

The “Advanced Techniques” of MIMIC-TPW2

Tony Wimmers

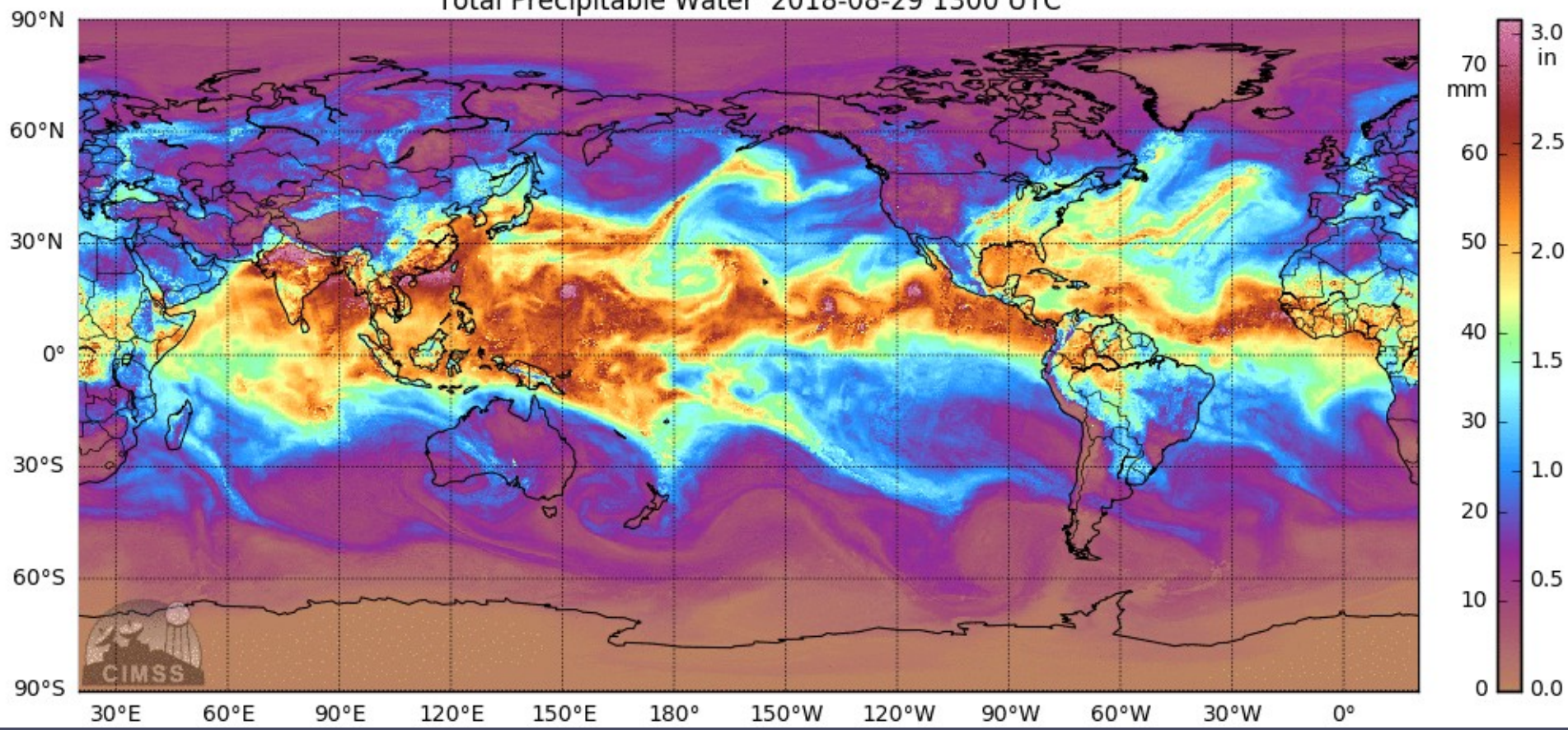
With contributions from Chris Velden, Jordan Gerth and Scott Bachmeier

Cooperative Institute for Meteorological Satellite Studies
University of Wisconsin - Madison



R&D supported by JPSS Risk Reduction, and the Naval Research Lab
and Office of Naval Research

Total Precipitable Water 2018-08-29 1300 UTC



The Uniqueness of TPW & LPW

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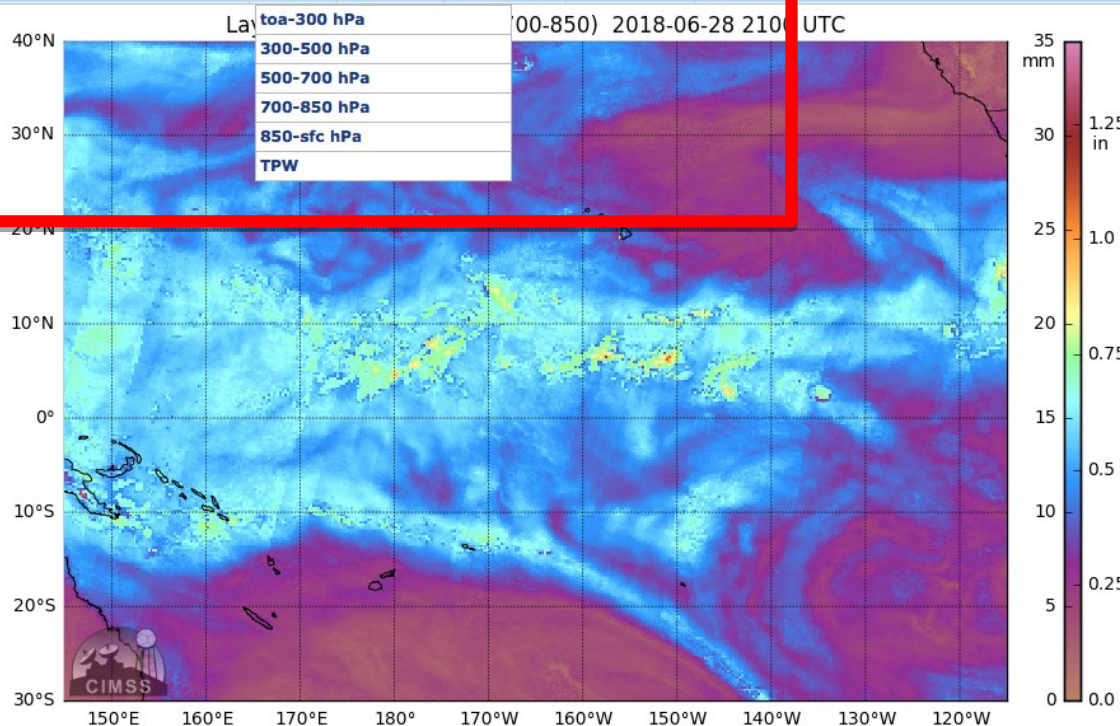
MIMIC-TPW VER.2M



Real-time Archive About News Credits MIMIC-TPW "1"

Real-time Product View

Color Scale Layer Domain Timespan Animation Page loaded on 2018-Jun-29 02:11:30 UTC



What's New

12 June 2018

We have added a "TPW" field that integrates all the sublayers. You can find it at the bottom of the "Layer" menu.

1 June 2018

Check out the new "Mid-Pacific" domain designed for forecasting in the U.S. Pacific Region.

17 May 2018

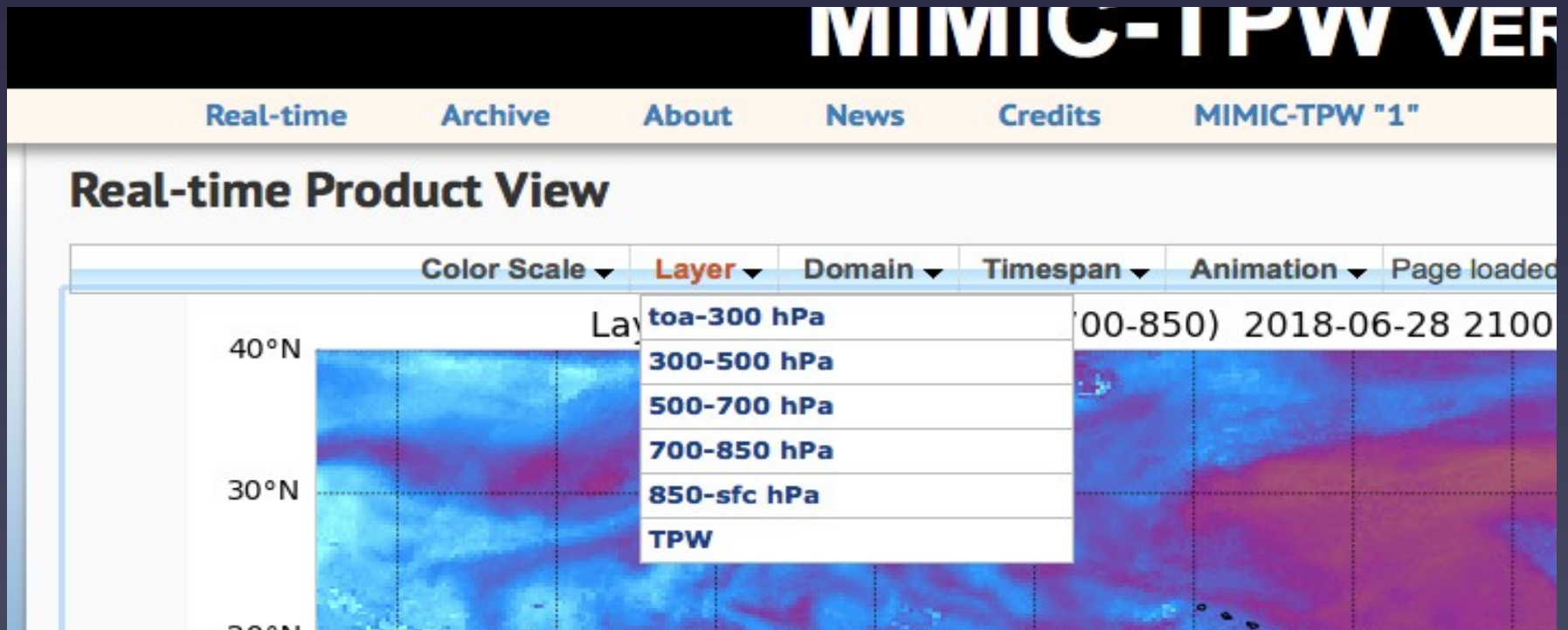
This new page has experimental multilayer retrievals. Select "Layer" from the menu to view one of four layers in the troposphere.

