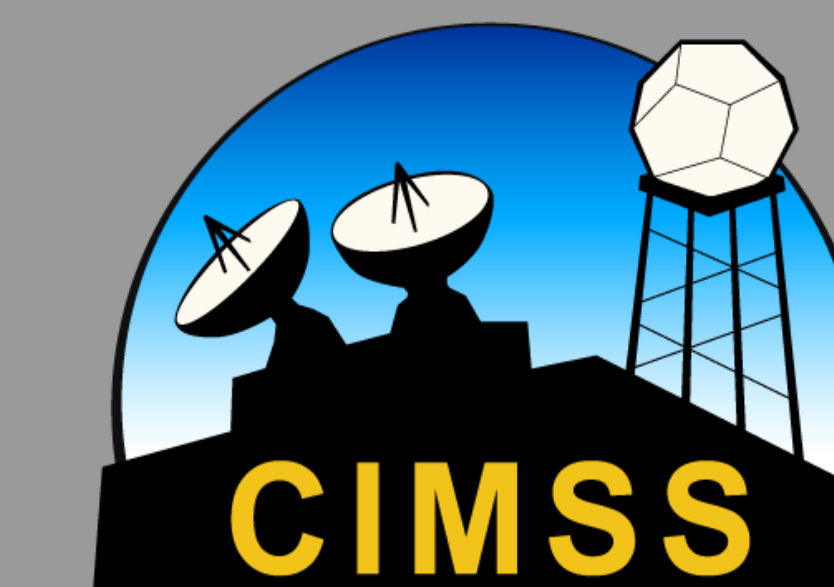


IMAPP IDEA-I: An Air Quality Forecast Software Package for Aerosols, Ozone and Carbon Monoxide from Polar Orbiting Satellites using Global Forecast System (GFS) Winds

