Atmospheric Composition From LEO

National Environmental Satellite, Data, and Information Service

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Low Earth Orbit Observations

MULTIPURPOSE IMAGERY

- Hurricane Location and Track
- Fires
- Air Quality
- Droughts and Floods
- Cloud Cover
- Land and Sea Ice
- Snow Cover
- Land Cover Changes
- Harmful Algal Blooms
- Wind Speed in High Latitudes
- Night Time Imagery
- Water Quality
- Fish Stock Assessments
- Oil Spills

UV MEASUREMENTS

- Ozone Hole Monitoring
- Air Quality

SOUNDINGS

- Numerical Weather Prediction
- Precipitaion
- Routine Weather
- Tropical Cyclone Intensity and Track Forecasts
- Aviation Weather
- Atmospheric Rivers

ALTIMETRY

- Sea Surface Height
- Marine Weather
- Coastal Flooding

SAR

- Floods
- Oil Slicks
- Ocean Surface Winds
- Sea Ice

SCATTEROMETRY

- Ocean Surface Winds
- Marine Weather
- Tropical Cyclone Intensity

MICROWAVE IMAGERY

- Precipitation
- Land and Sea Ice
- Ocean Surface Winds
- Tropical Cyclone Location, Track and Intensity
- Marine Weather
- Soil Moisture
- Ocean Salinity

LIDAR

- Wind Speed
- Aerosols for Air Quality
- Cloud Properties for Precipitation and Climate

BUY AND PARTNER

where we can.

BUILD

what we must.

The Office of LEO Observations uses Commercial and Government-owned assets together to provide the best value weather forecasts to the American taxpayer.

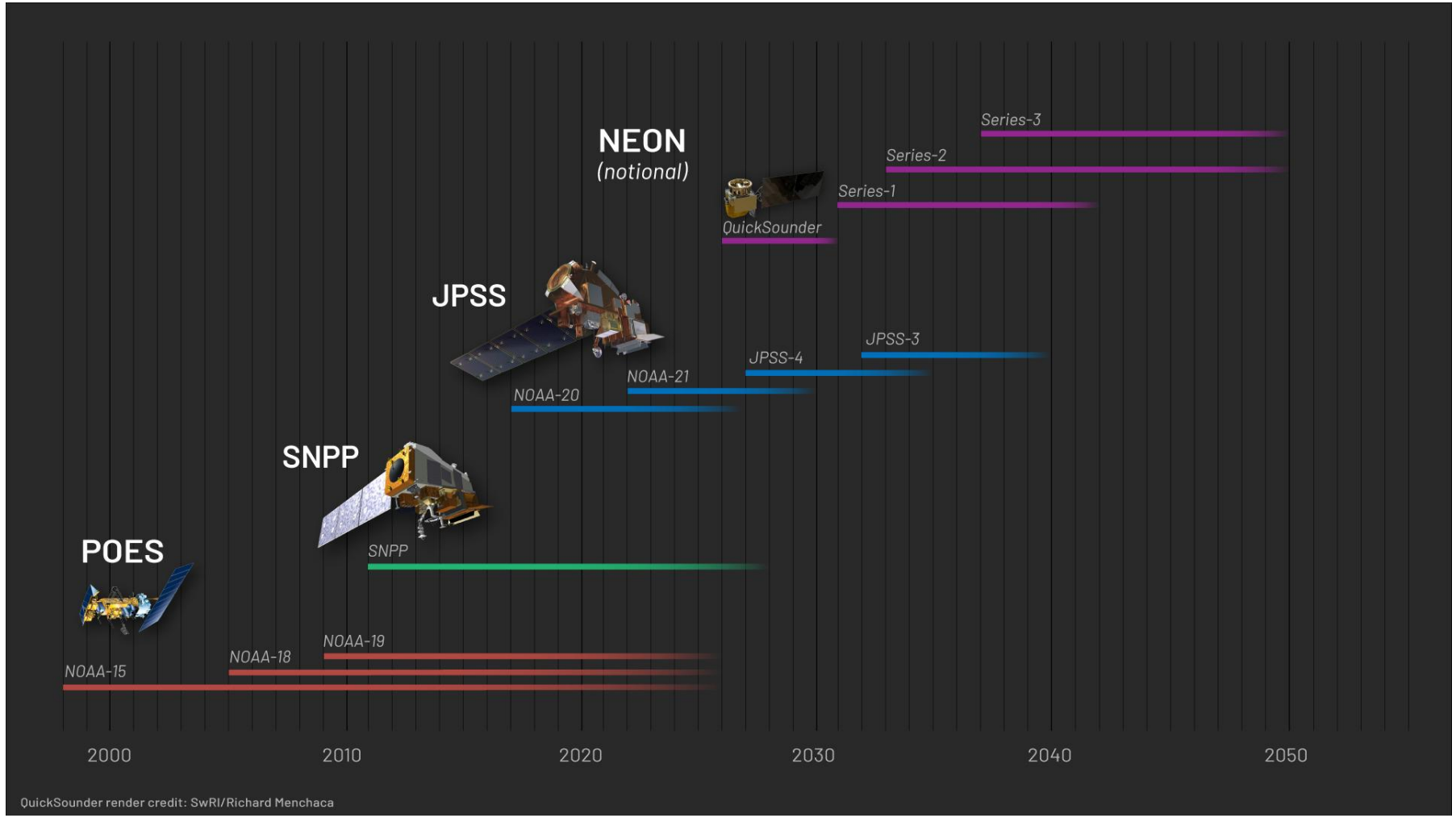
LEO Observational Objectives (NESDIS-REQ-4400.4)