Contact us

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University of Wisconsin - Madison
1225 W. Dayton Street, Madison, WI 53706, USA

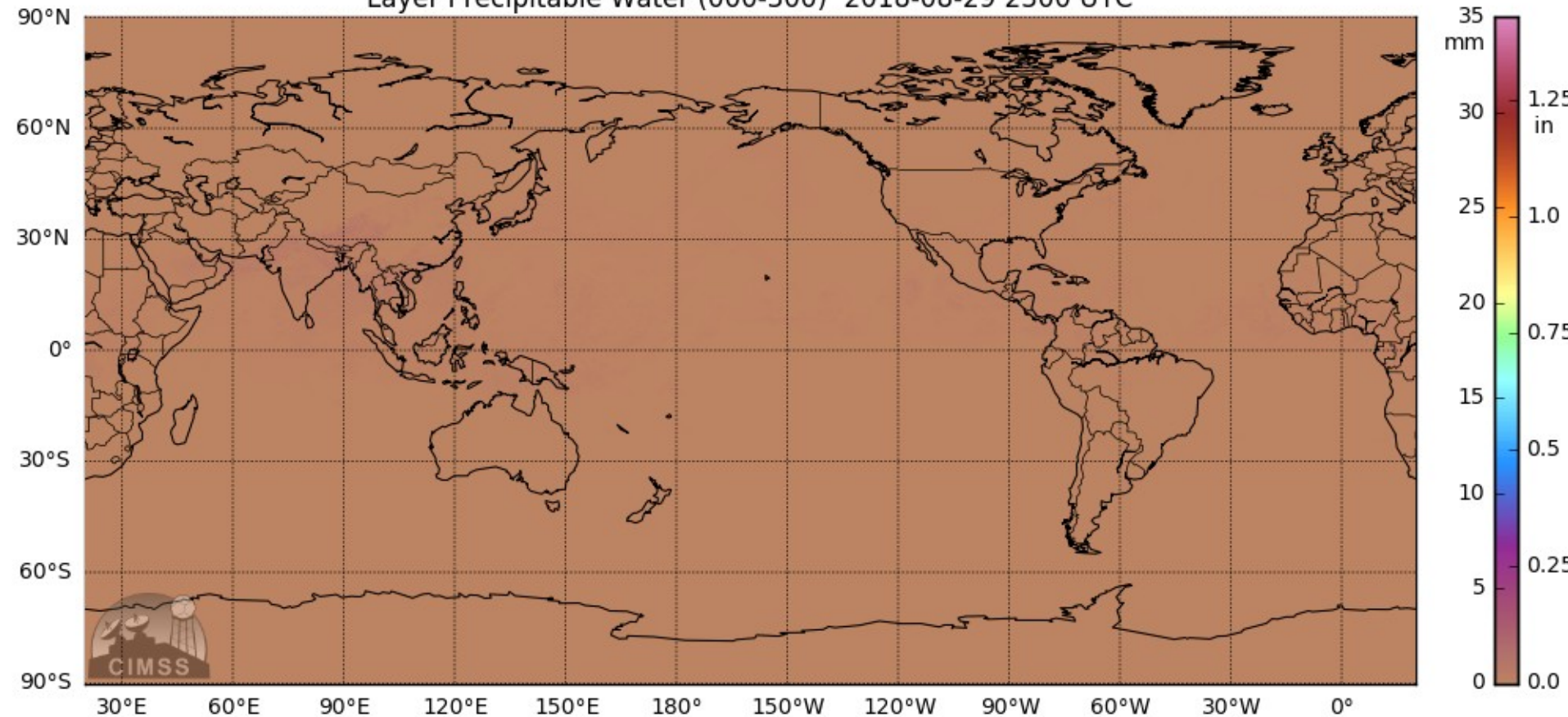


The Uniqueness of TPW & LPW



The Uniqueness of TPW & LPW

Layer Precipitable Water (000-300) 2018-08-29 2300 UTC



The Uniqueness of TPW & LPW

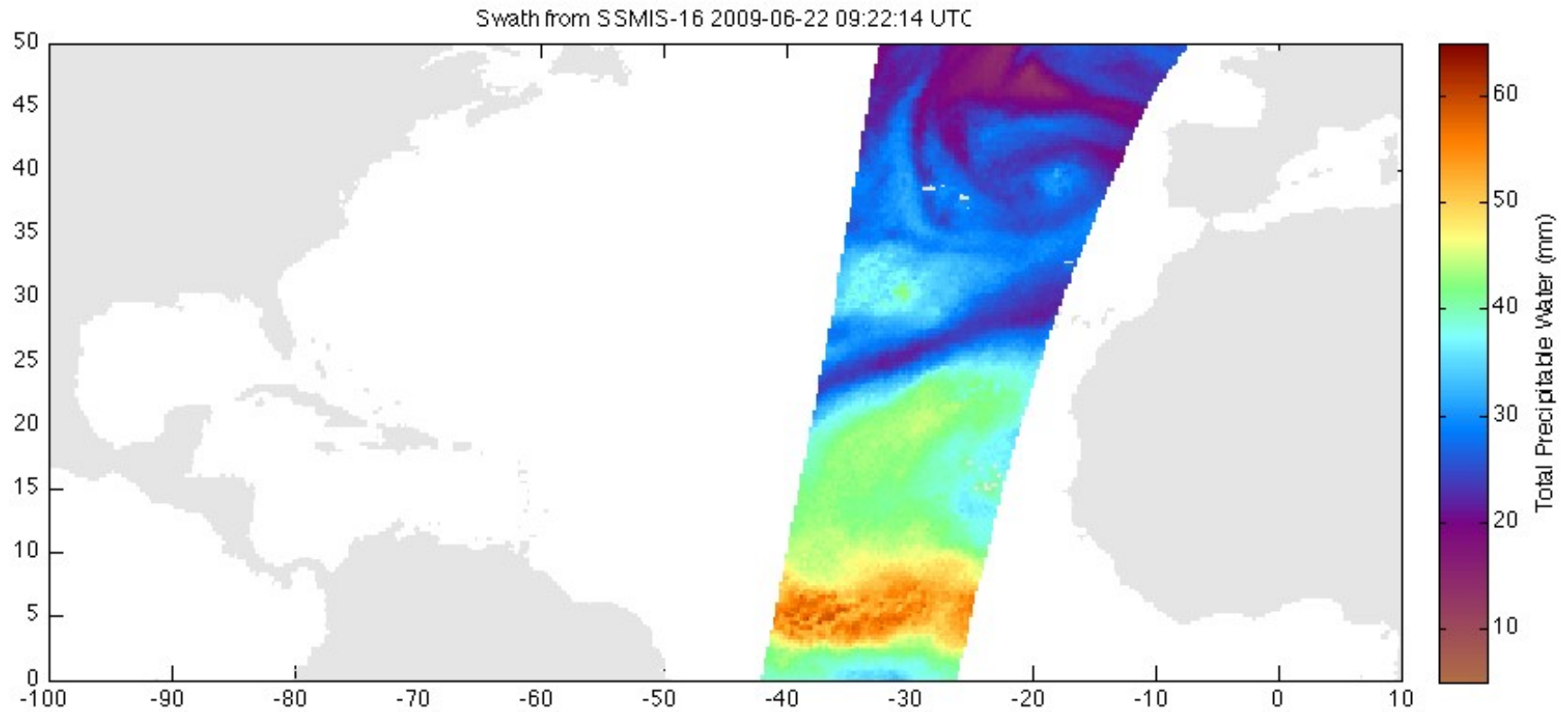
- Sampled by MiRS at ~4-6 hours
- Long-lived: Normally ~9-18 hours duration with advection
- Globally observed (over water, land, ice) with almost no gaps
- Highly consequential atmospheric quantity
- Clean, detailed retrieval with no significant noise
- How many products can you name that have all these qualities?
 - Temperature? (no major surprises)
 - Trace gases? (noisy, obscured by cloud)

The “Advanced Method” of advective blending

- The retrieval is pushed and pulled with a weighted average of wind
 - Weighting function comes from a climatology of specific humidity

Data advected from 09:22 UTC

2009 / 06 / 22

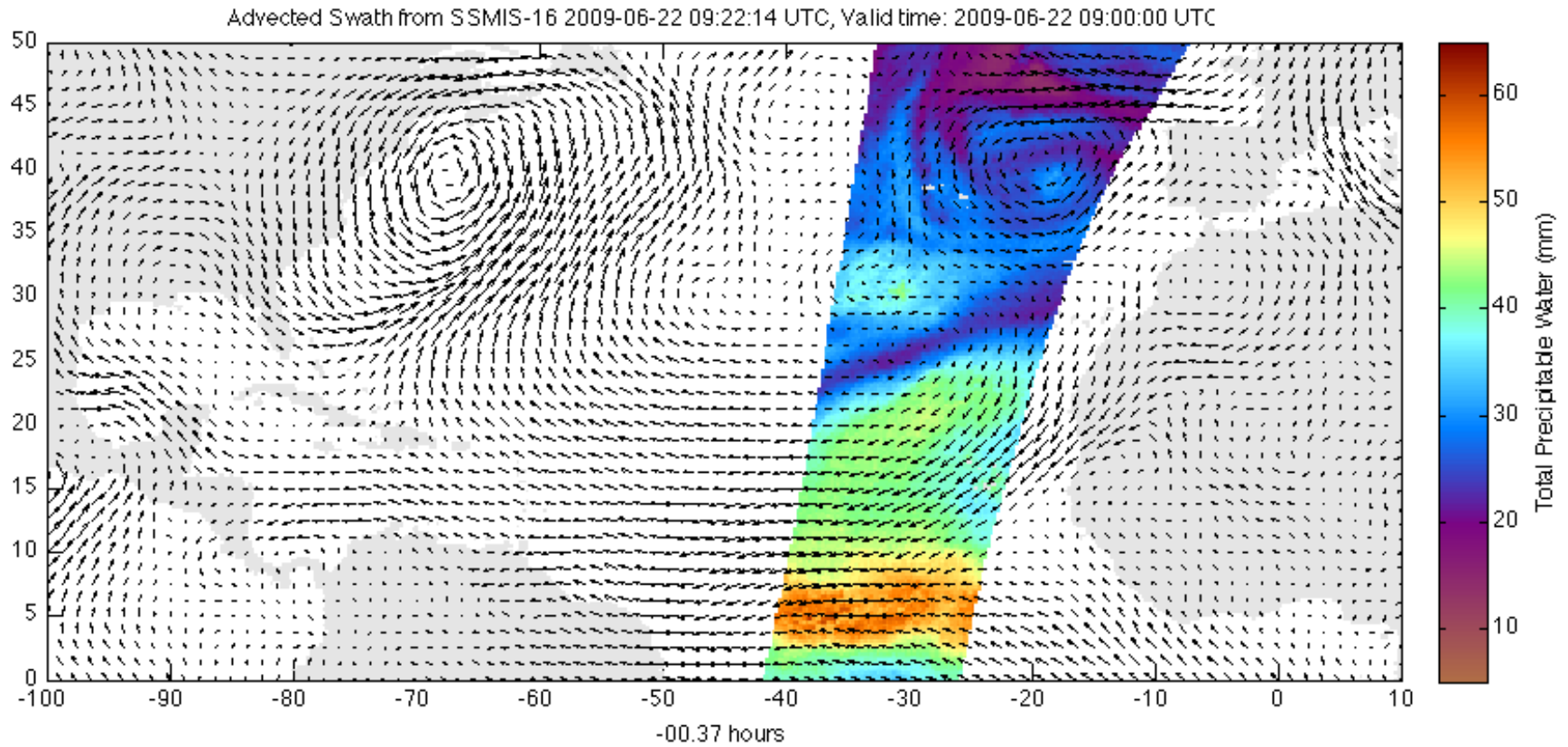


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Data advected from 09:22 UTC

