AGUACEROWX USER GUIDE

Satellite and lightning

Satellite covers GOES-East and GOES-West, Himawari-9 and EUMETSAT at native resolution, with single bands, RGB composites and recipes you build yourself. GLM lightning from the toolbar draws on top of any layer.

01 Load GOES satellite
02 GeoColor and RGB recipes
03 GLM lightning
04 Custom IR and water vapor color tables
05 Himawari-9
06 EUMETSAT: Europe, Africa and India
07 Native-resolution satellite
08 Satellite recipe builder
09 3D satellite
10 Common questions

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BEFORE YOU START

- Load satellite from the sidebar: on **Select Data**, click **Satellite** in the data type filter, then pick a satellite and a sector.
- Single bands and RGB products are also in **Add Layer** > **Satellite** on the **Edit Layers** tab, sorted by sector.
- Every band and RGB is on every plan. Your plan sets how many hours a loop can hold.
- Satellite loops run 1 hour on Free, 12 hours on Enthusiast and 24 hours on Professional. Mesoscale sectors run 4 hours on Enthusiast and 12 on Professional.

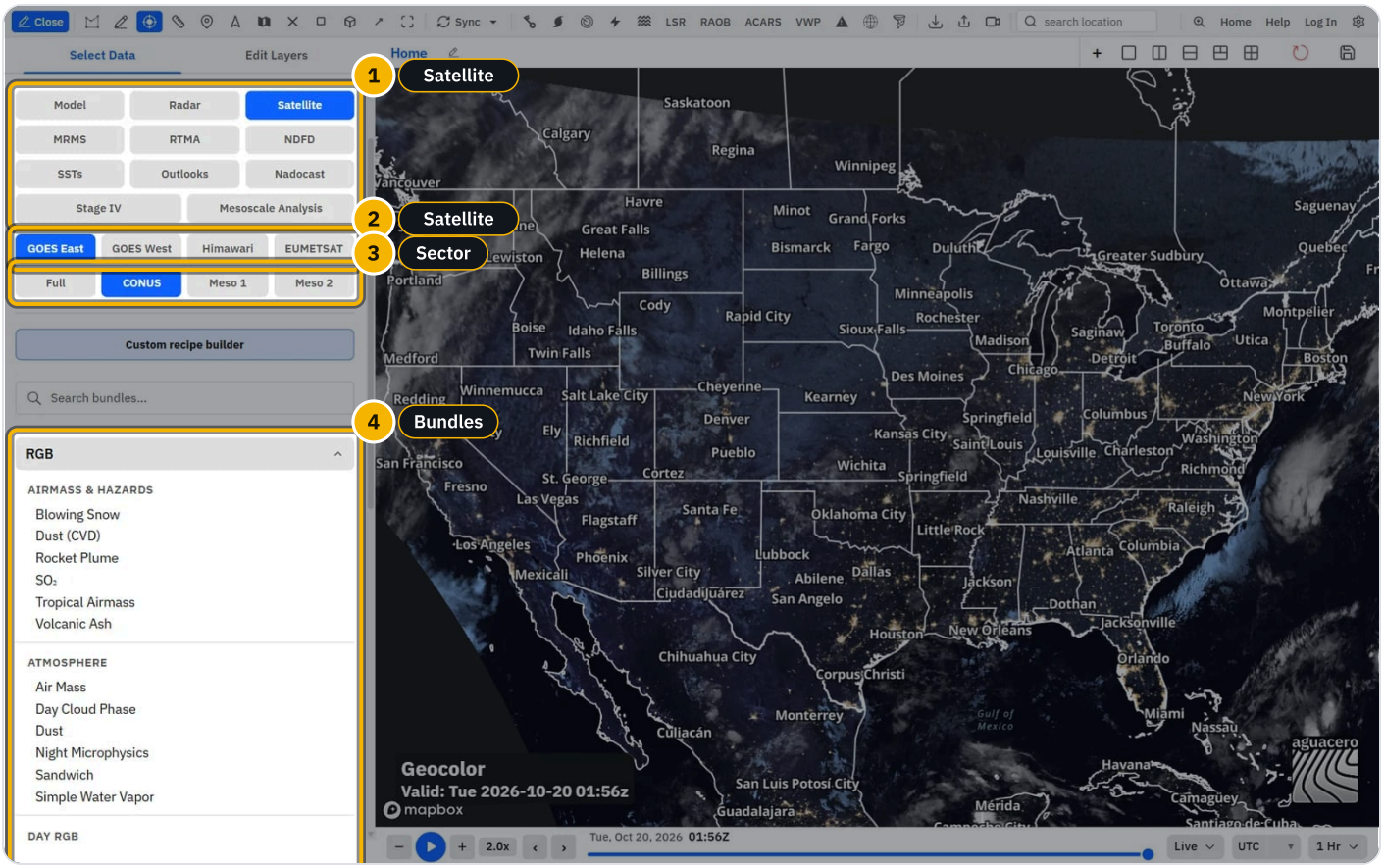
01 Load GOES satellite

Every ABI band from GOES-East and GOES-West, over CONUS, the full disk and the mesoscale sectors.

