



LADCO | LAKE MICHIGAN
AIR DIRECTORS CONSORTIUM

Midwest Air Quality Planning Applications of Earth Science Data

Presented to the GeoXO ACX Science Team Meeting
May 9, 2024

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(NASA) Satellite Data Products In-Use* @ LADCO

Meteorology

Surface reflectance

Soil moisture/temp

Cloud thickness and fraction

Temperature

Precipitation

Snow cover/depth

Air Quality and Emissions

AOD and AOT

Aerosol backscatter

NO₂, HCHO, SO₂, CO

Fire incidents and strength

Green vegetation fraction

Land cover/land use

Imagery: smoke, surface, clouds

* Or in the process of being integrated into our work

Satellite Data in Action

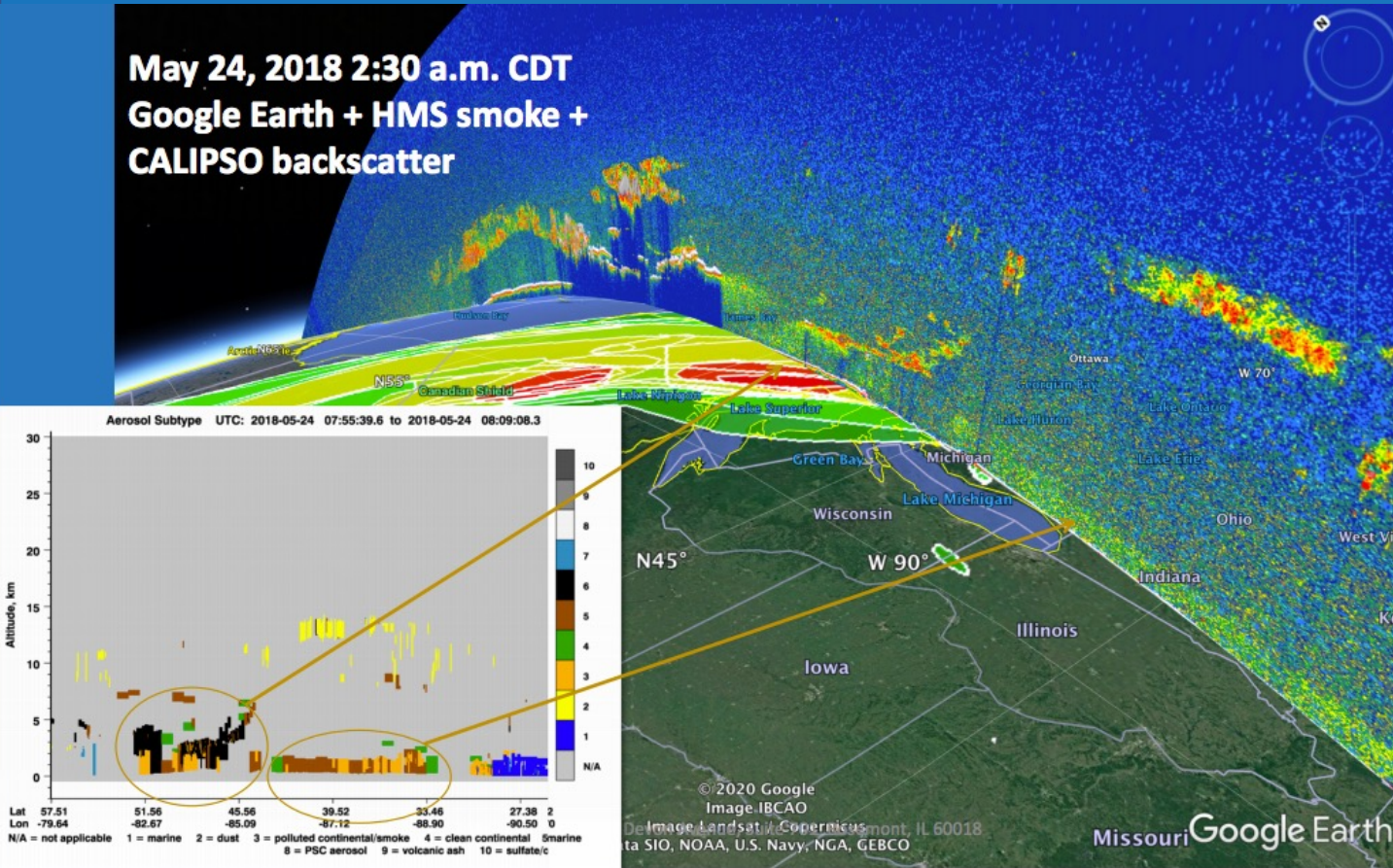
- Midwest planning satellite data applications
 - Tracking smoke from fires/exceptional events
 - Ozone or PM_{2.5} episode analysis
 - Lake breeze identification
 - Regional modeling boundary conditions
 - Surface trends analysis
 - Meteorology modeling FDDA
 - Ozone chemistry
- What's (been) on the horizon
 - Improving emissions inventories
 - Chemical data assimilation in regional AQMs
 - Data fusion across observational assets



