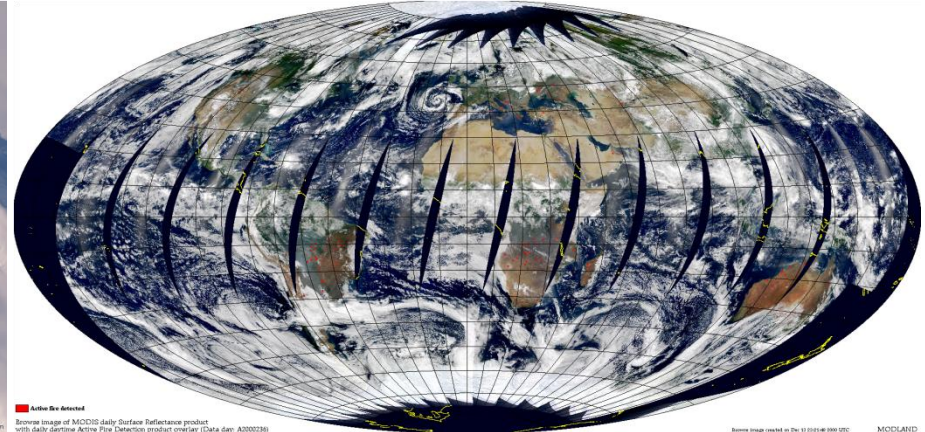
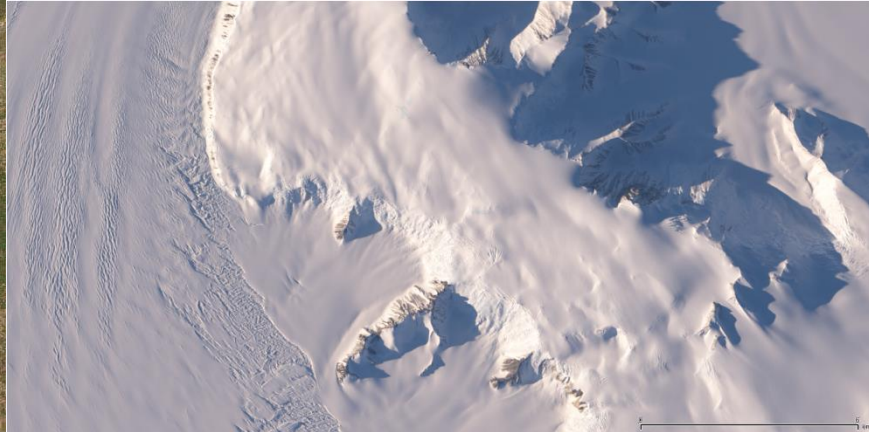
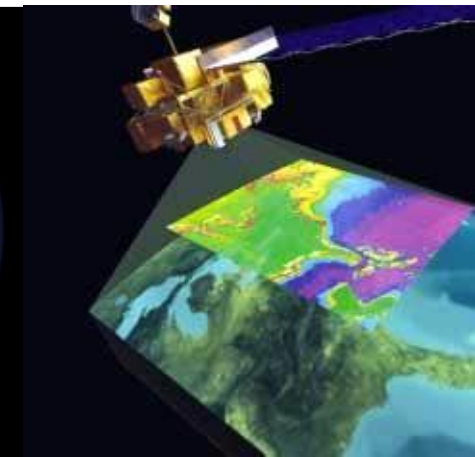
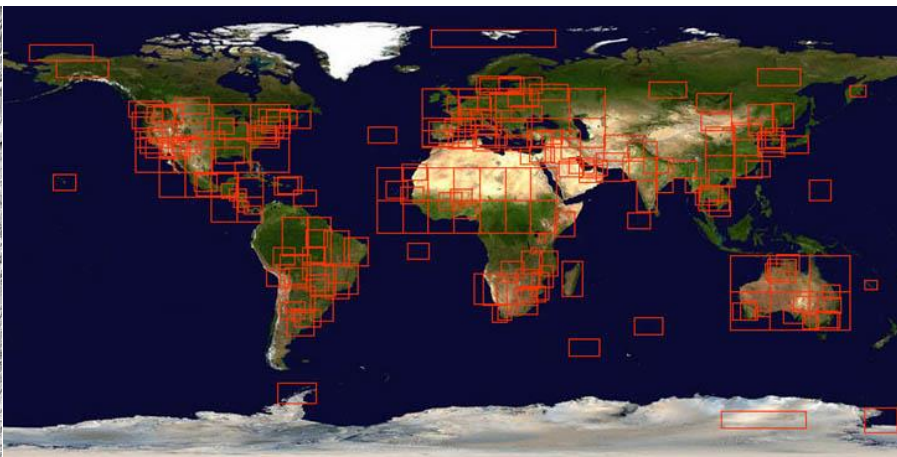
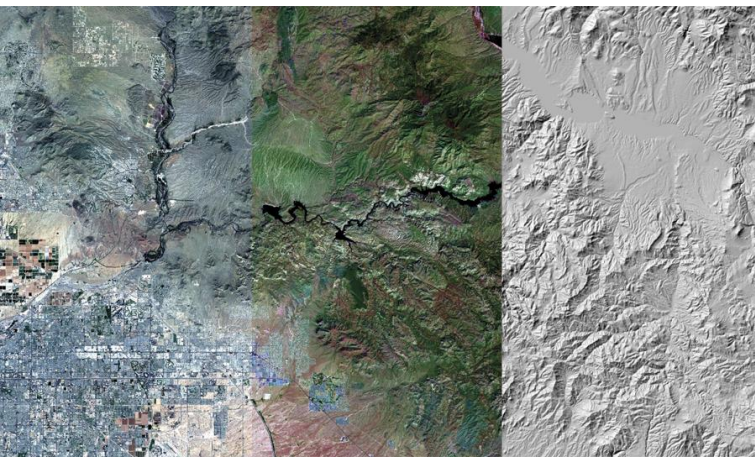




