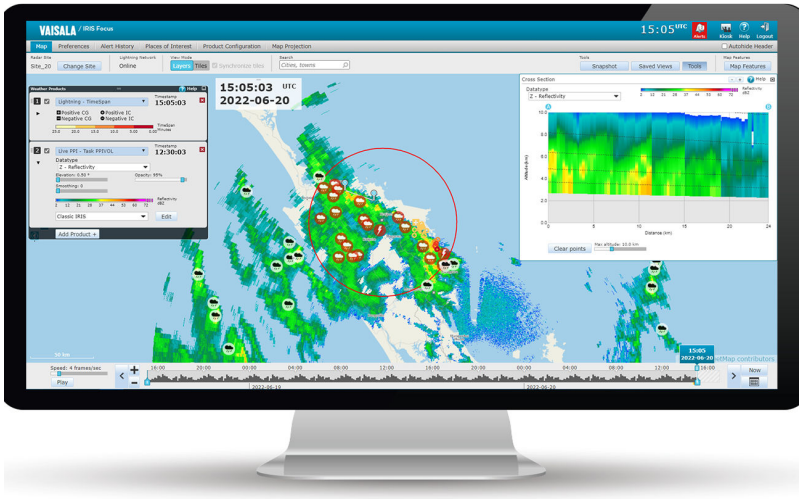
M212544EN-B

RESTRICTED

User Guide

IRIS Focus Lightning

Version 7.0



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1. About this document

1.1 Version information

This document provides information for using IRIS Focus Lightning software.

Table 1 Document versions (English)

Document code	Date	Description
M212544EN-B	June 2022	For IRIS Focus 7.0
M212544EN-A	November 2020	First version of this document. For IRIS Focus 6.0.

1.2 Related documents

Table 2 Related documents

Document code	Name
M211850EN	*IRIS Focus Administrator Guide*
M211849EN	*IRIS Focus User Guide*
M212545EN	*IRIS Focus Lightning Administrator Guide*
M212544EN	*IRIS Focus Lightning User Guide*
M211904EN	*IRIS Focus Release Notes*
M211315EN	*IRIS and RDA Software Installation Guide*

1.3 Trademarks

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1.4 Documentation conventions

WARNING! Warning alerts you to a serious hazard. If you do not read and follow instructions carefully at this point, there is a risk of injury or even death.

CAUTION! Caution warns you of a potential hazard. If you do not read and follow instructions carefully at this point, the product could be damaged or important data could be lost.

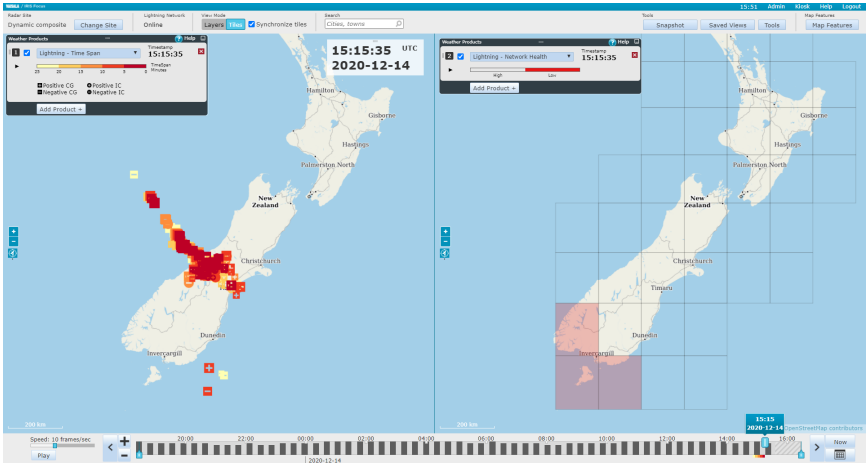
Note highlights important information on using the product.

Tip gives information for using the product more efficiently.

Lists tools needed to perform the task.

Indicates that you need to take some notes during the task.

2. IRIS Focus overview



1) Lightning data: courtesy of Transpower New Zealand Ltd.

Figure 1 IRIS Focus main view

IRIS Focus provides user-friendly, browser-based tools for viewing and analyzing lightning data received from a sensor network.

Lightning data is overlaid on a customizable geographical map. The data is visualized through products such as the **TimeSpan**, which provides information about recent lightning events.

With the zoomable animation timeline, you can easily visualize and animate recent data.

IRIS Focus can also be used to visualize weather radar data from a weather radar network. The application was initially designed for handling weather data, but it is suitable for visualizing any remotely sensored map-based data.

2.1 Lightning product generation

The data for lightning products in IRIS Focus originates from a Vaisala Lightning Detection System which uses multiple, remote sensors to detect signals emitted by lightning discharges, while filtering out the signals from non-lightning sources. Each sensor sends its data to the central processor (the **Total Lightning Processor**, TLP) where lightning locations are determined.

To ensure that the sensor data set applies to the same lightning event, the TLP compares the time at which the event was recorded by each sensor, and then calculates the precise location of the lightning event. The TLP also records several other descriptive characteristics of each lightning event.

The data from the TLP is delivered to IRIS Focus. The data is ingested to the system in real time, after which it can be requested across specific time frames by lightning products.

A single TLP can consume and merge data sets from multiple other TLP systems to produce a superset of data. For example, if organizations from three neighboring countries share TLP data, they can have a superset of lightning solutions from all three countries on each of the TLP systems. From there, they can create subsets of data feeds by lightning characteristics or geographic regions. Each of these subsets can then be fed to a specific Kafka topic on a specific Kafka cluster. Each of these topics can feed several IRIS Focus systems.

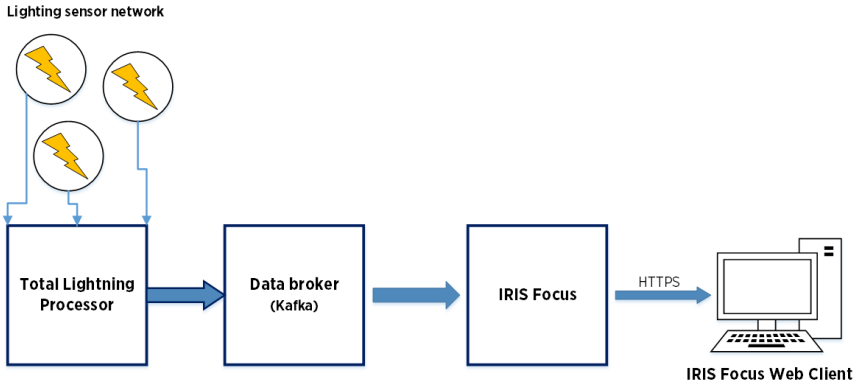
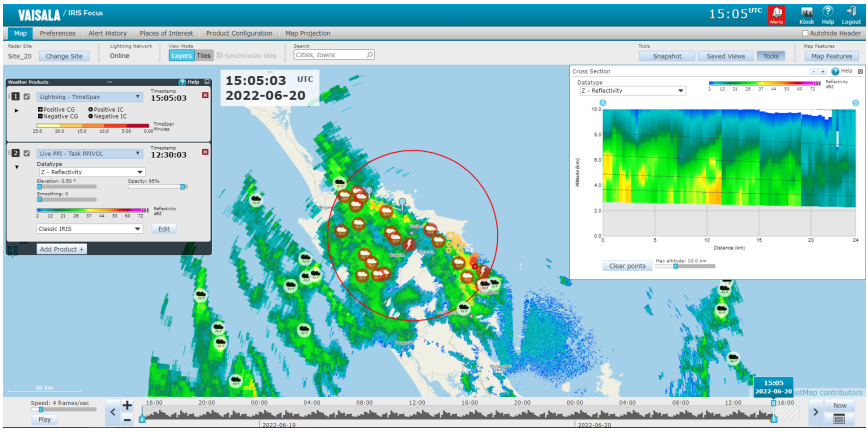


Figure 2 IRIS Focus lightning architecture

2.2 Weather radar data visualization



1) *Weather radar data: courtesy of Meteorological Service of New Zealand Ltd. Lightning data: courtesy of Transpower New Zealand Ltd.*

Figure 3 IRIS Focus main view with weather products

IRIS Focus can also be used to visualize weather radar data. The data comes from a single radar or a network of radar sites. With the zoomable animation timeline, you can easily visualize and animate recent or nowcasted data.

Nowcasting performs advection calculations on motion data from radar products to predict weather movement and severity up to 2 hours in the future.

Significant weather events such as hail, wind shear, or heavy rain are automatically detected when they enter a pre-defined area of interest.

2.3 IRIS Focus licensing

IRIS Focus requires a software license to run. To activate the license, you need a product key.

Vaisala delivers the product key when you purchase the software. If you have purchased the software and you have not received the product key, please contact Vaisala.

For server deliveries, Vaisala activates the product key in the factory, and a Vaisala representative sends you the key for future reference.

The license is mapped to the hardware of your IRIS Focus server or the ID of your virtual environment. If your hardware configuration changes and you need to re-install IRIS Focus, you must request a replacement license from your Vaisala representative.

An exception to this is the USB license key. If you have a USB license key, IRIS Focus runs when the USB license key is inserted in the server. If you install IRIS Focus on another server, you can move the USB license key to that server.

License options

IRIS Focus has a basic license called *IRIS Focus Light*. This license enables users to view certain weather data on the map, but gives limited interaction with the tools. The full license is called *IRIS Focus*. This license provides access to the interactive features of IRIS Focus. The *IRIS Focus* license includes all the features of *IRIS Focus Light*.

There are separate licenses for weather radar data visualization and for lightning data visualization, but users can have access to both licenses. Access to licenses is defined in the user profile.

IRIS Focus Light

IRIS Focus Light licenses have an unlimited number of seats. If there are no *IRIS Focus* license seats available, the user will be logged in with an *IRIS Focus Light* license. If the license is missing, users cannot log in. This could happen, for example, if the USB license key has been removed or if this is a new installation, not from the factory, that requires an e-mail be sent to Vaisala to retrieve the license. Administrators can log in even when the license is missing, but they have no access to the map view.

