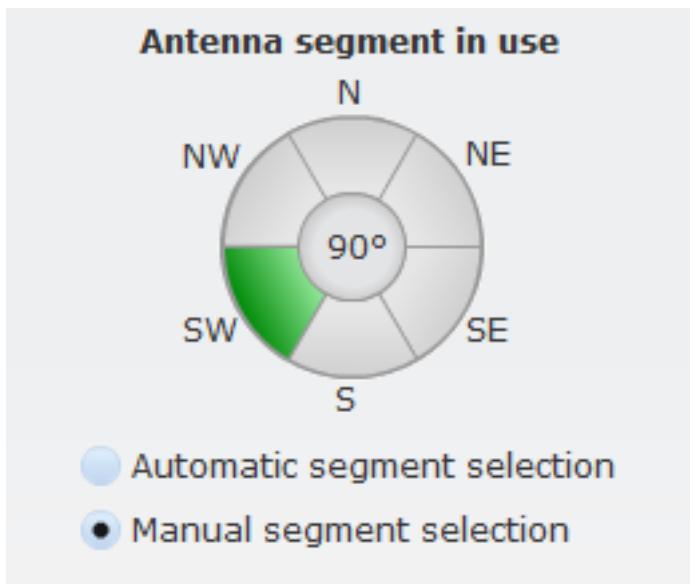
- Telemetry link status and the percentage of telemetry frames received during the last minute and since the start of the sounding.



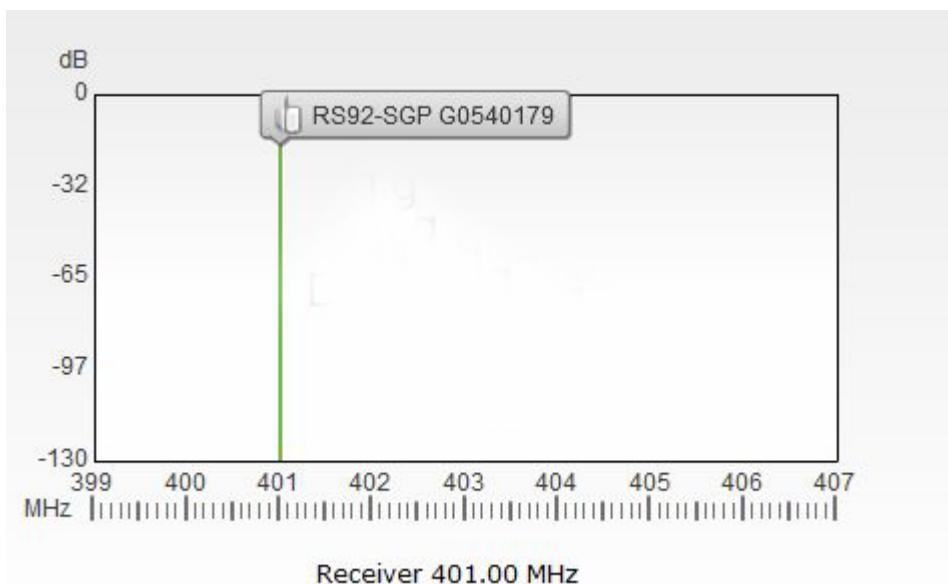
- If radio silence has been set for RS41-SGM, Telemetry link status displays information on radio silence.
- The state of the antenna selection: The view indicates the antenna element currently selected. The segment selection can be automatic or manual. Automatic segment is the default selection.



- If you select the manual segment selection, first click the option button to make the selection and then click the antenna segment you wish to use. The area you click is selected:



- Radio spectrum: The view displays the frequency selected and information on the radiosonde.



## 9.3 Viewing GPS status

You can verify the status of the GPS during the sounding.

- ▶ 1. On the application toolbar, select **Sounding > Monitoring > GPS and Telemetry**.  
The **GPS status** window displays information on the GPS calculation in graphical format. In this window, you can make sure that the GPS data is valid and, in case of a problem, get more information on the source of the problem.

2. Select either **Radiosonde GPS status** or **Local GPS status**.



- **Radiosonde GPS status** shows the satellite constellation observed by the radiosonde GPS receiver:



- **Local GPS status** shows the satellite constellation observed by the sounding software GPS receiver:

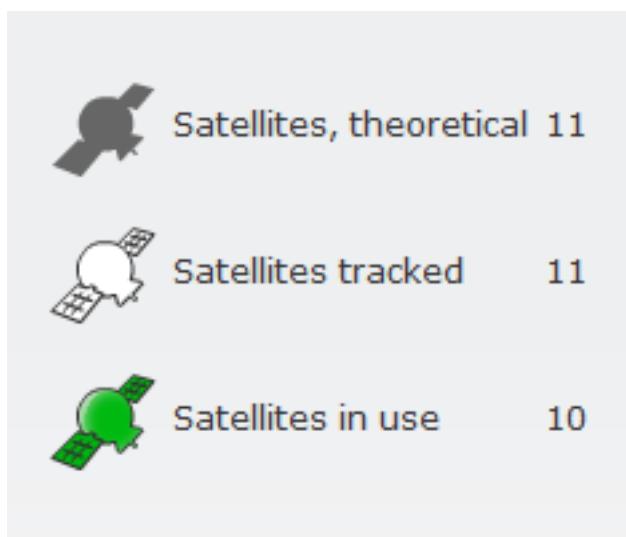


The following information is displayed:

- GPS satellites: GPS satellites are shown in a polar coordinate circle view, which describes the celestial sphere over the sounding station (local measurements), or radiosonde position (radiosonde measurements).
- The position of the symbol in the graphic corresponds to the satellite position in the sky: the closer the satellite is to the center, the closer the satellite is to the zenith. The azimuth (horizontal) angle is zero when the satellite is towards the North, 90° when the satellite is towards the East, and so on.
- The number in the satellite symbol identifies the GPS satellite.

The satellites displayed are:

- Theoretically available satellites: This information is based on the GPS almanac/ephemeris information received from the GPS receiver. The signal might not be received.
- Tracked satellites: The signal from a tracked satellite is received, which means that the tracked satellites are potentially applicable in wind solution. The number of tracked satellites varies between successive measurements.
- Used satellites: These satellites are used in wind solution. The number of used satellites varies between successive measurements.



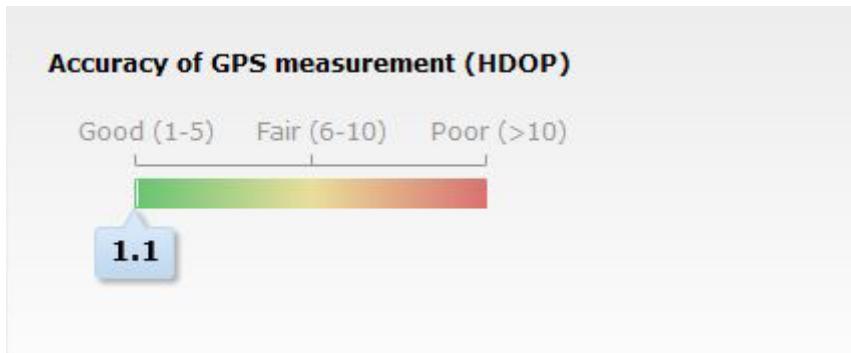
### 9.3.1 HDOP, accuracy of GPS measurement

Horizontal Dilution of Precision (HDOP) allows more precise estimation of the accuracy of the GPS horizontal (latitude and longitude) position fixes by adjusting the error estimates according to the geometry of the satellites used.

HDOP values below 4 are considered good, above 8 bad.

The HDOP value is displayed with a slider. The slider is positioned according to the HDOP value.

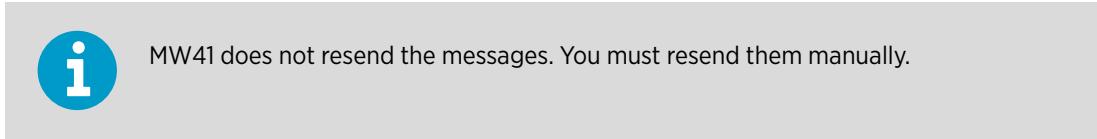
If the value is 10 or above, the slider position is 10.



## 9.4 Viewing and editing sounding summary

You can view the sounding summary once the sounding has ended, and you can also view it during a sounding simulation or when viewing an archived sounding.

- ▶ 1. On the application toolbar, select **Sounding > Monitoring > Sounding Summary**.
- 2. Select **Edit** to edit the information.
- 3. Select **Save** to save your changes.  
The modified data is saved in the sounding archive. MW41 applies the modified data, recalculates the sounding, and regenerates messages.



- 4. Select **Close Sounding** to close the sounding.

## 9.5 Viewing events

- 1. To view the sounding events in a tabular format, click **Events**. You can also view the event table when no sounding is ongoing.

The sounding events are displayed in rows, one event on each row:

Sounding events		
Time	Category	Description
09:13:39	 Info	Frames received from radiosonde at 09:13:39
09:18:50	 Warning	Telemetry parser has received a frame from wrong sonde.
09:20:15	 Warning	Radiosonde signal lost since 09:20:10.
09:20:29	 Info	Frames received from radiosonde at 09:20:29
09:41:16	 Info	Sounding is stopped automatically.
09:41:19	 Info	Calculations ready, messages can be generated.
09:41:19	 Info	Descending sounding e63fb71d-e073-45cf-a826-66ff8271569e started.
09:41:21	 Warning	Radiosonde signal lost since 09:41:16.
09:53:22	 Error	Radiosonde signal lost since 09:41:21.
09:53:22	 Info	Sounding e63fb71d-e073-45cf-a826-66ff8271569e finished.

The data is divided into three columns:

- **Time**: Shows the time of an event, that is, the time when the event was observed. The format is hours:minutes:seconds, for example, 23:42:12.
- **Category**: Shows the event status. The status is indicated with the following symbols:

	This symbol stands for information.
	No problems detected.
	Warning
	The system has detected an error.

- **Description**: Describes the reason why the event was issued.

### 9.5.1 Sorting tabular data

- ▶ 1. To sort the item order, click the arrow in the column headings. If the arrow is not visible, click the column heading.
- 2. To sort in the opposite order, click the arrow again. The arrow indicates the sorting order.

Time	
09:13:39	
09:18:50	
09:20:15	
09:20:29	

- 3. To freeze the tabular display on a specific row, click **Hold** when the desired row is highlighted.



You can now scroll through the previous measurements with the scroll bar on the right side of the table.

- 4. Click **Continue**.



The levels measured while the tabular display was frozen are spooled to the table.

## 9.6 Extended monitoring



Extended monitoring and editing significant points are only available with the Extended Graphics software option.

The windows presented in this on-line help are only examples and their details might vary.

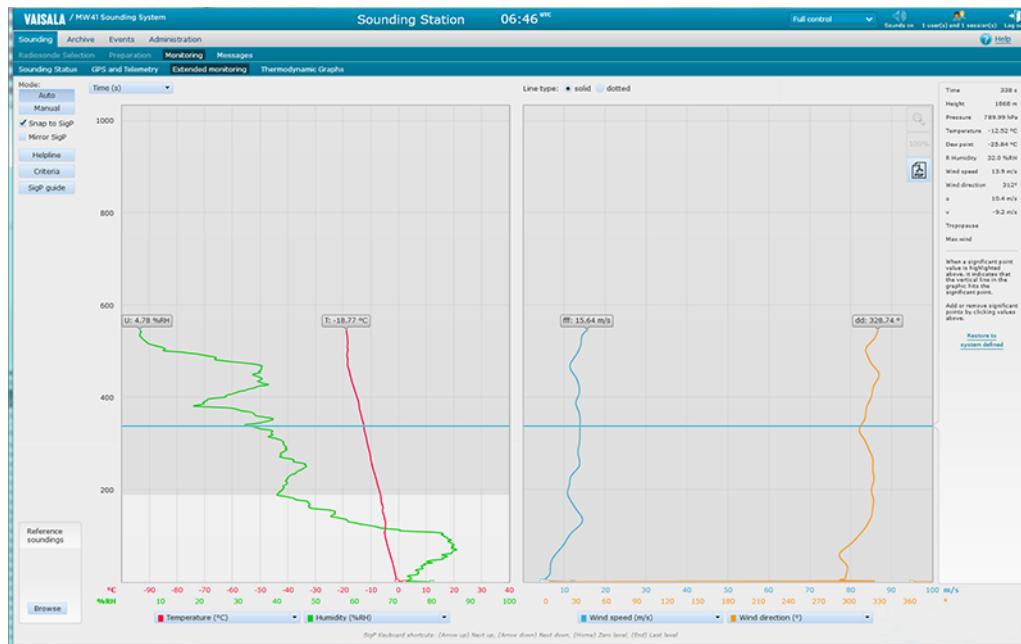
Extended monitoring is an optional graphical tool for the MW41 sounding software. When this option is installed, you can view sounding data graphically.

With Extended monitoring, you can view single or multiple graphs of temperature, humidity, wind speed and direction, and other wind components during a real-time sounding or a simulation. You can also view archived data.

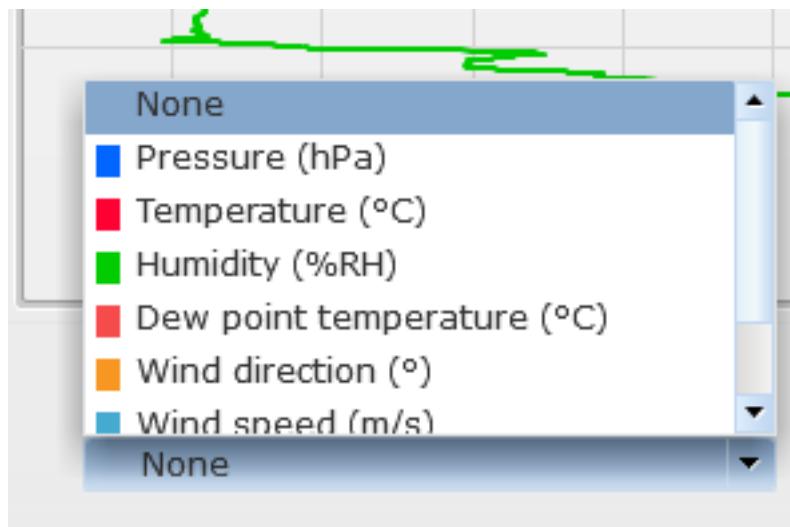
If you have the licence for the Special sensor sounding option, you can also view ozone data with Extended monitoring.

## 9.6.1 Viewing sounding data with extended monitoring

To view the sounding data in graphical format, select **Sounding > Monitoring > Extended monitoring**.



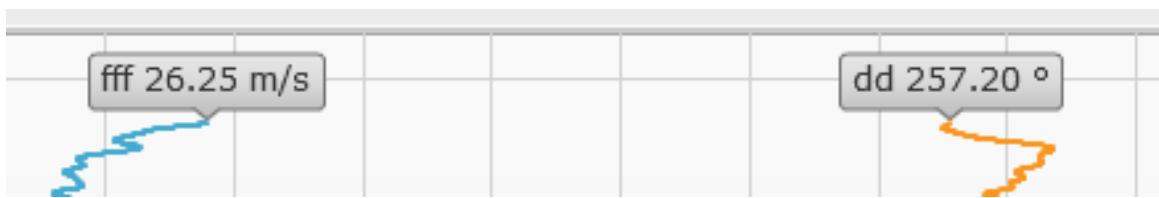
The following data is available, make your selection in the drop-down lists under the graphics. The color matches the colors displayed in the graphic lines. To hide a line, select **None**.



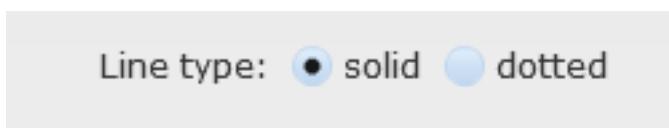
- Pressure (hPa)

- Temperature (°C)
- Humidity (% RH)
- Dew point temperature (°C)
- Wind direction
- Wind speed (m/s)
- North wind v (m/s)
- East wind u (m/s)

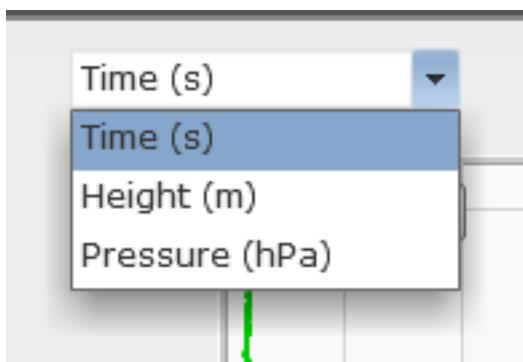
The current values are displayed on top of the line.



The lines can be displayed as either solid or dotted lines, depending on your selection.



The Y axis displays information on pressure (hPa), height (m), or time (s). The selection applies to both graphics.



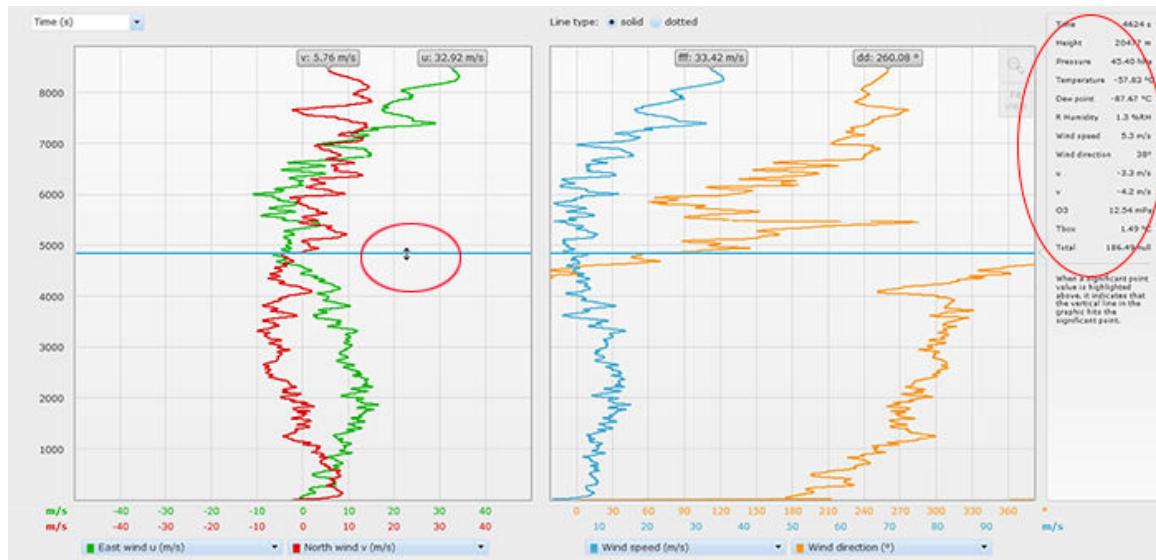
#### More information

- ▶ [Viewing ozone data with extended monitoring \(page 111\)](#)

##### 9.6.1.1 Viewing numerical data

To study the sounding information in more detail, point to the horizontal cursor line.

As you drag the cursor line up and down, the numerical values on the right change as they follow the values indicated with the cursor line. Note that the cursor line moves simultaneously in both graphics.



When a value on the right is highlighted, it means that the horizontal cursor line hits the significant point (SigP) defined.

Time	8435 s
Height	37560 m
Pressure	3.05 hPa
Temperature	-45.70 °C
Dew point	-79.96 °C
R Humidity	1.1 %RH
Wind speed	33.4 m/s
Wind direction	260°
u	32.9 m/s
v	5.8 m/s
O3	////
Tbox	-9.86 °C
Total	305.01 null

You can also use the following shortcut keys to move the line with smaller adjustments, or if you cannot see the mouse pointer:

- Up arrow key: One level up.
- Down arrow key: One level down.
- Home key: Jump to the surface level.
- End key: Jump to the last level.

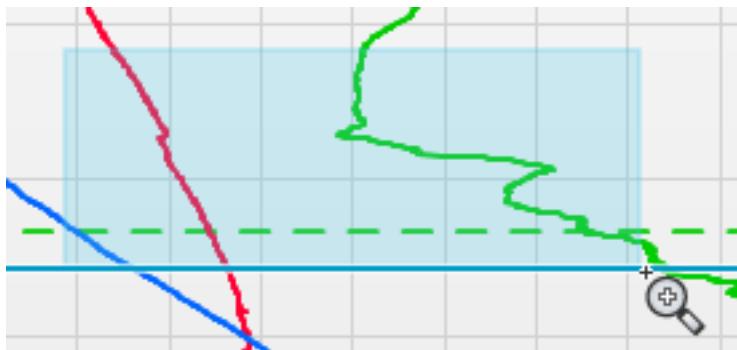
### 9.6.1.2 Zooming and panning

When you point to the graphic, the mouse pointer turns into a magnifying glass:



Keep the mouse button pressed down and drag the mouse on the graphic to select an area. A blue rectangle appears on the area you are selecting.

Release the mouse button to zoom in on the area you selected. To zoom in further, select another area and release the mouse button again.



Click the magnifier glass icon to zoom out step by step or click **100%** to immediately go back to the normal view.



When you zoom in, you can move the graphic by selecting the hand icon.



In the **Extended monitoring** window, both graphics are zoomed in and out simultaneously.

In the **Thermodynamic Graphs** window, when **Wind Shear** is active in **Hodograph**, you cannot zoom in.

#### 9.6.1.3 Save as PDF

- ▶ 1. To save the graphic as a PDF file and to print it, click the PDF icon.



You can either print the whole graphic, or the zoomed in part of it.

#### 9.6.2 Using Snap to Significant Points (SigP)

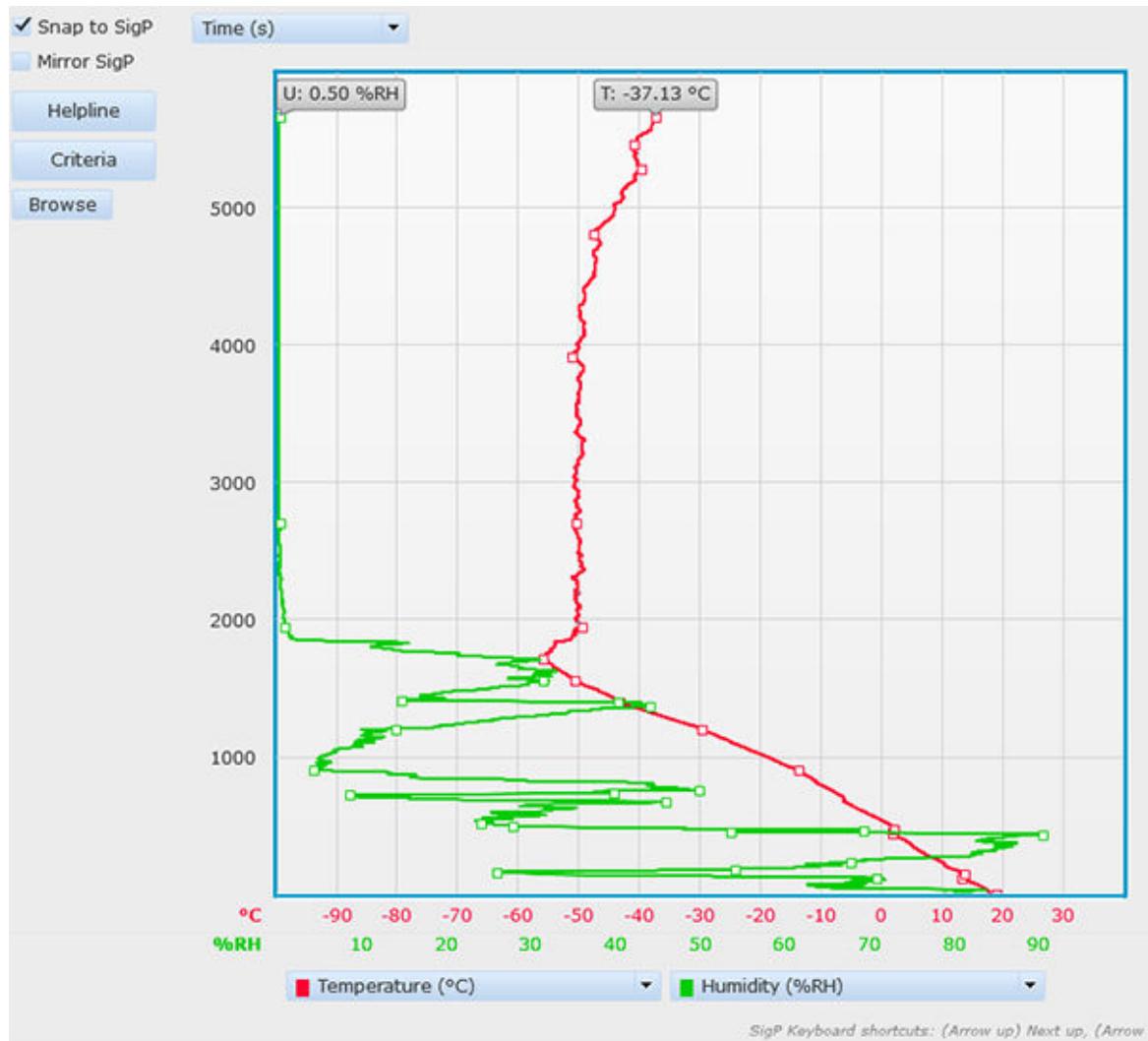


Extended monitoring and editing significant points are only available with the Extended Graphics software option.

The windows presented in this on-line help are only examples and their details might vary.

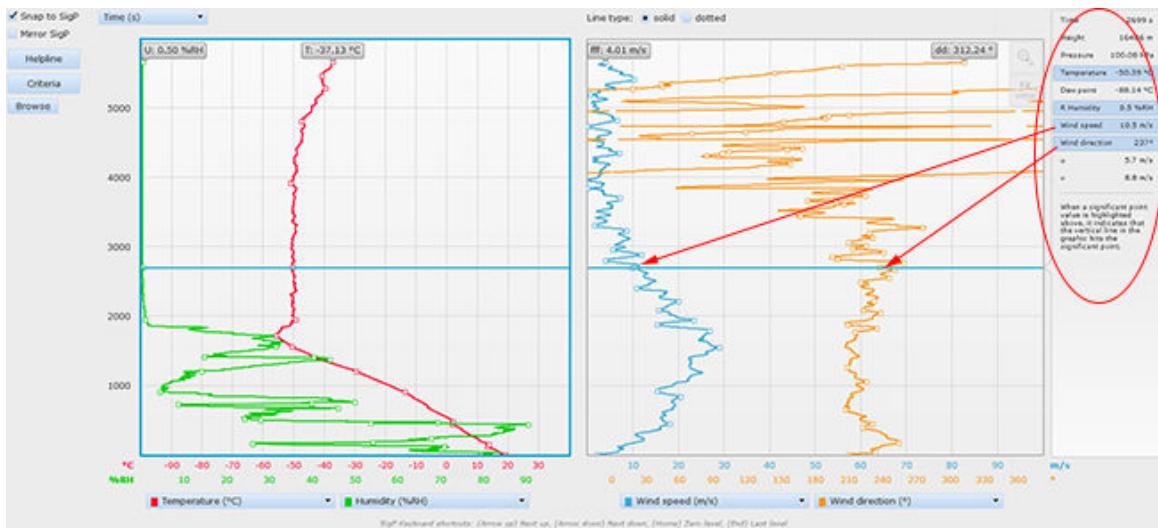
When you select the **Snap to SigP** checkbox, the mouse cursor jumps between significant points and omits all other levels. This way you do not have to go through all levels in the graphic.

To use the Snap to SigP function, select either of the graphics, or both of them, by clicking the graphic. When selected, the graphic borders are highlighted with blue color. Significant points are displayed as small rectangles on the graphic line.



When you move the horizontal cursor line, it jumps from one significant point to another and displays information on the point on the right side of the graphic.

In the example figure below, the arrows point to significant points in wind speed and wind direction, and the values on the right.



If you have selected both graphics, the cursor jumps to the closest significant point on either of the graphics.

The shortcut keys also work in this view.

### 9.6.3 Mirroring significant points (SigP)

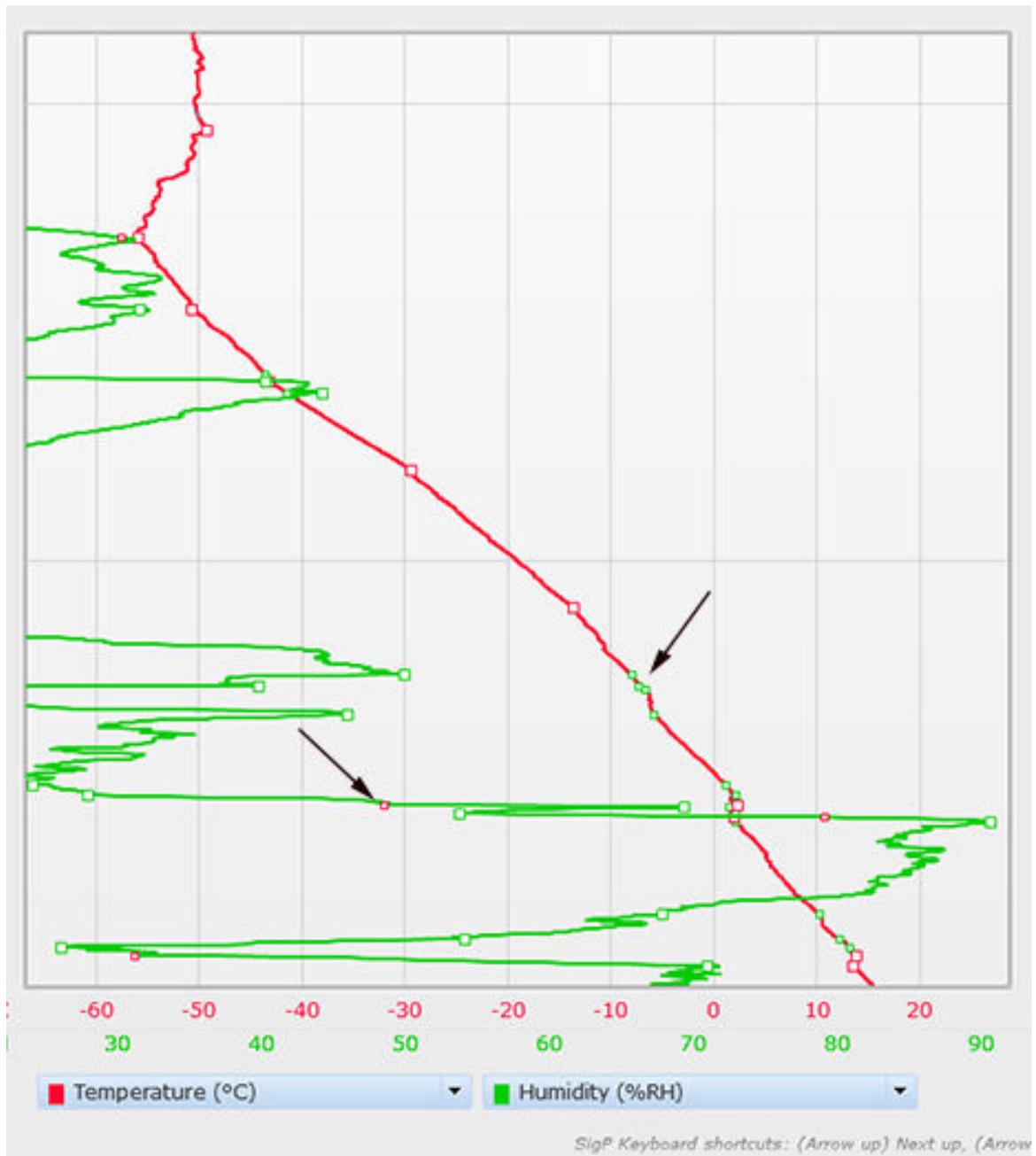


Extended monitoring and editing significant points are only available with the Extended Graphics software option.

The windows presented in this on-line help are only examples and their details might vary.

When you select the **SigP Mirroring** check box, you can mirror the significant points in the graphics.

This means that the significant points on, for example, the humidity graphic line, are displayed on the temperature graphic line, and vice versa. The mirrored points are displayed in their original color on the line they are mirroring. The arrows in the figure below point to examples of mirrored significant points on temperature and humidity lines.



Mirroring the significant points has no effect on the wind components view, it will always show both wind direction and wind speed.

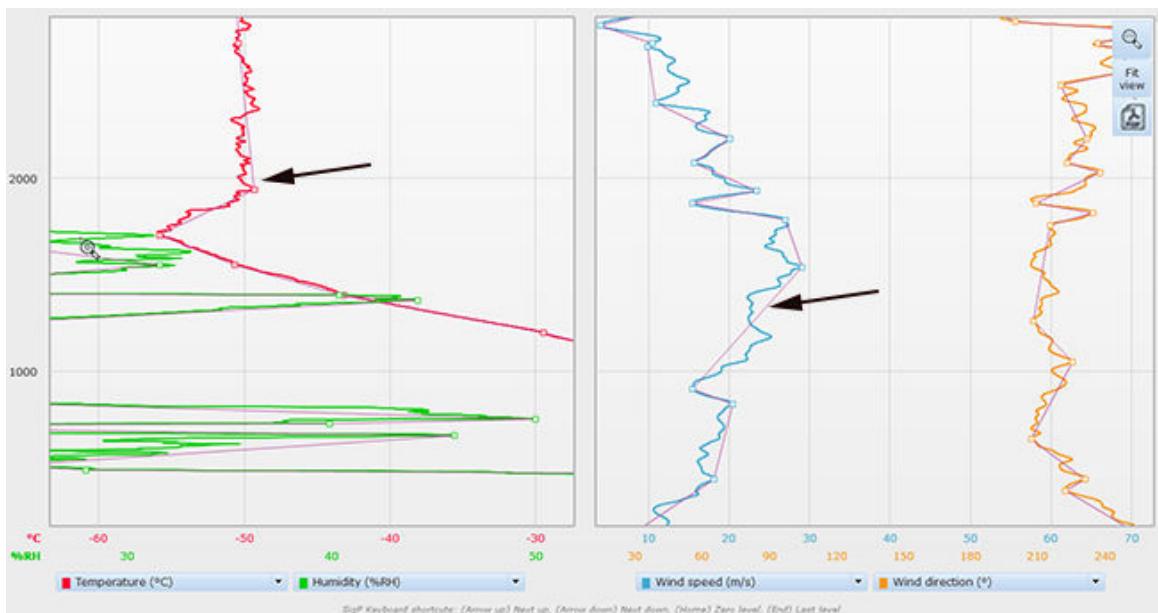
#### 9.6.4 Using helplines in extended monitoring



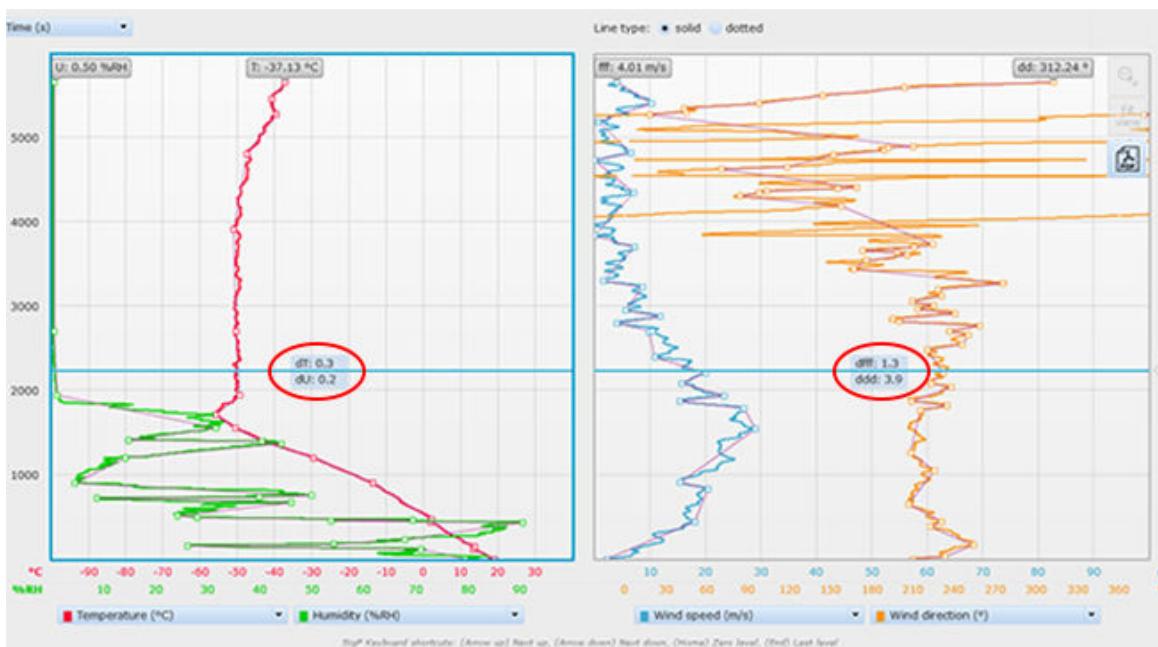
Extended monitoring and editing significant points are only available with the Extended Graphics software option.