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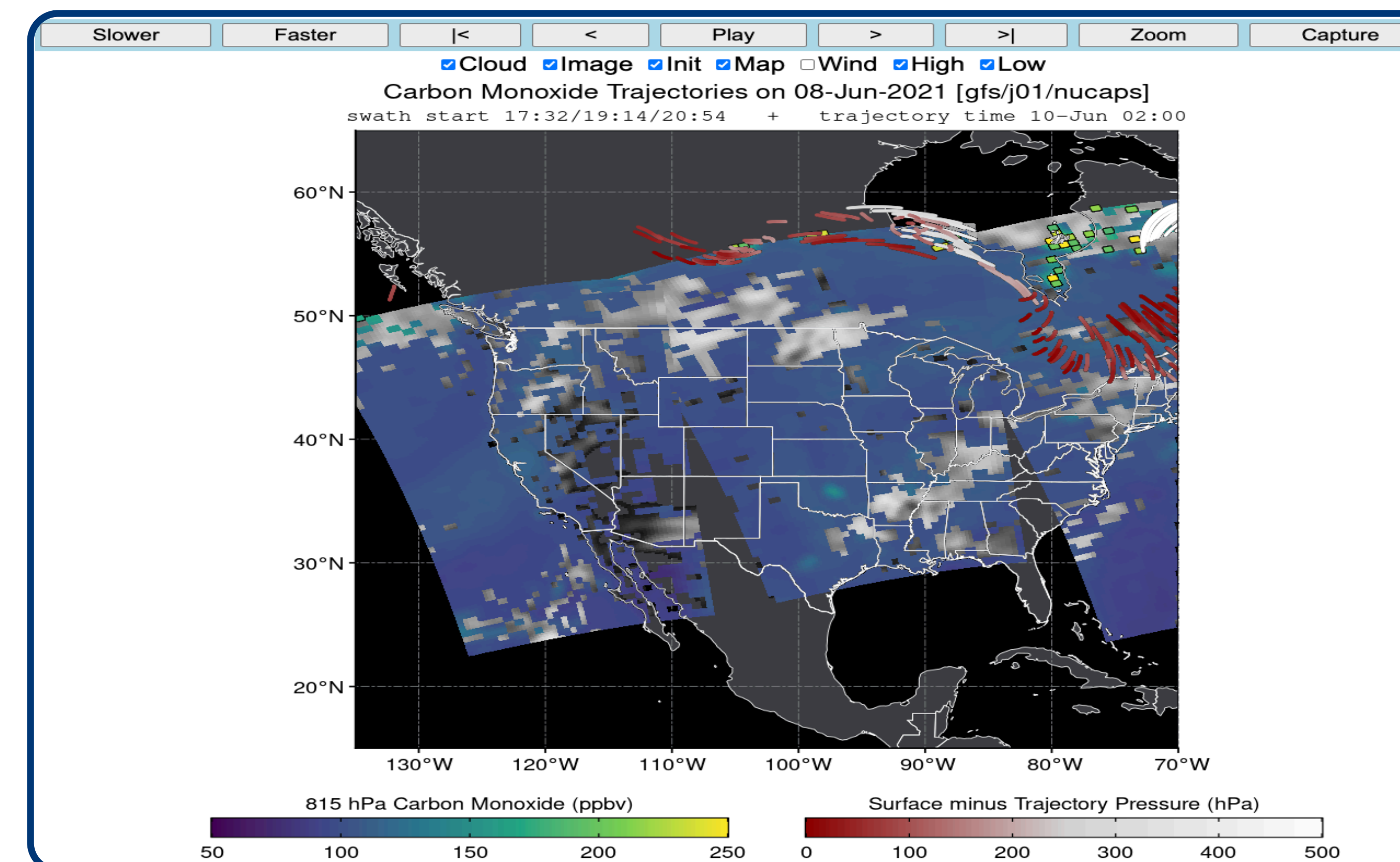
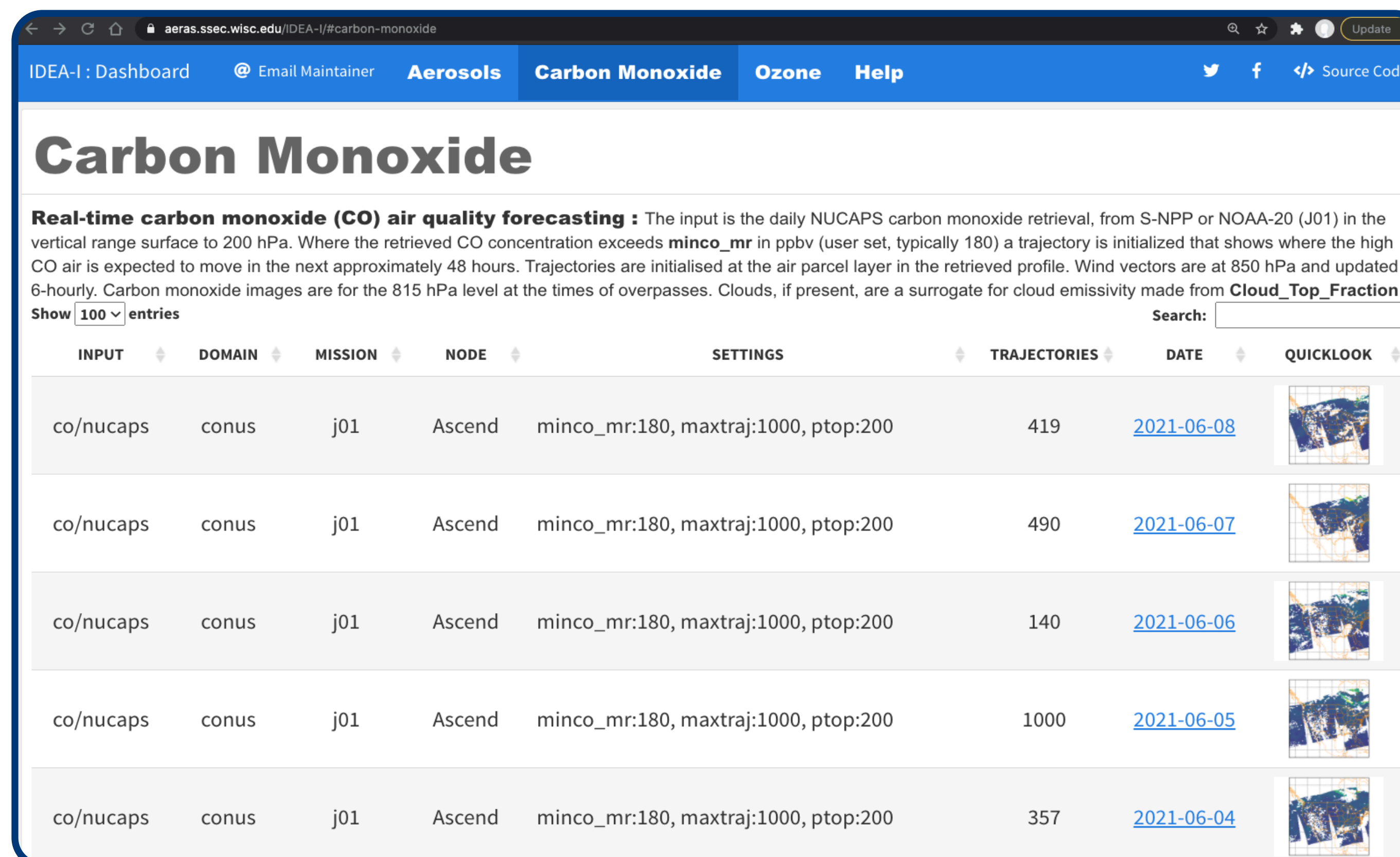