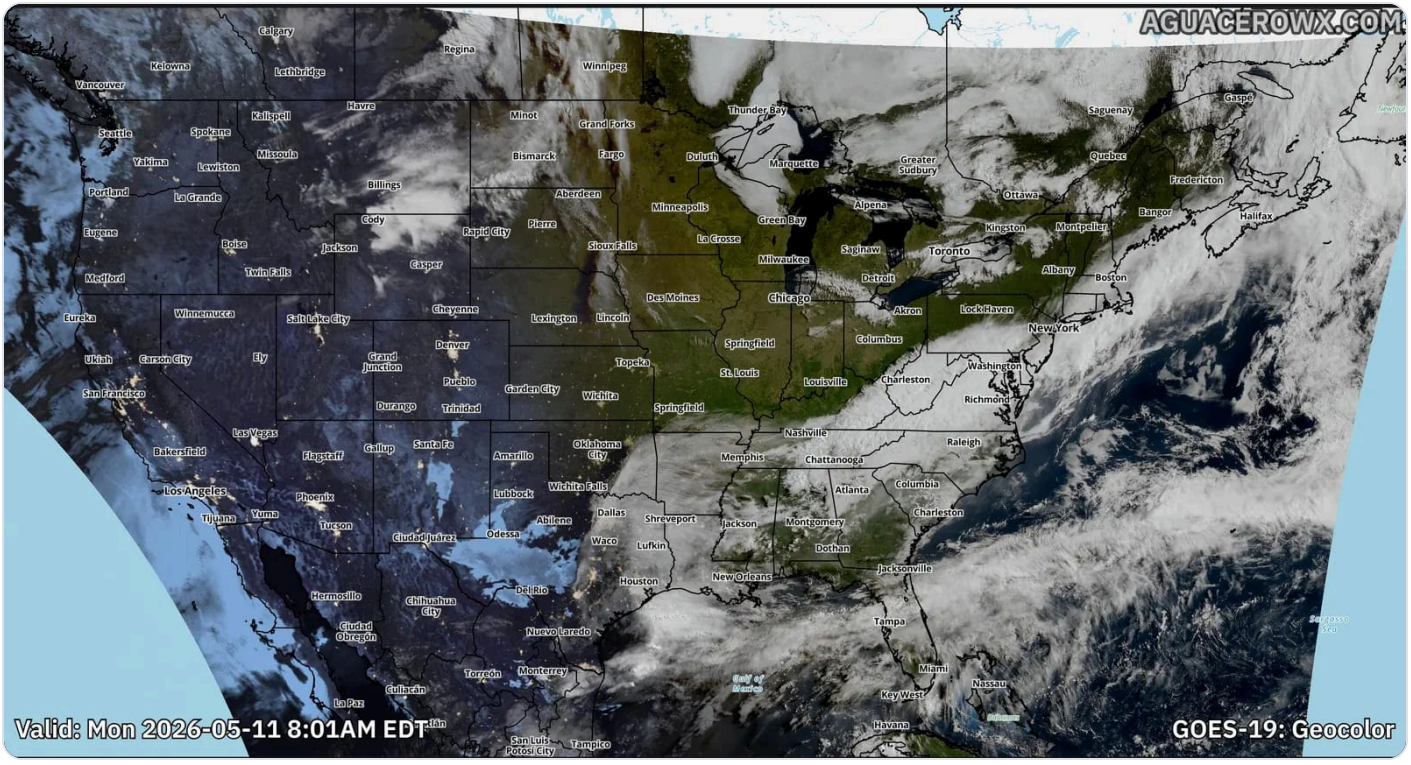
1. On **Select Data**, click **Satellite** in the data type filter. Press `F1` first if the sidebar is closed.
2. Click **GOES East** or **GOES West**.
3. Pick a sector, such as **CONUS**, **Full** or **Meso 1**.
4. Click a bundle in the list to load it.

TIPS

- With a satellite bundle loaded, clicking another satellite or sector moves it there, and the map flies to the sector when it is off screen. For **Meso 1**, **Meso 2** and **Target**, it flies to where the floater is now.
- To add one band, open **Edit Layers**, click **Add Layer**, then **Satellite**, a sector and a band.
- Right-click the map and choose **Nearest satellite** to add the clean longwave infrared band for the sector under the cursor.



The Satellite data type, the satellite and sector buttons, and the bundle list.



GOES-19 GeoColor image of North America.

02 GeoColor and RGB recipes

Ready-made composites such as GeoColor, Air Mass, Sandwich, Day Cloud Phase Distinction, Day Convection, Nighttime Microphysics, Dust, Fire Temperature and Day Snow-Fog.

1. Click the **Edit Layers** tab in the sidebar.
2. Click **Add Layer**, then **Satellite**.
3. Click a sector, such as **GOES-EAST CONUS**.
4. Pick a product under **Natural Color**, **Day RGB**, **Night & Microphysics**, **Airmass & Hazards** or **Water Vapor RGB**.

TIPS

- Geocolor, True Color and Sandwich are under **Natural Color**. Air Mass, Dust and Fire Temperature are under **Airmass & Hazards**.
- Click the info icon next to a product to read what it shows.

