NOAA/NESDIS

NESDIS-REQ-1002.2

NESDIS PRODUCT BASELINE

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National Oceanic and Atmospheric Administration (NOAA)
National Environmental Satellite, Data, and Information Service (NESDIS)

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Prepared by:

ZHAO.LIMIN.1365868111 Digitally signed by ZHAO.LIMIN.1365868111 Date: 2022.10.24 08:51:25 -04'00'

Limin Zhao — Date
Enterprise Product and Service Lead
System Architecture and Advanced Planning

Approved by:

ST JEAN.DANIEL.PAUL.1365819900 Digitally signed by ST JEAN.DANIEL.PAUL.1365819900 Date: 2022.10.25 15:15:05 -04'00'

Daniel St. Jean (Acting) — Date
Director, System Architecture and Advanced Planning

VOLZ.STEPHEN.MICHAEL.1504223694 Digitally signed by VOLZ.STEPHEN.MICHAEL.1504223694 Date: 2022.10.28 09:04:45 -04'00'

Stephen M. Volz, Ph.D. — Date
Assistant Administrator for Satellite and Information Services
Vice-Chair, NOSC (NESDIS)

Approved by:

HANN.NANCY.L.1088955338 Digitally signed by HANN.NANCY.L.1088955338 Date: 2022.11.01 13:22:53 -04'00'

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RADM Nancy Hann, NOAA Date
Vice-Chair, NOSC (OMAO)
Director, Office of Marine and Aviation Operations
National Oceanic and Atmospheric Administration's
Commissioned Officer Corps
National Oceanic and Atmospheric Administration

ERICKSON.MARY.CATHERINE.1365826923 Digitally signed by ERICKSON.MARY.CATHERINE.1365826923 Date: 2022.11.07 08:44:42 -05'00'

_____ _____

Mary C. Erickson Date
NOSC Vice-Chair (NWS)
Deputy Assistant Administrator for Weather Services
National Oceanic and Atmospheric Administration

Morgan, Michael C. Digitally signed by Morgan, Michael C. Date: 2022.11.07 12:37:39 -05'00'

_____ _____

Michael C. Morgan, Ph.D Date
Chair, NOSC
Assistant Secretary of Commerce for Environmental Observation and Prediction

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Version	Description	CCR#	Revised Sections	Date
1.0	Initial version	CCR-2021-008		September 30, 2021
2	FY22 revisions	CCR-2022-015	• Updated to fill the gaps identified in Version 1.0, including delayed mode science quality products, long-term time series and reanalysis, etc. • Updates to adjudicate NESDIS-NWS deep dive review comments	September 20, 2022

Table of Contents

Table of Figures

This document contains no figures.

Table of Tables

1. Introduction

The National Environmental Satellite, Data and Information Service (NESDIS) provides environmental products, information and services to promote and protect the Nation's security, environment, economy, and quality of life. NESDIS works to maximize the value of products and services it provides in support of the national, regional, state and local needs, international agreements and organizations, and National Oceanic and Atmospheric Administration (NOAA) Line Offices' operational mission requirements. The NESDIS Level Requirement (NLR)-001 codifies what products NESDIS commits to provide and sustain in the long-term. This document is a part of NLR-REQ-001 and provides in more detail the attribute characteristics that these products need for sustainment. The NLR and Product Baseline together describe the types of products and associated baseline commitment NESDIS will provide to its users at all times.

2. Scope

The NESDIS Product Baseline defines the set of products and accompanying threshold attribute specifications that NESDIS commits to sustain and maintain in terms of geographic coverage, refresh, and latency. It represents the baseline level of service that NESDIS commits to its users and stakeholders. However, this document does not preclude product performance above the baseline. NESDIS will enhance the baseline with available resources, and maintain the flexibility to optimize products for users with available data aligned with user impact-driven priority and budget profiles.

The NESDIS Product Baseline provides a strategic look at how NESDIS maintains its data and products in a data source-agnostic approach. It sets the foundation for NESDIS to focus on users' fundamental needs, optimize products, and maximize benefits from using the most effective combination of data sources for its user community. The NLR REQ-001 and the Product Baseline describe the types of products and associated level of service that NESDIS commits to in perpetuity.

The NESDIS Product Baseline sets the basis for the NESDIS Five-Year Product Plan, which documents the set of algorithms and data sources that NESDIS will fund to adopt and enhance the NESDIS baseline products aligned with user impact-driven priority and given budget profiles.

The performance-specific attributes that are tied to instrument measurements and algorithms (i.e., product resolution, product accuracy and precision, product formats) are not included in the Product Baseline. Those performance-specific attributes are currently documented in program level requirements documents under multiple NESDIS satellite programs. In the future, the performance-specific attributes will be consolidated and documented in a NESDIS Level Product Requirements Document.

The NESDIS Product Baseline will be reviewed and updated on an annual basis to match the ongoing changes to the NESDIS baseline commitment. New baseline products or updated threshold attributes of existing baseline products will be added into the Product Baseline using the Product Requirements Change process outlined in the NESDIS Requirements Management Plan (NESDIS-PLN-1312.1) and NESDIS Product Requirements Change Process (NESDIS-PROC-XXXX).

3. Methodology

The NESDIS Integrated Products List (IPL) is a vetted, living catalogue that captures data and products that NESDIS generates and delivers to its users. It provides data sources for NESDIS products, product capability, and their identified users. It presents how NESDIS serves its users' existing needs for data and products as documented in the NESDIS Consolidated Observation User Requirements List and other user requirements.

The NESDIS Product Baseline documents the product capabilities that NESDIS can sustain and maintain for an extended period, and is traceable to all NESDIS continuity products documented in the IPL. In general, the product capability supported only by a single research satellite without planned follow-ons will not be included as a baseline commitment since NESDIS cannot guarantee the support for continuity. Therefore, in some cases, the Product Baseline could represent a lower threshold of service than what NESDIS provides today. However, this does not prevent NESDIS from continuously using the data and enhancing the baseline commitment when funding resources are available.

The baseline products are specified with the attributes of geographic coverage, refresh and latency, which outline the fundamental needs and expectations of users in a data source-agnostic approach. The Product Baseline documents the threshold specifications of the attributes for each baseline product that NESDIS commits to sustain and maintain for continuity purposes.

The current version documents mostly the continuity capability. When evaluating the attribute specifications of the operational products that NESDIS provides today, the product capabilities supported by sustainable data sources are primarily considered, which are provided from NOAA and its partners under long-term operational agreements and partnership, such as the Initial Joint Polar-orbiting System (IJPS)/Joint Polar-orbiting System (JPS) agreement, Coordination Group for Meteorological Satellites (CGMS) commitments, etc.

Methodologies adopted in development of the NESDIS Product Baseline are as follows:

1. The products and their associated attribute specifications are determined based on the contribution of sustainable data sources from NOAA and its partners.

   a. Managed Data Sources – NOAA-owned and operated satellites
      i. Low Earth Orbit (LEO) current baseline: one satellite in the PM orbit with resiliency on orbit, one potential satellite in early morning, and one altimeter in the Reference Orbit (10-day repeat)
      ii. Geostationary Earth Orbit (GEO) current baseline: two satellites coverage- one in the East and one in the West
   b. Partnered Data Sources - Partner operational satellites under IJPS/JPS, Jason-Continuity of Service (CS) 4-Partner Memoranda of Agreement & CGMS baseline
      i. LEO baseline: one satellite in the AM, and one altimeter in the Reference Orbit (10-day repeat)
      ii. GEO baseline: GEOs from the CGMS baseline
   c. High Reliable Data Sources – Non-operational satellites under long-term partner agreements
      i. Only considered when long-term stable support resources are identified
2. Only one entry is included for the same type of products from different algorithms that have the same threshold attribute specifications. More detailed algorithm implementation will be captured in the Five-Year Product Plan.
3. When Geographical Coverage and Refresh are the same, the Product Baseline documents the product entry with the largest Latency as the Baseline commitment.
4. When Geographical Coverage and Latency are the same, the Product Baseline documents the product entry with the lowest Refresh as the Baseline commitment.
5. When the Refresh and Latency are the same, the Product Baseline documents the product entry with the larger Geophysical Coverage over multi-small-local regions. For example, if Snow Cover is generated over Hemi US, CONUS and Mesoscale with the same Refresh and Latency, only Snow Cover over Hemi US is documented as the Baseline commitment.
6. Product names in the same family of observations with the same attribute specifications (geographic coverage, refresh and latency) are documented as one entry. For example, Ocean Surface Wind to cover both Ocean Surface Wind Speed and Direction.
7. For blended/gridded products, the Refresh actually represents how frequently the products are made available to users, which is different from the general definition in Appendix B.
8. For blended/gridded products, the Latency represents the average data age, which is different from the general definition in Appendix B.

9. For Full Disk/Sectorized products, the Latency represents the interval between the end of an observation by an instrument on the satellite to the observation and products made available to users, which is different from the general definition in Appendix B.

All baseline products are traceable to what NESDIS is doing today with a baseline level of performance that can be sustained by the data from NOAA and partner missions and long-term partnership.

The NESDIS Product Baseline is aligned with the 31 product categories in NLR REQ-001 for continuity products, which encompass many user applications. Each product category includes:

- A brief product category description
- A product table, summarizing all products covered under each category and their associated threshold attributes specifications: geographic coverage, refresh, and latency.

The Data Type is included in Tables for reference purpose, but it is not a requirement.

4. Sources of Information

4.1. Applicable Documents

a. NESDIS-REQ-1001.1, NESDIS Level Requirements
b. NESDIS-PR-1302.1, NESDIS Requirements Management Procedural Requirements
c. NESDIS-PLN-1312.1, NESDIS Requirements Management Plan
d. NESDIS-PLN-1314.1, NESDIS Configuration Management Plan
e. NESDIS-PLN-1003.2, NESDIS Five-Year Product Plan
f. NESDIS-PROC-XXXX, NESDIS Product Requirement Change Process

4.2. References

Several sources are used to analyze the product threshold attributes specifications documented in the Product Baseline, which include:

- NESDIS Integrated Products List
- Joint Polar Satellite System (JPSS) Level 1 Requirements Document Supplement – Final V2.11
- JPSS Ground Segment Data Product Specification - 474-01543, Revision B
- Geostationary Operational Environmental Satellites (GOES)-R Series Level-1 Requirements, June 2020
- GOES-R Ground Segment Project Functional and Performance Specification
- GOES-R Product Definition and User's Guide

- IJPS/JPS Agreement
- Jason-3 and Jason-CS 4-Partner Memoranda of Agreement
- EUMETSAT Polar System (EPS)-Second Generation (SG) End User Requirements Document v5A, February 2020
- Metop-SG NOAA Products List v1.2
- Satellite Products and Services Review Board (SPSRB) User Request Database
- Others

5. The Product Baseline

5.1. Foundational

The NESDIS Foundational Thematic Product Area represents the raw sensor data generated from a satellite observing system to include calibration and geolocation information. Products within this thematic area are instrument specific and serve as building blocks for NESDIS Geophysical Products as well as for user applications.