Remote Sensing Open Source Data for Snow Cover Assessment



Características actuales de la colecta de datos

3V: Velocidad, Volumen, Variedad



Sentinels: 3 Tb/día

Características actuales de la colecta de datos

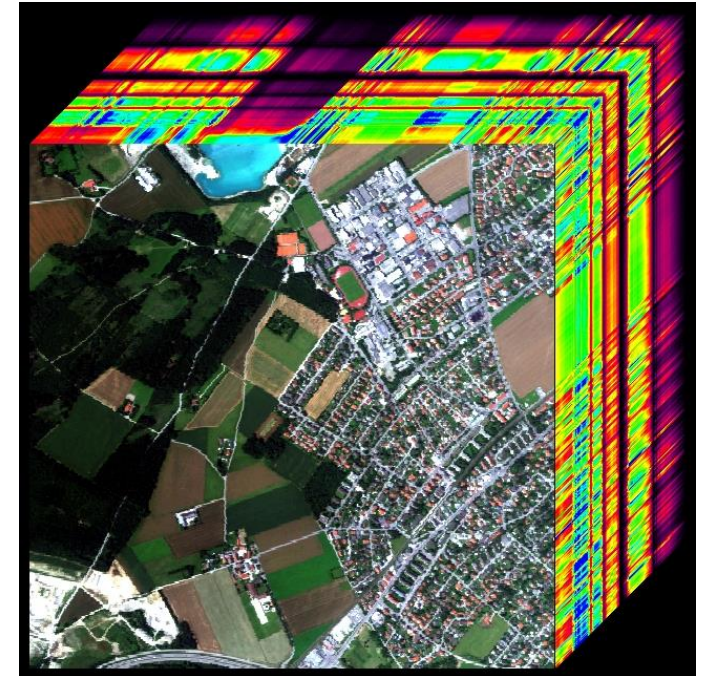
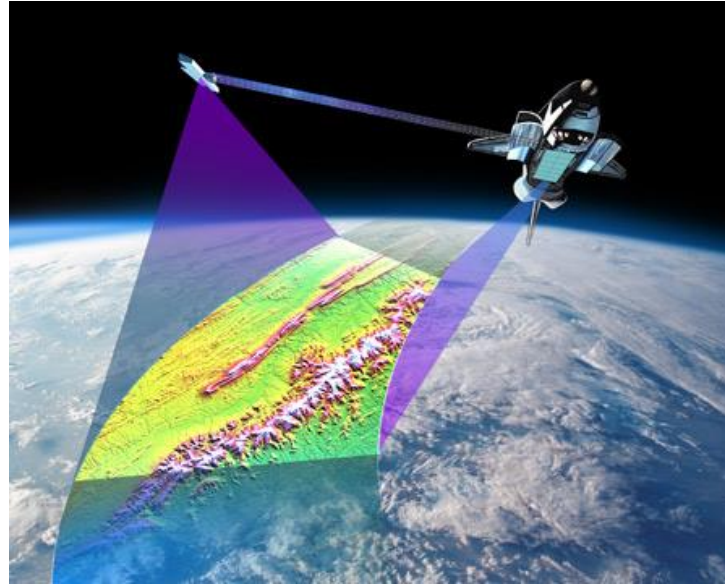
3V: Velocidad, Volumen, Variedad



¡40 años de monitoreo por satélite!

Características actuales de la colecta de datos

3V: Velocidad, Volumen, Variedad





© GEO Secretariat

¿Que datos están disponibles?