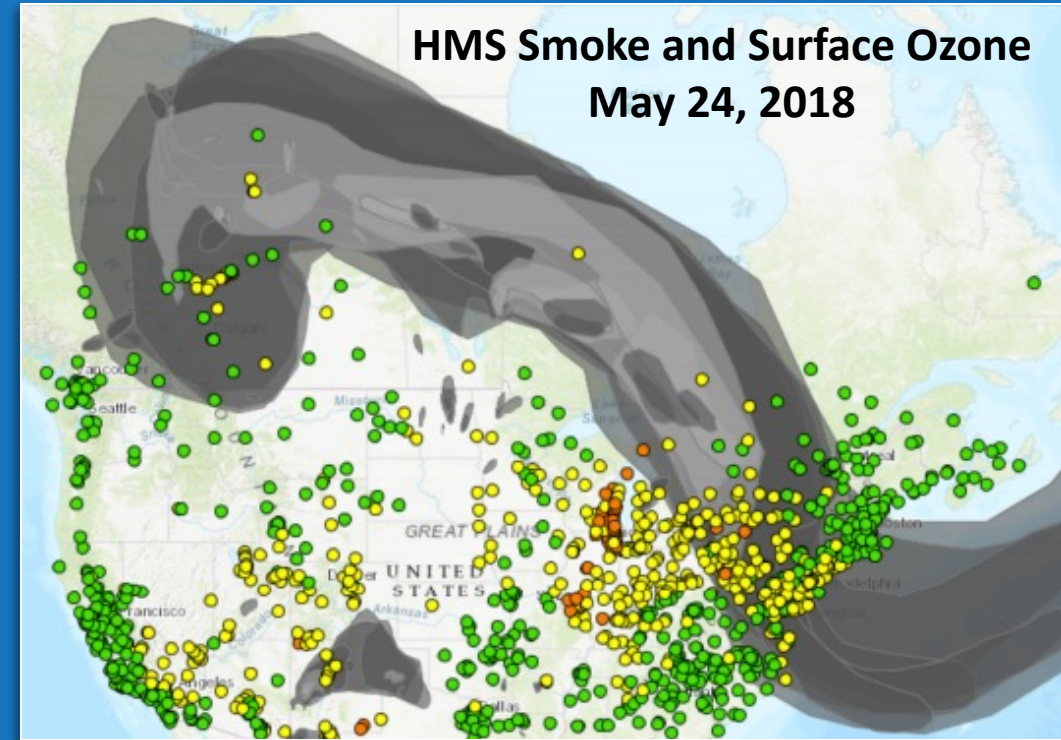
NOAA-20/VIIRS Corrected Reflectance
June 17, 2020

A Little More About Fires...