5.1.1 Imagery

Products in the Imagery category include but are not limited to visible, near-infrared, infrared, microwave and solar imagery at multiple wavelengths. These include but are not limited to direct interpretation of single-channel images and processed multi-channel images such as multispectral compositing, temporal combination of animated sequences, or multi-satellite mosaics, etc.

Table 1: Product Specifications/Attributes in NLR Category: Imagery

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Visible and Infrared Imagery	Granule	Global	12 hours	96 mins
Visible and Infrared Imagery	Blended	Arctic	60 mins	4 hours
Visible and Infrared Imagery	Blended	60S to 60N	60 mins	60 mins
Visible and Infrared Imagery	Full Disk	Hemi US	10 mins	55 secs
Visible and Infrared Imagery	Sectorized	CONUS	5 mins	55 secs
Visible and Infrared Imagery	Sectorized	Targeted Mesoscale	30 secs	28 secs
Microwave Sounder Imagery	Orbital	Global	6 hours	3 hours
Microwave Imager Imagery	Orbital	Global	12 hours	130 mins

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Near Constant Contrast Imagery	Granule	Global	12 hours	96 mins
Synthetic Aperture Radar Imagery	Granule	US Exclusive Economic Zone (EEZ) and Coastal Areas, Arctic, US Great Lakes, CONUS, Alaska (AK), and Hawaii (HI); Targeted Global Tropical Cyclone Coverage	10 days	1~8 hours

5.1.2 Sensor Data

Products in the Sensor Data category include but are not limited to radiances, radar/lidar backscatter amplitudes and phases, backscattered radiation, brightness temperatures, sensor radiometric calibration information and geolocation, and in-situ observations such as electrons, ions and electric and magnetic fields, etc.

Table 2: Product Specifications/Attributes in NLR Category: Sensor Data

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Shortwave Ultraviolet-Visible (UV/Vis) Sounder Raw Data Records	Granule	Global	24 hours	96 mins
Shortwave (UV/Vis) Sounder Sensor Data Records	Granule	Global	24 hours	96 mins
Shortwave (UV/Vis) Sounder Reflectance	Granule	Global	24 hours	96 mins
Shortwave (UV/Vis) Sounder Solar Irradiance	Granule	Global	24 hours	96 mins
Infrared Sounder Cloud Cleared Radiances	Granule	Global	6 hours	2 hours
Infrared Sounder Radiances	Granule	Global	6 hours	2 hours
Infrared Sounder Principal Components/Thinned Radiances	Granule	Global	6 hours	2 hours

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Infrared Sounder Raw Data Records	Granule	Global	6 hours	2 hours
Infrared Sounder Sensor Data Records	Granule	Global	6 hours	2 hours
Optical Imager Raw Data Records	Orbital	Global	6 hours	3 hours
Optical Imager Raw Data Records	Full Disk	Hemi US	10 mins	10 mins
Optical Imager Reflectance	Orbital	Global	6 hours	3 hours
Optical Imager Reflectance	Full Disk	Hemi US	10 mins	10 mins
Optical Imager Radiances	Orbital	Global	6 hours	3 hours
Optical Imager Radiances	Full Disk	Hemi US	10 mins	10 mins
Optical Imager Radiances	Sectorized	Targeted Mesoscale	5 mins	5 mins
Optical Imager Radiances	Climate Data Records	Arctic, Antarctic	6 hours	24 hours
Optical Imager Clear Sky Radiance	Full Disk	Hemi US	10 mins	10 mins
Optical Imager Clear Sky Radiance	Sectorized	Targeted Mesoscale	5 mins	5 mins
Optical Imager Brightness Temperatures	Orbital	Global	6 hours	3 hours
Optical Imager Brightness Temperatures	Full Disk	Hemi US	10 mins	10 mins
Optical Imager Brightness Temperatures	Sectorized	CONUS	10 mins	10 mins
Optical Imager Brightness Temperatures	Climate Data Records	70S to 70N	3 hours	3 months
Microwave Radiometer Brightness Temperatures	Orbital	Global	4 hours	3 hours

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Microwave Radiometer Brightness Temperatures	Climate Data Records	Global	24 hours	1 month
Microwave Radiometer Raw Data Records	Orbital	Global	12 hours	137 mins
Microwave Radiometer Raw Data Records	Orbital	Global	4 hours	2 hours
Microwave Radiometer Temperature Data Records	Orbital	Global	4 hours	2 hours
Microwave Radiometer Temperature Data Records	Orbital	Global	12 hours	137 mins
Microwave Radiometer Sensor Data Records	Orbital	Global	4 hours	2 hours
Lightning Imager	Point	Hemi US	20.5 secs	20 secs
Scatterometers	Orbital	Global	12 hours	3 hours
Radar Altimeter	Orbital	Global	10 days	2~5 hours
Radio Occultation Data	Orbital	Global	15 hours (high-latitude) / 26 hours (mid-latitude) / 42 hours (tropics)	150 mins

Table 3: Core Datasets from NCEI that support many Geophysical Products

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency	Duration
Global Historical Climatology Network (GHCN)	In-Situ	Global	24 hours	1 day	2012–present
NOAA Global Surface Temperature (NOAAGlobalTemp)	Blended	Global	Monthly	1 month	1900–present
HURSAT	Point	Global (centered on active tropical cyclones)	3 hours	18 months	N/A

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency	Duration
Integrated Surface Dataset	In-Situ	Global	1 hour	1 hour	1901–present
GridSat-B1	Gridded	70N to 70S	Monthly	3 months	1981–present
nClimDiv	In-Situ	180W to 66W, 24S to 71.5N	Monthly	1 month	1895–present

5.2. Geophysical

The NESDIS Geophysical Thematic Products Area describes the earth, atmosphere and surrounding space environment. Geophysical products are derived through mathematical algorithms that process observing system foundational data. Geophysical products are distributed to our end user community in support of weather, climate, cryosphere, oceanic and space forecast and monitoring capabilities.

5.2.1 Atmospheric Composition and Air Quality

Products in the Atmospheric Composition and Air Quality sub-category include but are not limited to aerosol detection, optical depth, particle size, height, ozone, methane, CO, CO2, and other trace gases, etc.

Table 4: Product Specifications/Attributes in NLR Category: Atmospheric Composite and Air Quality

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Biomass Burning Emissions	Orbital	Global Land	6 hours	6 hours
Aerosol Optical Depth/Thickness	Full Disk	Hemi US	10 mins	10 mins
Aerosol Optical Depth/Thickness	Sectorized	CONUS	5 mins	5 mins
Aerosol Optical Depth/Thickness	Granule	Global	24 hours	96 mins
Aerosol Optical Depth/Thickness	Climate Data Record	Global Ocean	24 hours	3 months
Aerosol Particle Properties	Granule	Global	24 hours	96 mins
Aerosol Detection	Granule	Global	24 hours	96 mins
Aerosol Detection	Full disk	Hemi US	10 mins	10 mins
Aerosol Detection	Sectorized	CONUS	5 mins	5 mins
Total Ozone	Granule	Global	24 hours	103 mins
Total Ozone	Blended	Global	24 hours	24 hours
Total Ozone	Gridded	Global	Weekly	1 week
Ozone Profile	Granule	Global	12 hours	96 mins
Ozone Profile	Granule	Global	24 hours	119 mins
Ozone Profile	Orbital	Global	4 days	1 hour
Ozone Profile	Gridded	Global	Weekly	1 week

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Trace Gases Product Suite*	Granule	Global	6 hours	2 hours
Dust/Ash/Smoke	Full disk	Hemi US	30 mins	30 mins
Dust/Ash/Smoke	Sectorized	CONUS	24 hours	24 hours
Dust/Ash/Smoke	Gridded	Global Land	6 hours	6 hours
Dust/Ash/Smoke	Gridded	Global Land	24 hours	24 hours

*Including Methane, Sulfur Dioxide, Carbon Dioxide, Carbon Dioxide Profile, Carbon Monoxide, Carbon Monoxide Profile, etc.

5.2.2 Atmospheric Water Vapor

Products in the Atmospheric Water Vapor sub-category include but are not limited to moisture profiles, total precipitable water, total precipitable water anomaly and stability indices, etc.

Table 5: Product Specifications/Attributes in NLR Category: Atmospheric Water Vapor

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Atmospheric Water Vapor Profiles	Orbital	Global	4 hours	3 hours
Atmospheric Water Vapor Profiles	Granule	Global	6 hours	2 hours
Atmospheric Water Vapor Profiles	Full Disk	Hemi US	60 mins	60 mins
Atmospheric Water Vapor Profiles	Sectorized	CONUS	30 mins	30 mins
Atmospheric Water Vapor Profiles	Sectorized	Targeted Meso	5 mins	5 mins
Total Precipitable Water (TPW)	Orbital	Global	4 hours	3 hours
Total Precipitable	Granule	Global	12 hours	96 mins

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Water (TPW)				
Total Precipitable Water (TPW)	Full disk	Hemi US	15 mins	15 mins
Total Precipitable Water (TPW)	Sectorized	CONUS	5 mins	5 mins
Total Precipitable Water (TPW)	Sectorized	Targeted Meso	30 secs	30 secs
Total Precipitable Water (TPW)	Blended	Global	60 mins	6 hours
Percentage of TPW Normal	Blended	Global	60 mins	6 hours
Layered Precipitable Water (LPW)	Blended	Global	60 mins	6 hours

5.2.3 Atmospheric Temperature

Products in the Atmospheric Temperature sub-category include but are not limited to near-surface air temperature and pressure, temperature profiles, atmospheric temperature indices, atmospheric pressure profile, virtual temperature, upper air temperature, etc.