Introduction

<https://cimss.ssec.wisc.edu/imapp/>

From 2000 to 2017 the International MODIS/AIRS Processing Package (IMAPP) successfully provided global receiving stations the ability to support environmental observations for decision makers using Aqua and Terra MODIS, AIRS, AMSU, and S-NPP VIIRS and CrIS instruments. In 2020 SSEC allocated internal funding to rehabilitate and enhance IMAPP through prioritizing software upgrades based upon their utility and on the effort required to update them. One of those packages was IDEA-I, an open source, portable, international version of Infusing satellite Data into Environmental air quality Applications (IDEA). In our new IDEA-I implementation:

- ★ The deployment is in a container, so the only system requirement is *Singularity*.
- ★ With a web server, you can display and easily control animated IDEA-I products.

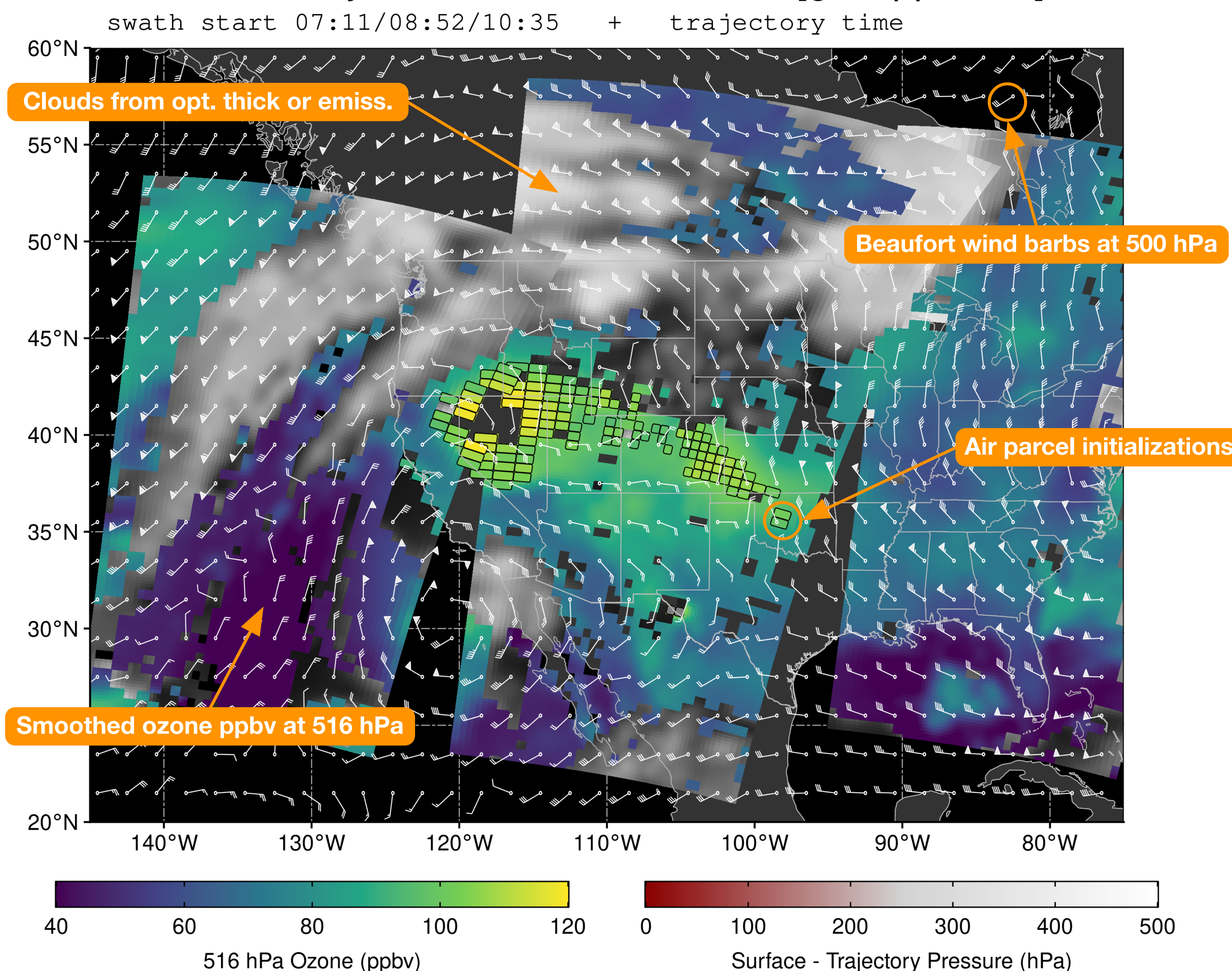


HAniS - the HTML5 Image AnimationS webapp

<https://www.ssec.wisc.edu/hanis/>

“What does HAniS do? Like its predecessors, it is a tool you can employ on your web pages that provides the ability to animate a sequence of individual images. It also lets you use overlays and provides many options for creating “hotspots”, probing data, and the like. This version is coded entirely in JavaScript and uses the HTML5 standards so is usable on multiple platforms with modern browsers.” **We have leveraged this technology for IDEA-I.**