- Species of interest
- UV-VIS-NIR-IR imagers, sounders, spectrometers

Objective is to reduce the development and launching of a satellite mission from ten years to three years. A solution of a small satellite carrying only one instrument is being first tested with QuickSounder project

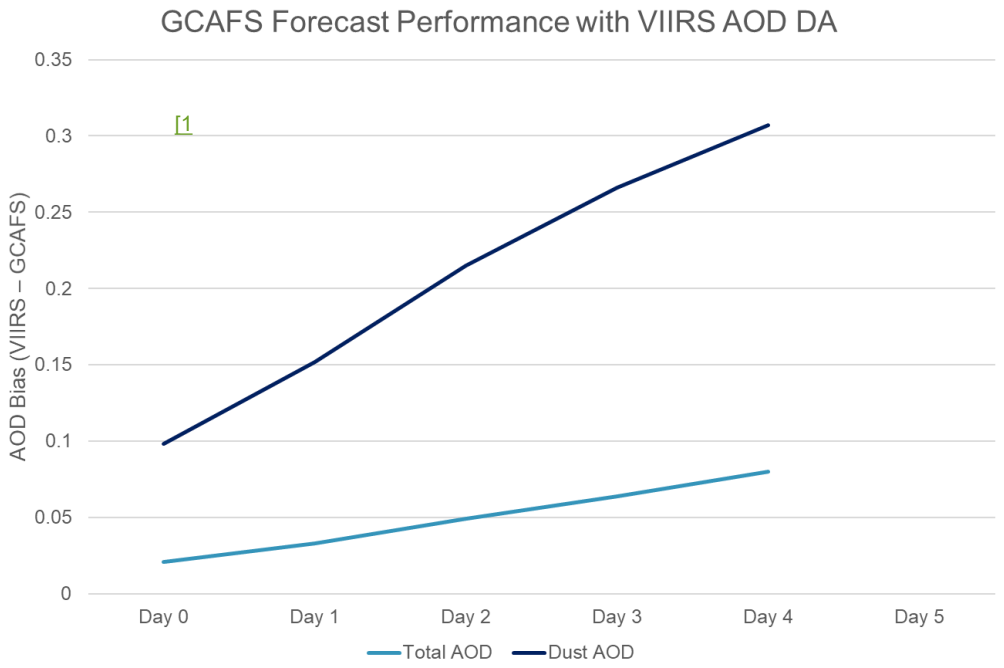
- Tropospheric O_3
- Stratospheric O_3
- Tropospheric Nitrogen Dioxide (NO_2)
- Tropospheric Formaldehyde (H_2CO)
- Sulfur Dioxide (SO_2)
- CO_2
- CO
- CH_4
- Volatile Organic Compounds (VOCs)
- Ammonia (NH3)
- Nitrous Oxide (N2O)
- Aerosols