Table 6: Product Specifications/Attributes in NLR Category: Atmospheric Temperature

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Surface Pressure	In-situ	Global	Weekly	1 week
Surface Pressure	In-situ	Global	Quarterly	3 months
Surface Pressure	Granule	Global	12 hours	96 mins
Atmospheric Temperature Profile	Orbital	Global	6 hours	3 hours
Atmospheric Temperature Profile	Climate Data Record	Global	Annually	1 year
Atmospheric Temperature Profile	Gridded	Hemi US	60 mins	60 mins
Atmospheric Temperature Profile	Gridded	CONUS	30 mins	30 mins
Atmospheric Temperature Profile	Sectorized	Targeted Meso	5 mins	5 mins
Surface Air Temperature	In-situ	Global	24 hours	24 hours

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Surface Air Temperature	In-situ	Global	Monthly	1 month
Surface Air Temperature	In-situ	Global	Quarterly	3 months
Surface Air Temperature	In-situ	Global	Decadal	10 years
Upper Air Temperature	In-situ	CONUS, AK, HI, US Territories	12 hours	3 days
Virtual Temperature (Near-surface air properties)	In-situ	Global	Monthly	1 month
Maximum/Minimum Temperatures	In-situ	CONUS, AK, HI, US Territories	60 mins	60 mins
Maximum/Minimum Temperatures	In-situ	CONUS, AK, HI, US Territories	24 hours	24 hours
Maximum/Minimum Temperatures	In-situ	CONUS, AK, HI, US Territories	Monthly	1 month
Maximum/Minimum Temperatures	In-situ	CONUS, AK, HI, US Territories	Quarterly	3 months
Maximum/Minimum Temperatures	In-situ	CONUS, AK, HI, US Territories	Annually	1 year
Maximum/Minimum Temperatures	In-situ	CONUS, AK, HI, US Territories	Decadal	10 years
Maximum/Minimum Temperatures	In-situ	Global	Monthly	1 month
Station-Based Climate Summaries	In-Situ	CONUS, AK, HI	Daily	1 day
Regional Climate Center: Extremes	In-Situ	CONUS, AK, HI, Pacific Islands, Puerto Rico	Annually	4 months
Stagnation Index	In-situ	CONUS	Monthly	1 month
Lifted Index	Orbital	Global	6 hours	3 hours
Stability Indices*	Granule	Global	6 hours	2 hours
Stability Indices*	Full disk	Hemi US	60 mins	60 mins
Stability Indices*	Sectorized	CONUS	30 mins	30 mins
Stability Indices*	Sectorized	Targeted Meso	5 mins	5 mins

*Stability Indices include Convective Index, Convective Available Potential Energy, etc.

5.2.4 Clouds

Products in the Clouds sub-category include but are not limited to water/ice path, cloud mask, height (top and base), layers, optical depth, liquid/ice path, phase, particle size, etc.

Table 7: Product Specifications/Attributes in NLR Category: Clouds

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Cloud Fraction	Orbital	Global	6 hours	3 hours
Cloud Fraction	In-Situ	CONUS, Puerto Rico, Hawaii	60 mins	10 mins
Cloud Layers	Granule	Global	12 hours	96 mins
Cloud Layers	Full disk	Hemi US	10 mins	10 mins
Cloud Layers	Sectorized	CONUS	5 mins	5 mins
Cloud Layers	Sectorized	Targeted Mesoscale	30 secs	30 secs
Cloud Phase	Granule	Global	12 hours	96 mins
Cloud Phase	Full disk	Hemi US	10 mins	10 mins
Cloud Phase	Sectorized	CONUS	5 mins	5 mins
Cloud Phase	Sectorized	Targeted Mesoscale	5 mins	5 mins
Cloud Heights (Top and Base)	Granules	Global	12 hours	96 mins
Cloud Heights (Top and Base)	Full disk	Hemi US	60 mins	60 mins
Cloud Heights (Top and Base)	Sectorized	Targeted Mesoscale	5 mins	5 mins
Cloud Mask	Granule	Global	12 hours	96 mins
Cloud Mask	Orbital	Global	6 hours	3 hours
Cloud Mask	Full disk	Hemi US	15 mins	15 mins
Cloud Mask	Sectorized	Targeted Mesoscale	5 mins	5 mins
Cloud Liquid/Ice Water	Granule	Global	12 hours	96 mins
Cloud Liquid/Ice Water	Orbital	Global	6 hours	3 hours
Cloud Optical Depth/Thickness	Orbital	Global	6 hours	3 hours
Cloud Optical Depth/Thickness	Full disk	Hemi US	15 mins	15 mins
Particle Size Distribution	Orbital	Global	6 hours	3 hours
Particle Size Distribution	Full disk	Hemi US	15 mins	15 mins
Particle Size Distribution	Sectorized	CONUS	5 mins	5 mins
Cloud Top Temperature	Orbital	Global	6 hours	3 hours
Cloud Top Temperature	Granule	Global	12 hours	96 mins

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Cloud Top Temperature	Gridded	Global	24 hours	24 hours
Cloud Top Temperature	Full disk	Hemi US	15 mins	15 mins
Cloud Top Temperature	Sectorized	Targeted Mesoscale	5 mins	5 mins
Cloud Top Pressure	Orbital	Global	6 hours	3 hours
Cloud Top Pressure	Full disk	Hemi US	60 mins	60 mins
Cloud Emissivity	Orbital	Global	6 hours	3 hours
Fog	Full disk	Hemi US	10 mins	10 mins
Fog	Sectorized	CONUS	5 mins	5 mins

5.2.5 Lightning

Products in the Lightning sub-category include but are not limited to lightning events, groups and flashes.

Table 8: Product Specifications/Attributes in NLR Category: Lightning

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Lightning Detection: Events, Groups and Flashes	Point	Hemi US	20 secs	20 secs
Lightning Detection Products (flash extent density, minimum flash area, total optical energy, etc.)	Gridded	Hemi US	1 min	1 min

5.2.6 Precipitation

The products in the Precipitation category include but are not limited to rain rate, snowfall rate, total rainfall estimates, rainfall potential and probability, Quantitative Precipitation Estimate and Precipitation Climate Data Records, etc.

Table 9: Product Specifications/Attributes in NLR Category: Precipitation

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Rain Rate	Granule	Global	12 hours	96 mins
Rain Rate	Orbital	Global	4 hours	3 hours
Rain Rate	Blended	Global	15 mins	30 mins
Rain Rate	Blended	Global	60 mins	6 hours

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Rain Rate	Climate Data Record	Global	24 hours	1 month
Snowfall Rate	Granule	Global	12 hours	96 mins
Snowfall Rate	Orbital	Global	4 hours	3 hours
Accumulated Rainfall Total	Blended	Global	60 mins	60 mins
Accumulated Rainfall Total	Blended	Global	24 hours	24 hours
Accumulated Rainfall Total	In-situ	CONUS	5 mins	24 hours
Accumulated Rainfall Total	In-situ	CONUS	15 mins	1 month
Accumulated Rainfall Total	In-situ	CONUS	60 mins	1 month
Maximum/Minimum Precipitation	In-situ	CONUS, AK, HI, US Territories	Annually	1 year
Maximum/Minimum Precipitation	In-situ	CONUS, AK, HI, US Territories	Decadal	10 years

5.2.7 Radiation Budget

Products in the Radiation Budget sub-category includes but is not limited to all incoming/outgoing radiances and irradiance, reflectance, emissivity, albedo, etc.

Table 10: Product Specifications/Attributes in NLR Category: Radiation Budget

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Outgoing Longwave Radiation	Granule	Global	12 hours	96 mins
Outgoing Longwave Radiation	Gridded	Global	24 hours	24 hours
Absorbed Shortwave Solar Radiation	Gridded	Global	24 hours	24 hours
Surface Albedo	Gridded	Global Land	24 hours	24 hours
Surface Albedo	Full disk	Hemi US Land	60 mins	30 mins
Surface Emissivity	Orbital	Global Land	6 hours	3 hours
Surface Reflectance	Orbital	Global Land	24 hours	24 hours
Reflected Shortwave Radiation: Top of Atmosphere*	Full disk	Hemi US	10 mins	10 mins
Reflected Shortwave Radiation: Top of Atmosphere	Sectorized	CONUS	60 mins	60 mins
Downward Shortwave Radiation*	Full disk	Hemi US	10 mins	10 mins

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Downward Shortwave Radiation	Sectorized	CONUS	60 mins	60 mins
Downward Shortwave Radiation	Gridded	Global	24 hours	24 hours
Radiative Flux	Full disk	Hemi US	3 hours	3 hours
Photosynthetically Active Radiation*	Full Disk	Hemi US	10 mins	10 mins
Photosynthetically Active Radiation	Gridded	Global	60 mins	60 mins
Total Solar Irradiance	Climate Data Record	Global	24 hours	3 months
Solar Spectral Irradiance	Climate Data Record	Global	24 hours	3 months
Outgoing Longwave Radiation	Climate Data Record	Global	Monthly	1 month
Outgoing Longwave Radiation	Climate Data Record	Global	24 hours	3 day
Reflectance	Climate Data Record	Global Land	24 hours	24 hours

*Confirming with SME for the proposed changes

5.2.8 Tropical Cyclone Characteristics

Products in the Tropical Cyclone Characteristics sub-category include but are not limited to tropical cyclone formation probabilistic forecasts, position and intensity estimates of tropical disturbances and cyclones and static and animated imagery of tropical disturbances, cyclones and areas of interest, and wind analysis, etc.

Table 11: Product Specifications/Attributes in NLR Category: Tropical Cyclone Characteristics

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Tropical Cyclone Intensity and Positions	Point	Storm Regions	6 hours	3 ~ 6 hours
Tropical Cyclone Intensity and Positions	Point	Storm Regions	30 mins	60 mins
Hurricane Imagery	Gridded	Global Ocean	3 hours	18 months
Hurricane Imagery	Orbital	Global Ocean	6 hours	3 hours
Hurricane Imagery	Full Disk	Hemi US	10 mins	10 mins
Hurricane Tracks	Point	Global	6 hours	4 days
Tropical Cyclone Surface Wind	Gridded	Storm Regions	6 hours	60 mins
Tropical Cyclone Surface Wind	Blended	Storm Regions	6 hours	3 ~ 6 hours

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Tropical Cyclone Rainfall Potential/Probability	Gridded	Storm Regions	6 hours	3 hours
Tropical Cyclone Formation Probability	Gridded	Global Ocean	6 hours	4 hours
Monitoring, US, Monthly State of Climate: Tropical Cyclones	Report	North Atlantic Ocean and Eastern North Pacific Ocean	Monthly	2 days

5.2.9 Volcanic Eruption Characteristics

Products in the Volcanic Eruption Characteristics sub-category include, but are not limited to, the detection, tracking, and characterization of volcanic emissions (primarily ash and SO2) and volcanic heat signatures (lava, hot gases, and incandescent material). This sub-category also includes specialized multi-spectral imagery and volcanic event centric eruption attributes such as source volcano, eruption timing, cloud height, mass of emissions, and cloud microphysical properties.

Table 12: Product Specifications/Attributes in NLR Category: Volcanic Eruption Characteristics

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Volcanic Ash Detection, Tracking, and Characterization	Granule	Global Land	12 hours	96 mins
Volcanic Ash Detection, Tracking, and Characterization	Full disk	Hemi US	10 mins	10 mins
Volcanic SO2 Detection, Tracking, and Characterization	Granule	Global	6 hours	2 hours
Volcanic Thermal Anomaly Detection, Tracking, and Characterization	Granule	Global	12 hours	96 mins
Volcanic Thermal Anomaly Detection, Tracking, and Characterization	Full Disk	Hemi US	10 mins	10 mins

5.2.10 Winds

Products in the Wind sub-category include but are not limited to derived motion winds, near-surface and ocean surface winds, winds at various levels in the atmosphere, wind profiles and aircraft turbulence, etc.