With an *IRIS Focus Light* license, the user sees the *IRIS Focus Light* map view. The following features are available:

- View the TimeSpan product
- View the animation timeline
- Edit color scales
- Select map features
- Change user preferences

There are two variants of the *IRIS Focus Light* license:

- ***IRIS_Focus_Light_LGT***
  This license is for viewing lighting data.
- ***IRIS_Focus_Light_WR***
  This license is for viewing weather radar data.

IRIS Focus

IRIS Focus licenses are based on a floating seat pool.

There are two variants of the *IRIS Focus* license:

- ***IRIS_Focus_Lightning***
  This license enables users to view the full-scale visualizations of lightning network sensor data, and to use all the related interactive tools.
- ***IRIS_Focus_Weather_Radar***
  This license enables users to view the full-scale visualizations of weather radar data, and to use all the related interactive tools.

Advanced feature licenses

If the license for WMS is provided, then this feature is enabled and becomes available for all users with an IRIS Focus seat.

In addition to the *IRIS Focus Light* and *IRIS Focus* licenses, the following advanced feature licenses are available. The seat pool does not apply to these licenses; if the advanced feature license is present in the system, users can access these features when they have an IRIS Focus seat.

- ***IRIS_WMS***
  With the *IRIS_WMS* license, external WMS layers can be added to the system. Users can then access the layers through the weather product panel.
- ***IRIS_NetworkHealth_LTG***
  With the *IRIS_NetworkHealth_LTG* license you can get the network performance information from the **Total Lightning Processor**, and display the information as **NetworkHealth** product in the product panel. Using this feature also requires the *IRIS_Focus_Lightning* license.
- ***IRIS_Nowcast***
  With the *IRIS_Nowcast* license you get access to the nowcast algorithm for creating forecasts based on weather radar data up to 2 hours into the future. Using this feature also requires the *IRIS_Focus_Weather_Radar* license.

Seat-based license pool

IRIS Focus licenses are available in different configurations. To increase your seat count, you must replace the current license with a new one by contacting your Vaisala representative.

The seat count defines how many users can access IRIS Focus at the same time. For example, if there are 10 users with IRIS Focus privileges configured to the system, and there are only 5 IRIS Focus seats, then the first 5 users to access the system will be given *IRIS Focus* rights, whereas the remaining 5 users will enter the system with *IRIS Focus Light* credential.

Seat counts within a workstation are browser-based. For one license reservation, users may view IRIS Focus in as many instances or tabs of one browser, such as Firefox®, as they like. If a user opens IRIS Focus in a different browser, such as Google Chrome™, they reserve one license for each browser.

More information

- User roles (page 14)

3. Using IRIS Focus

3.1 User roles

A user's access to IRIS Focus features depends on the roles assigned to the user. For example, the administration features are available to user accounts with the **administrator** role. A user may have several user roles, and when they log in, they have the features of all their roles available.

User roles can be divided into two categories:

- **Focus** roles are needed for full-scale remote sensing data visualization. Logging in with a **Focus** role reserves a seat from the seat pool.
- System roles are needed for system purposes. They do not reserve seats from the pool, and they do not offer the full-scale features. For full-scale features, the user also needs a **Focus** role.

Focus roles

Focus roles reserve a **Focus** seat from the seat pool when logging in.

Table 3 Focus roles

Focus Lightning	Can access the full IRIS Focus feature set for visualizing lighting data, such as: • Configuring product generation • Using data analysis tools, like Tracking tool • Creating personal areas of interest and monitoring these areas for weather events defined by **poweruser**

IRIS Focus Light

A user without a **focus** role enters the *IRIS Focus Light* view when logging in.

IRIS Focus Light view consists of a predefined map view with limited features. The following features are available:

- View the TimeSpan product
- View the animation timeline
- Edit color scales
- Select map features
- Change user preferences

IRIS Focus Light view has an unlimited number of seats. If there are no *IRIS Focus* license seats available, the user will be logged in with an *IRIS Focus Light* license. If the licence is missing, users cannot log in. This could happen, for example, if the USB license key has been removed or if this is a new installation, not from the factory, that requires an e-mail be sent to Vaisala to retrieve the license.

Seat allocation and restrictions

A user with a **Focus Lightning** role reserves one of the *IRIS_Focus_Lightning* seats associated with the license.

When the user logs out, the seat is released.

If a user with one of the **Focus** roles (**Focus Lightning**) logs in and there are no seats available, the user is directed to the IRIS Focus Light view.

When an *IRIS Focus* license is available, the user is provided with an opportunity to switch to the full-scale IRIS Focus view.

System roles

System roles are needed for various system management tasks and functionalities. System roles do not reserve a Focus seat from the seat pool.

When logging in, a user that has one or more of these roles, but no **Focus** role, enters the *IRIS Focus Light* view.

Table 4 System roles

Role	Description
administrator	Can access all administration features, such as: • User and licensing management • Map management and configuration • Alert notification settings (email and SMS) • Dataflow monitoring All administration features are described in *IRIS Focus Administrator Guide*.
poweruser	Can access **poweruser** features: • Defining weather events • Creating places of interest that are visible to all users in an organization, and set a weather event watch to monitor these areas. • Can select an organization-level map projection.
user	Can access various features of the base software. This role must be assigned as an additional role to every user account with **focus**, **poweruser**, or **kiosk** role.
kiosk	Identical to the **User** role with the exception that an account with the **Kiosk** role will not be automatically logged out after a period of inacivity.

More information

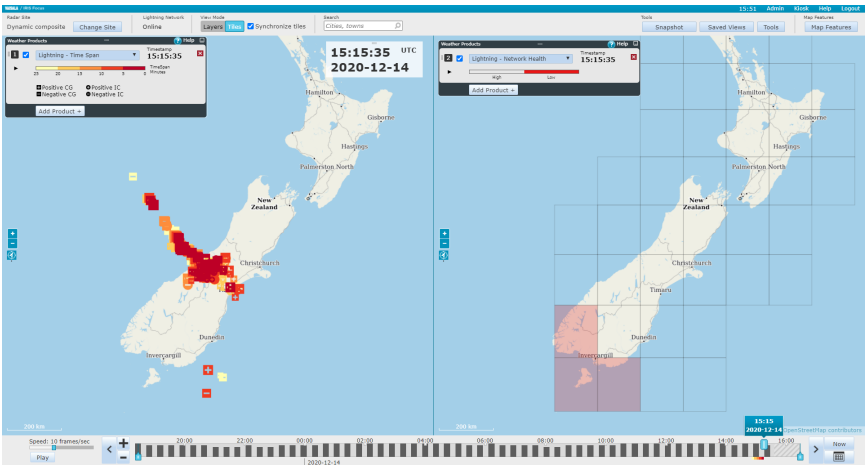
- IRIS Focus licensing (page 11)
- Required user roles (page 37)

3.2 Map view

The IRIS Focus main view is a scrollable map area. By default, it is drawn using azimuthal equidistant projection. Azimuthal equidistant projection has the useful properties that all points on the map are at proportionally correct distances from the center point, and that all points on the map are at the correct azimuth (direction) from the center point.

In the map view, you can select multiple simultaneous products, and display them on separate tiled windows, or on a combined layer overlay view.

The products include products generated by IRIS software, such as the **TimeSpan** product, and optionally WMS layers from external sources.



1) Lightning data: courtesy of Transpower New Zealand Ltd.

Figure 4 IRIS Focus map view

The map engine in IRIS Focus runs on the open source GeoServer map server. The map data is gathered from the collaborative OpenStreetMap project, and the JavaScript user interface is built with the OpenLayers library. To improve performance, map data is cached as bitmap tiles with GeoWebCache.

3.2.1 Map layers

The background map and the weather data visualizations are drawn as individual layers and then combined to form an overview of current weather conditions.

You can also view WMS layers from external sources, such as satellite image layers, as layers on the map.

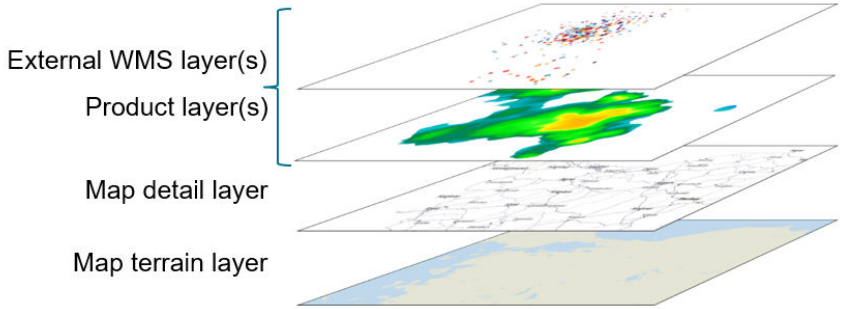


Figure 5 IRIS Focus product layers

Base layers

The background (also known as base) consists of a number of non-interactive layers. At the bottom is a terrain map that can be enhanced with additional layers containing roads, province boundaries, and other similar terrain features.

Lightning product layers

The interactive lightning product layers are drawn on top of the background layers.

External WMS layers

You can add WMS layers from external sources to the map. They are shown as product layers.

More information

- External WMS product layers (page 31)
- GLD360 (page 31)

3.2.2 Editing base layers

To manage map settings, styles, and additional map layers, such as roads, select **Map Features** on the top right corner of the UI.

Available **Base Map** styles include:

- **Standard**
  Basic terrain with oceans, lakes, rivers, landmasses, and islands. All waters are blue, and all land areas gray. Cities and dense settlement areas are brown. This is the default map view.
- **Simplified**
  Same as **Standard**, without cities.
- **Terrain**
  Same as **Standard**, with landforms added so mountain ranges and other terrain features are more visible.

You can also load in your own layers to IRIS Focus.

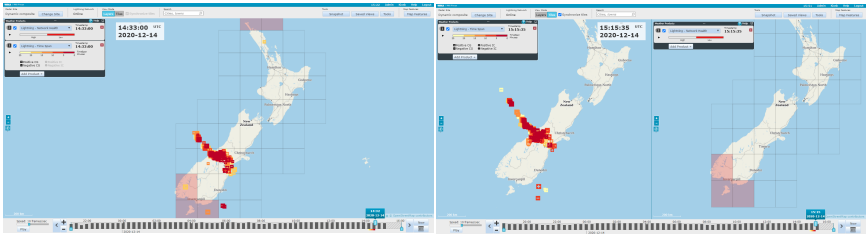
Changing from one map style to another takes some time while the new terrain assets are cached.

