AGUACEROWX USER GUIDE

Archive and reanalysis

Archive mode replays past weather with the same map, layers and tools you use for live data. Pick a dataset and a time window in the Archive Builder, load it, then loop it on the time bar like any other event.

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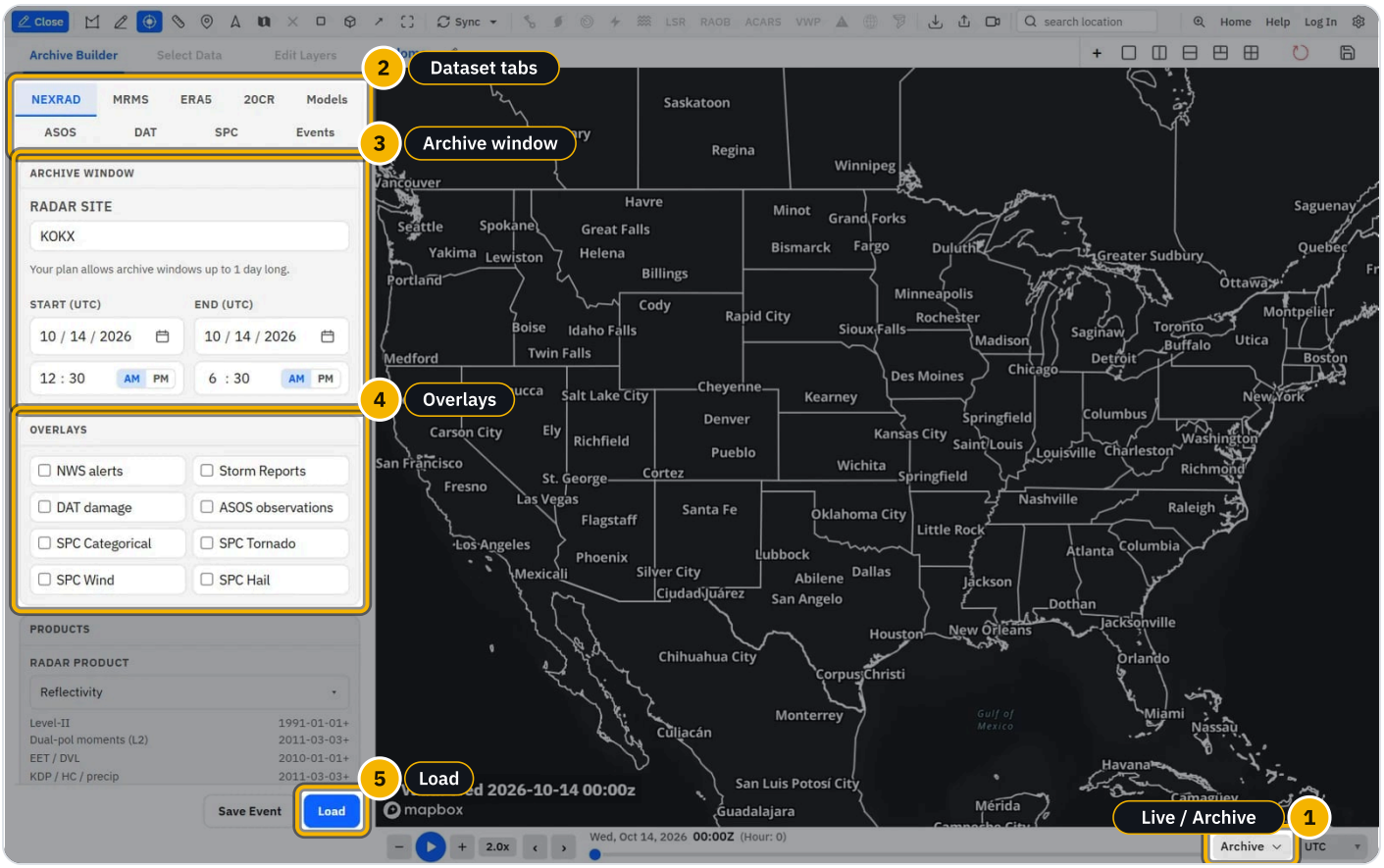
BEFORE YOU START

- The **Live** / **Archive** menu sits on the right side of the time bar at the bottom of the screen.
- Choosing **Archive** opens the **Archive Builder** tab in the sidebar. **Select Data** and **Edit Layers** stay locked until you load a window.
- Every plan can use Archive mode. Your plan sets how long each window can be and how many events you can save.

01 Load a past event

Switch the time bar from Live to Archive, set a time window in the Archive Builder and load it onto the active board.

1. On the time bar, open the **Live** menu and choose **Archive**. The **Archive Builder** opens in the sidebar.
2. Click a dataset tab: **NEXRAD**, **MRMS**, **ERA5**, **20CR**, **Models**, **ASOS**, **DAT** or **SPC**.
3. Under **Archive window**, set **Start** and **End**. Times use the board's time zone.
4. Pick the products you want, and tick any **Overlays** for the same window.
5. Click **Load**. The data loads on the active board, and **Select Data** and **Edit Layers** unlock.
6. Press `Space` or drag the time bar to play through the event.