Table 13: Product Specifications/Attributes in NLR Category: Winds

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Ocean Surface Wind	Granule	Global Ocean	10 hours	3 hours
Ocean Surface Wind	Orbital	Global Ocean	12 hours	130 mins
Ocean Surface Wind	Sectorized	US EEZ and Coastal Areas and US Great Lakes. Global Tropical Cyclone Coverage as needed.	12 hours	1 ~ 8 hours
Ocean Surface Wind	Orbital	Global Ocean	10 days	180 mins
Atmospheric Winds	Full disk	Hemi US	60 mins	60 mins
Atmospheric Winds	Sectorized	CONUS	15 mins	15 mins
Atmospheric Winds	Sectorized	Targeted Mesoscale	5 mins	5 mins
Atmospheric Winds	Sectorized	Polar Regions	12 hours	204 mins
Atmospheric Winds	Sectorized	Polar Regions	6 hours	3 hours
Sea Surface Winds Data Set	In-situ	Global Ocean	As needed	24 hours

5.2.11 Lake and Sea Ice

Products in the Lake and Sea Ice sub-category include ice extent, thickness and age, concentration, type, motion, surface temperature, and climatology.

Table 14: Product Specifications/Attributes in NLR Category: Lake and Sea Ice

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Ice Thickness	Granule	Global Ocean	12 hours	96 mins
Ice Thickness	Full Disk	Hemi US	3 hours	3 hours
Ice Age	Granule	Global Ocean	12 hours	96 mins
Ice Age	Full Disk	Hemi US	3 hours	3 hours
Ice Age	Orbital	Global Ocean	12 hours	130 mins

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Ice Extent	Blended	Hemispheric	24 hours	12 hours
Ice Extent	Blended	Northern Hemisphere	12 hours	12 hours
Ice Extent	Blended	Southern Hemisphere	24 hours	24 hours
Ice Surface Temperature	Granule	Global Ocean	12 hours	96 mins
Sea Ice Concentration/Extent	Granule	Global Ocean	12 hours	96 mins
Sea Ice Concentration/Extent	Orbital	Global Ocean	6 hours	3 hours
Sea Ice Concentration/Extent	Full Disk	Hemi US	3 hours	3 hours
Sea Ice Concentration/Extent	Blended	Hemispheric	24 hours	12 hours
Sea Ice Concentration/Extent	Climate Data Record	Polar Regions	24 hours	1 year
Sea Ice Motion	Sectorized	Arctic, Antarctic	24 hours	24 hours
Sea Ice Motion	Full Disk	Hemi US	3 hours	3 hours

5.2.12 Snow and Glacier

Products in the Snow and Glaciers sub-category include, but are not limited to, snow cover/extent, density, size of snow particles in the snowpack, snow depth, and snow water equivalent, snow analysis, etc.

Table 15: Product Specifications/Attributes in NLR Category: Snow and Glacier

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Snow Cover	Granule	Global Land	12 hours	96 mins
Snow Cover	Orbital	Global Land	6 hours	3 hours
Snow Cover	Full disk	Hemi US	60 mins	60 mins
Snow Cover	Gridded	Global Land	24 hours	12 hours
Snow Cover	Climate Data Record	North Hemisphere	24 hours	1 month
Snow Depth	Orbital	Global Land	12 hours	130 mins
Snow Depth	Blended	Global Land	24 hours	12 hours
Snow Depth	In-situ	Hemi US	24 hours	2 days
Snow Water Equivalent	Blended	North Hemisphere	24 hours	12 hours
Snow Water Equivalent	Orbital	Global Land	6 hours	3 hours
Snow Water Equivalent	Granule	Global Land	12 hours	96 mins
Extreme	In-Situ	Global Land	Annual	Annual

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Snowfall				

5.2.13 Fires

Products in the Fires sub-category include fire detection and mapping, fire occurrence and hotspot characterization, smoke analysis, smoke plumes and concentration, etc.

Table 16: Product Specifications/Attributes in NLR Category: Fires

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Fire Detection and Characterization	Granule	Global Land	12 hours	96 mins
Fire Detection and Characterization	Full Disk	Hemi US	10 mins	10 mins
Fire Detection and Characterization	Sectorized	CONUS	5 mins	5 mins
Fire Detection and Characterization	Sectorized	Targeted Mesoscale	1 min	1 min
Fire and Smoke Analysis	Analysis	US and Canada	60 mins	75 mins

5.2.14 Flood

Products in the Flood sub-category include but are not limited to near-real time, daily and multi-day composite flood maps, etc.

Table 17: Product Specifications/Attributes in NLR Category: Flood

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Flood Detection	Granule	CONUS and Alaska	12 hours	60 mins
Flood Detection	Sectorized	Global Land (80S~80N)	6 hours	24 hours

5.2.15 Surface Moisture

Products in the Surface Moisture sub-category include but are not limited to soil moisture and evapotranspiration, hydrologic forecasts and drought monitoring, etc.

Table 18: Product Specifications/Attributes in NLR Category: Surface Moisture

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Soil Moisture	Orbital	Global Land	12 hours	130 mins
Soil Moisture	Blended	Global Land	6 hours	2.5 hours

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Soil Moisture	Blended	Global Land	24 hours	24 hours
Drought Indices	In-situ	CONUS	Weekly	1 week + 2 days
Drought Indices	In-situ	Global Land	Monthly	1 month + 2 days
Drought Indices	In-situ	CONUS	Monthly	1 month + 2 days
Drought Indices	In-situ	North American	Monthly	1 month + 2 days

5.2.16 [Land] Surface Temperature

Products in the Surface Temperature sub-category include but are not limited to the surface and skin temperatures of the apparent surface of land (bare soil or vegetation).

Table 19: Product Specifications/Attributes in NLR Category: Surface Temperature

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Land Surface Temperature	Orbital	Global Land	6 hours	3 hours
Land Surface Temperature	Granules	Global Land	12 hours	96 mins
Land Surface Temperature	Full disk	Hemi US	60 mins	60 mins
Land Surface Air Temperature	In-Situ	Global	Monthly	1 month

5.2.17 Vegetation

Products in the Vegetation sub-category include but are not limited to vegetation type and dynamic status (vegetation density and health), and climate data records, etc.

Table 20: Product Specifications/Attributes in NLR Category: Vegetation

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Green Vegetation Fraction	Gridded	Global Land	24 hours	24 hours
Green Vegetation Fraction	Gridded	Global Land	24 hours	1 week
Vegetation/Surface Type	Gridded	Global Land	24 hours	1 week
Leaf Area Index	Gridded	Global Land	24 hours	1 week
Vegetation Health Indices	Gridded	Global Land	24 hours	1 week
Vegetation Indices*	Gridded	Global Land	24 hours	1 week
Vegetation Indices*	Climate Data Record	Global Land	24 hours	1 week

*Vegetation Indices include Normalized Difference Vegetation Index (NDVI), Enhanced Vegetation Index, etc.

5.2.18 Topography and Bathymetry

Products in the Topography and Bathymetry sub-category include but are not limited to ocean bathymetry information, sea floor topography, water depths, coastal shoreline mapping, bathymetric and fishing maps, sediment thickness, and the combination of land topography, ocean bathymetry and glacial information, etc.

Table 21: Product Specifications/Attributes in NLR Category: Topography and Bathymetry

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Coastal Bathymetry	In-situ	Global Ocean	Annually	1 year
Sea Floor Bathymetry	In-situ	Global Ocean	Annually	1 year
Sea Floor Bathymetry	Orbital	Global Ocean	Annually	1 year
Mean Dynamic Topography	Gridded	Global Ocean	Annually	1 year
Water Depth	In-situ	Global Ocean	Annually	1 year

5.2.19 Surface Height

Products in the Surface Height sub-category include but are not limited to surface and wave height products for both large and small features from waves to tsunamis.

Table 22: Product Specifications/Attributes in NLR Category: Ocean Surface Height and Roughness

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Sea Surface Height	Orbital	Global Ocean	10 days	2 ~ 5 hours
Sea Surface Height	Orbital	Global Ocean	10 days	2 ~ 3 days
Sea Surface Height	Orbital	Global Ocean	10 days	2 months
Sea Surface Height	Gridded	Global Ocean	10 days	3 hours ~ 10 days
Mean Sea Level Surface Height	Delayed Mode Blended	Global and Regional Ocean	24 hours	3 months
Significant Wave Height	Orbital	Global Ocean	10 days	2 ~ 5 hours
Significant Wave Height	Gridded	Global Ocean	10 days	2 ~ 3 days
Significant Wave Height	Orbital	Global Ocean	10 days	2 months
Absolute Dynamic Topography	Gridded	Global Ocean	10 days	24 hours
Absolute	Gridded	Global Ocean	10 days	2 months

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Dynamic Topography				

5.2.20 Water Temperature and Salinity

Products in the Temperature and Salinity sub-category include but are not limited to Sea Surface Temperature (SST), Lake Surface Temperature, SST Anomalies, SST Hot Spots, Degree Heating Weeks, Coral Bleaching Alerts, Ocean Heat Content, and Salinity Measurements, etc.

Table 23: Product Specifications/Attributes in NLR Category: Water Temperature and Salinity

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Sea Surface Temperature	Blended	Global Ocean	24 hours	24 hours
Sea Surface Temperature	Granule	Global Ocean	12 hours	103 mins
Sea Surface Temperature	Orbital	Global Ocean	6 hours	2 hours
Sea Surface Temperature	Gridded	Global Ocean	6 hours	2 hours
Sea Surface Temperature	Full Disk	Hemi US	60 mins	60 mins
Sea Surface Temperature	Full Disk	Hemi US	3 hours	3 hours
Sea Surface Temperature	Full Disk	Hemi US	24 hours	24 hours
Sea Surface Temperature	Blended	Arctic	24 hours	24 hours
Sea Surface Temperature	Gridded	Global Ocean	60 mins	6 hours
Sea Surface Temperature	Delayed mode gridded	Hemispheric	1 hours	3 months
Sea Surface Temperature	Delayed mode granule	Global Ocean	12 hours	3 months
Sea Surface Temperature	Delayed mode Gridded	Global Ocean	24 hours	3 months
Sea Surface Temperature	In-situ	Global Ocean	24 hours	24 hours
Sea Surface Temperature	In-situ	Global Ocean	Monthly	1 month
Sea Surface Temperature Anomaly	Gridded	Global Ocean	60 mins	6 hours

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Sea Surface Temperature Front	Blended	Global Ocean	24 hours	24 hours
Isotherm Depth (20C, 26C)	Gridded	North Atlantic Basin	24 hours	24 hours
Isotherm Depth (20C, 26C)	Gridded	North Pacific Basin	24 hours	24 hours
Isotherm Depth (20C, 26C)	Gridded	South Pacific Basin	24 hours	24 hours
Ocean Mixed Layer Depth	Gridded	North Atlantic Basin	24 hours	24 hours
Ocean Mixed Layer Depth	Gridded	North Pacific Basin	24 hours	24 hours
Ocean Mixed Layer Depth	Gridded	South Pacific Basin	24 hours	24 hours
Ocean Heat Content	Gridded	North Atlantic Basin	24 hours	24 hours
Ocean Heat Content	Gridded	North Pacific Basin	24 hours	24 hours
Ocean Heat Content	Gridded	South Pacific Basin	24 hours	24 hours
Coral Reef Hot Spots	Gridded	Global Ocean	6 hours	3 hours
Degree Heating Weeks	Gridded	Global Ocean	Weekly	1 week
Ocean Surface Salinity	Gridded	Global Ocean	12 hours	24 hours

5.2.21 Biology and Biogeochemistry

Products in the Biology and Biogeochemistry sub-category include but are not limited to remote sensing reflectance, ocean color, concentration of chlorophyll and suspended particulates, water-leaving radiance, dissolved colored organic matter, turbidity, surface and varying depths and diffuse attenuation coefficients, etc.

