Making Beautiful Images of NOAA Satellite Data using Python

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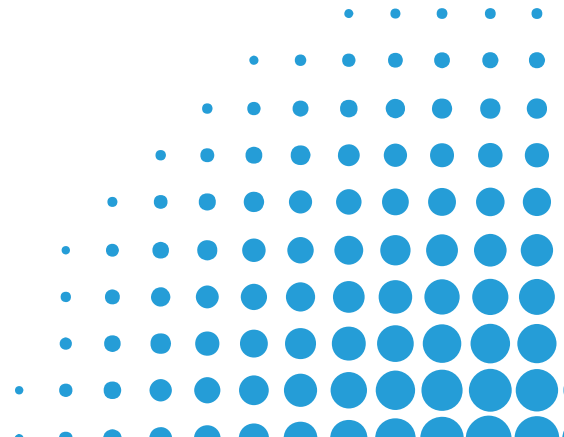
Course Website:
https://ter.ps/ams23web

Cloud Instance (last resort):
https://ter.ps/ams23

Philosophy

- Increase accessibility of NOAA satellite data and lower barriers to analysis
- Promote the proper use of the satellite products in operations and research
- Teach Python using practical examples and real-world satellite datasets



Pre-Requisites

- Should have already installed python/dependencies, and downloaded course material, etc.

If not, use the cloud instance: https://ter.ps/ams23

What Makes a Beautiful Image?

1. Purpose

The viewer knows what they're looking at and why

2. Composition

- Elements arranged to makes the purpose more clear
- Text readable, takes up appropriate space

3. Color

Colors focus what is important (and are accessible!) which again, furthers the purpose

4. Clarity

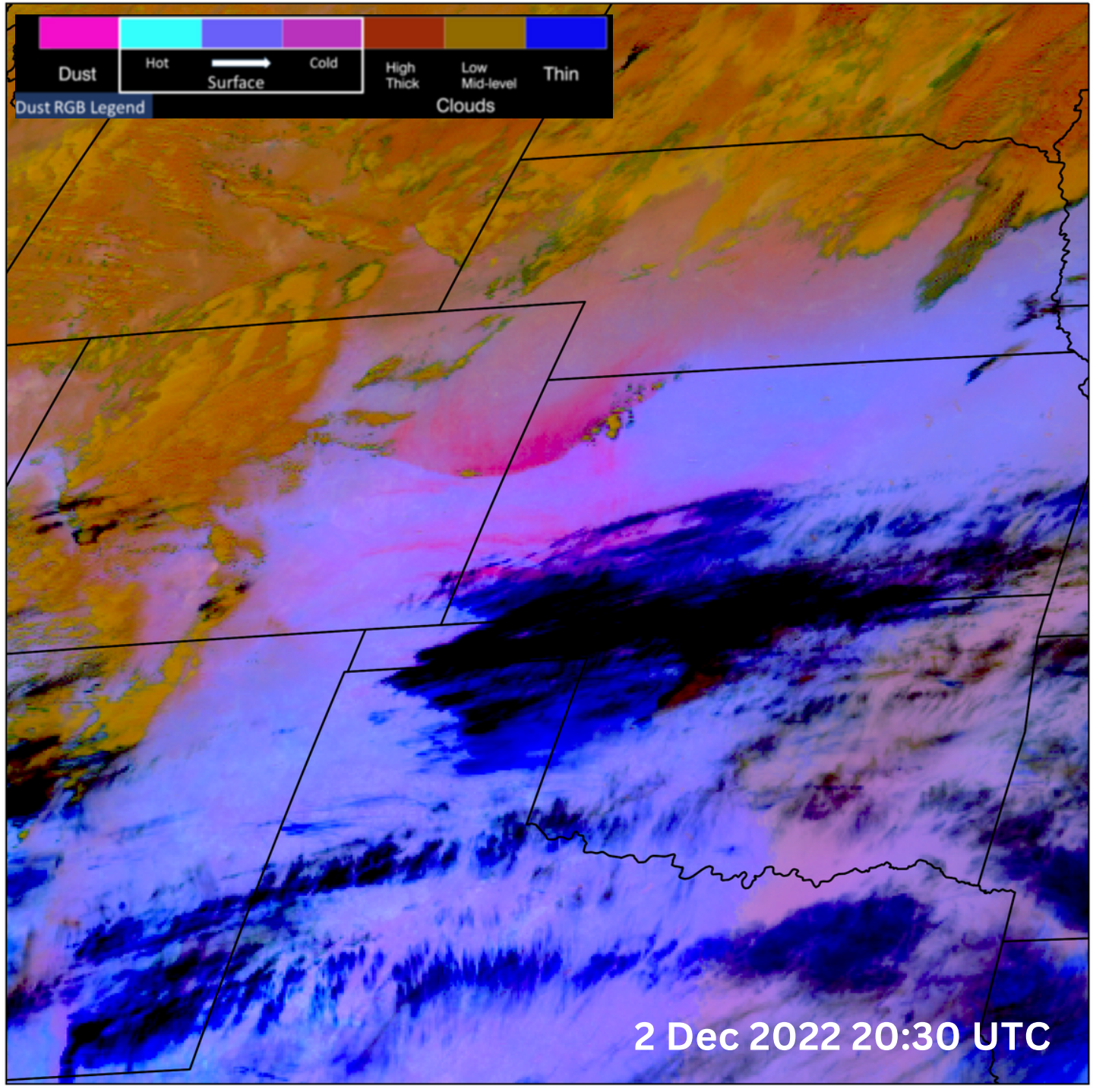
The viewer easily understands what they're looking at