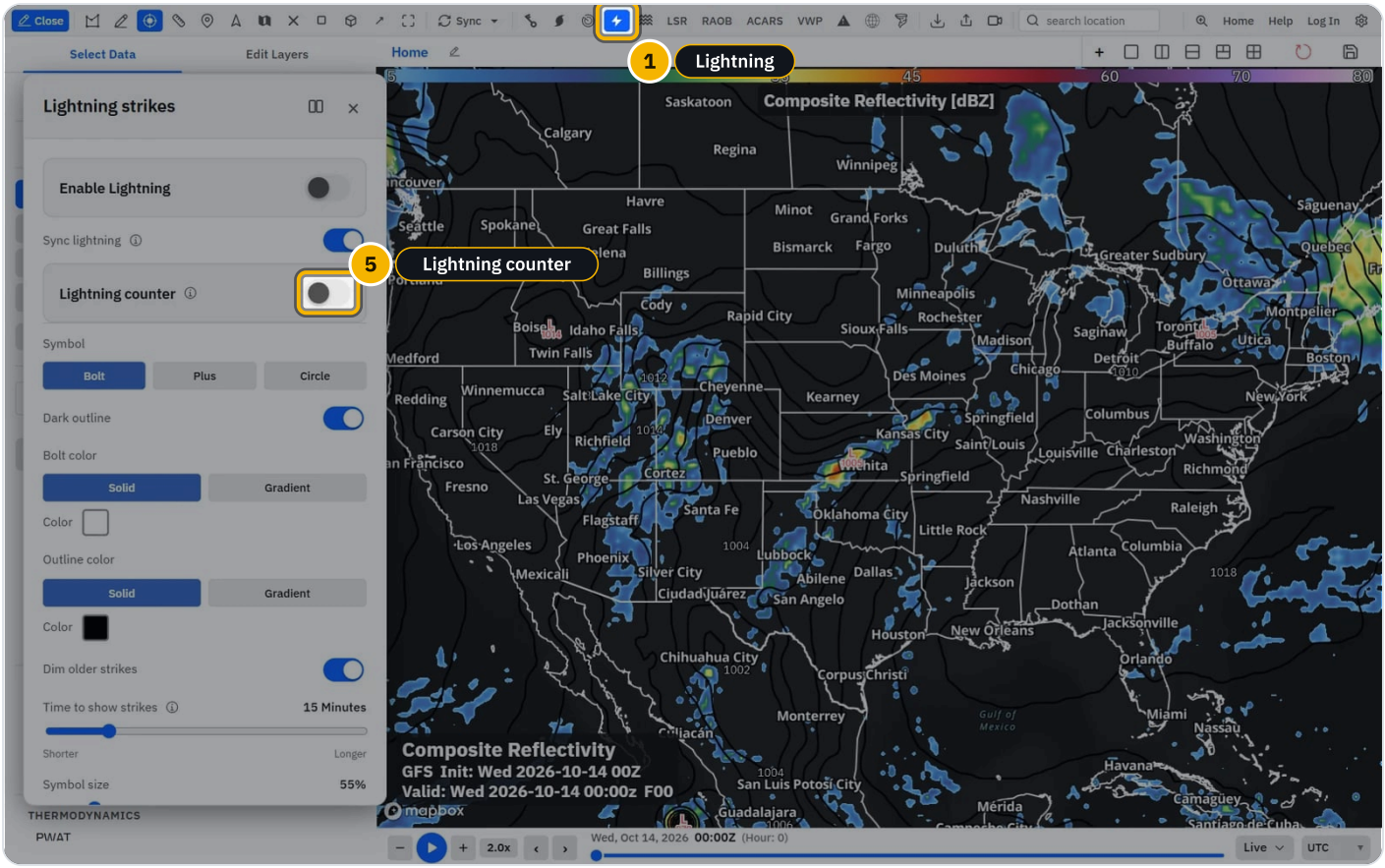
03 GLM lightning

Flashes from the GOES Geostationary Lightning Mapper, filtered by time and energy, with an optional strike counter.

1. Single-click **Lightning** on the toolbar to open **Lightning strikes**.
2. Turn on **Enable Lightning**.
3. Drag **Time to show strikes** to set how many minutes of flashes stay on the map.
4. Drag **Minimum flash energy** toward **High energy only** to hide weaker flashes.
5. Turn on **Lightning counter** for a running count of the strikes on the map.

TIPS

- Double-click **Lightning** to turn it on or off without opening the settings.
- Turn on **Sync lightning** to switch lightning on or off in every panel at once.



The Lightning button and the Lightning strikes settings.

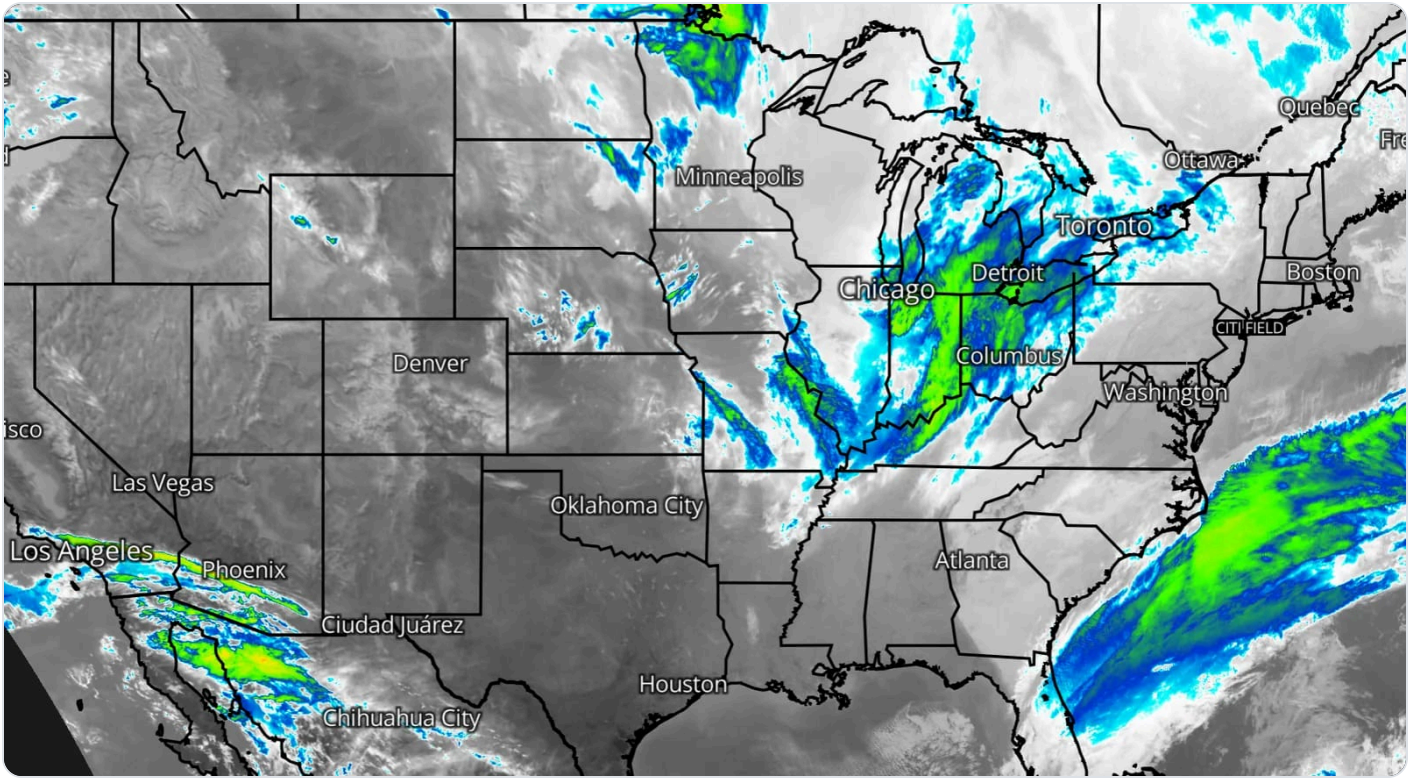
04 Custom IR and water vapor color tables