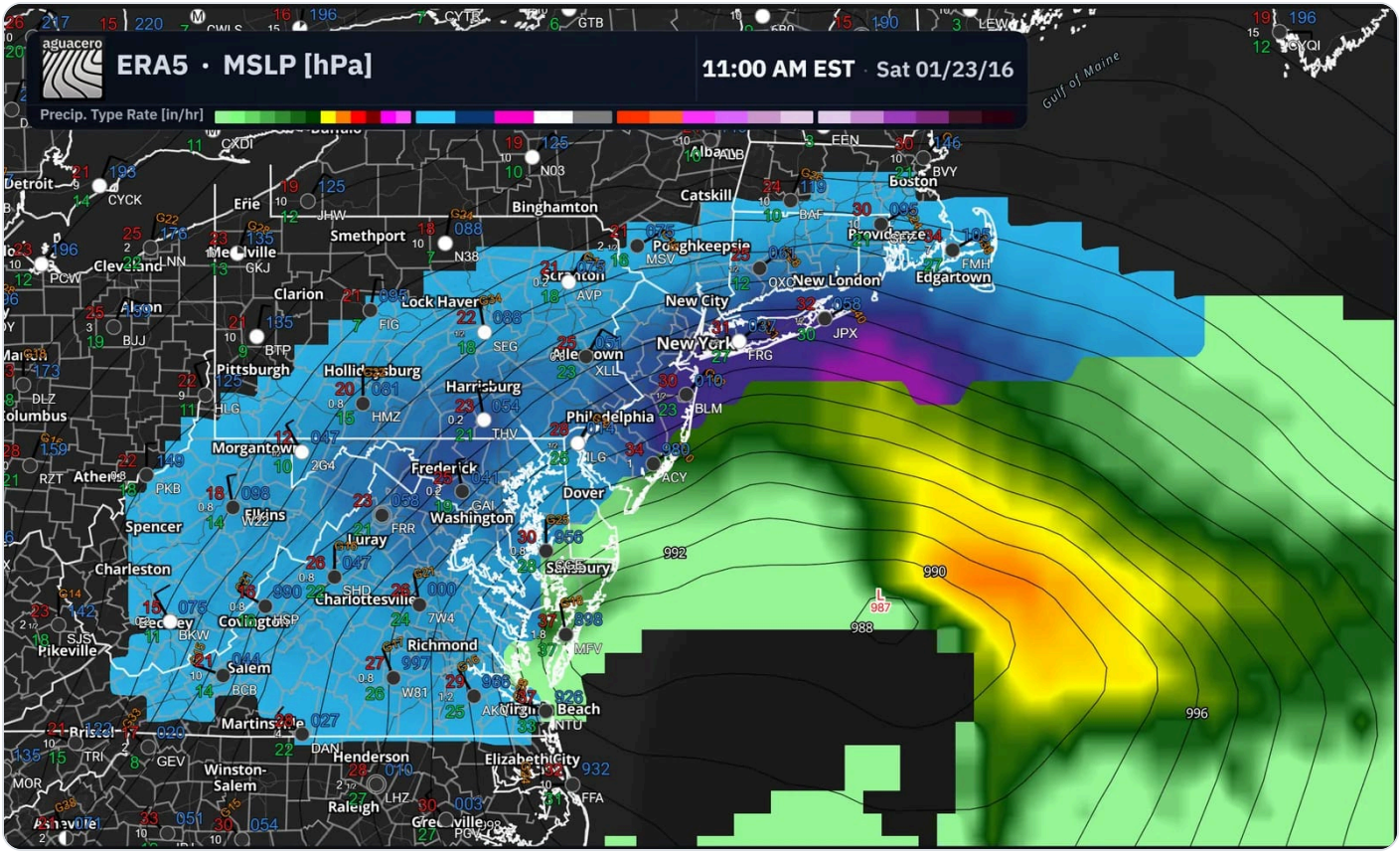


The Live / Archive menu on the time bar and the Archive Builder in the sidebar.

TIPS

- When you change the start time, the end moves to one hour later. Move the end out as far as your plan allows.
- After the first load the button reads **Update**. Change the window or products, then click **Update** to reload.
- To leave, choose **Live** in the same time bar menu, or click **Exit archive** in the builder. That clears the board, so load a bundle or workflow to get your live setup back.

Switching to Archive clears the layers on the active board. Save your bundle first if you want to keep it. Window limits: NEXRAD and MRMS 1 hour on Free, 2 hours on Enthusiast, 24 hours on Professional. ASOS 4 hours, 12 hours and 3 days. ERA5 and 20CR 12 hours, 24 hours and 5 days. DAT and SPC 30 days on every plan.



ERA5 sea-level pressure and ASOS stations replayed for the January 2016 blizzard.