The windows presented in this on-line help are only examples and their details might vary.

To view the profile that the significant points form in the graphics, click the **Helplines** button. A helpline in a different color from the actual graphic line will appear in both graphics. The helpline runs next to the graphic line and goes through selected significant points. The arrows in the figure below point to examples of helplines.



When you move the horizontal cursor line, the absolute value of the distance between the graphic line and the helpline will be displayed. The absolute values are circled in the example below.



To stop displaying the helplines, click the **Helplines** button again.

### 9.6.5 Using criteria in extended monitoring

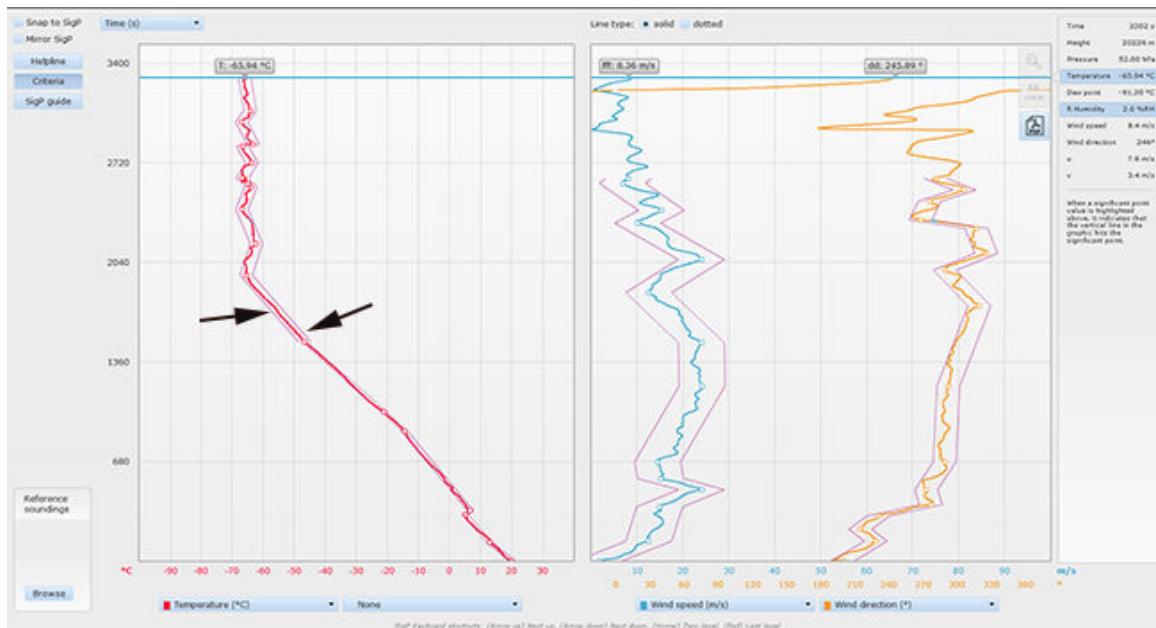


Extended monitoring and editing significant points are only available with the Extended Graphics software option.

The windows presented in this on-line help are only examples and their details might vary.

With criteria lines you can check whether the selected significant levels fulfill your selection criteria. To view criteria lines on both sides of the graphic lines, click the **Criteria** button.

The arrows in the example below point to the criteria line following the temperature line in the graphic.



The criteria lines apply to profiles of:

- Temperature
- Humidity
- Wind direction
- Wind speed
- Wind components

When the tolerance point changes, the criteria line is discontinued at this point.

The tolerances visible in the **Criteria** window follow the inflection points set by WMO.

To stop displaying the criteria lines, click the **Criteria** button again.

## 9.6.6 Reference soundings



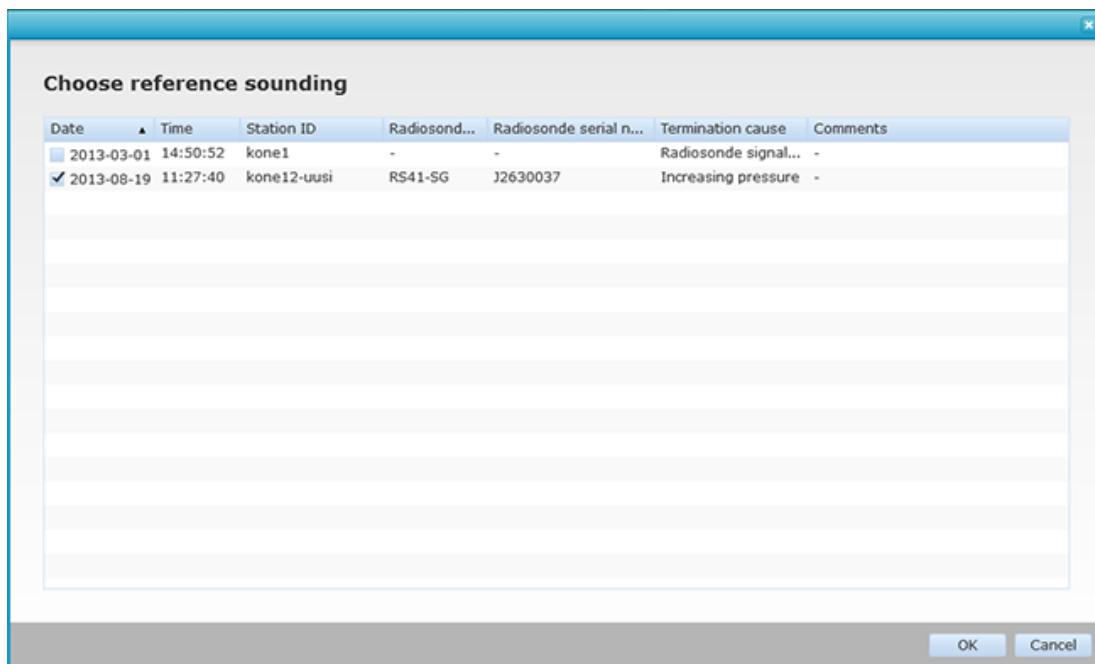
Extended monitoring and editing significant points are only available with the Extended Graphics software option.

The windows presented in this on-line help are only examples and their details might vary.

If you want to compare the current sounding with a previous one, you can view a reference sounding in the **Extended monitoring** tab.

### 9.6.6.1 Comparing soundings

- ▶ 1. In the **Extended monitoring** tab, click the **Browse** button next to the graphic. A window opens with a list of the archived soundings that you can open and compare with the main sounding. The archive contains a maximum of four soundings.  
2. Select the sounding(s) you wish to use as the reference material, and click **OK**.

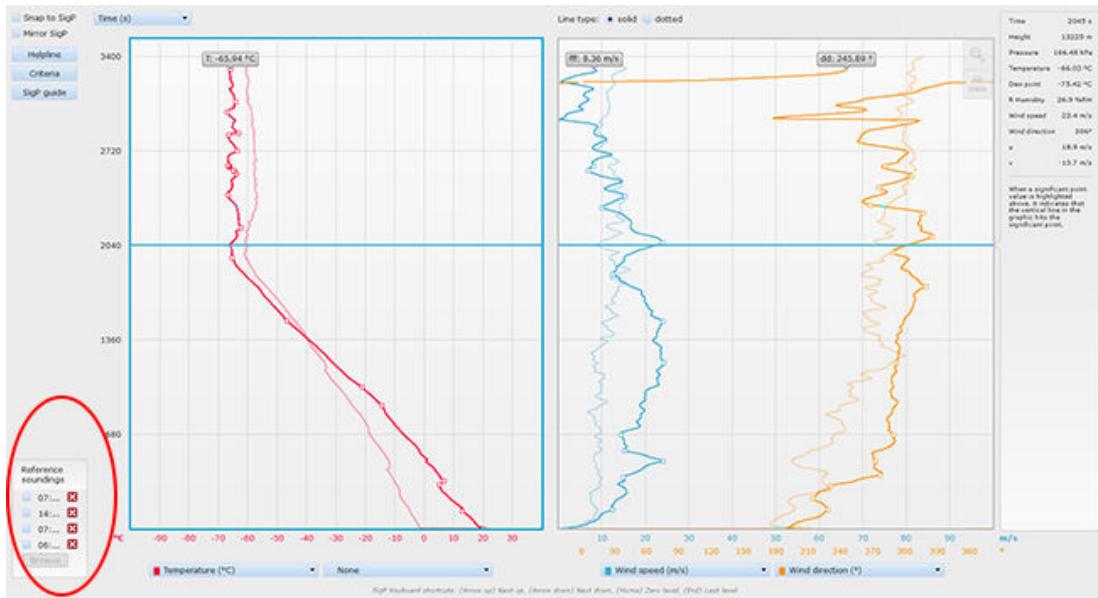


The soundings you select appear in the **Extended monitoring** tab.

- Select the sounding you wish to compare the current sounding with.

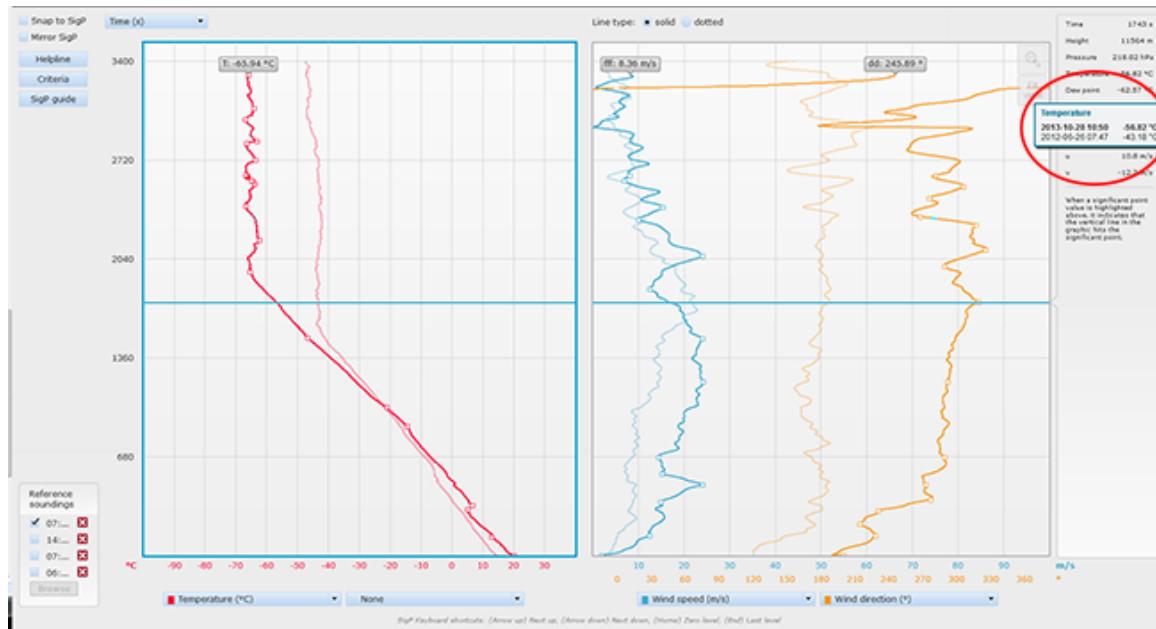
Selecting a check box shows the reference sounding in the graphic, deselecting the check box hides the reference sounding.

You can compare the main sounding with a maximum of two soundings. The **Browse** button will become inactive once the maximum number of soundings has been selected.



### 9.6.6.2 Displaying sounding information

Information on the current main sounding is displayed in the numerical value field on the right. When you place the mouse cursor on top of a value, a tooltip displays information on the reference sounding.



### 9.6.6.3 Closing a reference sounding

The reference sounding(s) will close when the main sounding ends.

When you close a sounding, the **Browse** button will be active again and you can select another reference sounding.

### 9.6.7 Editing significant points (SigP)



Extended monitoring and editing significant points are only available with the Extended Graphics software option.

The windows presented in this on-line help are only examples and their details might vary.

#### 9.6.7.1 Auto and manual modes

In the beginning of the sounding, the graphic is in the **Auto** mode.

At this point, only the significant points set by the system are displayed. It is not yet possible to edit the significant points, the graphic background is grey, and the **Manual** button is inactive.

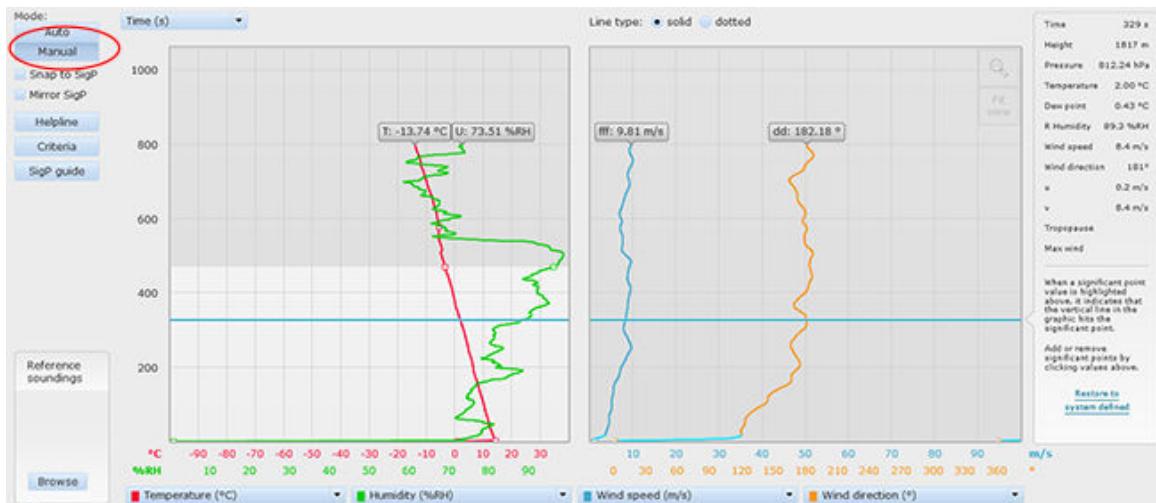


After a while, the **Manual** mode begins.

The **Manual** mode displays both the significant points set by the system and the ones you have set.

You can start editing the significant points once the graphic background or a part of it turns white and the **Manual** button becomes active. You can only edit the significant points inside the active white area.

It is possible to start editing the significant points in one graphic while still waiting for the significant points to appear in the other.

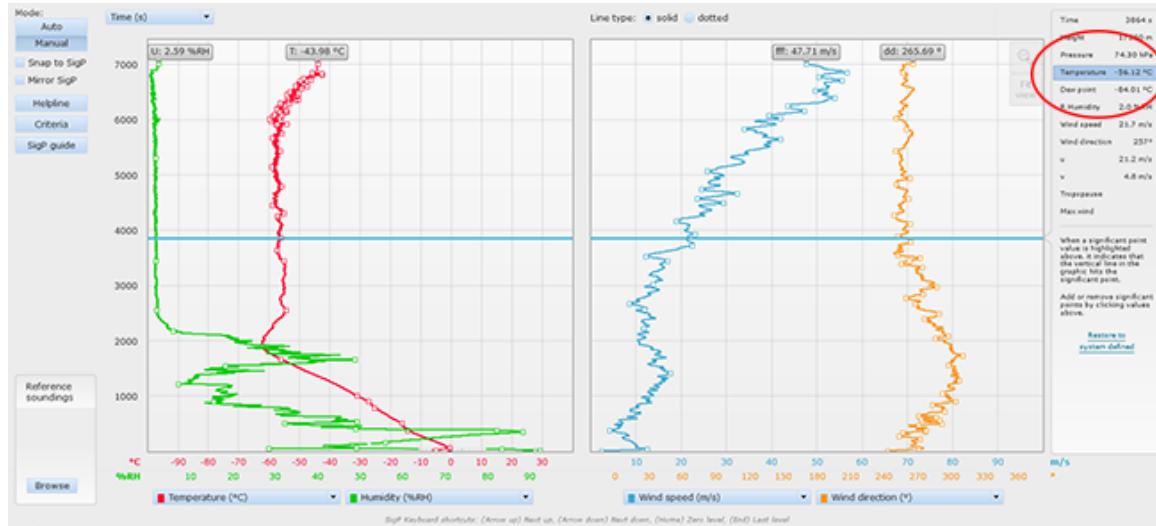


### 9.6.7.2 Adding or deleting significant points

To add a significant point to the graphic, move the horizontal line to the intended place on the graphic line and click the value you want to add to the graphic.



You cannot add significant points on top of the ones the system has created, or below tropopause (indicated by a grey area in the graphic).



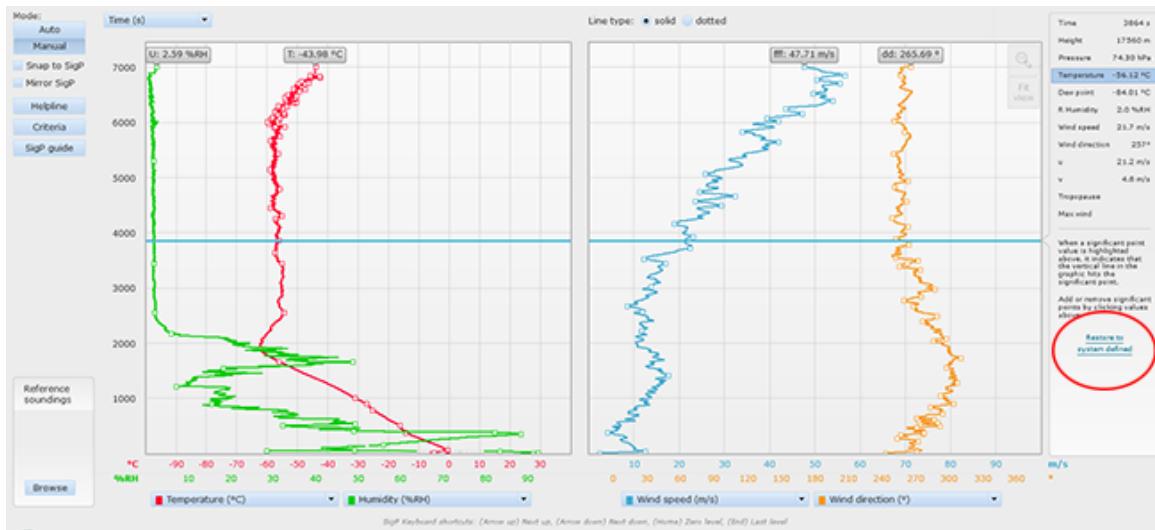
To delete a significant point from the graphic, move the horizontal line to the significant point you wish to delete on the graphic line, and click the highlighted value on the right.



You cannot delete the first or the last significant point of the sounding.

### 9.6.7.3 Restoring system defined values

To restore the original values defined by the sounding system, click the text **Restore system defined**.



## 9.6.8 SigP Guide



Extended monitoring and editing significant points are only available with the Extended Graphics software option.

The windows presented in this on-line help are only examples and their details might vary.

With SigP Guide, you can analyze the sounding profile further and see more clearly whether the selected significant levels fulfill your selection criteria.

The SigP Guide applies to profiles of:

- Temperature
- Humidity
- Wind direction
- Wind speed
- Wind components

You cannot use the SigP Guide tool simultaneously with the Helpline or Criteria tools.

Clicking the **SigP Guide** button resets the **Helpline** and **Criteria tool** buttons, and vice versa.

### 9.6.8.1 Using the SigP Guide

- 1. Click the **SigP Guide** button and point between two consecutive significant points. A fractional help line appears in the graphic and parallel criteria lines appear on both sides of the help line sections divided by the cursor.
2. When you point to another position, new lines appear in the graphic.
3. Clicking several times removes the SigP Guide lines from the graphic.

## 9.7 Thermodynamic graphs



Thermodynamic graphs is a licensed option.  
The windows presented in this on-line help are only examples and their details might vary.

Thermodynamic graphs is an optional graphical tool for the MW41 sounding software. With Thermodynamic graphs you can view sounding data graphically during a real-time sounding or a simulation. You can also view archived data.

To view the Thermodynamic graphs, select **Sounding > Monitoring > Thermodynamic Graphs**.

The following graphics are available, make your selection in the drop-down list:

- Hodograph
- Skew-T / Log-P
- Tephigram
- Stüve Diagram

### 9.7.1 Grid lines

The thermodynamic graphs have five sets of grid lines or curves you can select from:

- Lines of constant pressure (isobars)
- Lines of constant temperature (isotherms)
- Lines of constant dry adiabatic lapse rate
- Lines of constant saturated (or "moist") adiabatic lapse rates
- Lines of constant saturated mixing ratios (isopleths)

For more information, see the appropriate topic.

### 9.7.2 Zooming and panning

When you point to the graphic, the mouse pointer turns into a magnifying glass:



Keep the mouse button pressed down and drag the mouse on the graphic to select an area. A blue rectangle appears on the area you are selecting.

Release the mouse button to zoom in on the area you selected. To zoom in further, select another area and release the mouse button again.



Click the magnifier glass icon to zoom out step by step or click **100%** to immediately go back to the normal view.



When you zoom in, you can move the graphic by selecting the hand icon.



In the **Extended monitoring** window, both graphics are zoomed in and out simultaneously.

In the **Thermodynamic Graphs** window, when **Wind Shear** is active in **Hodograph**, you cannot zoom in.

### 9.7.3 Save as PDF

- ▶ 1. To save the graphic as a PDF file and to print it, click the PDF icon.



You can either print the whole graphic, or the zoomed in part of it.

### 9.7.4 Wind rose

The wind rose pane displays a wind barb in the compass rose. The wind barb represents the wind on the selected level.

## 9.7.5 Hodograph



Thermodynamic graphs is a licensed option.  
The windows presented in this on-line help are only examples and their details might vary.

Hodograph is used for observing wind shear conditions. In Hodograph, wind speed and direction are plotted on a polar diagram as a function of height, resulting in a graph tracing the vertical wind shear of the intervening layers.

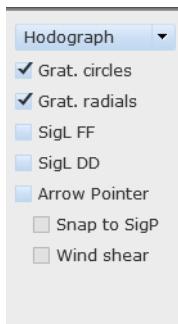
In the friction layer, Hodograph displays the effect of friction on wind speed and direction.

Above the friction layer, the relative stability of the atmosphere can be inferred from the plot. The manner in which the hodograph rotates with height in free air is important for determining thermal advection.

Missing numeric information is indicated with slashes: ////.

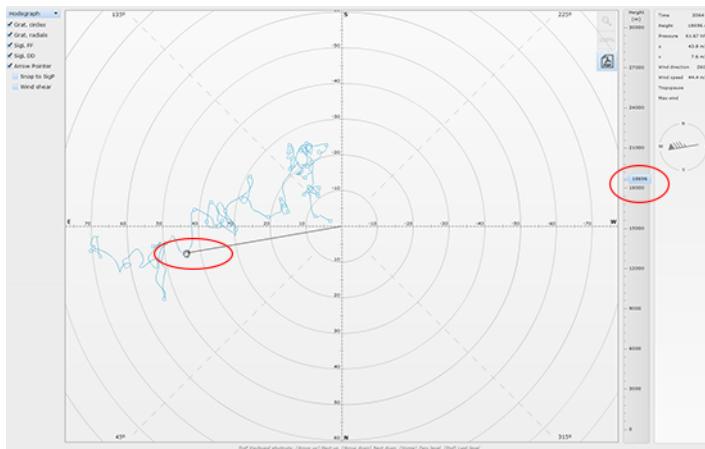
### 9.7.5.1 Grid selections

- **Grat. circles:** Select this option to display the graticule (circular or haircross) grid.
- **Grat. radials:** Select this option to display the radii of the Hodograph.



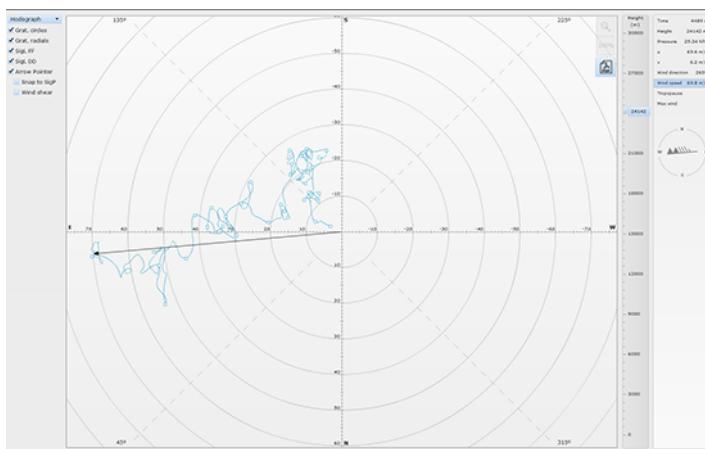
### 9.7.5.2 Arrow pointer

When you select **Arrow Pointer**, you can draw a wind arrow at the last plotted point on the diagram. The numeric values on the right start showing the values at the arrow pointer's position.



### 9.7.5.3 Significant level markers

- **SigL FF:** Select this option to display the significant level markers of wind speed.
- **SigL DD:** Select this option to display the significant level markers of wind direction.
- **Snap to SigP:**
  - You can select the **Snap to SigP** option only when you select either **SigL FF** and/or **SigL DD**, and **Arrow Pointer**.
  - When you select the **Snap to SigP** option, the cursor moves to the nearest significant level when you click the mouse. Otherwise the cursor moves to the nearest EDT (edited data transfer) level.
  - You can also use the arrow keys to jump from significant level to another.



In a live sounding, the levels are marked as they appear along with the proceeding sounding. In an archived sounding, all points are marked from surface to the end of the sounding.

### 9.7.5.4 Using wind shear

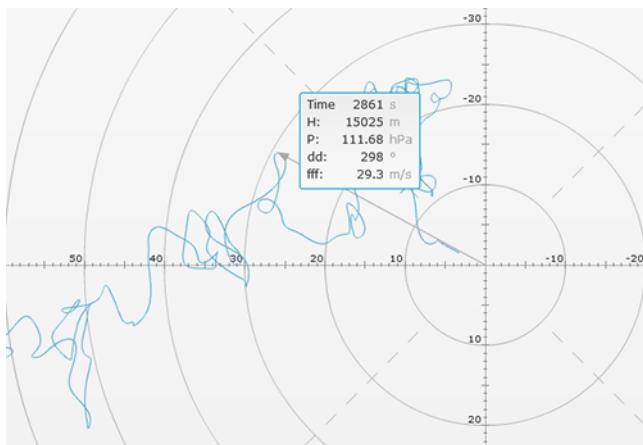
You can select **Wind Shear** only when you have selected **Arrow Pointer**.

When you select **Wind Shear**, you can determine wind shear vectors between two sounding layers. This helps you, for example, to resolve thermal wind in the layer.



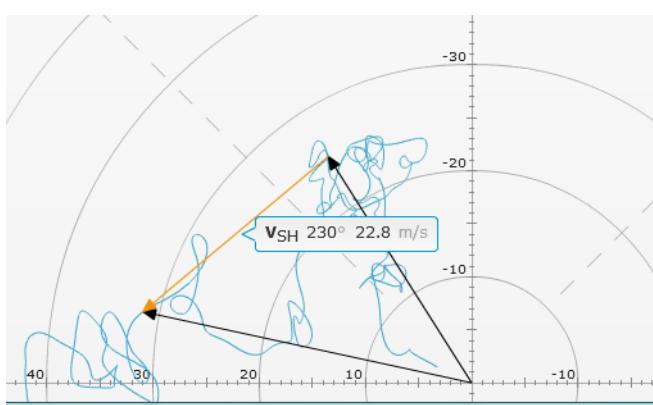
When **Wind Shear** is active in Hodograph, you cannot zoom in.

- ▶ 1. Select the **Wind Shear** check box.  
The current wind arrow disappears, and a new arrow and current values are displayed when you point to the graphic.



2. Select the first layer: point to the desired position of time, height of pressure in the graphic, and click at the correct point. An arrow is drawn to that point.
3. Select the second layer in the same way.

Another arrow and a wind shear vector are drawn on the diagram. The direction and length (speed) values of the shear vector are displayed next to the shear vector arrow.



4. When you click again, the current arrows are removed and a new sequence starts. The sequences are repeated as long as the Wind Shear check box is selected.
5. To exit the wind shear display, deselect the check box.  
The diagram returns to the state it was in before you selected the wind shear display.

- If you deselect the Arrow Pointer check box, both selections (Arrow Pointer and Wind Shear) are cleared at the same time and the current sounding status is shown.



The wind vector is always drawn from the arrow at the lower level upwards to the arrow at the upper level, regardless of the order in which you set the arrows.

#### 9.7.5.5 Height pane

The height pane on the right shows the height of a point on the hodograph diagram. In a live sounding, the height scale increases in steps of five kilometers along with the proceeding sounding.

In an archived sounding, the scaling is according to the last height of the sounding and the indicator shows the last level after opening the archived sounding.

#### 9.7.5.6 Viewing numerical data

The numerical values on the right display the following information. A highlighted value indicates a significant point (SigP) in the graphic.

- Time from launch (s)
  - Height (m)
  - Pressure (hPa)
  - Wind components u, v (m/s)
  - Wind direction (°)
  - Wind speed (m/s)
  - Tropopause
  - Max. wind
- 1. To study the graphic in more detail, point to the horizontal cursor line. As you drag the cursor line up and down, the numerical values on the right change as they follow the values indicated with the cursor line.

#### 9.7.6 Skew-T / Log-P

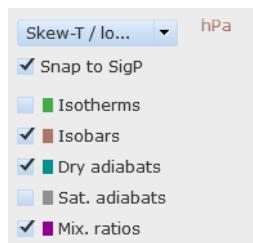


Thermodynamic graphs is a licensed option.

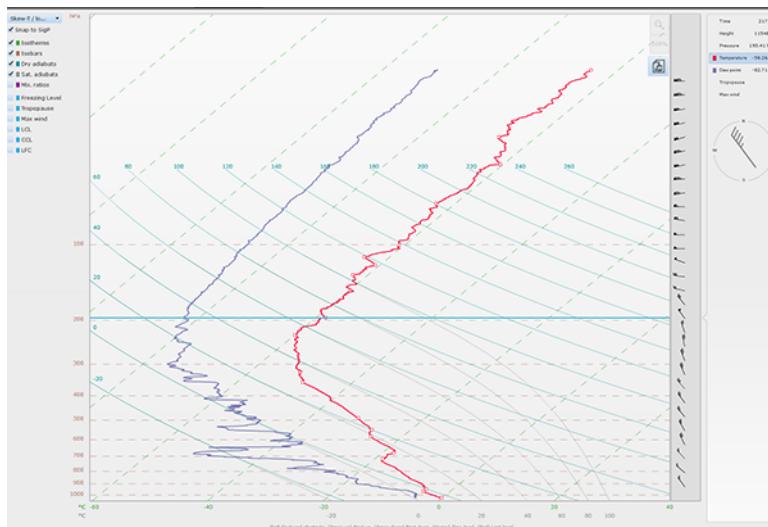
The windows presented in this on-line help are only examples and their details might vary.

Missing numeric information is indicated with slashes: ////.

### 9.7.6.1 Displaying grids



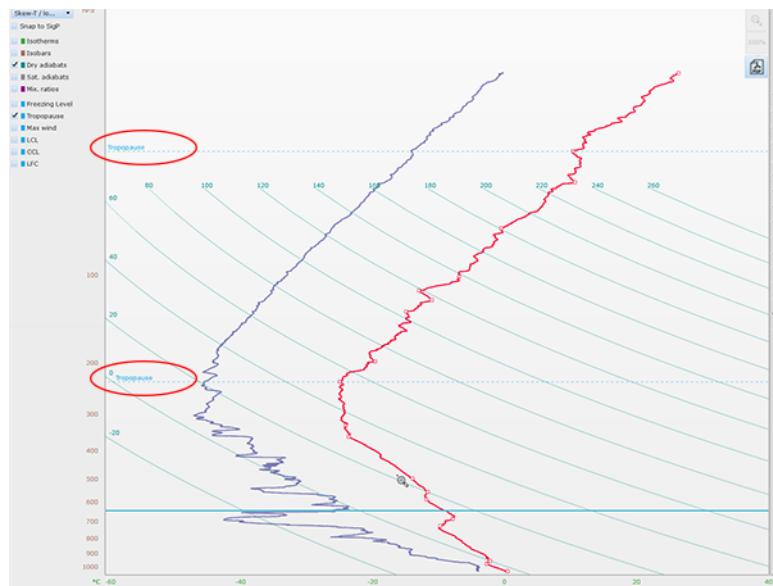
- ▶ 1. Select the grid lines you wish to display by selecting the appropriate options. The graphic lines are color-coded.
  - **Isotherms:** Constant temperature
  - **Isobars:** Constant pressure
  - **Dry adiabat:** Determines the stability of the temperature graph. The slope of the line matches the dry adiabatic lapse rate.
  - **Sat. adiabats:** Constant saturated (moist) adiabats
  - **Mix. ratios:** Constant mixing ratios



### 9.7.6.2 Displaying levels



- 1. Select the levels you wish to display by selecting the appropriate options.
- **Freezing level**
  - **Tropopause**: Tropopause lines determine the height of the sounding by defining tropopauses on the graphic.
    - The first tropopause line defines the first tropopause and it displays a lapse rate of  $2^{\circ}\text{C} / \text{km}$  over a depth of 2 km above the cursor.
    - The second tropopause line defines the second or subsequent tropopauses, and displays a lapse rate of  $3^{\circ}\text{C} / \text{km}$  over a depth of 1 km above the cursor.



- **Max. wind**
- **LCL**: Lifting Condensation Level
- **CCL**: Convection Condensation Level
- **LFC**: Level of Free Convection

#### 9.7.6.3 Snap to SigP

When you select the **Snap to SigP** checkbox, the mouse cursor jumps between significant points and omits all other levels. This way you do not have to go through all levels in the graphic.

When you move the horizontal cursor line, it jumps from one significant point to another. When a value on the right is highlighted, it means that the horizontal cursor line hits the significant point (SigP) defined.

#### 9.7.6.4 Viewing numerical data

The numerical values on the right display the following information. A highlighted value indicates a significant point (SigP) in the graphic.

- Time from launch (s)
- Height (m)
- Pressure (hPa)
- Temperature ( $^{\circ}\text{C}$ )
- Dew point ( $^{\circ}\text{C}$ )

- Tropopause
- Max. wind

- 1. To study the graphic in more detail, point to the horizontal cursor line. As you drag the cursor line up and down, the numerical values on the right change as they follow the values indicated with the cursor line.

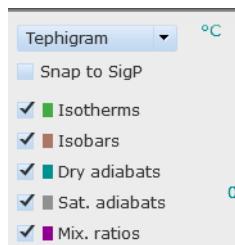
## 9.7.7 Tephigram



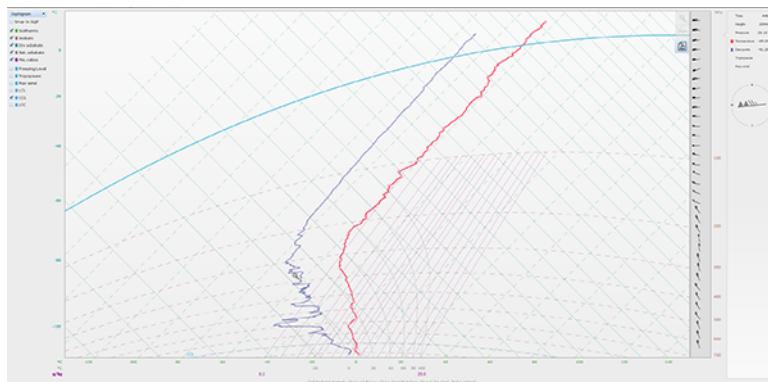
Thermodynamic graphs is a licensed option.  
The windows presented in this on-line help are only examples and their details might vary.

Missing numeric information is indicated with slashes: /////.

