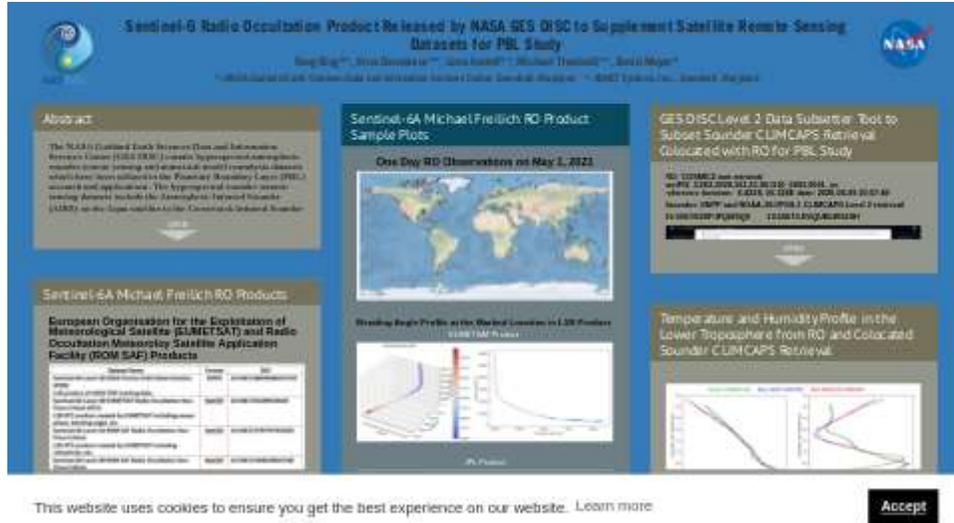
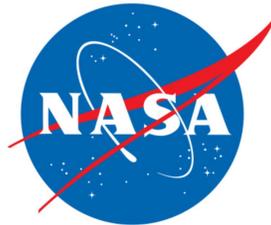


Sentinel-6 Radio Occultation Product Released by NASA GES DISC to Supplement Satellite Remote Sensing Datasets for PBL Study



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PRESENTED AT:



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ABSTRACT

The NASA Goddard Earth Sciences Data and Information Services Center (GES DISC) curates hyperspectral atmospheric sounder remote sensing and numerical model reanalysis datasets which have been utilized in the Planetary Boundary Layer (PBL) research and applications. The hyperspectral sounder remote-sensing datasets include the Atmospheric Infrared Sounder (AIRS) on the Aqua satellite to the Cross-track Infrared Sounder (CrIS) on Suomi--National Polar-orbiting Partnership (NPP) and National Oceanic and Atmospheric Administration -20 (NOAA-20)/ Joint Polar-orbiting Satellite System -1 (JPSS-1). The Modern-Era Retrospective analysis for Research and Applications Version 2 (MERRA-2) global reanalysis product provides a data record commencing in 1980. The sounder remote sensing and reanalysis datasets is also available from the GES DISC. COSMIC Global Navigation Satellite System (GNSS) radio occultation (RO) measurement seasonal and annual PBL height climatology dataset from June 2006 to December 2015) include temperature, water vapor, and trace gas profile down to the PBL, and also have a derived PBL height as well. A nearly 10-year (June 2006 to December 2015) seasonal and annual PBL height climatology dataset from COSMIC Global Navigation Satellite System (GNSS) radio occultation (RO) measurement is also available from the GES DISC.

In collaboration with Sentinel-6 Project, the GES DISC is implementing curation activities for GNSS RO products from the Sentinel-6A/Sentinel-6 Michael Freilich satellite launched on November 21, 2020. Sentinel-6A RO products provide refractivity, temperature, and humidity profile with finer vertical resolution, leveraging PBL research and application as a supplement to the hyperspectral sounder remote sensing and reanalysis products. In this presentation, we introduce all Sentinel-6A products and services, and demonstrate use cases studying the PBL by combining these products with other GES DISC archived data products.