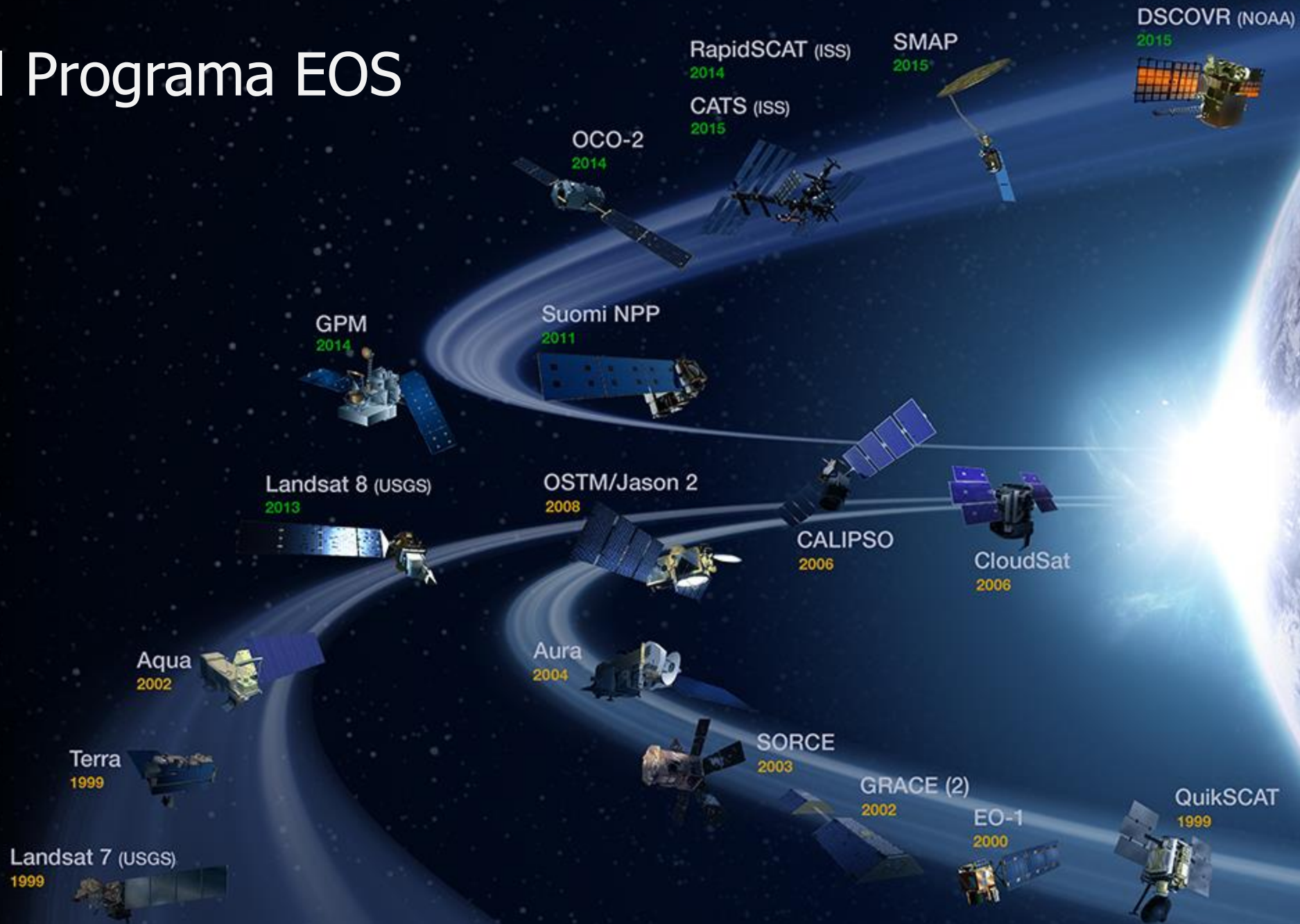
¿Resolución espacial?

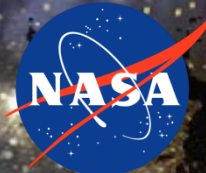
¿Tamaño de la serie temporal?

¿Open source?