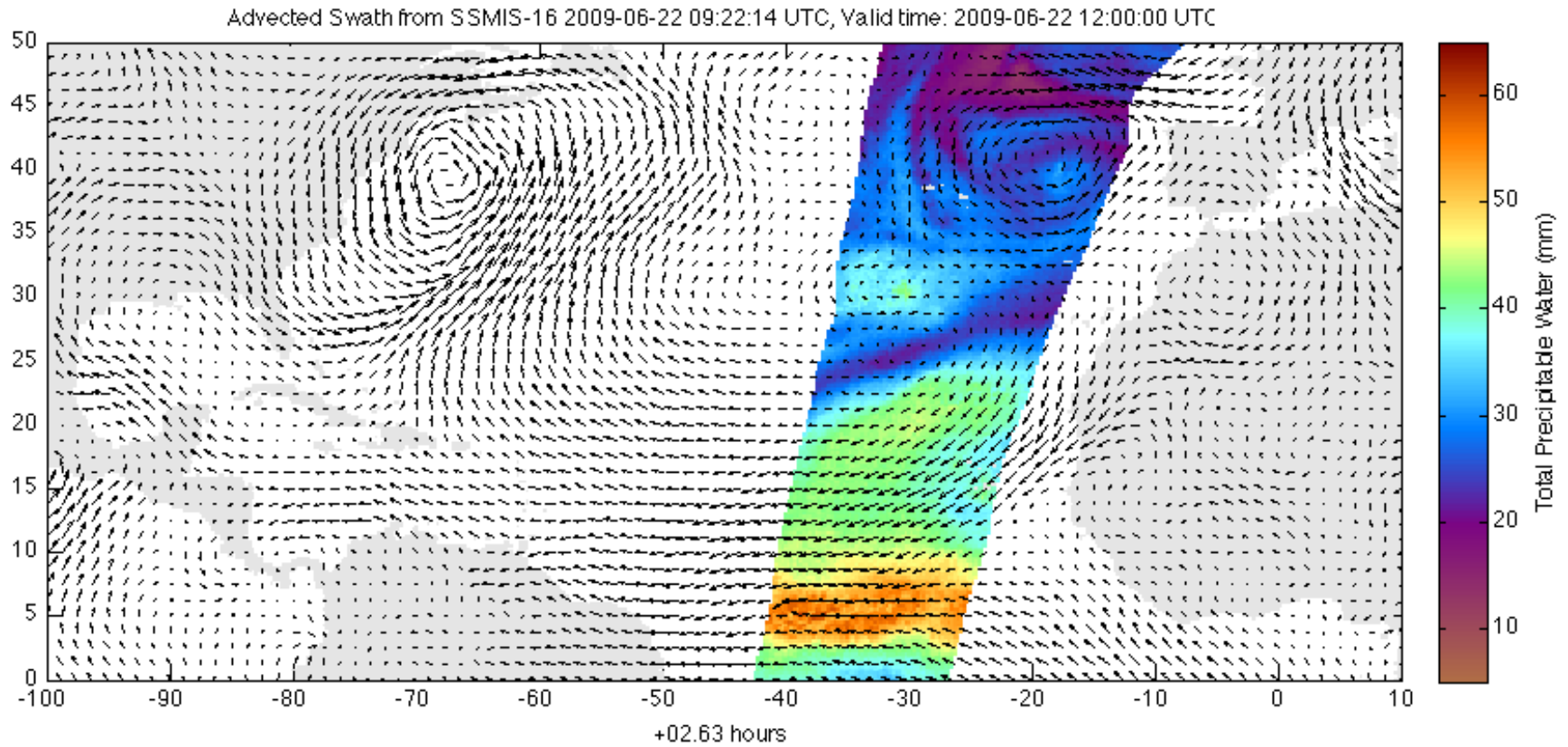
2009 / 06 / 22



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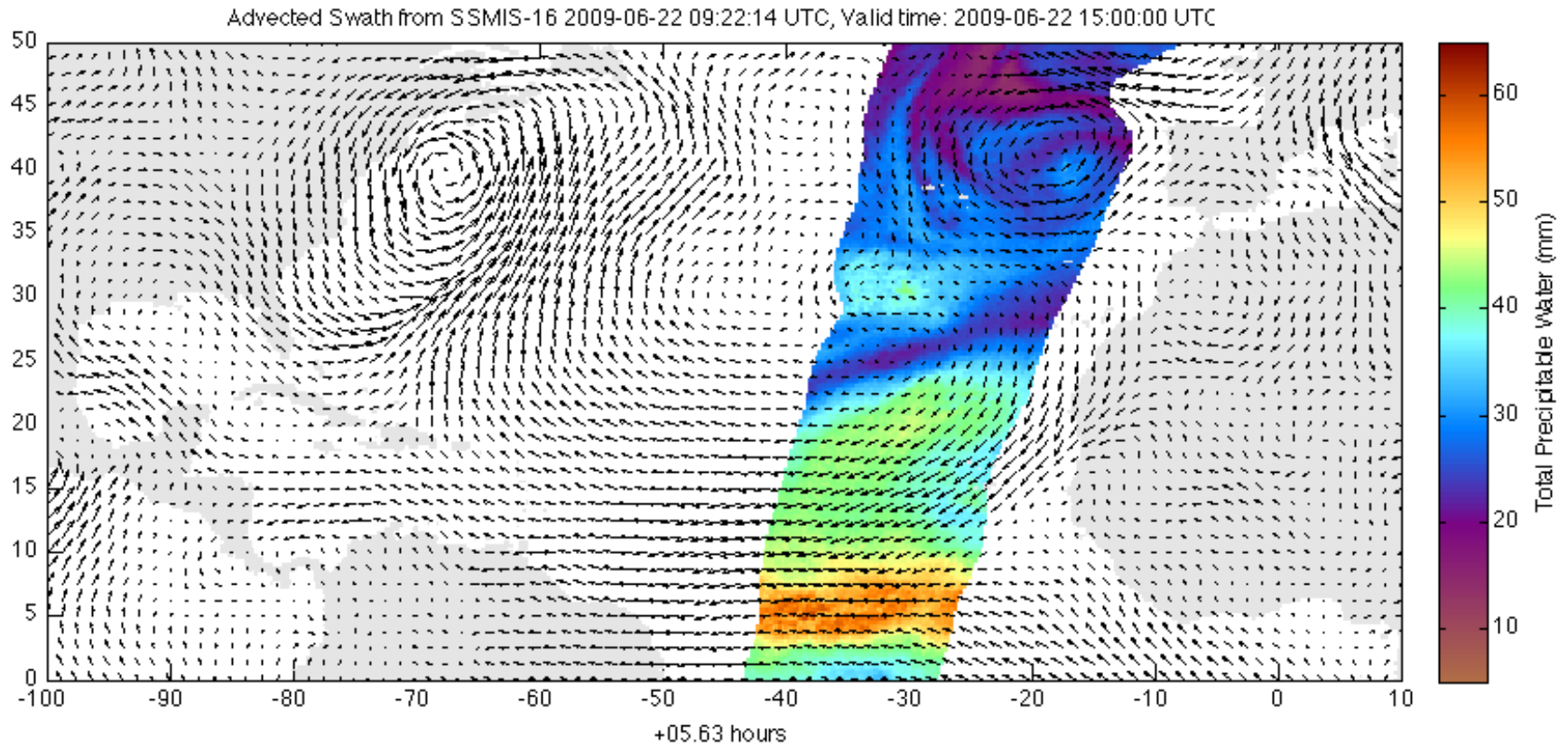
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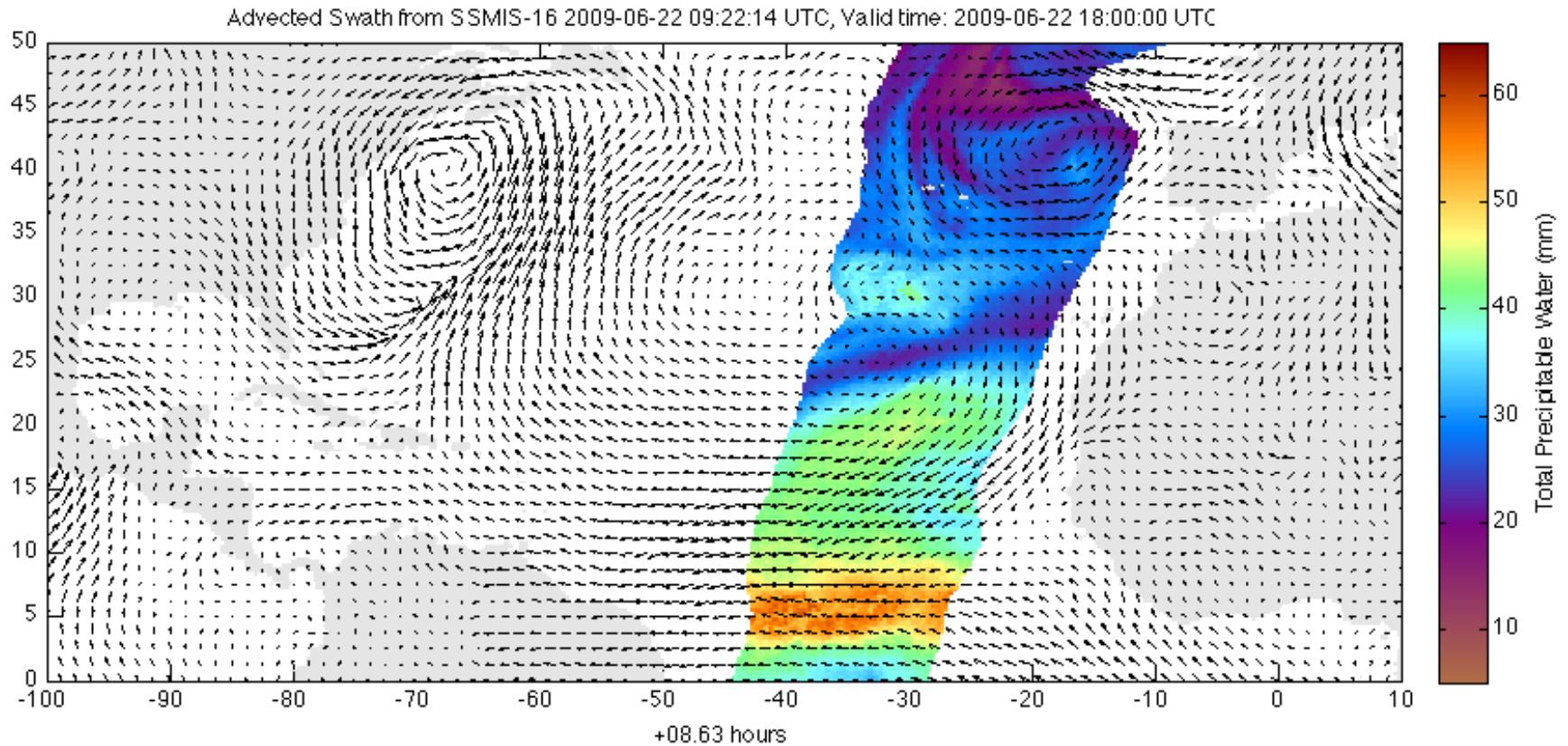