SENTINEL-6A MICHAEL FREILICH RO PRODUCTS

European Organisation for the Exploitation of Meteorological Satellite (EUMETSAT) and Radio Occultation Meteorology Satellite Application Facility (ROM SAF) Products

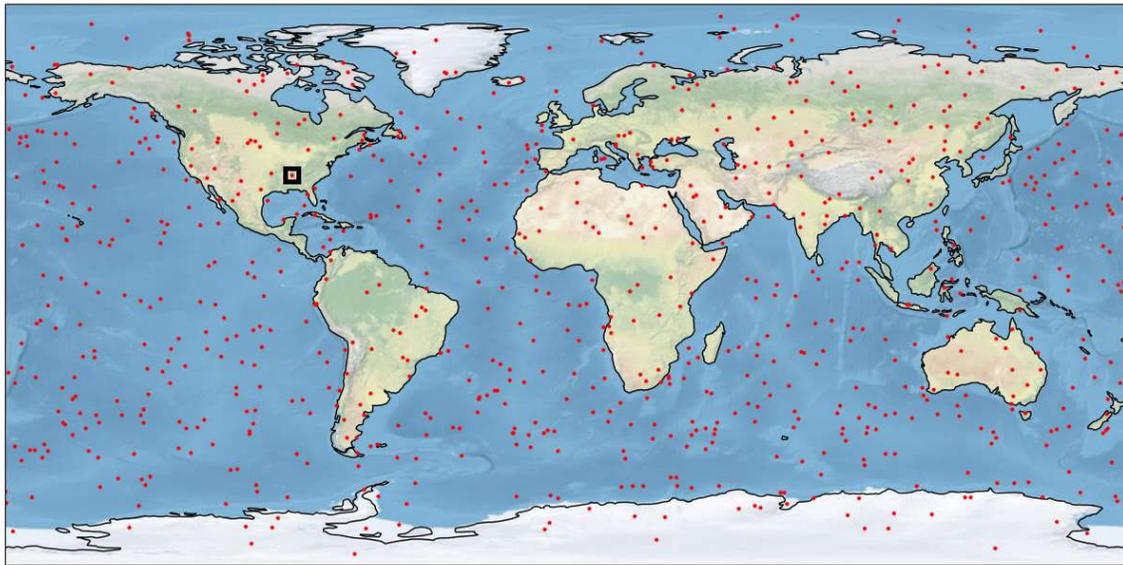
Dataset Name	Format	DOI
Sentinel-6A Level 1B GNSS Precise Orbit Determination (POD): L1B product of GNSS POD tracking data	RINEX	10.5067/Q8FMQ8GO71D5
Sentinel-6A Level 1B EUMETSAT Radio Occultation Non-Time-Critical (NTC): L1B NTC product created by EUMETSAT including excess phase, bending angle, etc.	NetCDF	10.5067/4GIJ09OJ0L6R
Sentinel-6A Level 2A ROM SAF Radio Occultation Non-Time-Critical: L2A NTC product created by EUMETSAT including refractivity, etc.	NetCDF	10.5067/UT9VTX7KOZKD
Sentinel-6A Level 2B ROM SAF Radio Occultation Non-Time-Critical: L2B NTC product created by EUMETSAT including temperature, humidity, etc.	NetCDF	10.5067/AWBIJ3BDCVQE

NASA Jet Propulsion Laboratory (JPL) Products

Dataset Name	Format	DOI
Sentinel-6A Level 1B GNSS Radio Occultation POD: L1B product of GNSS POD tracking data for RO	RINEX	10.5067/WO228VAW5RQU
Sentinel-6A Level 1B GNSS Radio Occultation Near-Real-Time (NRT): L1B NRT product created by JPL including excess phase, bending angle, etc.	NetCDF	10.5067/BRVCFYKTSI2
Sentinel-6A Level 2 GNSS Radio Occultation Near-Real-Time: L2 NRT product created by JPL including refractivity, temperature, humidity, etc.	NetCDF	10.5067/RVP3XBGSHNEM
Sentinel-6A Level 1B GNSS Radio Occultation Non-Time-Critical: L1B NTC product created by JPL including excess phase, bending angle, etc.	NetCDF	10.5067/51A9FYX50AN1
Sentinel-6A Level 2 GNSS Radio Occultation Non-Time-Critical: L2 NTC product created by JPL including refractivity, temperature, humidity, etc.	NetCDF	10.5067/I6S2B8X78ZFQ