Applications of beautiful images

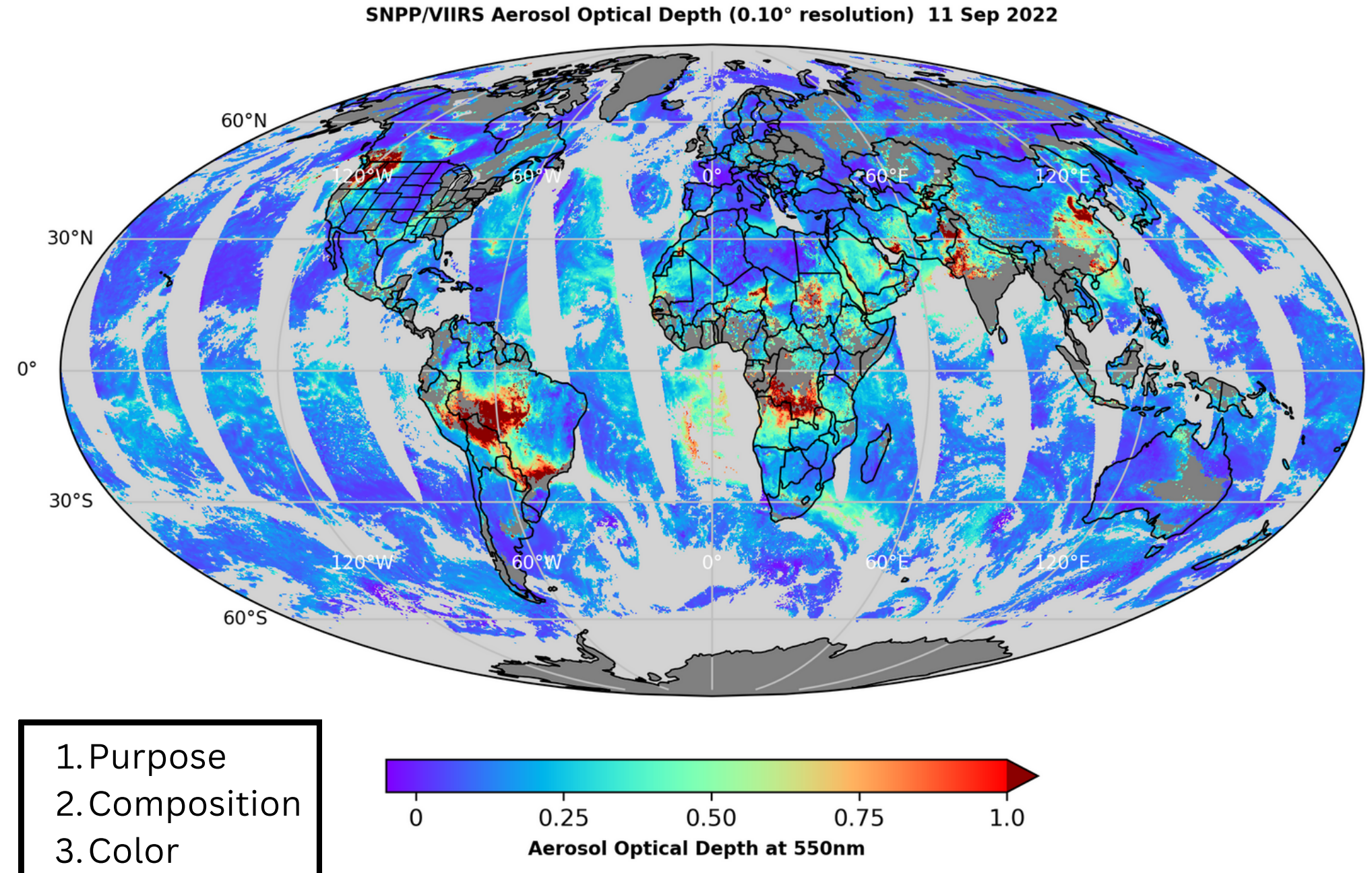
- Research publications
- Social media - discuss major weather events with peers and engage with the public
- Graphical abstracts - increasingly required by journals
- Blog posts, newsletters, white papers. AMS requests extended abstracts after the conference, can apply what you learned