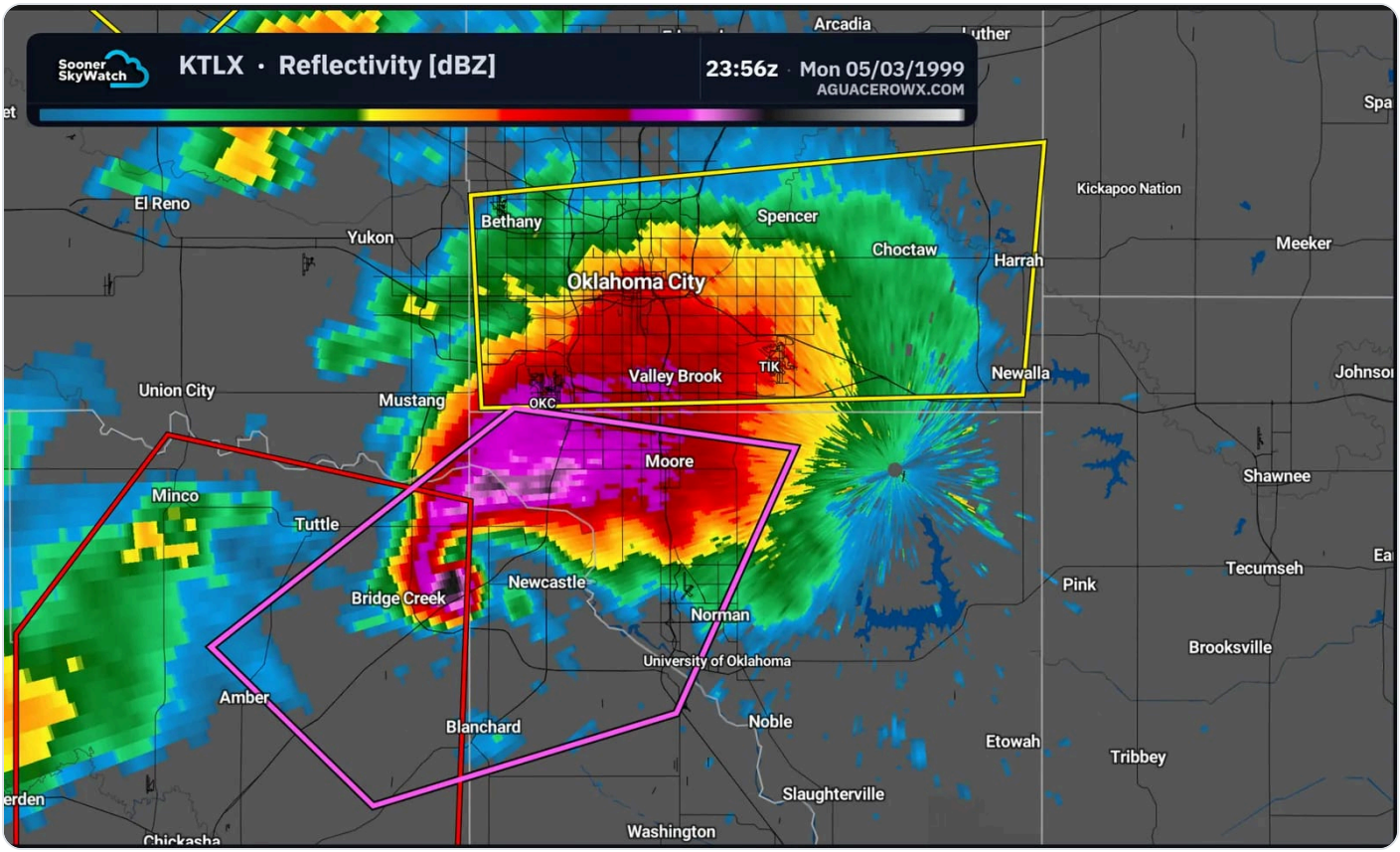
02 Replay NEXRAD radar

Load Level II radar back to 1991 and Level III products back to 1999 for any NEXRAD site.

1. In the **Archive Builder**, click the **NEXRAD** tab.
2. Type the four-letter site ID in **Radar site**, for example KTLX.
3. Set **Start** and **End**.
4. Under **Products**, pick a **Radar product**.
5. Click **Load**.

TIPS

- Dual-pol products start in March 2011. Products that the site or date can’t provide stay unavailable in the picker.
- Archived velocity is dealiased automatically.
- Cross sections in Archive mode work only when NEXRAD is the dataset. The **VWP** toolbar button works for windows from 1999 on.



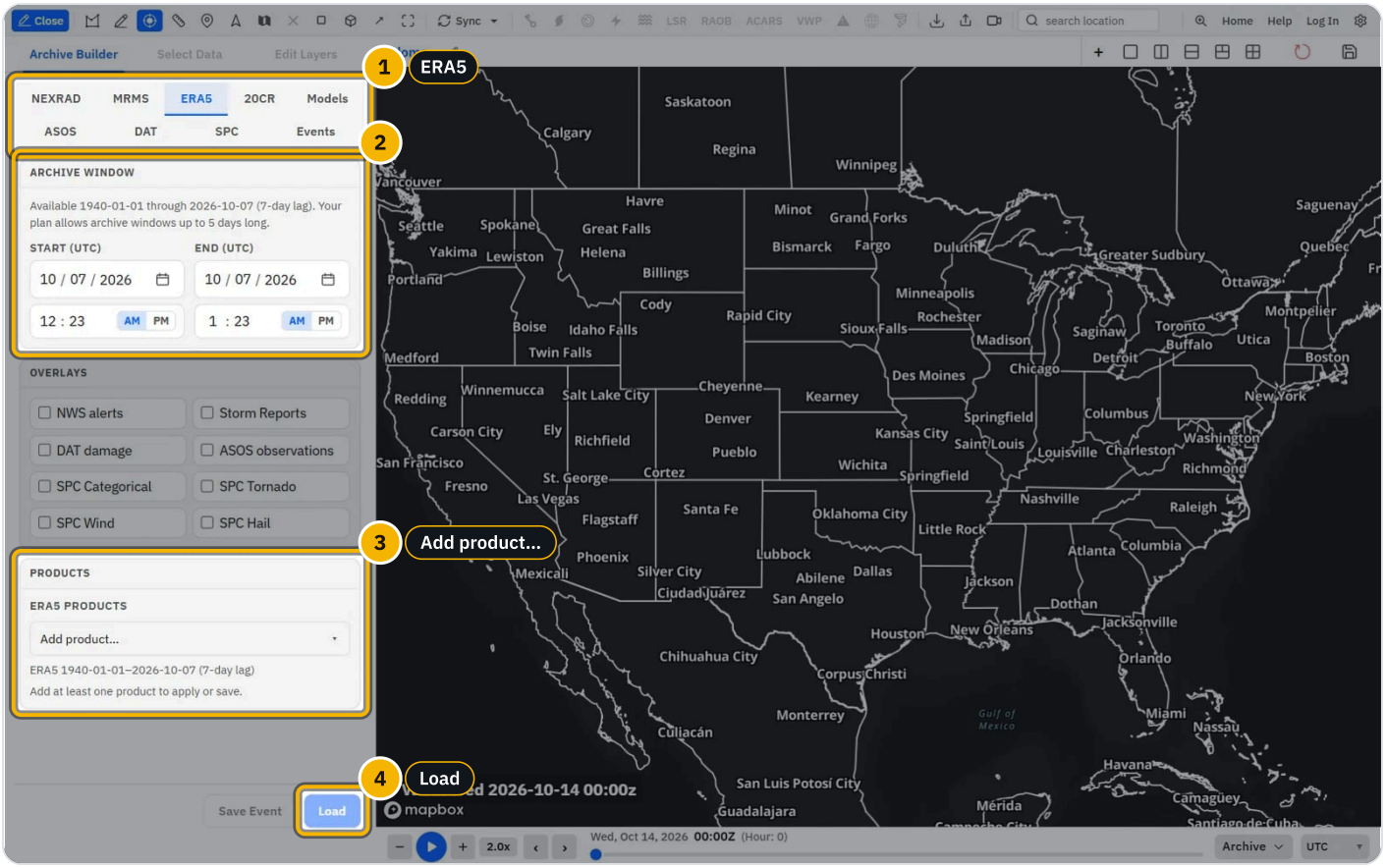
KTLX Level II reflectivity of the May 3, 1999 Oklahoma City tornado.