Restyle infrared and water vapor bands with your own colors and value ranges.

1. Load an infrared or water vapor band, such as **Clean Longwave Window (Band 13)**.
2. Click the **Edit Layers** tab, then **Edit Layer** on the satellite layer.
3. Change the colors and breakpoints in the colormap editor.

TIPS

- To use your colors every time, open **Settings** > **Data** > **Satellite** and edit the band there.

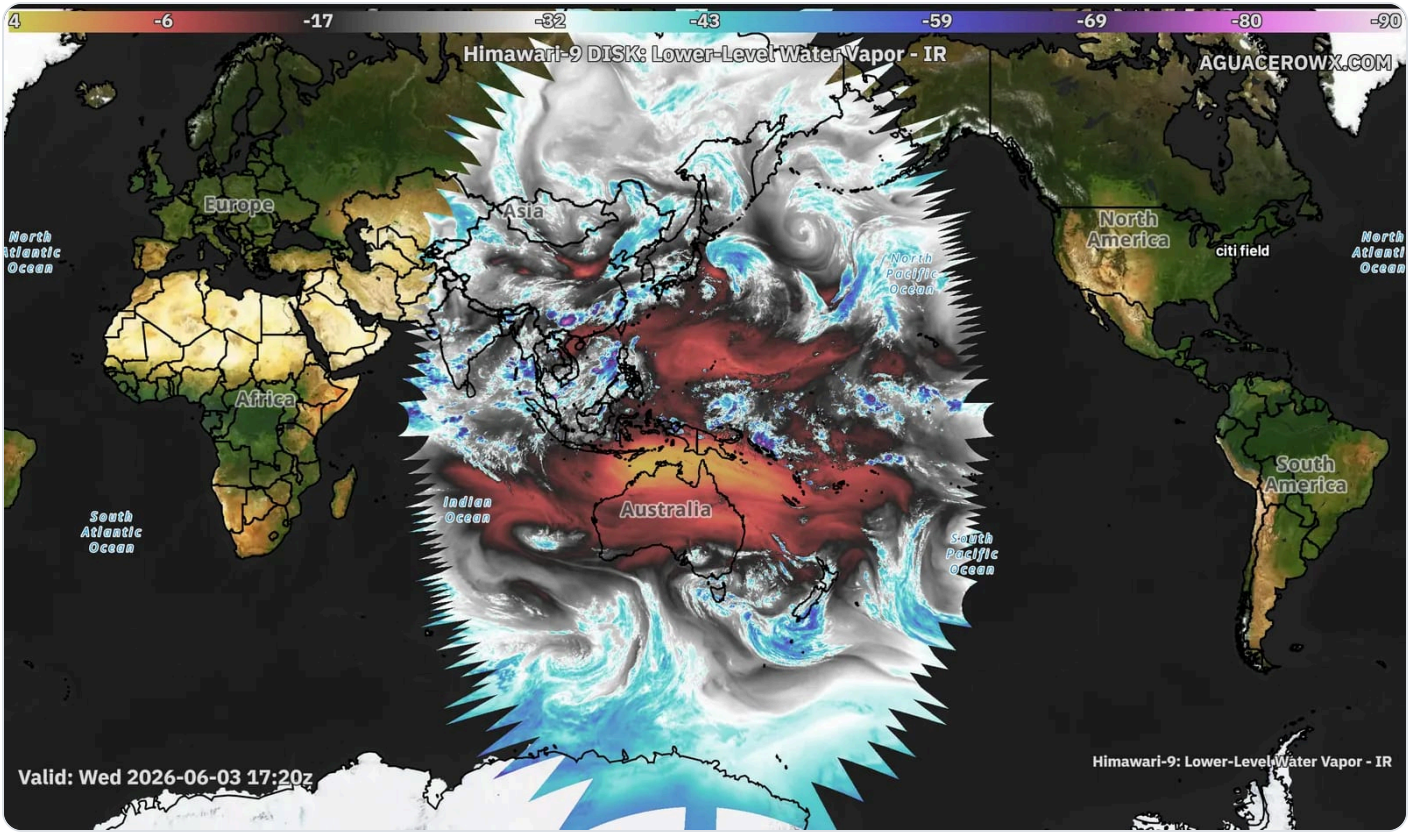


GOES-East infrared imagery with a custom color table.

05 Himawari-9

The western Pacific, Asia and Australia, with the same bands and products as GOES.

1. On **Select Data**, click **Satellite** in the data type filter.
2. Click **Himawari**.
3. Pick **Full Disk**, **Japan** or **Target**.
4. Click a bundle in the list to load it.