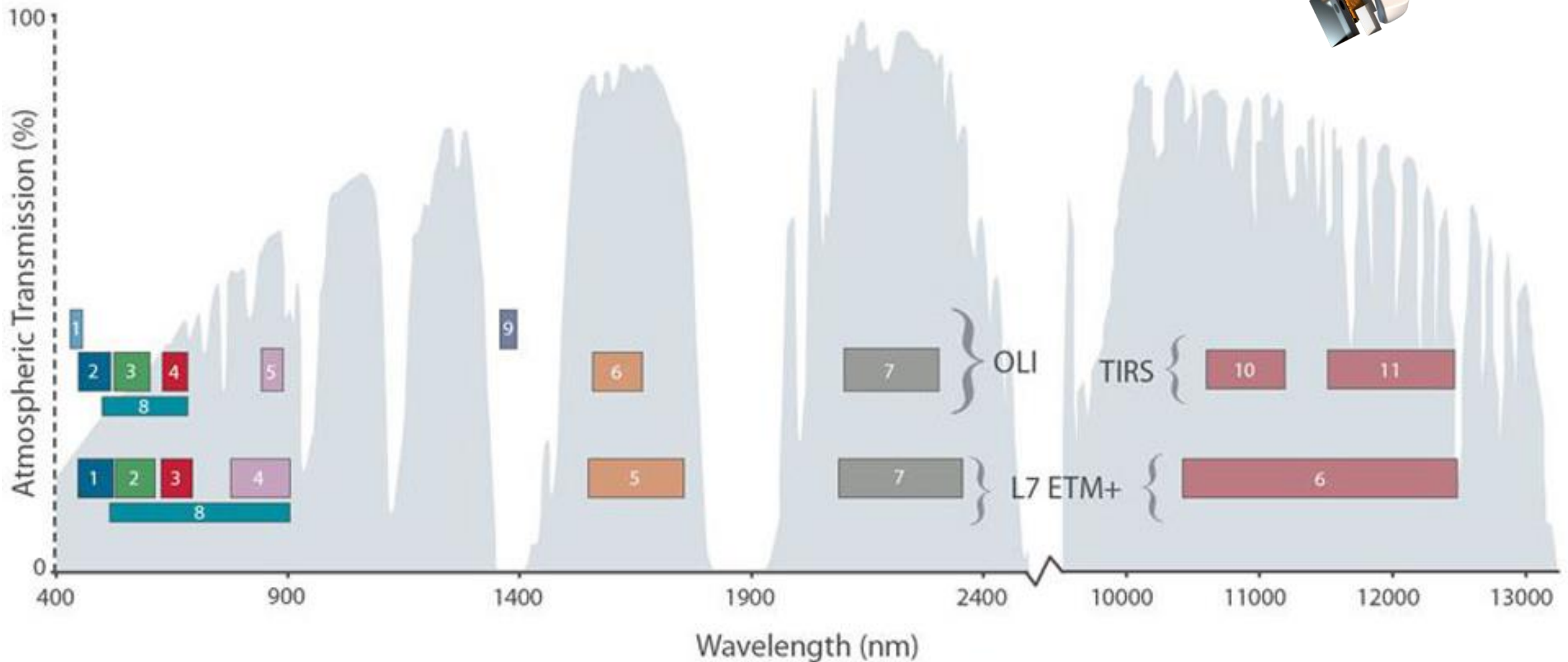
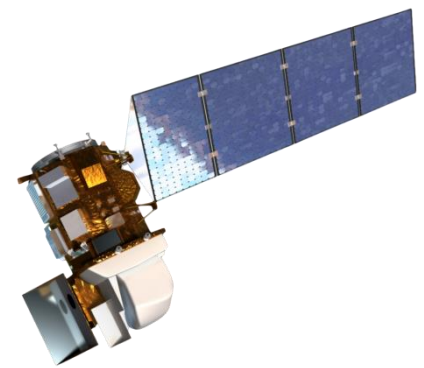
El Programa EOS