03 ERA5 reanalysis back to 1940

Load ERA5 reanalysis fields for any date from 1940 to about a week ago, to see the setup behind an event.

1. In the **Archive Builder**, click the **ERA5** tab.
2. Set **Start** and **End**. The note above the fields shows the latest date you can pick.
3. Under **ERA5 products**, open **Add product…** and pick a field. Repeat to add more.

4 Click **Load**.

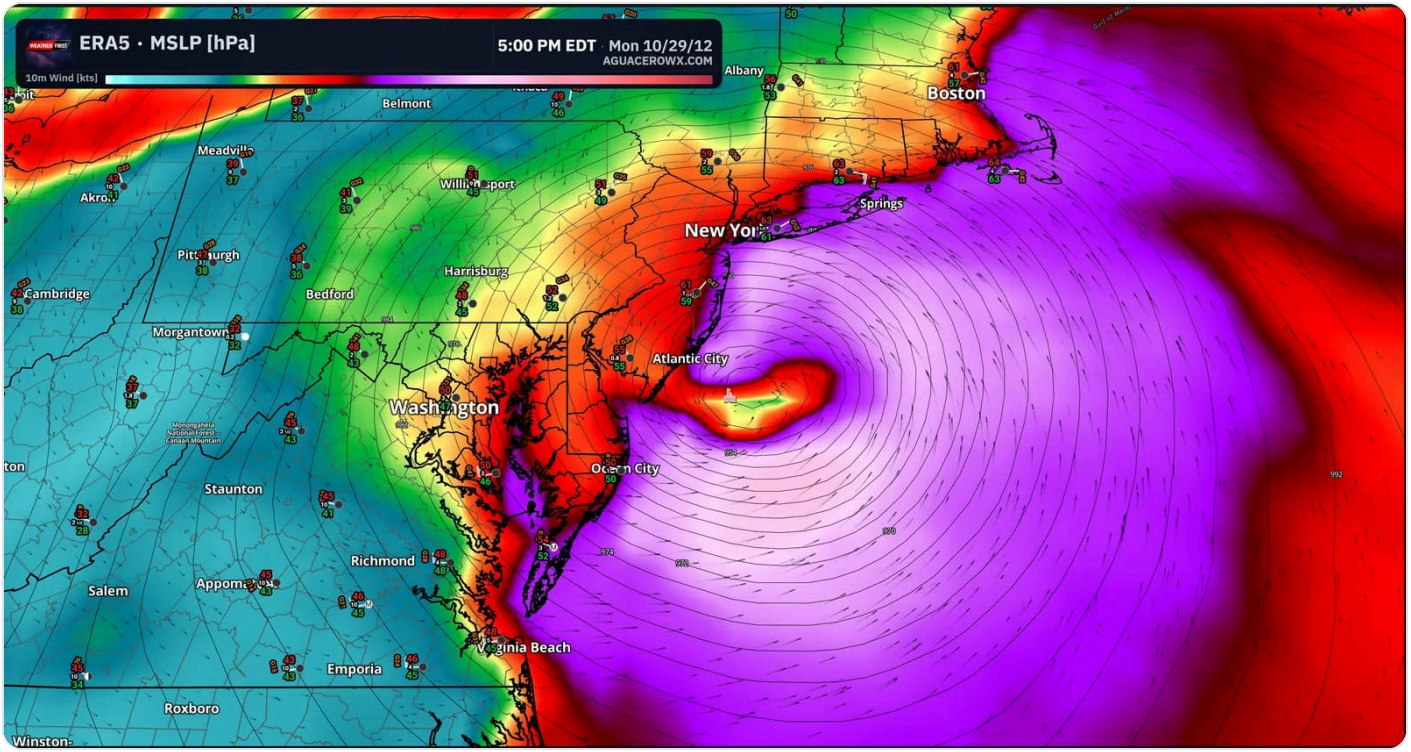


The ERA5 tab with its window and product list.

TIPS

- Some ERA5 products are anomalies, such as the 700–500 hPa lapse rate anomaly, which compare the event with climatology.
- To drop a product, click the remove button next to its name.

ERA5 windows can be 12 hours on Free, 24 hours on Enthusiast and 5 days on Professional.



