

# CHRONOS

Transforming the assessment of highly uncertain air pollution emissions and air quality from space.

## CHRONOS Quantifies Changing Emissions

CHRONOS measures the air pollutants carbon monoxide and methane every hour over greater North America at fine spatial scale (~4 km) in less than 10 minutes each hour.

*Like weather, air quality can change hour by hour.*

Methane is released from decay of organic materials, geologic sources, landfills, and agricultural practices.

CHRONOS acquires significantly more data each day for North American air pollution inventories than any planned or existing mission.

CHRONOS data reduce the uncertainty of emissions estimates.

Carbon monoxide is released by agricultural and wild fires, industrial activities, and transportation.

CHRONOS observations can resolve intermittent sources such as fires that impact the ability of urban areas to meet air quality standards.

CHRONOS reveals the complex interactions between changing and variable air pollution emissions and their transport across North America, using space-proven measurement capability.

Science proposed to NASA Earth Venture Instrument-4 in November 2016

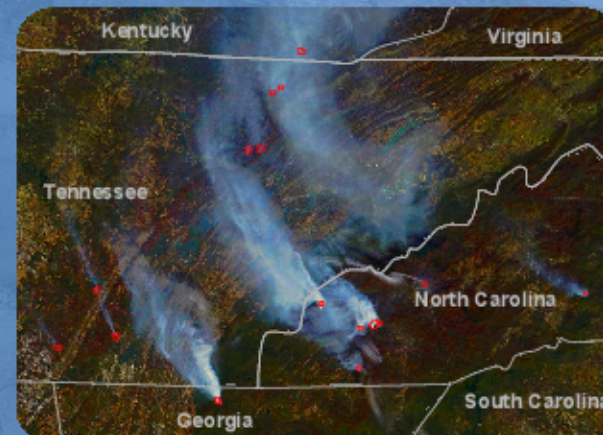
## CHRONOS Tracks Air Pollution Transport

CHRONOS uniquely measures pollution in two separate layers, one near the surface and one aloft. The vertical and horizontal atmospheric transport observed by CHRONOS every hour can distinguish locally produced air pollution from transported air pollution.

Air pollution moves up and away from ground level, and can cause harm far from the original pollution sources.



*Some increased air pollution near the surface in the U.S. can be attributed to sources in Asia. (PNAS, 2014)*



*Smoke is a simple visual tracer of regional pollution transport across states. (southeast U.S. fires, 2016)*

CHRONOS measures the amount of pollution being transported away from sources.

CHRONOS' transport data can improve atmospheric models, leading to better local forecasts.

