

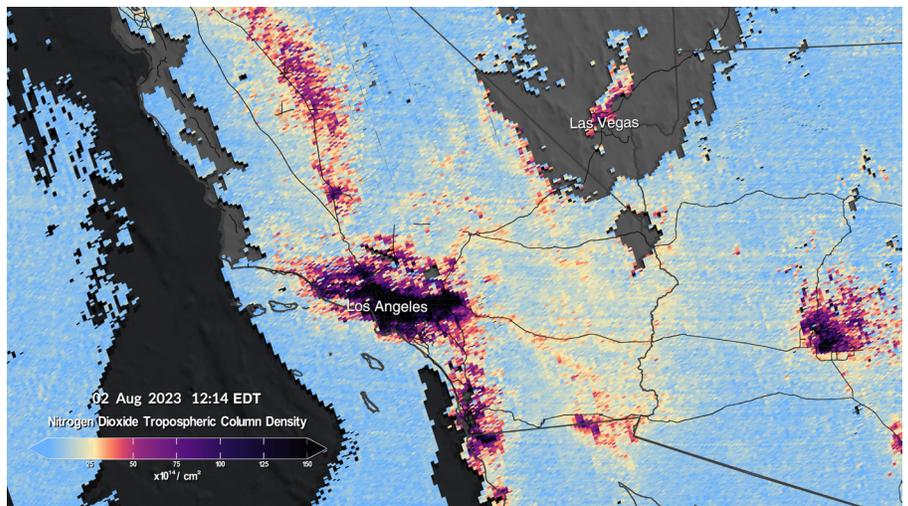
TEMPO/GOES Near Real-Time Products

Satellite Needs Working Group - Solution Fact Sheet

The Tropospheric Emissions: Monitoring of Pollution (TEMPO) mission is a collaborative effort between NASA and the Smithsonian Astrophysical Observatory (SAO) to provide high spatial and temporal resolution measurements of tropospheric air pollution over North America. TEMPO is a UV-Vis spectrometer that operates in geostationary orbit and captures a comprehensive view of tropospheric composition hourly during daylight. In addition to standard TEMPO products, the SNWG enabled the mission to produce near real-time (NRT) products with < 3 hour latency for nitrogen dioxide (NO_2), formaldehyde (HCHO), clouds (using $\text{O}_2\text{-O}_2$ absorption), and a Level 1B product that NOAA will use with Geostationary Operational Environmental Satellite – R Series (GOES-R) measurements to generate NRT aerosol products. These products will be publicly available for air quality monitoring and forecasting.

These maps of nitrogen dioxide gas concentrations created from TEMPO measurements show the extent of air pollution in the Los Angeles and Las Vegas areas on August 2, 2023. TEMPO can detect pollution that is typically hidden in reflected sunlight.

Credit: Kel Elkins, Trent Schindler, and Cindy Starr of NASA's Science Visualization Studio



Societal Benefit

- Provide NRT measurements of tropospheric constituents (NO_2 , HCHO, SO_2 , clouds, aerosols) over North America every 2-3 hours
- Obtain hourly observations of small-scale emission sources and pollution gradients at suburban levels (e.g. industrial activities, vehicular exhaust)
- Capture rapidly-developing episodic events like wildfires and volcanic eruptions
- Provide expedited pollution products to advance air quality monitoring/forecasting, pollution transport modeling, weather and climate analysis, and population exposure assessments



TEMPO/GOES Near Real-Time Products

TEMPO NRT Products	NO ₂ (Nitrogen dioxide)	HCHO (Formaldehyde)	O ₂ -O ₂ (Cloud)	Aerosol
Platform	Intelsat 40e (IS-40e)			
Sensor Type	Ultraviolet-Visible Spectrometer			
Processing Level	2			
Temporal Coverage	Based on TEMPO availability (April 7, 2023 – IS-40e launch date)			
Temporal Frequency	Hourly			
Latency	< 3 hours			
Spatial Coverage	North America			
Spatial Resolution	2.0 × 4.75 km ²			
Data Format	NetCDF4/HDF5			

How do I access this data?

TEMPO NRT data will be available through NASA's ASDC. The first images from TEMPO have been released and are accessible through NASA's website.



NASA ASDC



TEMPO Images

Where can I find more information?

More information on TEMPO NRT products is available on this solution's webpage. More information on the TEMPO mission is provided on the TEMPO website.



TEMPO NRT Webpage



TEMPO Website

Background Image Credit: Joseph V. Ardizzone, NASA's Global Modeling and Assimilation Office