Landsat 8

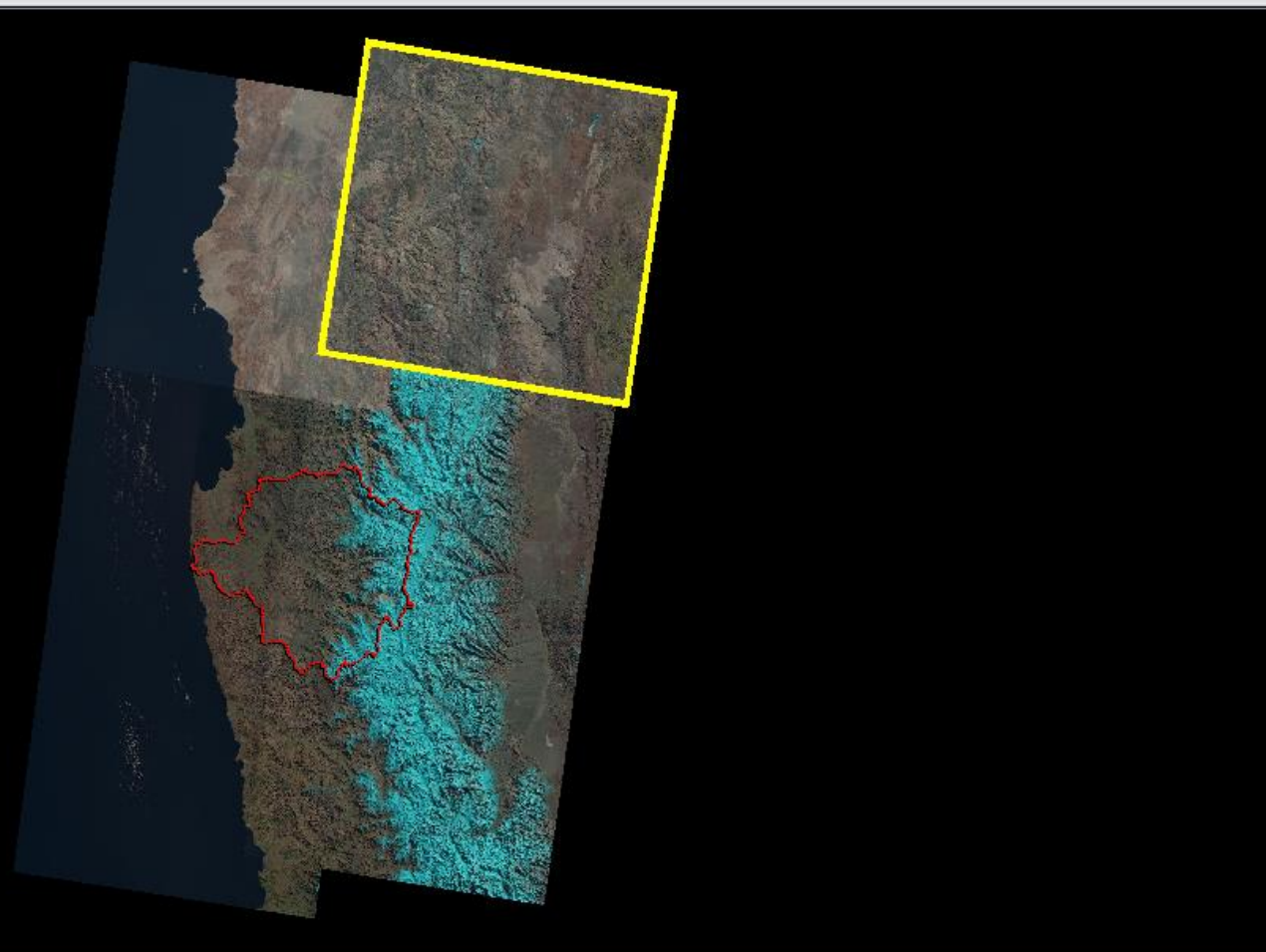
- Continuación de la misión Landsat que colecta datos desde 1972
- Cobertura completa de la Tierra a cada 16 días (offset de 8 días del Landsat 7)
- Sensor OLI: 8 bandas multiespectrales con resolución espacial de 30 metros y una banda pancromática con resolución de 15 metros
- Sensor TIRS: 2 bandas no infrarrojo termal con resolución espacial de 100 metros (remuestreada para 30 metros)
- 12-bits de resolución radiométrica (distribuida con 16-bits)
- GeoTIFF; UTM-WGS84 (aproximadamente 1GB)
- Disponible para download en el acervo USGS via GLOVIS y EarthExplorer



Bandpass wavelengths for Landsat 8 OLI and TIRS sensor, compared to Landsat 7 ETM+ sensor
Note: atmospheric transmission values for this graphic were calculated using MODTRAN for a summertime mid-latitude hazy atmosphere (circa 5 km visibility).

1000m	No Limits Set
-------	---------------

Downloadable



1000m	No Limits Set	Lat/Long: -28.596136, -73.170377 degrees
-------	---------------	--

Collection Resolution Map Layers Tools File Help



Downloadable

WRS-2
Path /Row: 233 82 Go
Lat/Long: -31.7 -70.3 Go
Max Cloud: 30%

⬅️ ⬆️ ⬇️ ➡️

Scene Information:
ID: LC82330822015204LGN00
CC: 6% Date: 2015/7/23
Qty: 9 Product: OLI TIRS L1T
Jul 2015 Go

Prev Scene Next Scene

Landsat 8 OLI Scene List

LC80010812015195LGN00 🗑️
LC80010822015195LGN00 🗑️
LC82330812015204LGN00 🗑️
LC82330822015204LGN00 🗑️

Add Delete Send to Cart

1000m No Limits Set Lat/Long: -30,163999, -76,339349 degrees

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No scenes were automatically added to your item basket. Please select the appropriate order type for each scene and click 'Apply'.