Himawari-9 full-disk lower-level water vapor.

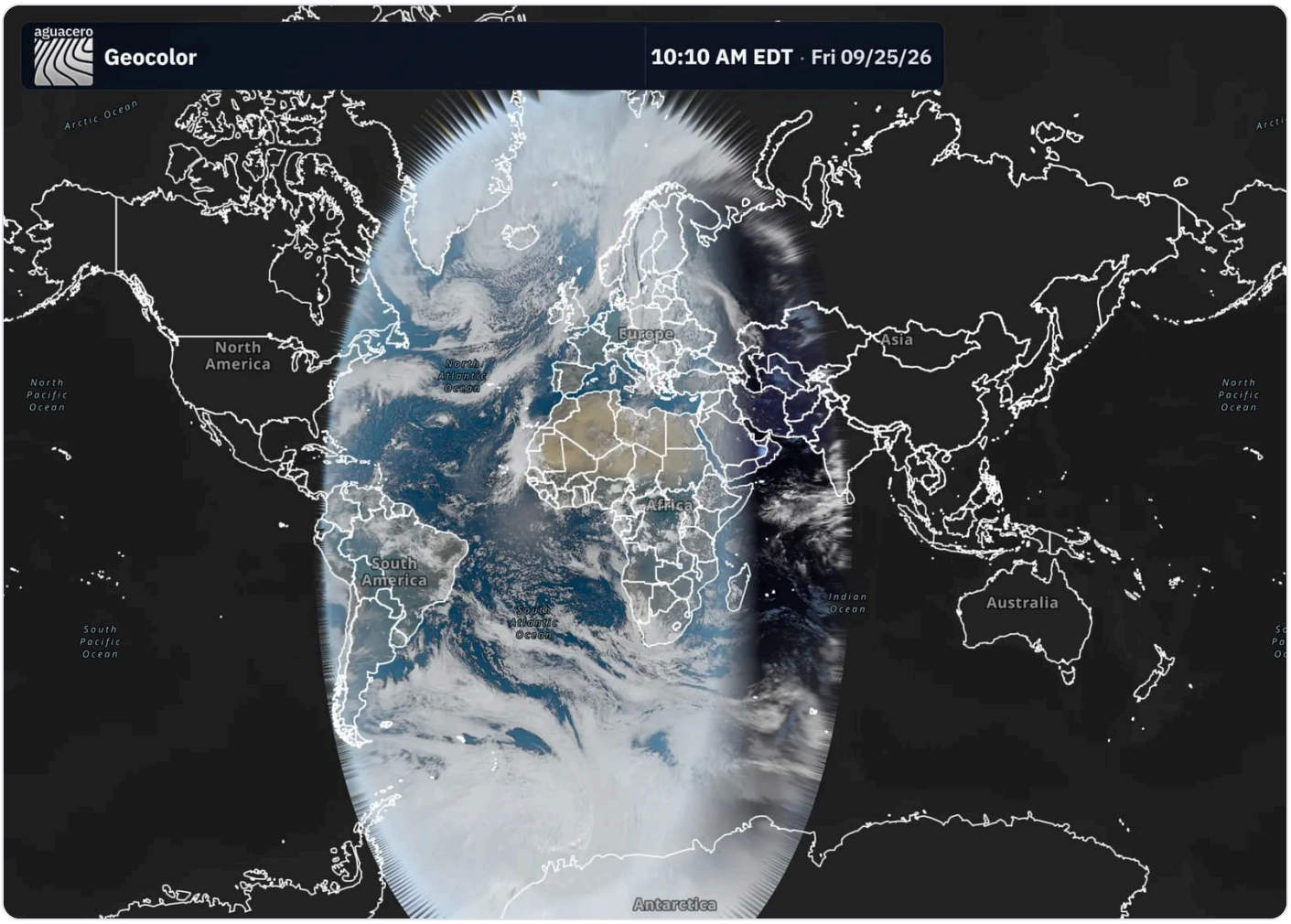
06 EUMETSAT: Europe, Africa and India

Meteosat full disk over Europe and Africa, a rapid-scan Europe sector and the Indian Ocean, with the products you know from GOES.

1. On **Select Data**, click **Satellite** in the data type filter.
2. Click **EUMETSAT**.
3. Pick **Full Disk**, **Europe** or **India**.
4. Click a bundle in the list to load it.

TIPS

- **Europe** is Meteosat's rapid-scan sector. In **Add Layer** > **Satellite** on the **Edit Layers** tab it is listed as **EUMETSAT EUROPE**.