Relevant LEO sensors and missions

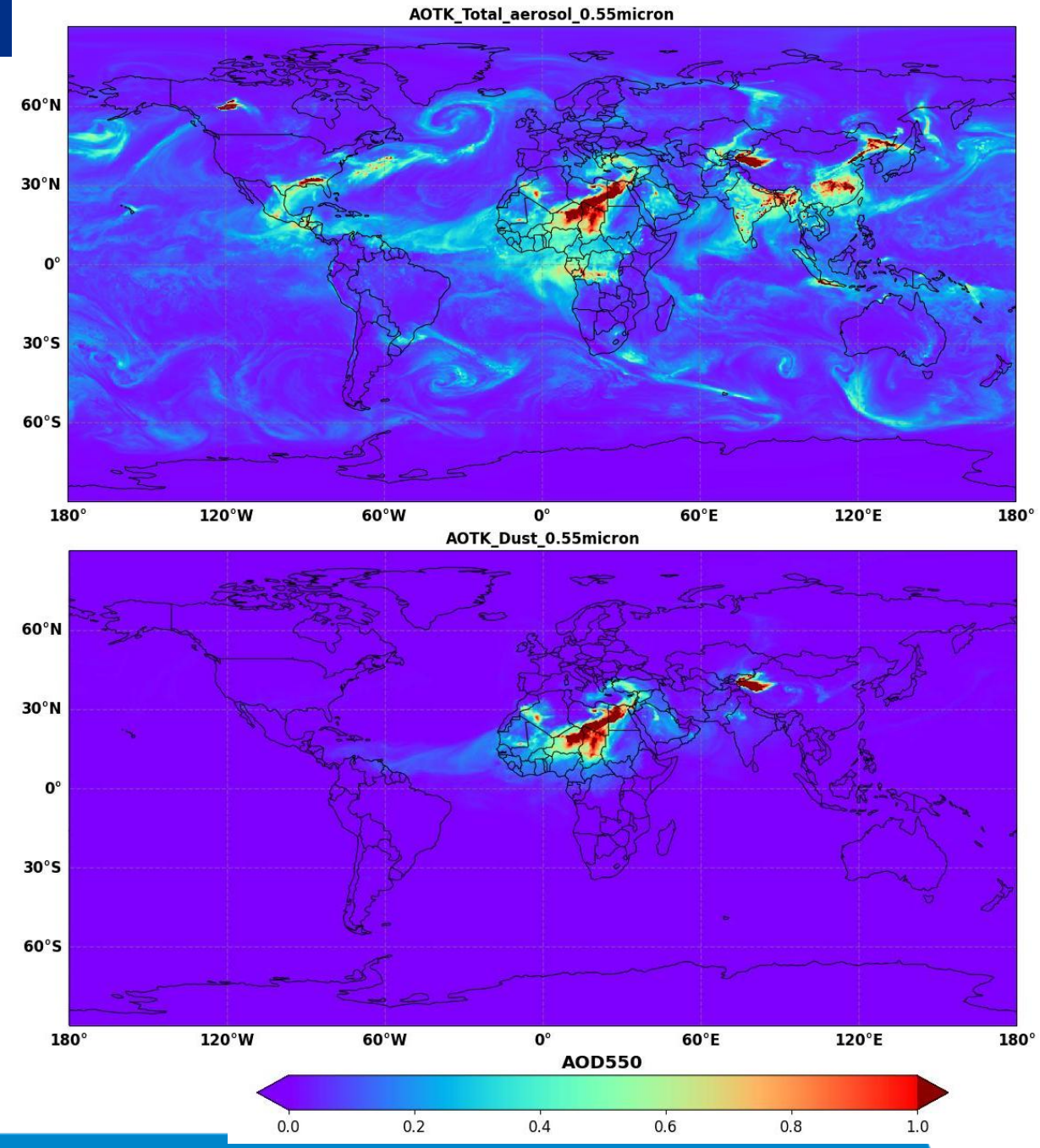


- JPSS-OMPS, CrIS, VIIRS (2012 – 2040s)
- Metop - IASI, IASI-NG, GOME, Sentinel 5, MetImage
- GOSAT-GW-TANSO
- CO2M
- Potential commercial/civilian small satellites - TBD

