https://ntrs.nasa.gov/search.jsp?R=20190034187 2020-03-11T15:28:12+00:00Z

Explore Air Quality from NASA Satellite Data

AGU American Geophysical Union

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NASA/Goddard EARTH SCIENCES DATA and INFORMATION SERVICES CENTER (GES DISC)

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Abstract

Space-borne earth observation has been important to monitor the Earth conditions and played a critical role in validating other instruments or modeling's outputs. However, the data from satellite Earth observation are usually very complex in terms of science contents, formats, and spatiotemporal granularities, making them difficult to use from many aspects. NASA Goddard Earth Sciences Data and Information Services Center (GES DISC), one of the 12 official NASA data centers, archives and distributes rich collections of data from multiple satellite missions and model results. The GES DISC is also the official archive center for data from the Ozone Monitoring Instrument (OMI) aboard NASA's Aura mission since 2004. Recently, the GES DISC has been evolving and improving its data management and services in order to promote NASA data to be easily discovered and accessed, as well as to facilitate interoperability. We'll show in this presentation how to explore and analyze NASA earth observation data for air quality through a suite of user-friendly tools - from Worldview to Giovanni, demonstrating in using this set of tools prepares us to serve the Sentinel 5P TROPOMI to the community.

Find Data and Services

- Contains datasets from **Atmospheric Composition, Weather and Atmospheric Dynamics, Climate Variability and Change, Water and Energy Cycle,** and **Carbon Cycle** focus areas.
- All datasets are **Findable, Accessible, Interoperable** and **Reusable.**
- Provides **support** for all data and services.

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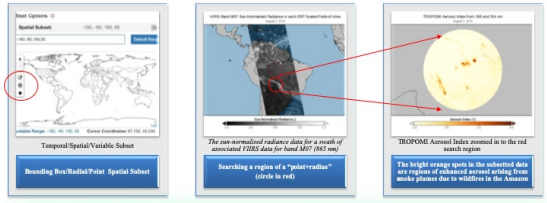
GES DISC Air Quality Data & Services

Physical Property	Measurement Instrument	Data Source	Temporal		Spatial		FAIR Data Principles				
							Dataset Landing Page		Interoperable Services		
			Coverage	Resolution	Coverage	Resolution	DOI	Search/ Find	Subsetter	Regridder	Giovanni
Aerosols (AOD)	OMI	Satellite	2004-10-01 ~ present	98.8 min	Global	13x24 km	10.5067/MEASURES/AER/DATA203	SCAN ME	✓	✓	
				98 min		13x24 km	10.5067/Aura/OMI/DATA2004 10.5067/Aura/OMI/DATA2001		✓	✓	
				32 days		13x12 km	10.5067/Aura/OMI/DATA3003		✓	✓	
				daily		0.25x0.25 deg	10.5067/Aura/OMI/DATA3005 10.5067/Aura/OMI/DATA3004		✓	✓	
				daily		1x1 deg	10.5067/Aura/OMI/DATA3003		✓	✓	✓
	MERRA-2	Model	1980-01-01~ present	hourly	Global	0.5x0.625 deg	10.5067/INGASEWWGR09		✓	✓	✓
				3 hourly			10.5067/TVGMH4BED3NL 10.5067/PUMVXFEQLA1		✓	✓	✓
				Monthly diurnal					✓	✓	
				Monthly			10.5067/VCGK8GEPLUC5		✓	✓	✓
	OCO-2	Satellite	2014-09-06~ present	16 days	Global	2.25x1.29 km	10.5067/IHGOS/HNSS1JC		✓		
	SSP-TROPOMI* (Aerosol Index) (Aerosol Layer Height)	Satellite	2018-05-14~ 2019-08-06 2019-08-06 ~ present	daily	Global	7x3.5 km 5.5x3.5 km	10.5270/SSP-3eafvvf 10.5270/SSP-j7ajkgr		✓		
	Terra/Aqua-MODIS	Satellite	2000-02-24 ~ present	daily	Global	3 km, 10 km					✓
	MISR	Satellite	2000-03-03 ~ present	daily	Global	0.5 deg					✓
Carbon Monoxide (CO)	AIRS	Satellite	2002-08-30 ~ present	12 hr	Global	1x1 deg	10.5067/Aqua/AIRS/DATA303	SCAN ME	✓		✓
				8 days			10.5067/Aqua/AIRS/DATA312		✓		
				Monthly			10.5067/Aqua/AIRS/DATA321		✓		✓
				6 min		50x50 km	10.5067/Aqua/AIRS/DATA322		✓		
	MERRA-2	Model	1980-01-01~ present	hourly	Global	0.5x0.625 deg	10.5067/3R29/SEHDGQ		✓	✓	✓
				3 hourly			10.5067/HO9OVZWF3KW2		✓	✓	
				Monthly diurnal			10.5067/9KFZ6GXRH2NN		✓	✓	
				Monthly			10.5067/WM73VNEDWX8		✓	✓	✓
	SSP-TROPOMI	Satellite	2018-05-14~ 2019-08-06 2019-08-06 ~ present	daily	Global	7x3.5 km 5.5x3.5 km	10.5270/SSP-1nkp7rp		✓		
	MOPITT	Satellite	2000-03-03 ~ 2019-02-01	daily	Global	1 deg		SCAN ME			✓
Sulfur Dioxide (SO2)	OMI	Satellite	2004-10-01 ~ present	daily	Global	0.25x0.25 deg	10.5067/Aura/OMI/DATA3008	SCAN ME	✓	✓	✓
				daily			10.5067/Aura/OMI/DATA3023		✓	✓	✓
				98 min		13x24 km	10.5067/Aura/OMI/DATA3022		✓		
	SSP-TROPOMI	Satellite	2018-05-14~ 2019-08-06 2019-08-06 ~ present	daily	Global	7x3.5 km 5.5x3.5 km	10.5270/SSP-e4lgp54		✓		
	OMPS NM	Satellite	2012-01-26~ present	daily	Global	50x50 km	10.5067/MEASURES/SO2/DATA203 10.5067/AIGO2ZHUJ4R		✓		
	MERRA-2	Model	1980-01-01~ present	Monthly diurnal	Global	0.5x0.625 deg	10.5067/PUMVXFEQLA1		✓	✓	
	Multi-Satellite Air Quality SO2 Database	Satellite	2005-01-01~ 2018-12-31				10.5067/MEASURES/SO2/DATA403		✓		
Nitrogen Dioxide (NO2)	OMPS NM	Satellite	2012-01-26 ~ present	101 min	Global	50x50 km	10.5067/N0WUE2QAVR3	SCAN ME	✓		
	OMI	Satellite	2004-10-01 ~ present	daily	Global	0.25x0.25 deg	10.5067/Aura/OMI/DATA3007		✓	✓	✓
				daily			10.5067/Aura/OMI/DATA2018		✓		
				98 min		13x24 km	10.5067/Aura/OMI/DATA2017		✓		
	SSP-TROPOMI	Satellite	2018-05-14~ 2019-08-06 2019-08-06 ~ present	daily	Global	7x3.5 km 5.5x3.5 km	10.5270/SSP-e4lgp54		✓		
Formaldehyde (HCHO)	OMI	Satellite	2004-10-01 ~ present	daily	Global	0.1x0.1 deg	10.5067/Aura/OMI/DATA3010	SCAN ME	✓	✓	✓
				daily		0.25x0.25 deg	10.5067/Aura/OMI/DATA2016		✓	✓	
				98 min		13x24 km	10.5067/Aura/OMI/DATA2015		✓		
	SSP-TROPOMI	Satellite	2018-05-14~ 2019-08-06 2019-08-06 ~ present	daily	Global	7x3.5 km 5.5x3.5 km	10.5270/SSP-ljs4ld2		✓		
Ammonia (NH3)	AIRS	Satellite	2002-09-01~ 2016-08-31	monthly	Global	1x1 deg	10.5067/0KITTGAOKFN	SCAN ME	✓		