G16 ABI Dust RGB Composite

$Red = BT_{12.3\mu m} - BT_{10.3\mu m}$ $Green = BT_{11.2\mu m} - BT_{8.4\mu m}$ $Blue = BT_{10.3\mu m}$



1. Purpose
2. Composition
3. Color
4. Clarity



1. Purpose
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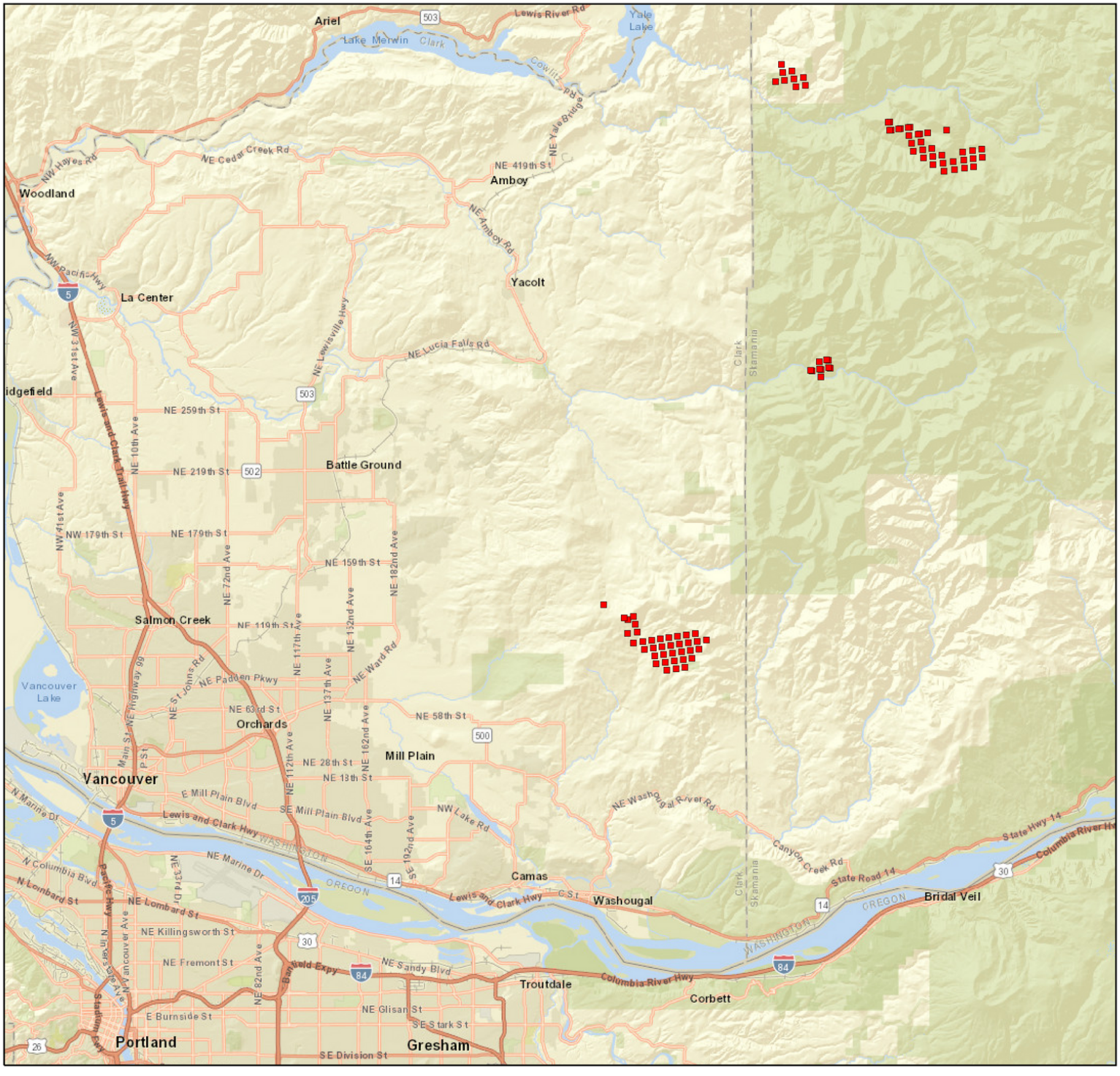
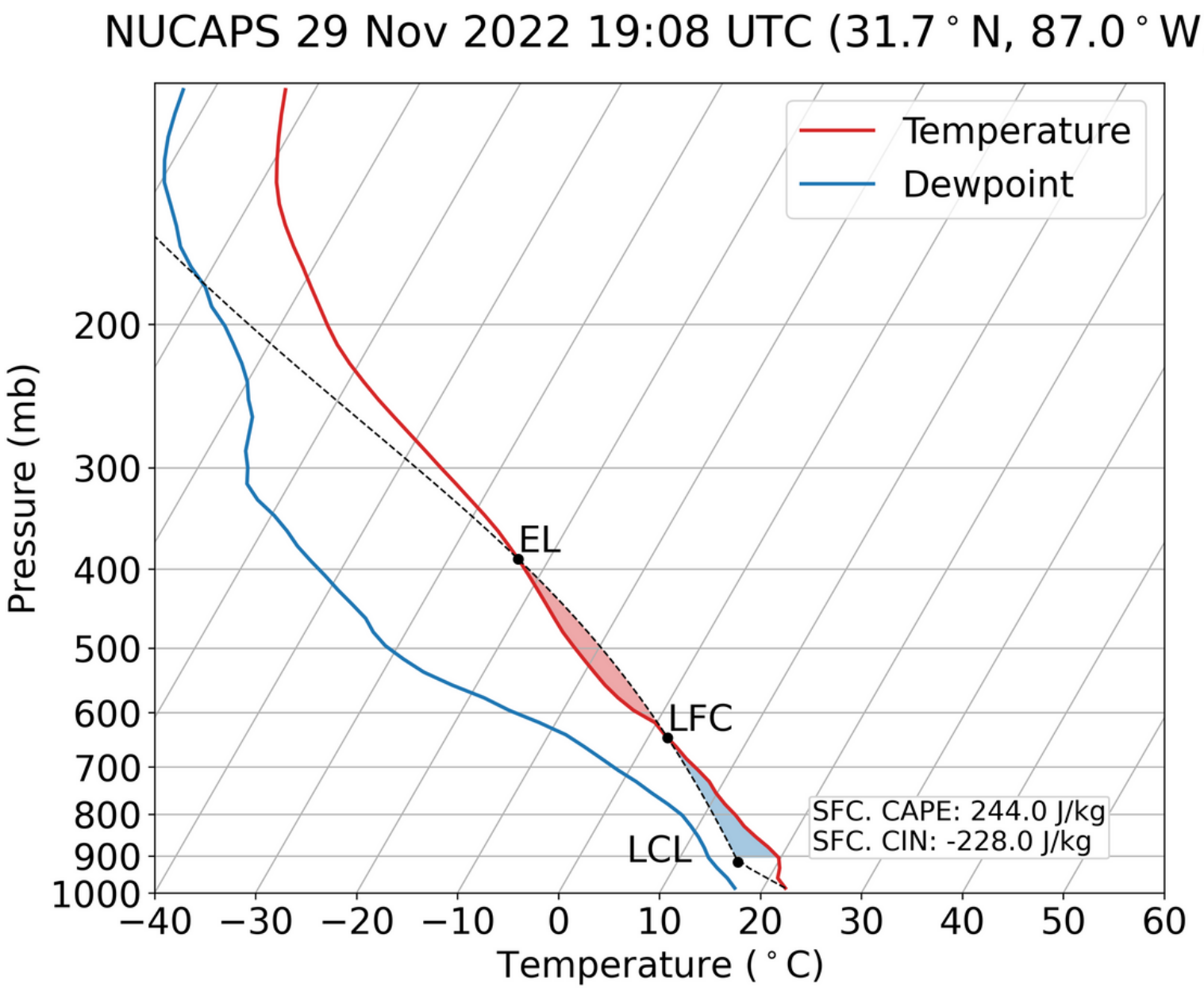
NOAA-20/VIIRS Active Fires I-band 16 Oct 2022 21:18 UTC