### 9.7.7.1 Displaying grids



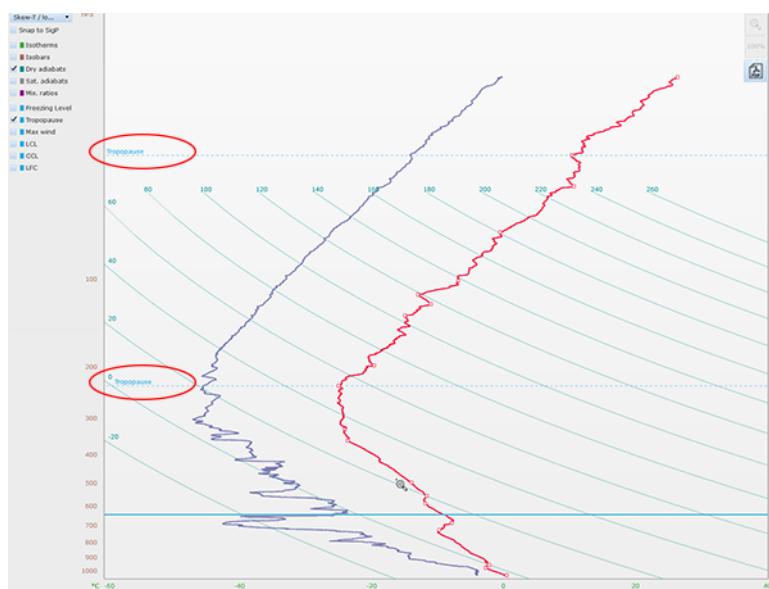
- 1. Select the grid lines you wish to display by selecting the appropriate options. The graphic lines are color-coded.
- **Isotherms:** Constant temperature
  - **Isobars:** Constant pressure
  - **Dry adiabat:** Determines the stability of the temperature graph. The slope of the line matches the dry adiabatic lapse rate.
  - **Sat. adiabats:** Constant saturated (moist) adiabats
  - **Mix. ratios:** Constant mixing ratios



### 9.7.7.2 Displaying levels



- 1. Select the levels you wish to display by selecting the appropriate options.
- **Freezing level**
  - **Tropopause:** Tropopause lines determine the height of the sounding by defining tropopauses on the graphic.
    - The first tropopause line defines the first tropopause and it displays a lapse rate of  $2^{\circ}\text{C} / \text{km}$  over a depth of 2 km above the cursor.
    - The second tropopause line defines the second or subsequent tropopauses, and displays a lapse rate of  $3^{\circ}\text{C} / \text{km}$  over a depth of 1 km above the cursor.



- **Max. wind**
- **LCL:** Lifting Condensation Level
- **CCL:** Convection Condensation Level
- **LFC:** Level of Free Convection

### 9.7.7.3 Snap to SigP

When you select the **Snap to SigP** checkbox, the mouse cursor jumps between significant points and omits all other levels. This way you do not have to go through all levels in the graphic.

When you move the horizontal cursor line, it jumps from one significant point to another. When a value on the right is highlighted, it means that the horizontal cursor line hits the significant point (SigP) defined.

#### 9.7.7.4 Viewing numerical data

The numerical values on the right display the following information. A highlighted value indicates a significant point (SigP) in the graphic.

- Time from launch (s)
- Height (m)
- Pressure (hPa)
- Temperature (°C)
- Dew point (°C)
- Tropopause
- Max. wind

- 1. To study the graphic in more detail, point to the horizontal cursor line. As you drag the cursor line up and down, the numerical values on the right change as they follow the values indicated with the cursor line.

#### 9.7.8 Stüve diagram



Thermodynamic graphs is a licensed option.

The windows presented in this on-line help are only examples and their details might vary.

Stüve (or Pseudoadiabatic) diagram uses straight lines for the three primary variables:

- Pressure
- Temperature
- Potential temperature

In the Stüve diagram, the isobars are straight, parallel and vertical, and the isotherms are straight, parallel and horizontal.

The constant dry adiabatic lapse rate (DALR) lines are straight and sharply angled and convergent to the left, and the constant saturated (or "moist") adiabatic lapse rates (SALR) lines are slightly curved to the left with height.

The isopleths are quasi-straight, angled less than 20 degrees to the left.

Missing numeric information is indicated with slashes: /////.

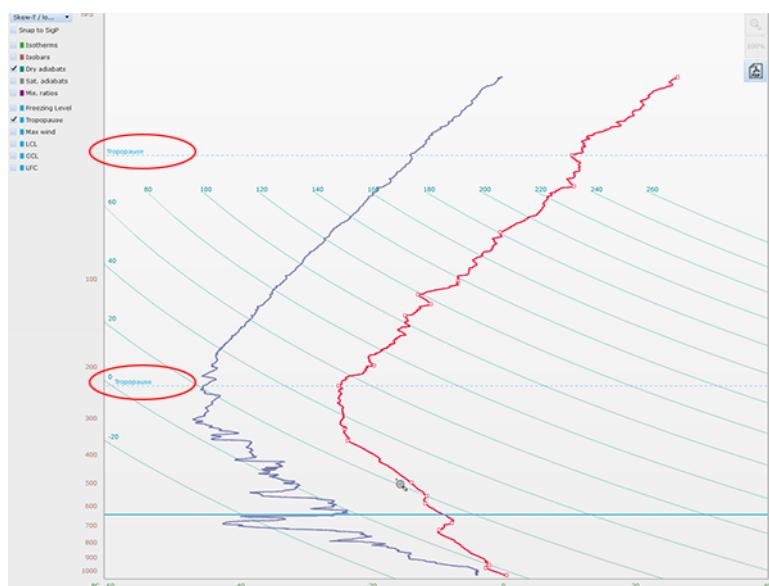
#### 9.7.8.1 Displaying grids

- 1. Select the grid lines you wish to display by selecting the appropriate options. The graphic lines are color-coded.
- **Dry adiabat:** Determines the stability of the temperature graph. The slope of the line matches the dry adiabatic lapse rate.
  - **Sat. adiabats:** Constant saturated (moist) adiabats
  - **Mix. ratios:** Constant mixing ratios

### 9.7.8.2 Displaying levels



- 1. Select the levels you wish to display by selecting the appropriate options.
- **Freezing level**
  - **Tropopause:** Tropopause lines determine the height of the sounding by defining tropopauses on the graphic.
    - The first tropopause line defines the first tropopause and it displays a lapse rate of  $2^{\circ}\text{C} / \text{km}$  over a depth of 2 km above the cursor.
    - The second tropopause line defines the second or subsequent tropopauses, and displays a lapse rate of  $3^{\circ}\text{C} / \text{km}$  over a depth of 1 km above the cursor.



- **Max. wind**
- **LCL:** Lifting Condensation Level
- **CCL:** Convection Condensation Level
- **LFC:** Level of Free Convection

### 9.7.8.3 Snap to SigP

When you select the **Snap to SigP** checkbox, the mouse cursor jumps between significant points and omits all other levels. This way you do not have to go through all levels in the graphic.

When you move the horizontal cursor line, it jumps from one significant point to another. When a value on the right is highlighted, it means that the horizontal cursor line hits the significant point (SigP) defined.

#### 9.7.8.4 Viewing numerical data

The numerical values on the right display the following information. A highlighted value indicates a significant point (SigP) in the graphic.

- Time from launch (s)
- Height (m)
- Pressure (hPa)
- Temperature (°C)
- Dew point (°C)
- Tropopause
- Max. wind

- 1. To study the graphic in more detail, point to the horizontal cursor line. As you drag the cursor line up and down, the numerical values on the right change as they follow the values indicated with the cursor line.

# 10. Terminating a sounding

## 10.1 Viewing sounding data after termination

All sounding data is stored right from the beginning of the sounding and can be viewed and saved in **Archive** after the sounding has terminated.

Even if the sounding is stopped uncontrollably by, for example, a power loss in the sounding workstation, you can still view and save the sounding data that has been calculated and stored so far.

## 10.2 Terminating a sounding

A sounding can be terminated manually or automatically. Before the sounding starts, you can set termination triggers for the sounding if the termination triggers are enabled.

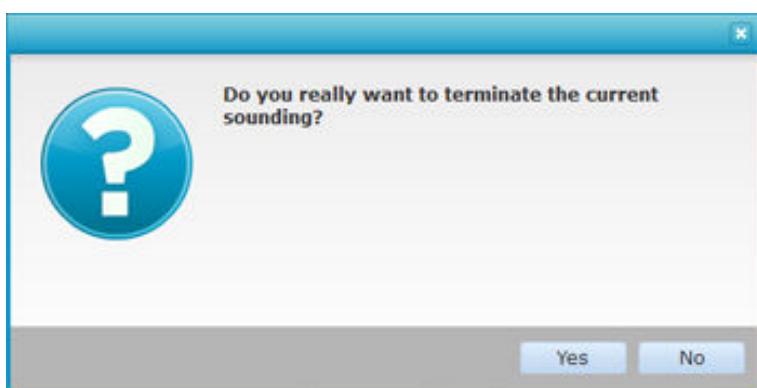
### More information

- [Sounding procedure \(page 8\)](#)
- [Setting termination triggers \(page 32\)](#)
- [Viewing sounding status \(page 52\)](#)

### 10.2.1 Terminating a sounding manually

When you terminate a sounding manually, all sounding data calculations end immediately, even if you have set the sounding calculations to continue during radiosonde descent. The reason for termination is Manual stop.

- 1. In the **Sounding status** window, click the **Terminate sounding** button. The **Terminate sounding** button is visible when EDT data is available and the sounding has started.
2. You are asked to confirm your decision:



3. After terminating the sounding, click **Close sounding** to close the current sounding.
4. After the sounding has terminated and you have closed it, turn off SPS3xx.

### 10.2.2 Automatic sounding termination

The sounding is automatically terminated in the following cases:

Increasing pressure	Balloon has burst and pressure increases when the radiosonde falls.
Radiosonde termination condition met	Sounding ends when the criteria set as termination trigger for the radiosonde has been met.
Temperature, pressure or humidity sensor has failed	PTU check has failed, for example, because a temperature sensor has broken down during the sounding.
Radiosonde signal lost	No signal has been received from the radiosonde for 12 minutes. All sounding data calculations end immediately.
Unknown radiosonde type	Radiosonde type is unknown, the ground equipment does not recognize the radiosonde type. All sounding data calculations end immediately.
PTU filtering has stopped	Maximum interpolation time has been exceeded for humidity (6 minutes), temperature (8 minutes) and pressure (10 minutes).
Preparation failed	Radiosonde preparation has failed, for example, because one of the ground check limits has been exceeded.
Radiosonde disconnected	Radiosonde has been prematurely disconnected during the sounding preparations.
System shutdown	System has been shut down. All sounding data calculations end immediately.
Battery low	Sounding has been terminated due to low battery.
Radio failure	SPS has been restarted during the sounding.

## 10.3 Sounding termination condition met

The termination reason **Sounding termination condition met** is displayed when:

- The radiosonde has met a sounding termination trigger and stops transmitting
- The sounding termination triggers set for time or height have been met
- The balloon has burst and continue descending sounding is not selected

# 11. Special sensor sounding



Special sensor sounding is a licensed option and requires the Advanced option.

These instructions explain you how to prepare an ozone sounding with radiosonde RS41. For more detailed information on ozone soundings, see the appropriate User Guide.

## 11.1 Importing scripts for special sensor sounding

To be able to create and simulate ozone data with MW41, you must first delete the possible old ozone scripts and, after that, import and activate the following scripts:

- *OzoneCalculations.py*
- *OzoneMain.py*
- *OIF411.py* for RS41-SG and RS41-SGP



Ozone sounding cannot be completed if any of these scripts is missing.

- ▶ 1. Delete the possible old ozone scripts.
- 2. On the installation media, go to folder *ScriptLibrary\CalcOzone*.
- 3. Import the scripts to the same *Script Group* and select *OzoneMain.py* as the main script. You do not need to set a command line argument.
- 4. Make sure that *Script group* is set active.

### More information

- ▶ [Uploading and activating scripts \(page 195\)](#)

## 11.2 Starting a special sensor sounding with RS41

Before you start, make sure that you have imported the necessary scripts.

- ▶ 1. Place the radiosonde on the ground check device.

2. During the radiosonde ground check, scroll down the **Radiosonde Selection** tab and select the correct special sensor from the drop-down list. By default, the selection is **None**.
3. Proceed to prepare the radiosonde.

### 11.2.1 Preparing an ozone sounding with RS41



**CAUTION!** Do not connect the special sensor connector into the radiosonde while the radiosonde is being prepared by the ground check device. Connecting the sensor during the ground check will interrupt the preparations and the software will return to the Radiosonde selection phase.

For detailed information on ozone sounding with RS41, see *Ozone Sounding with Vaisala Radiosonde RS41 User Guide*, included on the installation media.

- 1. When you select **Ozone** in the **Radiosonde Selection** tab, the following window opens. Enter the information required and click **Apply**.

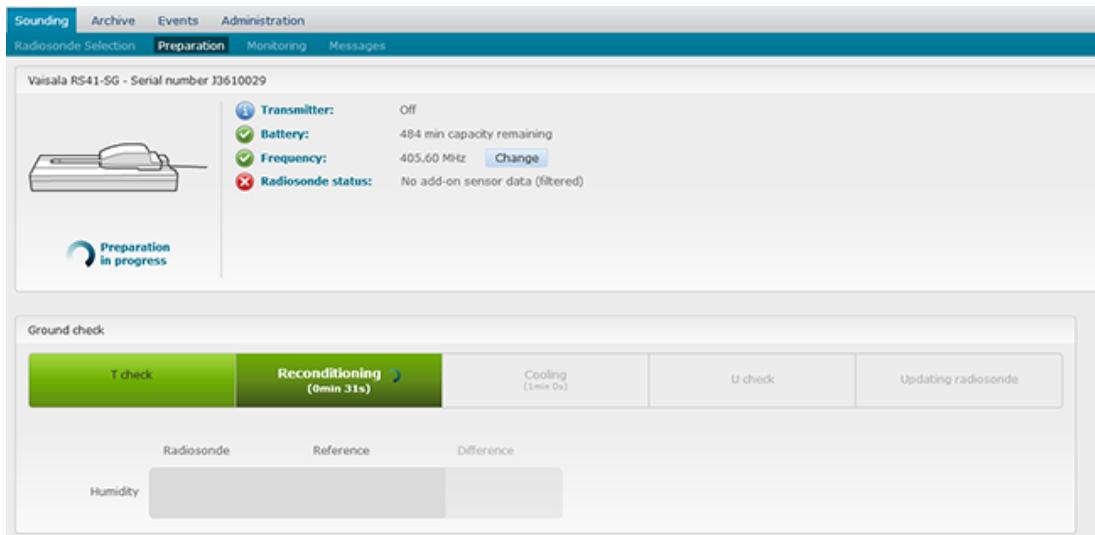


- **Sensor:** Options are **None** (the default value), **SPC-6A**, and **DMT-Z**.
- **Calibration pressure:** Possible values are 500 ... 1200.
- **Cathode solution volume:** Options are 2.5 (the default value) and 3.0.
- **Median filter window radius:** Default value is 4 and it is already input.
- **Pump air flow rate:** Possible values are 20 ... 40.

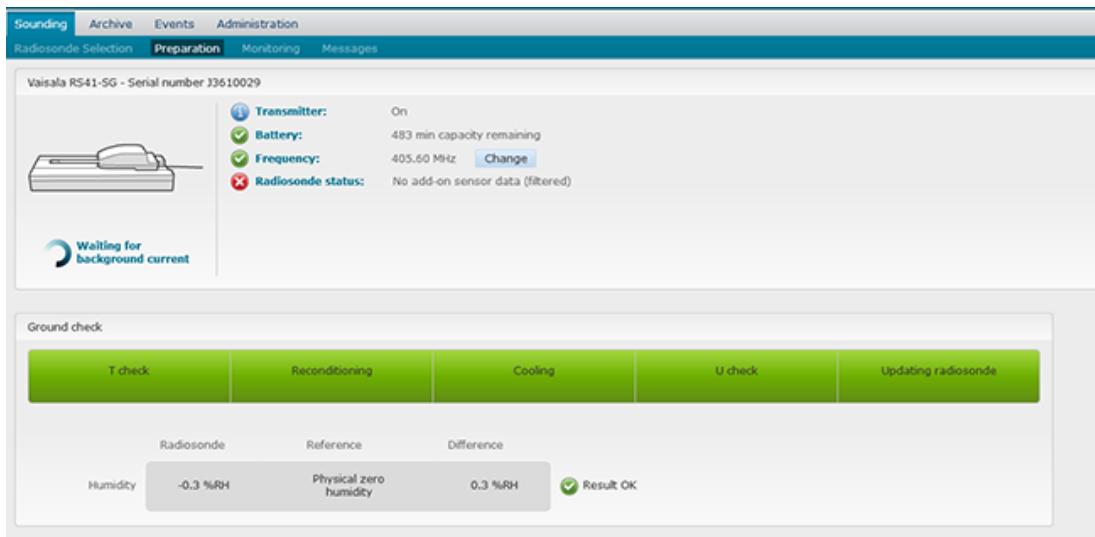
The **Sensor background current** view is greyed out at this stage.

During this phase, the radiosonde LED light is red, but you can ignore it. It does not indicate an error and you can continue with the preparations as usual.

2. The preparations begin. During the preparations, **Radiosonde status** may display an error message **No add-on sensor data (filtered)**. You can ignore this message, since it has no effect on the preparations.



3. When the message **Waiting for background current** is displayed, remove the radiosonde from the ground check device.



4. Connect the special sensor to the radiosonde. The radiosonde LED light is now green. Next, enter or copy the sensor background current value.

#### More information

- [Giving background current input \(page 108\)](#)

## 11.3 Giving background current input

Sensor background current  Reference value

Copy or insert value to be used in the current sounding.

- ▶ 1. After the ground check phase is finished, connect the special sensor to the radiosonde and give the sensor background current value. When available, a reference value is displayed. Enter the sensor background current value either manually, or copy the most recent value by clicking **Copy**. Enter the background current value just before the launch. You can make sure that everything is in order by checking the special sensor tabular data before the launch.

Time	Raw O3 [mPa]	Current [μA]	Box temperature [°C]	Ozone pump current [mA]
07:21:16	3.88	1.086	22.73	0.000
07:21:17	3.90	1.092	22.71	0.000
07:21:18	3.98	1.114	22.71	0.000
07:21:19	0.43	0.121	22.71	0.000
07:21:23	0.26	0.072	22.71	0.000
07:21:24	0.25	0.070	22.70	0.000
07:21:25	0.25	0.069	22.70	0.000
07:21:26	0.24	0.068	22.70	0.000
07:21:27	0.24	0.067	22.71	0.000
07:21:28	0.24	0.067	22.71	0.000
07:21:29	0.23	0.066	22.71	0.000
07:21:30	0.23	0.065	22.72	0.000
07:21:31	0.23	0.065	22.72	0.000
07:21:32	0.23	0.065	22.72	0.000

- 2. Click **Apply** to accept and continue with the sounding preparations as usual. The system will be ready for release after the special sensor has been connected and data is received.



In an ozone sounding, the system will remain in the preparation mode until the background current has been applied, even if the ground check procedure has finished.

## 11.4 Monitoring special sensor data

### 11.4.1 Viewing ozone data in tabular format

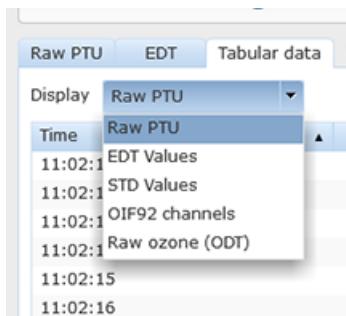


Special sensor sounding is a licensed option and requires the Advanced option.

Tabular ozone data is only available if special sensor or ozone sounding has been selected in the preparation display during the radiosonde ground check.

You can check the tabular data prior to launch to make sure that everything is in order.

- 1. Select **Monitoring > Sounding Status**.
- 2. In the **Tabular data** tab, select the appropriate option from the drop-down menu on top of the table to display raw ozone data for OIF411, or channels for OIF92.



#### 11.4.1.1 OIF411 data

During a special sensor sounding with OIF411, raw ozone data is displayed for OIF411. The following information is given:

- Time: Time in seconds
- Raw O<sub>3</sub>: Ozone partial pressure
- Current
- Box temperature
- Ozone pump current

Time	Raw O <sub>3</sub> [mPa]	Current [μA]	Box temperature [°C]	Ozone pump current [mA]
07:21:16	3.88	1.086	22.73	0.000
07:21:17	3.90	1.092	22.71	0.000
07:21:18	3.98	1.114	22.71	0.000
07:21:19	0.43	0.121	22.71	0.000
07:21:23	0.26	0.072	22.71	0.000
07:21:24	0.25	0.070	22.70	0.000
07:21:25	0.25	0.069	22.70	0.000
07:21:26	0.24	0.068	22.70	0.000
07:21:27	0.24	0.067	22.71	0.000
07:21:28	0.24	0.067	22.71	0.000
07:21:29	0.23	0.066	22.71	0.000
07:21:30	0.23	0.065	22.72	0.000
07:21:31	0.23	0.065	22.72	0.000
07:21:32	0.23	0.065	22.72	0.000

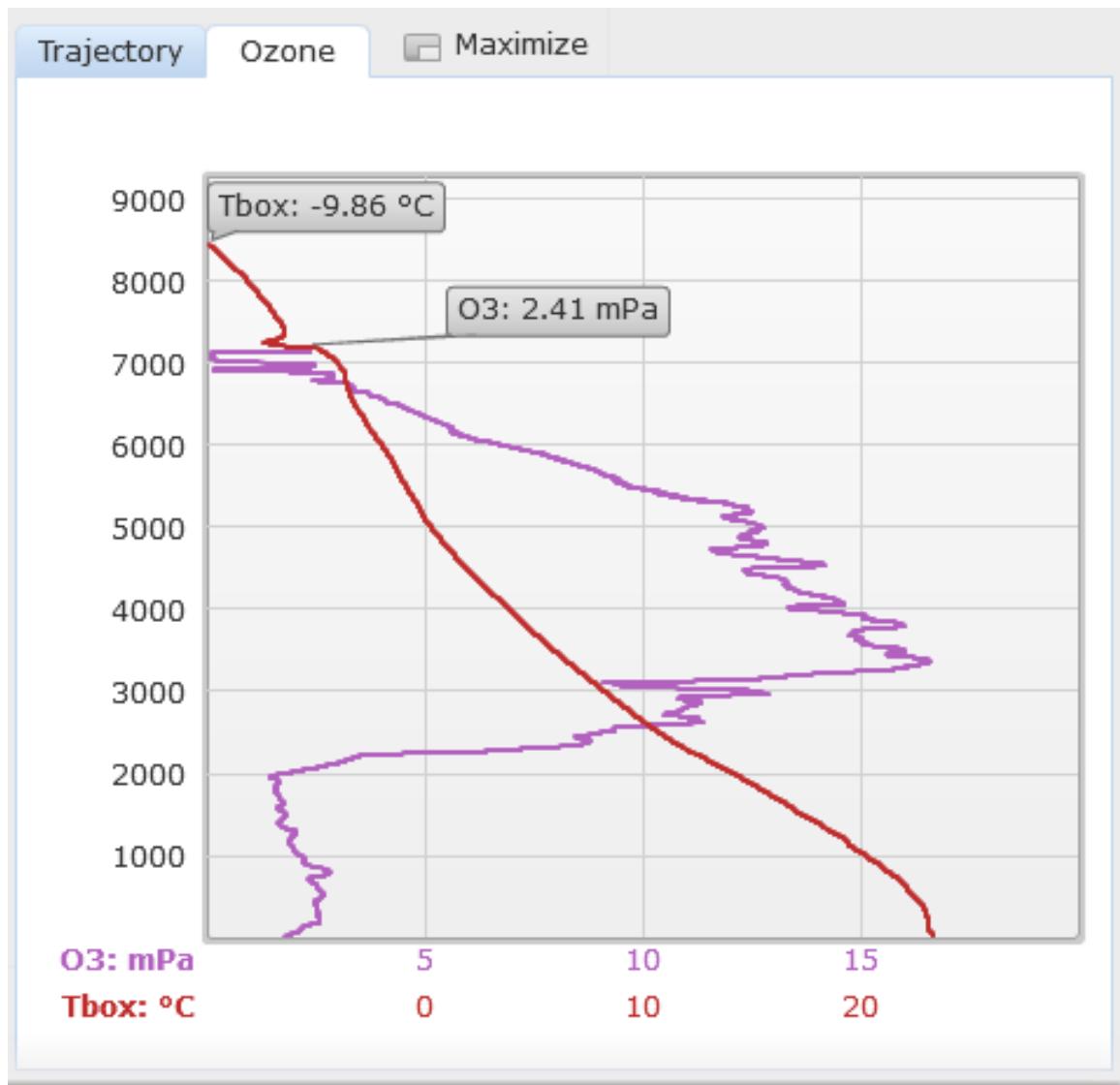
### 11.4.2 Viewing ozone data in the monitoring tab



Special sensor sounding is a licensed option and requires the Advanced option.

In an ozone sounding, the **Monitoring** tab displays edited real-time graphical information on the sounding.

To view ozone partial pressure (O3) and sensor box temperature (Tbox) in graphical format, select the **Ozone** tab next to the **Trajectory** tab.



Information on the ozone sounding is also displayed in the EDT data graphic. To view the values at different stages of the sounding, point to a line in the graphic. Information on the ozone values received during the sounding will be displayed:



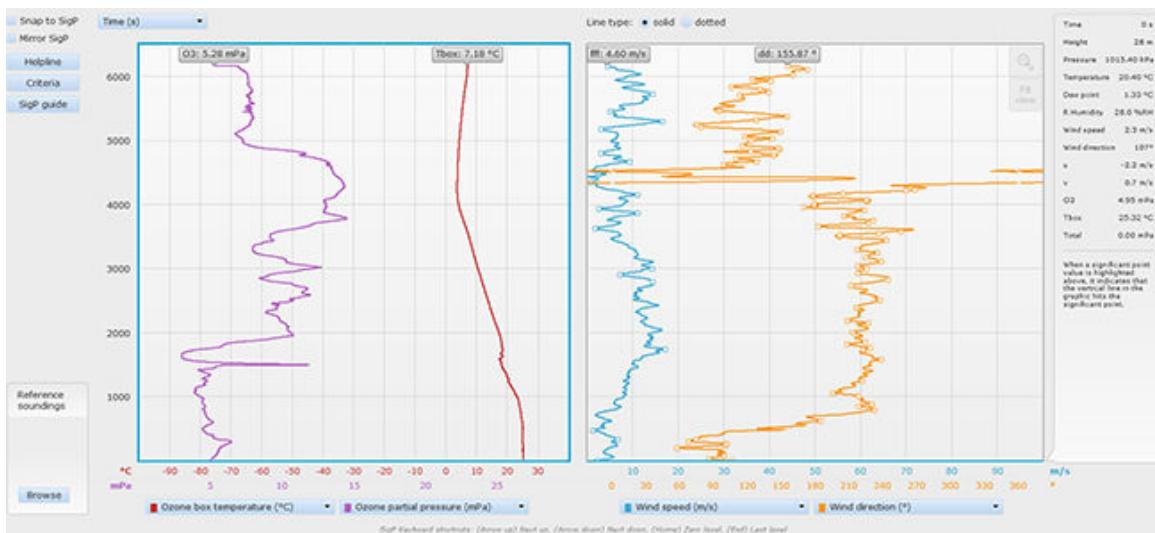
Note that the information is not displayed in the maximized window.

### 11.4.3 Viewing ozone data with extended monitoring



Special sensor sounding is a licensed option and requires the Advanced option.

To view the ozone data in graphical format, select **Sounding > Monitoring > Extended monitoring**.

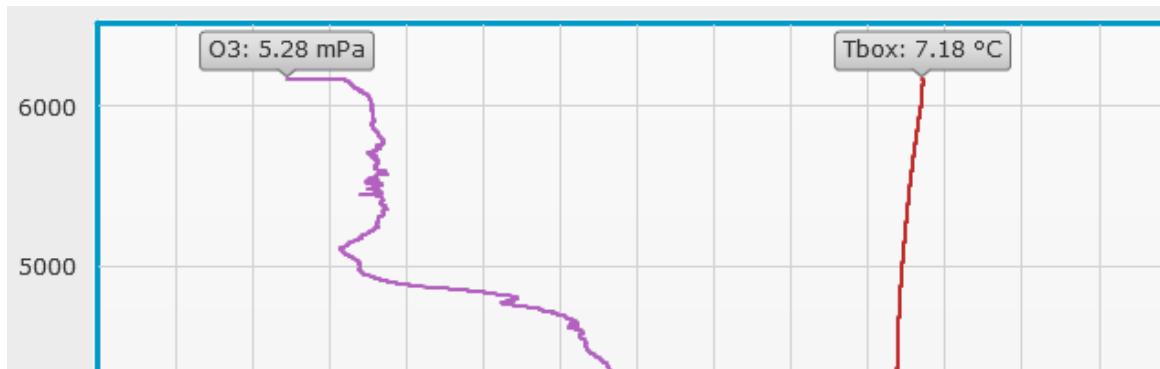
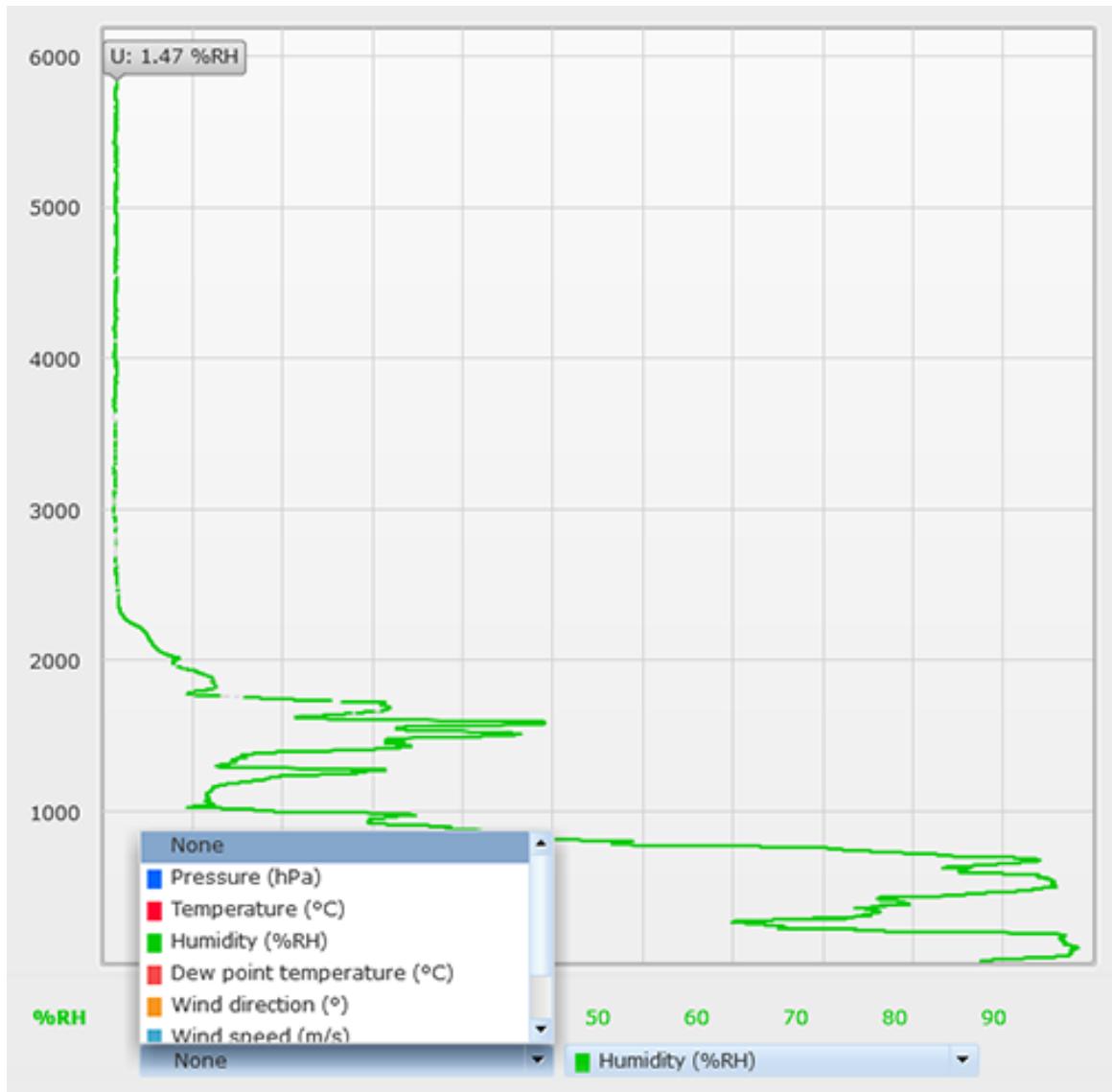


In addition to other sounding data, the following ozone data is displayed. The color matches the colors displayed in the graphic lines.



- Ozone partial pressure (mPa)
- Ozone box temperature (C)

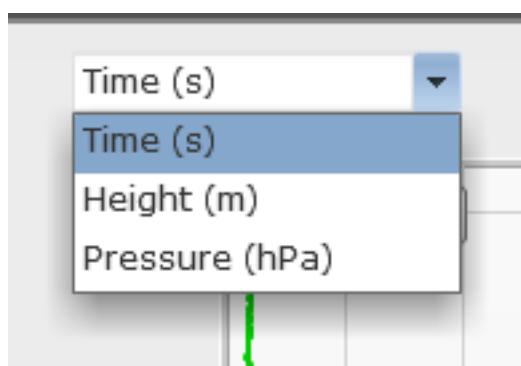
Select **None** to hide a line in the graphic.



The lines can be displayed as either solid or dotted lines, depending on your selection.



The Y axis displays information on pressure (hPa), height (m), or time (s). The selection applies to both graphics.



#### More information

- [Viewing sounding data with extended monitoring \(page 74\)](#)

#### 11.4.4 Viewing events

Information on the ozone parameter input and background current is also visible in the **Sounding events** window. Click **Events** on the application toolbar to open the window.

#### 11.4.5 Ozone data location

After the sounding, the OIF411 data is stored in XML format in an exported `.mwx` sounding archive file. You can also access the data programmatically via the script interface during the sounding.

#### 11.4.6 Ozone data calculation

The scripting engine calculates the ozone data using raw ozone and EDT data. This information, along with the calculated ozone, can be archived for further inspection, for example, simulation.

If the calculated ozone values are not available during a sounding, for example, there are slashes in the data (///), it may be due to incorrectly entered ozone parameters.

The calculated ozone data, CALC-OZONE, is also stored in XML format in an exported `.mwx` sounding archive file. You can use the report template editor to create an ASCII output of the calculated ozone data.

You can also access the data programmatically via the script interface during the sounding.

#### More information

- [Reports \(page 164\)](#)

## 11.5 NILU messages

### 11.5.1 Creating a NILU message



Special sensor sounding and NILU message are licensed options and require the Advanced option.

NILU message is available with ozone soundings. To create a NILU message, you need the files available on the MW41 installation media, path `\MW41\ScriptLibrary\Nilu`.

- ▶ 1. Copy the files in `\MW41\ScriptLibrary\Nilu` to your sounding workstation's local hard drive directory, for example, `D:\Nilu`.
- 2. To start generating a NILU message, double-click the `Nilu.bat` file in the location on your local hard drive where you have copied the files related to NILU message, for example, `D:\Nilu`.  
A command window opens. You are prompted to select an ozone sounding in the MW41 database from which you would like to generate the NILU message. If there is only one ozone sounding in the database, it will be selected automatically.
- 3. The **Common parameters** window opens and you can enter the parameters. Click **Next** to continue to the **Aux variables** window.
- 4. After entering the variables, click **Next**. NILU message generation starts. When the message has been generated, it is stored in your local messages directory (default is `D:\Messages`).

### 11.5.2 NILU message parameters

NILU message parameters are given in two groups, common and auxiliary.

The parameters are given when generating the NILU message, but you can also predefine them in the `Nilu.py.config` file. Enter the predefinition for each parameter between the `<Text>` and `</Text>` tags.