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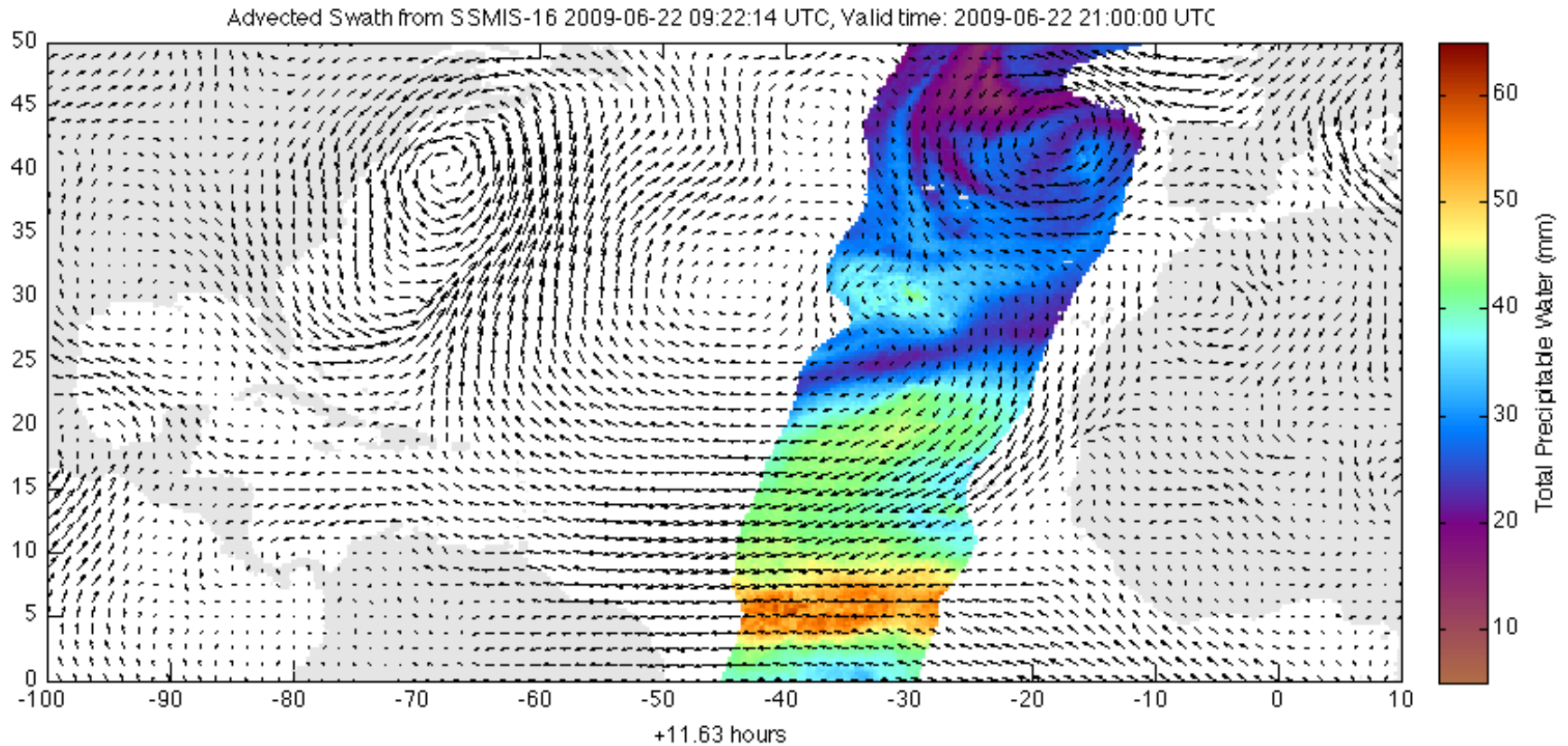
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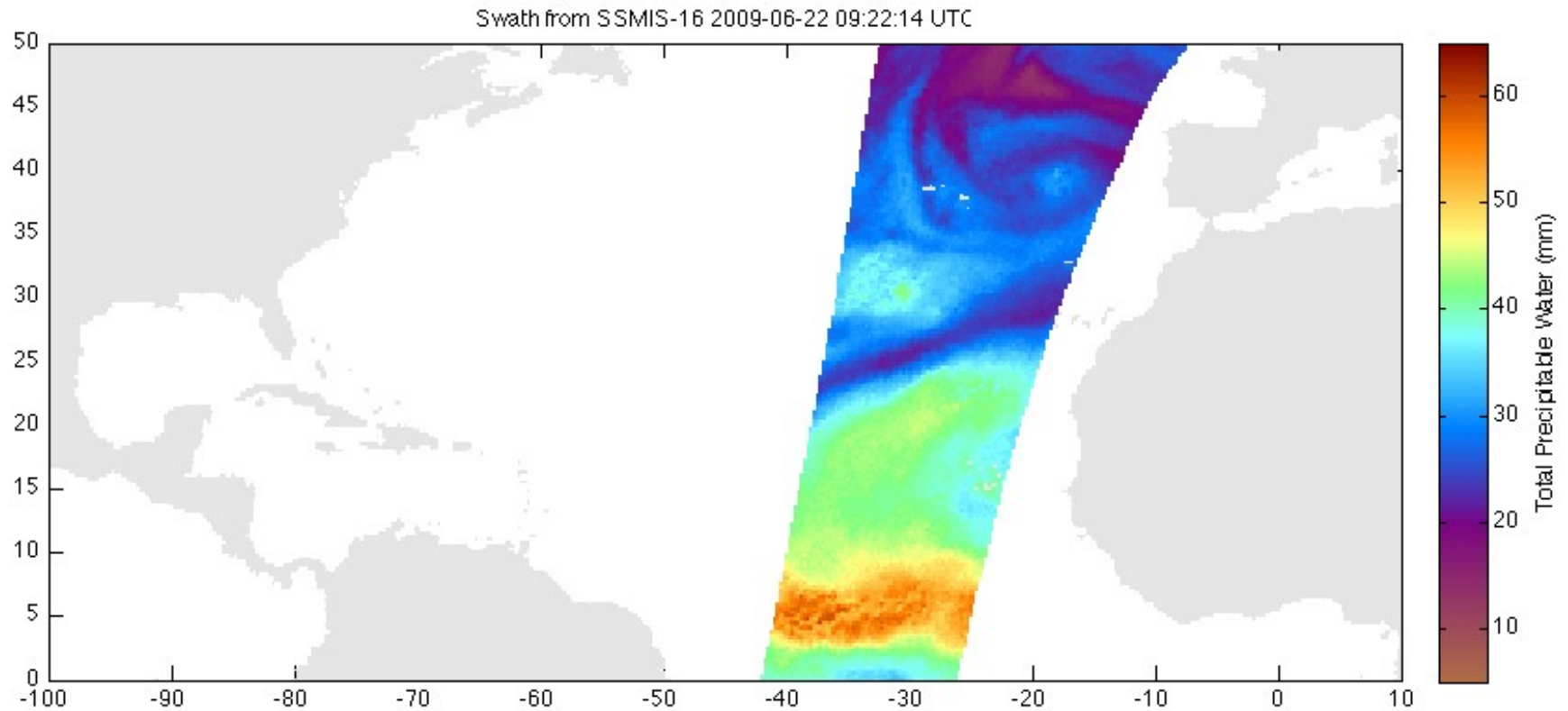
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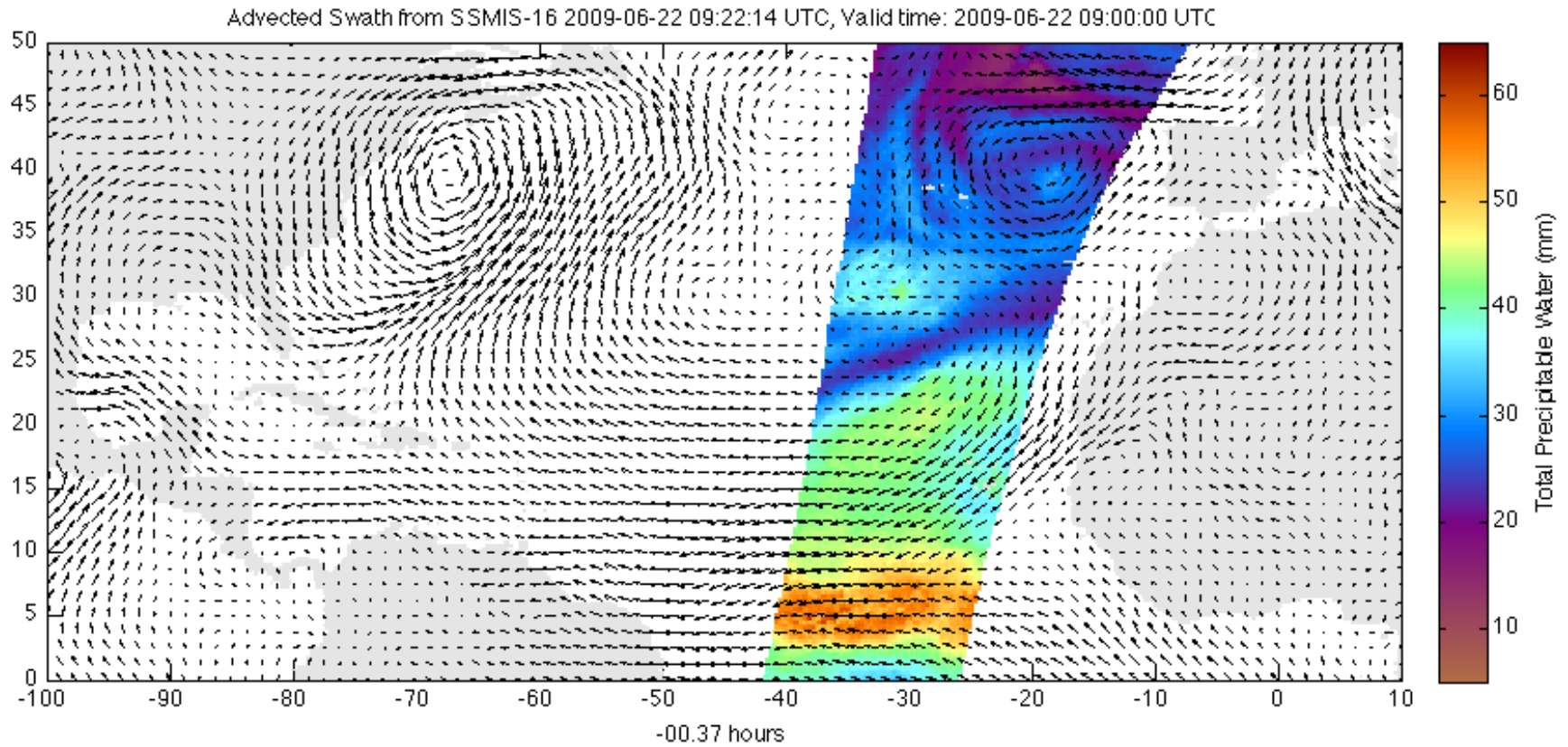