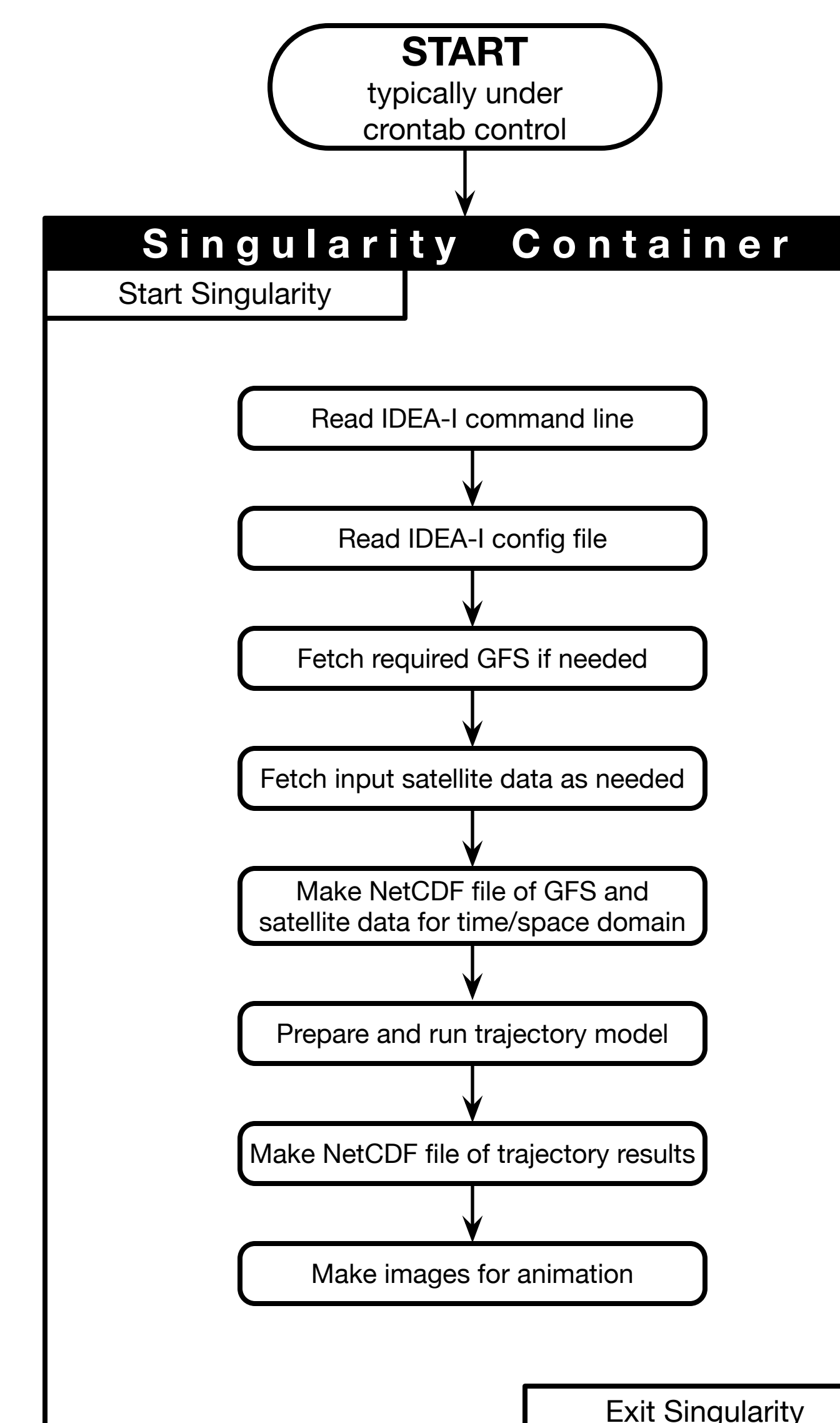
Ozone Trajectories on 08-Dec-2020 [gfs/npp/hsrtv]



Description

IDEA-I is a real-time system for trajectory-based forecasts of atmospheric transport of air parcels identified in Level-2 products from polar orbiting satellites. Specifically these are air parcels anomalously high in aerosol, carbon monoxide or ozone whose predicted trajectories may have them remain near, or descend down to, the Earth's surface. We have updated IDEA-I to support MODIS and VIIRS aerosol optical depth products, ozone retrievals from HSRTV (UW Hyperspectral Retrieval Package) and carbon monoxide retrievals from HEAP (Hyper-Spectral Enterprise Algorithm Package, the follow-on to NUCAPS), each driven by GFS winds for global applicability. Improved HTML5 web delivery has been achieved by leveraging HAniS, a tool developed at SSEC that provides animated sequences of images on web pages with user-selectable overlays.