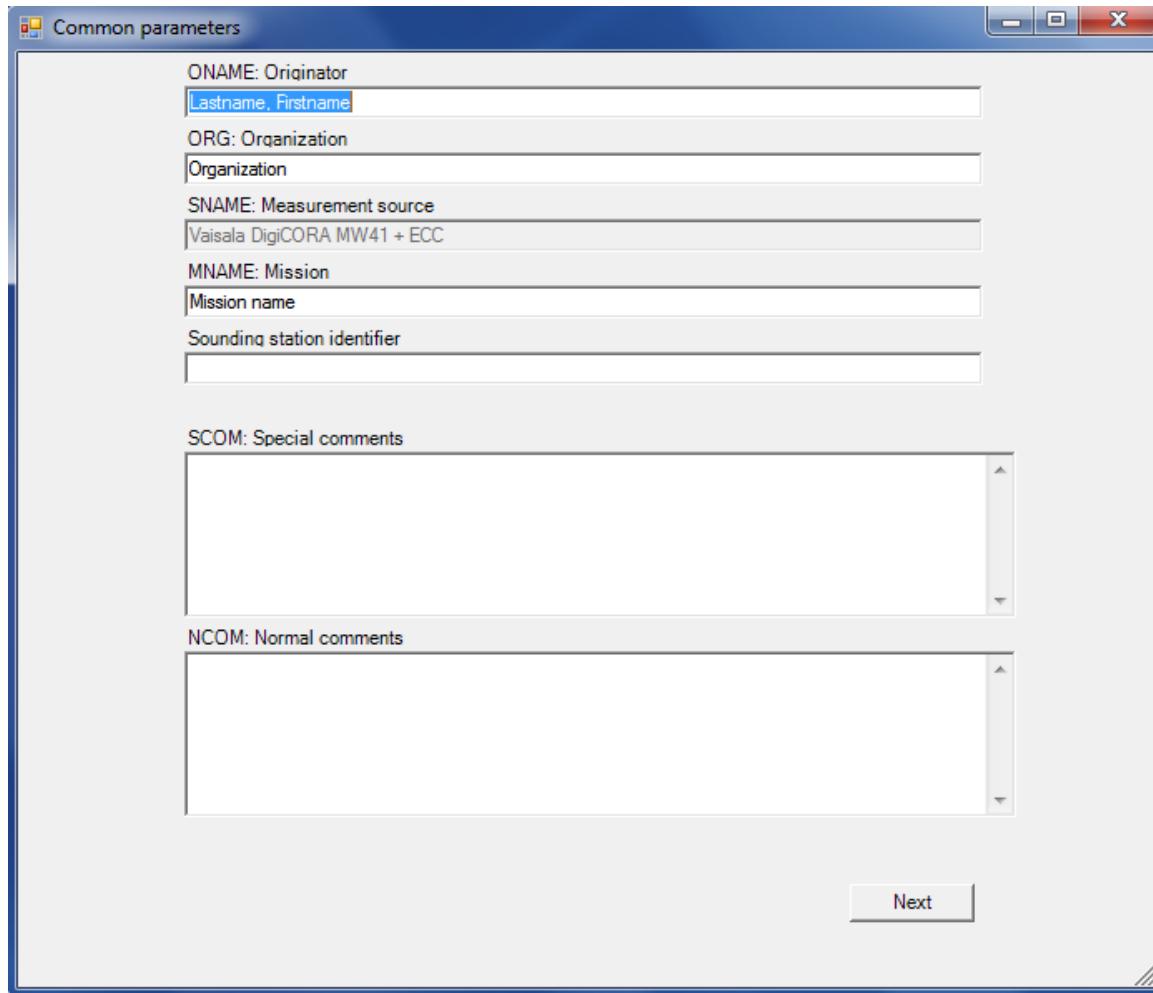


Figure 2 Common NILU message parameters

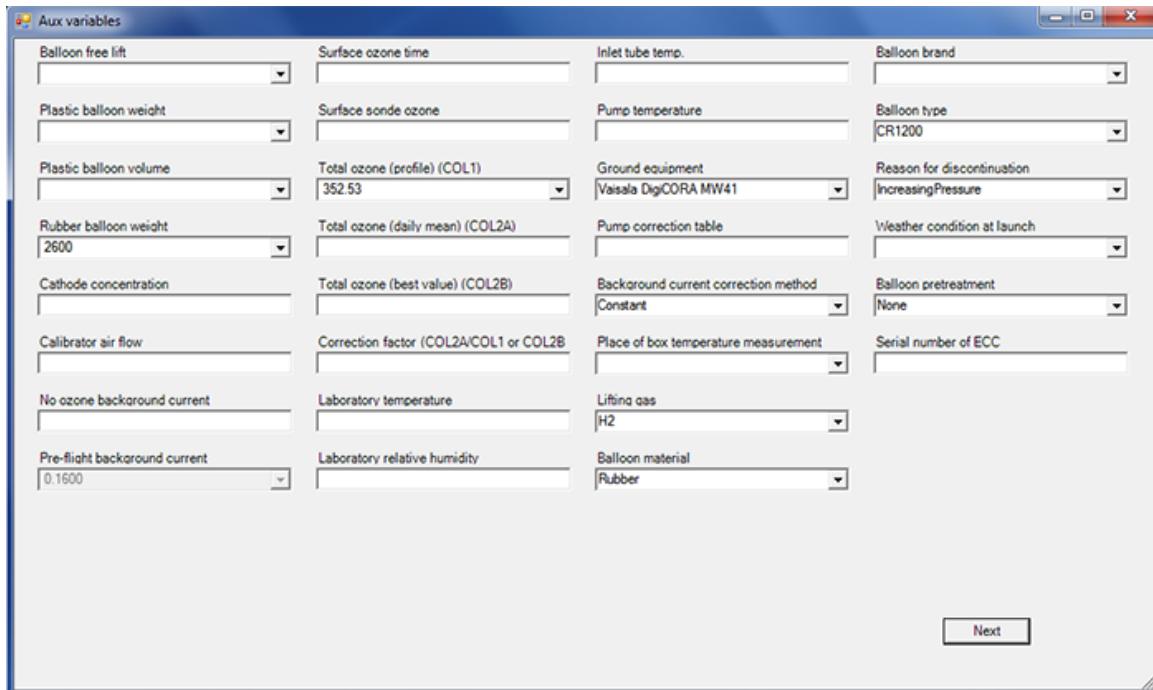


Figure 3 Auxiliary NILU message parameters

### 11.5.3 NILU message location

You can edit the destination of the messages in **Administration > Sounding > Messages > Message Destinations > File: Local Folder**.

By default, all messages are stored in a local folder called *Messages* on the *D:* drive, or the *C:* drive if *D:* does not exist.

To change the default destination of NILU messages, edit the file *Nilu.bat*. The destination is indicated after the -d parameter, that is, -d "Local folder".

## 11.6 WOUDC messages

### 11.6.1 Prerequisites for WOUDC messages



Special sensor sounding and WOUDC message are licensed options and require the Advanced option.

WOUDC (World Ozone and Ultraviolet Radiation Data Centre operated by Environment Canada) message is available with archived ozone sounding files (*.mwx*) created with the RS41 radiosonde.

To create a WOUDC message, you need the files available on the MW41 installation media, path *\MW41\ScriptLibrary\WOUDC*:

- *WOU DC.bat*
- *WOU DC.py*
- *WOU DC.py.configconfigreader.py*

You can predefine some of the parameters in the dialog windows by editing the *WOU DC.py.config* file. Enter the predefinition for each parameter between the *<Text>* and *</Text>* tags. It is a good idea to insert some of the basic information in the script. This way you do not have to write them in the parameter window each time you want to create a WOUDC file.

### 11.6.2 Creating a WOUDC message



Special sensor sounding and WOUDC message are licensed options and require the Advanced option.

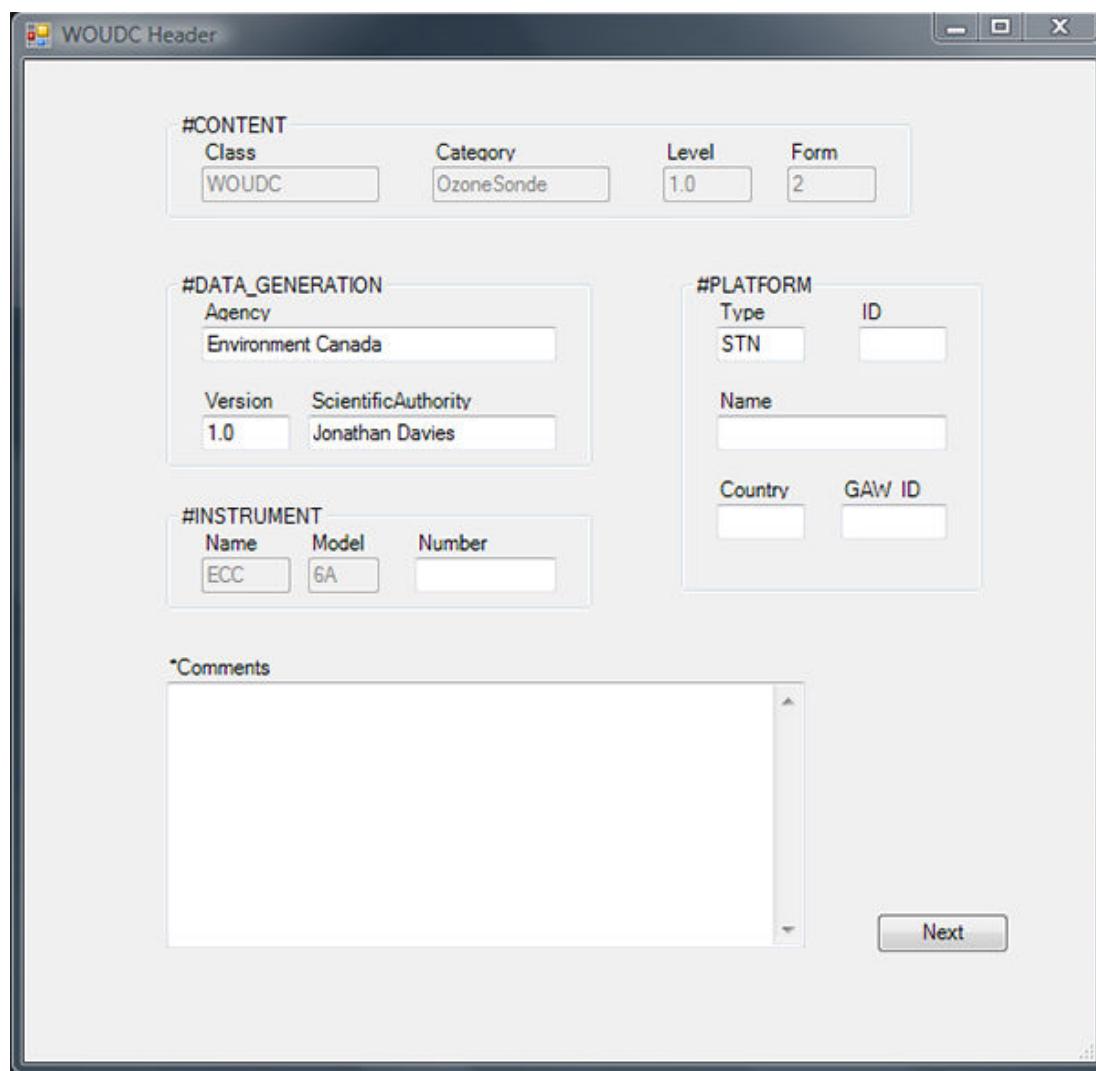
- ▶ 1. Copy the files on the installation media in *\MW41\ScriptLibrary\WOUDC* to your sounding workstation's local hard drive directory, for example, *D:\WOUDC*.
- 2. To start generating a WOUDC message, double-click the *WOUDC.bat* file in the location on your local hard drive where you have copied the files related to WOUDC message, for example, *D:\WOUDC*.



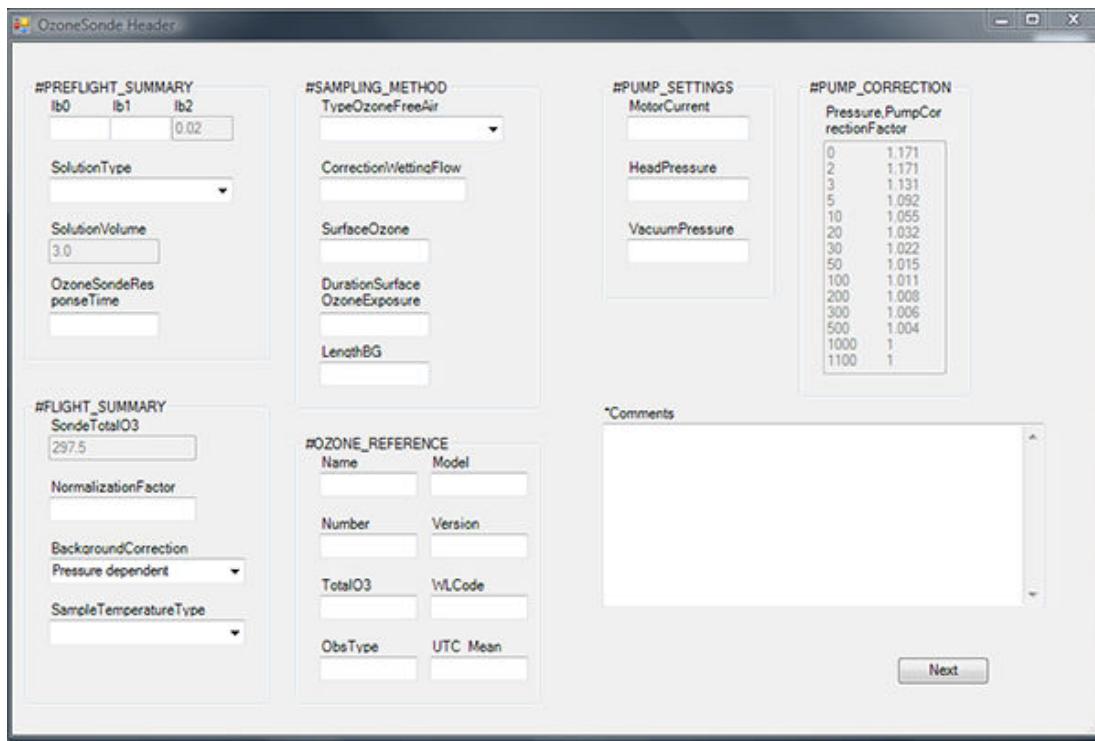
MW41 must be running while you are creating a WOUDC message.

A command window opens showing the archived RS41 ozone soundings. You are prompted to select an ozone sounding in the MW41 database from which you would like to generate the message. If there is only one ozone sounding in the database, it will be selected automatically.

3. The **WOUDC Header** window opens. Fill in the information needed. Enter the ozone sensor's serial number you have written down earlier in the **Number** text box. Click **Next**.



4. The **OzoneSonde Header** window opens. The information received from the ozone sounding data is automatically filled in. Fill in the rest of the information needed and click **Next**.



WOUDC message generation starts. When the message has been generated, it is stored in your local messages directory (default is *D:* \Messages).

5. The resulting file is of type .txt. Right-click the file to rename it as .csv.

### 11.6.3 WOUDC message location

You can edit the destination of the messages in **Administration > Sounding > Messages > Message Destinations > File: Local Folder**.

By default, all messages are stored in a local folder called *Messages* on the *D:* drive, or the *C:* drive if *D:* does not exist.

For more detailed information on creating WOUDC messages, see WOUDC Guide Book v.3.1, May 2013, available at <http://www.woudc.org>.

## 12. Messages

Messages can be triggered automatically, or you can create them manually at any time during or after a sounding.

However, note that if the sounding has only just started, there may not be enough data available to create a message.

**MW41 Administrator** can configure the message settings in **Administration > Sounding > Messages**.

## 12.1 Viewing the message log

- 1. On the application toolbar, select **Sounding > Messages**.  
 The **Message log** shows a list of the created messages.

Message log				
Create a message	Pilot A		Create	
Message	Trigger	Created	Message status	Transmission status
BUFR309052	Sounding end	07:32:16 (UTC)	Message OK	Transmission complete (1/1)
BUFR309052	Sigp ready at 100 hPa	-	Trigger not reached	-
PILOT A	Sounding end	07:32:16 (UTC)	Message OK	Transmission complete (1/1)
PILOT A	Sigp ready at 100 hPa	-	Trigger not reached	-
PILOT B	Sounding end	07:32:17 (UTC)	Message OK	Transmission complete (1/1)
PILOT B	Sigp ready at 100 hPa	-	Trigger not reached	-
PILOT C	Sounding end	07:32:17 (UTC)	Message OK	Transmission complete (1/1)
PILOT D	Sounding end	07:32:18 (UTC)	Message OK	Transmission complete (1/1)
TEMP A	Sounding end	07:32:18 (UTC)	Message OK	Transmission complete (1/1)
TEMP A	Sigp ready at 100 hPa	-	Trigger not reached	-
TEMP B	Sounding end	-	Message generation failed	-
TEMP B	Sigp ready at 100 hPa	-	Trigger not reached	-
TEMP C	Sounding end	07:32:19 (UTC)	Message OK	Transmission complete (1/1)
TEMP D	Sounding end	07:32:19 (UTC)	Message OK	Transmission complete (1/1)
PILOT A	Manually created	07:42:47 (UTC)	Message OK	Transmission complete (1/1)

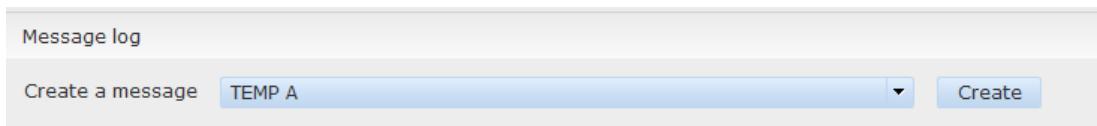
The symbols in the **Message status** and **Transmission status** columns indicate the following:

	This symbol stands for information.
	No problems detected.
	Warning
	The system has detected an error.

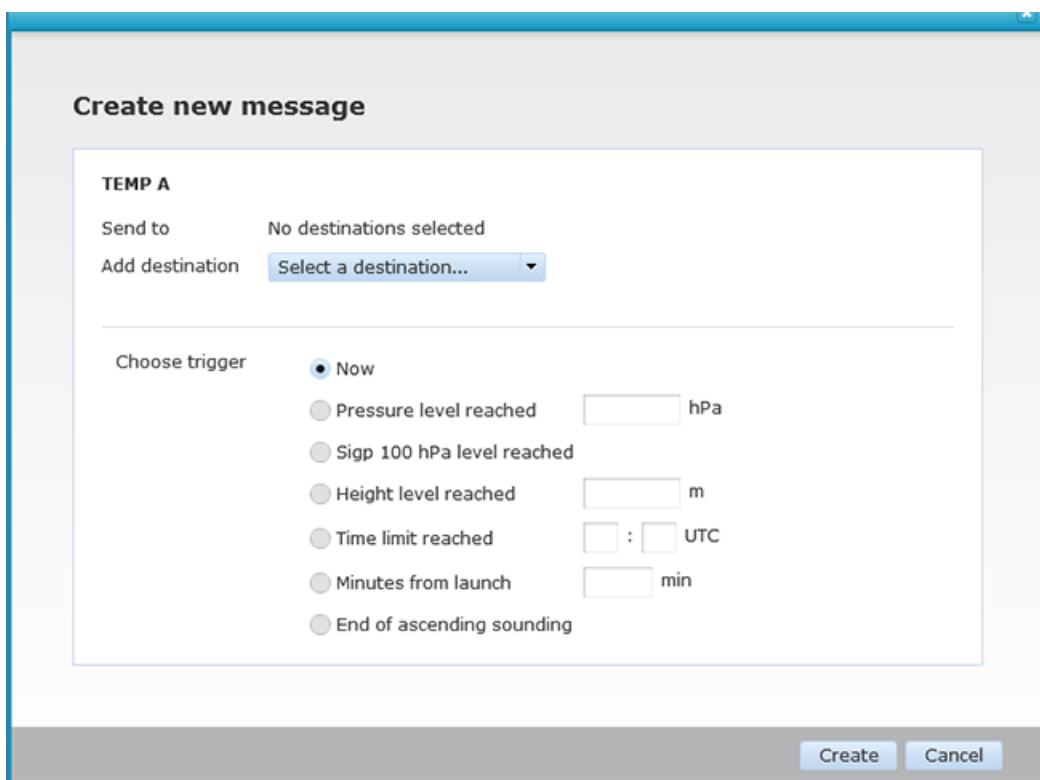
2. To arrange the messages in an ascending or a descending order, click the arrows in the column titles. If the arrow is not visible, click the column title.  
 3. To sort in the opposite order, click the arrow in the column title again.

## 12.2 Creating messages

- 1. On the application toolbar, select **Sounding > Messages**.
- 2. Select the message type from the drop-down list and click **Create**.



- 3. In the **Create new message** window, add a destination from the drop-down list.



Destination is the place you want to send the message to, for example, a printer or a USB flash drive. By default, messages are stored in a local folder, on the C: or D: drive. Destinations are set in **Administration > Sounding > Messages**.

You can add several destinations by clicking them on the list. The destination appears in the **Send to** field.

To delete a destination, click the **Delete** icon next to the destination name.

4. Choose a trigger for the message and give the information required.
- You can use triggering to generate automatic meteorological messages based on monitored sounding data, but also to launch other custom actions.
- Triggers that generate messages can be based either on a time interval, or on any specified sounding data condition, for example, a given pressure limit.

5. To finalize the message creation, click **Create**.

When the message has been created, it will appear in the **Message log**.

## 12.3 Viewing and editing messages

When a message is being edited, the username of the user who is currently logged in and editing the message is displayed, preceded by the message **Manually edited by**.

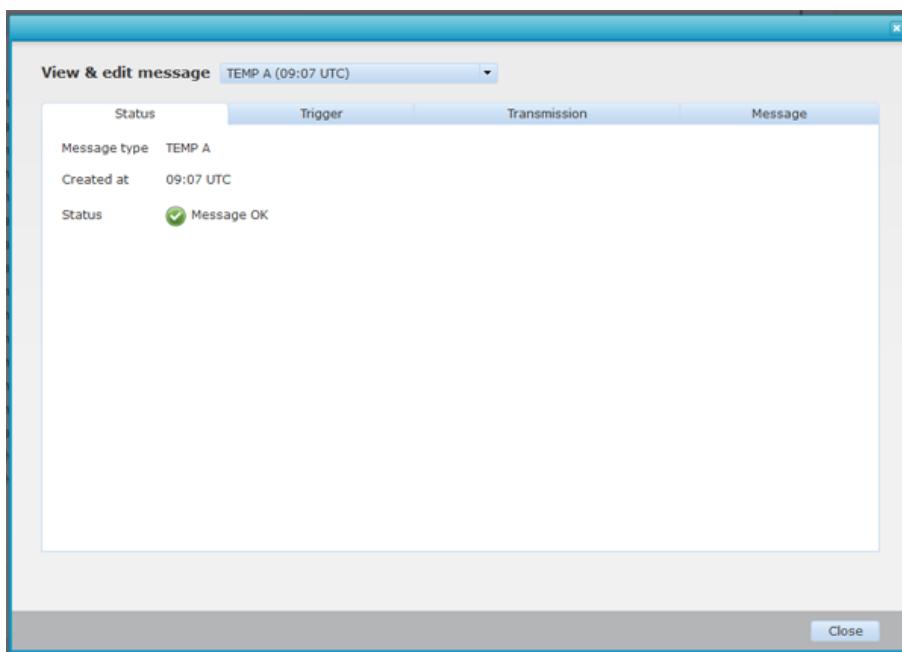
- ▶ 1. On the application toolbar, select **Sounding > Messages**.
- 2. To select the message you want to view or edit, select the checkbox preceding the message to activate the correct row.

<input checked="" type="checkbox"/> TEMP A	Manually created	08:57:45 (UTC)
--	------------------	----------------

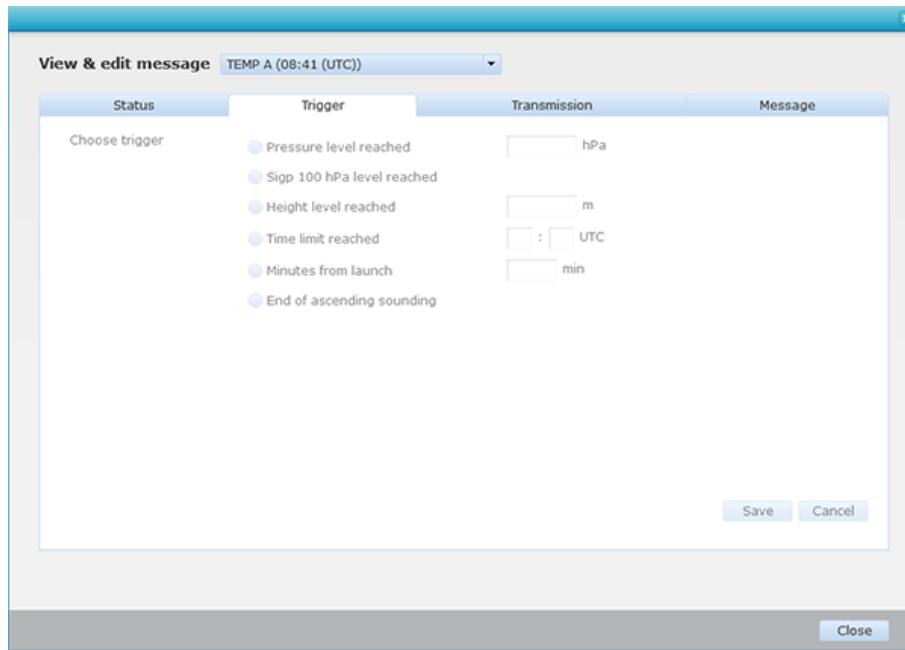
3. To begin viewing or editing the messages:
  - Click **View & Edit** or double-click the line with the message you want to edit.
  - To select all messages at the same time, click the **Select all** text line at the bottom of the **Message log**.

The editing view opens with the **Status** tab selected. The message name, creation time and status are displayed.

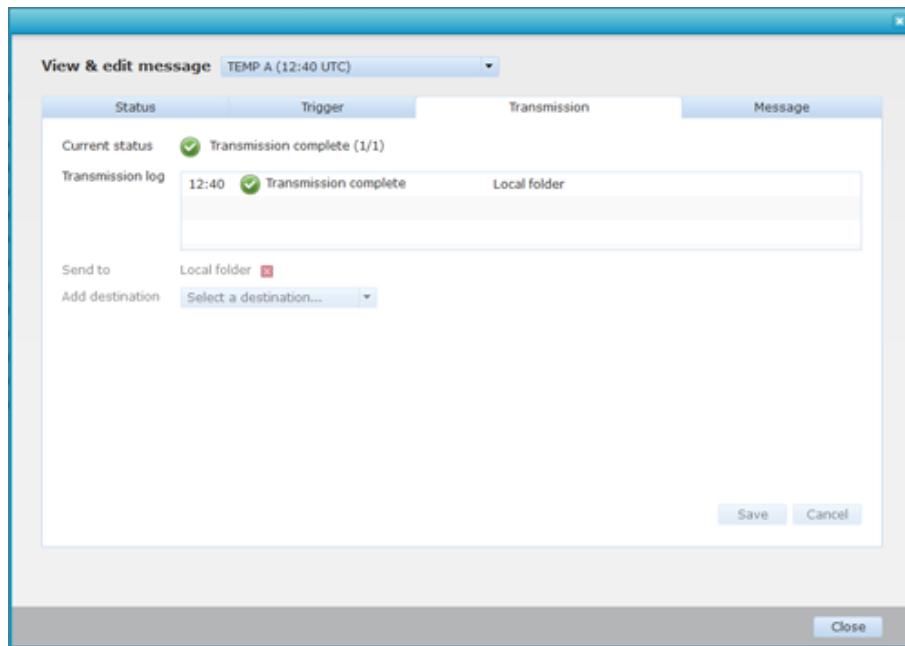
If you selected several messages, the message you selected first is displayed on the **Status** tab and the rest of the messages are added in a drop-down list.



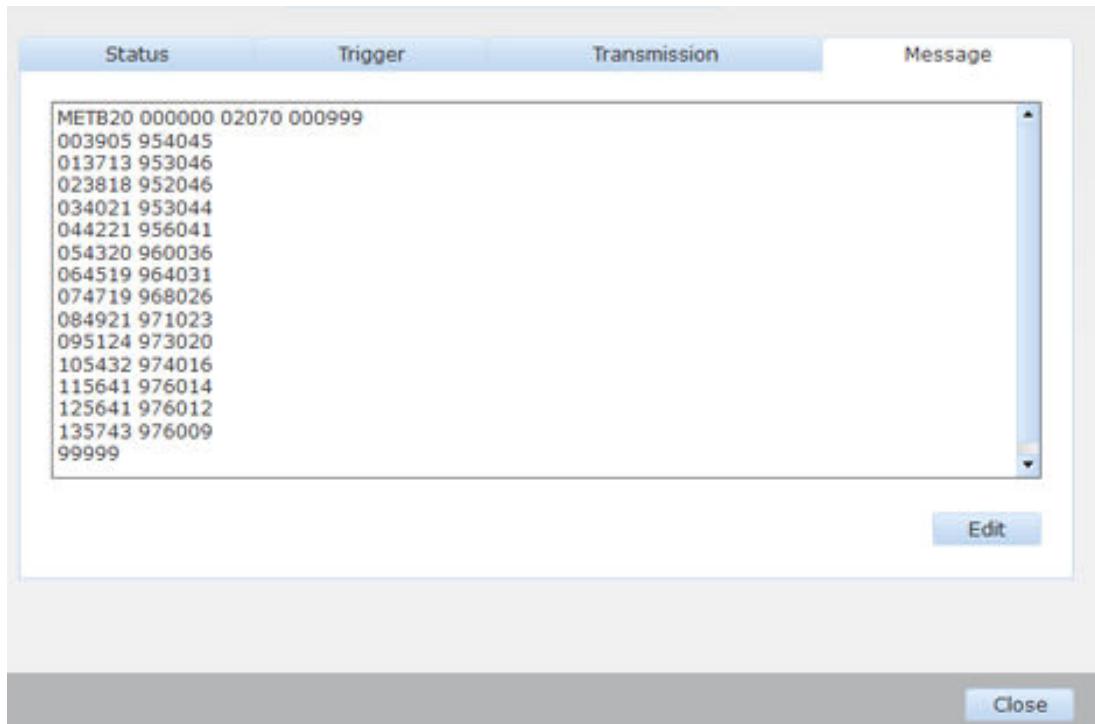
4. To edit the message triggers, select the **Trigger** tab.



5. To edit the message transmission settings, select the **Transmission** tab. When the message is ready, a note appears in the **Transmission log** text box.



6. To edit the contents of the message, select the **Message** tab. Click **Edit** to start editing the message.



7. After you have edited the message, click **Save as new message** to save the message or **Cancel** to cancel the changes you made.
8. To exit the message editing view, select another tab, or click the **Close** button.  
The **Close** button is inactive until you select either **Save as new message** or **Cancel**.

### 12.3.1 Error situation

In case of a failure, detailed information of the problem is given in the **View & edit message** window. For example, if a transmission error takes place:

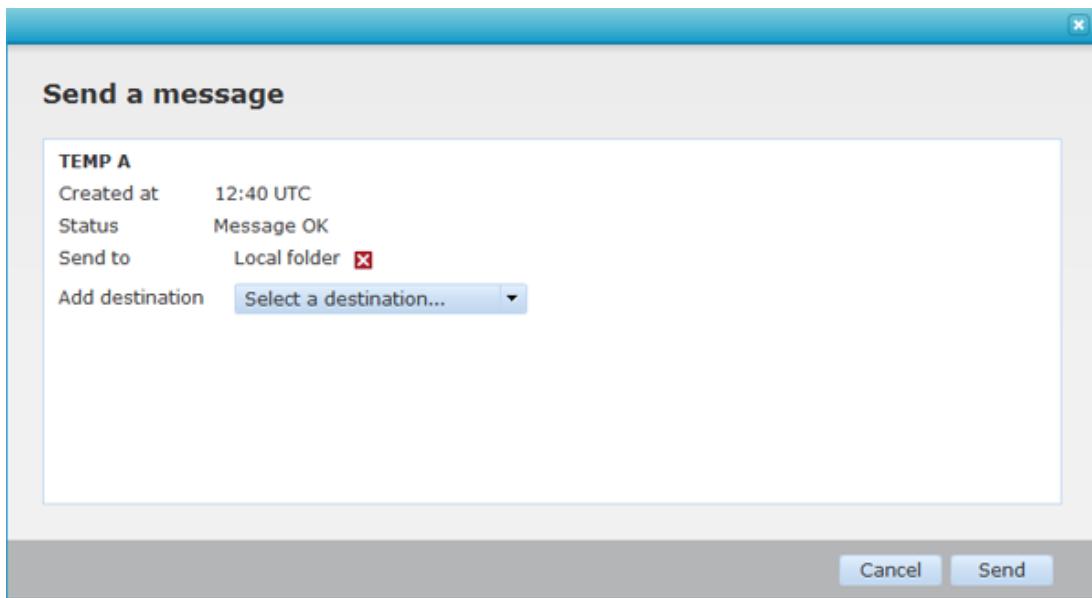
- The **View & edit message** window is opened with the **Status** tab selected.
- A red error mark is shown in the **Transmission** tab, indicating the transmission error.

Select the **Transmission** tab to view detailed information on the error.

## 12.4 Sending messages

- ▶ 1. On the application toolbar, select **Sounding > Messages**.

2. To send a message to, for example, a printer, click **Send** and add a destination from the **Add destination** list. The default destination is the local folder.



You can add several destinations by clicking them on the list. The destination appears in the **Send to** field.

To delete a destination, click the **Delete** icon next to the destination name. X

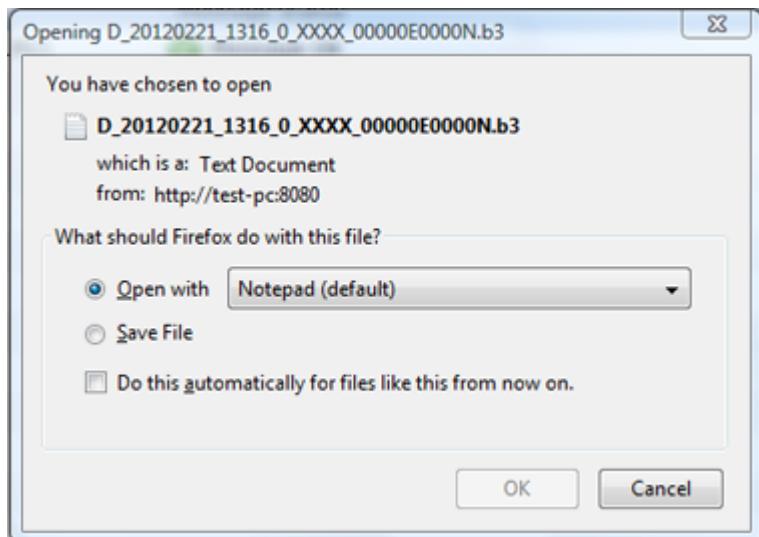
3. After adding the destination, click **Send**.

## 12.5 Downloading messages

- 1. On the application toolbar, select **Sounding > Messages**.

## 2. Click Download.

The message is opened or saved in the browser's default location for downloaded files.



## 12.6 Creating CLIMAT messages



CLIMAT is only available with the Advanced option.



You cannot generate CLIMAT messages during a sounding. You can only generate them after the sounding has finished.

For more detailed information on the CLIMAT application, see *Vaisala DigiCORA Sounding System MW41 Technical Reference*.