Table 5 Map detail settings

Map detail	National borders	Province borders	Airports	Roads	Labels
None					
Minimal	✓				
Aviation	✓		✓		
Roads	✓			✓	
General	✓	✓			✓
Full	✓	✓	✓	✓	✓

3.2.3 Product layers

IRIS Focus supports up to 4 simultaneous lightning product and external WMS layers that can be displayed on top of each other (**Layers** mode) or in separate tiles (**Tiles** mode).



1) Lightning data: courtesy of Transpower New Zealand Ltd.

Figure 6 Layered and Tiled view modes

The **Weather Products** pane lists the active product layers.

Each additional layer requires more processing capacity from the system. To improve performance, avoid showing unnecessary product layers on screen.

Tiles Mode

In **Tiles** mode, the tiles are synchronized by default.

When synchronized, all tiles pan and zoom automatically to the same coordinates when you interact with one of the tiles.

To disable the synchronization, deselect the **Synchronize tiles** check box.

Layers Mode

In **Layers** mode, the layers are drawn on the screen in the same order as they are listed on the **Weather Products** pane. The top layer in the pane is also drawn on top in the map view.

To change the order of the layers, drag them to new positions in the pane. IRIS Focus re-draws the products on the map view using the new layer order.

3.2.4 Product layer settings

The **Weather Products** pane includes settings for product layers.

The contents of the pane depend on the product.

3.2.5 Map units

IRIS Focus supports the following unit sets. To change them, select **Preferences**.

Unit	Metric	Imperial	Aviation
Distance	km	miles	nmi

3.3 Animation timeline

With the zoomable animation timeline, you can easily visualize and animate recent data.

The histogram provides at-a-glance information on the amount and intensity of weather for points in time.

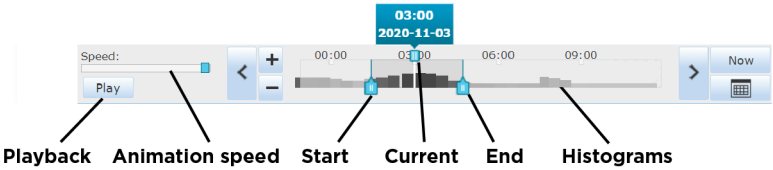


Figure 7 Animation controls

1. On the animation timeline, select the time of the data you want to view:
   a. To find an approximate time, pan the indicator back and forth.
   b. To zoom in and out on the level of detail, scroll the mouse wheel.
   c. To select a time, select the search icon on the right of the time line.
   d. To return to the current time, select **Now**.
2. To start a looping animation of the data, select **Play**.
   a. Move the start and end time indicators along the time line.
   b. Adjust the animation speed with the controls on the left side of the timeline.
   c. To set only a part of the weather history to be animated, drag the start and end points to the desired positions on the timeline. The animation settings update in real time.
   d. By default, the animation stops for 1 second before looping back to the beginning. To change this, select **Preferences**.

3.4 Map tools

3.4.1 Cursor tool

The cursor tool shows information about the latest lightning event when hovering over the icon on the map.

The cursor tool shows the time, location, amplitude, and type of the lightning event. Additionally, the error ellipse is shown, and this represents the location accuracy of the lightning event.

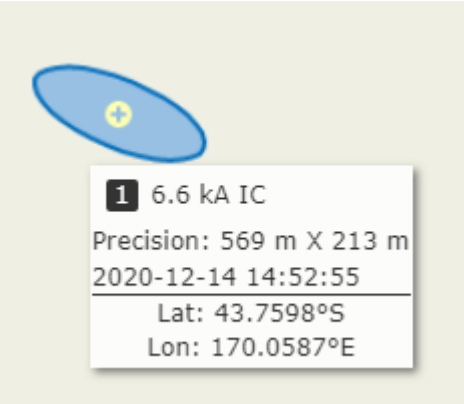


Figure 8 Cursor tool example for TimeSpan

When you select multiple products, the cursor tool lists values for each product in the same order they are displayed on the screen.

The cursor tool works in both layered and tiled modes. In tiled modes, the overlay box displays values for each product at the current position, even if the tiles are not synchronized.

For external WMS layers, the availability of cursor tool data depends on the layer provider. In order for the system to query for the cursor tool data, the **Usable in map cursor tool** checkbox must be selected in the **Map Layer Information** screen of the admin view.

3.4.2 Color scale editor

To access the editor, select **Edit** on a product pane.

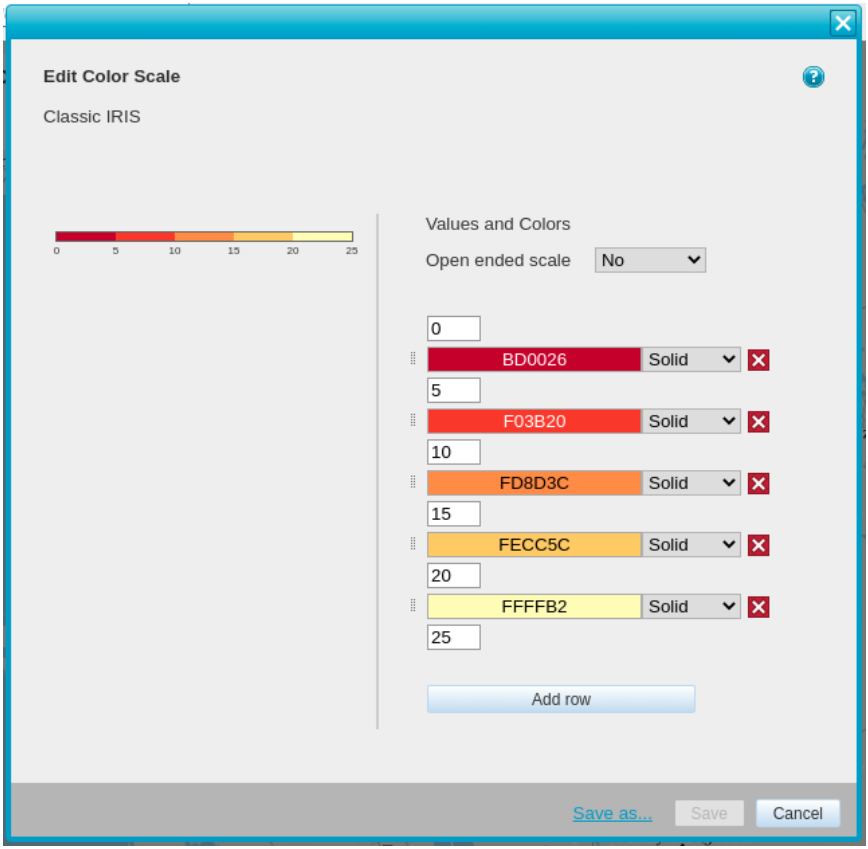


Figure 9 Color scale editor for lightning products

Use the color scale editor to create your own color scales. The editor displays the current color scale gradient and presents a preview on the left. On the right side is a list of the keypoints of the color scale.

3.4.3 Ruler Tool

Use the **Ruler Tool** to measure the distance between points on the map.

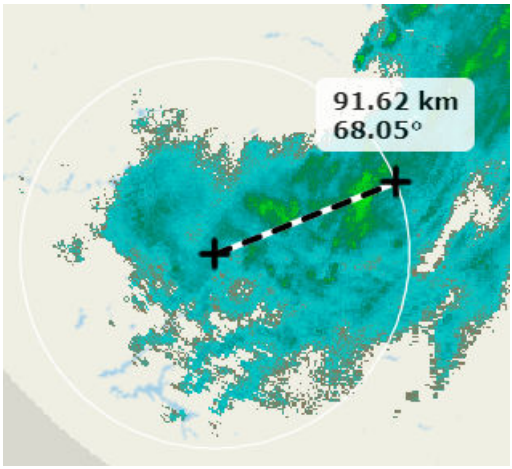


Figure 10 **Ruler Tool** example

1. On top right of the main UI, select **Tools > Ruler Tool**.

> Press **SHIFT**+click to snap to the radar center.

2. On the map view, click the start point, slide the mouse, and click the end point.

   The map shows the distance between the 2 points.
3. When you are finished, on the menu bar, select **Ruler Tool** to disable the tool.

3.4.4 Snapshot tool

You can use the **Snapshot** tool to capture interesting weather events in an image.

1. On the **Map** view, select **Snapshot**.

   A PNG file of the current screen is downloaded to your computer.

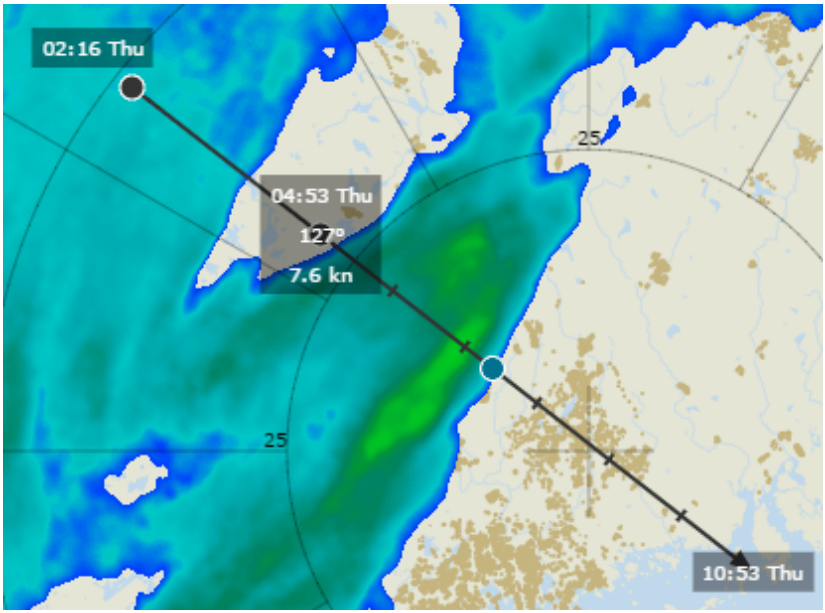
> The Snapshot image that IRIS Focus produces may not look exactly like the image in your browser. This is because the Snapshot image is rendered with the server's browser, which may be slightly different from the browser with which you are viewing IRIS Focus.