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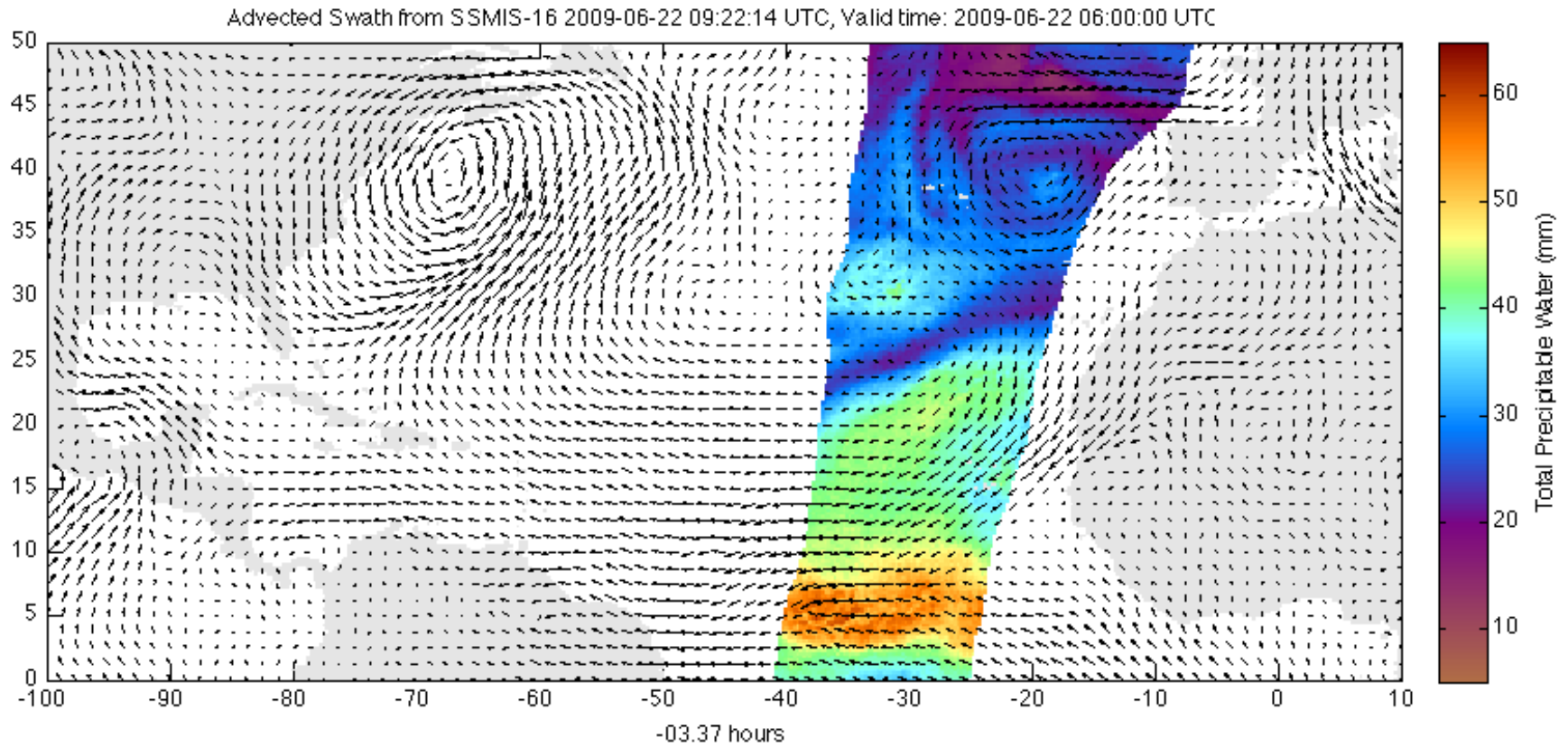
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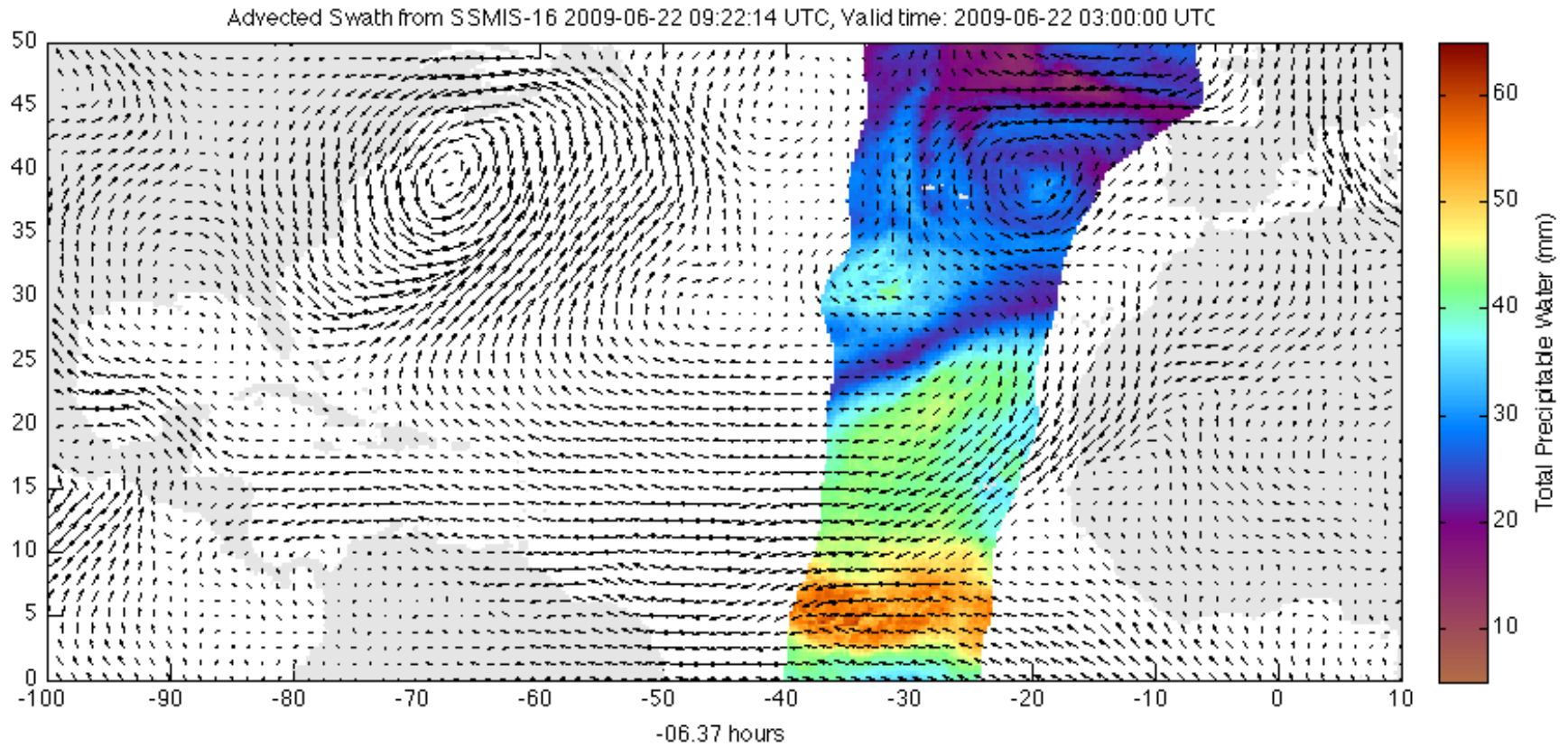
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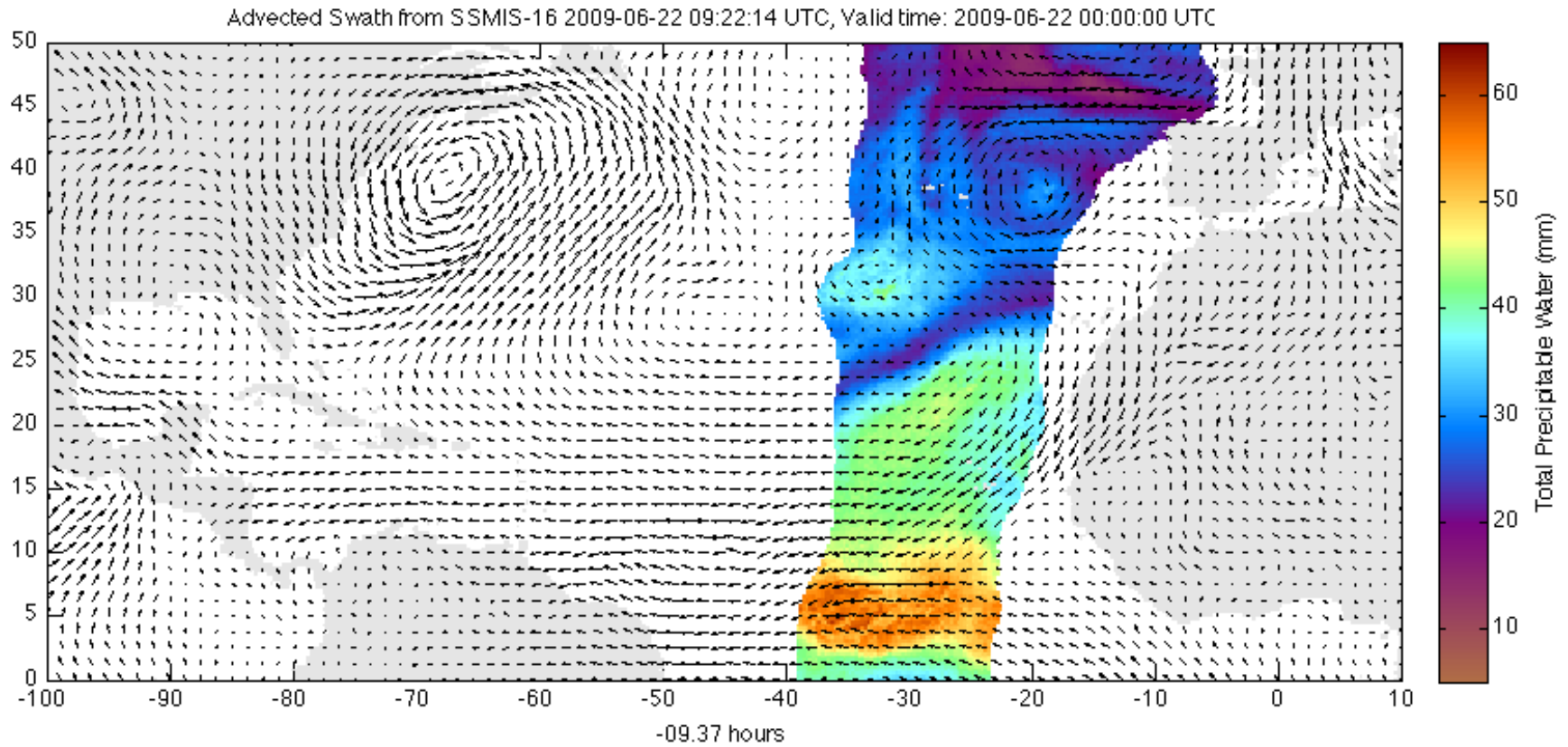
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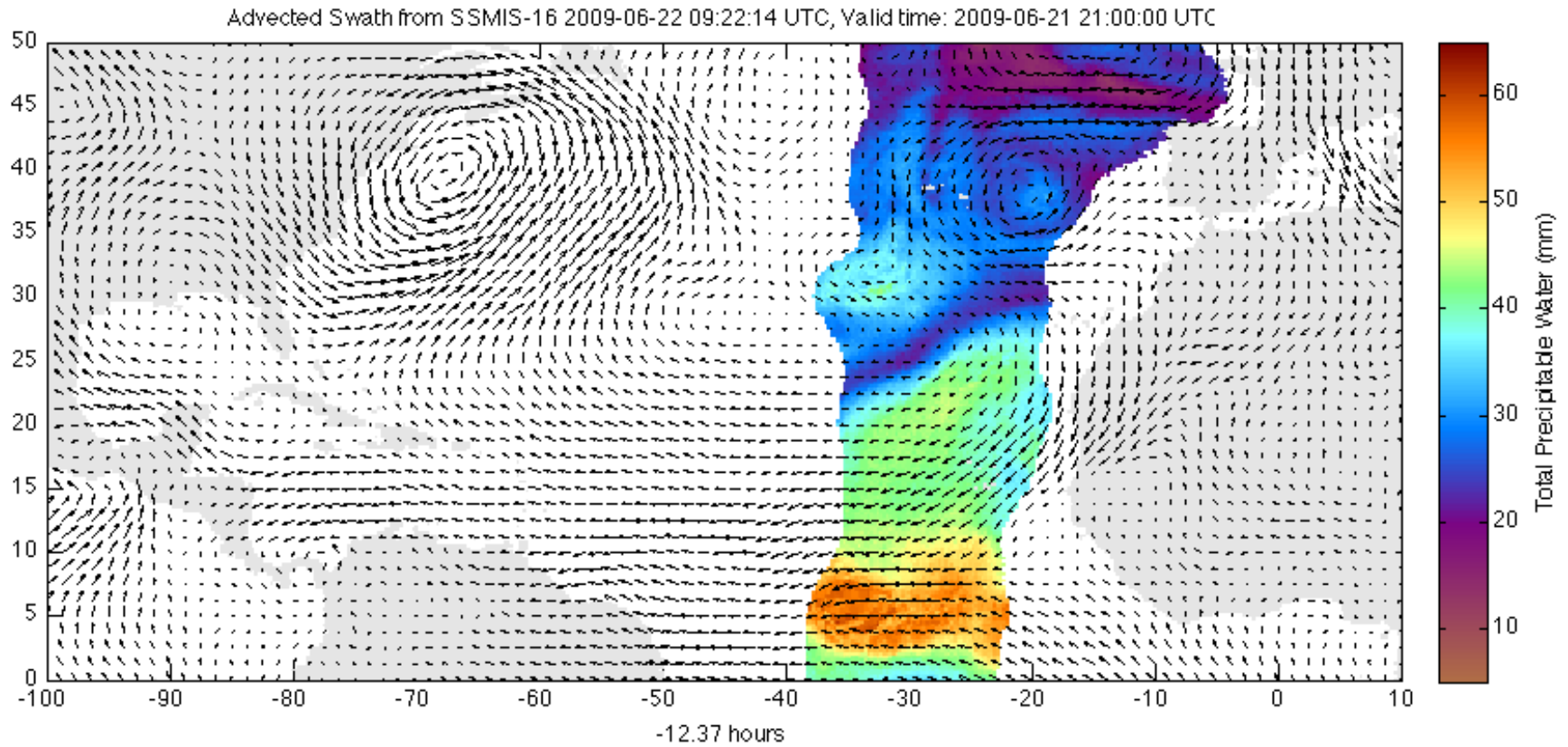