Table 24: Product Specifications/Attributes in NLR Category: Biology and Biogeochemistry

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Water Diffuse Attenuation	Granule	Coastal Global	12 hours	12 hours
Water Diffuse Attenuation	Gridded	Coastal Global	24 hours	24 hours
Water Diffuse Attenuation	Gridded	Coastal Global	Weekly	1 week
Water Diffuse Attenuation	Gridded	Coastal Global	Monthly	1 month

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Water Diffuse Attenuation	Gridded	Global Ocean	24 hours	24 hours
Water Diffuse Attenuation	Gridded	Global Ocean	Weekly	1 week
Water Diffuse Attenuation	Gridded	Global Ocean	Monthly	1 month
Water Diffuse Attenuation	Delayed mode granule	Global Ocean and Coastal Global	24 hours	3 months
Water Diffuse Attenuation	Delayed mode gridded	Global Ocean and Coastal Global	24 hours	3 months
Water Diffuse Attenuation	Delayed mode gridded	Global Ocean and Coastal Global	Weekly	3 months
Water Diffuse Attenuation	Delayed mode gridded	Global Ocean and Coastal Global	Monthly	3 months
Chlorophyll-a Concentration	Granule	Global Ocean and Coastal Global	12 hours	12 hours
Chlorophyll-a Concentration	Gridded	Global Ocean and Coastal Global	24 hours	24 hours
Chlorophyll-a Concentration	Gridded	Global Ocean and Coastal Global	Weekly	1 week
Chlorophyll-a Concentration	Gridded	Global Ocean and Coastal Global	Monthly	1 month
Chlorophyll-a Concentration	Delayed mode Granule	Global Ocean and Coastal Global	24 hours	3 months
Chlorophyll-a Concentration	Delayed Mode Gridded	Global Ocean and Coastal Global	24 hours	3 months
Chlorophyll-a Concentration	Delayed Mode Gridded	Global Ocean and Coastal Global	Weekly	3 months
Chlorophyll-a Concentration	Delayed Mode Gridded	Global Ocean and Coastal Global	Monthly	3 months
Chlorophyll-a Anomaly	Granule	Global Ocean, Coastal Global, Coastal US	12 hours	12 hours
Chlorophyll-a Anomaly	Gridded	Global Ocean, Coastal Global, Coastal US	24 hours	24 hours

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Chlorophyll-a Front	Granule	Global Ocean and Coastal Global	12 hours	12 hours
True Color	Granule	Coastal US	12 hours	12 hours
True Color	Gridded	Coastal US	24 hours	24 hours
Normalized Water-leaving Radiance (Reflectance)	Granule	Coastal Global	12 hours	12 hours
Normalized Water-leaving Radiance (Reflectance)	Gridded	Coastal Global	24 hours	24 hours
Normalized Water-leaving Radiance (Reflectance)	Gridded	Coastal Global	Weekly	1 week
Normalized Water-leaving Radiance (Reflectance)	Gridded	Coastal Global	Monthly	1 month
Normalized Water-leaving Radiance (Reflectance)	Gridded	Global Ocean	24 hours	24 hours
Normalized Water-leaving Radiance (Reflectance)	Gridded	Global Ocean	Weekly	1 week
Normalized Water-leaving Radiance (Reflectance)	Gridded	Global Ocean	Monthly	1 month
Normalized Water-leaving Radiance (Reflectance)	Granule	Coastal US	12 hours	6 hours
Normalized Water-leaving Radiance (Reflectance)	Gridded	Coastal US	24 hours	24 hours
Normalized Water-leaving Radiance (Reflectance)	Gridded	Coastal US	Bi-monthly	61 days

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Normalized Water-leaving Radiance (Reflectance)	Delayed mode Granule	Global Ocean and Coastal Global	24 hours	3 months
Normalized Water-leaving Radiance (Reflectance)	Delayed Mode Gridded	Global Ocean and Coastal Global	24 hours	3 months
Normalized Water-leaving Radiance (Reflectance)	Delayed Mode Gridded	Global Ocean and Coastal Global	Weekly	3 months
Normalized Water-leaving Radiance (Reflectance)	Delayed Mode Gridded	Global Ocean and Coastal Global	Monthly	3 months
Color Producing Agents	Delayed Mode Gridded	Great Lake	Daily	12 hours

5.2.22 Water Pollution

Products in the Water Pollution sub-category include but are not limited to oil spill mapping.

Table 25: Product Specifications/Attributes in NLR Category: Water Pollution

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Oil Spills and Marine Debris Detection	Granule	US Coastal Zone and EEZ	5 days	4 hours
Oil Spills and Marine Debris Detection	Analysis	Global Ocean and Coastal Global	6 hours	10 hours

5.2.23 Heliosphere

Products in the Heliosphere sub-category include but are not limited to solar wind measurements and models.

Table 26: Product Specifications/Attributes in NLR Category: Heliosphere

Baseline Products	Data Type	Geographic Coverage	Refresh Rate	Latency
WSA-Enlil Solar Wind Prediction	Gridded	Heliosphere	Hourly	60 mins
Solar and Galactic Energetic Particles/Protons	In-situ	GEO In-Situ	30 secs	30 secs
Magnetic Field Measurements	In-situ	L1 In-Situ	0.5 sec	60 secs

Baseline Products	Data Type	Geographic Coverage	Refresh Rate	Latency
Solar Energetic Particle	In-situ	L1 In-Situ	30 secs	30 secs
Solar Wind/Plasma Density	In-situ	L1 In-Situ	1 min	5 mins
Solar Wind/Plasma Velocity	In-situ	L1 In-Situ	1 min	5 mins
Solar Wind/Plasma Temperature	In-situ	L1 In-Situ	1 min	5 mins

5.2.24 Ionosphere

Products in the Ionosphere sub-category include but are not limited to ionospheric monitoring, total electron count, energetic charged particles, etc.

Table 27: Product Specifications/Attributes in NLR Category: Ionosphere

Baseline Products	Data Type	Geophysical Coverage	Refresh	Latency
Vertical Total Electron Content	Gridded	Global	10 mins	15 mins
Ionospheric Plasma Parameters (electron density profiles, scintillation, plasma drift, Rate of change Of TEC Index)	In-situ	LEO In-Situ	24 hours	15 mins
D Region Absorption Prediction	Gridded	Global	1 min	Negligible
Ionosonde	Ground-Based Profiles	Global	5 mins	5 mins

5.2.25 Magnetosphere

Products in the Magnetosphere sub-category include but are not limited to enhanced magnetic models, space environment magnetic field, magnetic field calculators, geomagnetic models, earth magnetic anomaly grid, gravity field database, magnetopause location and crossing detection, etc.

Table 28: Product Specifications/Attributes in NLR Category: Magnetosphere

Baseline Products	Data Type	Geographic Coverage	Refresh Rate	Latency
Energetic Particle	In-situ	GEO In-Situ	1 sec	60 secs

Baseline Products	Data Type	Geographic Coverage	Refresh Rate	Latency
(electron, ion) spectra				
Energetic Particle (electron, ion) spectra	In-situ	LEO In-Situ	1 sec	60 secs
World Magnetic Model	Gridded	Global	5 Years	Static
Magnetic Field Measurements	In-situ	GEO In-Situ	0.5 sec	60 secs
Magnetic Field Measurements	In-situ	LEO In-Situ	0.5 sec	60 secs
High Definition Geomagnetic Model	Gridded	Global	Annually	Static

5.2.26 Solar

Products in the Solar sub-category include but are not limited to solar and coronal images, solar irradiance measures, and derived products.

Table 29: Product Specifications/Attributes in NLR Category: Solar

Baseline Products	Data Type	Geographic Coverage	Refresh Rate	Latency
Solar UV Imagery	Image	Whole Sun	4 mins	1 min
Coronal Imagery	Image	Coronal	15 mins	15 mins
Solar UV Irradiance	Time series	Whole Sun	20 mins/90 mins	15 mins
Solar X-ray Irradiance	Time series	Whole Sun	3 secs	3 secs

6. Analytical

NESDIS Analytical Products synthesize geophysical information into highly processed datasets such as fused and blended analysis datasets, multi-mission time series, climate data records, written reports, and human interpretive analyses and assessments. Beyond numerical representations of data, analytical products describe how geophysical products help us to monitor the environment for global changes and significant weather events. These products support national and international users responsible for environmental monitoring and weather forecasts.

6.1. Analytical – Climate

Products in the Climate sub-category include but are not limited to quantitative analysis of climate variables in the ocean, atmosphere, land, cryosphere, and regional climate

summaries around the world including: United States National Climate Assessment, Annual State of the Climate, Monthly Monitoring, etc.