To create a CLIMAT message, you need the following files available on the MW41 installation media, path `\MW41\ScriptLibrary\Climat`:

- `ClimatTools.py`
- `Climat.py.config`

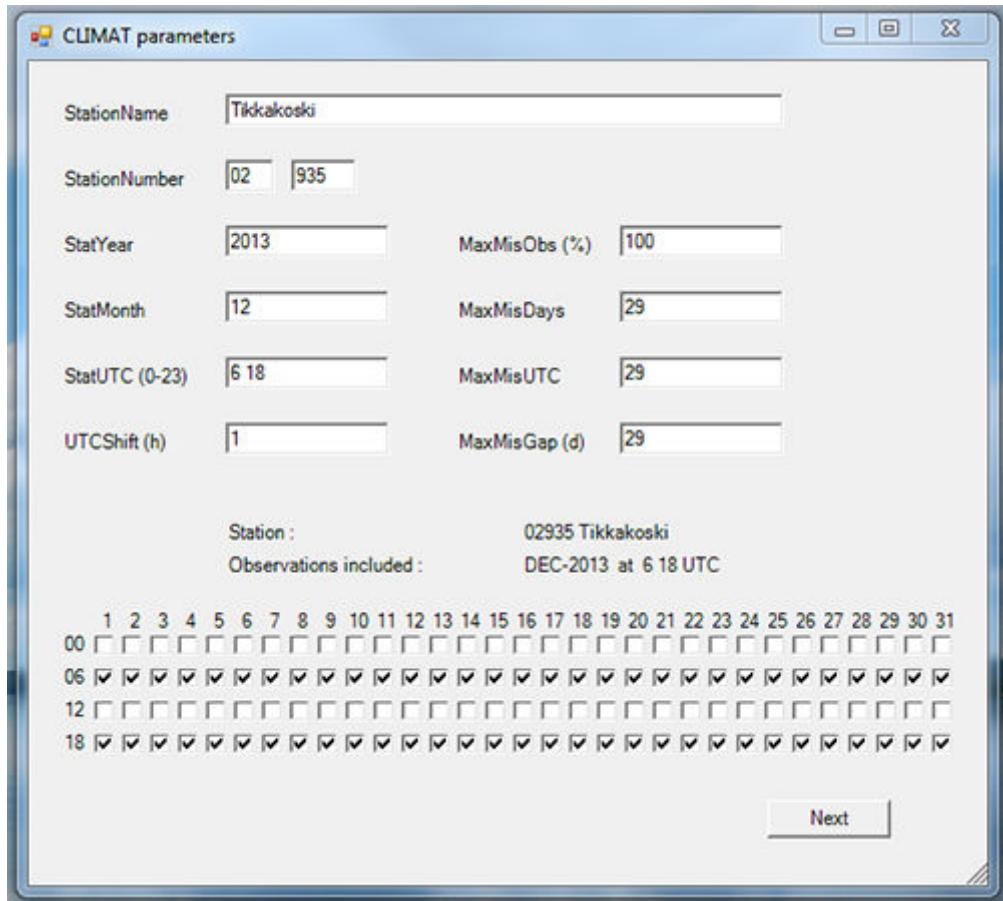
- 1. Copy the files in `\MW41\ScriptLibrary\Climat` to your sounding workstation's local hard drive directory, for example, `D:\Climat`.
2. To start generating a CLIMAT message and a report, double-click the `Climat.bat` file in the location on your local hard drive where you copied the files related to the CLIMAT message, for example, `D:\Climat`.
- The **CLIMAT parameters** window opens.

3. You can give the parameters at this stage, but you can also predefine them in the `climat.py.config` file. Type the predefinition for each parameter between the `<Text>` and `</Text>` tags.



It is a good idea to give some of the basic information in the script, for example, station name and station number. This way you do not have to write them in the parameter window each time you want to create a CLIMAT file.

4. Enter the information needed to find a sounding in the archive, for example, the number of the month.  
 The check boxes in the window show which soundings are included in the file. Numbers 1 ... 31 represent days in a month, and numbers 00, 06, 12, and 18 are UTC times.



- **StationName:** Name of the station
- **StationNumber:** WMO station number of the station
- **StatYear:** Year of the report to be produced
- **StatMonth:** Month of the report to be produced
- **StatUTC (0 - 23):** Lists the UTC hours to be included in the report, separated by spaces. These are usually the UTC times of the soundings. WMO standard hours are 0, 6, 12, and 18.
- **UTCShift (h):** Maximum time shift (in UTC) allowed between the start time of the sounding (release of balloon) and the defined UTC hour (listed on StatUTC line). If the start time is too far from the defined UTC hours, the observation is excluded from the statistics.
- **MaxMisObs (%):** Maximum acceptable number of missing observations
- **MaxMisDays:** Maximum acceptable number of calendar days without observations
- **MaxMisUTC:** Maximum acceptable number of observation times without data
- **MaxMisGap (d):** Maximum acceptable number of consecutive days (gap) without data

5. Click **Next**.

The system starts to generate the CLIMAT files.

File *Climattemp.txt* contains the message.

File *Climatstat.txt* contains more informative statistical data from the month.

When the files have been generated, they are stored in your local messages directory (default is *D:\Messages*).

### 12.6.1 CLIMAT message location

You can edit the destination of the messages in **Administration > Sounding > Messages > Message Destinations > File: Local Folder**.

By default, all messages are stored in a local folder called *Messages* on the *D:* drive, or the *C:* drive if *D:* does not exist.

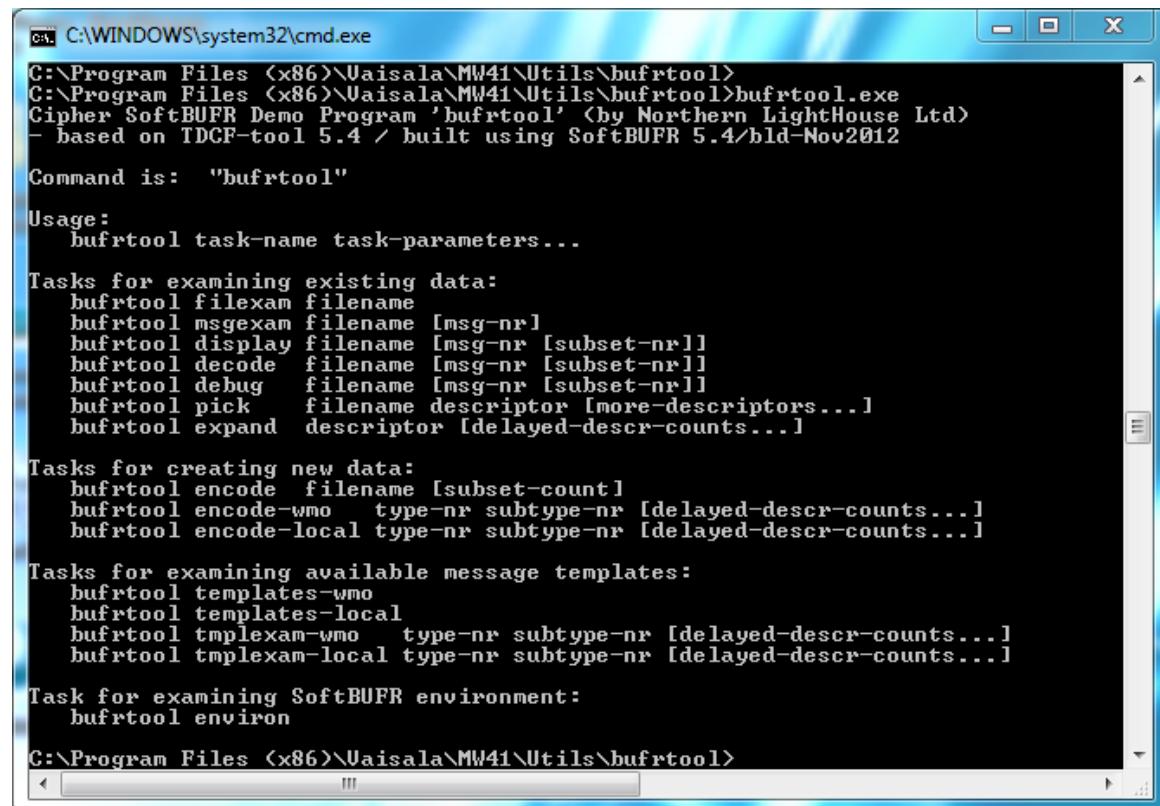
To change the default destination of the CLIMAT files, edit the file *climat.bat*. The destination is indicated after the -d parameter, that is, -d "Local folder".

## 12.7 Decoding BUFR messages

The MW41 sounding software contains a command line tool called *bufrtool.exe*. The tool is installed in the installation folder when you install the MW41 software (for example, *C:\Program Files (x86)\Vaisala\MW41\Utils\bufrtool*).

With *Bufrtool*, you can decode BUFR messages and display them in ASCII format.

*Bufrtool* has its own help that you can access by entering command line **bufrtool.exe** in the Windows command prompt.



C:\>Program Files (<x86>)\Uaisala\MW41\Utils\bufrtool>  
C:\>Program Files (<x86>)\Uaisala\MW41\Utils\bufrtool>bufrtool.exe  
Cipher SoftBUFR Demo Program 'bufrtool' (by Northern LightHouse Ltd)  
- based on TDCF-tool 5.4 / built using SoftBUFR 5.4/bld-Nov2012  
  
Command is: "bufrtool"  
  
Usage:  
    bufrtool task-name task-parameters...  
  
Tasks for examining existing data:  
    bufrtool fileexam filename  
    bufrtool msgexam filename [msg-nr]  
    bufrtool display filename [msg-nr [subset-nr]]  
    bufrtool decode filename [msg-nr [subset-nr]]  
    bufrtool debug filename [msg-nr [subset-nr]]  
    bufrtool pick filename descriptor [more-descriptors...]  
    bufrtool expand descriptor [delayed-descr-counts...]  
  
Tasks for creating new data:  
    bufrtool encode filename [subset-count]  
    bufrtool encode-wmo type-nr subtype-nr [delayed-descr-counts...]  
    bufrtool encode-local type-nr subtype-nr [delayed-descr-counts...]  
  
Tasks for examining available message templates:  
    bufrtool templates-wmo  
    bufrtool templates-local  
    bufrtool tmplexam-wmo type-nr subtype-nr [delayed-descr-counts...]  
    bufrtool tmplexam-local type-nr subtype-nr [delayed-descr-counts...]  
  
Task for examining SoftBUFR environment:  
    bufrtool environ  
  
C:\>Program Files (<x86>)\Uaisala\MW41\Utils\bufrtool>

# 13. Archive sounding data

The sounding data together with metadata is stored right from the beginning of the sounding, that is, sounding data is saved and archived as it is calculated during the sounding.

If you have edited sounding data, the edited information is displayed in the **Archive** window.

## 13.1 Viewing archive sounding data

- ▶ 1. On the application toolbar, select **Archive**.
- 2. The **Archive** window lists the archived soundings in rows. You can scroll the list of soundings with the scroll bar on the side of the window.

Date	Time	Station ID	Radiosonde type	Radiosonde serial number	Termination cause	Comments	Status	Sounding mode
✓ 2013-12-12	07:59:19	Test41	RS41-SG	J4110038	Increasing pressure	-	Ready	Live
2013-03-28	02:46:10	kone12	RS41-SG	J0840052	Increasing pressure	-	Ready	Live

The columns display the following information:

- **Date**: Date the sounding took place
- **Time**: Time when the sounding took place
- **Station ID**: Sounding station name
- **Radiosonde type**: Type of the radiosonde used as given in radiosonde data
- **Radiosonde serial number**
- **Termination cause**: Reason for sounding termination
- **Comments**: Your comments on the sounding, if you entered any in the **Surface level values and Metadata** window.
- **Status**: Status of the archived sounding, for example, **Open**.
- **Sounding mode**: Mode of the archived sounding. Either **Live** or **Simulated**.



The maximum number of soundings in the **Archive** window is defined in the **Advanced** settings. For details, see *Vaisala DigiCORA Sounding System MW41 Technical Reference*. The default value is 120.

Once the maximum number of soundings in the **Archive** window is exceeded, the oldest sounding archive is removed from the window. The `.mwx` file will still be available in the `SoundingArchive` folder.

## 13.2 Opening an archived sounding

You can open an archived sounding for more detailed viewing.

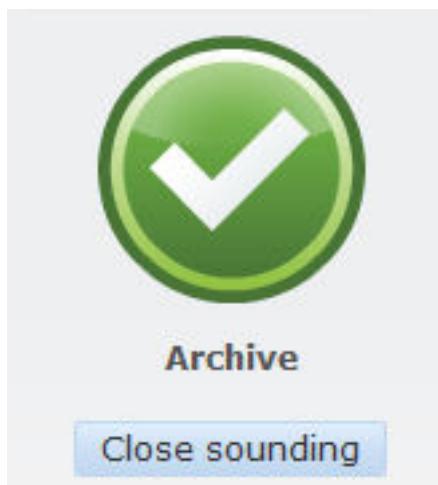
- 1. In the **Archive** window, select the check box for the correct sounding in the beginning of the row.
- Or, to select all the archived soundings, click the **Select all** text under the rows.

Date	Time	Station ID
<input checked="" type="checkbox"/> 2011-09-02	07:14:05	Default station

2. Click **Open** or double-click the sounding you wish to open.

When ready, the archived sounding is displayed and the user interface header bar turns grey.

The sounding status field also indicates that you are watching an archived sounding:



3. To arrange the archived sounding data in a descending or an ascending order, click the arrows in the column titles.  
If the arrow is not visible, click the column heading.

Time
09:13:39
09:18:50
09:20:15
09:20:29

4. To sort in the opposite order, click the arrow in the column title again.  
5. To exit the window, click **Close archive** on the header bar.

## 13.3 Exporting archive sounding data

You can export archived soundings to view them with other sounding systems.



To perform this task, you must have the **MW41 Manager** or **MW41 Administrator** user role.  
You cannot perform this task if you have the **MW41 Operator** user role.

- ▶ 1. Download the sounding data by selecting either **\*.mwx** or **\*.spf** file format from the option list at the bottom of the display, and then click **Download**.  
The format of the file name is *[Station name]\_YYYYMMDD\_HHMMSS.mwx/spf*.



Download from archive as    \*.mwx    **Download**

- 2. Type a new filename or use the default name.
- 3. Click **Save**.  
The archived sounding is saved in the browser's default location.

## 13.4 Importing archive sounding data

You can import archived soundings that have been made elsewhere to your sounding archive. After the import, you can open or simulate these soundings.

Importing archived soundings is not possible during a sounding.



To perform this task, you must have the **MW41 Manager** or **MW41 Administrator** user role.  
You cannot perform this task if you have the **MW41 Operator** user role.



Importing a sounding takes some time. In the meanwhile, you can open other MW41 displays.

- ▶ 1. Click **Upload** to import an archived file.
- 2. Locate the sounding file you want to import and click **Open**. The sounding file appears in the sounding file list and can now be opened or simulated.

## 13.5 Uploading .mwx files to sounding database



The upload process takes some time. It is a good idea to let the system perform the upload overnight, for example.

- ▶ 1. To upload *.mwx* files from the sounding archive back to the sounding database, copy the files to directory *SoundingUpload*.  
The system will upload the selected files back into the sounding database.

## 13.6 Error situation

If the storage space in the sounding archive is low, you will see an alert message.

## 13.7 Deleting archived soundings



To perform this task, you must have the **MW41 Manager** or **MW41 Administrator** user role. You cannot perform this task if you have the **MW41 Operator** user role.



Deleting a sounding takes some time. In the meanwhile, you can open other MW41 displays.

- ▶ 1. Select the sounding that you want to delete by selecting the corresponding check box in the beginning of the row, and then click **Delete**.

## 13.8 Simulating a sounding

Sounding simulation means that you can open a selected archived sounding from the archive. You cannot use simulation for recalculation purposes. Simulation is useful, for example, for training and demonstration purposes.

In simulation, all triggers are started as in a normal sounding. This means, for example, that all messages are regenerated and spooled, but note that message sending is disabled.

### 13.8.1 Configuring station and enabling SPS

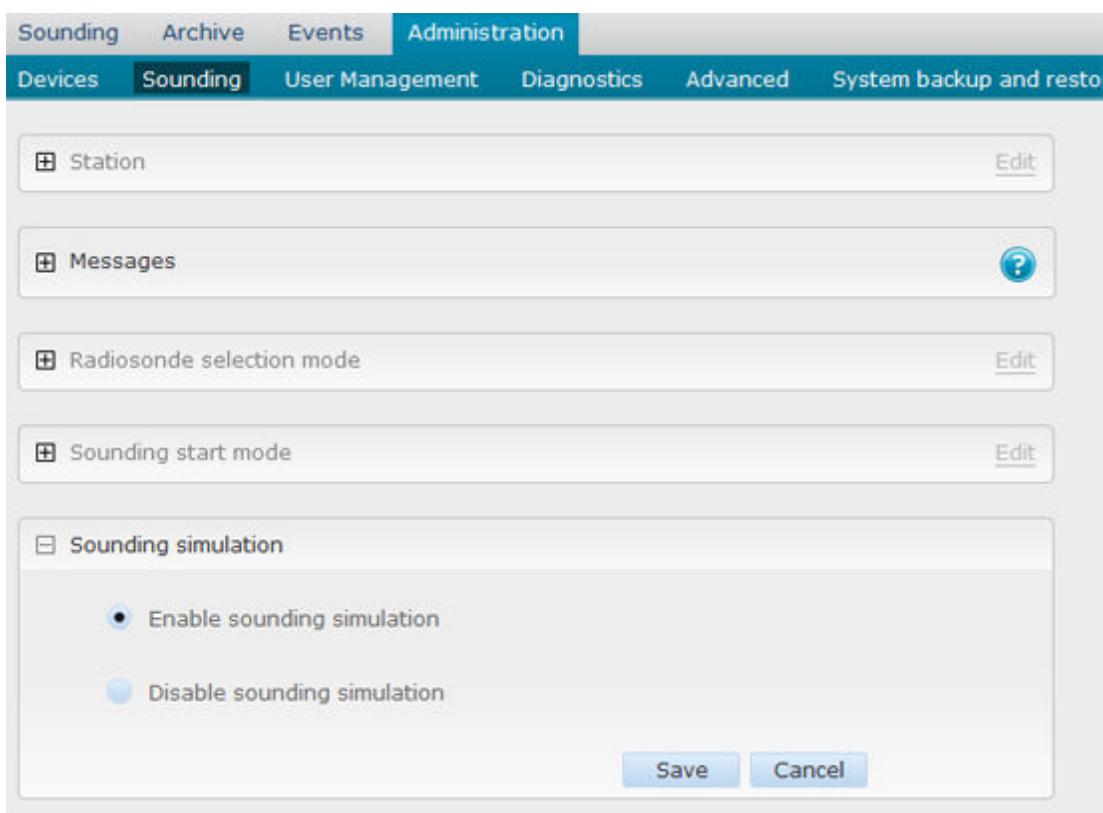
For the sounding simulation to work, you must first do the following preparations:

- ▶ 1. In **Administration > Station**, configure the station parameters.
- 2. In **Administration > Devices**, enable Sounding Processing Subsystem SPS3xx.  
Even if you have no SPS, you must enable it anyway and set the local host as the IP address.

### 13.8.2 Enabling sounding simulation

Sounding simulation is not enabled by default. To enable sounding simulation:

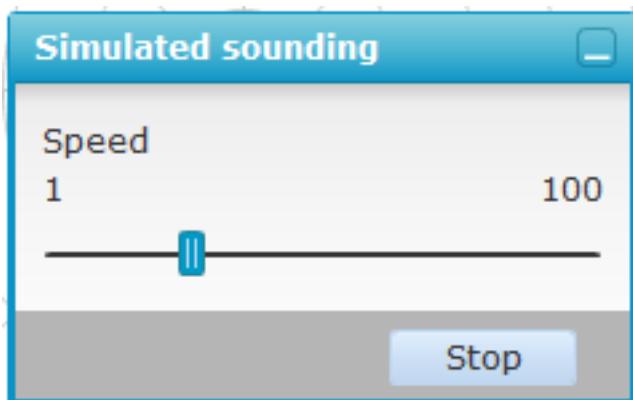
- ▶ 1. Select **Administration > Sounding > Sounding simulation**.
- 2. Select **Enable sounding simulation** and click **Save**.



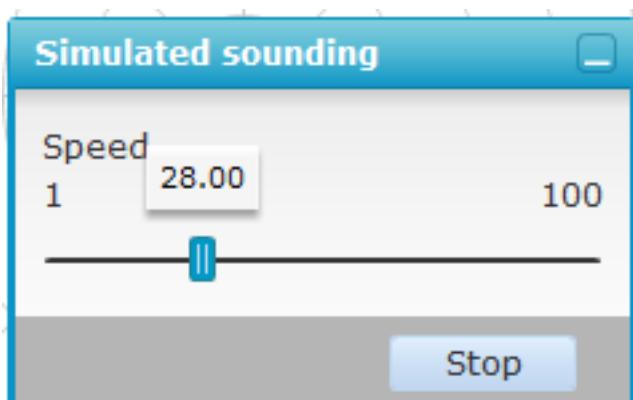
### 13.8.3 Starting sounding simulation

- ▶ 1. Select a sounding from the list of soundings in the sounding archive, or import the sounding you wish to simulate.
- 2. Click **Simulate**.  
The simulation begins and a floating window appears in the bottom corner of the window.

3. You can move the floating window by dragging it with the mouse. The floating window is always displayed, even if you move from one window to another during the simulation.



4. To adjust the simulation speed, move the slider. The current value is displayed on top of the slider.



#### More information

- ▶ [Importing archive sounding data \(page 135\)](#)

#### 13.8.4 Ending sounding simulation

- ▶ 1. In the floating **Simulated sounding** window, click **Stop**.  
The **Sounding terminated** window opens.
- 2. Click **Close sounding** to end the simulation.

# 14. System administration

The **Administration** part of the MW41 sounding software contains the following tabs:

- **Devices and Systems**
- **Sounding**
- **Report Templates and Scripts**
- **System Backup and Restore**
- **Diagnostics**
- **Advanced, System Backup and Restore, and Report Templates:** These options are only available for administrators. For more information, see *Vaisala DigiCORA Sounding System MW41 Technical Reference*, included on the installation media.

## 14.1 Viewing and editing advanced configuration data

The **Advanced** configuration option is only available for administrators.

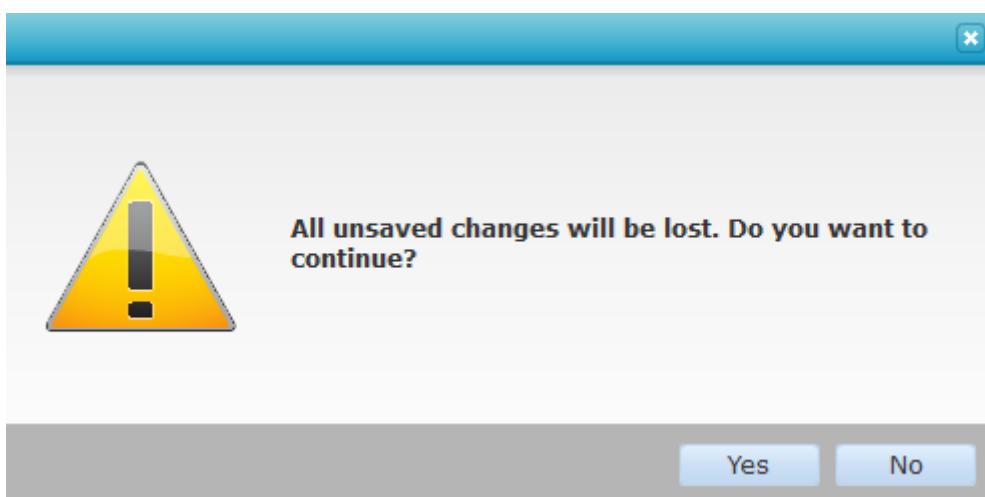
For more detailed information on the settings available in the **Advanced** configuration, see *Vaisala DigiCORA Sounding System MW41 Technical Reference*, included on the installation media.

- 1. To view the system settings, click the + sign to open the folder that contains the setting you wish to view.
2. To edit the setting, click **Edit** and **Save**. To restore the default values set at the factory, click **Restore default value**.



## 14.2 Viewing and editing administration data

- ▶ 1. To open the data under the different **Administration** tabs for viewing, click the plus (+) sign.  
To close the window, click the minus (-) sign.
- 2. To edit the data, click the **Edit** and **Save**.
  - When you fill in the data, the system guides you by giving information on possible errors.
  - Information is required in text boxes marked with an asterisk \*.
  - If you have edited the information and try to exit a window without saving the data or canceling the changes, the system prompts you about unsaved changes.



## 14.3 Configuring the sounding software



You need **MW41 Administrator** rights to be able to configure the MW41 sounding software.

When you first start the MW41 sounding software, the system prompts you to make the necessary configurations to the sounding system. Click the text links on the bottom of the window to directly access the settings you need to configure. At minimum, you must configure the station position settings and Sounding Processing Subsystem SPS3xx IP address before you can start a sounding.

If you have already made all the necessary configurations during a previous session, the software opens directly to the **Radiosonde Selection** tab.

Before you start a sounding, set the following in the **Administration** window:

- ▶ 1. In **Devices and Systems > Sounding Processing Subsystem**, give an IP address for SPS3xx.
- 2. In **Devices and Systems > Radiosonde - workstation connection**, set a serial port for the ground check device or the cable.
- 3. In **Soundings > Station**, set the station parameters:
  - WMO station name
  - WMO station number (3 digits; in case of a ship or a mobile station, enter 0.)
  - WMO block number (2 digits; in case of a ship or a mobile station, enter 0.)
  - WMO region number
  - Message type
  - Station position
- 4. In **Soundings > Messages**:
  - a. Set WMO message destinations.
  - b. Modify WMO message headers and footers.
- 5. In **Soundings > Radiosonde selection mode**, select the radiosonde preparation mode, if necessary.

For advanced-level configurations, see *Vaisala DigiCORA Sounding System MW41 Technical Reference*.

#### More information

- ▶ [Configuring sounding processing subsystem \(page 141\)](#)
- ▶ [Configuring radiosonde - workstation connection \(page 143\)](#)
- ▶ [Station \(page 146\)](#)
- ▶ [Messages \(page 151\)](#)
- ▶ [Setting radiosonde selection mode \(page 172\)](#)

## 14.4 Configuring devices and systems

### 14.4.1 Devices and systems

In the **Devices and Systems** tab, you can configure devices and systems connected to the sounding system, including:

- Sounding Processing Subsystem (SPS)
- Radiotheodolite RT20
- Ground Check device (GC)
- Automatic Weather Station (AWS)
- Observation Network Manager NM10

### 14.4.2 Configuring sounding processing subsystem

To configure the SPS settings, edit the following information.

► 1. Select **Administration > Devices and Systems > Sounding Processing Subsystem**.

- **Status:** Enabled or Disabled.
- **IP address or hostname:** SPS IP address or hostname.  
Default IP address set at Vaisala is 192.168.0.10
- **Local IP address:** IP address of the MW41 workstation, needed by SPS in special cases. Options are **Unset**, or the default IP address.  
Default value is **Unset**.
- **Signal threshold:** Values between 0 ... 100 are allowed.
- **Antenna type:** **Directional** or **Omnidirectional**.
- **Default frequency:** Default frequency for SPS.  
Default value is 405.30.

The screenshot shows a configuration dialog for the 'Sounding Processing Subsystem: SPS'. It contains the following fields:

- Status: Enabled
- IP address or hostname: 192.168.0.10
- Local IP address: 192.168.0.1
- Signal threshold: 10 (0-100)
- Antenna type: Directional
- Default frequency: 405.3 \*

You can also add pre-selected or forbidden frequencies.

#### More information

- [Configuring the sounding software \(page 19\)](#)

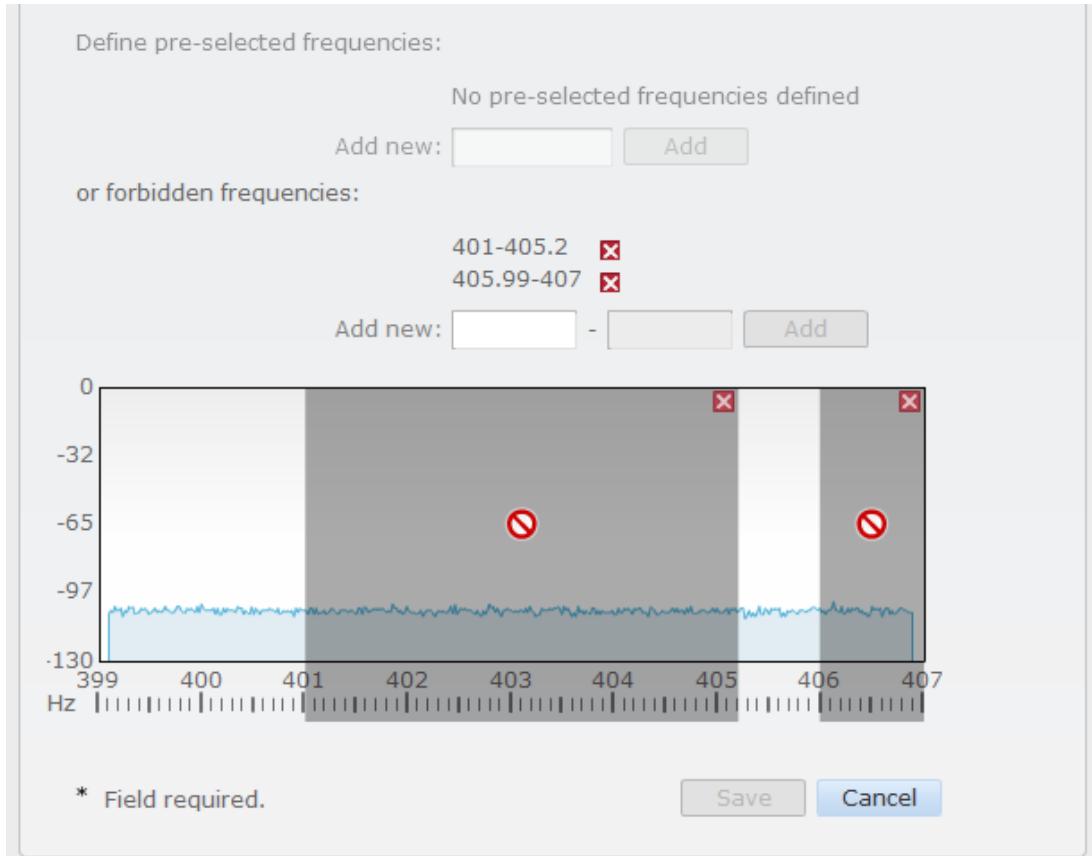
#### 14.4.2.1 Adding pre-selected or forbidden frequencies

You can add frequencies that must be used in the sounding (pre-selected frequencies), or frequencies that must not be used (forbidden frequencies).



If you are using the MW41 sounding software with AUTOSONDE, you must define one or more pre-selected frequencies. Also, for AUTOSONDE and for any computer with more than one LAN interface, you must select the Local IP address for SPS connection.

- 1. Define the pre-selected or forbidden frequencies by entering a value in the **Add new** text box and clicking **Add**.  
The frequencies are displayed in a list and as grey areas in the spectrum.



2. To remove a frequency, click the **Delete** icon next to the frequency value, or in the forbidden frequency area in the spectrum.

#### More information

- [Tuning the radiosonde frequency \(page 25\)](#)

### 14.4.3 Configuring radiosonde - workstation connection

To configure how the radiosonde is connected to the sounding workstation, edit the following information.

- 1. Select **Administration > Devices and Systems > Radiosonde - workstation connection**.  
2. Select the correct ground check device from the drop-down list. Default value is **None**.

3. Select the correct serial port from the drop-down list.

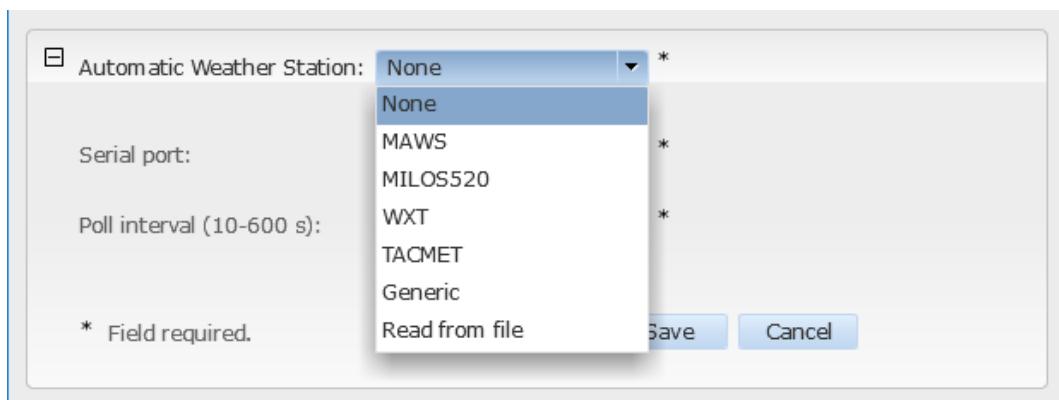


#### More information

- [Configuring the sounding software \(page 19\)](#)

#### 14.4.4 Configuring Automatic Weather Station

- ▶ 1. Select **Administration > Devices and Systems > Automatic Weather Station**.
- 2. Select the type of AWS used in the sounding from the drop-down list. The options are:
  - None (default value)
  - MAWS
  - MILOS520
  - WXT520
  - TACMET
  - Generic
  - Read from file



- Set the **Serial port** and **Poll interval** for the AWS. The default value for the poll interval is 10.

For the **Read from file** option, give the poll interval and the paths to the surface weather and version info files.

The screenshot shows a configuration dialog for an 'Automatic Weather Station'. At the top, it says 'Automatic Weather Station:' followed by a dropdown menu showing 'Read from file' with an asterisk (\*) next to it. Below this, there are three input fields: 'Poll interval (10-600 s):' with the value '10', 'Path to surface weather file:' with the value 'C:\aws\aws\_surface\_weather.txt', and 'Path to version info file:' with the value 'C:\aws\aws\_version\_info.txt'. At the bottom left of the dialog, there is a note that says '\* Field required.' and at the bottom right are two buttons: 'Save' and 'Cancel'.

The file formats of the surface weather file and version info file follow the structure of the SMS AWS interface messages.

For more information on the SMS AWS messages, see *Vaisala DigiCORA Sounding System MW41 Technical Reference*.

#### 14.4.5 Configuring Observation Network Manager

The information given in the **Observation Network Manager** window is used to register the connection between MW41 and Observation Network Manager NM10.

For instructions on creating the connection, see *Vaisala DigiCORA Sounding System MW41 Getting Started Guide*.



If you are using the MW41 sounding software with AUTOSONDE and have registered a connection between NM10 and AUTOSONDE, the Observation Network Manager configuration is not available in MW41. The configuration is also not available if the MW41 station has been configured as a station that moves during the sounding.

To configure the Observation Network Manager, edit the following information.

- ▶ 1. Select **Administration > Devices and Systems > Observation Network Manager**.

2. Click **Edit** and then **Disconnect**.

- **Connection status:** Shows whether MW41 is connected to NM10 or not.
- **Server address:** NM10 computer name.
- **Port:** Port used for the connection between MW41 and NM10.
- **Connection status interval:**
  - This value shows how many hours have passed since the beginning of the previous sounding and for how long NM10 will wait for the next sounding.
  - For example, if the value is 12 hours, NM10 waits for 12 hours for a new sounding to start. If the sounding does not start after the 12 hours, NM10 shows an error status for the sounding station.
  - Possible values are 1 ... 240 hours, default value is 12 hours. Value 0 means disabled.
- **Authentication key:** NM10 authentication key
- **Authentication secret:** NM10 authentication secret

## 14.5 Configuring sounding settings

### 14.5.1 Station

The following information can be edited:

#### Station name

The station name is displayed in the UI application header.

#### WMO station index number

2 digits represent the WMO-assigned block number. 3 digits represent the WMO-assigned station number.

These values are for fixed stations only, mobile and ship (ASAP) WMO messages only include the name of the station or the ship.

On a mobile station and an ASAP application, the block number and station number must be set to 0, which results in a missing code for BUFR messages.

#### WMO region number

These options are available:

- Europe (6)
- Africa (1). You must use this option if ASECNA type PILOT message coding is in use. For more information, see *Vaisala DigiCORA Sounding System MW41 Technical Reference*.
- South America (3)
- Asia and the South-West Pacific (2)
- North America, Central America and the Caribbean (4)
- South-West Pacific (5)
- Stations in the Antarctic (7)

#### Message type

These options are available:

- **Mobile:** Check box **Station moves during sounding** is automatically selected and you cannot set the station location.  
If you select this option, you are required to enter station altitude and confidence factor values before the launch.

Message type: **Mobile**

Station moves during sounding

Station location: [Find location](#)

Latitude (WGS84 coordinates):  North \*

Longitude (WGS84 coordinates):  East \*

Altitude (Mean sea level):  m \*

- **Fixed:** You are required to set the station location. This is the default value.

Message type: **Fixed**

Station moves during sounding

Station location: [Find location](#)

Latitude (WGS84 coordinates):  North **Field required.**

Longitude (WGS84 coordinates):  East **Field required.**

Altitude (Mean sea level):  m **Field required.**

- **Ship:** Check box **Station moves during sounding** is automatically selected. Station altitude is required.

Message type: Ship

Station moves during sounding

Station location: Find location

Latitude (WGS84 coordinates):  North \*

Longitude (WGS84 coordinates):  East \*

Altitude (Mean sea level):  m X Field required.

## Station location

When you have a connection to Sounding Processing Subsystem SPS3xx, click **Find location** to fetch the station position. By default, station position information is fetched from the SPS:

- Power on the SPS.
- After the unit's self-tests are finished, the GPS receiver starts to receive data and the program starts to calculate the coordinates. This can take several minutes.  
If the green OK light is flashing, the system is at work getting the position fix.  
//// means that the system could not fetch the data.
- **Latitude** and **Longitude**: Given by the SPS. Default value is ////.
- **Altitude (Mean Sea Level, MSL)**: Defines the altitude of the station ground level in TEMP and BUFR messages. This value affects the accuracy when calculating geopotential height from radiosonde pressure sensor, and when calculating geopotential height from differential GPS. It is reported in BUFR messages. Default value is ////.