3.4.5 Tracking Tool

Use the **Tracking Tool** to track the movement of weather elements in products.

1. On top right of the main UI, select **Tools > Tracking Tool**.
2. On the animation timeline, drag the playback slider to the time where you want start tracking something.
3. On the map view, click the position you intend to track.
4. Drag the playback slider forward and add a second tracking point to where the tracked event appears to have moved.

   The **Tracking Tool** draws a line by continuing with the same path and speed. The first 6 estimated hours are always drawn on the screen. To run the tracking point further, drag the playback slider onwards.
   In the following image, the black circles are tracking points and blue is a future estimate point based on the tracking points. The floating overlay box next to the tracking points shows a timestamp.



5. When you are finished or want to start another tracking event, clear the tracking points by selecting **Tracking Tool > Clear tracking points**.

3.5 User preferences

To view and change user-specific settings, select **Preferences**.

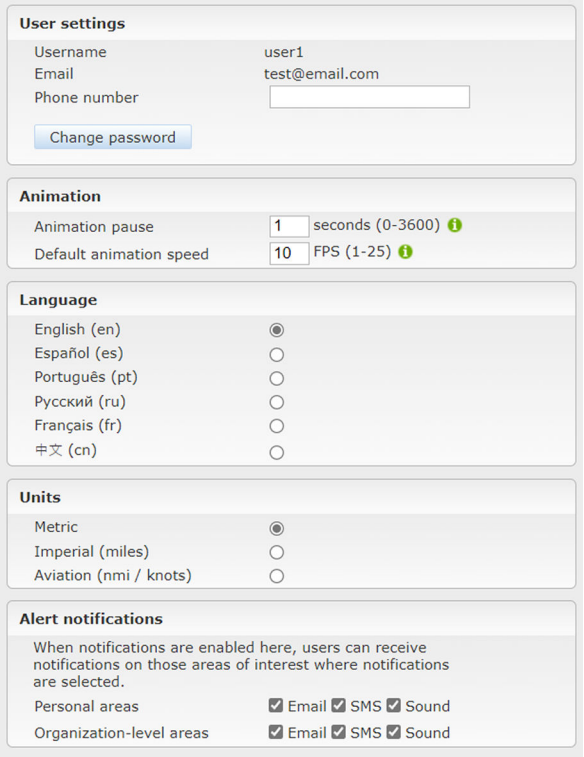


Figure 11 Preferences tab

You can change:

- Your password
- Your phonenumber
- Default animation settings
- Language used in the web interface
- Measurement units used in IRIS Focus
- Alert notification settings

Your email address is set in your user account, created by an administrator.

More information

- Configuring alert notifications (page 45)

3.6 Saved views

Many IRIS Focus users work from the same **Map** views from one session to the next.

You can use **Saved Views** to save your frequently used views so they are available each time you log in to IRIS Focus.

1. In the IRIS Focus **Map** view, set-up the view you want to save.

   For example, you can save the settings for:
   - **Weather Products**
   - Map tools such as the cross-section and tracking tools
   - Zoom level
2. Select **Saved Views > Save**.
3. Name the view and select **Save**.

   The new view is added to the **Saved Views** list for your future use.
4. To update a saved view:
   a. Under **Saved Views**, select the view you want to update.
   b. On the **Map**, update the view settings.

      For example, change the zoom level or the product data type.
   c. Select **Saved Views > Save**.
   d. Save the view with the same name as the view you want to update.
5. To delete a saved view, in the list of saved views, select the **X** next to the view you want to delete.

3.7 Supported browsers

IRIS Focus data is available through a secure network connection, and can be displayed on multiple client workstations across your organization.

IRIS Focus supports current Microsoft Edge®, Mozilla Firefox®, and Google Chrome™ browsers.

4. Products in IRIS Focus

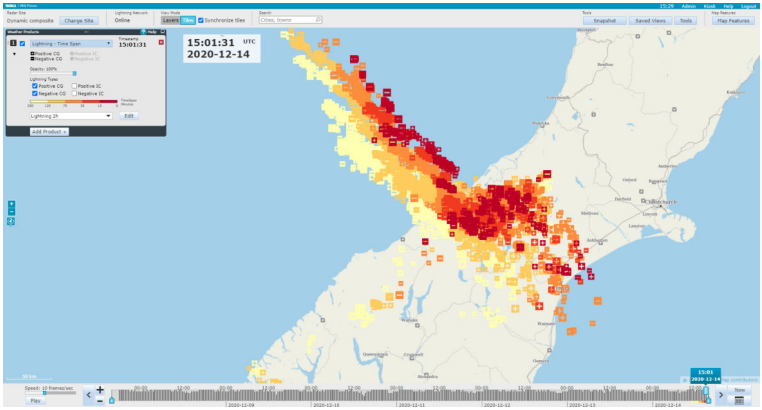
4.1 TimeSpan

The **TimeSpan** product is a data visualization of recent lightning events. It visualizes lightning events as color-coded icons, which change color at user-defined intervals. The size and shape of the lightning icon indicates the type, amplitude, and polarity of the lightning event. You can choose a default or a customized color scheme.

When a new lightning event occurs, it is indicated with an animated circle around the lightning, if you are viewing the current time.

On the timeline, you can view information about lightning events up to 7 days in the past (up to 700k).

The **Total Lightning Processor** can be configured to provide either flashes or strokes to IRIS Focus.



1) Lightning data: courtesy of Transpower New Zealand Ltd.

Figure 12 **TimeSpan** product

More information

- Animation timeline (page 19)
- Color scale editor (page 21)
- Map view (page 16)

4.1.1 TimeSpan product configuration

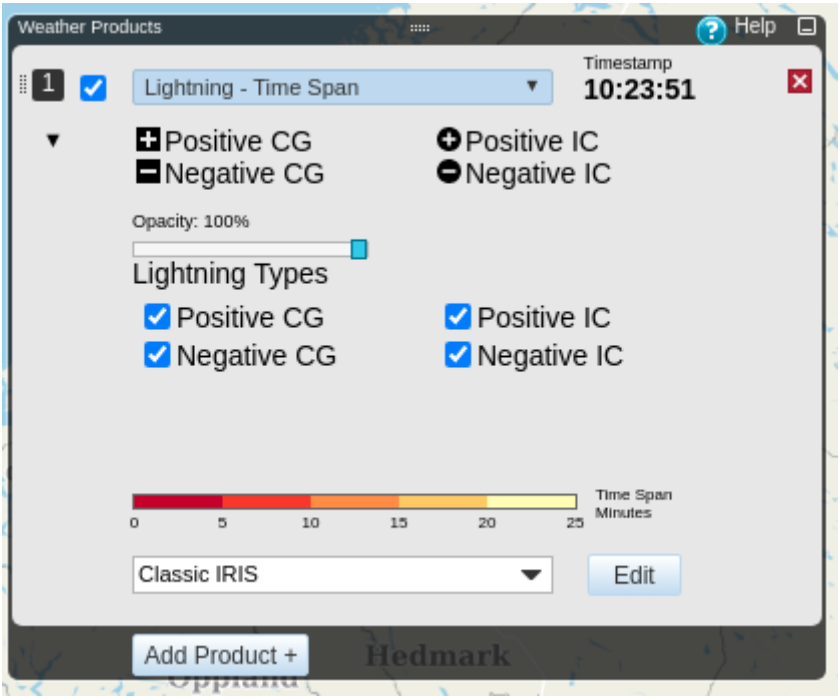


Figure 13 The **TimeSpan** product in the **Weather Products** pane

Choose the product from the **Weather Products** pane.

1. Click **Show details** to show the detailed product settings.
2. Use the **Opacity** slider to adjust the opacity of the TimeSpan layer.

   The opacity can be set in the range of 0 percent (completely transparent) to 100 percent (completely opaque).
3. Choose the lightning types you want to have visualized in **Lightning types**.
4. Choose the color scale from the **Color scale** pulldown bar.

   Click **Edit** to edit the selected color scale.
5. Click **Hide details** to hide the detailed product settings.

4.2 Network Health

4.2.1 Network Health product overview

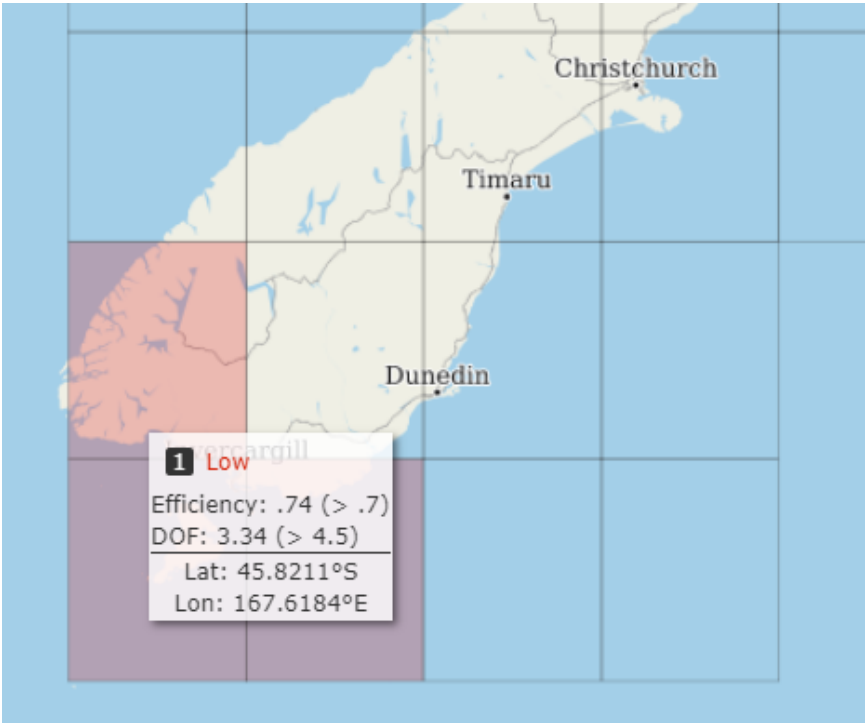
With the **Network Health** product you can visualize the performance of the lightning sensor network. The product uses a color-coded, gridded representation of the performance estimate generated by the **Total Lightning Processor**.