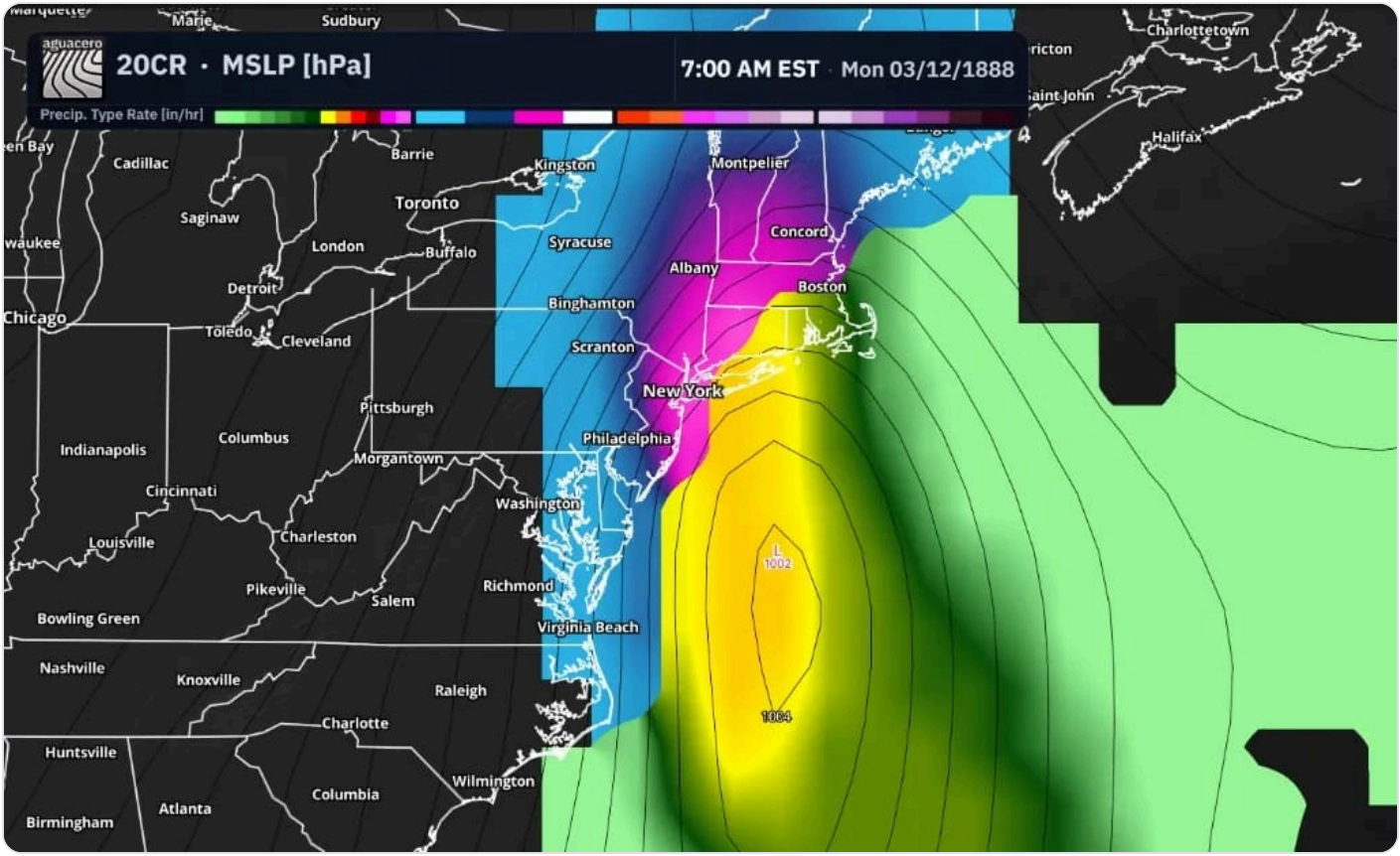
ERA5 sea-level pressure and wind for Hurricane Sandy at landfall.

04 20CR reanalysis back to 1836

The Twentieth Century Reanalysis covers 1836 to 2015, every 3 hours, for storms long before radar and satellites.

1. In the **Archive Builder**, click the **20CR** tab.
2. Set **Start** and **End** between 1836 and 2015.
3. Under **20CR products**, open **Add product…** and pick one or more fields.
4. Click **Load**.

20CR uses the same window limits as ERA5: 12 hours on Free, 24 hours on Enthusiast and 5 days on Professional.



20CR reanalysis of the Blizzard of 1888 over the Northeast.

05 Past HRRR and GFS runs and SPC outlooks

Reload an old HRRR or GFS run, and show the SPC convective outlooks that were in effect at the time.