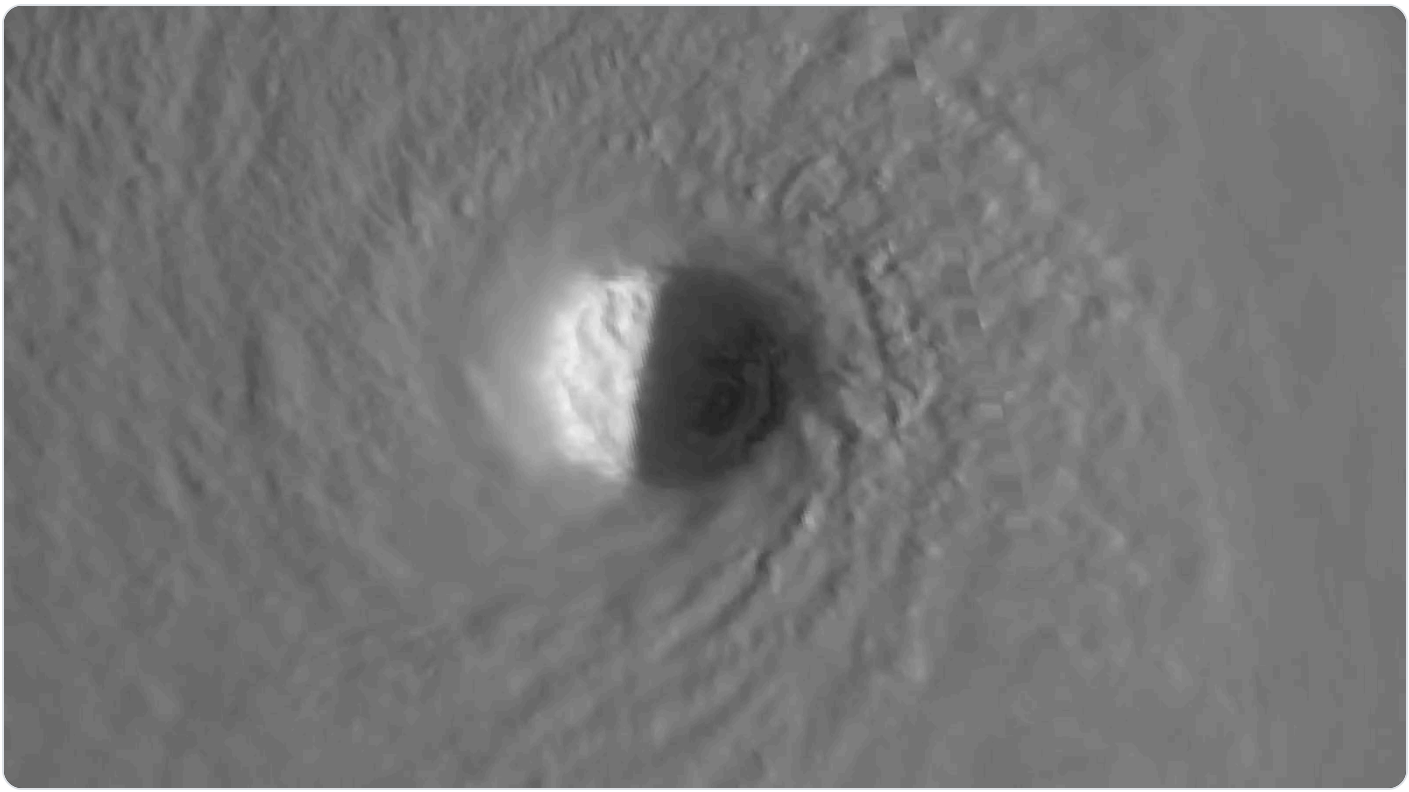


Meteosat GeoColor full-disk image of Europe and Africa on a globe.

07 Native-resolution satellite

Imagery loads at native resolution as you zoom in, down to 0.5 km for the GOES red visible band.

1. On the **Edit Layers** tab, click **Add Layer** > **Satellite** and pick a GOES sector.
2. Click **Red (Band 2)** under **Visible**.
3. Zoom in on the area you want. Finer detail loads as you zoom.



Native-resolution visible image of a hurricane eye.

08 Satellite recipe builder PROFESSIONAL

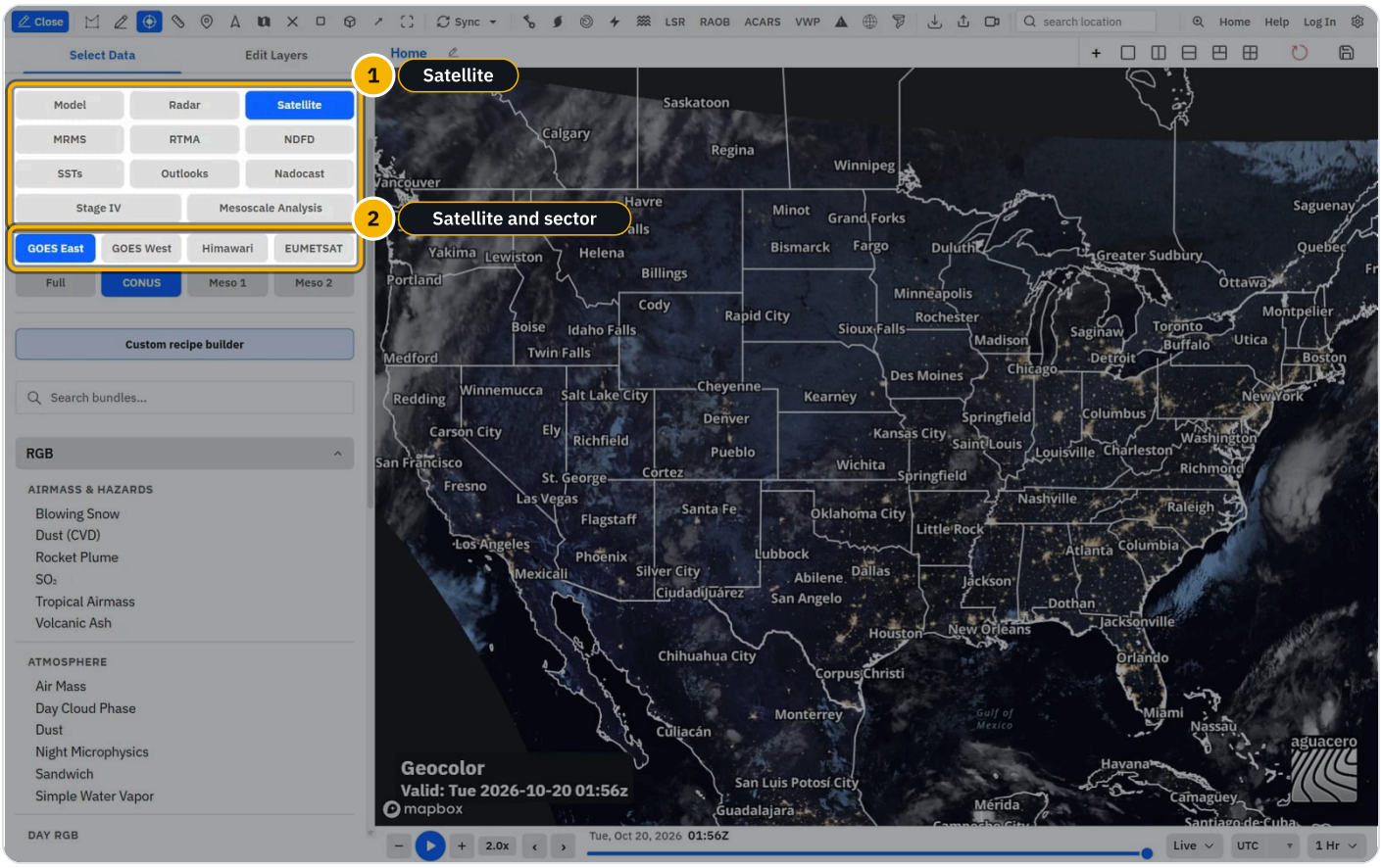
Build your own composite from single bands, with day and night stacks, stretch, gamma and color mix, then load it on the map and save it.