Performance statistics are obtained in two ways:

- If enough lightning is present in a region, performance metrics are obtained from the lightning location data.
- If lightning is not present, sensor status is based on the sensors that can participate in that region.

A full active display IRIS Focus license with an advanced feature IRIS Lightning Network Health license is required to run the **Network Health** product.

The **Network Health** product data is provided by your local **Total Lightning Processor** system. It uses statistical information derived from the lightning data produced by the system, as well as the status and configuration of LF lightning sensors connected to the TLP. **Network Health** is not available for lightning data brought in from external providers such as the **GLD360**.



1) Lightning data: courtesy of Transpower New Zealand Ltd.

Figure 14 **Network Health** visualization

4.2.2 Visualizing Network Health

The lightning **Network Health** product displays a grid of cells and provides a visual indication as to whether the lightning network has a sufficient detection efficiency (DE) and average degrees of freedom (DOF) for lightning occurring in each cell. If the estimated detection efficiency or average degrees of freedom drops below threshold, the cell will be flagged (filled with a color) indicating that it had low DE or low DOF.

Cells that are flagged should be regarded as being less reliable at detecting lightning events. This does not mean that the network is failing to detect lightning events in the region, just that it is more likely that events will be missed.

1. To view **Network Health** on the map, select it on the weather product pane.
2. Hover your cursor over a cell to see a short description of its status.

3. Use the **Opacity** field to adjust the opacity of the colored cells.

   The opacity can be set in the range of 0 percent (completely transparent) to 100 percent (completely opaque).

You can not adjust the colors or thresholds associated with **Network Health**. These values are determined and set by the system administrator in the *vsoweb-override.ini* file based on the number and spacing of lightning sensors in the network. If **Network Health** is always showing down, ask your system administrator to review the threshold settings.

4.3 External WMS product layers

WMS layers from external sources, such as satellite images and radar data from an external radar network, can be added to IRIS Focus and viewed on the map exactly like other radar product layers. Many characteristics of the external product layers, such as the availability of the color legend, depend on the layer providers.

The external WMS layers are images, and only available in certain projections. You can only view those external WMS layers that support the projection you are currently viewing.

For example, if the requested WMS layer is only available in Web Mercator projection, and the radar site is configured in azimuthal equidistant projection, the WMS layer will not be shown.

IRIS Focus supports both WMS and WMS-T layers. WMS-T layers are layers with time parameters included in the request.

For more information on adding WMS layers, see *IRIS Focus Lightning Administrator Guide*.

4.3.1 GLD360

Vaisala Global Lightning Dataset **GLD360** provides real-time lightning data for accurate, early detection and tracking of severe weather. You can view the **GLD360** data in IRIS Focus as an external WMS layer.

The **GLD360** layer is a visualization of weather data provided by a uniform, global network owned and operated by Vaisala. Cloud-to-ground and cloud lightnings are detected instantly, and data is delivered in less than one minute.

You will have access to a 24/7 stream of lightning data from any location you choose. Similarly to the other external WMS layers, the **GLD360** is an image layer which you can combine with other product layers and map layers.

The **GLD360** layer is projected as a Web Mercator projection.

The detection accuracy of the **GLD360** exceeds other long-range systems, including satellite data. It detects about 8 out of 10 cloud-to-ground lightning flashes worldwide and a significant fraction of cloud lightning flashes, with a location accuracy of 2 to 3 km.

To take the **GLD360** layer into use, the IRIS Focus server must be online, and your organization must have an active subscription to **GLD360** data. A system administrator needs to enable the layer.

5. Events and alerts

5.1 Weather events and alerts

IRIS Focus can provide alerts for weather events, such as a severe storm, turbulence, or flood potential, for user-defined areas of interest. You can see the alerts on the map and receive notifications as email and SMS.

In IRIS Focus, a *weather event* means a user-defined set of weather-related criteria. When an event occurs on the map, it is shown as an icon.

A weather event triggers an *alert* when it occurs within an area of interest. Users can receive notifications when alerts are triggered.

An *area of interest* is a user-defined area where the user wants to see alerts for certain weather events.

5.1.1 Alerts workflow

First, a **poweruser** creates weather events by defining relevant meteorological criteria. The list of these weather events will be available to all users when they create areas of interest.

Next, users must create areas of interest, and select which weather events to monitor within each area. The selected weather events will trigger alerts when they occur within the area.

When creating an area of interest, the user can select the severity level of the alerts that are triggered within that area.

More information

- Creating a lightning weather event (page 38)

5.1.2 Alerts on the screen

When a weather event triggers an alert, both the weather event icon and area of interest appear in a different color on the map. You can hover over the area to show more information about the alert.

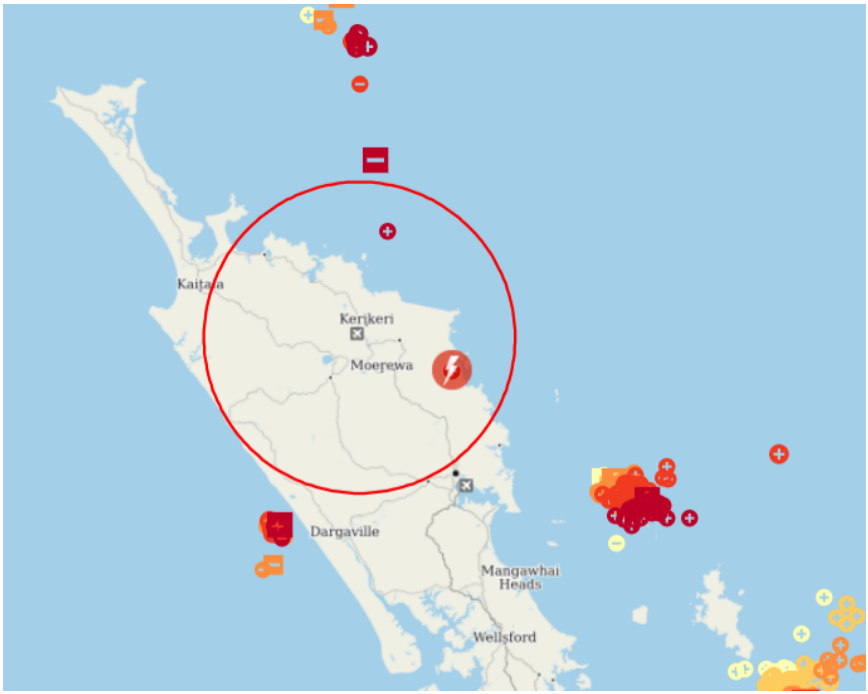


Figure 15 A lightning event triggers an alert on an area of interest

The number of active alerts is shown on the **Alerts** button at the upper right corner of the screen. Click the button to see a list of alerts.

Figure 16 Alerts button showing 10 active alerts

5.1.3 Alert severities

When creating an area of interest, you can select the severity of the alerts triggered on that area.

The options are:

- Information (blue icon): lowest level of alert
- Warning (yellow icon): middle level of alert
- Alarm (red icon): highest level of alert

For example, on a very critical area, you might want to set the most severe alert, alarm. On the other hand, on a less critical area, you might like to set a less severe alert: a warning or just an information alert. For example, if you are monitoring an airport, you could draw three circles of various sizes around it, and assign a different severity to each of them: the highest severity in the middle, closest to the airport, and lower severities on the edges, further away from the airport.

When alerts are triggered, the area changes color.

Following the progress of a weather event

You can use different alert severities to easily follow the progress of a weather event:

Draw areas of interest around an important location on the map. Select different alert severities for these areas: for example, **Alarm** (highest severity) for the area closest to the location, and **Warning** for an area farther away. Now, as a weather event approaches the location, you will first receive the **Warning**, and then the **Alarm**.

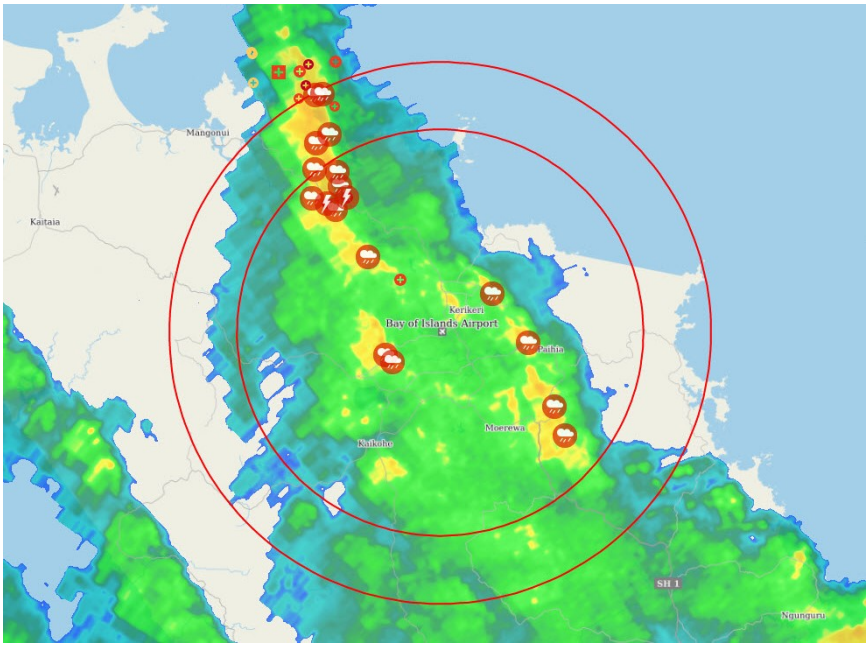


Figure 17 Alerts on areas of interest

5.1.4 Alert notifications

IRIS Focus can send notifications to users when an alert is triggered within an area of interest. All users with a **focus** role can configure notifications for their personal areas of interest. Users with **poweruser** role can configure notifications for organization-level areas of interest.

The types of notifications available are sound, SMS, and email.

For personal areas of interest, only the user who created the area will receive notifications. For organization-level areas of interest, the **poweruser** can configure the system to send notifications to selected people.

The user will receive a notification when the area of interest goes into an active alert state, and the user can specify whether to receive a notification when the area is cleared of alerts.