Pending Scenes

Entity Id	Collection	Order	Bulk Download	Available Products	
LC82330822015204LGN00	L8 OLI/TIRS			Order Products L8 OLI/TIRS L1 WMS ON-DEMAND Bulk Products LandsatLook "Natural Color" Image LandsatLook "Thermal" Image LandsatLook "Quality" Image LandsatLook images with Geographic Reference Level 1 GeoTIFF Data Product	 
LC82330812015204LGN00	L8 OLI/TIRS			Order Products L8 OLI/TIRS L1 WMS ON-DEMAND Bulk Products LandsatLook "Natural Color" Image LandsatLook "Thermal" Image LandsatLook "Quality" Image LandsatLook images with Geographic Reference Level 1 GeoTIFF Data Product	 
LC80010812015195LGN00	L8 OLI/TIRS			Order Products L8 OLI/TIRS L1 WMS ON-DEMAND Bulk Products LandsatLook "Natural Color" Image LandsatLook "Thermal" Image LandsatLook "Quality" Image LandsatLook images with Geographic Reference Level 1 GeoTIFF Data Product	 
LC80010822015195LGN00	L8 OLI/TIRS			Order Products L8 OLI/TIRS L1 WMS ON-DEMAND Bulk Products LandsatLook "Natural Color" Image	 



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- Download LandsatLook "Thermal" Image (4.2 MB)
- Download LandsatLook "Quality" Image (4.6 MB)
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- Download Level 1 GeoTIFF Data Product (1,009.3 MB)

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[U.S. Department of the Interior U.S. Geological Survey](#)

URL: <http://earthexplorer.usgs.gov>

Page Contact Information: ita@usgs.gov

Page Last Modified: 09/29/2015



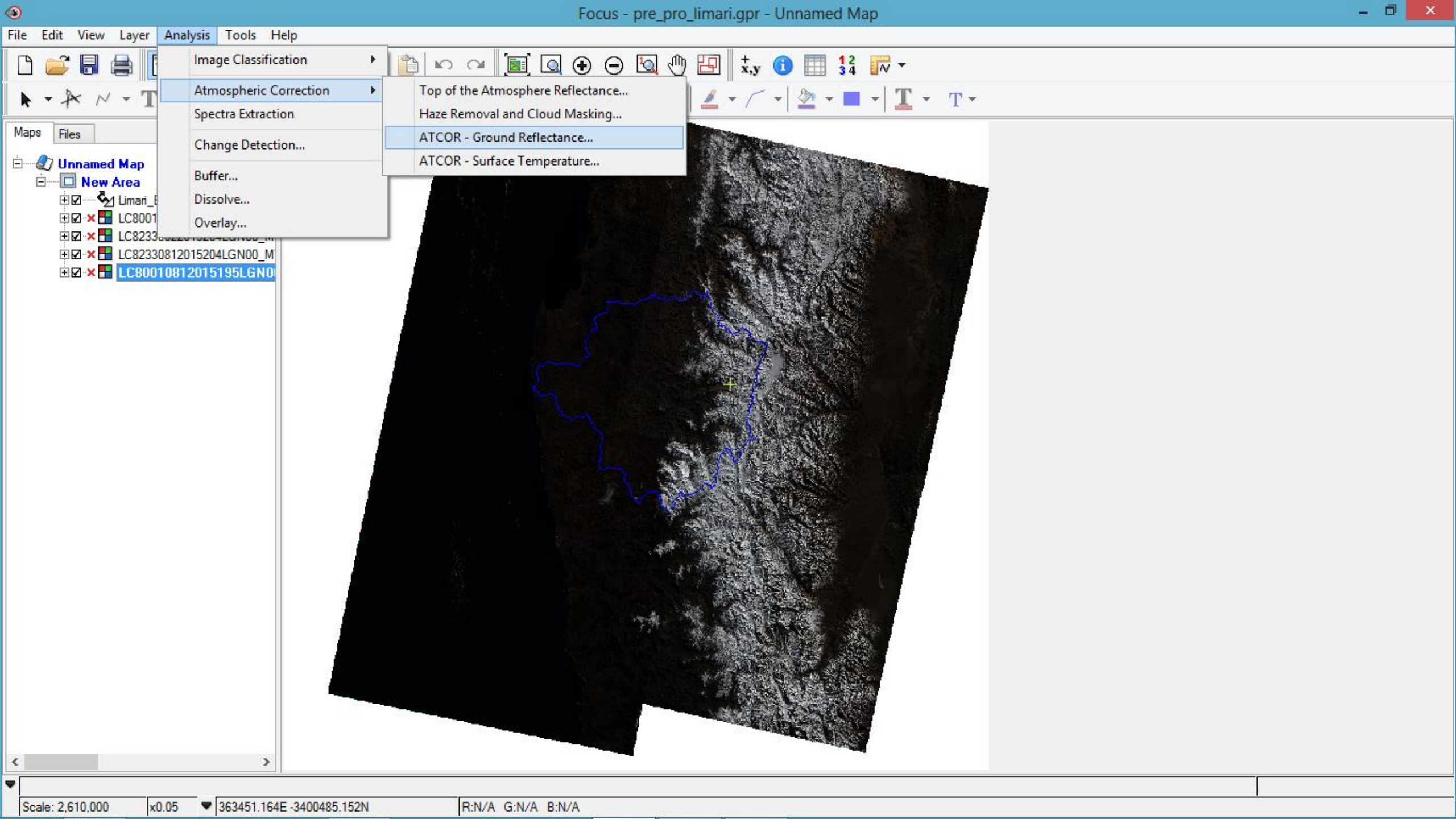


Image Classification

Atmospheric Correction

Spectra Extraction

Change Detection...