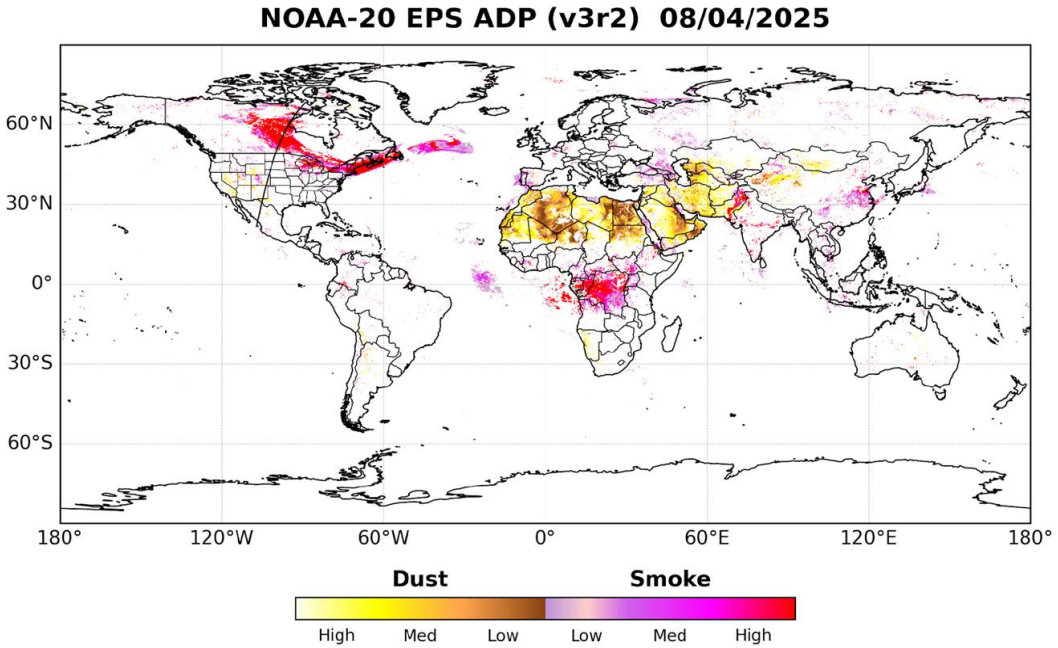
NOAA Global Aerosol and Chemistry Forecasting System (GCAFS) Assimilates VIIRS AOD and looking to expand to assimilating geostationary satellite AOD data, tropospheric nitrogen dioxide along with timely updating of NOx emissions from OMPS corrected using TROPOMI and UVNS.