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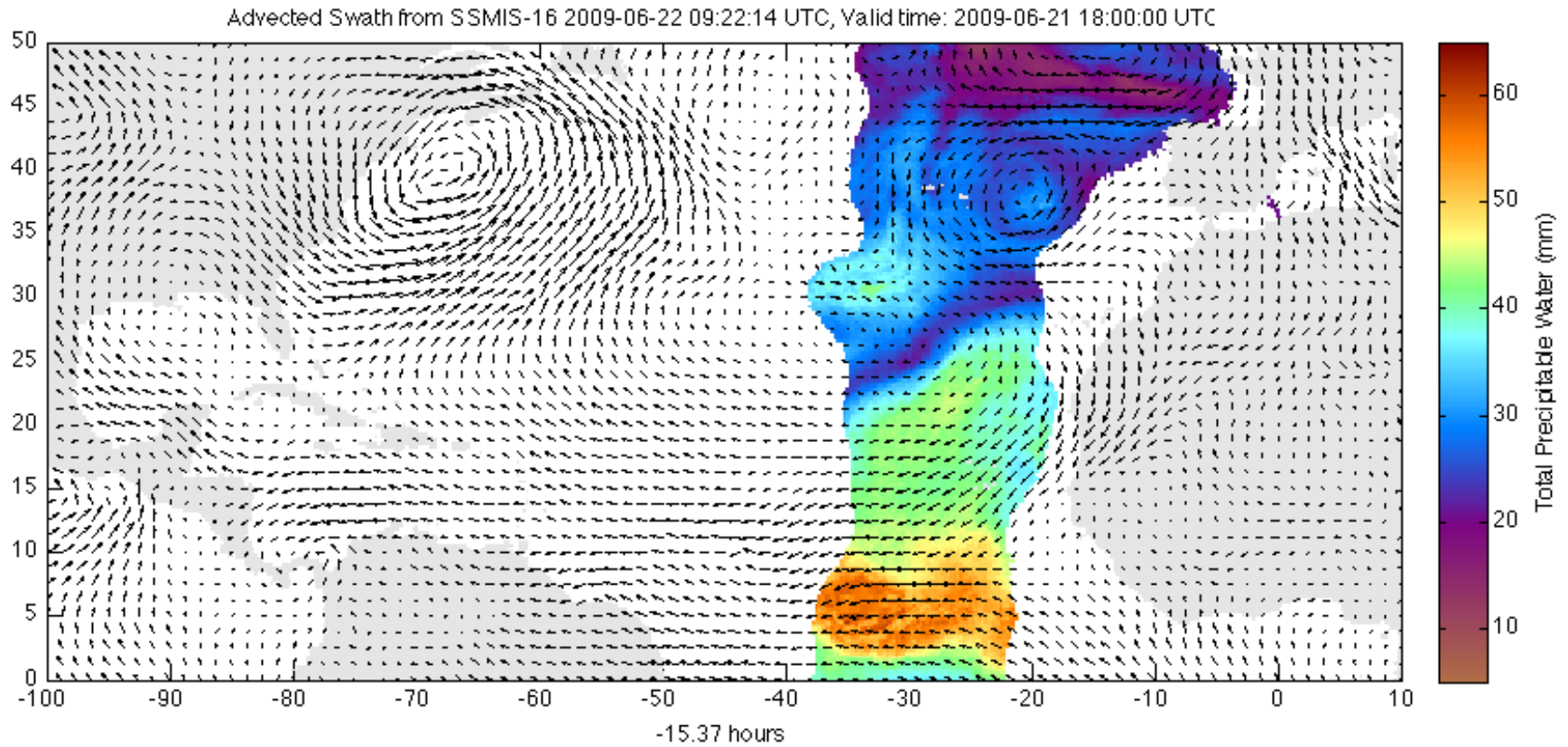
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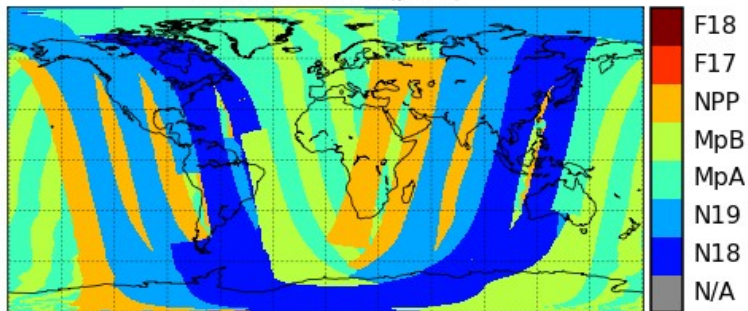
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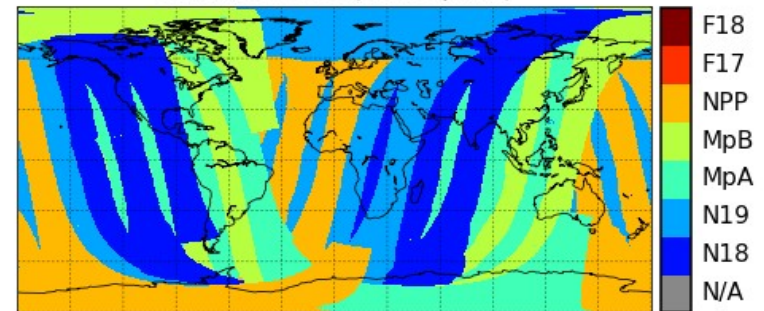
The “Advanced Method” of advective blending