Buffer...

Dissolve...

Overlay...

Top of the Atmosphere Reflectance...

Haze Removal and Cloud Masking...

ATCOR - Ground Reflectance...

ATCOR - Surface Temperature...

Maps Files

Unnamed Map

New Area

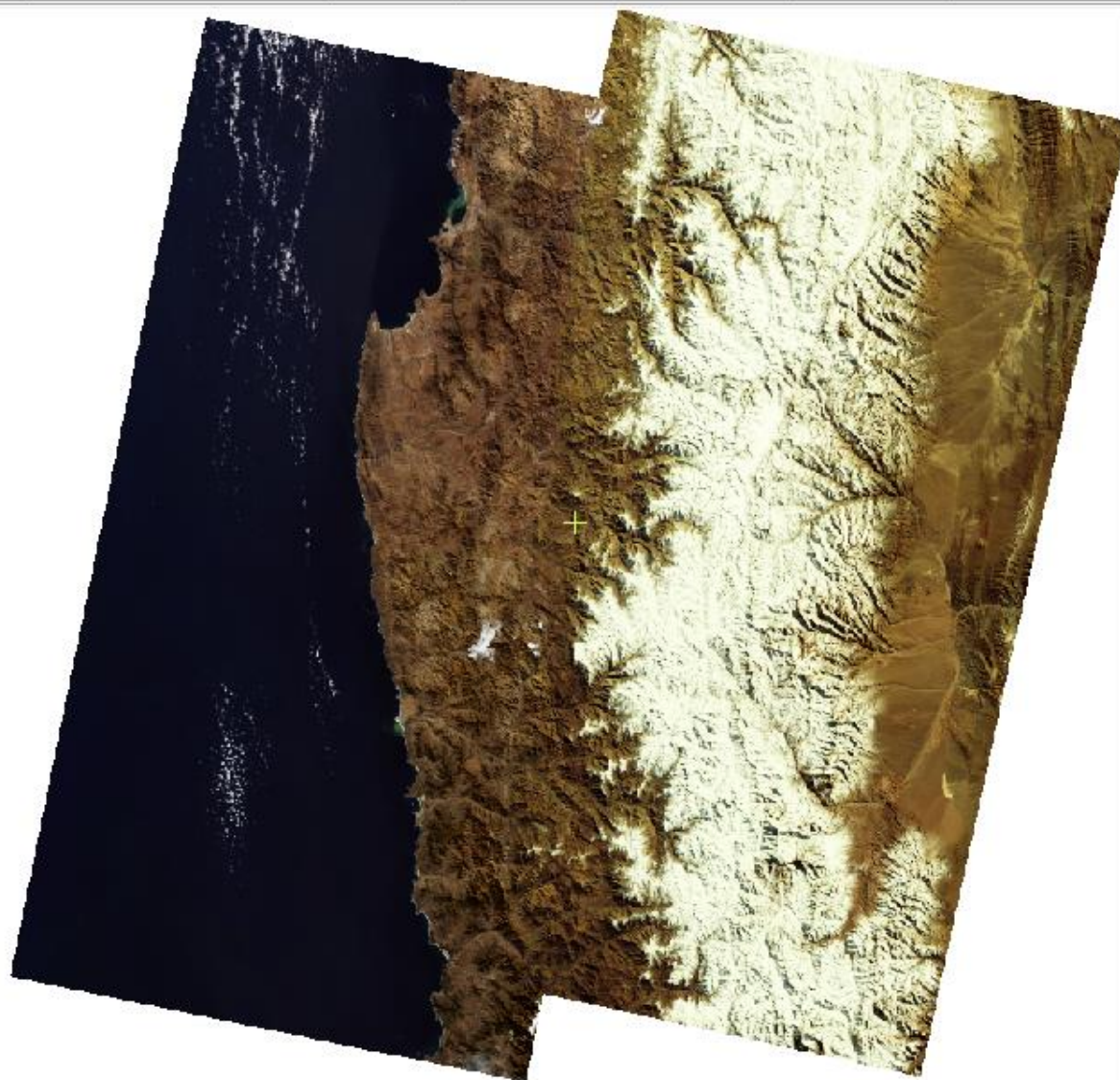
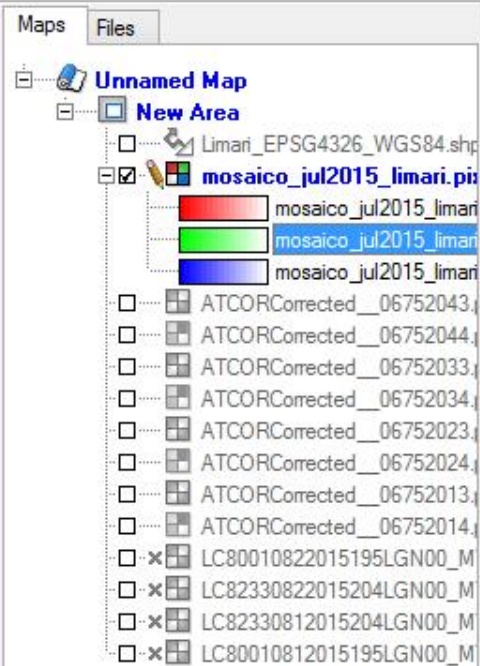
Limari_E