## Launch site location

- **Latitude**
- **Longitude**
- **Altitude (Mean Sea Level, MSL)**: This value is gained by adding the station altitude value to launch site offset value.



Typically, the altitude value given by the SPS is not accurate. The altitude value affects the sounding data accuracy, so be careful to set the correct value manually.



Offset values affect the sounding data accuracy, so be careful to set the correct values. Set the offset values manually.

### Launch site offset

This parameter can be set to a non-zero value to indicate a significant difference between launch site altitude and station altitude. This offset is used in calculation for reducing the given surface pressure to correspond to the launch site circumstances.

This value affects the ground-level values of geopotential height and pressure. It is used in BUFR messages to report the launch site altitude.

A non-zero value changes the altitude of the ground level in TEMP and BUFR messages; The ground level is reported from launch site altitude instead of station altitude. In Synchronized Sounding Data, it determines the first altitude of the sounding profiles.

Default value is 0.00 m.

### Surface barometer offset

Defines the altitude of the barometer used for surface pressure measurement. This offset is used in calculation for reducing the given surface pressure to correspond to the launch site circumstances.

This value affects the accuracy when calculating geopotential height from the radiosonde pressure sensor, and when calculating pressure from GPS. It also affects the ground level value when calculating pressure from the radiosonde pressure sensor.

This value is used in BUFR messages to report the barometer altitude.

Default value is 0.00 m.

### GPS antenna offset

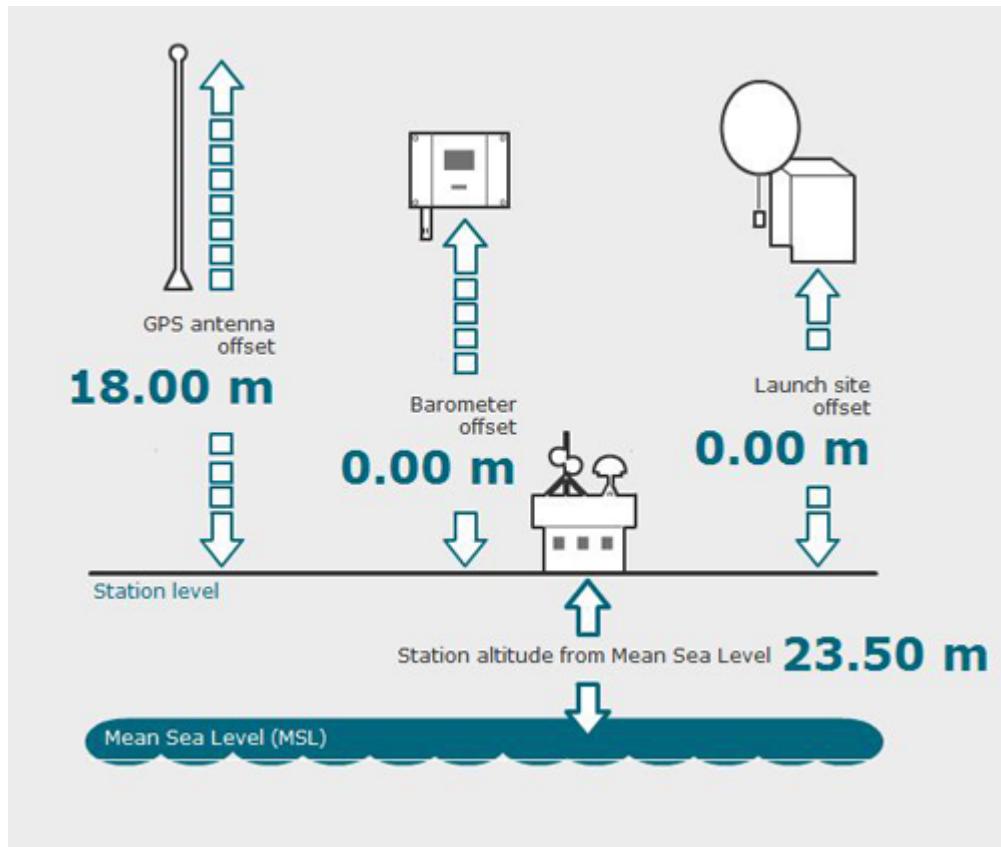
Defines the altitude of the local GPS antenna for differential GPS corrections.

This value affects the accuracy when calculating geopotential height and pressure from GPS.

It is not reported in TEMP or BUFR messages.

Default value is 0.00 m.

The figure below guides you in editing the **GPS antenna offset**, **Barometer offset**, **Station altitude from mean sea level**, and **Launch site offset** values.



### BUFR WIGOS identifiers

- **WIGOS identifier series**
- **WIGOS issuer of identifier**
- **WIGOS issue number**
- **WIGOS local identifier**

Starting from WMO code table version 31.0, WIGOS identifier is part of BUFR messages 309056 and 309057.

For a description of the WIGOS identifier system, see *Manual on the WMO Integrated Global Observing System (WMO-No. 1160)*, Attachment 2.1. Each observing station must have at least one WIGOS station identifier. The station identifier links the station to its WIGOS metadata.

**Table 5 Structure of WIGOS identifier**

WIGOS identifier series	Issuer of identifier	Issue number	Local identifier
Number 0	A number in the range of 0 to 65534	A number in the range of 0 to 65534	Up to 16 characters in the CCIT ITA5 alphabet

Only the WIGOS Identifier Series 0 has been defined. This series is used to identify observing stations.

## More information

- [Entering station altitude and confidence factor \(page 44\)](#)
- [Configuring the sounding software \(page 19\)](#)

### 14.5.2 Messages

In **Administration > Sounding > Messages**, you can configure the settings for the sounding station messages.

## More information

- [Configuring the sounding software \(page 19\)](#)

#### 14.5.2.1 Standard messages

The standard MW41 sounding software can generate the following standard messages:

**Table 6** Standard messages

Message	Description
FM 35-XI Ext. TEMP	Upper-level pressure, temperature, humidity and wind reports from a fixed land station
FM 36-XI Ext. TEMP SHIP	Upper-level pressure, temperature, humidity and wind reports from a sea station
FM 38-XI Ext. TEMP MOBIL	Upper-level pressure, temperature, humidity and wind reports from a mobile land station
FM 32-XI PILOT	Upper-wind report from a fixed land station
FM 33-XI PILOT SHIP	Upper-wind report from a sea station
FM 34-XI PILOT MOBIL	Upper-wind report from a mobile land station
3'09'050	BUFR for wind sounding (Pressure - PILOT)
3'09'051	BUFR for wind sounding (Height - PILOT)
3'09'052	BUFR for temperature, humidity and wind sounding
3'09'056	BUFR for descending sounding. Includes WIGOS identifiers.
3'09'057	BUFR for temperature, humidity, and wind sounding type data with higher precision of pressure and geopotential height. Includes WIGOS identifiers.

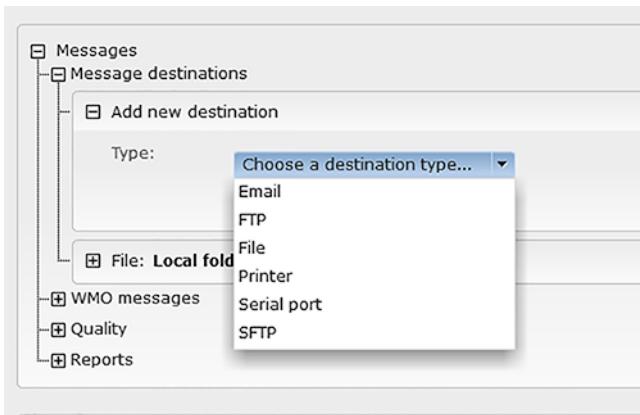
#### 14.5.2.2 Licensed message options

- Defense messages are available with a separate licence.
- 3'09'053 - BUFR down message requires the Advanced option.
- NILU and World Ozone and Ultraviolet Radiation Data Centre operated by Environment Canada (WOUDC) messages require the Special sensor option.
- WMO FM 75-X CLIMAT TEMP - Report of monthly aerological data from a land station. Requires the Advanced option.

### 14.5.2.3 Adding message destinations

To add a new destination to send your message to (for example, a computer or a location):

- ▶ 1. Select **Administration > Sounding > Messages > Message destinations > Add new destination**.
- 2. On the drop-down list, select the option you want.



- 3. Fill in the information needed for the option you selected and click **Add**.  
The new destination appears under **Message destinations**. The **Local folder** folder displays the default message destination on the local folder, on either **C:** or **D:** drive.
- 4. If you wish to add the message to an existing file, select **Local folder > Append to existing file**, and give a name for the file.

In **Administration > Sounding > Special Sequences**, you can also add customer-defined information in a message header or file name.

### 14.5.2.4 Selecting the SFTP authentication method

You can use either password or public key as the authentication method for an SFTP connection.

- ▶ 1. Select **Administration > Sounding > Messages > Message destinations > Add new destination**.
- 2. On the drop-down list, select **SFTP**.
- 3. Fill in all the other information needed, and select either **Password** or **Public key**.

4. To add a message destination using a password, do the following steps:

- a. Type the user name and password that have been created on the SFTP server.

The screenshot shows a configuration dialog for an SFTP connection. The 'Authentication method' is set to 'Password'. The 'User name' field contains 'as\_helsinki1'. The 'Password' field is masked. The 'Character encoding' is set to 'iso-8859-1'. The 'Connection timeout (ms)' is 20000. The 'Transfer timeout (ms)' is 300000. The 'Retry count' is 1. The 'Retry delay (ms)' is 3000. A warning message at the bottom states: 'Message cannot be delivered to the destination before server host key fingerprint is validated and set.' The 'Query host key' button is highlighted with a red box.

- b. Click **Query host key** to receive a host key.  
c. The server host key fingerprint appears. Click **Accept**.  
d. Click **Test connection** to make sure that the host and user settings are correct.  
e. Click **Add**.

5. To add a message destination using a public key, do the following steps:

a. Fill in the other information needed and click **Generate public key**.

b. A key string appears. Click **Copy public key** and paste the key, for example, on a Notepad file. Save the file on a USB memory stick.

```
----- BEGIN SSH2 PUBLIC KEY -----
Comment: ""
AAAQABjQ2MzUyc2EAAQDQAQAAAQgQCVgA82b
KhhBgjgjwZUJyDpvA+6azv0lISP2Yar
izwM1RamP6cv0(2P)ie7G2m0d0kXXYt+NrRwIa
+M3hkPqOQjpAxNfIt4dHx7YKa1e/2R
BWg1E41C824pkTKlUp
+HaCIE6vUph9dEtWTmkvevtBompYdFOEudCqZ
TUEGdQ==

----- END SSH2 PUBLIC KEY -----
```

c. Install the key to the destination SFTP server.

d. Type the user name that has been created on the SFTP server.

e. Click **Query host key** to receive a host key.

\* Field required.

f. The host key fingerprint appears. Click **Accept**.

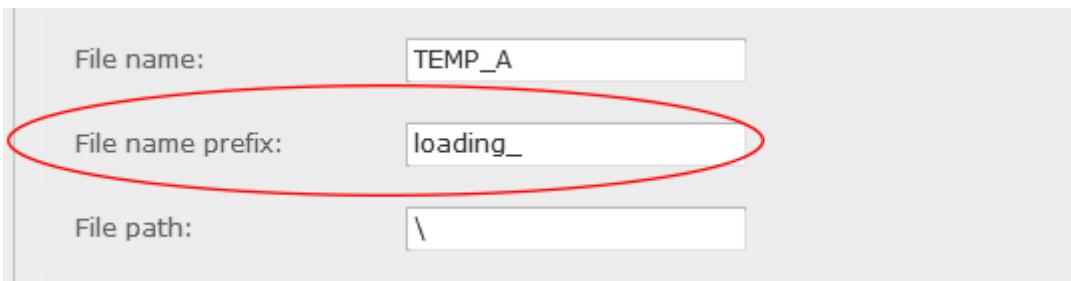
\* Field required.

g. Click **Test connection** to make sure that the host and user settings are correct.



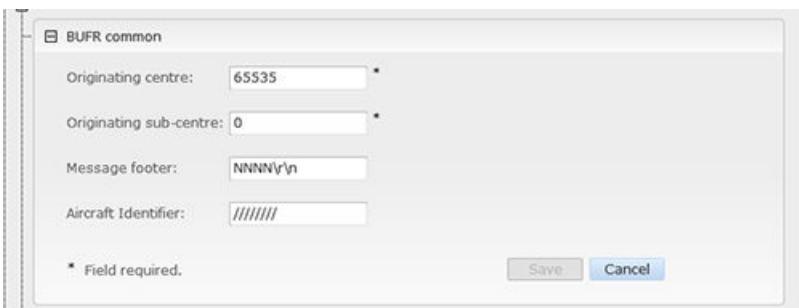
h. Click **Add**.

If you give a prefix for a file you are transferring with FTP or SFTP, the prefix is visible until the file has been completely transferred. When the file has been completely transferred, the prefix will disappear from the file name.



#### 14.5.2.5 BUFR common

These selections are common to all BUFR messages:



You can enter the following information:

- **Originating centre:** Possible values are 0 ... 65535. Default value is 65535.
- **Originating sub-centre:** Possible values are 0 ... 65535. Default value is 0.
- **Message footer:** Default value is NNNN.
- **Aircraft identifier**

#### 14.5.2.6 BUFR 309050 - 309052

This information is common to BUFR 309050 - 309052 messages, including BUFR 309050 - 309052 All Levels.

You can enter the following information:

- **Message header for BUFR 309050 and 309051:** Default value is ZCZC\r\nIUXXXX  
XXXX ~SMD2~SMH200\r\n
- **Message header for 100 hPa message:** ZCZC\r\nIUWXXX XXXX ~SMD2~SMH200\r\n
- **Message header for BUFR 309052:** ZCZC\r\nIUSXXX XXXX ~SMD2~SMH200\r\n
- **Message header for 100 hPa message:** ZCZC\r\nIUKXXX XXXX ~SMD2~SMH200\r\n
- **Automatic message generation:** Select the checkbox to enable automatic message generation.
- **Automatic message sending:** Select the check box to enable automatic message sending. You can select the check box after you have selected to enable automatic message generation.
- **Triggers:** Add a trigger by clicking on the arrow and make your selection from the option list. Enter a value if required, and click **Add**.  
The options are:
  - **End of ascending sounding**
  - **T, U & W Sigp ready at 100 hPa level:** This option forces the nearest level below the 100 hPa level to be a significant level of wind direction and speed. You must select this option if a TEMP message is coded during the ascent (Real Time TEMP message). Selecting this trigger enables the generation of messages at the end of the sounding even if the 100 hPa level has not been reached.  
Default values are **End of ascending sounding** and **T, U & W Sigp ready at 100 hPa level**.
- **Message destinations:** Enter message destination and click **Add**. Default is **Local folder**.

On a mobile station and an ASAP application, the block number and station number must be set to 0, which results in missing code for BUFR messages.

#### 14.5.2.7 BUFR 309053 and BUFR 309053 all levels



BUFR309053 is only available with the Advanced option.

BUFR309053 creates a message about the sounding events that occur after the balloon has burst and the radiosonde starts to descend.

BUFR309053 cannot be created during a sounding.

For information on BUFR 309053, see *Vaisala DigiCORA Sounding System MW41 Technical Reference*.

You can enter the following information:

- **Message header:** Default value is ZCZC\r\nIUSXXX XXXX ~SMD2~SMH200\r\n
- **Automatic message generation:** Select the checkbox to enable automatic message generation.
- **Automatic message sending:** Select the check box to enable automatic message sending. You can select the check box after you have selected to enable automatic message generation.
- **Triggers:** End of descending sounding

- **Message destinations:** Enter message destination and click **Add**. Default is **Local folder**.

On a mobile station and an ASAP application, the block number and station number must be set to 0, which results in missing code for BUFR messages.

#### 14.5.2.8 BUFR 309056 and BUFR 309057

Starting from WMO code table version 31.0, WIGOS identifier is part of BUFR messages 309056 and 309057.

##### BUFR309056 and BUFR309056 All Levels

BUFR309056 message is generated once the sounding has ended, if descending mode has been enabled. You can enter the following information:

- **Message header:** Default value is ZCZC\r\nIUJXXX XXXX ~SMD2~SMH200\r\n
- **Automatic message generation:** Select the checkbox to enable automatic message generation.
- **Automatic message sending:** Select the check box to enable automatic message sending. You can select the check box after you have selected to enable automatic message generation.
- **Triggers: End of descending sounding.**
- **Message destinations:** Enter message destination and click **Add**. Default is **Local folder**.

##### BUFR309057 and BUFR309057 All Levels

You can enter the following information:

- **Message header:** Default value is ZCZC\r\nIUSXXX XXXX ~SMD2~SMH200\r\n
- **Automatic message generation:** Select the checkbox to enable automatic message generation.
- **Automatic message sending:** Select the check box to enable automatic message sending. You can select the check box after you have selected to enable automatic message generation.
- **Triggers:**
  - **End of ascending sounding**
  - **Height:** Add a value and select **Add**.
  - **Pressure:** Add a value and select **Add**.
  - **T, U, and W Sigp ready at 100 hPa level**
  - **Time:** Add a value and select **Add**.
  - **Time from launch:** Add a value and select **Add**.
- **Message destinations:** Enter message destination and click **Add**. Default is **Local folder**.

#### 14.5.2.9 TEMP and PILOT common

These selections are common to all TEMP and PILOT messages.

You can enter the following information:

- **Dew point minimums:**
  - **Temperature:** Possible values are -100 ... 100. Default value is -100.
  - **Pressure:** Default value is 0.0 hPa.

- **Message units:**
  - **Altitude:** Meters or feet. Default is Meters.
  - **Wind speed:** Knots or meters per second, m/s. Default is Knots.
- **PTU only:** Select **Yes** if you wish to generate TEMP messages without wind groups. Default is **No**.  
By default, wind data is included in TEMP B and TEMP D messages, but you can leave wind data out.
  - To make the selection, go to **Administration > Sounding > Messages > WMO Messages > TEMP and PILOT > TEMP and PILOT common**.
  - To include wind data in TEMP messages, select **No** for PTU only.
  - To leave out wind data in TEMP messages, select **Yes** for PTU only.
- **Message footer:** The default value for both TEMP and PILOT footer is NNNN.

#### 14.5.2.10 TEMP A - TEMP D

These selections are common to all TEMP A - TEMP D messages. The default triggers differ, as do the message headers.

**TEMP A**

Message header: ZCZC\r\nUSXX99 XXXX ~SMD2~SMH200\r\n

Automatic message generation:  Enabled

Automatic message sending:  Enabled

Triggers: T, U, & W Sigp ready at 100 hPa level.

Add trigger: Choose a message trigger

Message destinations: Local folder

Add destination: Choose a message destination

\* Field required.

- **Message header:**
  - TEMP A: ZCZC\r\nUSXX99 XXX ~SMD2~SMH200\r\n
  - TEMP B: ZCZC\r\nUKXX99 XXX ~SMD2~SMH200\r\n
  - TEMP C: ZCZC\r\nULXX99 XXX ~SMD2~SMH200\r\n
  - TEMP D: ZCZC\r\nUEXX99 XXX ~SMD2~SMH200\r\n
- **Automatic message generation:** Select the checkbox to enable automatic message generation.
- **Automatic message sending:** Select the checkbox to enable automatic message sending after the sounding has terminated. You can select the checkbox after you have selected to enable automatic message generation.

- **Triggers:** Add a trigger by clicking on the arrow and make your selection from the option list. Enter a value if required, and click **Add**.  
The options are:
  - **End of sounding** (Default for TEMP C, D)
  - **Height**
  - **Pressure**
  - **T, U & W Sigp ready at 100 hPa level** (Default for TEMP A, B). When this option is selected, it forces the nearest level below the 100 hPa level to be a significant level for wind direction and speed. You must select this option if a TEMP message is coded during the ascent (Real Time TEMP message). This trigger enables message generation for TEMP A and B even when the 100 hPa level has not been reached by the end of the sounding.
  - **Time**
  - **Time from launch**
- **Message destinations:** Enter message destination and click **Add**. Default is **Local folder**.

#### 14.5.2.11 PILOT A - D

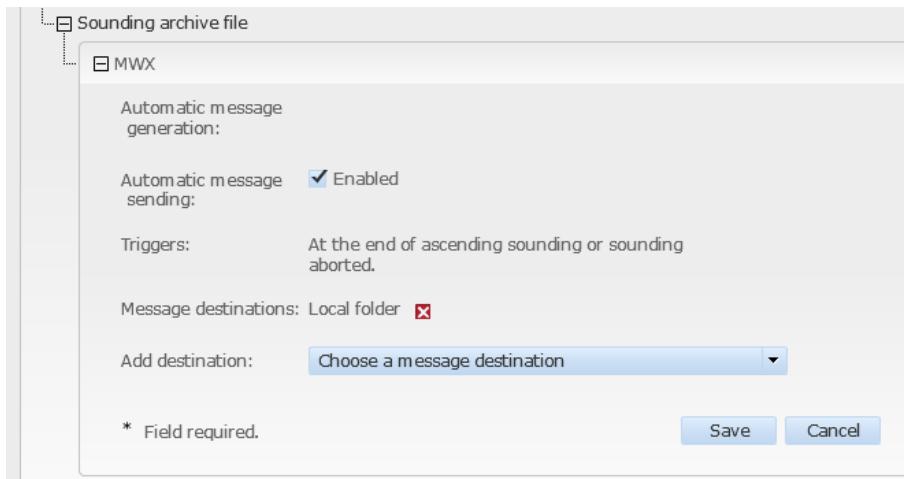
These selections are common to all PILOT A - D messages. The default triggers differ, as do the message headers.

- **Message header:**
  - PILOT A: ZCZC\r\nUPXX99 XXXX ~SMD2~SMH200\r\n
  - PILOT B: ZCZC\r\nUGXX99 XXXX ~SMD2~SMH200\r\n
  - PILOT C: ZCZC\r\nUHXX99 XXXX ~SMD2~SMH200\r\n
  - PILOT D: ZCZC\r\nUQXX99 XXXX ~SMD2~SMH200\r\n
- **Automatic message generation:** Select the checkbox to enable automatic message generation.
- **Automatic message sending:** Select the checkbox to enable automatic message sending. You can select the checkbox after you have selected to enable automatic message generation.
- **Triggers:** Add a trigger by clicking on the arrow and make your selection from the drop-down list. Enter a value if required, and click **Add**.  
The options are:
  - **End of sounding** (Default for PILOT C, D)
  - **Height**
  - **Pressure**
  - **T, U & W Sigp ready at 100 hPa level** (Default for PILOT A, B). When this option is selected, it forces the nearest level below the 100 hPa level to be a significant level for wind direction and speed. You must select this option if a TEMP message is coded during the ascent (Real Time TEMP message). This trigger enables message generation for PILOT A and B even when the 100 hPa level has not been reached by the end of the sounding.
  - **Time**
  - **Time from launch**
- **Message destinations:** Enter message destination and click **Add**. Default is **Local folder**.

### 14.5.2.12 Sending sounding archive file to message destinations

You can send sounding archive files automatically to desired message destination(s) after a sounding has been completed or aborted. Recalculated soundings and simulated soundings are not sent.

- ▶ 1. Select **Administration > Sounding > Messages > Sounding Archive File > MWX**.
- 2. In the **Automatic message sending** checkbox, select **Enabled**.
- 3. From the drop-down list, select the message destination(s).



- 4. Select **Save**.

### 14.5.3 Special sequences

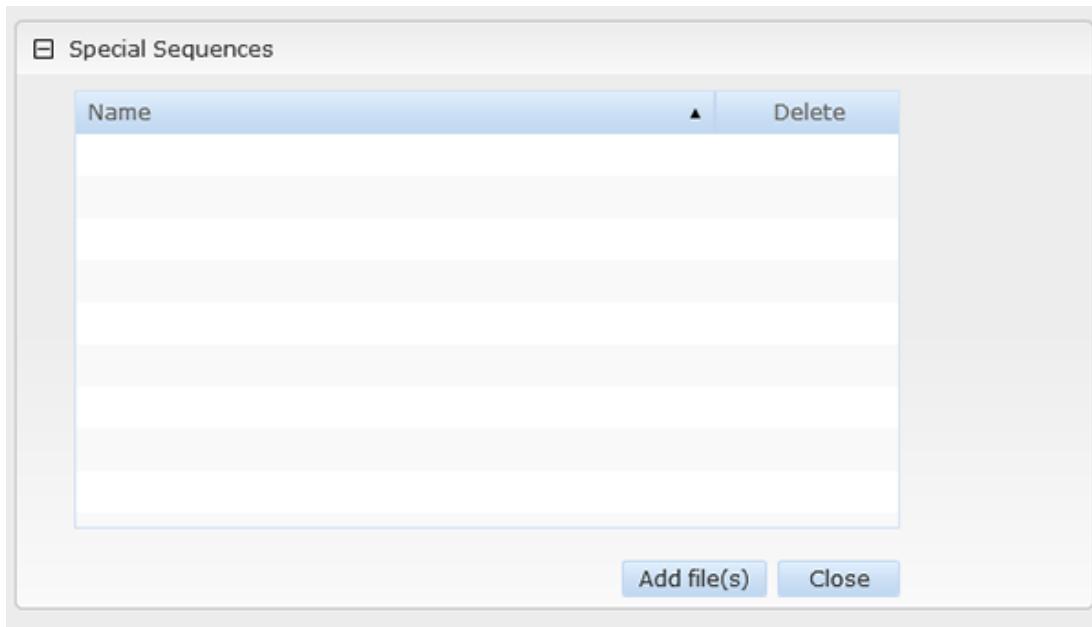
#### 14.5.3.1 Uploading special sequence files

To add user-defined information into message headers or file names, a special sequence “~F” is used. The information is uploaded to MW41 via XML parameter files you have created.

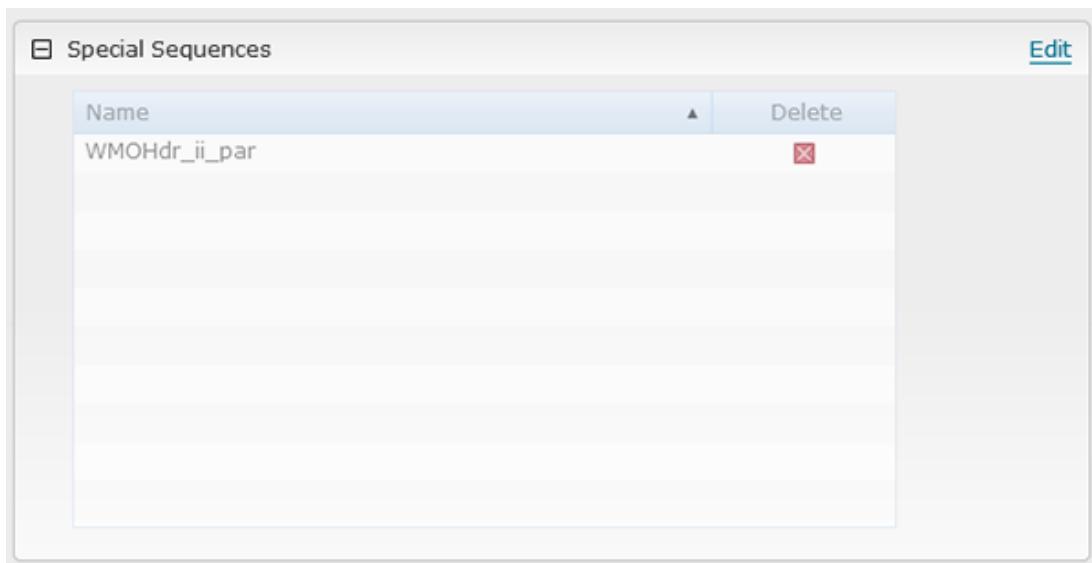
Before taking the files into use, you must upload them to MW41.

- ▶ 1. Select **Administration > Sounding > Special Sequences**.
- 2. Click **Edit** and browse to the XML file you want to upload.

3. Click **Add file(s)** to import the selected file.



The imported file appears in the window.



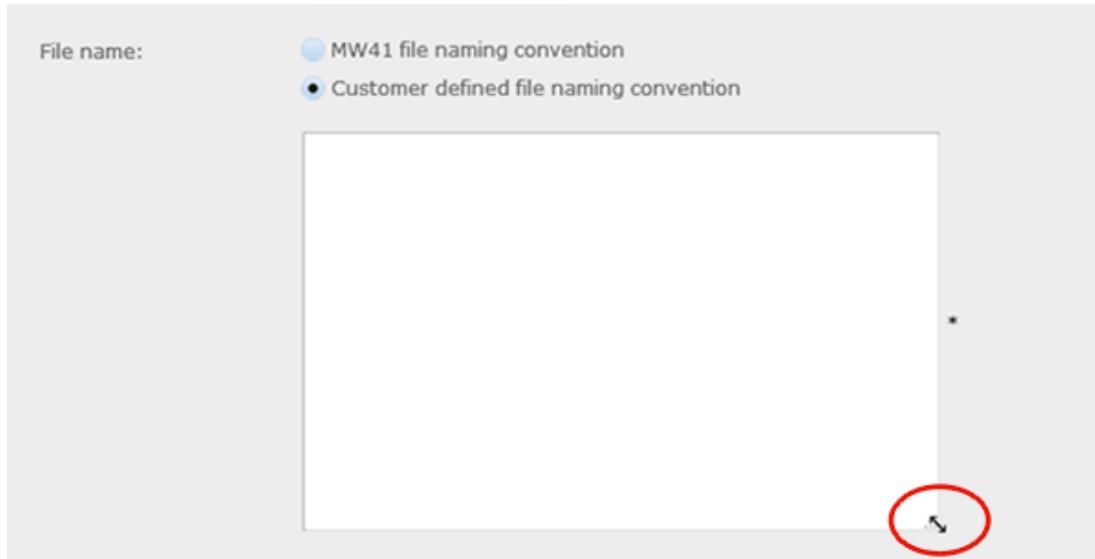
#### 14.5.3.2 Adding special sequences to messages

- ▶ 1. Select **Administration > Sounding > Message destinations > Add new destination**.
- 2. Select either **(S) FTP** or **File** as the message destination.

3. Fill in all the information required and select **Customer defined naming convention** to give the information desired to the message header or file name.

Customer defined naming convention defines the name of the file that is used for the messages sent to the destination. You can use characters and signs that are accepted by your operating system, and the special sequence characters starting with a ~ (tilde) character that you can use in message headers.

To fit more text in the text field, expand the text field by pointing to the corner and dragging.



If you select the option **Append to existing file**, the file is added to an existing file. In this case, you cannot use control marks (for example, <CR><LF>, that is, Carriage Return and Line Feed) in the file name.

4. Click **Add**.

FTP: ftp_demo	
Description:	
Server address:	mw41-demo
Port number:	21
File name:	<input type="radio"/> MW41 file naming convention <input checked="" type="radio"/> Customer defined file naming convention <pre>test_~F WMOHdr_ii_par HeadingLineComp  TEMPii HdrCompII&lt;~SMH2&gt;  .txt</pre>
<input type="checkbox"/> Append to existing file Append separator:	
File name prefix:	
File path:	\test_folder\SO
Use passive mode:	<input checked="" type="checkbox"/>
User name:	systest
Password:	*****
Character encoding:	iso-8859-1
Connection timeout (ms):	20000
Enable transfer timeout:	<input checked="" type="checkbox"/>
Transfer timeout (ms):	300000
Retry count:	1
Retry delay (ms):	3000

The information appears in the selected destination window.

For more information and examples on special sequences, see *Vaisala DigiCORA Sounding System MW41 Technical Reference*.

#### 14.5.3.3 Special sequences in messages

Message headers can include special sequences starting with a ~ character (tilde). These special sequences are expanded into their positions, containing specific information in a certain format. Message headers containing special sequences can be included in any message.

When you have selected option **Customer defined filenames convention** as the message destination in MW41, you can also use special sequences in file names.

One time-expanding sequence always consists of five parts.

#### 14.5.3.4 Special sequences: value

Another type of special sequence can be used to access information that is stored in the database. This information may either be included in the message headers, or applied as user-defined file naming conventions.

The format is shown below.

```
~V|value|subvalue|format string|
```

The following table shows the letter descriptions related to value.

**Table 7 Special sequence letter descriptions (value)**

Sequence letter	Description
~	Tilde sequences always start with a ~ character.
V	Expands a database value to this position.
value	Definition of the data, e.g. station.
subvalue	Subvalue of data definition, e.g. name of the station.
format string	The width of the field and the number of digits in the decimal fraction of the value. The format is width.precision. The default alignment is right, but width.precision aligns the text to the left. Format string is not mandatory and may also be left out.
	Separator character.    means that format string is missing between the separators.

The following is an example of no\_data:

- `~ V | STATION | NAEM | |`

No data is received because of a misspelled word NAEM (NAME).

Whereas in:

- `~ V | STATION | NAME | |`

The station name was found and read from the database as Vaisala.

For more examples of the use of the special sequence Value, see *Vaisala DigiCORA Sounding System MW41 Technical Reference*.

#### 14.5.4 Reports



Reports is an optional feature and the data is only available for licensed users.

You can create the following default reports from a sounding:

- Formout
- SoundingQualityReport

SoundingQualityReport is always enabled and its format is fixed. You cannot delete or edit SoundingQualityReport even if your license permits report template editing.

Alternatively, you can create your own report template, which will appear in the list of reports after it has been created. The report template is created in **Administration > Report Templates and Scripts**.



Creating a new report template is only possible for **MW41 Administrator**.

More report templates, for example, for Metpar and AED reports, are available on the installation media.

#### More information

- [Report templates \(page 180\)](#)

#### 14.5.4.1 Selections for SoundingQualityReport



Reports is an optional feature and the data is only available for licensed users.

- **Automatic message generation.** Enabled by default.
- **Triggers:**
  - **SoundingQualityReport:** At the end of ascending sounding or sounding aborted.
  - **Message destinations.** Default is Local folder.

#### 14.5.4.2 Selections for Formout



Reports is an optional feature and the data is only available for licensed users.

The following selections are available for SoundingQualityReport:

- **Automatic message generation.** Enabled or Disabled.
- **Automatic message sending:** Select the check box to enable automatic message sending. You can select the check box after you have selected to enable automatic message generation.

- **Triggers:**
  - **End of ascending sounding**
  - **Height**
  - **Pressure**
  - **T, U, & W Sigp ready at 100 hPa level.** This option forces the nearest level below the 100 hPa level to be a significant level of wind direction and speed. You must select this option if TEMP message is coded during the ascent (Real Time TEMP message).
  - **Time**
  - **Time from launch**
- **Message destinations.** Default is Local folder.

Fill in the information required for the report you wish to create, and click **Save**.

You can send the report forward, download it, or view and edit the report.

#### 14.5.4.3 Formout Example



Reports is an optional feature and the data is only available for licensed users.

The example below presents a typical Formout report. To save space, the whole report is not included, only samples of the beginning and end of the report are included.

The missing part in the middle is indicated with three dots (...).