To make sure users hear the sound notifications right away when alerts are triggered, enable the web browser to play sounds by default.

Notification settings for areas of interest

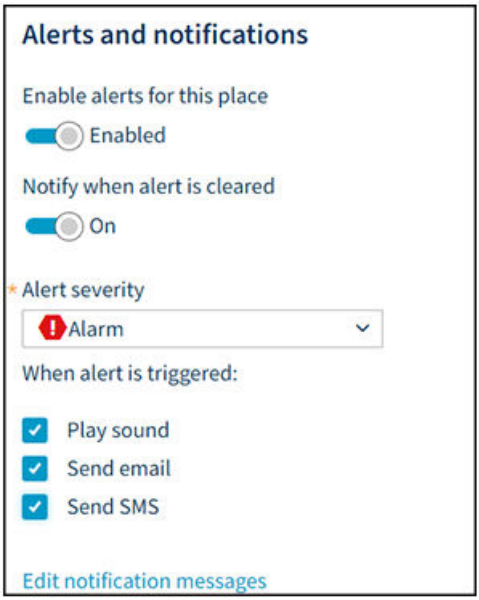


Figure 18 Notification settings in the Area of interest tab

Personal preferences for notifications

You can use the settings in the **Preferences** tab to define whether you will receive alert notifications. For example, you might like to turn the notifications off when you go on a vacation.

If you are on a distribution list to receive notifications from organization-level areas of interest, you will receive those notifications even if you have disabled notifications in **Preferences**. This setting only applies to notifications that have your individual email address or phone number as a recipient (such as `firstname.lastname@organization.com`), not to notifications that have a distribution list as a recipient (such as `all-meteorologists@organization.com`).

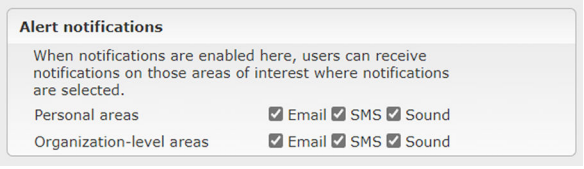


Figure 19 Notification settings in the **Preferences** tab

5.1.5 Weather event generation

When a weather event is linked to one or more areas of interest, IRIS Focus monitors the lightning data to look for conditions where all the criteria of the weather event are met. When IRIS Focus finds a match, it produces a weather event and shows it on the map.

If a weather event is not linked to any area of interest, IRIS Focus does not run comparison checks for that event, and this, does not display the event icon on the map.

For events that only have lightning-related criteria (and no weather radar related criteria), the alert expiration time is configurable. If new events of the same type arrive in the same area of interest within that time, IRIS Focus keeps the alert active. Once there have been no new events for the configured time, the alert is cleared.

5.1.6 Required user roles

The table shows the required user roles (`user/kiosk`, `focus`, or `poweruser`) for working with weather events, alerts, and areas of interest.

To see alerts on the map and the alert history, you need to have a **focus** role. For receiving notifications as email or SMS, there are no limitations.

Table 6 Required user roles

Action	user/kiosk	focus	poweruser
Create weather events	--	--	✔
Create, edit, or delete organization-level areas of interest and pins	--	--	✔

Action	user/kiosk	focus	poweruser
Link weather events to organization-level areas of interest	--	--	✓
View organization-level areas of interest and pins	✓	✓	✓
View alerts on map for organization-level areas of interest	--	✓	✓
Create, edit, or delete personal areas of interest and pins	--	✓	--
Link weather events to personal areas of interest to see alerts	--	✓	--
Add recipients for alert notifications for organization-level areas of interest	--	--	✓
Receive alert notifications for organization-level areas of interest	✓	✓	✓
Receive alert notifications for their own personal areas of interest	--	✓	--

If you have the **poweruser** role, all the areas of interest that you create become organization-level areas.

More information

- User roles (page 14)

5.2 Creating a lightning weather event

Create lightning-related weather events that you want to see alerts for.

You must be assigned a **poweruser** role to define events.

To be effective, the event criteria must be based on the local climatology and experience.
Vaisala can work with you to develop such a climatology or to better understand the capabilities and limitations of the criteria.
Vaisala makes no warranty, either express or implied, that the alerts can detect all hazardous weather situations. In no event can Vaisala be held liable for damages of any kind for failure of the system to issue a warning, or for false alarms that may be issued by the system.

1. Log in to IRIS Focus as **poweruser**.
2. Select **Places of interest > Events**.
3. In the **Events** tab, select **Create event**.
4. Give the event a descriptive name, and a code.

   The code is typically used in the context of aviation.
5. In the **Product** field, select **Lightning**.

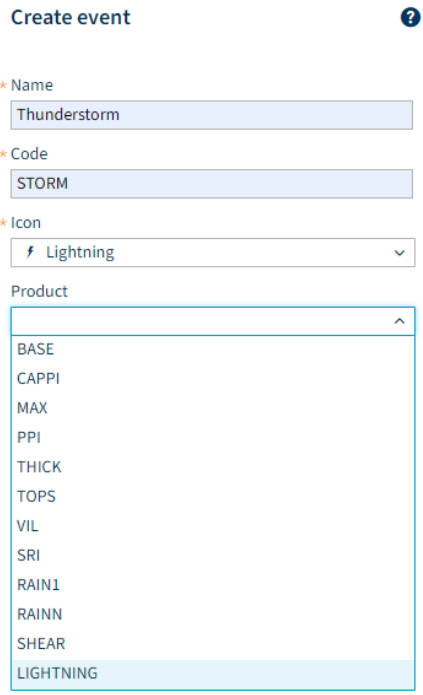
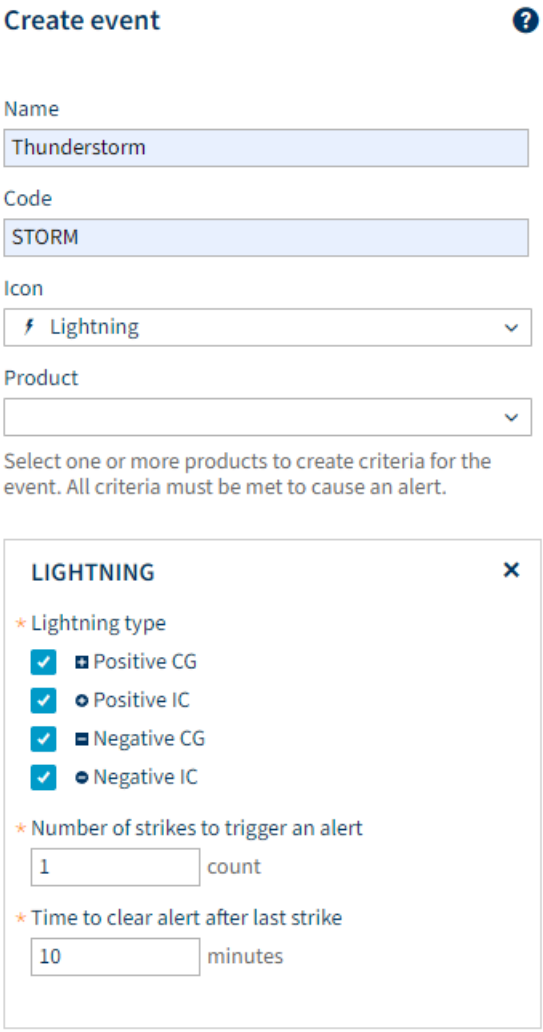


Figure 20 Defining a weather event

6. Select the lightning types.
   - **CG** = Cloud-to-ground lightning
   - **IC** = Intra-cloud/Inter-cloud lightning



7. Define the minimum number of strikes to trigger an alert, and alert clear time.

Table 7 Event criteria descriptions

Criterion	Description
Number of lightning strikes	This field defines how many lightning strikes must occur within a certain time frame to trigger an alert. If you create an event for lightning where the alert is triggered after several strikes, then after the alert has been triggered, any further lightning strikes (even just one) will cause the alert to persist.
Time to clear alert after last strike	When there have been no lightning strikes for the time defined in this field, the alert is cleared.

Example: Let's say that **Number of lightning strikes** is **3** strikes, and **Time to clear alert after last strike** is **5** minutes. In this case, an alert is triggered when there have occurred 3 strikes within 5 minutes. The alert persists as long as there are at least 3 strikes within any given period of 5 minutes. When there has been a period of 5 minutes with no lightning strikes, the alert is cleared.

A lightning strike here refers to either a flash or a stroke, depending on the configuration on the TLP.

8. Select **Save**.

Example case with lightning weather events with different criteria: A user draws areas of interest at different distances from a critical location: 5 km, 10 km, and 15 km. Closest to the location the user sets the number of lightning strikes to trigger an alert to **1**. In the location further away the user sets higher thresholds: **3** or **5**.

Table 8 Example event criteria

Weather event name	Criteria
Lightning within 5 km	[Lightning Positive CG and Negative CG 1 lightning strike to trigger an alert Time to clear alert after no new strikes 10 min]
Lightning within 10 km	[Lightning Positive CG and Negative CG 3 lightning strikes to trigger an alert Time to clear alert after no new strikes 10 min]
Lightning within 15 km	[Lightning Positive CG and Negative CG 5 lightning strikes to trigger an alert Time to clear alert after no new strikes 10 min]

5.3 Add events to areas of interest to receive alerts

You can select which weather events you want to monitor in an area of interest. The selected weather events will trigger alerts when they occur within the area of interest.

1. Select **Places of interest**.

   The **Places of interest** pane opens.

2. In the **Places of interest** pane, select an existing area of interest, or create a new one.

   A window with settings for the area of interest opens.

3. In the **Events** section, select **Add events**.

   The list of available weather events opens. These are weather events created for the organization by a **poweruser**.
4. Select the weather events that you want to monitor in this area from the list.
5. Select **Save**.

5.4 Places of interest

In IRIS Focus, a place of interest may be either an *area of interest* or a *pin* (single point) on the map.

Pins

Pins on a map indicate points of interest with reference points and labels.

Areas of interest

An area of interest is a geographical area that you can monitor for weather events.

If the system detects a weather event within an area of interest, it generates an alert.