1. On **Select Data**, click **Satellite** in the data type filter.
2. Pick a satellite and a sector.
3. Click **Custom recipe builder**.
4. Under **Day channels** or **Night channels**, click **Add channel** until you have at least two different bands.
5. Set each band’s **Channel color**, **Stretch** and **Gamma**.
6. Click **Load** to draw the recipe.
7. Click **Save**, enter a **Name** and **Category**, and click **Save** again.

TIPS

- With both day and night bands, **Auto** blends them by sun angle. **Manual** uses one mix for the whole image.
- Leave **Private** checked to keep a recipe out of **Advanced search**.
- Saved recipes are in **Add Layer** > **Satellite** > **Custom Recipe**.

A panel holds one satellite layer (a second GOES mesoscale layer is allowed). If one is already there, edit that layer to load a recipe.



The Satellite data type and the satellite buttons. Custom recipe builder sits below them.

09 3D satellite PROFESSIONAL

Raise infrared cloud tops in 3D, so colder, higher clouds stand taller.

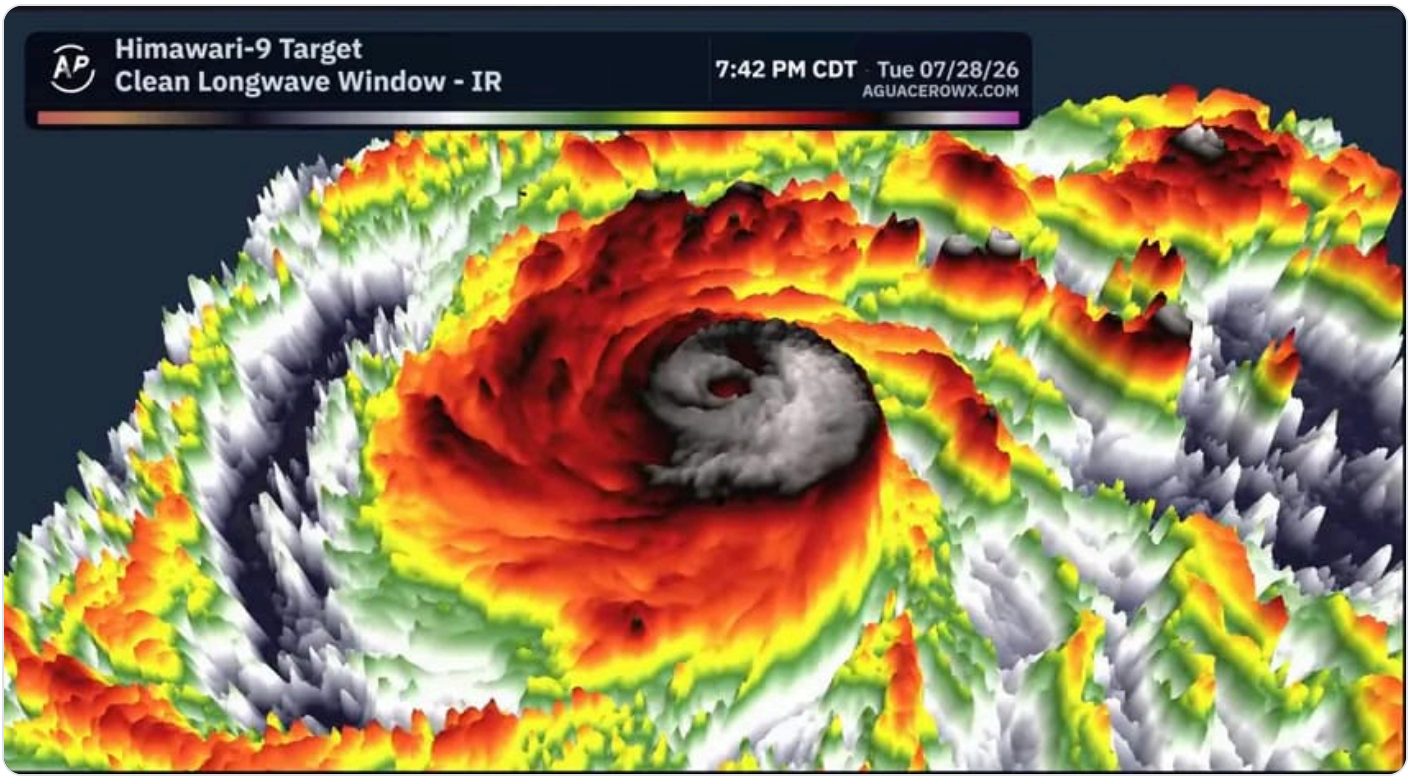
1. Load a single band, such as **Clean Longwave Window (Band 13)**.

