National Aeronautics and Space Administration



# EXPLOREEARTH

#### **NASA Air Quality Research**

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## **Overview**

- NASA and Air Quality Science
- NASA Satellites and Air Quality Measurements
- NASA Participation in Air Quality Related Campaigns

#### **NASA and Air Quality Science**

- NASA contributes to air quality related research in a variety of ways
  - Satellite observations (see next chart)
  - Surface-based measurement networks
  - Airborne field campaigns
  - Modeling/data assimilation/reanalysis
  - Provision of data to research and applications communities
  - Connection to users, incl. Health and Air Quality Applied Sciences Team
  - Technology Development
  - Interagency and international partnership in all of the above











AERONET

## NASA EARTH FLEET

**OPERATING & FUTURE THROUGH 2023** 

**INVEST/CUBESATS** PACE (NSO) SENTINEL-6 Michael Freilich (ESA, EUMETSAT, NOAA) **ICESAT-2** GRACE-FO (2) (GFZ) **CYGNSS** (8) NISTAR, EPIC (DSCOVR/NOAA) **CLOUDSAT** (CSA) ITERRA (METI, CSA) AQUA (JAXA, AEB) AURA (NSO, FMI, UKSA) CALIPSO (CNES) **GPM** (JAXA) LANDSAT 7 (USGS) LANDSAT 8 (USGS) 0CO-2 **SMAP** SUOMI NPP (NOAA)

**CSIM-FD** HARP TEMPEST-D **CIRiS** CTIM HyTI **SNoOPI NACHOS** 

(PRE) FORMULATION IMPLEMENTATON

- PRIMARY OPS
- EXTENDED OPS

**SWOT** (CNES) LANDSAT-9 (USGS) SENTINEL-6 B (ESA, EUMETSAT, NOAA) **TROPICS** (6) NISAR (ISRO) TSIS-2 **PREFIRE** (2) **GLIMR ISS INSTRUMENTS** EMIT **CLARREO-PF** GEDI **OCO-3 TSIS-1 ECOSTRESS** LIS SAGE III JPSS-2, 3 & 4 INSTRUMENTS

**GEOCARB** 

MAIA

TEMPO

**OMPS-Limb** LIBERA 03.26.2021

### **NASA Participation in Air Quality Related Campaigns**

- NASA has a long history of participation in airborne field campaigns associated with global and regional air quality
  - Early on (1980s-2000s) much of effort focused on global air quality in relatively unpolluted areas or those that were affected by long range transport
  - More recently, large campaigns using one or more large platforms have emphasized polluted areas, including
    - DISCOVER-AQ (2011-2014) Baltimore/Washington, California Central Valley, Houston, Denver Area
    - KORUS-AQ (2016) Seoul, Korea and surrounding areas (with Korea Institute for Environmental Research)
    - FIREX-AQ (2019) Boise, ID and Salina, KS (with NOAA) to study atmospheric aspects of wildfires and agricultural burning
  - "Smaller" campaigns have used smaller platforms and surface-based measurements (Chesapeake Bay, Lake Michigan, Long Island Sound); forthcoming ones include Houston, TX (with Department of Energy), Detroit area, NY Metropolitan Area
  - Deployment of surface-based measurement network instruments (esp. PANDORA/PANDONIA and Tropospheric Ozone Lidar Network (TOLNet) enhance campaigns
  - Modeling participation supports mission planning and incorporation of satellite data
- Next major air quality airborne campaign is planned for ~2024-2025 in Asia

Long Island Sound Tropospheric Ozone Study (LISTOS) - 2018

**New Haven** 

Flax Pond

Hammonasset State Park

**Outer Island** 

Bronx Pfizer BG GCNY

Bayonne

Queens College

Sherwood Island

Rutgers

https://www-air.larc.nasa.gov/missions/listos/index.html