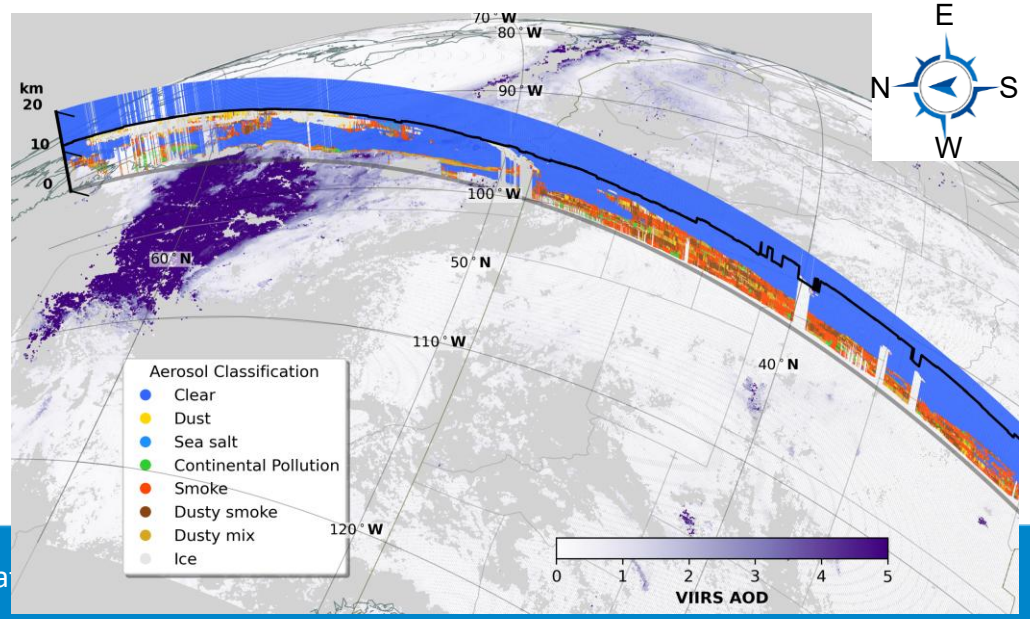


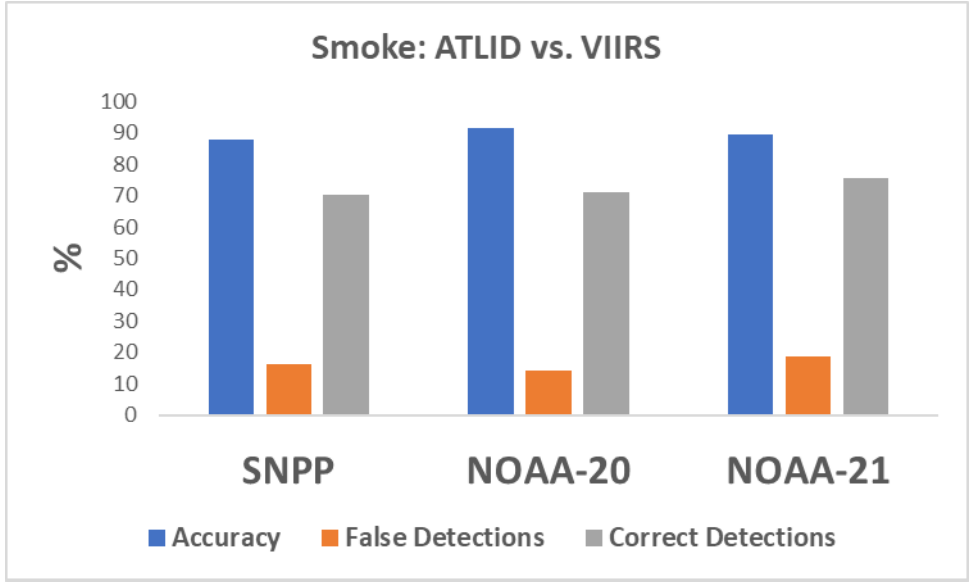
GCAFS 5/10/2024 t00z f012

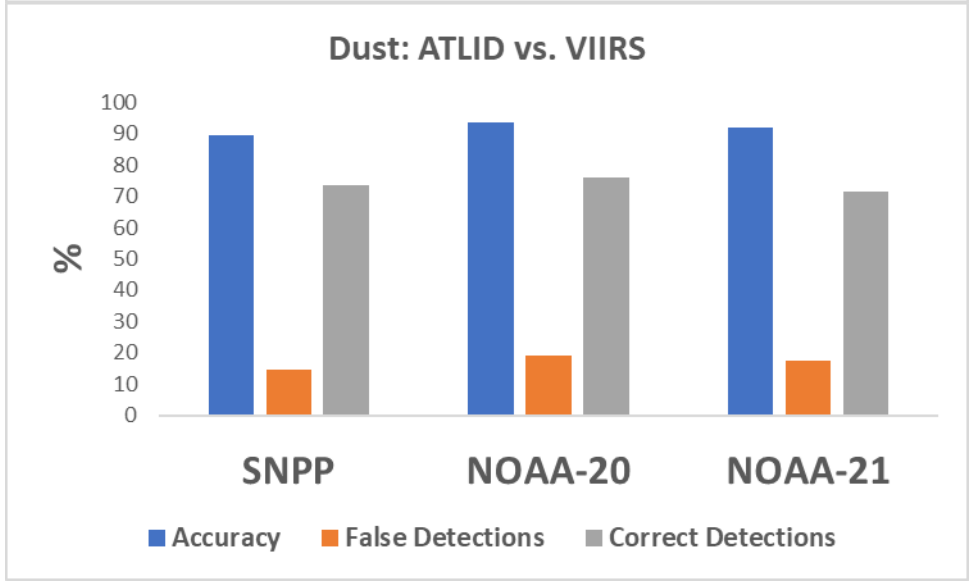


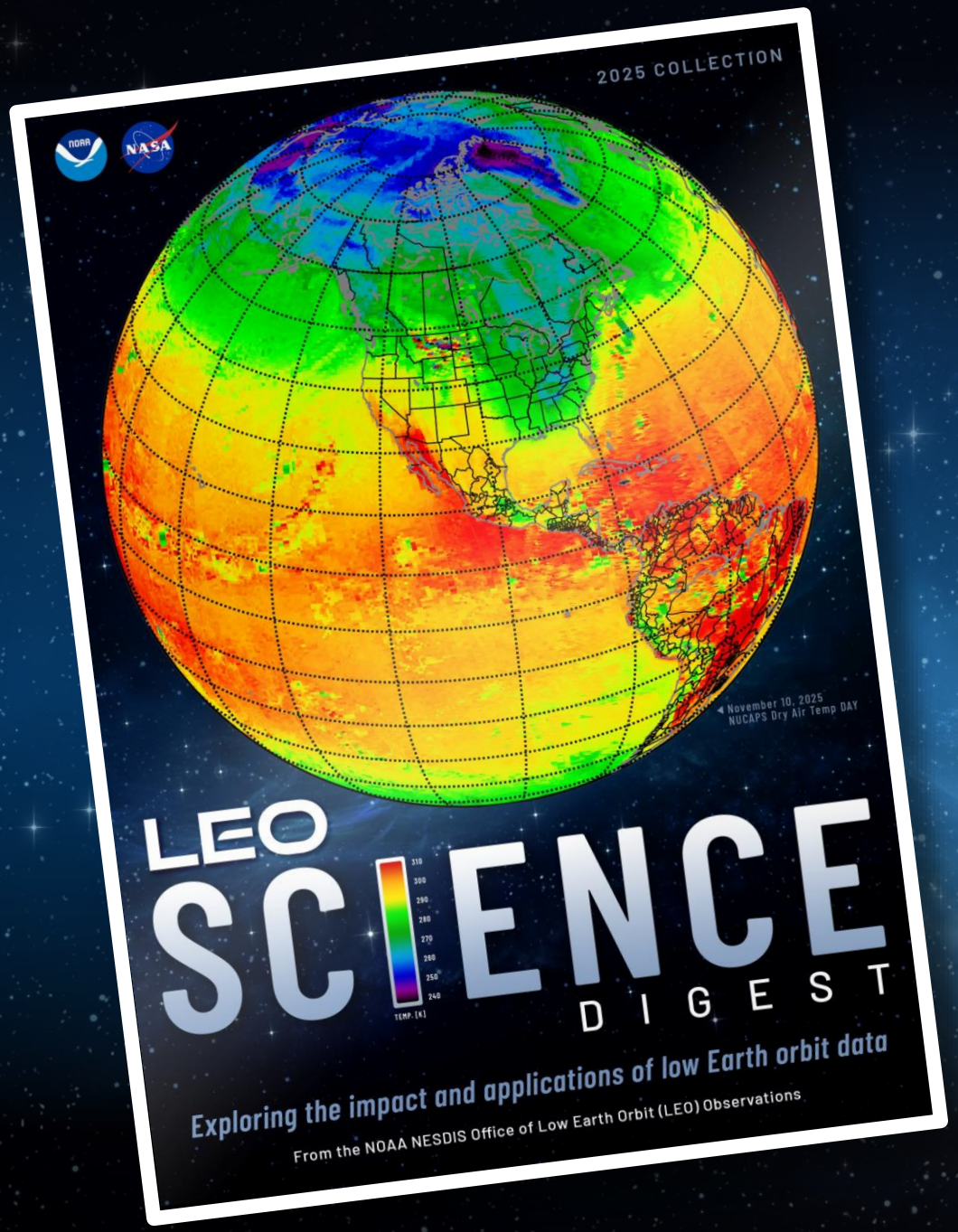
Comparison of VIIRS Smoke and Dust With ATLID











FROM THE NOAA NESDIS OFFICE OF LOW EARTH ORBIT (LEO) OBSERVATIONS

EXPLORING THE **IMPACT & APPLICATIONS** OF LOW EARTH ORBIT DATA

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