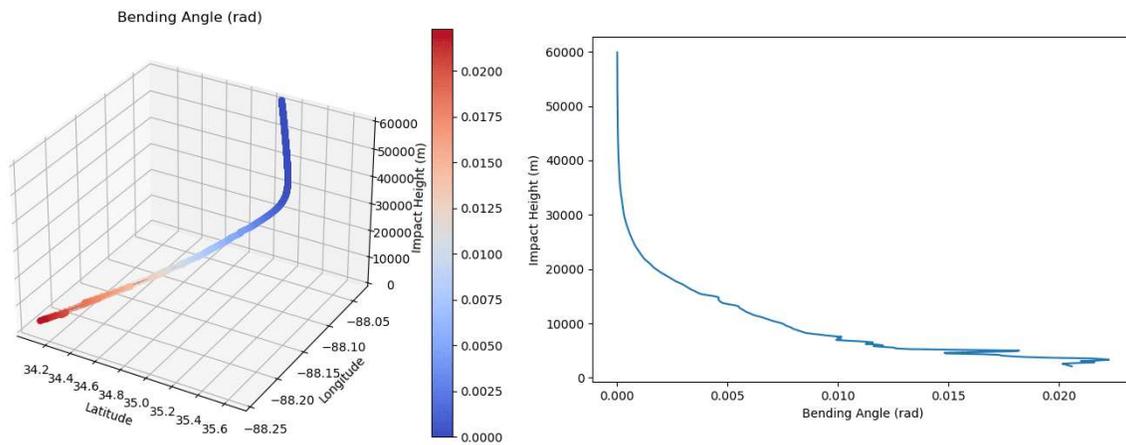
SENTINEL-6A MICHAEL FREILICH RO PRODUCT SAMPLE PLOTS

One Day RO Observations on May 1, 2021

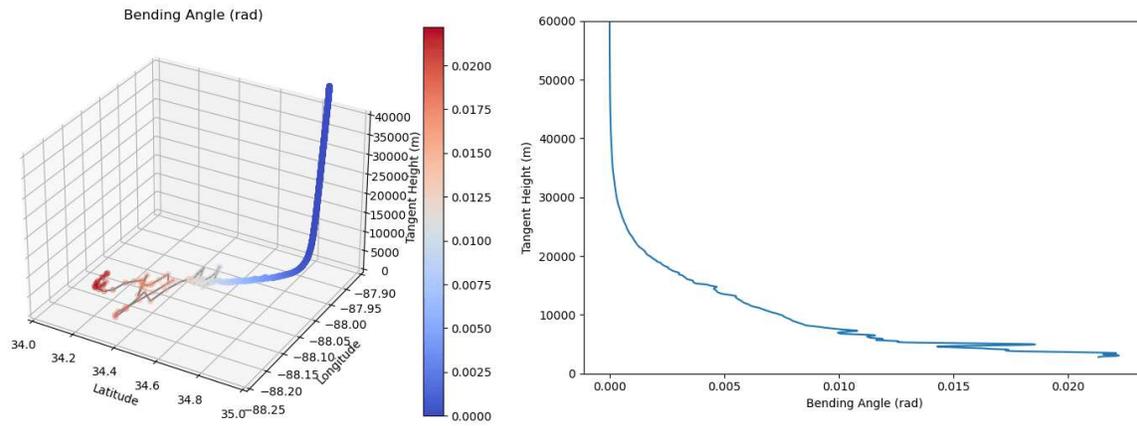


Bending Angle Profile at the Marked Location in L1B Product

EUMETSAT Product



JPL Product



Plots are created from the sample products for demonstration purpose. Final products may be different from the samples.