Above is shown the R dashboard-style web interface and to its right is a single HAniS animation page selected from this interface. Below is a sequence of images; each animation is comprised of about 40 frames with toggle controls for graphic elements.



```

# Force UTC times
CRON_TZ=UTC
# Specify the shell
SHELL=/bin/bash
# Location for logs
CRONLOG=/home/jmd/cronlogs
# HAniS url
IDEAL_HANISURL=https://aeras.ssec.wisc.edu/IDEA-I
# IDEA-I
IDEAL_HOME=/data/jmd/IDEA-I
# Descending node : j01
15 16 * * * IDEAL_HOME/scripts/run_IDEA-I.bash -s j01 -i o3/hsrtv -g westus -DCFGXVW -d $(date --date="today" +%Y-%m-%d) > $CRONLOG/IDEA-I_$(date +%a_h%H%M).log 2>&1
25 16 * * * IDEAL_HOME/scripts/run_IDEA-I.bash -s j01 -i co/nucaps -g conus -DCFGXVW -d $(date --date="today" +%Y-%m-%d) > $CRONLOG/IDEA-I_$(date +%a_h%H%M).log 2>&1
# Ascending node : j01
15 03 * * * IDEAL_HOME/scripts/run_IDEA-I.bash -s j01 -i o3/hsrtv -g westus -DCFGXVW -d $(date --date="yesterday" +%Y-%m-%d) > $CRONLOG/IDEA-I_$(date +%a_h%H%M).log 2>&1
25 03 * * * IDEAL_HOME/scripts/run_IDEA-I.bash -s j01 -i co/nucaps -g conus -ACFGXVW -d $(date --date="yesterday" +%Y-%m-%d) > $CRONLOG/IDEA-I_$(date +%a_h%H%M).log 2>&1
55 10 * * * IDEAL_HOME/scripts/run_IDEA-I.bash -s j01 -i aod/jr -g beijing -ACFGXVW -d $(date --date="today" +%Y-%m-%d) > $CRONLOG/IDEA-I_$(date +%a_h%H%M).log 2>&1
# Descending node : aqua
15 19 * * * IDEAL_HOME/scripts/run_IDEA-I.bash -s aqua -i o3/hsrtv -g westus -DCFGXVW -d $(date --date="today" +%Y-%m-%d) > $CRONLOG/IDEA-I_$(date +%a_h%H%M).log 2>&1
# Ascending node : aqua
15 02 * * * IDEAL_HOME/scripts/run_IDEA-I.bash -s aqua -i o3/hsrtv -g westus -ACFGXVW -d $(date --date="yesterday" +%Y-%m-%d) > $CRONLOG/IDEA-I_$(date +%a_h%H%M).log 2>&1
30 02 * * * IDEAL_HOME/scripts/run_IDEA-I.bash -s aqua -i aod/mod04 -g conus -ACFGXVW -d $(date --date="yesterday" +%Y-%m-%d) > $CRONLOG/IDEA-I_$(date +%a_h%H%M).log 2>&1
# Ascending node : terra
35 02 * * * IDEAL_HOME/scripts/run_IDEA-I.bash -s terra -i aod/mod04 -g conus -ACFGXVW -d $(date --date="yesterday" +%Y-%m-%d) > $CRONLOG/IDEA-I_$(date +%a_h%H%M).log 2>&1
  
```

Excerpt from crontab

Summary and release information

IDEA-I has been ported to a new language system (from Perl to R; the trajectory computations remain in FORTRAN) and packaged into in a Singularity container with a simple top-level R dashboard-style web interface. Graphics for animations have been greatly improved and the codebase is now simpler to both maintain and extend.

IDEA-I should see its re-release in June or July 2021 as a Singularity package for Linux. Scheduled execution is shown as a crontab excerpt above. A later release will provide a VM deployment to support users on Win, Mac and Linux platforms.