Satellite Level 2 Data Subsetter



Service Highlight:

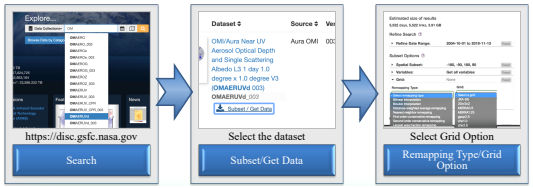
- Subset by Dimension/Variable and with Spatial/Temporal criteria;
- Provides data lineage and format conversion;
- **25** Level 2 TROPOMI products: https://disc.gsfc.nasa.gov/datasets?keywords=(tropomi)&processingLevel=2

Tutorial:

- How-To Subset Level 2 Data
- How to Use the Web Services API for Subsetting

Other products for the subsetting service : **OMI (L2, L2G), MLS, OCO-2, ACOS, GPM**

Remapping Gridded Data



Service highlights:

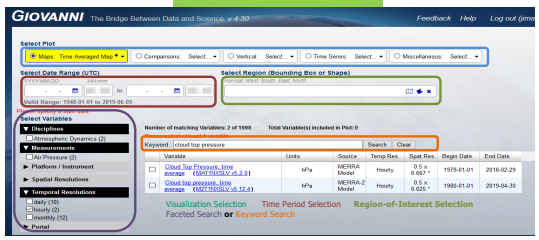
- **7 remapping methods: bilinear, bicubic, distance-weighted average, nearest neighbor, 1st order conservative, 2nd order conservative, largest area fraction**
- **30 gridding schemes: MERRA-2, LDAS, GEOS5, NCEP, ERA….etc.**

Tutorial:

- How to use the Level 3 and 4 Subsetter and Regridder
- Using the GES DISC Level 3/4 Regridder and Subsetter for OMI Products

Other Products for the remapping service: MERRA-2, LDAS (GLDAS, NLDAS, FLDAS, NCA-LDAS), IMERG

Giovanni



- Contains about **1,500** parameters from **6 DAACs**
- Provides **22 on-the-fly analytic functions**
- Provides sharable URLs