GES DISC LEVEL 2 DATA SUBSETTER TOOL TO SUBSET SOUNDER CLIMCAPS RETRIEVAL COLOCATED WITH RO FOR PBL STUDY

RO: COSMIC2 wet retrieval wetPf2_C2E2.2020.161.21.00.G10_0001.0001_nc
reference locaion: 6.432S, 56.326E date: 2020-06-09 20:57:49

Sounder: SNPP and NOAA-20/JPSS-1 CLIMCAPS Level 2 retrieval

10.5067/62SPJFQW5Q9 (https://disc.gsfc.nasa.gov/datasets/SNDRSNIML2CCPRET_2/summary)

10.5067/LESQUBLWS18H (https://disc.gsfc.nasa.gov/datasets/SNDRJ1IML2CCPRET_2/summary)

The screenshot shows the 'GES DISC Level 2 Data Subsetter' tool interface. The main configuration area includes:

- Download Method:** Get File Subsets using the GES DISC Subsetter (Reset)
- Get Original Files (Generate unmodified file links directly from the archive.)
- Get File Subsets using the GES DISC Subsetter (Generate file links supporting geo-spatial search and crop, selection of variables and dimensions, selection of time of day, and data presentation, in netCDF format.)

Method Options:

- Refine Date Range:** 2020-06-09 18:00:00 to 2020-06-09 23:59:59 (Reset)
- Refine Region:** -6.432, 56.326 (Reset)
- Use 'Refine Region' for geo-spatial subsetting
- Variables:** 8 variable(s) selected (Reset)
- Dimensions:** Get all dimensions (Reset)
- Time of Day:** Get complete time span (Reset)
- Data Presentation:** CROP (Reset)

Output format: File Format: netCDF

Buttons: Reset All, Get Data

Refine Date Range: ✓ 2020-06-09 18:00:00 to 2020-06-09 23:59:59 Reset

NOTE: All dates and times are in UTC.

From: To:

Available Range: 2018-02-17 00:00:00 to 2021-09-29 23:59:59

June 2020

Sun	Mon	Tue	Wed	Thu	Fri	Sat
31	01	02	03	04	05	06
07	08	09	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	01	02	03	04
05	06	07	08	09	10	11

June 2020

Sun	Mon	Tue	Wed	Thu	Fri	Sat
31	01	02	03	04	05	06
07	08	09	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	01	02	03	04
05	06	07	08	09	10	11

Refine Region: ✓ -6.432, 56.326 Reset

Default Range

Available Range: -180, -90, 180, 90 Cursor Coordinates:

Use 'Refine Region' for geo-spatial subsetting

Use 'Refine Region' for geo-spatial subsetting

Variables: ✓ 8 variable(s) selected Reset

NOTE: By default, ALL variables are sent in the subset request.

Expand Tree

- aux
- ave_kern
- mol_lay
- mw
- air_pres_h2o_nsurf
- air_pres_lay_bnds
- air_pres_lay_nsurf
- air_pres_nsurf
- air_temp
- air_temp_dof
- air_temp_err
- air_temp_qc
- asc_flag
- asc_node_local_solar_time
- asc_node_lon
- asc_node_tai93
- attitude_lbl
- ch4_dof
- ch4_mmr_midtrop
- ch4_mmr_midtrop_err
- ch4_mmr_midtrop_qc
- cid_frac
- cid_frac_err
- cid_frac_qc
- cid_lay_lbl
- cid_top_pres
- cid_top_pres_err
- cid_top_pres_qc