2. Click the **Edit Layers** tab, then **Edit Layer** on the satellite layer.
3. Tick **3D cloud tops**.
4. Drag **Height** to set how tall the clouds stand.
5. Right-click and drag on the map to tilt the view.

TIPS

- If the cloud tops stay flat, turn on **Allow 3D effects** in **Settings** > **Performance**.

3D works on single bands. RGB composites stay flat.



Himawari-9 clean longwave infrared cloud tops in 3D around a typhoon.

10 Common questions

Answers to the questions we hear most about satellite and lightning.

How long a loop can I play?

Free plays 30 minutes or 1 hour. Enthusiast goes up to 12 hours, and Professional and Creator up to 24 hours. Mesoscale sectors (GOES **Meso 1** and **Meso 2**, Himawari **Target** and EUMETSAT **Europe**) go up to 4 hours on Enthusiast and 12 hours on Professional. Pick the length in the duration menu on the time bar, which reads **1 Hr** at first. Locked lengths open the upgrade window.

Why do long loops skip frames?

Longer loops space frames out so they load and play smoothly. On Professional, CONUS loops show every 5 minutes up to 4 hours, every 10 minutes at 12 hours and every 20 minutes at 24 hours. Full-disk loops start at every 10 minutes, and mesoscale loops show every minute up to 4 hours. Enthusiast spaces frames out sooner, and Free shows mesoscale sectors every 2 minutes.

Why is the newest image a few minutes old?

An image appears after the satellite finishes its scan, the agency publishes it and AguaceroWx turns it into map tiles. The app checks for new images every minute. RGB products such as **Geocolor** wait until every band from the same scan is in, so they can trail single bands. EUMETSAT imagery runs about an hour behind GOES and Himawari.

Which satellite should I pick?

GOES East (GOES-19) covers the Americas and the Atlantic and has the **CONUS** sector. **GOES West** (GOES-18) is best for the western United States, Alaska, Hawaii and the eastern Pacific, with its **Pacific** sector. **Himawari** (Himawari-9) covers East Asia, the western Pacific and Australia. **EUMETSAT** covers Europe and Africa, and the Indian Ocean with **India**.

What are Meso 1 and Meso 2?

Small sectors that NOAA moves to follow active weather. GOES scans them every minute. Each frame is drawn where it was scanned, so a loop jumps when NOAA moves the sector. To load the one over a spot, right-click there and choose **Nearest satellite**, which picks a mesoscale sector when one covers it. Himawari's **Target** sector works the same way.

Why is the visible satellite black at night?

Visible bands and most daytime RGBs show reflected sunlight, so they go dark after sunset. At night, use an infrared band such as **Clean Longwave Window (Band 13)**, which works day and night. **Geocolor** switches to an infrared view with city lights after dark, and **Nighttime Microphysics** is the main product for finding fog at night.

Why did Satellite disappear from Add Layer?

Each panel holds one satellite layer, so **Satellite** leaves **Add Layer** once one is on. To show another band or sector, click the satellite layer's name on its card in **Edit Layers** and pick it there. The exception is GOES mesoscale: with a **Meso 1** or **Meso 2** layer on, you can add one more mesoscale sector.

Do I need a paid plan for RGB composites or infrared bands?

No. Every band and RGB product is on every plan, including Free. Paid plans add longer loops, and the **Custom recipe builder** and **3D cloud tops** need Professional or higher.

How do I change or reset an infrared color table?

Click **Edit Layer** on the satellite layer and change the colors and breakpoints. **Reset to Defaults** in the same panel puts the default colors back. To use your colors on every new layer, edit the band in **Settings** > **Data** > **Satellite**. Saved bundles keep their own colors unless **Apply customizations to** is set to an **All layers/bundles** choice. Visible bands and RGB composites have fixed colors.

Can I show infrared temperatures in °F?

No. Infrared and water vapor bands read in °C or K. Switch between them under **Units** in **Edit Layer**.

Why does the imagery look blurry or blocky?

Imagery loads coarser when you're zoomed out and sharpens as you zoom in, down to 0.5 km for GOES **Red (Band 2)** and 2 km for most GOES infrared bands. Most Himawari and EUMETSAT bands are stored at 2 to 4 km. A long loop that doesn't fit in graphics memory drops to coarser tiles, so raise **Graphics memory** in **Settings** > **Performance**. **Smoothing** in **Edit Layer** softens pixel edges.

Where does the lightning come from?

From the Geostationary Lightning Mapper on GOES-East and GOES-West, so it covers the Americas and nearby oceans only, not Europe, Asia or Australia. The app keeps the last 24 hours and checks for new flashes every minute. Lightning is live only, so it’s greyed out in Archive mode.

Why don’t I see all the lightning?

Single-click **Lightning** on the toolbar and check the filters. **Time to show strikes** keeps 5 to 60 minutes of flashes before the map time, 15 by default. **Minimum flash energy** above **All** hides weaker flashes, and **Strike density** hides strikes that sit too close together on screen. Lightning follows the time bar, so moving back in time shows the flashes from then.

Can I see satellite from a past event?

No. Archive mode doesn’t include satellite, and **Add Layer** has no **Satellite** menu there. Live loops go back up to 24 hours on Professional and Creator.

Why is Load greyed out in the recipe builder?

A recipe needs at least two different bands. Click **Add channel** under **Day channels** or **Night channels** until it has two. A recipe can use up to 5 bands. If the bands still don’t load, the note under **Custom Recipe** says why, such as when they don’t share a scan time.