Table 30: Product Specifications/Attributes in NLR Category: Analytical – Climate Reports

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Bulletin of American Meteorological Society State of the Climate	Reports	Global	Annually	1 year
Societal Impacts: Billion Dollar Disasters	Reports	CONUS, AK, HI, Puerto Rico and US Territories	Quarterly	3 months
Monthly State of Climate: National Overview	Reports	CONUS, AK, HI	Monthly	1 month
Monthly State of Climate: National Snow and Ice	Reports	CONUS, AK, HI	Monthly	1 month
Monthly State of Climate: Synoptic Discussion	Reports	CONUS, AK, HI, Puerto Rico, US Territories	Monthly	1 month
Monthly State of Climate: Tornadoes	Reports	CONUS, AK, HI	Monthly	1 month
Monthly State of Climate: Global Analysis Report	Reports	Global	Monthly	1 month
National Climate Assessment	Reports	CONUS, AK, HI, Pacific Islands and Ocean	4 years	4 years
Monthly State of Climate: Upper Air Temperature Report	Reports	Global-Atmosphere	Monthly	Monthly
World Meteorological Organization Annual Statement	Reports	Global	Annually	1 year
Climate and Health	Reports	Southeast Region	4 years	4 years
Climate and Forecast Perspectives	Reports	National, Southeast Region	24 hours	24 hours
Sporting Events Climatology	Reports	National	Annually	1 year
Monthly State of Climate: Global	Reports	Global	Monthly	1 month

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Snow and Ice Report				
Monthly State of Climate: Wildfire	Reports	CONUS	Monthly	1 month
Monthly State of Climate: Tropical Cyclones	Reports	North Atlantic Ocean and Eastern North Pacific Ocean	Monthly	1 month
Climate at a Glance	Reports	Global	Monthly	1 month
Publication Products, Monthly Climatic Data for the World	Reports	Global	Monthly	1 month
Publication Products, CD Pubs incl. QAR/Extremes reports to NWS	Reports	CONUS, AK, HI, US Territories	Monthly	1 month
Publication Products, CD Pubs incl. QAR/Extremes reports to NWS	Reports	CONUS, AK, HI, US Territories	Annually	1 year
Value of National Centers for Environmental Information (NCEI) Information Reports	Reports	Global	As Needed	As Needed
Global Climate Product Generation for Climate Reports	Reports	Global	Monthly to Quarterly	1 year
Climate and Forecast Perspectives	Reports	Southeast US	24 hours	24 hours
The Drought Monitor	Reports	CONUS, AK, HI, US Territories	Weekly	1 week
The Drought Monitor	Reports	North American	Weekly	1 week
U.S. Global Change Research Program Indicators Suite	Reports	Global	Annually	18 months

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Wind Climatology and Monitoring	Reports	CONUS	Monthly	1 month
Disaster Reports	Reports	CONUS, AK, HI, US Territories	Quarterly	3 months
Precipitation Climate Reports	Reports	Global	Monthly	1 month
Tornado Climatology	Reports	CONUS, AK, HI	Daily	6 days
Regional Snowfall Index	Reports	Six of Nine NCEI Climate Regions: Northeast, Northern Rockies & Plains, Ohio Valley, Southeast, South, Upper Midwest	Annual or more often as needed	3-5 days after storm exits CONUS

6.2. Analytical – Oceans, Freshwater and Coasts

Products in the Oceans, Freshwater and Coasts sub-category include but are not limited to qualitative analysis of ocean observations and marine data including United States National Climate Assessment, Annual State of the Climate, Monthly Monitoring, Oil spill detection and monitoring, etc.

Table 31: Product Specifications/Attributes in NLR Category: Oceans, Freshwater and Coasts

Baseline Products	Data Type	Geographic Coverage	Refresh Rate	Latency
GPRA Performance Measure Reports	Reports	Global Ocean	Quarterly	3 months
Marine Pollution Analysis	Reports	EEZ US	As needed	As needed
Oil Spills and Marine Debris Detection	Analysis	Global	6 hours	10 hours

6.3. Analytical – Weather

Products in the Weather sub-category include but are not limited to interpretive analyses based on satellite data and its derived products in helping monitoring and forecasts of significant weather events including: Hurricane intensity and position, Significant Precipitation, Volcanic Ash, and Fire and Smoke, etc.

Table 32: Product Specifications/Attributes in NLR Category: Analytical/Weather

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency
Global Hazards Monitoring Report	Reports	Global	Weekly	1 week
Regional Winter Weather	Reports	CONUS	Daily	24 hours
Freeze/Thaw	Reports	US Northeast Region	Daily	24 hours
Tropical Weather and Impacts	Reports	Gulf of Mexico and Atlantic Ocean	As needed	As needed
Wildfire Monitoring	Reports	CONUS	Monthly	1 month
Wildfire Monitoring	Analysis	US and Canada	1 hour	1.25 hours
Land Surface Data Sets / Publication Products, Storm Data	Reports	CONUS, AK, HI, US Territories	Monthly	6 months
Monitoring, US, Monthly State of Climate: Drought	Reports	CONUS, AK, HI, US Territories	Monthly	1 month
Volcanic Hazard	Analysis	Global	6 hours	15 mins
Volcanic Ash Advisories and Graphics	Analysis	Global	6 hours	15 mins
Automated Severe Weather Analyses and Nowcasts	Analysis	CONUS	2–10 mins	5 mins

6.4. Analytical – Climate Data Records

Products in the Climate Data Records (CDR) sub-category include but are not limited to long-term environmental data records produced for continuity over long time periods serving NOAA's users. These include well-characterized and cross-calibrated satellite observations and uniform records of geophysical data of the atmosphere, ocean and land. The former Climate Data Record Program categorized the CDRs into 4 areas: Atmospheric, Oceanic, Terrestrial and Fundamental in Tables 32 - 35 following these categorical assignments.

The following are the categories of CDR Types:

- FCDR - Fundamental CDRs provide intersatellite calibrated brightness temperatures.
- TCDR - Thematic CDRs provide retrievals of geophysical values.
- L1b - Satellite observations with corrections for intersatellite differences. Data are still at the original satellite projection (e.g., swath)
- L1g - Satellite observations with corrections for intersatellite differences. Data are mapped to a fixed projection grid.
- L2 - Level 2 indicates the data are on the same projection as the source data.
- L3 - Level 3 indicates data have been re-projected. While some data have been filled to ensure completeness of the field in space and time, our criteria for level 3 does not require it. Level 3 data indicates that data primarily derive from satellite observations.
- L3b - Level 3b identifies a field that has blended satellite data and *in situ* data.

Table 33: Product Specifications/Attributes in NLR Category: Analytical/Climate Data Records for the Atmospheric CDRs

Baseline Products	CDR Type	Geographic Coverage	Refresh Rate	Latency
Aerosol Optical Depth/Thickness	TCDR L3	Global Ocean	24 hours	3 months
Rain Rate	TCDR L3b	60S-60N	24 hours	3 months
Rain Rate	TCDR L3b	Global	24 hours	1 month
Rain Rate	TCDR L3b	Global	Monthly	1 month
Total Solar Irradiance	TCDR	Global	24 hours	3 months
Solar Spectral Irradiance	TCDR	Global	24 hours	3 months
Outgoing Longwave Radiation	TCDR L3	Global	Monthly	1 month
Outgoing Longwave Radiation	TCDR L3	Global	24 hours	3 day
Surface Heat Flux	TCDR L3	Global Oceans	24 hours	3 months
Cloud Fraction	TCDR L3	Global	3 hours	3 months
Cloud Fraction	TCDR L3	Global	12 hours	24 hours
Cloud Fraction	TCDR L3	Poles	12 hours	3 months
Cloud Optical Depth	TCDR L3	Global	3 hours	3 months
Cloud Optical Depth	TCDR L3	Global	12 hours	24 hours
Cloud Particle Size	TCDR L3	Global	12 hours	24 hours
Cloud Top Temperature	TCDR L3	Global	3 hours	3 months
Cloud Top Temperature	TCDR L3	Global	12 hours	24 hours
Cloud Top Temperature	TCDR L3	Poles	12 hours	3 months
Cloud Emissivity	TCDR L3	Global	12 hours	24 hours

Baseline Products	CDR Type	Geographic Coverage	Refresh Rate	Latency
Cloud Top Pressure	TCDR L3	Global	12 hours	24 hours
Cloud Liquid/Ice Water	TCDR L3	Global	12 hours	24 hours
Cloud Type	TCDR L3	Global	12 hours	24 hours
Total Precipitable Water	TCDR L2	Global	12 hours	4 months
Total Ozone	TCDR L3b	Global	Monthly	3 months
Ocean Surface Wind	TCDR L3	Global Oceans	3 hours	3 months
Mean Layer Temperatures	TCDR L3	Global	Monthly	1 month
Mean Layer Temperatures, Radio Occultation	TCDR L3	Global	Static	Static
Surface Radiative Flux	TCDR L3	Poles	3 hours	3 months
Top of Atmosphere Radiative Flux	TCDR L3	Poles	3 hours	3 months
Near Surface Specific Humidity	TCDR L3	Global Oceans	3 hours	3 months
Near Surface Air Temperature	TCDR L3	Global Oceans	3 hours	3 months

Table 34: Product Specifications/Attributes in NLR Category: Analytical/Climate Data Records for the Oceanic CDRs

Baseline Products	CDR Type	Geographic Coverage	Refresh Rate	Latency
Ocean Heat Content	TCDR L3	Global	3 months	3 months
Sea Surface Temperature	TCDR L3b	Global Oceans	24 hours	15 days
Sea Surface Temperature	TCDR L2	Global Oceans	12 hours	3 months
Sea Surface Temperature	TCDR L3	Global Oceans	3 hours	3 months
Sea Ice Concentration	TCDR L3	Poles	24 hours	1 year
Sea Ice Thickness	TCDR L3	Poles	12 hours	3 months

Table 35: Product Specifications/Attributes in NLR Category: Analytical/Climate Data Records for the Terrestrial CDRs

Baseline Products	CDR Type	Geographic Coverage	Refresh Rate	Latency
Surface Reflectance	TCDR L3	Global Land	24 hours	24 hours
NDVI	TCDR L3	Global Land	24 hours	1 week
Leaf Area Index	TCDR L3	Global Land	24 hours	1 week
FAPAR	TCDR L3	Global Land	24 hours	1 week
Snow Cover	TCDR L3b	North Hemisphere	24 hours	1 month
Snow Water equivalent	TCDR L2	Global Land	12 hours	3 months
Surface Temperature	TCDR L3	Polar regions	12 hours	3 months

Baseline Products	CDR Type	Geographic Coverage	Refresh Rate	Latency
Surface Albedo	TCDR L3	Polar Regions	12 hours	3 months
Emissivity	TCDR L2	Global	12 hours	3 months

Table 36: Product Specifications/Attributes in NLR Category: Analytical/Climate Data Records for the Fundamental CDRs

Baseline Products	CDR Type	Geographic Coverage	Refresh Rate	Latency
Optical Sounder Brightness Temperatures	FCDR L1b	Global	Annual	1 month
Optical Imager Radiances	FCDR L1g	Poles	12 hours	24 hours
Optical Imager Radiances	FCDR L1b	Global	12 hours	24 hours
Optical Imager Brightness Temperatures	FCDR L1g	70S to 70N	3 hours	3 months
Microwave Sounder Radiometer Brightness Temperatures	FCDR L1b	Global	12 hours	1 month
Microwave Sounder Radiometer Brightness Temperatures	FCDR L1g	Global	24 hours	1 month
Microwave Imager Radiometer Brightness Temperatures	FCDR L1b	Global	12 hours	10 days

6.5. Analytical – Time Series*

Products in the Time series sub-category include but are not limited to long-term environmental data records produced for continuity over long time periods serving NOAA's users. Unlike the Climate Data Record, these data sets might not include well-characterized and cross-calibrated satellite observations and uniform records of geophysical data of the atmosphere, ocean and land.

