AREN GLOBE PROGRAM

QUICK GUIDE FOR:

ACCESSING NASA EARTH OBSERVING SATELLITE MISSION DATA PRODUCTS

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NASA’s unique vantage point from space allows scientists the ability to monitor the entire Earth 24/7. The data collected provides information about current conditions on Earth. Looking at the satellite data collected through time, helps scientists better understand how the Earth works as a system and monitors how the Earth is changing. This valuable information is shared with decision makers and the public.

This quick-step instructional guide is designed to help AREN Mission Investigators obtain NASA satellite data products as an important component of local AREN Mission investigations to corroborate local AREN field mission data with NASA’s Space instrument observations.

Please feel free to contact Sallie M. Smith, NASA AREN Liaison if you need assistance at: Sallie.M.Smith@nasa.gov or (301) 286-4674.
Recommended NASA Earth Observing Satellite Products
to Corroborate with AREN Aerokats (Kite) and ROVER (Boat) Field Missions

Recommended NASA Satellite Data Products for AREN AEROKAT Kite Field Missions
Includes:
NASA GSFC Direct Readout Laboratory:
- TERRA or AQUA MODIS Instrument Land Surface Temperature, (LST)
- TERRA or AQUA MODIS Instrument True Color Visible Data Images (clouds)
- NPP Water Vapor (Precipitable Water in Clouds)
- NPP Cloud Phases

GPM – if monitoring/ground-truthing local precipitation
SMAP – if monitoring/ground-truthing local soil moisture
Aura – if monitoring local Air Quality
Landsat (30 meter resolution) satellite data products for AREN Camera Field Missions.

Recommended NASA Satellite Data Products for AREN ROVER (Boat) Field Missions
Includes:
NASA GSFC Direct Readout Laboratory
- Sea Surface Temperature
- MODIS True Color Data Images
- Chlorophyll Product

Aquarius (derived) Salinity Data Product
Landsat (30 meter) resolution satellite data products for AREN Camera Field Missions.
- “Landsat Look” – 30 Meter Resolution Data Satellite Data Tool
- Image J Processing Software - Can be used with Landsat and AREN Camera Data Imagery
Step 1. Go to:  http://directreadout.sci.gsfc.nasa.gov/

Step 2. Under Recent Data Products click the “DRL Google Maps” link.
Step 3. **Type in your location address, then click “Locate”**.

**Note:** A reference marker should appear identifying the location entered.

4. **Select** information from the 4 drop down menus.

For “Direct Broadcast Station” **Select**

- **GSFC** – Goddard Space Flight Center
  - For **East Coast** Data
- **OSU** – Oregon State University
  - For **Western US** and **Eastern North Pacific Ocean**.

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**RSA** – USDA Forest Service Remote Sensing Application Center (UT)
- Fire Data US and CN

**TUIS** – Tokyo University of Information Sciences
- Asia
For “Satellite” Select: ✓ “Terra” or “Aqua” for AREN GLOBE Missions.

For “Sensor” Select: ✓ “MODIS” for AREN GLOBE Missions.

Moderate Resolution Imaging Spectroradiometer (An instrument aboard the Aqua and Terra satellites that acquires science data from the entire Earth every two days in 36 different wavelengths.

For “Product”:  
For Atmospheric AREN GLOBE Missions Select: ✓ Land Surface Temperature ✓ True Color (Cloud Monitoring) ✓ Water Vapor (Total Precipitable Water) ✓ Aerosols (3 km) data
For ROVER AREN GLOBE Missions Select: ✓ Sea Surface Temperature ✓ Chlorophyll ✓ True Color
Step 5: Click on the “Get Data” tab.

Step 6. Click on the desired dates and time links. The data will display on the map.

Notes:
1. You may “close” your location marker by clicking on the “X” or can type in the site address and click “locate” to mark the area of study.
2. Click “clear map” to clear a data product.
3. Select other data products by scrolling, clicking on the desired product, clicking “Get Data” and the date/time desired.

Important: “GET DATA” MUST BE CLICKED EACH time you select a new data product to view.

Step 7: Use the provided “Legend” for data analysis.

Note: NASA Land Surface Temperature Data color scale is noted in Kelvin Temperatures. AREN Field Mission Surface Temperature measurements are collected in °C so AREN participants might prefer to use this provided conversion scale when analyzing NASA Land Surface Temperature Data.

Q. How does NASA satellite data compare with AREN Field Mission data collection?
Accessing Direct Readout MODIS and NPP Cloud Data Products

The following NASA Satellite Data Products are recommended to corroborate with local AREN Field Mission Observations:

- Terra or Aqua MODIS instrument TRUE COLOR (visible cloud) imagery data.
- NPP Water Vapor (Precipitable Water) data product.
- NPP VIRS Cloud Phase Identification Product

**Note:** Clouds move and so do the NASA satellites orbiting the Earth. Ideally, try to conduct field cloud observations at the same time NASA satellites pass over the local AREN Mission site or select data as close to the AREN field data collection mission as possible.