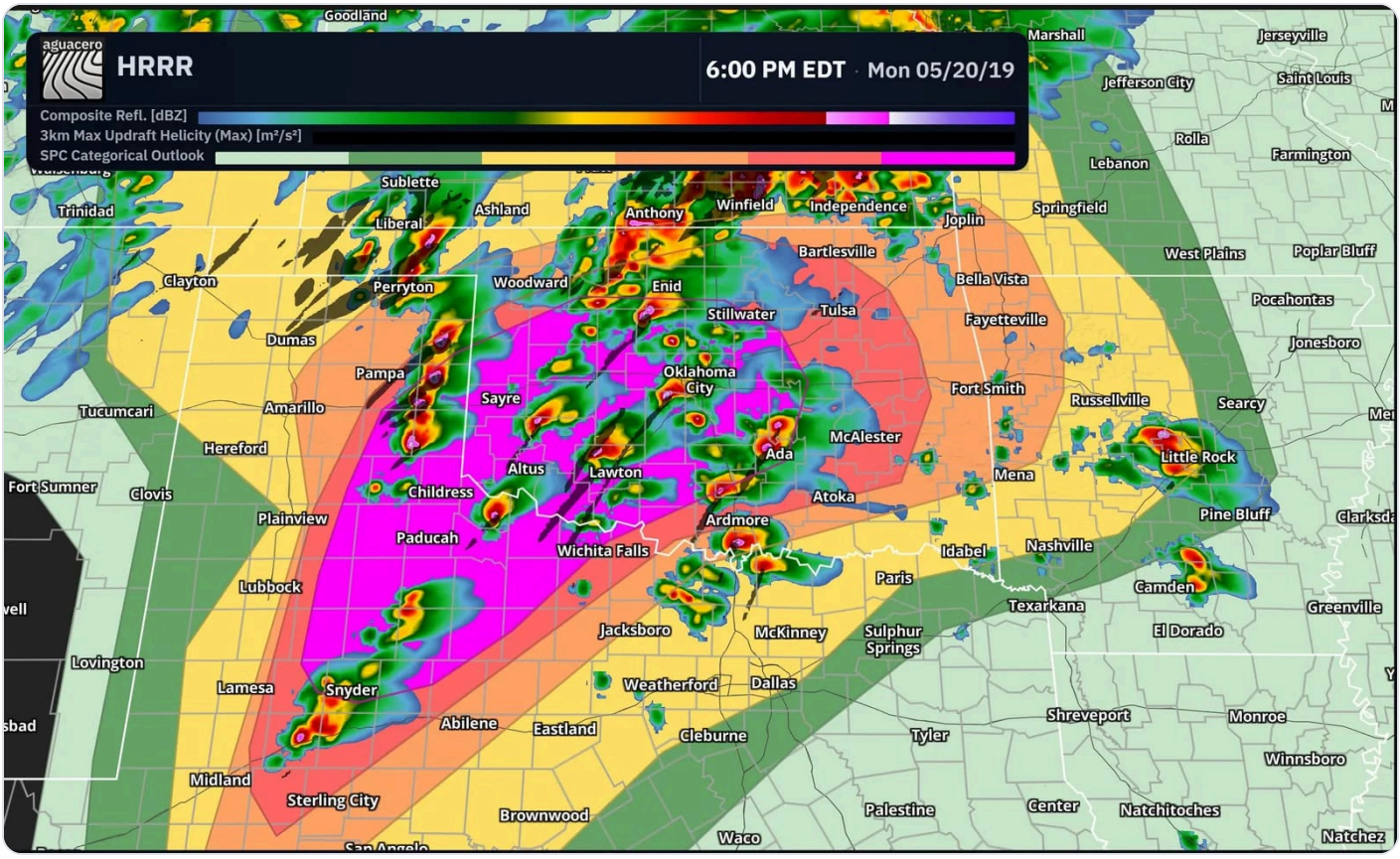
1. In the **Archive Builder**, click the **Models** tab.
2. Choose **HRRR** or **GFS** under **Model**.
3. Set **Init date (UTC)** and **Run (UTC)**, then pick the last forecast hour in **Max FH**.
4. Under **Variables**, open **Add variable…** and pick the fields you want.
5. Click **Load**.

For outlooks on their own, click the **SPC** tab, set the window, tick **SPC Categorical**, **SPC Tornado**, **SPC Wind** or **SPC Hail**, and click **Load**. On other tabs you can add the same outlooks under **Overlays**.

TIPS

- HRRR goes back to August 2014 and GFS to 2021. The note at the top of the tab shows the earliest date for the model you picked.
- Categorical SPC outlooks go back to 1987. Tornado, wind and hail probabilities start in 2002.

On Free, HRRR is limited to the 00, 06, 12 and 18z runs through forecast hour 18, and GFS through hour 72. Enthusiast and up get every run and forecast hour.



An archived HRRR run from May 20, 2019 under the SPC outlook.

06 Past observations, reports and warnings

Load surface observations back to 1900, storm reports from 2003, NWS alerts from 1986, damage surveys, ACARS from 2019 and historical RAOB soundings.

1. For surface observations alone, click the **ASOS** tab in the **Archive Builder** and set the window.

2. On any other tab, tick the extras you want under **Overlays**: **NWS alerts**, **Storm Reports**, **DAT damage** or **ASOS observations**.
3. Click **Load**.
4. To see soundings from the window, turn on **RAOB** or **ACARS** on the toolbar, then click a site.

TIPS

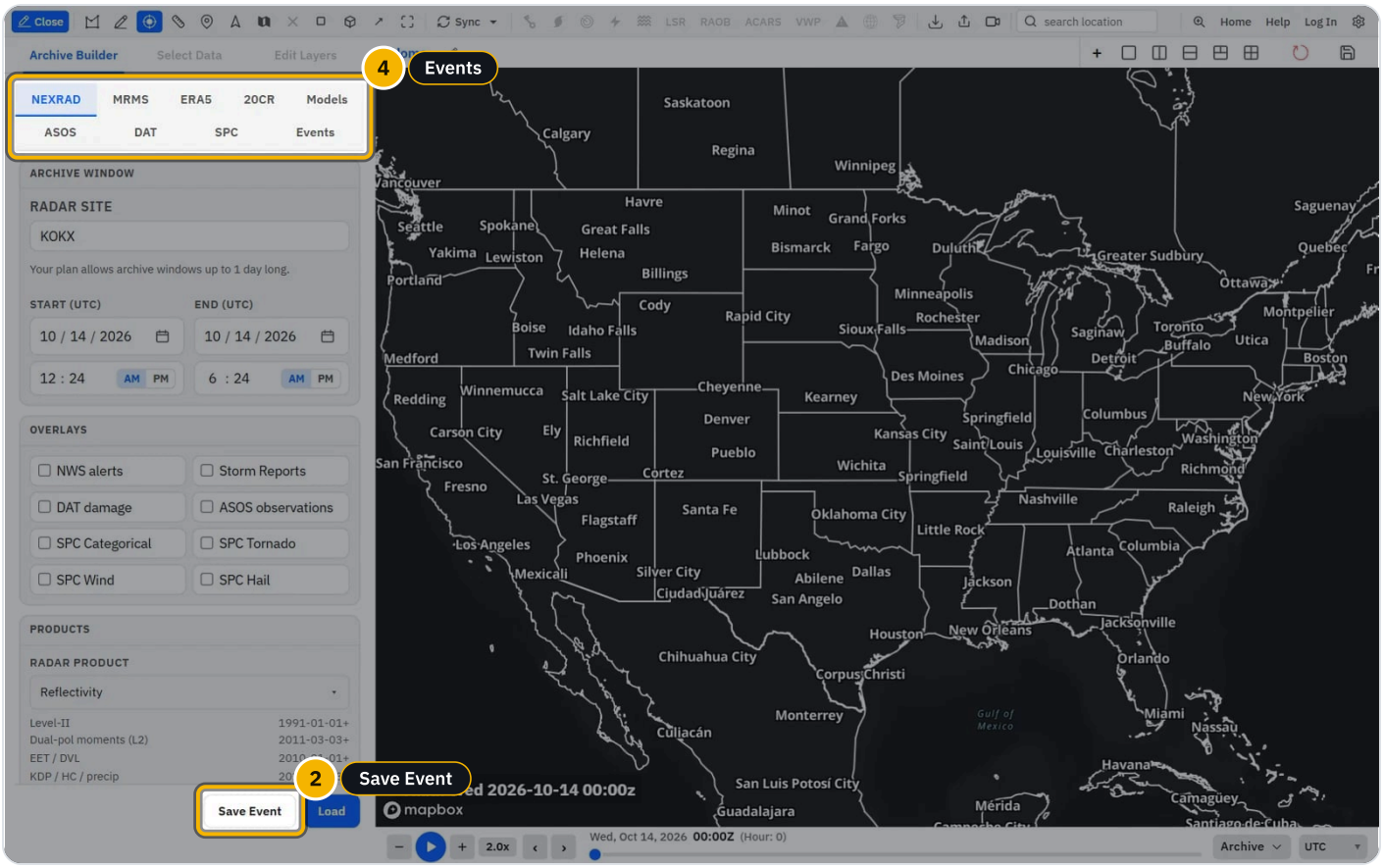
- An overlay that isn't available for your dates stays greyed out and shows the date its coverage starts.
- The **DAT** tab loads NWS damage surveys from 2010 on, with windows up to 30 days.