- The retrieval is pushed and pulled with a weighted average of wind
 - Weighting function comes from a climatology of specific humidity
- *After that*, the TPW/LPW values are averaged temporally

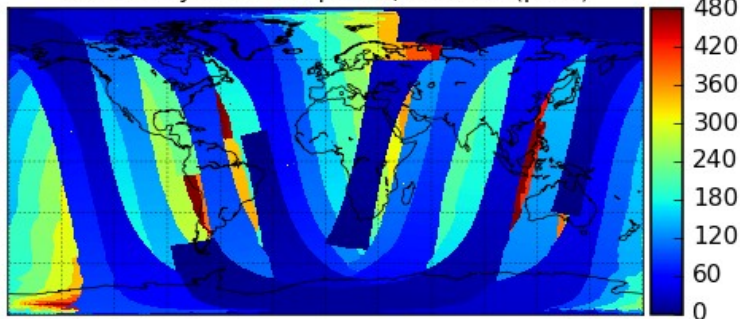
Satellite source (prior)



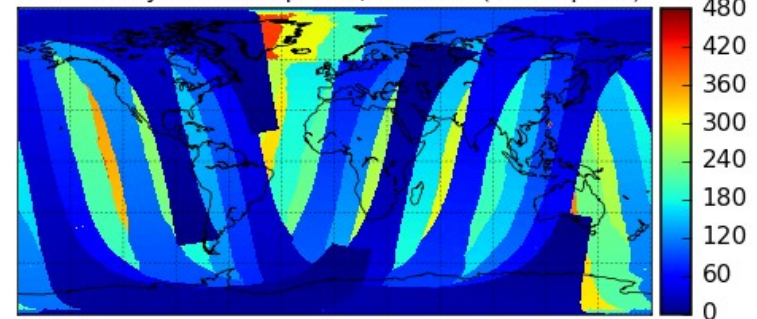
Satellite source (subsequent)



Time away from composite, minutes (prior)

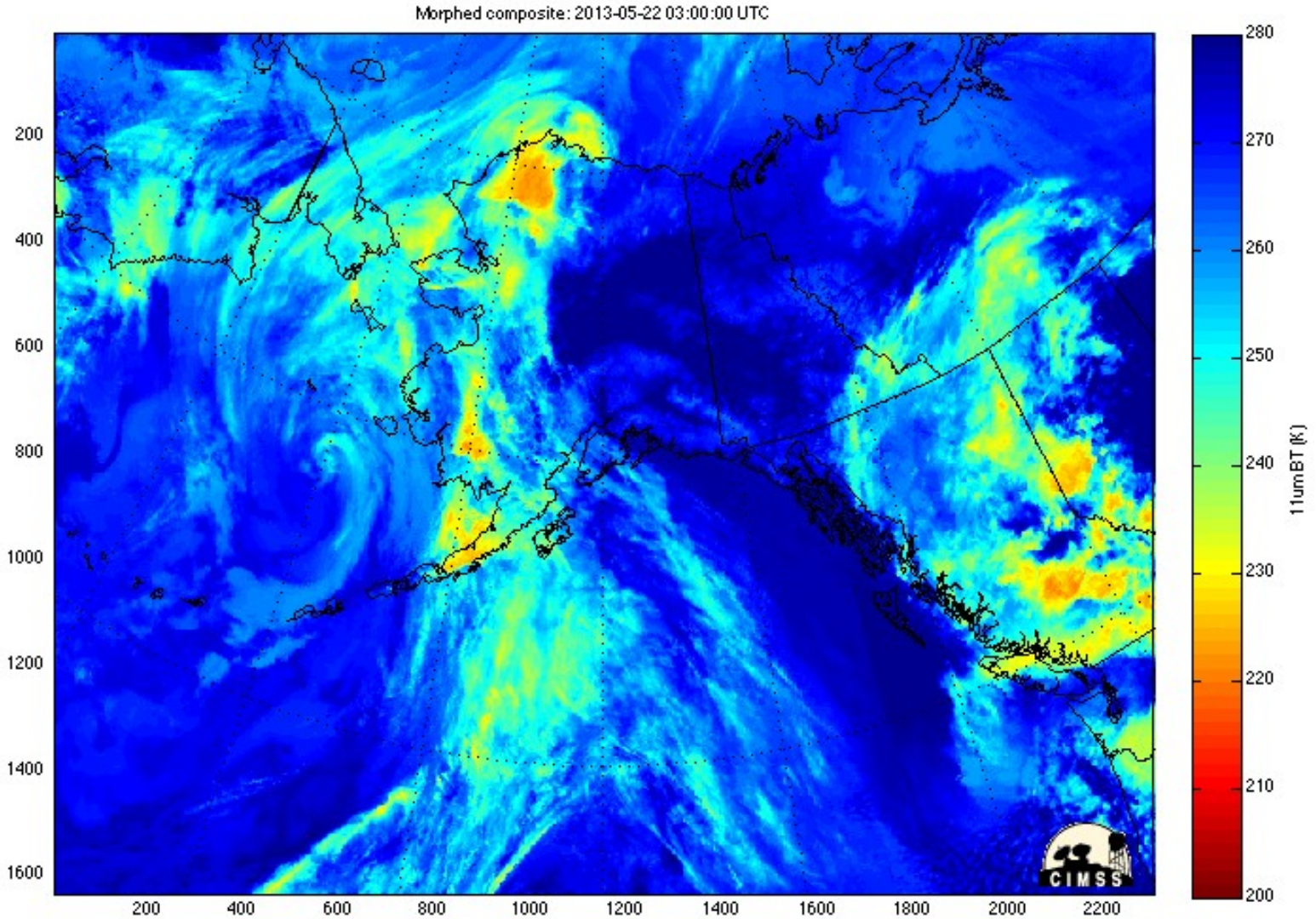


Time away from composite, minutes (subsequent)