Table 37: Product Specifications/Attributes in NLR Category: Analytical/Time Series

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency	Duration
Mean Sea Level Height	Multi-Year Blended	Global Ocean and Coastal Global	4 months	4 months	30 years
Sea Ice Extent	Multi-Year Blended	North Hemisphere	Daily	24 hours	5 years
Sea Surface Temperature	Multi-Year Reanalysis	Global	24 hours	3 years	40 years
Sea Surface Temperature	Reanalysis Granule	Global Ocean	1 hour	3 months	7+ years

Baseline Products	Data Type	Geographic Coverage	Refresh	Latency	Duration
Sea Surface Temperature	Reanalysis Granule	Global Ocean	12 hours	1–3 years	10 ~ 40 years
Sea Surface Temperature	Reanalysis Gridded	Global Ocean	12 hours	1–3 years	10 ~ 40 years
Sea Surface Temperature	Reanalysis Gridded	Global Ocean	24 hours	1–3 years	10 ~ 40 years
Sea Surface Temperature	Reanalysis Granule	Hemispheric	1 hour	1–3 years	7+ years
Sea Surface Temperature	Reanalysis Gridded	Global Ocean	1 hour	1–3 years	7+ years
Sea Surface Temperature	Multi-Year Blended	Reef Areas and Surrounding Waters	24 hours	24 hours	30 years
Ozone Profile	Time Series	Global	Six months	Six months	40 Years
Gap-free Chlorophyll-a	Multi-Year Blended	Global Oceans and Inland Lakes	Daily	1 hour	Since 2012
Altimetry (Sea level anomalies, eddies, wave heights, etc.)	Multi-Year Blended	Global	24 hours	24 hours	30 years

*Working on user needs, which might impact the final inclusion of those products.

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Appendix A: References

1. NESDIS-REQ-1001.1, NESDIS Level Requirements
2. NESDIS Integrated Product List
3. NESDIS-PR-1302.1, NESDIS Requirements Management Procedural Requirements
4. JPSS Level 1 Requirements Document – Final Version: 2.0
5. GOES-R Ground Segment Project Functional and Performance Specification
6. GOES-R Product Definition and User's Guide
7. IJPS Agreement
8. Jason-3 and Jason-CS 4-Partner Memoranda of Agreement
9. EPS-SG End User Requirements Documentv5A, 6 February 2020
10. Metop-SG NOAA Products List v1.2
11. SPSRB User Request Database
12. Consolidated Observation User Requirements List
13. Technology, Planning, and Integration for Observation Glossary
14. NOAA Space Platform Requirements Working Group – Report, 2018
15. CoastWatch User Requests Database
16. Interagency or International Memoranda of Understandings

Appendix B: Glossary

Baseline: An agreed-to set of product requirements that will have changes controlled through a formal approval and monitoring process.

Blended Product: A value-added product that merges the geophysical parameters retrieved from various satellite/sensors with the same or different algorithms, sometimes including those from ground observations and model outputs, to provide users a unified high-quality product of the same kind.

Climate Data Records: Data records produced with inter-satellite calibrated observations over a very long time -period.

Consolidated Observation User Requirements List: An extensive database that documents observing requirements of NOAA Line Offices users

Continuity/Operational Products - NESDIS Continuity Products are user facing products with fit-for-purpose quality controls to meet or exceed the minimum requirements documented in the NESDIS Product Baseline

Data Type: An attribute that describes the type of data products.

- Granule: data products from a segment of a satellite revolution with a given number of lines along track.
- Orbital: data products from one complete satellite revolution.
- Full Disk: data products from a full geostationary satellite diameter circle centered at nadir. It can be referred to Earth or Sun.
- Sectorized: data products from sub-regions of a full geostationary satellite diameter circle or any regional area over global.
- Gridded: data products mapped into grid cells with a specific map projection.
- Blended: gridded products merged from multiple data sources
- Analysis: data products integrated with human interactive inputs
- Reports: An authoritative document that describes the state of the environment based on data products and is integrated with expert review.
- Point: data products specified on irregular grid cells with particular latitude and longitude information
- In-situ: observations made at the point where the instrument is located
- GEO In-Situ: in-situ measurement of a geostationary satellite parked over the U.S
- LEO In-Situ: an in-situ observation made in low-Earth polar orbit
- L1 In-Situ: an in-situ observation made at the solar L1 Lagrange point between Earth and Sun

- Ground-Based Profiles: vertical distribution of solar observations from Earth
- Climate Data Records: Data records produced with inter-satellite calibrated observations over a very long time-period
- Time Series: A group of observations or data products on a single entity over time
- Image: Visualized observations and data products in imagery format

Latency: Elapsed time from the start of data acquisition until delivery of data/products to the user, including observing, downlink, data processing and product generation time.

NESDIS-Level Requirements: Requirements that define customer expectations in the context of the NESDIS mission, strategic plans, Mission Essential Functions, policies and regulations.

NESDIS Office(s): A term used in the widest sense to include NESDIS Headquarters elements, NESDIS Operations and Acquisitions offices, the Center for Satellite Applications and Research (STAR), and the National Centers for Environmental Information.

Process: A set of activities used to convert inputs into desired outputs to generate expected outcomes and satisfy a purpose.

Project: A specific investment that has defined goals, objectives, requirements, lifecycle cost, a beginning, and an end. A project yields products or services that directly address NESDIS' strategic needs. In this document, the term 'project' applies in the widest sense to include projects, programs, portfolios, and major initiatives.

Raw Data Records (RDRs): Full resolution digital sensor data, time referenced and earth located, with absolute radiometric and geometric calibration coefficients appended (or identified in the SRD metadata), but not applied, to the data and with communications artifacts removed.

Refresh: Averaged time interval between consecutive measurements of the same area of the environment.

Requirement: A statement that identifies a system, product, or process characteristic or constraint. A requirement statement must be clear, correct, feasible to obtain, unambiguous in meaning, and able to be validated at the level of the system structure at which it is stated.

Sensor Data Records (SDRs): Data Records produced when an algorithm is used to convert the reconstructed unprocessed instrument and payload data at full resolution as delivered by RDRs into processed instrument data at full resolution, time-referenced, and with radiometric and geometric calibration coefficients and georeferencing parameters (i.e., platform ephemeris) computed and applied.

Temperature Data Records (TDRs): Data Records produced from geolocated antenna temperatures (Ta) with all relevant calibration data counts and ephemeris data to revert from Ta into counts.

Appendix C: Acronyms

AK	Alaska
AM	Ante meridiem: Before noon
CDRs	Climate Data Records
CONUS	Continental United States
EEZ	Exclusive Economic Zone
EPS	EUMETSAT Polar System
FAPAR	Fraction of Absorbed Photosynthetically Active Radiation
FCDR	Fundamental CDR
GEO	Geostationary Earth Orbit
GOES	Geostationary Operational Environmental Satellites
GPRA	Government Performance and Results Act
HI	Hawaii
IJPS	Initial Joint Polar-orbiting System
IPL	Integrated Product List
JPS	Joint Polar-orbiting System
JPSS	Joint Polar Satellite System
L1RDS	Level 1 Requirements Document Supplement
LEO	Low Earth Orbit
NCEI	National Centers for Environmental Information
NDVI	Normalized Difference Vegetation Index
NESDIS	National Environmental Satellite, Data, and Information Service
NLR	NESDIS Level Requirements
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
OMAO	Office of Marine and Aviation Operations
PM	Post meridiem: After noon
RDRs	Raw Data Records
REQ	Requirement
SDRs	Sensor Data Records
SG	Second Generation
SPSRB	Satellite Products and Services Review Board
TCDR	Thematic CDR
TDRs	Temperature Data Records
US	United States
UV/Vis	Ultraviolet Visible

Appendix D: Geographical Coverage Definitions

Reference: Technology, Planning, and Integration for Observation Glossary: https://nosc.noaa.gov/tpio/main/geocoverages.html

Geographical Coverage Name	Definition
3-axis orthogonal	3-axis orthogonal refers to 3 measurements made at 90 degrees to each other to define a vector
35 deg Pitch Angle	Pitch angle is the position angle between the geocentric north pole and the solar rotational north pole measured eastward from geocentric north.
Aircraft Track	The track that an aircraft travel
Alaska Complex	One of the Regional Ecosystem Complexes defined by the Coastal Large Marine Ecosystems and Regional Governance Organizations of the United States. The Alaska Complex is made up of 5 distinct ecosystems: the Aleutian Islands, the Eastern Bering Sea, the Gulf of Alaska, the Beaufort Sea, and the Chukchi Sea.
Atlantic Ocean	The Atlantic Ocean extends from the Arctic Ocean in the north to the Southern Ocean in the south and is bounded by Europe and Africa in the east and the Americas in the west.
California Current	One of the Regional Ecosystem Complexes defined by the Coastal Large Marine Ecosystems and Regional Governance Organizations of the United States. The California Current is a surface oceanic current that is a southward-flowing continuation of the Aleutian current along the west coast of North America between latitudes 48° N and 23° N.
Caribbean Sea	One of the Regional Ecosystem Complexes defined by the Coastal Large Marine Ecosystems and Regional Governance Organizations of the United States. The area of the Caribbean Sea lies between latitudes 9° and 22° N and longitudes 89° and 60° W, and is approximately 1,063,000 square miles in extent.
Chesapeake Bay	The Chesapeake Bay is approximately 200 miles (320km) long from its northern headwaters in the Susquehanna River to its outlet in the Atlantic Ocean and is 3 to 25 miles (5 to 40km) wide.
Coastal Global	The coast is defined as the part of the land adjoining or near the ocean and the immediate area offshore of the coast. Coastal Global is an area 3 miles inland and 12 miles offshore that borders the shoreline.
Coastal US	The coast is defined as the part of the land adjoining or near the ocean and the immediate area offshore of the coast. The coastal area of the