Organization-level areas of interest

Organization-level areas of interest, and alerts triggered in them, are visible to all `focus` users within the organization.

Only users assigned a `poweruser` role can create, edit, or delete organization-level areas of interest, and link weather events to these areas.

`powerusers` can also define a list of recipients who will receive notification when alerts are triggered in an organization-level area of interest.

Personal areas of interest

Users assigned a `focus` role can create, edit, and delete their own personal areas of interest. (Exception: areas created by a user who also has the `poweruser` role become organization-level areas.)

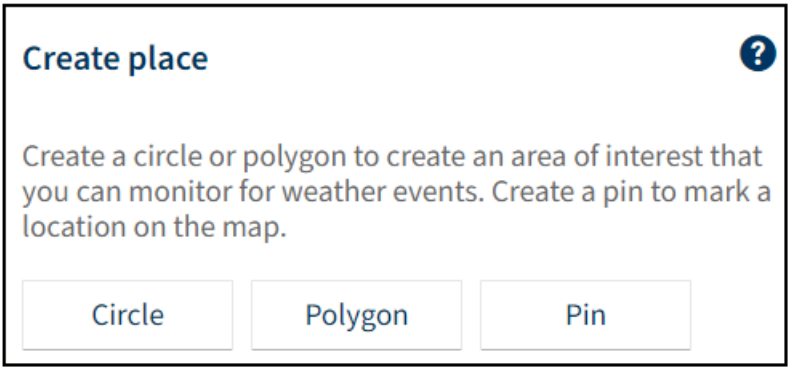
Personal areas of interest are only visible to the user who created them. Alerts triggered on these areas are also only visible to the user who created the area.

5.4.1 Creating areas of interest

1. Select **Places of interest**.

   The **Places of interest** pane opens.

2. Select the type of area you want to create: **Polygon** or **Circle**.

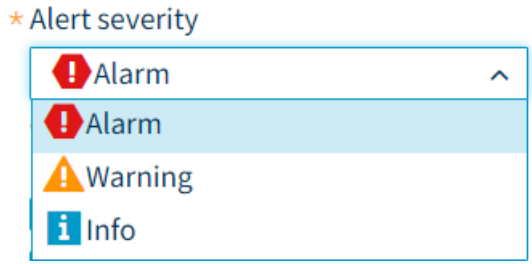


3. Draw the area on the map.
4. Give the area of interest a unique name.
5. If you want to show the area name on the map, select **Show name on map** .

6. Configure alert settings for the area.
   a. Select whether you want to enable alerts within this area.

      CAUTION! If the **Enable alerts in this area** checkbox is not selected, you will not receive weather alerts for the area.

   b. Select the severity of alerts triggered on this area in the **Alert severity** drop-down list.



      The options are:
      - **Information**: lowest level of alert
      - **Warning**: middle level of alert
      - **Alarm**: highest level of alert

   c. Configure **Alert notifications**.

      Select what kind of notification you want to receive for alerts in this area, and fill in the message texts.
      If you are a **poweruser**, you can also add other people as recipients.

7. Select the weather events that you want to monitor in this area. When the monitored weather event occurs in this area, an alert is triggered.

   The weather events are created in the system by `poweruser`.

8. Select **Save**.

5.4.1.1 Configuring alert notifications

You can select the type of notifications you want to receive: sound, SMS, or email. For email and SMS, the administrator has created default content, but you can replace it with your own text.

To receive notifications, you also need to have notifications enabled in your personal **Preferences**.

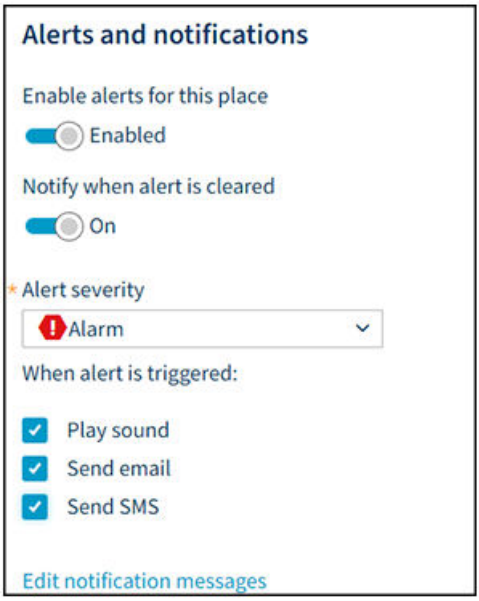


Figure 21 Notification settings in the Area of interest tab

1. Select an area of interest.
2. Select the notifications you want IRIS Focus to send when an alert is triggered.
3. Select whether IRIS Focus sends notifications when the alert is cleared.
4. Select **Edit notification messages**, and fill in the message fields.

   If you do not type in any message, the default content defined by the **admin** user will be used.
5. Select **Save**.

Table 9 Email message field

Field	Description
Email to	Default: the address set for the user account of the user who created the area of interest. If the user only has the **focus** user role, then only the user can receive the notification. If the user has the **poweruser** role, the user can add other recipients.
Email subject	You can use macros to fill in information, such as the severity of the alert and the name of the area of interest.
Email text (HTML)	The content of the email. You can use macros to fill in information.
Email text (plain text)	The content of the email. You can use macros to fill in information. Use this field if the recipients' devices do not support HTML. If you are using an email-to-SMS service, and some recipients' phones do not support HTML formatting, use the SMS message fields instead of the email message fields.
Email subject when cleared	The subject of the email that is sent when the alert is cleared. You can use macros to fill in information.
Email text when cleared (HTML)	The content of the email that is sent when the alert is cleared. You can use macros to fill in information.
Email text when cleared (plain text)	The content of the email that is sent when the alert is cleared. You can use macros to fill in information. Use this field if the recipients' devices do not support HTML. If you are using an email-to-SMS service, and some recipients' phones do not support HTML formatting, use the SMS message fields instead of the email message fields.

Table 10 SMS message fields

Field	Description
Send to	Default: the number set for the user account of the user who created the area of interest. If the user only has the **focus** user role, then only the user can receive the notification. If the user has the **poweruser** role, the user can add other recipients.
SMS text	You can use macros to fill in information, such as the severity of the alert, and the name of the area of interest. Character limit: 160 Messages that exceed the character limit (160 characters) will be broken up into multiple messages.
SMS text when cleared	The content of the SMS that is sent when the alert is cleared. You can use macros to fill in information.

5.4.1.2 Enabling or disabling alerts in an area of interest

The **Enable alerts in this area** setting available for each area of interest allows you to manage which areas of interest generate weather alerts.

For example, if you want to monitor severe weather conditions that are only meaningful to an area of interest for a period of time, you can control when you receive weather notifications for that area.

CAUTION! If the **Enable alerts in this area** checkbox is not selected, you will not receive weather alerts for the area.

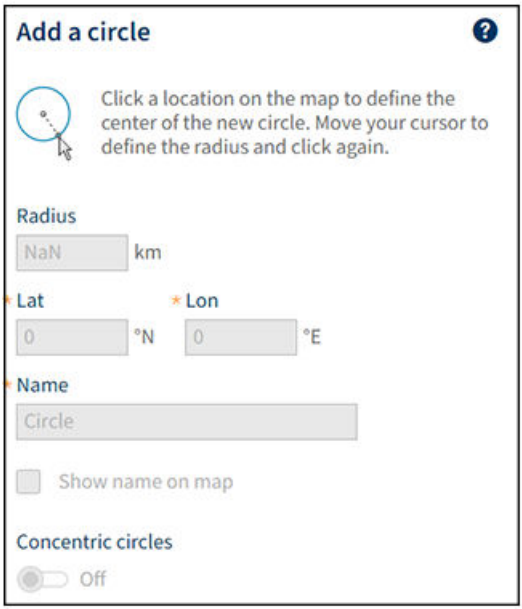
1. Select **Places of interest**.

   The **Places of interest** pane opens.
2. In the area of interest configuration pane, update the **Enable alerts in this area** setting.
3. Select **Save**.

More information

- Showing and hiding places of interest on the map (page 51)

5.4.1.3 Drawing circles



1. Select **Places of interest**.

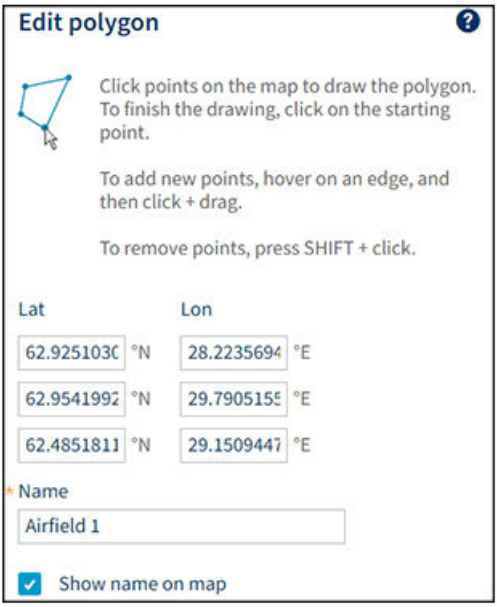
   The **Places of interest** pane opens.
2. Select **Circle**.
3. To draw the circle on the map:
   a. Click the location on the map where you want to place the center of the circle.
   b. Move the mouse to define the radius of the circle, and click again.
   c. To move the circle on the map, drag the center point of the circle.
   d. To resize the circle on the map, use the corner points around the circle.
4. After drawing the circle, you can also modify it by filling in the exact radius and coordinates. IRIS Focus uses the WGS84 coordinate system.
5. Give the area of interest a unique name.

6. To show concentric circles between the center point and the outer edge of the area of interest circle, set the **Concentric circles** toggle button On.

> Concentric circles are a visual aid for viewing the area. They do not have an impact on the alerting functionality.

7. Select **Save**.

5.4.1.4 Drawing polygons



1. Select **Places of interest**.

   The **Places of interest** pane opens.

2. Select **Polygon** to create a new area.

   a. To form the polygon, click points on the map.

   b. To close the polygon, click the starting point.

   After drawing the initial polygon, you can modify the polygon by filling in the exact coordinates. IRIS Focus uses the WGS84 coordinate system.