Fire Locations

1. Purpose
2. Composition
3. Color
4. Clarity



1. Purpose
2. Composition
3. Color
4. Clarity

Workflow for Making Beautiful Satellite Images in Python

Launch Python development environment

1

Download satellite data file(s)

2

Understand the structure and contents of file(s)

3

4

Handle data arrays

0

Read dataset documentation

Work with map projections

6

5

Make geo plot or RGB image

7

Add professional touches

8

Create a Skew-T plot

Step 0: Read the Documentation

Before working with a new NOAA satellite dataset, **users should always consult the official documentation** appropriate for their application, e.g.:

- Algorithm Theoretical Basis Document (ATBD)
- User's Guide/Manual
- "ReadMe" for Data Users
- Quick Guide

Documents describe important information needed to process, display, and interpret satellite data correctly, e.g.:

- Known issues
- Valid data range
- Data quality/confidence flags
- How to display data

Relevant Documentation for Short Course

GOES-16 ABI CMIP Read Me

NUCAPS

- Quick Guide
- ATBD

VIIRS Active Fires I-band

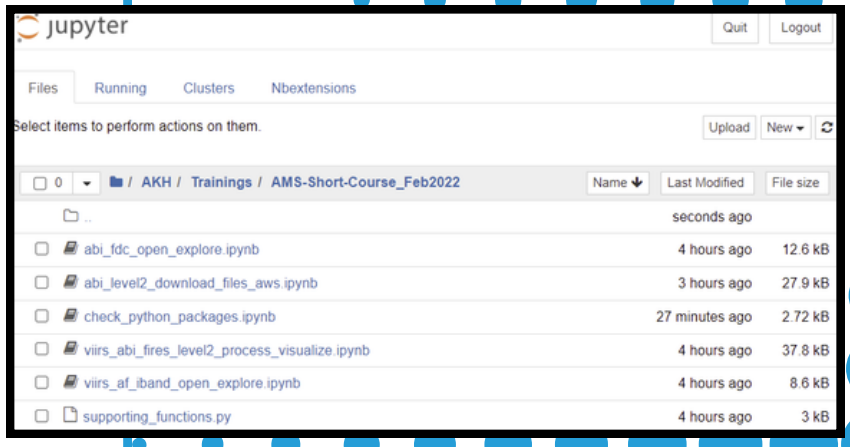
- User's Manual
- ATBD

VIIRS AOD ATBD

Let's Get Started!

If you successfully installed the Course Materials:

- Launch Jupyter Notebooks
  - Windows users: Go to Start → Anaconda3 → Jupyter Notebook
  - Mac/Linux users: Type jupyter notebook into the terminal
- *(If Applicable) Change environment to python-workshop*
- Navigate to your jupyter notebook directory for course
- Open/run check_python_packages.ipynb



See an error?
Trouble getting setup?
https://ter.ps/ams23