ASOS windows can be 4 hours on Free, 12 hours on Enthusiast and 3 days on Professional. **RAOB** and **ACARS** stay disabled until an archive window is loaded.

07 Save and reopen events

Save an archive window as an event so you can reload the same case later in one click.

1. Set up a window in the **Archive Builder**.
2. Click **Save Event** at the bottom of the builder. If the window isn't loaded yet, it loads first.
3. Enter a **Name**, **Category** and **Subcategory**, then click **Save Event**.
4. To reopen it later, click the **Events** tab and click the event's name.

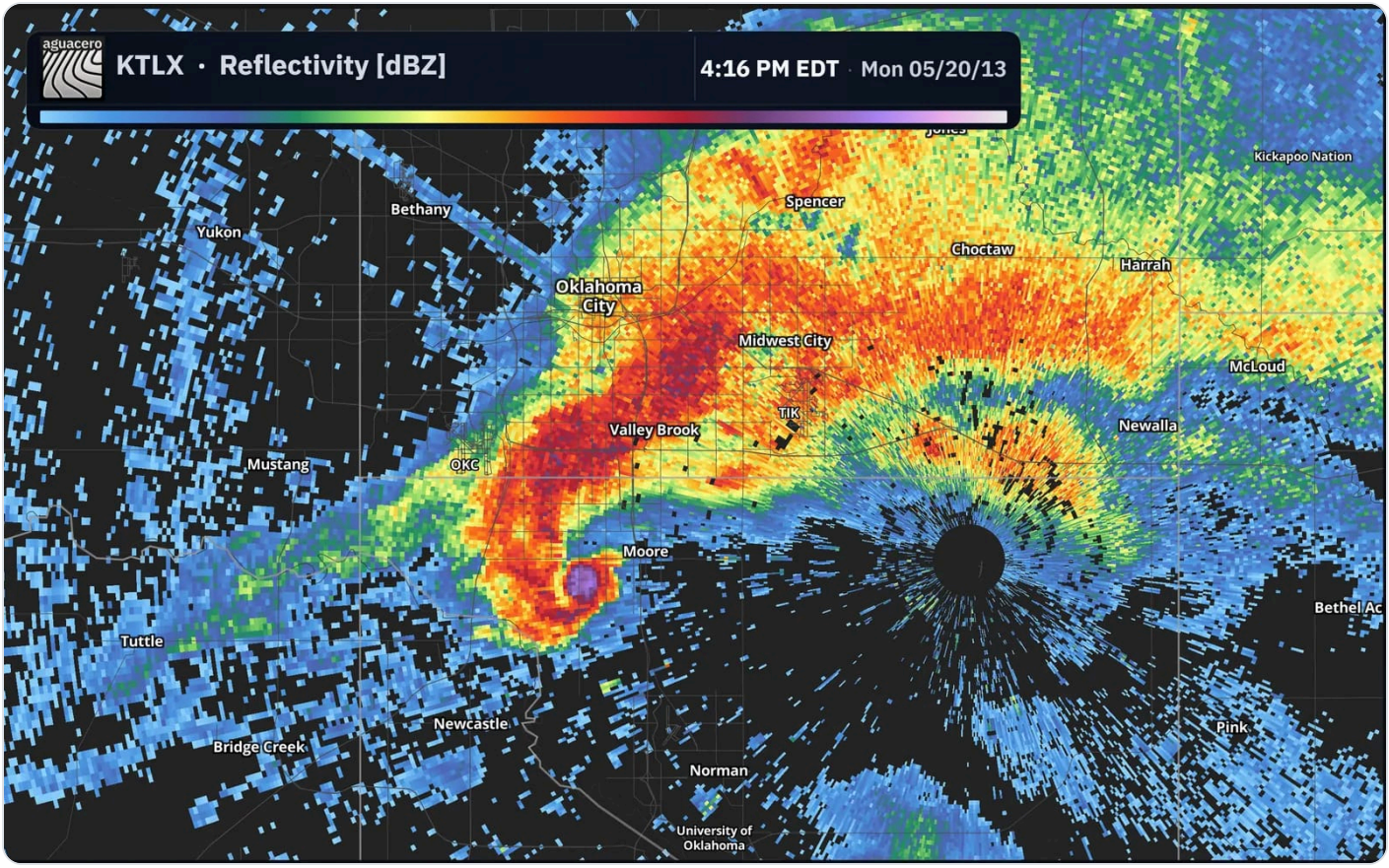


Save Event and the Events tab in the Archive Builder.