Geographical Coverage Name	Definition
	United States, including Alaska and Hawaii, is defined as the land and sea areas that are 3 miles inland and 12 miles offshore that border the shoreline.
Coastal US-Alaska	The coast is defined as the part of the land adjoining or near the ocean and the immediate area offshore of the coast. Coastal US-Alaska is the coastal area 3 miles inland and 12 miles offshore the Alaskan coastline.
Coastal US-East Coast	The coast is defined as the part of the land adjoining or near the ocean and the immediate area offshore of the coast. Coastal US-East is the coastal area from Maine to Florida that is 3 miles inland and 12 miles offshore from the coastline.
Coastal US-Gulf of Mexico	The coast is defined as the part of the land adjoining or near the ocean and the immediate area offshore the coast. Coastal US-Gulf of Mexico is the coastal area of the United States bordering the Gulf of Mexico that is 3 miles inland and 12 miles offshore from the coastline.
Coastal US-Hawaii	The coast is defined as the part of the land adjoining or near the ocean and the immediate area offshore of the coast. Coastal US-Hawaii is the coastal area 3 miles inland and 12 miles offshore the Hawaiian coastline.
Coastal US-West Coast	The coast is defined as the part of the land adjoining or near the ocean and the immediate area offshore of the coast. Coastal US-West Coast is the coastal area of Washington, Oregon, and California. This includes the areas 3 miles inland and 12 miles offshore from the coastline.
CONUS	The Contiguous United States or the Lower 48 States.
CONUS+AK+HI	The Contiguous United States plus Alaska and Hawaii.
CONUS+AK+HI+US Territories	The Contiguous United States plus Alaska, Hawaii, and the US Territories.
CONUS+AK+HI+US Territories	The Contiguous United States plus Alaska, Hawaii, and the US Exclusive Economic Zone (US EEZ). An EEZ is a sea zone over which a state has special rights over the exploration and use of marine resources. Generally, a state's EEZ extends to a distance of 200 nautical miles (370 km) out from its coast.
Eastern Tropical Pacific	Area of the Pacific Ocean bounded by a line from San Diego, California to, and surrounding the Hawaiian Islands to Tacna, Peru, and back to San Diego, California.
EEZ Equatorial	Under the law of the sea, an Exclusive Economic Zone (EEZ) is a sea zone over which a state has special rights over the exploration and use of marine resources. The Equatorial EEZ starts at

Geographical Coverage Name	Definition
	the coast of all states/countries within the equatorial regions of the world (limited in latitude by the Tropic of Cancer in the northern hemisphere at approximately 23°26' (23.4°) N latitude and the Tropic of Capricorn in the southern hemisphere at 23°26' (23.4°) S latitude) and extends 200 nautical miles (370 kilometers) out into the sea, perpendicular to the baseline.
EEZ Global	Under the law of the sea, an Exclusive Economic Zone (EEZ) is a sea zone over which a state has special rights over the exploration and use of marine resources. Generally, a state's EEZ extends to a distance of 200 nautical miles (370 km) out from its coast.
EEZ Hawaiian	Under the law of the sea, an Exclusive Economic Zone (EEZ) is a sea zone over which a state has special rights over the exploration and use of marine resources. The EEZ around the Hawaiian Islands starts at the coastline baseline and extends perpendicularly 200 nautical miles offshore.
EEZ US	Under the law of the sea, an Exclusive Economic Zone (EEZ) is a sea zone over which a state has special rights over the exploration and use of marine resources. The United States EEZ starts at the coastline baseline and extends perpendicularly 200 nautical miles offshore. Thus, the United States EEZ overlaps both the contiguous zone and US territorial waters.
Equatorial Atlantic Ocean	The Equatorial Atlantic Ocean is limited in latitude by the Tropic of Cancer in the northern hemisphere at approximately 23°26' (23.4°) N latitude and the Tropic of Capricorn in the southern hemisphere at 23°26' (23.4°) S latitude.
Equatorial Indian Ocean	The Equatorial Indian Ocean is limited in latitude by the Tropic of Cancer in the northern hemisphere at approximately 23°26' (23.4°) N latitude and the Tropic of Capricorn in the southern hemisphere at 23°26' (23.4°) S latitude.
Equatorial Ocean	The Equatorial Ocean is seated in the equatorial regions of the world and is limited in latitude by the Tropic of Cancer in the northern hemisphere at approximately 23°26' (23.4°) N latitude and the Tropic of Capricorn in the southern hemisphere at 23°26' (23.4°) S latitude.
Equatorial Pacific Ocean	The Equatorial Pacific Ocean is limited in latitude by the Tropic of Cancer in the northern hemisphere at approximately 23°26' (23.4°) N latitude and the Tropic of Capricorn in the southern hemisphere at 23°26' (23.4°) S latitude.
GEO In-situ, Global	A local geosynchronous observation required at multiple locations in that orbit

Geographical Coverage Name	Definition
GEO In-situ, Hemi US	In-situ measurements of a geostationary satellite parked over the U.S.
Global	Of, relating to, or involving the entire earth; worldwide
Global Land	The continents and islands that cover nearly 30% of the surface of the earth.
Global Ocean	The whole body of salt water that covers 71% of the surface of the earth.
Great Lakes	The Great Lakes, Superior, Michigan, Huron, Erie, and Ontario, are a series of interconnected freshwater lakes, and are one of the Regional Ecosystem Complexes defined by the Coastal Large Marine Ecosystems and Regional Governance Organizations of the United States.
Greater than 30 deg N and S	The area north and south of the 30° latitude
Greater than 75 deg N	The area north of 75°N latitude
Gulf of Mexico	One of the Regional Ecosystem Complexes defined by the Coastal Large Marine Ecosystems and Regional Governance Organizations of the United States. The Gulf of Mexico (GOM) has an area of 700,000 square miles (1,813,000 square km) and is an arm of the Atlantic Ocean surrounded by the US, Cuba, and Mexico.
Heliocentric	A location relative to the center of the sun, or in some cases, relative to the center of the observed solar disk.
Hemi Eur	Hemispheric footprint of a geostationary satellite parked over Europe
Hemi India	Hemispheric footprint of a geostationary satellite parked over India
Hemi Japan	Hemispheric footprint of a geostationary satellite parked over Japan
Hemi US	GEO Imagery Minimum Coverage Area of 68° N to 68° S, 150°E eastward to 2°W.
Indian Ocean	Ocean bordered by Africa in the west, Asia in the north, and Australia in the east and merging with the Antarctic Ocean in the south.
L1 In-situ	An in-situ observation made at the solar L1 Lagrange point between Earth and sun.
L5 In-situ	An in-situ observation made at the solar L5 Lagrange point between Earth and sun.
LEO In-situ, Polar	An in-situ observation made in low-Earth polar orbit
Marine Sanctuaries	A network of underwater parks encompassing more than 170,000 square miles of marine and Great Lakes waters from Washington state to the Florida Keys, and from Lake Huron to American Samoa. The network includes a system of 13 national marine sanctuaries, as well as the

Geographical Coverage Name	Definition
	Papahānaumokuākea and Rose Atoll marine national monuments.
NERRS	The National Estuarine Research Reserve System (NERRS) is a network of 28 protected areas established by partnerships between the National Oceanic and Atmospheric Administration (NOAA) and coastal states. NERRS protects more than 1.3 million acres of coastal and estuarine habitats.
NERRS-SW Florida	The National Estuarine Research Reserve System (NERRS) in SW Florida. The SW Florida Research is in Rookery Bay, 5 miles south of Naples, Florida. The National Estuarine Research Reserve System is a network of 28 protected areas established by partnerships between the National Oceanic and Atmospheric Administration (NOAA) and coastal states.
North America + US Territories	The United States, including Alaska, Hawaii, and the US Territories, plus Canada and Mexico.
North Atlantic Ocean	The North Atlantic Ocean is located north of the equator. It extends north to the Arctic Ocean and is bounded by Europe and Africa in the east and the Americas in the west
North Pacific Ocean	The North Pacific Ocean is located north of the equator. It extends north to the Arctic Ocean and is bounded by Asia and Australia in the west and the Americas in the east.
Northeast US Shelf	The Northeast Shelf Regional Ecosystem extends from northern Maine to Cape Hatteras, North Carolina. The continental shelf is a coastal plain that extends from the coast to the continental slope.
Pacific Island Complex	The Pacific Island Complex is one of 8 US Large Marine Ecosystems (LME) and stretches west from the Hawaiian Islands to Guam and the Marianas and south to American Samoa. The Pacific Island Complex LME is one of the Regional Ecosystem Complexes defined by the Coastal Large Marine Ecosystems and Regional Governance Organizations of the United States.
Pacific Ocean	The Pacific Ocean extends from the Arctic Ocean in the north to the Southern Ocean (or, depending on the definition, to Antarctica) in the south and is bounded by Asia and Australia in the west and the Americas in the east.
Point Source	A single identifiable localized source; has negligible extent.
Polar Regions	The area of the earth north of 66° N and south of 66° S.
Polar Regions-Antarctic	Polar Regions-Antarctic is usually defined as south of 60° south latitude.

Geographical Coverage Name	Definition
Polar Regions-Arctic	Polar Regions-Arctic is usually defined as north of 60° north latitude.
Ship Track	The track that a ship travels along.
South Atlantic Ocean	The South Atlantic Ocean is located south of the equator. It extends south to the Southern Ocean and is bounded by Europe and Africa in the east and the Americas in the west
South Pacific Ocean	The South Pacific Ocean is located south of the equator. It extends south to the Southern Ocean and is bounded by Asia and Australia in the west and the Americas in the east.
Southeast US Shelf	The Southeast US Shelf is one of 8 US Large Marine Ecosystems (LME) and stretches south from Cape Hatteras, North Carolina to Key West, Florida and roughly to the Exclusive Economic Zone (EEZ) limit. The Southeast US Shelf LME is one of the Regional Ecosystem Complexes defined by the Coastal Large Marine Ecosystems and Regional Governance Organizations of the United States.
Storm Area/Region	A National Weather Service (NWS) User Defined Area Forecast related to winter storms, hurricanes, and severe weather.
Targeted Global	Specific, targeted observations (horizontal dimensions generally range from around 5 kilometers to several hundred kilometers) for re-definable geographic areas globally.
Targeted Mesoscale	A specific, targeted observational capability over a specific region, i.e., a 1,000 by 1,000 km rectangle
TC/Marine/ Surface Analysis AOR	An Area of Responsibility (AOR) for tropical cyclone and marine analysis, forecasting, and warning operations, and surface analysis responsibilities of the National Hurricane Center and Central Pacific Hurricane Center/WFO Honolulu. The area falls within the Pacific Ocean bounded at 40° N and 30° S and the Atlantic Ocean bounded at 60° N and 30° S.
Tropics (30N-30S)	Seated in the equatorial regions of the world, limited in latitude by 30° N to 30° S.
US Coral Reefs	Coral reef communities within the EEZ waters of CONUS US, Alaska, Hawaii, and the US Territories.
Western US States	Western US as defined by the Census Bureau, which includes 13 states: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.
Whole Sun	Whole Sun is a Space Weather spatial coverage that includes a view of the entire solar disk as seen from a fixed point relative to the Earth. This

Geographical Coverage Name	Definition
	spatial coverage includes an additional angular width of 1 solar radius around the entire solar disk.

END OF DOCUMENT