3. Give the area of interest a unique name.

4. Continue editing the polygon as needed:
   a. To add new points to a polygon, hover on an edge and click and drag the mouse.
   b. To move an existing point, hover over it and click and drag the mouse to move it.
   c. To remove points, click **X** next to the point coordinates.
5. Select **Save**.

5.4.1.5 Editing areas of interest

1. On the map, click an area of interest.

   The configuration pane for that area opens.
2. Update the configuration settings.

   You can also use the mouse to adjust the dimensions of the area on the map.
3. Select **Save**.

5.4.1.6 Removing areas of interest

When you remove an area of interest from IRIS Focus, it is unavailable for tracking significant weather in future. When you browse historical data, the area and any recorded alerts for that area remain in the system.

CAUTION! Take care when removing areas of interest from your map. You cannot undo an action that removes an area of interest.

1. To remove the area of interest through the **Places of interest**:
   a. Select **Places of interest**.

      The **Places of interest** pane opens.
   b. In the list of places of interest, select the **x** for the area you wish to remove.
2. To remove the area of interest through the map:
   a. Select the area you wish to remove.
   b. Press **DELETE**.

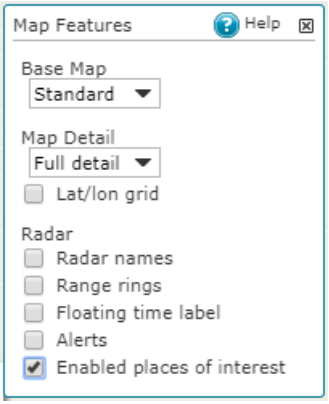
The area of interest is removed from the IRIS Focus display.

You will no longer be alerted to weather events in this area.

5.4.2 Showing and hiding places of interest on the map

You can select whether areas of interest and pins are shown on the map.

If alerts are enabled for an area of interest, you will receive weather alerts in the area even if the area is not shown on the map.



To see pins and areas of interest on the map, do the following:

1. Select **Map Features**.
2. Select **Enabled places of interest**.

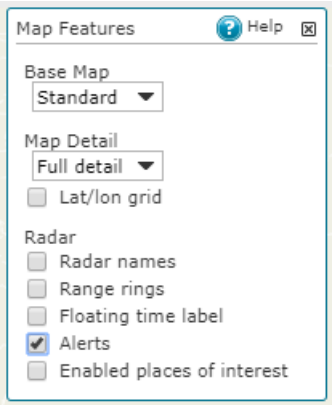
More information

- Enabling or disabling alerts in an area of interest (page 48)

5.5 Showing events and alerts on the map

If you do not see event icons and alert on the map, check the following:

1. The **Alerts** checkbox must be selected in the **Map Features** pane.



> The **Alert history** pane, which you can open with the **Alerts** button, is always active. It lists weather alerts even if the **Alerts** checkbox is not selected in the **Map Features** pane.

2. In the settings of the area of interest, you must select which weather events you want to monitor on that area. If a weather event is not selected for any area, it is not displayed on the map.
3. The **Enable alerts in this area** checkbox must be selected for the area on interest. If it is not selected, no alerts will be triggered on the area.

5.6 Acknowledging weather alerts

The acknowledgement records who has seen an alert and when.

> Acknowledging alerts has no effect on the alert status.

1. Click the **Alerts** button.

The **Alert history** pane opens.

2. In the **Alert history** pane, click **Acknowledge**.

5.7 Alert history

You can view both the currently active and previous alerts in the **Alert history** view. To open the view, select the **Alert history** tab.

You can see alerts from both your personal areas of interest and from organization-level areas of interest. You can search alerts by key words, such as the weather event name, or from a certain period of time. You can filter the list to see either the active or inactive alerts, or all alerts. Click on an alert to see more details about it.

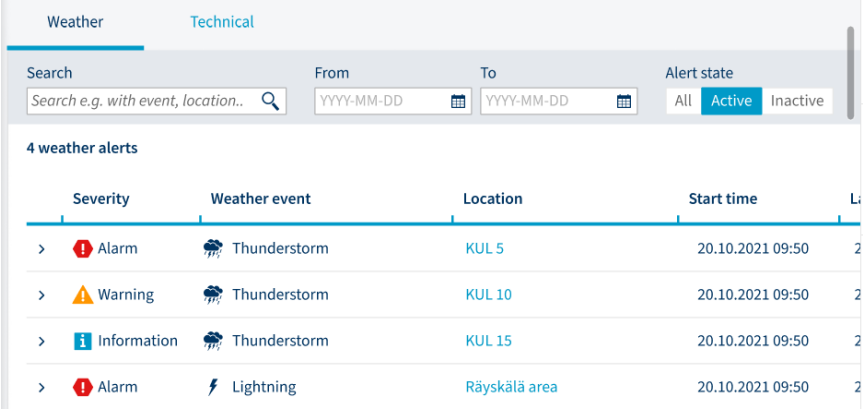


Figure 22 Alert history view

For alerts that were configured by a user with the **`poweruser`** role, the **owner** column says "organization".

By default, the view shows alerts from the past 72 hours.

You can export the alert list into a CSV, XLS, or HTML file.

In addition to weather-related alerts, the history view has a tab for technical alerts. These are mainly intended for system administrators. Technical alerts are related to, for example, dataflow problems.

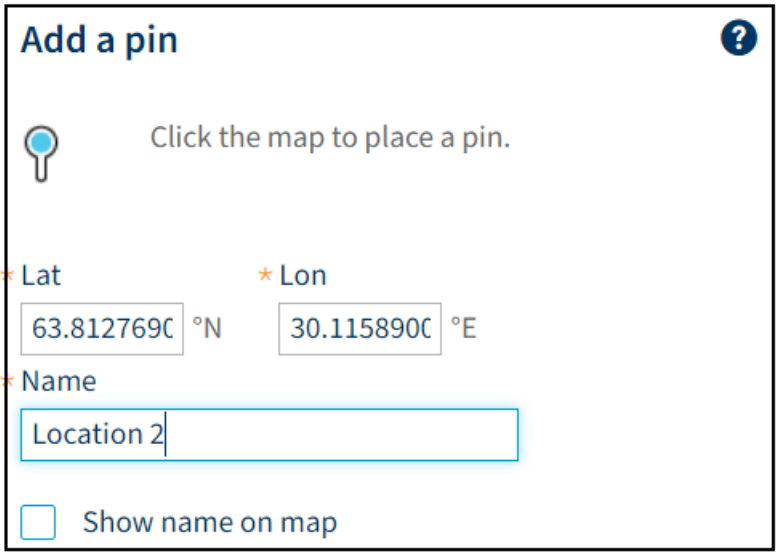
When you are working with historical data, consider the following:

- When you browse historical data, you see information about weather events and alerts that were recorded in real time using the event criteria setting at the time the event was recorded.
- If you delete an area of interest or some alert criteria, the area and any recorded alerts associated with that area remain visible when browsing historical data.

5.8 Pinning locations on the map

You can add pins to the map to indicate points of interest with useful reference points and labels.

You cannot monitor pins for weather events or receive alerts about weather events occuring near pins.



1. Select **Places of interest**.

   The **Places of interest** pane opens.
2. Select **Pin** to mark a new point of interest.

3. To add a pin to the map, do one of the following:
   - In the configuration pane, type the latitude and longitude of the pin location.
   - On the map, click the pin location.
4. To show concentric circles around the pin, select **Concentric circles**.
5. To show the name of the pin on the map, select **Show name on map**.
6. Select **Save**.

5.8.1 Showing and hiding pins on the map

The **Show pin on map** setting available for each pin allows you to manage which pins are shown on the map. For example, you can hide a pin from view but save it for showing on the map later on.

1. Select **Places of interest**.

   The **Places of interest** pane opens.
2. In the pin configuration pane, update the **Show pin on map** setting.
3. Select **Save**.

5.8.2 Removing pins

When you remove a pin from IRIS Focus, it is deleted from the system.

CAUTION! You cannot undo an action that removes a pin.

1. Select the pin you wish to remove.
2. Press **DELETE**.

   The pin is removed from the IRIS Focus map and from the list of pins in the **Places of interest** pane.

Glossary

alarm
An alarm is an alert of highest severity.

alert
Alert is a state that requires user intervention or recognition. Different types of alerts include alarms, warning, and informational alerts.

area of interest
An area of interest is a geographical area that you can monitor for weather events. If the system detects a weather event within an area of interest, it generates an alert.

Data Manager
The raw volume data from the radar signal processor is stored in Data Manager, which makes the data available to the IRIS Focus user interface. Through Data Manager, IRIS Focus can read raw volume data and generate on-demand radar products in real time.

event
See weather event.

k9s
An easy to use tool for exploring and controlling a Kubernetes cluster.

Kubernetes (k8s)
General name for managing a collection of containers (services) running on a computer (conductor of the programs running on the computer).

lightning strike
In IRIS Focus, a *lightning strike* refers to either a flash or a lightning stroke, depending on the configuration of the TLP.

microk8s
The implementation of Kubernetes run on IRIS Focus.

pin
Pins on a map indicate points of interest with reference points and labels.

place of interest
A location on the map that is either a single point (pin) or a larger area. See area of interest and pin.

pre-configured products
Pre-configured products are products with default settings used for advanced data visualization such as nowcasting, warnings, or multilayer products.

radar product
Radar products are raw signal data from a radar receiver processed to provide information about current weather conditions. Radar products are calculated from ingest files that are collected during the execution of radar tasks. Products may be data, pictures, or text. For example, **PPI** and **RHI**.

TLP
See Total Lightning Processor.

Total Lightning Processor
Total Lightning Processor (TLP) is the central processor of a Vaisala Lightning Detection System, which uses multiple, remote sensors to detect lightning. Each sensor sends its data to the central processor.

warning
A warning is an alert of medium severity.

weather event
A user-defined set of weather-related criteria. When an event occurs on the map, it is shown as an icon. When an event occurs within an area of interest, it triggers an alert.

weather product
Weather products are raw signal data from the TLP or from a radar receiver that are processed to provide information about current weather conditions. Weather products are displayed as layers in IRIS Focus.

WMS
Web Map Service protocol

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Warranty

For standard warranty terms and conditions, see 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. 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.

Recycling

Recycle all applicable material according to local regulations.

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