Colocated SNPP Sounder Pixel: 6.295S, 56.103E, ~28.95km,

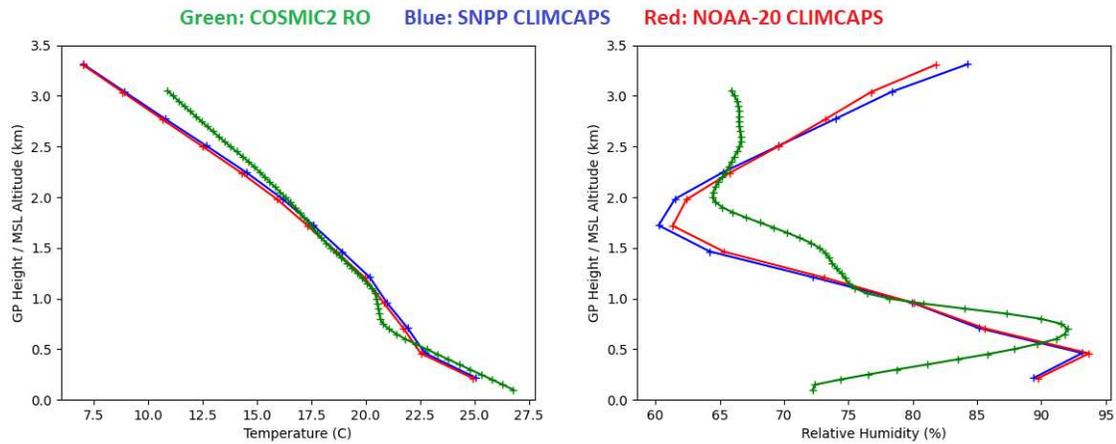
2020-06-09 21:12:00 to 21:18:00 6-min granule

Colocated NOAA-20/JPSS-1 Sounder Pixel: 6.519S, 56.035E, ~33.62km,

2020-06-09 22:00:00 to 22:06:00 6-min granule

How to Subset Level 2 Data (<https://disc.gsfc.nasa.gov/information/howto?keywords=subsetter&title=How%20to%20Subset%20Level-2%20Data>)

TEMPERATURE AND HUMIDITY PROFILE IN THE LOWER TROPOSPHERE FROM RO AND COLOCATED SOUNDER CLIMCAPS RETRIEVAL



SUMMARY

1. Sentinel-6A Michael Freilich RO products will be released in GES DISC.
2. GES DISC provides services to combine RO product with hyperspectral sounder remote sensing data, reanalysis data for the PBL study.

ABSTRACT

The NASA Goddard Earth Sciences Data and Information Services Center (GES DISC) curates hyperspectral atmospheric sounder remote sensing and numerical model reanalysis datasets which have been utilized in the Planetary Boundary Layer (PBL) research and applications. The hyperspectral sounder remote-sensing datasets include the Atmospheric Infrared Sounder (AIRS) on the Aqua satellite to the Cross-track Infrared Sounder (CrIS) on Suomi--National Polar-orbiting Partnership (NPP) and National Oceanic and Atmospheric Administration -20 (N NOAA-20)/ Joint Polar-orbiting Satellite System -1 (JPSS-1). The Modern-Era Retrospective analysis for Research and Applications Version 2 (MERRA-2) global reanalysis product provides a data record commencing in 1980. The sounder remote sensing and reanalysis datasets include temperature, water vapor, and trace gas profile down to the PBL, and also have a derived PBL height as well. A nearly 10-year (June 2006 to December 2015) seasonal and annual PBL height climatology dataset from COSMIC Global Navigation Satellite System (GNSS) radio occultation (RO) measurement is also available from the GES DISC.

In collaboration with Sentinel-6 Project, the GES DISC is implementing curation activities for GNSS RO products from the Sentinel-6A/Sentinel-6 Michael Freilich satellite launched on November 21, 2020. Sentinel-6A RO products provide refractivity, temperature, and humidity profile with finer vertical resolution, leveraging PBL research and application as a supplement to the hyperspectral sounder remote sensing and reanalysis products. The public release of Sentinel-6A RO products is scheduled for mid-October of 2021. In this presentation, we will introduce all Sentinel-6A products and services, and demonstrate use cases studying the PBL by combining these products with other GES DISC archived data products.