**Resource:** NASA Satellite Overpass Prediction Link or just look at the times on the data products for the Direct Readout broadcast station in the area of your mission.

**True Color MODIS Cloud Imagery**

While AREN investigators used NASA S’COOL GLOBE Cloud charts to identify cloud types and estimate cloud % sky cover from the ground, NASA Earth Observing Satellite instruments monitor cloud globally as clouds are important factors in the Earth’s radiative energy balance, water cycle and climate depends on the distribution and properties of clouds.

**Use the following directions to access TERRA and AQUA MODIS (MODe rate Imaging Spectroradiometer) instrument image data:**

**Procedure:**

**Step 1.** Go to: [http://directreadout.sci.gsfc.nasa.gov/](http://directreadout.sci.gsfc.nasa.gov/)

**Step 2.** Under Recent Data Products click the “DRL Google Maps” link.
Step 3. **Type in your location address, then click “Locate”**.

**Note:** A reference marker should appear identifying the location entered.

4. **Select the Direct Broadcast station (dbstation)** that provides satellite data for the local AREN Mission location site.

   - **For “Direct Broadcast Station” Select**
     - GSFC – Goddard Space Flight Center
       - For **East Coast** Data
     - OSU - Oregon State University
       - For **Western US** and **Eastern North Pacific Ocean**.
For “Satellite” Select:
✓ “Terra” or “Aqua” for AREN GLOBE Missions.

For “Sensor” Select:
✓ “MODIS” for AREN GLOBE Missions.

Moderate Resolution Imaging Spectroradiometer
(An instrument aboard the Aqua and Terra
satellites that acquires science data from the
entire Earth every two days in 36 different
wavelengths.)

For “Product”:
For Visible Cloud Observations Select:
✓ True Color (Cloud Monitoring)
Step 5: Click on the “Get Data” tab.

Step 6: Click on the desired dates and time links. The data will display on the map.

Notes:
1. You may “close” your location marker by clicking on the “X” or can type in the site address and click “locate” to mark the area of study.
2. Click “clear map” to clear a data product.
3. Select other data products by scrolling, clicking on the desired product, clicking “Get Data” and the date/time desired.

Important: “GET DATA” MUST BE CLICKED EACH time you select a new data product to view.

Step 7: Analyze the visible cloud cover for the AREN Mission location.

Q. How does NASA True Color MODIS instrument data compare with local AREN observations
Of Course There’s Water in the Clouds! How Much?

Challenge: Compare “True Color” visible imagery clouds with the “Water Vapor” product to denote precipitable water in the clouds.

Instructions for Creating a “True Color” Visible / “Water Vapor” Cloud Overlay:

When accessing the “True Color” visible data product imagery to view cloud cover over the mission area, you may want to overlay (add) the “Water Vapor” product to compare cloud cover over the area of study and the amount of precipitable water at 3 km resolution.

Procedure:
1. Enter the desired station, satellite, sensor information.
2. For “Product” scroll and select “True Color” and click “Get Data”.
3. Click on the desired dates and UTC time to view the data on the map.
4. For “Product”, scroll and select “Water Vapor” and click “Get Data”.

[Images of maps showing cloud cover and precipitable water overlay]
5. Click on the same dates and time as before for the precipitable data to overly (be added) to the map.

Note: "Weather" is the "current state of the atmosphere" which is always changing. Clouds move. So matching the observation times and data set overlays should be as close as possible for analysis purposes.

6. Move the computer mouse over the “legend” to view the color scale of “precipitable water”, which is the depth of water in a column of the atmosphere, if all the water in that column were precipitated as rain.

7. Conduct your analysis, examining NASA satellite data for the local AREN Mission Area.
NASA’s NPP VIRS (Visible Infrared Imaging Radiometer Suite) Instrument satellite data product provides informative Cloud Phase Data based on the composition of the clouds observed from space.

Follow the directions below to access VIRS Cloud Phase Data to corroborate with local AREN Field Mission Observations.

**Step 1: Click** the “Clear Map” tab. This will clear any previous satellite data products from the map.
If AREN address location information and direct broadcast (db) station information have already been entered then only the following changes need to be made:

**Step 2:** Under “Satellite” scroll and select “Suomi NPP”.

**Step 3:** Under “Sensor”, scroll and select “VIRS”.

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**Image Description:**
- **Step 2:** A map showing the United States with a highlighted area indicating the selection process for “Suomi NPP” under the “Satellite” category.
- **Step 3:** A similar map showing the selection process for “VIRS” under the “Sensor” category.
Step 4: Under “Product” scroll and select “Cloud Phase”.

Step 5: Click on the “Get Data” tab.
Step 6: Click on the desired date and time link(s).

Step 7: Move the computer mouse over the “Cloud Phase” product legend to analyze cloud phase data observed from space.

Q. How does NASA NPP VIRS satellite Cloud Phase Observation data compare with local AREN Field Ground Mission Cloud Observations?