Elapsed time	AscRate	HeightMSL	Pressure	Temp	RH	Dewp	Dir	Speed
s	m/s	m	hPa	°C	%	°C	°	m/s
0	0.0	28	1012.1	14.0	59	6.1	113	1.6
31	5.4	194	992.1	10.8	62	3.8	116	5.1
61	5.7	375	970.7	9.6	64	3.2	117	6.6
91	6.1	578	947.3	9.0	64	2.6	121	6.1
121	6.2	773	925.2	7.8	68	2.2	123	6.2
151	6.2	961	904.3	6.4	72	1.8	143	5.1
181	6.1	1139	884.9	5.1	79	1.9	171	5.5
211	6.1	1311	866.4	3.9	64	2.2	154	8.0
241	6.0	1479	848.5	2.6	60	-4-4	155	8.6
271	6.0	1659	829.9	1.1	63	-5.2	154	8.4
301	6.0	1820	813.3	0.0	72	-4.4	161	6.6
331	5.9	1995	795.8	-0.1	77	-3.6	157	5.3
361	5.9	2160	779.6	-1.4	81	-4.2	153	6.0
391	5.9	2337	762.5	-1.7	72	-6.1	146	8.1
421	5.9	2506	746.4	-2.9	76	-6.5	150	8.2

451	5.9	2676	730.5	-4.2	60	-10.8	158	7.9
481	5.9	2865	713.1	-5.1	64	-10.8	166	8.2
511	5.9	3035	697.9	-6.5	68	-11.3	158	8.2
541	5.8	3190	684.2	-7.7	76	-11.2	166	9.2
571	5.8	3364	669.0	-8.1	84	-10.3	196	9.1
...								
3756	5.5	20846	50.0	-49.8	1	-81.9	202	6.1
3786	5.5	21009	48.8	-49.9	1	-81.9	165	3.6
3816	5.5	21174	47.6	-49.7	1	-81.8	164	3.6
3846	5.5	21338	46.4	-49.3	1	-81.5	148	4.4
3876	5.5	21505	45.2	-49.7	1	-81.6	128	6.7
3906	5.5	21667	44.1	-49.6	1	-81.6	146	5.9
3936	5.5	21831	43.0	-49.6	1	-81.5	153	5.7
3966	5.5	21996	41.9	-50.3	1	-81.9	165	6.3
3996	5.5	22164	40.9	-50.0	1	-81.9	173	8.5
4026	5.5	22339	39.8	-49.7	1	-81.7	166	6.0
4056	5.5	22511	38.8	-49.0	1	-81.3	143	6.2
4086	5.5	22685	37.7	-49.5	1	-81.5	145	9.0
4116	5.5	22860	36.7	-49.9	1	-81.7	148	7.9
4146	5.5	23033	35.8	-50.2	1	-81.8	145	7.1
4176	5.6	23205	34.9	-50.7	1	-82.0	124	4.6
4206	5.6	23377	33.9	-51.2	1	-82.3	88	3.4
4236	5.6	23553	33.0	-51.0	1	-82.2	88	5.7
4266	5.6	23720	32.2	-51.0	1	-82.2	118	9.7
4296	5.6	23893	31.4	-51.7	1	-82.7	137	9.7
4326	5.6	24068	30.5	-51.0	1	-82.4	132	7.5

## More information

- [Report templates \(page 180\)](#)

### 14.5.4.4 SoundingQualityReport Example



Reports is an optional feature and the data is only available for licensed users.

The example below presents a typical SoundingQualityReport.

In this example, information on Special Group Input for surface observations is missing because it was not configured as part of the sounding preparations. Missing information is indicated with ////.

Radiosonde		
	Sonde type	RS41-SG
	Sonde software version	2.2.15
	RS41 calculation version	1.3
	Sonde serial number	S0430811
	Height and pressure in messages is based on	GPS
Ground equipment		
	System trademark and model	AS41
	Station name	Porkkala autosonde
	Software version	MW41 2.16.0
	Ground check device	RI41-AS1
	Ground check device hardware version	0x70
	Ground check device software version	2.05
Ground check		
	P correction (Pref - P)	////
	T difference (Tu - T)	-0.08 °C
	T in-built check temperature difference limit	3.0 °C
	U correction (Uref1 - U1)	0.77 %Rh
	U correction (Uref1 - U1) limit	2.0 %Rh
	Tref temperature	////
	Tu temperature	17.28 °C
	T temperature	17.36 °C
	Uref1 humidity	0 %Rh
	U1 humidity	-0.77 %Rh
Sounding events		
	Terminating altitude	18989 m
	Reason for termination	IncreasingPressure
	Reason for sounding failure	////
	Balloon release time	23:59:53

	Sounding length	01:02:39 hh:mm:ss
	Average ascent rate	5.1 m/s
	STD level heights	67, 703, 1387, 2908, 5459, 7072, 9032, 10215, 11647, 13536, 16181, 18496
	Soundings status	Ok
Surface level observations		
	Surface pressure	1007.8 hPa
	Surface temperature	5.80 °C
	Surface humidity	97.0 %Rh
	Surface wind direction	235°
	Surface wind speed	6.7 m/s
	Sea water temperature	////
Special group input		
	WMO cloud group	////
	Special group 1	////
	Special group 2	////
	ASAP status	0
Sounding notes		
	Comments	
GPS status		
	Tracked satellite average count	11.8

#### 14.5.4.5 Metpar Example



Reports is an optional feature and the data is only available for licensed users.

The example below presents a typical Metpar report. To save space, the whole report is not included here, only samples of the beginning and the end of the report. The missing part in the middle is indicated with three dots (...).

Release point latitude	60.28°N
Release point longitude	24.88°E
Release point height from sea level	28 m
Balloon release date and time	2010-05-11T14:02:35

HeightMSL	RH	Dewp	MixR	VirT	Temp	Pressure	PEPT
m	%	°C	g/kg	°C	°C	hPa	°C
28	58.9	6	5.80	15.0	14.0	1012.1	14.0
1031	76.8	2.2	4.96	6.8	5.9	896.6	6.1
2032	77.5	3.8	3.63	0.2	-0.4	792.2	-0.4
3035	68.4	-11.3	2.29	-6.1	-6.5	697.9	-7.2
4036	77.2	-14.9	1.96	-11.4	-11.7	613.2	-13.4
5040	78.5	-21.7	1.25	-18.7	-18.9	536.8	-22.6
6044	36.7	-35.9	0.38	-25.4	-25.4	468.2	-31.6
7047	46.7	-41.4	0.25	-33.9	-34.0	406.8	-43.9
8048	36.1	-51.6	0.09	-42.6	-42.6	351.6	-57.4
9053	31.9	-59.7	0.04	-50.4	50.4	-302.1	-71.0
...							
10058	-19.1	-66.1	0.02	-53.3	-53.3	258.6	78.5
11061	3.0	-75.9	0.01	-50.0	-50.0	221.5	-77.0
12004	1.1	-80.4	0.00	-47.9	-47.9	191.8	-76.7
14005	1.0	-81.8	0.00	-49.0	-49.0	141.7	-85.7
16006	1.0	-82.2	0.00	-49.4	-49.4	104.4	-94.2
18006	1.1	-81.3	0.01	-48.5	-48.5	77.0	-100.9
20008	1.0	-81.2	0.01	-48.3	-48.3	56.8	-109.7
22011	1.2	-81.9	0.01	-50.3	-50.3	41.8	-124.7

#### 14.5.4.6 AED Example



Reports is an optional feature and the data is only available for licensed users.

The example below presents a typical AED report. To save space, the whole report is not included here, only samples of the beginning and end of the report are included. The missing part in the middle is indicated with three dots (...).

SignificantLevelFlags are displayed on one row and you can choose which flags are displayed in the report:

- T = significant point of temperature
- U = significant point of humidity
- d = significant point of wind direction
- f = significant point of wind speed
- v = significant point of wind components

- Tr = tropopause level
- Mw = maximum wind level
- Pi = pressure value interpolated on this level
- Ti = temperature value interpolated on this level
- Ui = humidity value interpolated on this level
- wi = wind values interpolated on this level

	Elapsed time	HeightMS L	Pressure	Temp	RH	Dewp	Dir	Speed	SignificantLevelFlags:
	min s	m	hPa	°C	%	°C	°	m/s	TUdfvTrMwPiTiUiwi
0	00	28	994.2	-1.4	91	-2.7	175	2.6	TUdfy Pi
0	01	32	993.7	-1.7	92	-2.8	173	2.8	
0	02	35	993.2	-1.8	93	-2.8	171	3.0	
0	03	39	992.8	-1.9	93	-2.9	169	3.2	
0	04	42	992.4	-1.9	93	-2.9	167	3.5	
0	05	46	992.0	-1.9	93	-2.9	166	3.7	
0	06	49	991.6	-1.9	93	-3.0	164	4.0	
0	07	52	991.1	-1.9	92	-3.0	163	4.1	
0	08	57	990.6	-2.0	93	-3.0	162	4.5	
0	09	61	990.1	-2.0	93	-3.0	161	4.7	
0	10	65	989.6	-2.0	93	-3.1	160	4.9	
0	11	69	989.1	-2.1	93	-3.1	159	5.2	
0	12	72	988.6	-2.1	93	-3.1	158	5.4	
0	13	76	988.2	-2.1	93	-3.1	157	5.6	
0	14	80	987.7	-2.2	93	-3.1	156	5.8	
0	15	83	987.3	-2.2	94	-3.1	156	6.0	
0	16	85	987.1	-2.2	94	-3.1	155	6.0	
0	17	87	986.8	-2.3	94	-3.1	155	6.3	
0	18	90	986.5	-2.3	94	-3.1	155	6.3	
0	19	93	986.1	-2.3	94	-3.1	154	6.6	dv
...									
112	30	32569	6.1	-27.3	1	-68.2	227	54.7	PiTi
112	31	32571	6.1	-27.3	1	-68.2	227	54.8	Pi
112	32	32573	6.1	-27.3	1	-68.2	227	54.8	Pi
112	33	32575	6.1	-27.4	1	-68.3	227	54.9	
112	34	32578	6.1	-27.4	1	-68.3	228	54.9	

112	34	32578	6.1	-27.4	1	-68.3	228	54.9	
112	35	32581	6.1	-27.5	1	-68.3	228	54.9	Pi
112	36	32584	6.1	-27.5	1	-68.3	228	54.9	Pi
112	37	32587	6.1	-27.5	1	-68.3	228	54.9	fv MwPi
112	38	32590	6.1	-27.4	1	-68.3	228	54.9	
112	39	32593	6.1	-27.3	1	-68.2	228	54.9	
112	40	32596	6.1	-27.2	1	-68.1	228	54.8	Pi
112	41	32598	6.1	-27.0	1	-68.0	228	54.7	Pi
112	42	32604	6.1	-26.8	1	-67.9	228	54.6	
112	43	32604	6.1	-26.7	1	-67.8	228	54.5	
112	44	32607	6.1	-26.5	1	-67.7	228	54.3	Pi
112	45	32610	6.1	-26.5	1	-67.6	228	54.1	PiTi
112	46	32613	6.1	-26.4	1	-67.6	228	53.9	Ti
112	47	32617	6.1	-26.3	1	-67.5	228	53.7	Ti
112	49	32624	6.1	-26.1	1	-67.4	228	53.3	Pi

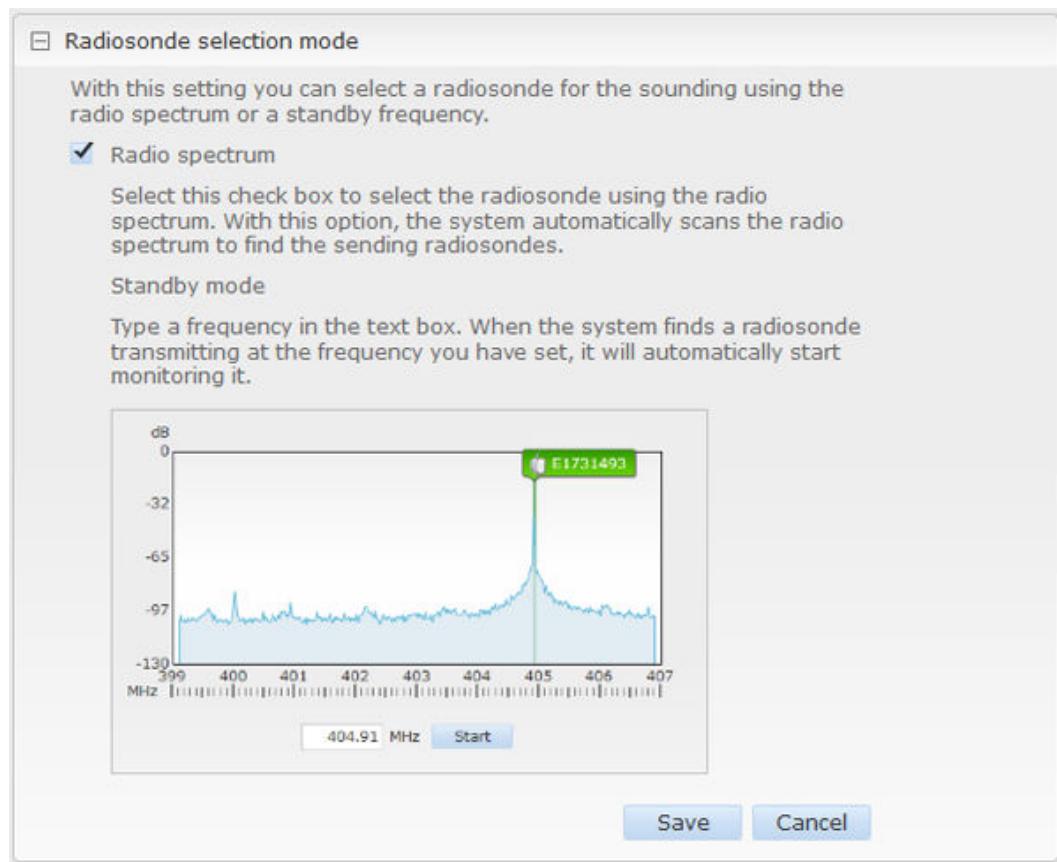
#### 14.5.5 Setting radiosonde selection mode

- ▶ 1. Select **Administration > Sounding > Radiosonde selection mode**.

2. Radiosonde selection mode defines how the radiosonde is prepared for the sounding.

You can select either **Radio spectrum** or **Standby mode**.

- **Radio spectrum:** The software automatically scans the radio spectrum to find the sending radiosondes and you then select the radiosonde by clicking the radiosonde icon.
- **Standby mode:** You must type a frequency in the check box. When the system finds the frequency, it will automatically start monitoring it.



Alternatively, you can choose to prepare the radiosonde with a ground check device in **Administration > Devices and Systems > Radiosonde - workstation connection**.

#### More information

- [Selecting the radiosonde from the radio spectrum \(page 35\)](#)
- [Configuring the sounding software \(page 19\)](#)

#### 14.5.6 Setting sounding start mode

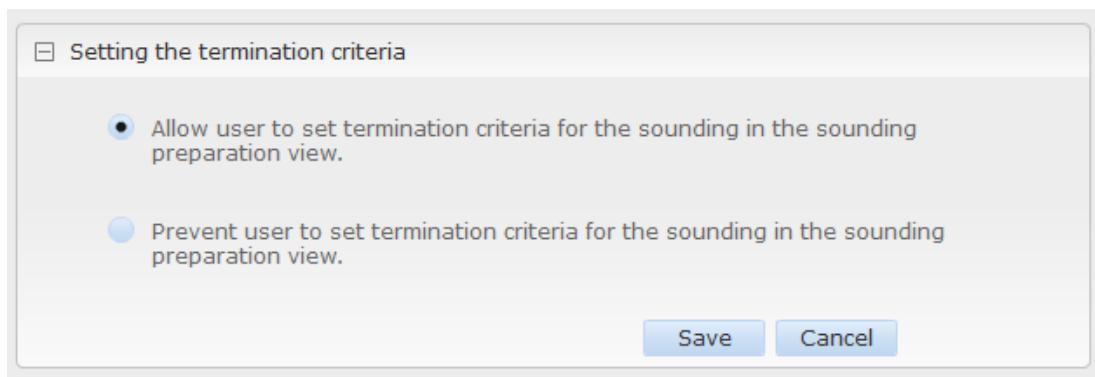
You can set the sounding to start automatically when the balloon is released, or manually when the user presses the **Manual start** button.

- 1. Select **Administration > Sounding > Sounding Start Mode**.
- **Automatic Start:** The sounding starts automatically when the balloon is released. This is the default value.
  - **Manual Start:** The sounding starts automatically when the balloon is released, but you can also start it manually by clicking the **Manual start** button as you release the balloon. The automatic sounding start cannot be disabled, even if you have set the sounding start mode as manual. This way, the sounding will start even if you forget to click the **Manual start** button.

#### 14.5.7 Setting termination criteria

You can select whether the user can set termination triggers for the sounding in the radiosonde preparation phase.

- 1. Select **Administration > Sounding > Setting the termination criteria**, and make the selection.



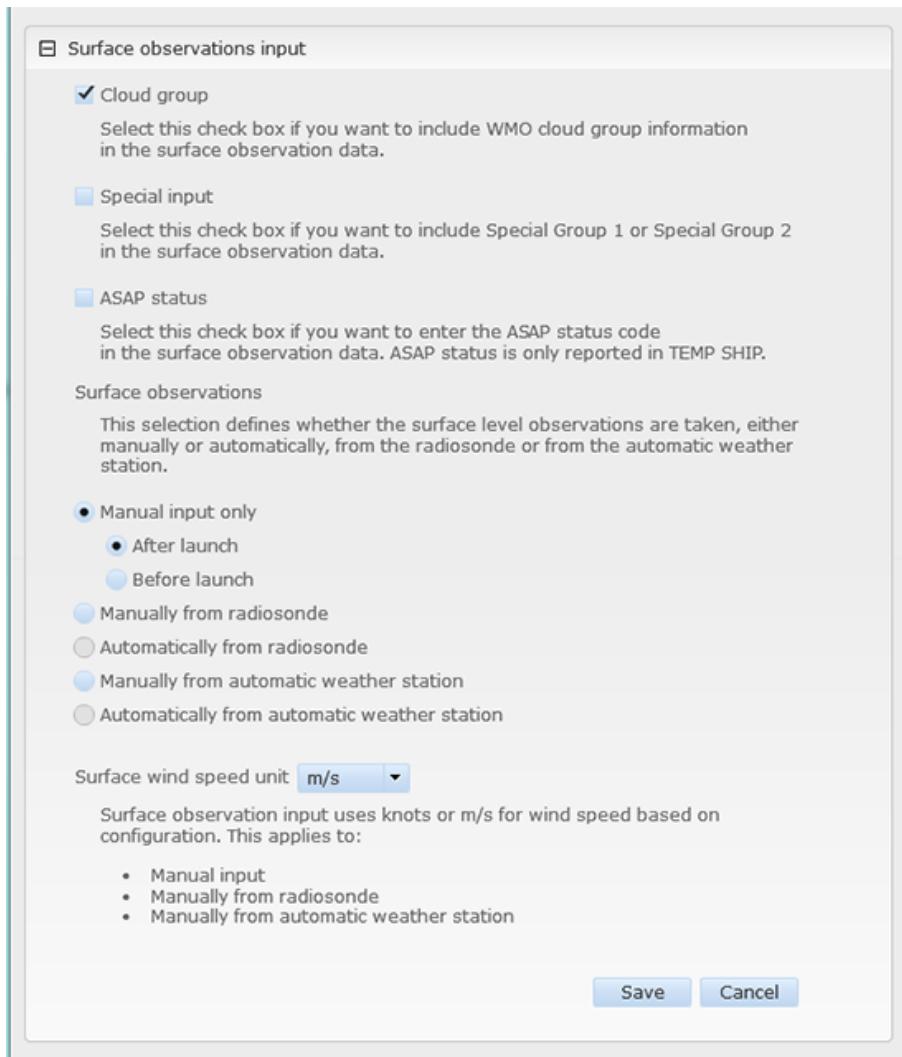
#### More information

- [Setting termination triggers \(page 32\)](#)

### 14.5.8 Editing surface observation values

- 1. Select **Administration > Sounding > Surface observations input**.

The following additional options are available for surface observation values:



- Cloud group:** Select this check box if you want to enter WMO cloud group information in the surface level observation data. This option is selected by default.
- Special input:** Select this check box if you want to include Special Group 1 or Special Group 2 in the surface level observation data.
- ASAP status:** Select this check box if you want to enter the ASAP status code in the surface level observation data. If the input value is outside the limit boundaries, this group in the message will be replaced with a group of information about tracking technique. For example:

```
ZCZC  
UKXX99 XXXX 280800  
UUBB DorisTEST 78086 99603 10249 25004  
00980 03130  
21212 00980 00000  
31313 47806 80822 90059  
41414 ////  
51515 11000 30005=
```

If ASAP status is enabled, and the system has an AWS device connected that can provide seawater temperature, that value is automatically fetched from the AWS device. ASAP status is only reported in TEMP SHIP.

- **Surface observations:**

- **Manual input only:** Input the surface level values manually, either before or after the release.
- **Manually from radiosonde or Automatically from radiosonde:** Surface level observation values are read from the radiosonde and they are input either manually or automatically.
- **Manually from automatic weather station or Automatically from automatic weather station:** Surface level observation values are read from the automatic weather station and they are input either manually or automatically.
- **Surface wind speed unit:** Select either meters or feet per second (m/s or ft/s).



If one or several of values **Cloud group**, **Special input** or **ASAP status** are selected, you cannot set surface level values automatically from radiosonde, or automatically from AWS. Only manual input is possible.

### 14.5.9 Sounding audio notifications

If you want to receive an audible alert when a certain event takes place, you can set an audio notification for selected default events.

To select and import audio files, select **Administration > Sounding > Sounding audio notifications**.

#### 14.5.9.1 Selecting audio file

- 1. To select an audio file for the event, click **Edit** and select the audio file from the drop-down list.

The screenshot shows a dialog box titled "Sounding audio notifications". It contains a table with columns for "Event name", "Audio file", and "Loop". The table lists several events and their corresponding audio files:

Event name	Audio file	Loop
Balloon released	beep500ms.mp3	<input checked="" type="checkbox"/>
End of ascending sounding	beep500ms.mp3	<input checked="" type="checkbox"/>
All system error events	beep1s.mp3	<input checked="" type="checkbox"/>
SigP calculation reached 10...	None	<input checked="" type="checkbox"/>
Radiosonde signal lost	digicora.mp3	<input checked="" type="checkbox"/>
Sounding aborted	None	<input checked="" type="checkbox"/>
Sounding created	None	<input checked="" type="checkbox"/>

Below the table, there is a note: "Manage audio files: [Manage](#)". At the bottom right are "Save" and "Cancel" buttons.

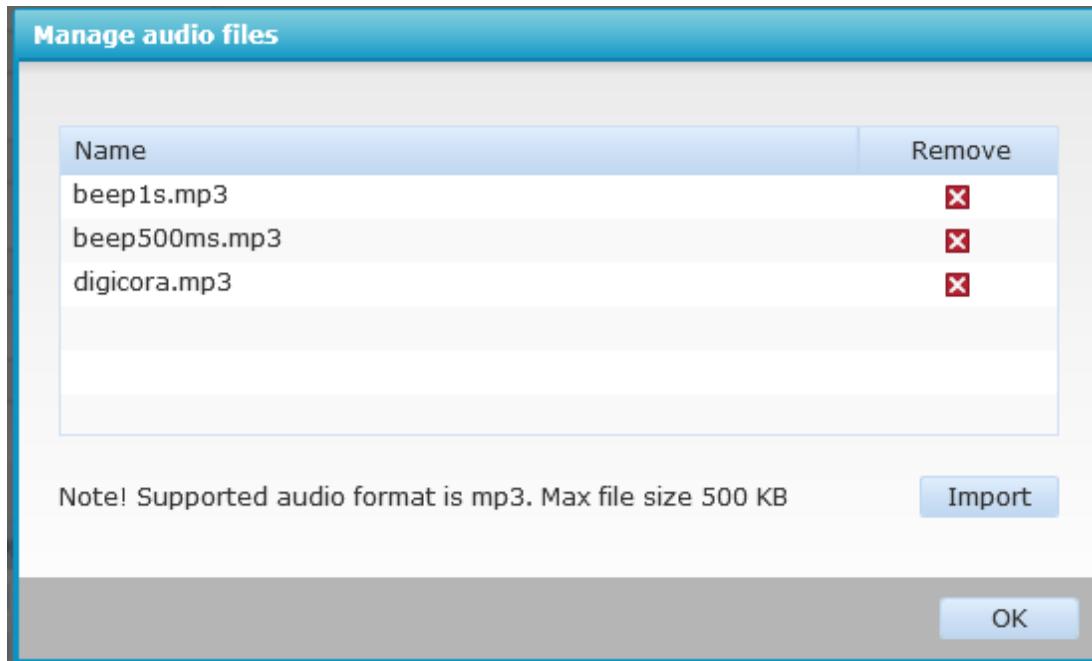
#### 14.5.9.2 Importing audio file



After a software update, you must reinstall the audio files you have imported.

- 1. To start importing an audio file, click **Edit** and **Manage**.

2. Click **Import** to import an audio file. The system supports audio format mp3 with a maximum file size of 500 KB.

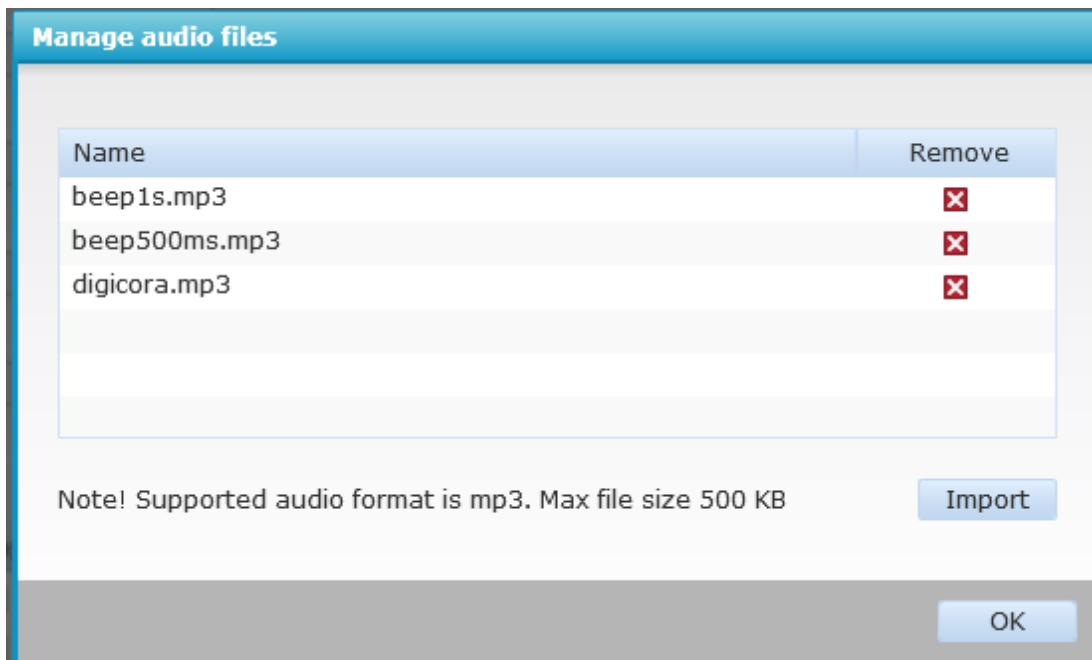


The imported file appears in the list of audio files.

When the event specified in the list occurs, the appropriate audio file is played.

#### 14.5.9.3 Removing audio file

- 1. To remove an audio file, click **Manage** and the **Delete** icon under **Remove**.



#### 14.5.9.4 Looping

If you select the **Loop** checkbox, a pop-up window appears to indicate the event when it occurs, and the audio alert is played continuously.

Click **Clear** to clear the event and to stop playing the audio alert. You can also click the icon in the application header to mute the sound.

#### 14.5.9.5 Controlling audio alerts

- 1. Click the icon in the application header to have the sounds on:



or muted:



## 14.6 Configuring report templates and scripts

### 14.6.1 Report templates

With report templates you can generate sounding data in the form of reports. If you need more parameters than available in the report templates, or if you are more familiar with the software database, you can upload a Python script.



Report templates are only available with the Advanced option.

Report templates are available on the MW41 installation media. The Formout report is included in the software as a default report template.

#### More information

- [Formout Example \(page 166\)](#)
- [Reports \(page 164\)](#)

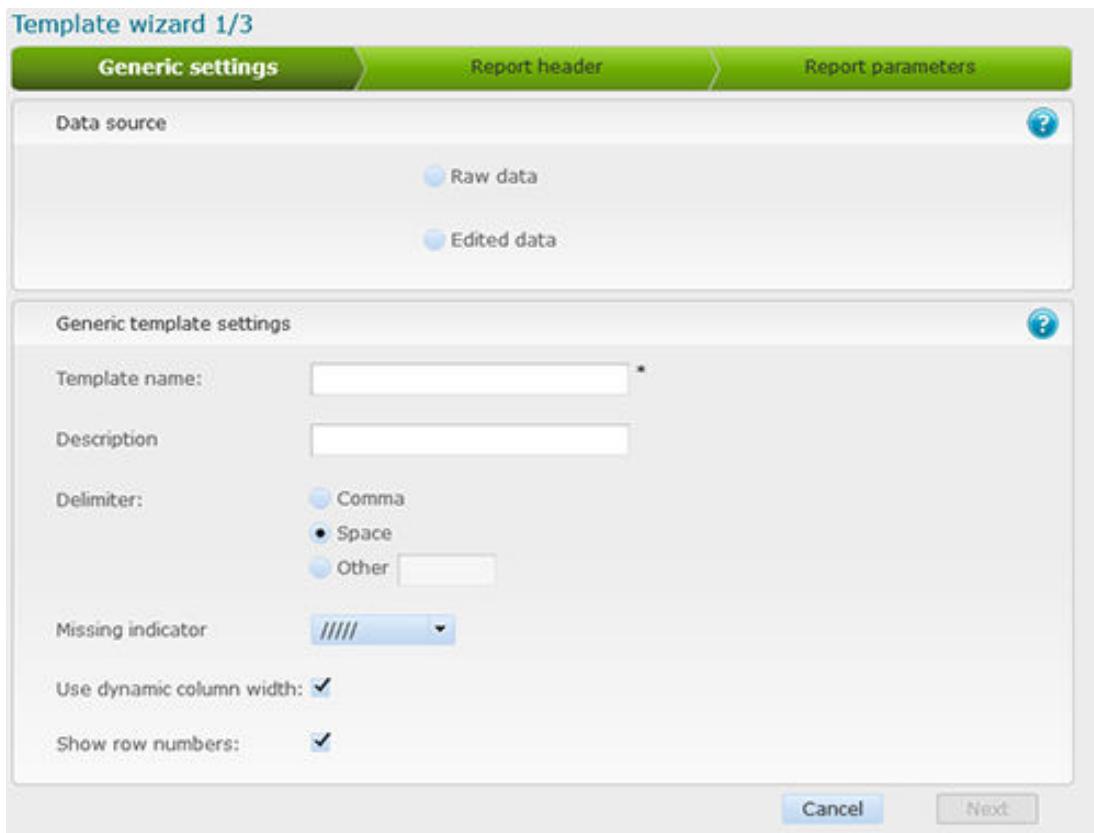
### 14.6.2 Editing and creating a report



Report templates are only available with the Advanced option.

- 1. Editing and creating a report consists basically of the same steps.
- To edit a report, select a report and click **Edit** in the **Report templates** window.
  - To create a new report, click **Create new**.

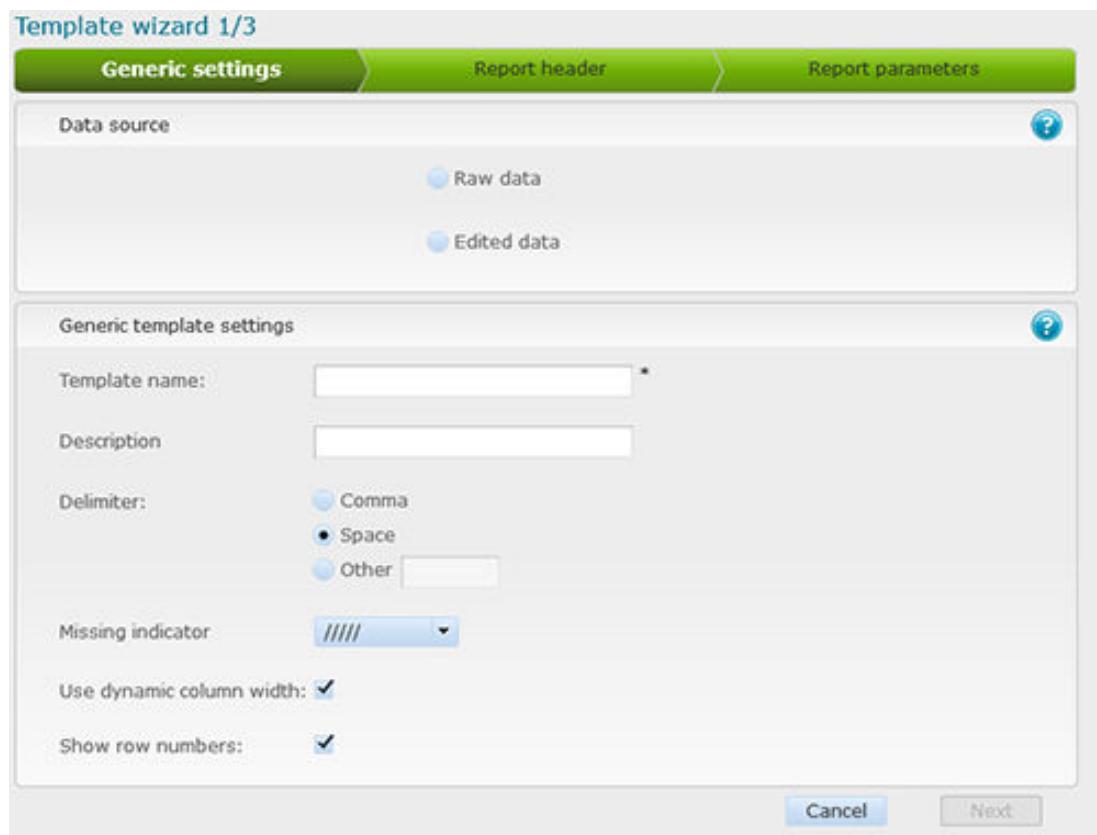
Page 1 of the template wizard opens.



#### 14.6.2.1 Generic settings

On page 1 of the template wizard, you can define generic settings for the report template.

- 1. In the **Generic settings** tab, make the necessary selections:



- **Data source:** Select whether you want the report to include raw data or edited data. Raw and edited data cannot be combined in a report. With this feature it is possible to compare raw data with edited data, and to perform calculations with the raw data.
- **Template name:** Give a name for your report template. If you are editing an existing preset report template (for example, Formout), the default name of the report is the name of the report you are editing, preceded by "Copy of..."
- **Description:** If you are editing a report, the default description refers to the report you are editing.
- **Delimiter:** Comma, space, or other (type a value in the text box).
- **Missing indicator:** Indicator for missing information. The options are //// and 99999.
- **Use dynamic column width:** When you select this option, the report generator optimizes the column widths according to the selected parameter. This means that the parameter-dependent default settings will be used for the output resolution (number of digits, number of decimals). If you do not use the dynamic width, you must define the minimum number of characters on a row in the **Report parameters** tab.
- **Show row numbers:** Select whether row numbers are shown.

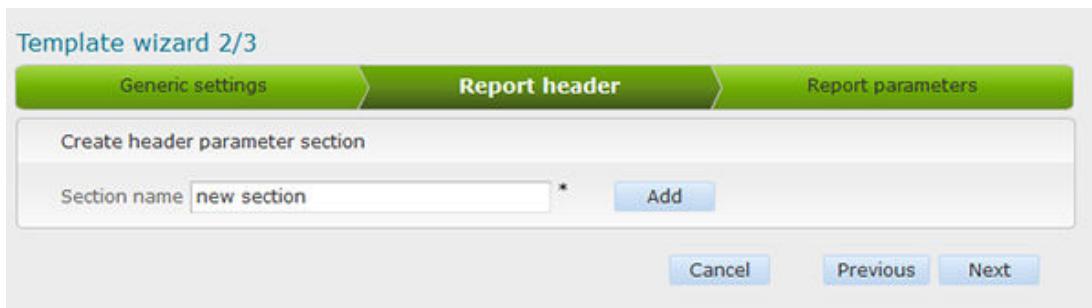
2. When you have made all the necessary selections, click **Next** to proceed to page 2 of the template wizard, where you can add parameters to the report.

You can also create a report with only the generic settings. If you do not want to add any further parameters to the report, click **Next** in the next pages of the template wizard until you get to the **Report parameters** tab, where you can finish the report template creation.