TIPS

- On the **Events** tab, use the pencil to change an event's name, category or window, then click **Update event**. The trash icon deletes it.
- Once a window is on the board, the save icon at the top right of the board also reads **Save Event**.
- Type in **Search events...** to find an event in a large library.

Sign in to save events. You can keep 1 event on Free, 5 on Enthusiast and unlimited events on Professional and up.



A saved event: KTLX reflectivity of the May 20, 2013 Moore tornado.

08 Common questions

Answers to the questions we hear most about Archive mode.

How far back does each dataset go?

NEXRAD Level II radar goes back to 1991 and Level III products to 1999, with dual-pol products from March 2011. MRMS starts in November 2014, with the full product list from October 2020. ERA5 covers 1940 to about a week ago, and 20CR covers 1836 through 2015. HRRR runs go back to August 2014 and GFS to 2021. Surface observations go back to 1900, NWS alerts to 1986, SPC categorical outlooks to 1987 (tornado, wind and hail from 2002), storm reports to 2003, DAT damage surveys to 2010 and ACARS soundings to 2019. A single radar site or station can start later.

How long can an archive window be?

It depends on the dataset and your plan. NEXRAD and MRMS: 1 hour on Free, 2 hours on Enthusiast and 24 hours on Professional and up. ASOS: 4 hours, 12 hours and 3 days. ERA5 and 20CR: 12 hours, 24 hours and 5 days. DAT and SPC: 30 days on every plan. **Models** has no window: you pick a run and its last forecast hour instead. The note in **Archive window** shows your plan's limit for the tab you're on.

Why does Load open an upgrade window instead of loading?

Your window is longer than your plan allows. Shorten it to your plan's limit, or upgrade. On **Models**, Free includes only the 00, 06, 12 and 18z HRRR runs through forecast hour 18, and GFS through hour 72, so other runs or hours ask you to upgrade too. On Professional and up, a window past the longest allowed shows an error with the maximum length instead.

Why is the Load button greyed out?

Something in the form is missing or out of range. Check that **End** is after **Start**, that you picked at least one product or variable, and that your dates are inside the range in the tab's note. On **SPC**, tick at least one outlook. Some products start later than their dataset, such as dual-pol radar products before March 2011 and most MRMS products before October 2020.

Why is my archive window taking so long to load?

Archive data is fetched and prepared when you ask for it, so it loads more slowly than live data. Radar windows can take up to 3 minutes, and the first request for an ERA5 or 20CR hour can take about a minute. Archived model runs unlock forecast hours as they're ready. Longer windows take longer, so start with a short one. To stop, click × on the loading message, then **Cancel loading**. That also leaves archive mode.

Why do I get No archive data available?

The source has nothing for that site or time. Radar coverage varies by site, especially in early years, so try a nearby site or another date. A few research radars, such as FWLX and GAWX, have live data only and aren't in the public archive. **Archive coverage gap** means the site's data stops partway through your window. What did load stays on the map, and a nearby site may cover the later hours.

How do I get back to live data?

On the time bar, open the menu that reads **Archive** and choose **Live**, or click **Exit archive** in the builder. Switching clears every layer on the board, so the layers you had before Archive don't come back on their own. Load a bundle or workflow from **Select Data** to get your live maps back. Switching from Live to Archive clears the board the same way, so save first if you want to keep it.

Which layers and tools work in archive mode?

Add Layer offers the products of the dataset you loaded, such as radar products for your NEXRAD site or ERA5 fields, plus custom layers. NWS alerts, storm reports, surface observations and RAOB soundings follow the archive window once it's loaded. The **Lightning**, **Tropical cyclones** and **Stream and tide gauges** buttons are live only and stay greyed out. **NEXRAD Sites** and cross sections need the NEXRAD dataset, **VWP** needs a window from 1999 on, and **ACARS** one from 2019 on.

Can I load my saved bundles and workflows in archive mode?

Yes, on **NEXRAD**, **MRMS**, **Models**, **ERA5** and **20CR** windows. **Select Data** lists only bundles and workflows of the matching data type, for example radar bundles on a NEXRAD window, and loads them into the archive window. ASOS, DAT and SPC windows have no **Bundle** or **Workflow** tab.

What time zone are the archive times in?

Start and **End** use the board's time zone, which you set in the time zone menu on the time bar. On **Models**, **Init date (UTC)** and **Run (UTC)** are always in UTC.

What does a saved event keep?

An event saves the dataset, window, products, overlays, panels and layer styles. It doesn't save the map position, map style or layout. NEXRAD events fly the map to the radar site when you open them.

Can I share a saved event?

No. Events are private to your account and have no share link. To share a case, export it with **Download board** or **Export animation**, or send the dataset, site and times so someone else can build the same window.

Why can't I save another event?

Your plan's event limit is full: 1 event on Free, 5 on Enthusiast and unlimited on Professional and up. Delete one on the **Events** tab with the trash icon, or use the pencil on an existing event to change it and click **Update event**. Events have their own limit and don't count against your saved workflows.

Why does an event I saved earlier ask me to upgrade?

Each time you open an event, it’s checked against your current plan. If you saved it on a higher plan with a longer window, or with a model run Free doesn’t include, opening it asks you to upgrade. Use the pencil on the **Events** tab to fit the window or run to your plan, then click **Update event**.

Why can’t I find Archive on my phone?

The **Live** / **Archive** menu is only on the time bar of the full-size layout. The phone layout doesn’t have it, so open AguaceroWx on a computer to replay past events.