May 24, 2018 2:30 a.m. CDT
Google Earth + HMS smoke +
CALIPSO backscatter

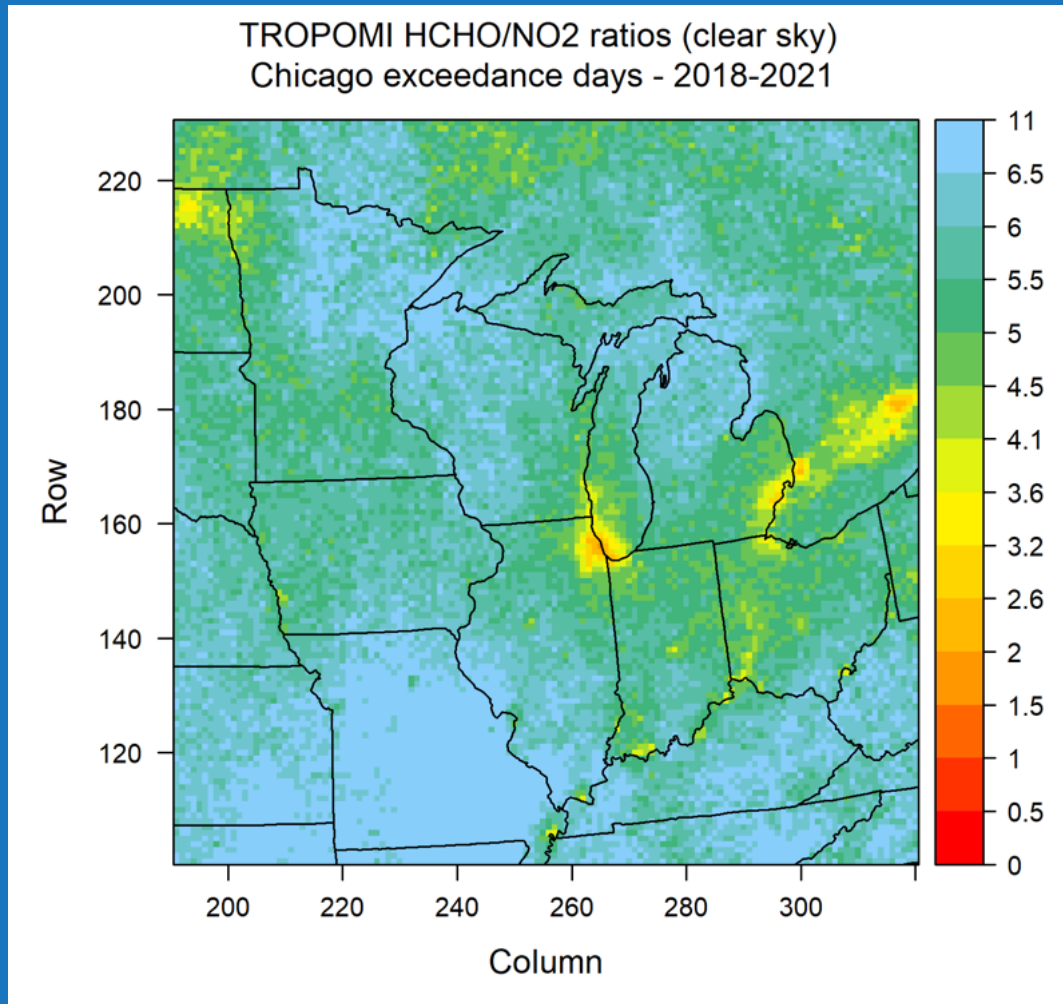


HMS Smoke and Surface Ozone
May 24, 2018



Satellite retrievals of AOD, smoke imagery, and vertical backscatter profiles are used heavily for smoke impact assessments/exceptional events

...and Ozone Chemistry



Ratio of satellite retrievals of HCHO and NO₂ to indicate ozone formation sensitivity.

Satellite Data Are Being Used for Air Quality Planning... .. yet there is still work to be done to expand the use of these data

2024 Edition

Applied Science
for
DUMMIES

Leverage experience to educate researchers in emerging applied science programs on communicating with planners, understanding planning agency needs, and building sustained collaborations

Create saliency.

How to integrate remote sensing in the mission of the environmental management or health agency?

Create legitimacy.

How to solidify the use of these assets/analysis techniques in the planning process such that they become integral to formal regulatory guidance/actions?

Create demand.

How to create extensible, reproducible, planning-agency friendly processes for using remote sensing data?

Understand the paradigm.

Commit to and invest in the concept that applied science is a process as much as it a product.