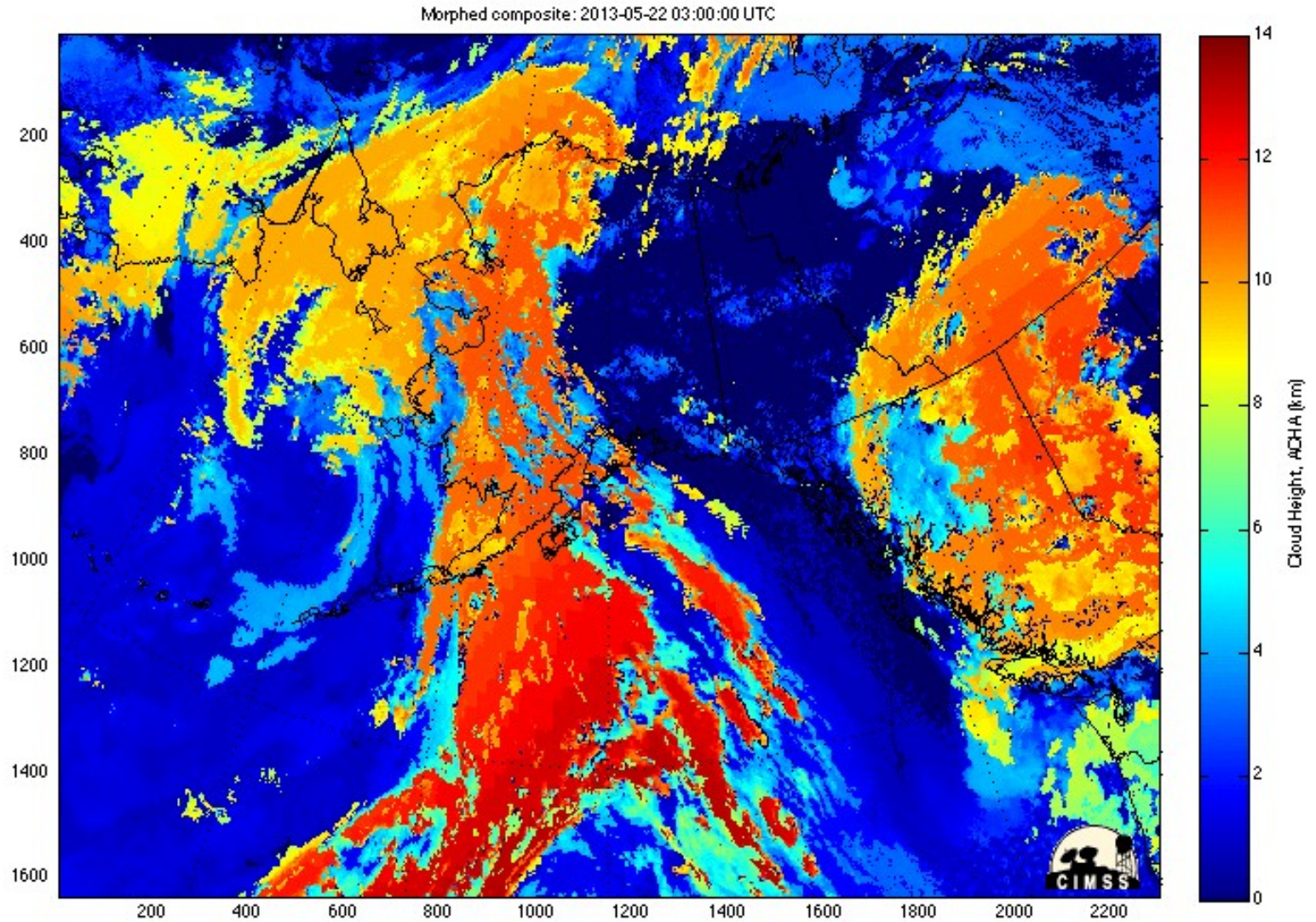


Temporal continuity

Temporal continuity



Temporal continuity

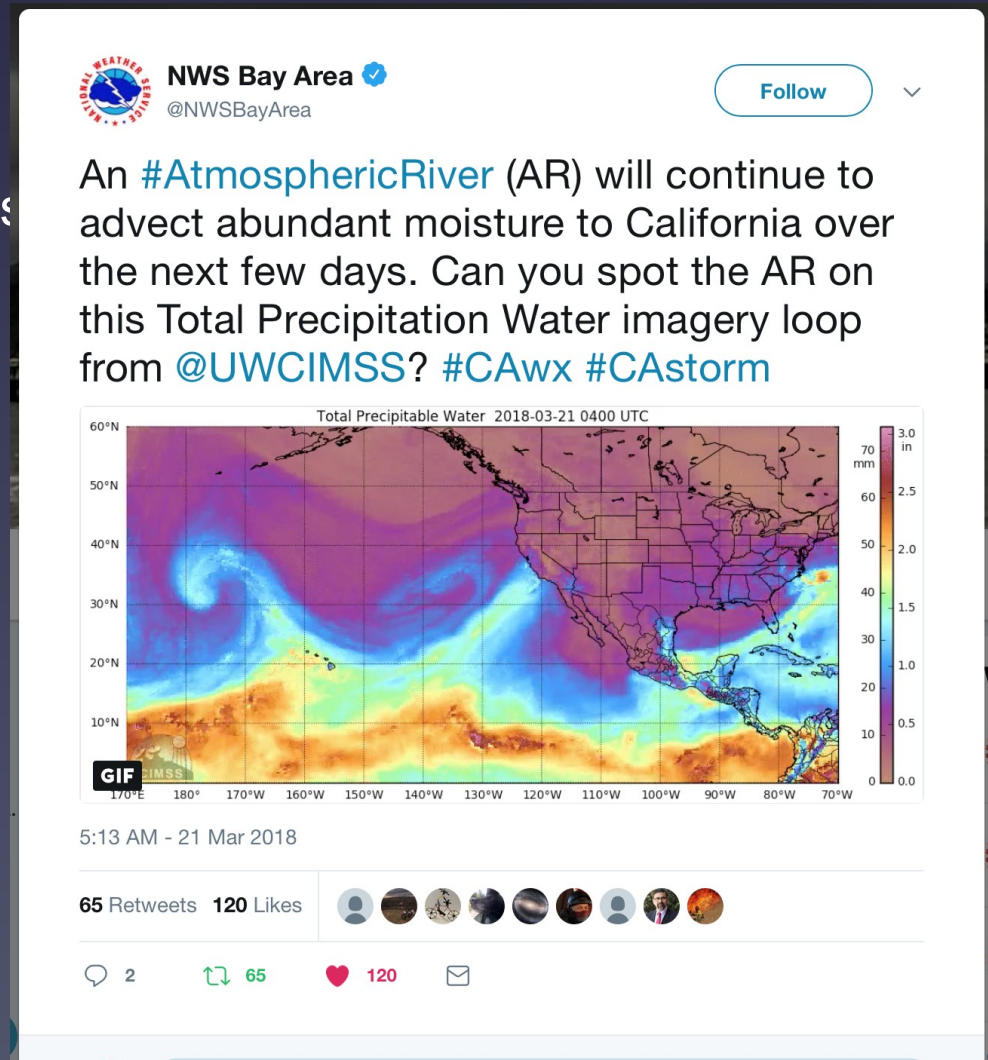


Temporal continuity

- *Temporal continuity* is usually not driven by developers
 - Notice “temporal continuity” is not in any product requirements
 - Is it implied in the “accuracy” requirement maybe?
 - It is generally not pushed by end-users either. (MIMIC-TPW was not requested by the forecasters. But they sure want morphed TPW products now.)

User response

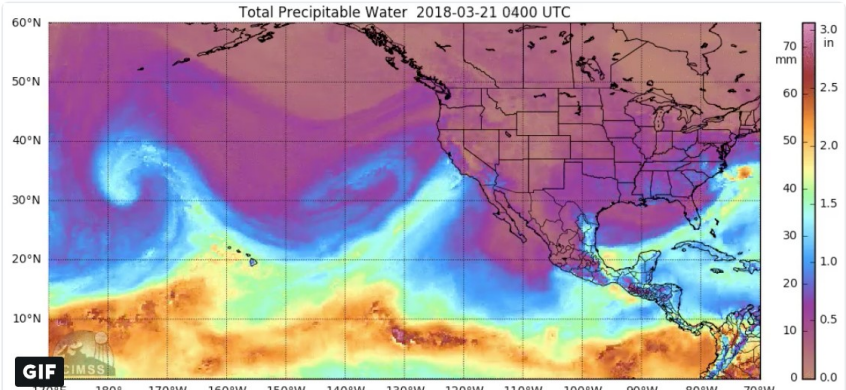
- Good blended advection will increase your user base significantly
- Social media
 - Social media platforms



NWS Bay Area @NWSBayArea

An [#AtmosphericRiver](#) (AR) will continue to advect abundant moisture to California over the next few days. Can you spot the AR on this Total Precipitation Water imagery loop from [@UWCIMSS](#)? [#CAwx](#) [#CAstorm](#)

Total Precipitable Water 2018-03-21 0400 UTC



5:13 AM - 21 Mar 2018

65 Retweets 120 Likes

2 65 120

User response

- Good blended advection will increase your user base significantly
- Social media
 - Trades in animated gifs
- News/documentaries
- Attention from crazy people

Infowars host: Hurricane threatening Hawaii has been split in two by energy beam shot from Antarctica, possibly by John Kerry

Owen Shroyer: "Why is John Kerry going down to Antarctica just a week after the election to discuss climate change and then you have energy beams coming out of Antarctica splitting hurricanes?"

Video » August 24, 2018 10:25 AM EDT » MEDIA MATTERS STAFF

Like 4.6K

Share

Tweet

G+



234

From the August 23 edition of Infowars' *War Room*:



User response

YouTube search bar: `secureteam10 aug 12 haarp`

Map showing energy wave anomalies (color scale from blue to red) across the globe. The x-axis is labeled "Longitude" and ranges from 150 to 50. The y-axis ranges from 50 to -80. The map shows high energy levels (red/orange) in the North Atlantic and Indian Ocean, and lower energy levels (blue) in the Southern Ocean and Pacific.

SECURETEAM logo (alien head icon)

INFORMATION CENSORED WARS logo

ANOMALOUS Energy Waves Coming From Antarctica 8/12/17

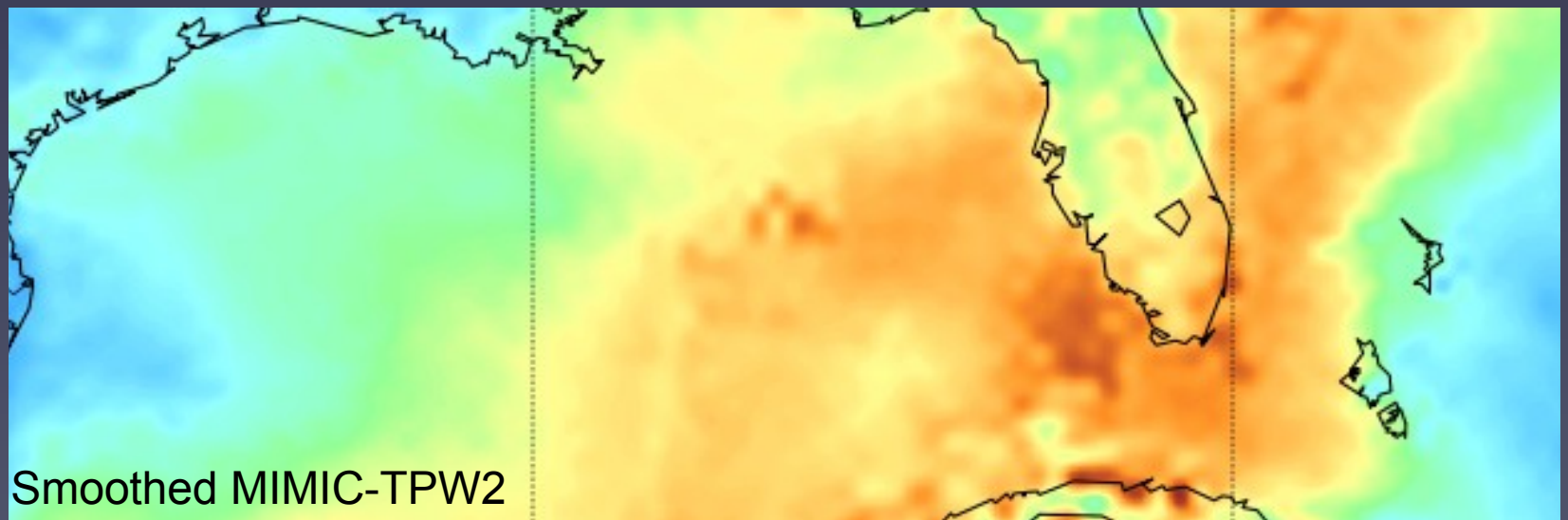
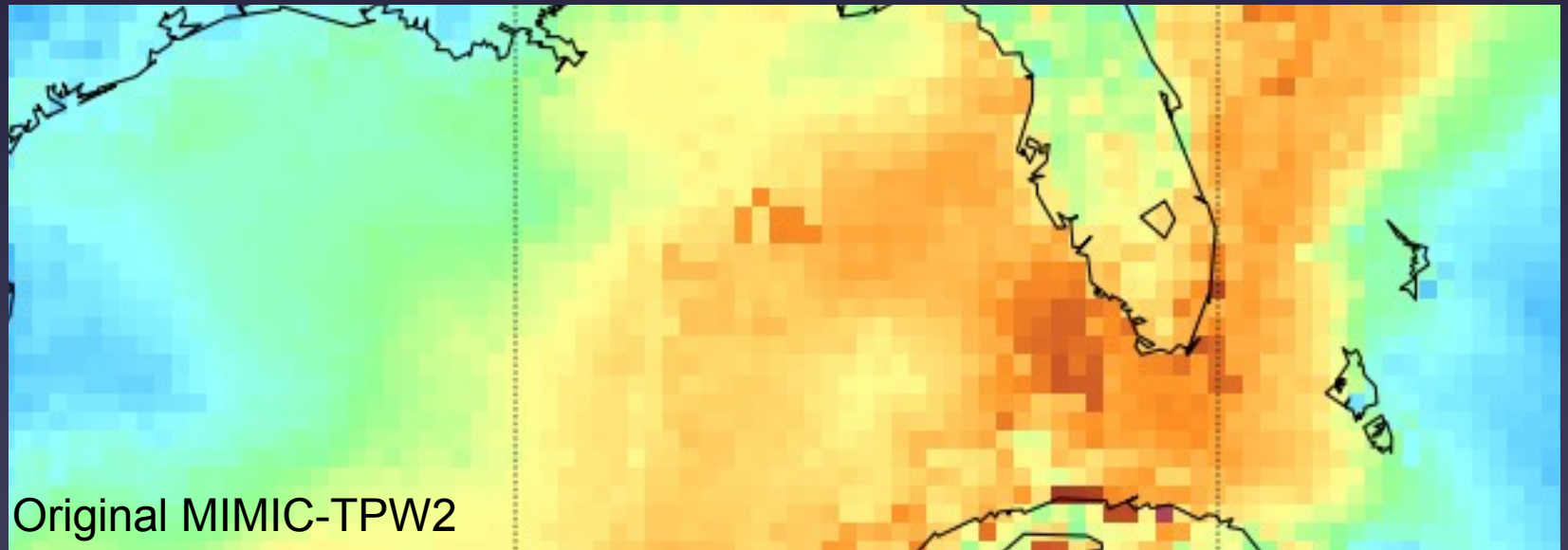
Up next

244,788 views

Nominal resolution vs. display resolution

- MIMIC-TPW is 25 km resolution
- But forecasters on TV do not want pixelated imagery

Nominal resolution vs. display resolution



Nominal resolution vs. display resolution

- MIMIC-TPW is 25 km resolution
- But forecasters on TV do not want pixelated imagery
- They actually don't mind interpolation and smoothing. In fact, they seem to prefer it
- This is a >100-fold increase in file size
 - Too large to render on the MIMIC-TPW2 website, but just fine for SSEC RealEarth

Key takeaways

- TPW, LPW is uniquely suited for blended advection, making it the best source to learn from.
- The “advanced method” of morphing (blended advection) is not too advanced to apply to other products.
- The key advantage of morphed products is temporal consistency.
- Showing your product with good temporal consistency will greatly increase its profile.
- A little smoothing and interpolation for HD-level resolution will be embraced by the public.