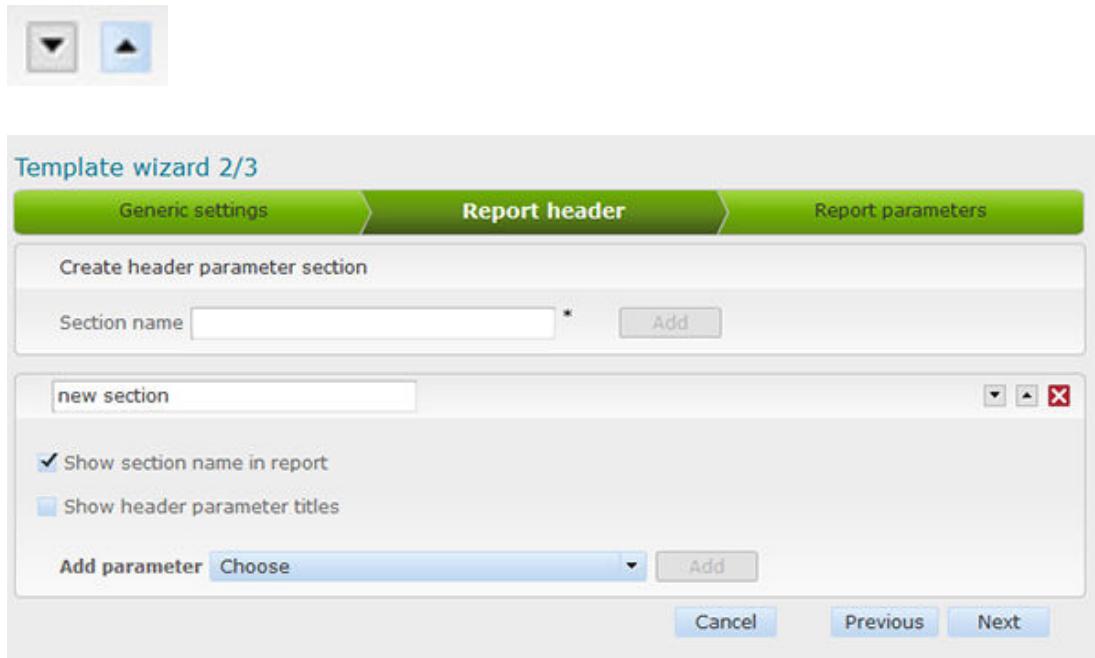
#### 14.6.2.2 Report header

On page 2 of the template wizard, you can create header parameter sections and add parameters to the sections.

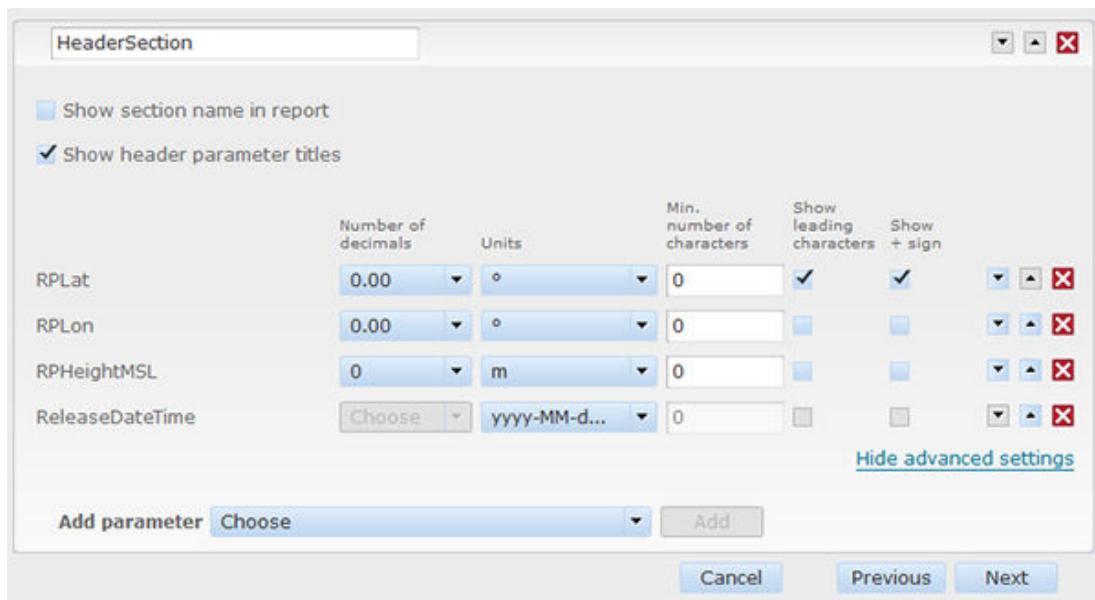
- 1. In the **Section name** field, type a name for the header parameter section and click **Add**.



2. For the new section, select whether the section name or the header parameter titles are shown in the report. The section names must be unique.  
 You can add several header parameter sections and change their order by clicking the arrow buttons.



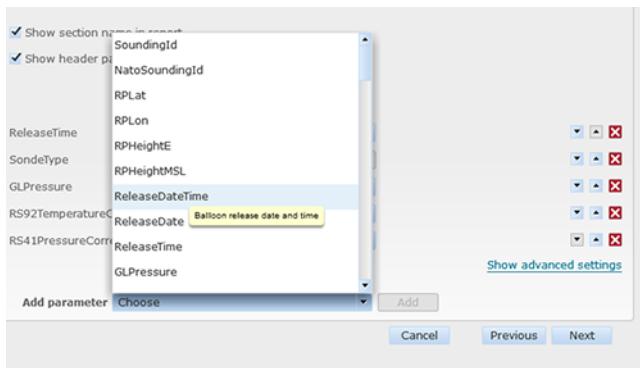
The parameters included depend on the report type. If you are editing a METPAR report, for example, the following parameters are included by default:



3. To add parameters to the section, select a parameter from the **Add parameter** drop-down list and click **Add**.

To view an explanation for the parameter, place the mouse pointer on top of the parameter to view a tool tip.

To change the order of the parameters, click the arrow buttons.



4. Click the **Show advanced settings** text link to view the advanced settings.
- Minimum number of characters: This option is disabled if the dynamic column width mode has been selected in the **Generic settings** tab.
  - Show leading characters, that is, leading zeros.
  - Show + signs, that is, leading + signs.
5. Click **Next** to proceed to adding report parameters.

#### 14.6.2.3 Report parameters

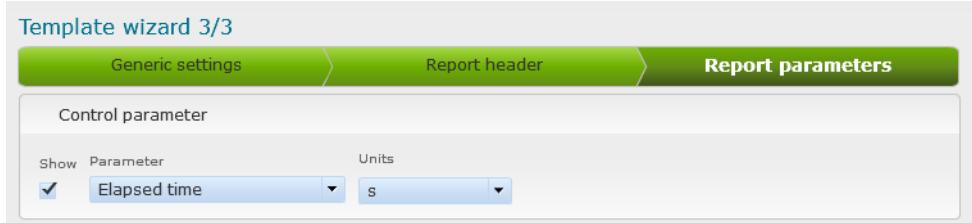
On page 3 of the template wizard, you can add more detailed parameters to the report template you are creating.



To view an explanation for the parameter, place the mouse pointer on top of the parameter to view a tool tip.

If you selected **Raw data** as the data source for your report, the parameters available are only the ones related to raw data. In a raw data report, time is the only control parameter and no interpolation is included, only measured levels.

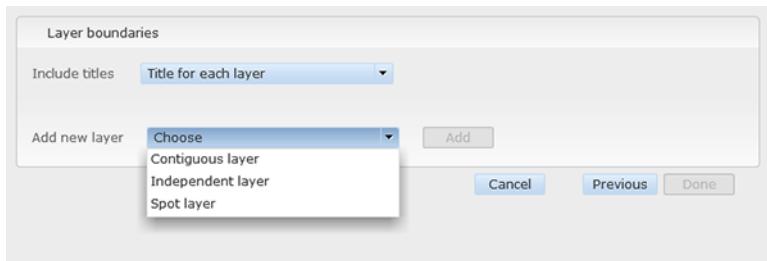
- 1. **Control parameter** is the first data column in the report. Make a selection in the **Parameter** and **Units** drop-down lists.  
Selecting the **Show Parameter** checkbox adds the control parameter used to generate the report. This is especially useful when the calculation method is Mid-point and Average, as the start and end layers used for the calculation are displayed in the report.



To edit the control parameter, you must first remove all report layers in the **Layer boundaries** field, or define one layer that covers the sounding from the release to the end of the sounding.

2. Under **Report parameters**, add a parameter and select the number of decimals and units for the selected parameters.
3. Click the **Show advanced settings** text link to view the advanced settings.
  - Minimum number of characters: This option is disabled if the dynamic column width mode has been selected in the **Generic settings** tab.
  - Show leading characters, that is, leading zeros.
  - Show + signs, that is, leading + signs.

4. Under **Layer boundaries**, make the following selections.



- **Include titles:** Select **No title**, **Title only for the first layer**, or **Title for each layer**.
- **Add new layer:** The new layer can be of type **Spot**, **Contiguous**, or **Independent**, or you can mix several layer types. Spot and contiguous layers cannot be used with raw data, only independent layers. You can add layers only in the ascending or descending order, based on the selected control parameter.
  - **Spot** layers are added to the report by configuring single, independent layers. Type value for the layer level in the text box. Spot layers cannot be duplicated.
  - **Contiguous** layers are configured for any control parameter. You can add several contiguous layers to the report. The report generator calculates the needed layers for the report based on layer thickness. Contiguous and independent layers support parameter value calculation using the mid-point or average method.
  - **Independent** layers are configured for any control parameter. You can add several independent layers to the report, but the layers must not overlap.
- **Output:** Values are calculated either using the mid-point or average method, or using an existing implementation (values for all levels). When you select **Interval** as the output, the specified layer is divided into those intervals for calculation, unlike in **All levels**, where all the data levels in the layer are used for calculation.

The limits given in the text boxes follow those of the selected control parameter.

5. Click **Add** to add the new layer.

Next, finish the report creation.

#### 14.6.2.4 Finishing report creation

When your report template is ready, you must finish the template creation on page 3 of the template wizard.

- 1. In the **Report Parameters** tab, click **Save** and **Done**.  
The report templates appear in the list.

The settings you have created will be saved as new report templates.

Report templates

Name	Delete
AED	
Copy of AED	X
Formout	
METPAR	
SoundingQualityReport	
new template	X

[Select all](#)

[Edit](#) [Export](#) [Import](#) [Create new](#)

The new report templates also appear in **Administration > Sounding > Reports > Messages**.

Messages

- Message destinations
- WMO messages
- Reports
  - METPAR
  - Formout
  - SoundingQualityReport
  - AED
  - Copy of AED
  - new template

### 14.6.3 Parameter list



Report templates are only available with the Advanced option.

The following parameters are used in the reports.

**Table 8 Report parameters**

Parameter	Description
AsapStatus	ASAP status
AscRate	Ascent rate of the radiosonde
AverageAscentRate	Average ascent rate
Comments	Comments from the user
CompAz	Azimuth angle of the radiosonde, computed using wind values
CompRng	Horizontal projection of slant range. Radiosonde location is obtained using wind values
CrossWind	Cross wind vector to a given direction of fire
Den	Air density
Dewp	Atmospheric dew point temperature
Dir	Wind Direction
Ecomp	East Component of wind
Elapsed	Time elapsed from the sounding start
EllipsoidHeight	WGS84 ellipsoid height
ELR	Environmental Lapse Rate. Atmospheric temperature gradient.
GCDevice	Ground check device
GCDeviceHWVersion	Ground check device hardware version number
GCReferenceHumidity	Ground check reference humidity
GCReferencePressure	Ground check reference pressure
GCReferenceTemperature	Ground check reference temperature
GLDir	Surface wind direction. GL means Ground Level.
GLPressure	Surface pressure
GLRH	Surface relative humidity
GLSpeed	Surface wind speed
GLTemp	Surface temperature
GpsHeightGnd	Height from station level calculated from GPS

Parameter	Description
GpsHeightMSL	Geopotential height from sea level calculated from GPS
HeightGnd	Geopotential height from release point
Height_MSL	Geopotential height from sea level
Lat	Latitude of the radiosonde, computed using wind values
Lon	Longitude of the radiosonde, computed using wind values
MethodForHeightAndPressure	Input for height and pressure calculation, that is, whether GPS or the pressure sensor is used as the input method.
MixR	Mixing Ratio
MRI	Modified Refractive Index
NatoSoundingId	NATO format sounding ID
Ncomp	North component of wind
P	Pressure used in EDT data. With RS41-SGP, the value is taken from the pressure sensor. With RS41-SG, the value is calculated using GPS height.
Pc	Calculated pressure. If RS41-SGP is used, this information is missing. With RS41-SG, the value is calculated using GPS height.
PEPT	Pseudo Equivalent Potential Temperature
Pm	Measured pressure. With RS41-SGP, the value is taken from the pressure sensor. If RS41-SG is used, this information is missing.
PotTemp	Potential temperature
Pressure	Measured atmospheric pressure
PressureCalculated	Calculated pressure (see Pc)
RHice	Relative humidity over ice
RS41AirTemperature	RS41 T in-built check air temperature
RS41CalculationVersion	RS41 calculation version number
RS41GCPressure	RS41 ground check pressure
RS41GCHumidity1	RS41 ground check humidity 1
RS41GCHumidity2	RS41 ground check humidity 2
RS41GCReferenceHumidity1	RS41 ground check reference humidity 1
RS41GCReferenceHumidity2	RS41 ground check reference humidity 2
RS41GCTemperature	RS41 ground check temperature
RS41HumidityCorrection	RS41 U correction ( $U_{ref1} - U_1$ )
RS41HumidityCorrectionLimit	RS41 U correction ( $U_{ref1} - U_1$ ) limit
RS41HumidityDifference	RS41 U difference ( $U_{ref2} - U_2$ )
RS41PressureCorrection	RS41 P correction ( $P_{ref} - P$ )

Parameter	Description
<b>RS41TemperatureDifference</b>	RS41 T difference ( $T_{ref} - T$ )
<b>RS41TemperatureDiffLimit</b>	RS41 T in-built check temperature difference limit
<b>RS41TuTemperature</b>	RS41 Tu temperature
<b>ReasonForTermination</b>	Reason for termination
<b>ReleaseDate</b>	Balloon release date
<b>ReleaseDateTime</b>	Balloon release date and time
<b>ReleaseTime</b>	Balloon release time
<b>ReservedHeader1</b>	Reserved for possible future use. Displayed as an empty field in the report.
<b>ReservedHeader2</b>	Reserved for possible future use. Displayed as an empty field in the report.
<b>RH</b>	Atmospheric relative humidity
<b>RI</b>	Refractive Index
<b>RIG</b>	Refractive Index Gradient
<b>RPHeightE</b>	Release point geometric height from sea level. In case of a fixed station, release point means the station position.
<b>RPHeightMSL</b>	Release point geopotential height from sea level
<b>RPLat</b>	Release point latitude
<b>RPLon</b>	Release point longitude
<b>SatVapP</b>	Saturation Vapour Pressure
<b>SeaWaterTemperature</b>	Sea water temperature
<b>SignificantLevelFlags</b>	Significant level flags
<b>SoftwareVersion</b>	MW41 software version number
<b>SondeId</b>	Radiosonde serial number
<b>SondeSWVersion</b>	Radiosonde software version
<b>SondeType</b>	Radiosonde type
<b>SoundingId</b>	Sounding ID
<b>SoundingLength</b>	Sounding duration
<b>SoundingStatus</b>	Sounding status
<b>SpecialGroup1</b>	Special group 1
<b>SpecialGroup2</b>	Special group 2
<b>Speed</b>	Wind Speed
<b>SpHum</b>	Specific Humidity
<b>SSpc</b>	Sonic Speed

Parameter	Description
<b>StandardLevelHeights</b>	STD level heights
<b>StationName</b>	Station name
<b>SurfaceHumidity</b>	Surface humidity
<b>SurfacePressure</b>	Surface pressure
<b>SurfaceTemperature</b>	Surface temperature
<b>SurfaceWindDirection</b>	Surface wind direction
<b>SurfaceWindSpeed</b>	Surface wind speed
<b>SystemTrademarkAndModel</b>	System trademark and model. For example, MW41 2.4.0.
<b>TailWind</b>	Tail wind vector to a given direction of fire
<b>Temp</b>	Atmospheric temperature
<b>TerminatingAltitude</b>	Terminating geopotential height from sea level
<b>TimeUTC</b>	UTC time
<b>TrackedSatelliteAverageCount</b>	Average count of tracked satellites
<b>VapP</b>	Vapour pressure
<b>VirT</b>	Virtual temperature
<b>WmoCloudGroup</b>	WMO cloud group

For an ozone sounding, the following report parameters are also available:

Table 9 Report parameters for an ozone sounding

Parameter	Description
<b>O3</b>	Ozone
<b>BoxTemperature</b>	Sensor box temperature
<b>O3 Current</b>	Ozone current
<b>IntegratedOzone</b>	Integrated ozone
<b>ResidualOzone</b>	Residual ozone
<b>O3Voltage</b>	Ozone voltage
<b>O3Aux</b>	Additional ozone
<b>O3PumpCurrent</b>	Ozone pump current



Special sensor sounding is a licensed option and requires the Advanced option.

#### 14.6.4 Report preview



Report templates are only available with the Advanced option.

While you are editing or creating a report, a preview of the report is displayed with the section you are creating highlighted. The preview does not show actual data.

Report.txt

Radiosonde							
Sonde type		RS41					
Software version		////					
<b>Surface level values</b>							
Surface pressure		000.0 hPa					
Surface temperature		00.0 °C					
HeightMSL m	RH %	Dewp °C	MixR g/kg	VirT °C	Temp °C	PM hPa	PEPT °C
00	00.0	00.0	00.00	00.0	00.0	0000.0	00.0
00	00.0	00.0	00.00	00.0	00.0	0000.0	00.0
00	00.0	00.0	00.00	00.0	00.0	0000.0	00.0
00	00.0	00.0	00.00	00.0	00.0	0000.0	00.0
~10	00.0	00.00	00.0	00.0	00.0	0000.0	00.0
	~10	00.00	00.0	00.0	00.0	0000.0	00.0
		00.00	00.0	00.0	00.0	0000.0	00.0
		~10	00.00	00.0	00.0	0000.0	00.0
			00.00	00.0	00.0	0000.0	00.0
			~10	00.00	00.0	0000.0	00.0
				00.00	00.0	0000.0	00.0
				~10	00.00	0000.0	00.0
					00.00	0000.0	00.0

**Preview**

After you have defined the first header section for the report, the **Preview** button is activated and you can check the content and format of the report you are creating or editing:

Report preview									
new section									
1010.0	0.0	0 00	26.9	5	-15.9	0 0.0		0	0
1009.0	3.5	0 01	26.8	5	-15.9	0 0.0		1	4
1008.0	7.0	0 02	26.8	5	-15.9	0 0.0		2	7
1007.0	10.5	0 03	26.8	5	-15.9	0 0.0		3	11
1006.0	14.0	0 04	26.8	5	-15.9	0 0.0		4	14
1005.0	17.5	0 05	26.8	5	-16.0	0 0.0		5	18
1004.0	21.0	0 06	26.8	5	-16.0	0 0.0		6	21
1003.0	24.5	0 07	26.8	5	-16.0	0 0.0		7	25
1002.0	28.0	0 08	26.8	5	-16.0	0 0.0		8	28
1001.0	31.5	0 09	26.8	5	-16.0	0 0.0		9	32
1000.0	35.0	0 10	26.7	5	-16.0	0 0.0		10	35
999.0	38.5	0 11	26.7	5	-16.0	0 0.0		11	39
998.0	42.0	0 12	26.7	5	-16.0	0 0.0		12	42
997.0	45.5	0 13	26.7	5	-16.0	0 0.0		13	46
996.0	49.0	0 14	26.7	5	-16.0	0 0.0		14	49
995.0	52.5	0 15	26.7	5	-16.0	0 0.0		15	53
994.0	56.0	0 16	26.7	5	-16.0	0 0.0		16	56
993.0	59.5	0 17	26.7	5	-16.0	0 0.0		17	60
992.0	63.0	0 18	26.7	5	-16.0	0 0.0		18	63
991.0	66.5	0 19	26.7	5	-16.1	0 0.0		19	67
990.0	70.0	0 20	26.6	5	-16.1	0 0.0		20	70
989.0	73.5	0 21	26.6	5	-16.1	0 0.0		21	74
988.0	77.0	0 22	26.6	5	-16.1	0 0.0		22	77
987.0	80.5	0 23	26.6	5	-16.1	0 0.0		23	81
986.0	84.0	0 24	26.6	5	-16.1	0 0.0		24	84
985.0	87.5	0 25	26.6	5	-16.1	0 0.0		25	88
984.0	91.0	0 26	26.6	5	-16.1	0 0.0		26	91
---	---	---	---	5	---	0 0.0		--	--



#### 14.6.5 Exporting and importing report templates



Report templates are only available with the Advanced option.



To import a report template, you must have a security certificate installed. See *Vaisala DigiCORA Sounding System MW41 Getting Started Guide* for detailed instructions on how to install the security certificate.

- ▶ 1. You can export several reports, or only one report.
  - To export a report, select the check boxes of the report templates you wish to export, and then click **Export**.
  - To export all reports, click **Select all**, and then click **Export**.

If you export only one report template, it is exported as an .xml file. If you export several report templates, they are exported in a .zip file.

2. To import a report, click **Import** and browse to the correct location.

The screenshot shows a software interface titled 'Templates'. At the top right is a 'Delete' button with a small upward arrow icon. Below the title is a table with a single column labeled 'Name'. The table contains four rows, each with a small blue square icon and a report name: 'AED', 'Formout', 'METPAR', and 'SoundingQualityReport'. At the bottom left is a 'Select all' link. Below the table are four buttons: 'Edit', 'Export', 'Import' (which is highlighted in blue), and 'Create new'.

The report template is imported as an *.xml* file and added to the list of reports.

#### 14.6.6 Uploading and activating scripts



Scripts are only available with the Advanced option.



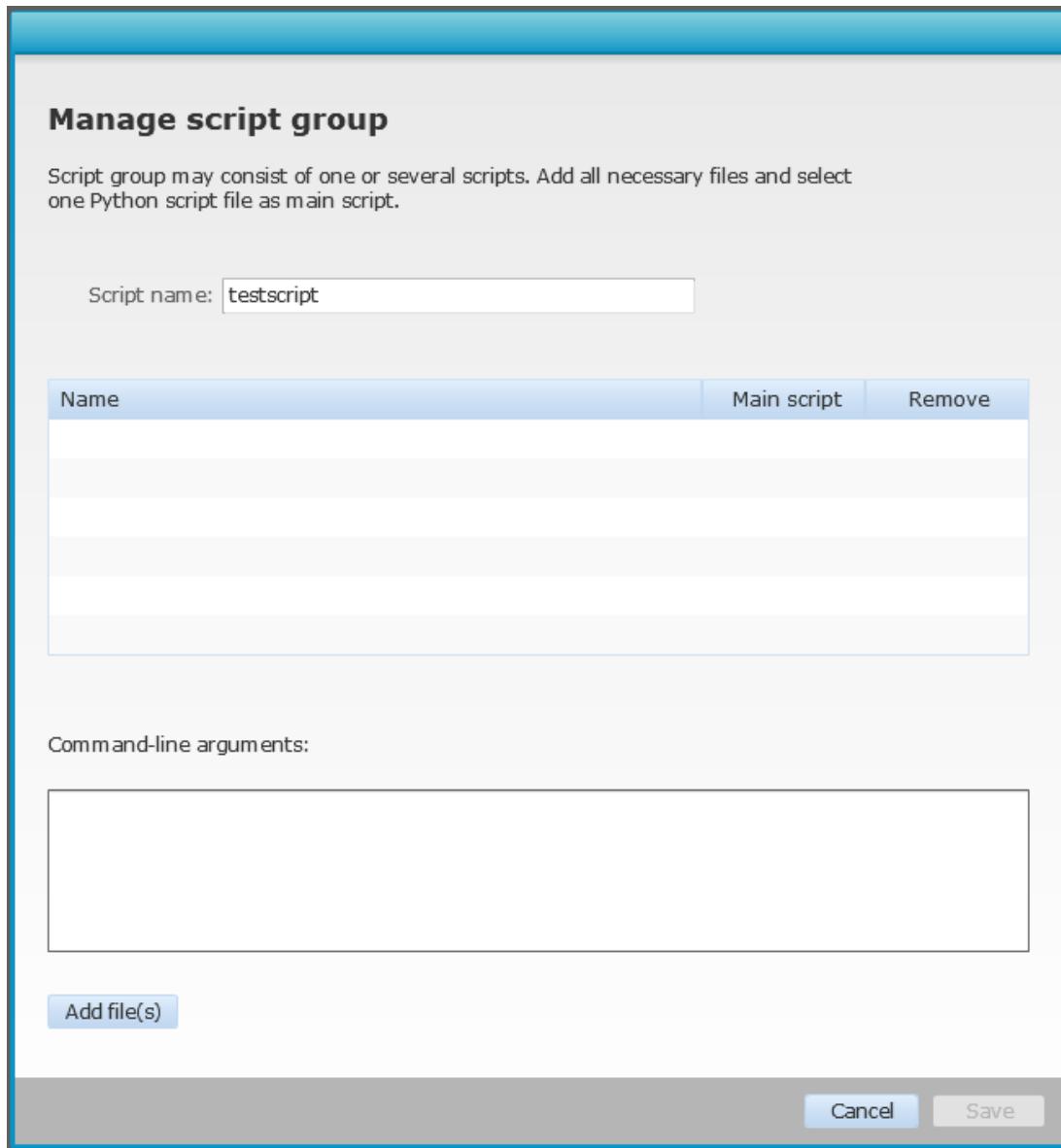
To upload and activate a script you must have a security certificate installed. See *Vaisala DigiCORA Sounding System MW41 Getting Started Guide* for detailed instructions on installing the security certificate.

You can upload scripts from, for example, a remote computer.

For more information on scripts, see folder *Script Library* and the script interface documentation available on the installation media.

- 1. Select **Administration > Report Templates and Scripts > Scripts**.

2. To upload a script, click **Add**.  
A window for managing a script group appears.



3. Type a name for the script and click **Add file(s)** to add a .py file from your chosen location.  
The new file appears in the window. You can add several files to form, for example, a script group for a certain purpose.
4. To activate the script you have created, select one of the script files as the main script.

Name	Main script	Remove
CalcOzone.py	●	✗
OIF411.py	●	✗

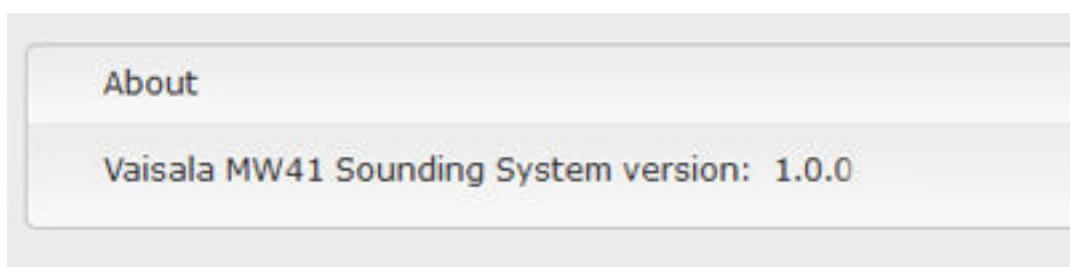
5. In **Command-line arguments**, you can enter information on, for example, in which folder the script output will appear.
6. To remove a single script, click the delete icon under heading **Remove**. This only removes a single script, not the whole script file group.
7. When you have added all the files you need, click **Save**.

The new script will appear in the **Scripts** window. You can edit the script by double-clicking it, or delete the entire script by clicking **Delete**.

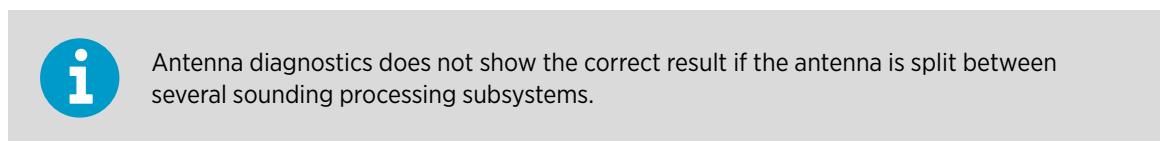
## 14.7 Checking system status

### 14.7.1 Diagnostics

In the **Diagnostics** tab, the **About** field shows information on the sounding software and the licenses available.

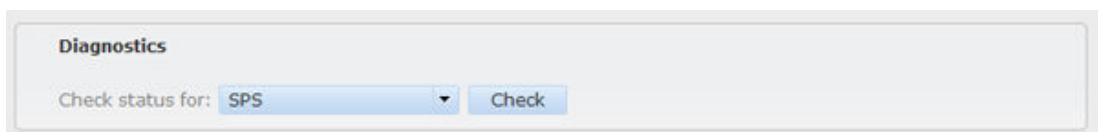


Here you can also check the connection or status of a device connected to the sounding system.

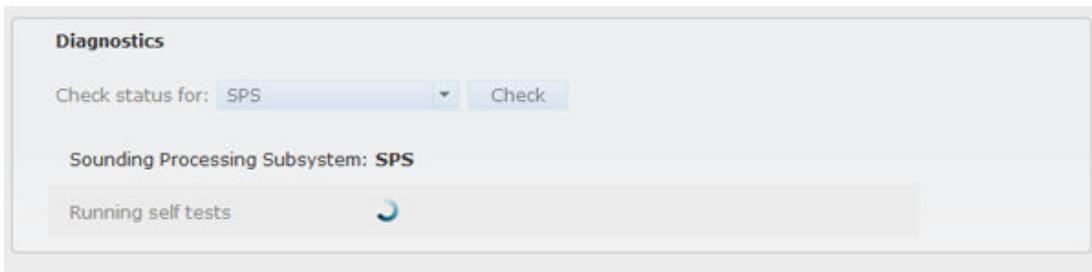


### 14.7.2 Checking device status

- 1. In the **Diagnostics** tab, select whether you want to see the status of a device or all devices connected to the system, and then click **Check**.



2. Wait while the system performs a self test.



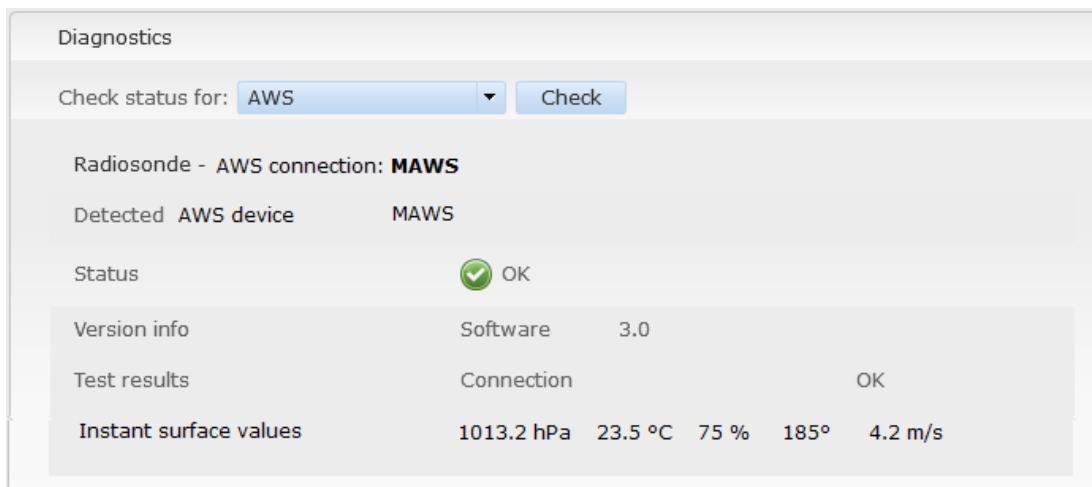
After the self test, the system gives information on the test results. If the connection is missing or there are errors, the error cause is stated.

Diagnostics		
Check status for: SPS		
Sounding Processing Subsystem: SPS		
Status	Error	
SPS IP address	192.168.0.10:42900	
User IP address		
Test results		
	SpsConnection	OK
	MRP voltage	OK
	MRP DDC	OK
	MRP DDAC	OK
	MRP I/O line	Not executed
	MRR voltage	OK
	MRR antenna	Error
	MRR synthesizer	OK
	MRR ADC	OK
	MRR noise	OK

### 14.7.3 Checking AWS surface data

You can check the instant AWS surface values to make sure that all sensors are functioning properly.

- 1. In the **Diagnostics** tab, select **AWS** from the drop-down list, and then click **Check**.  
The instant surface values are displayed.



## 14.8 Viewing and editing advanced configuration data

The **Advanced** configuration option is only available for administrators.

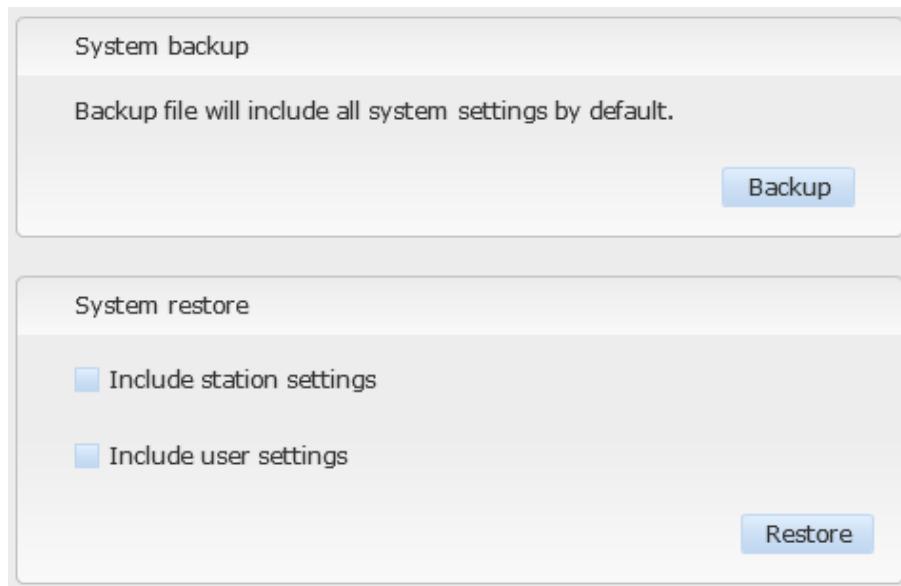
For more detailed information on the settings available in the **Advanced** configuration, see *Vaisala DigiCORA Sounding System MW41 Technical Reference*, included on the installation media.

- 1. To view the system settings, click the + sign to open the folder that contains the setting you wish to view.  
2. To edit the setting, click **Edit** and **Save**. To restore the default values set at the factory, click **Restore default value**.



# 15. System backup and restore

In the **System Backup and Restore** tab, you can back up your sounding system, or restore it. System backup and restore are only available for administrators.



## 15.1 Backing up the system

- ▶ 1. In the **System Backup and Restore** tab, click **Backup**.  
The backup file is saved as an *.xml* file.

## 15.2 Restoring the system

- ▶ 1. In the **System Backup and Restore** tab, select whether you want to restore station settings.
  - If you select the **Include station settings** check box, all current parameters and system settings will be restored.
  - If you do not select the **Include station settings** check box, it is possible to copy the system settings from another sounding station. In this case, the following settings are not updated from the settings file:
    - Station name, type and location
    - SPS address
    - Devices using COM ports
- 2. Select whether you want to restore user settings.
  - If you select the **Include user settings** checkbox, users and passwords are restored.

3. Click **Restore**.

When the restore process is finished, the **Radiosonde Selection** tab opens.



After performing the system restore, check carefully that all parameters you have set have been restored.

# 16. Troubleshooting

## 16.1 Troubleshooting MW41

Table 10 Software-related problems

Problem	Solution
You get an error message that the system cannot connect to backend.	The error message occurs when the computer name has been changed. To fix the error, uninstall and reinstall the MW41 software. The MW41 configuration and license will remain the same, but you must reinstall the HTTPS certificate, otherwise a warning will occur.

Table 11 Sounding processing subsystem-related problems

Problem	Solution
Connection to the SPS does not work properly.	<ol style="list-style-type: none"><li>1. Check that the IP connection from the sounding PC to the SPS works. Firewall can prevent the connection.</li><li>2. The sounding system uses ports 42990 and 42900 for communication between the SPS and the PC. Check that those are not blocked by firewall.</li></ol>

# Warranty

For standard warranty terms and conditions, see [www.vaisala.com/warranty](http://www.vaisala.com/warranty).

Please observe that any such warranty may not be valid in case of damage due to normal wear and tear, exceptional operating conditions, negligent handling or installation, or unauthorized modifications. Please see the applicable supply contract or Conditions of Sale for details of the warranty for each product.

# Technical support



Contact Vaisala technical support at [helpdesk@vaisala.com](mailto:helpdesk@vaisala.com). Provide at least the following supporting information as applicable:

- Product name, model, and serial number
- Software/Firmware version
- Name and location of the installation site
- Name and contact information of a technical person who can provide further information on the problem

For more information, see [www.vaisala.com/support](http://www.vaisala.com/support).

# Recycling



Recycle all applicable material.



Follow the statutory regulations for disposing of the product and packaging.





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[www.vaisala.com](http://www.vaisala.com)