LC8001

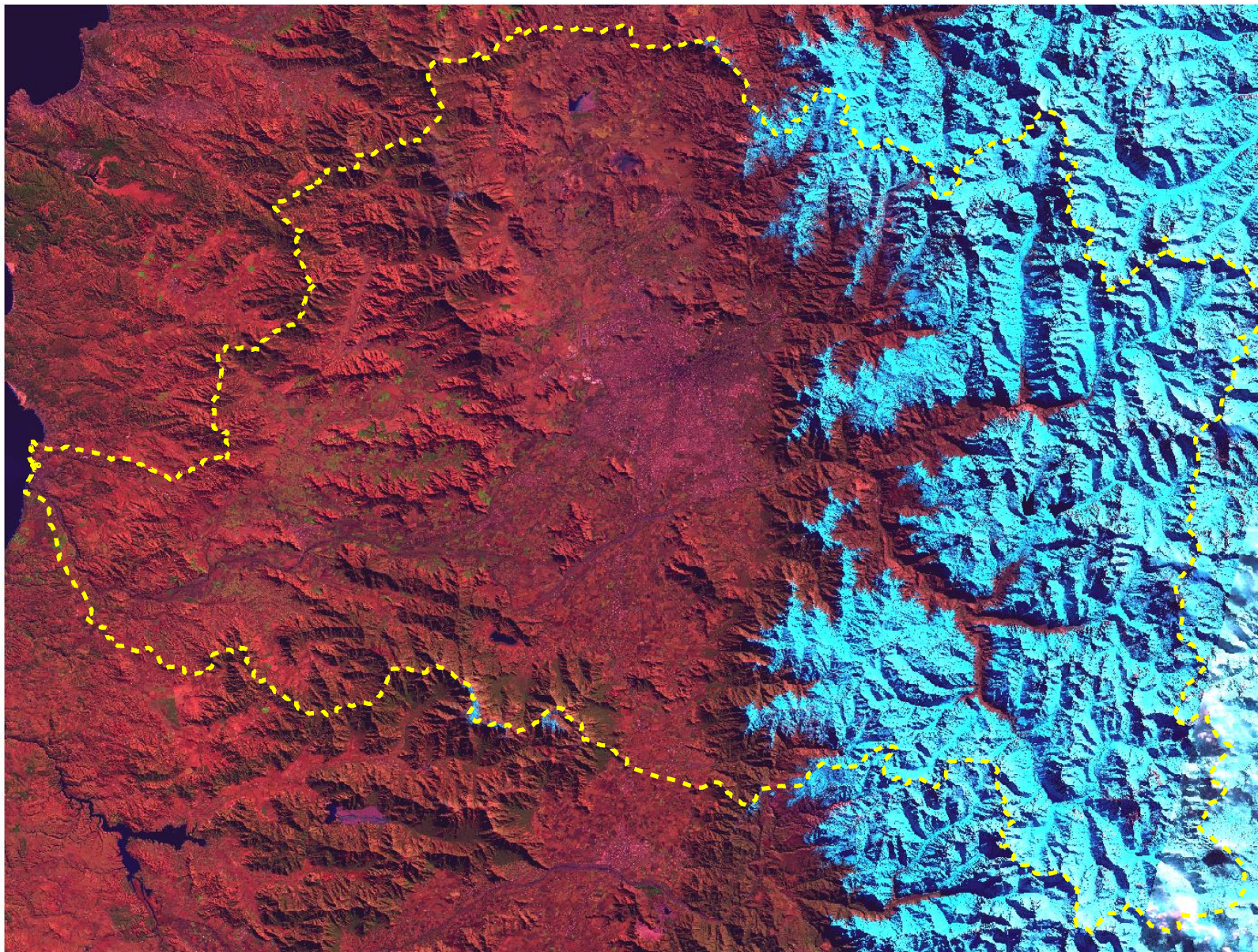
LC8233

LC82330812015204LGN00_M

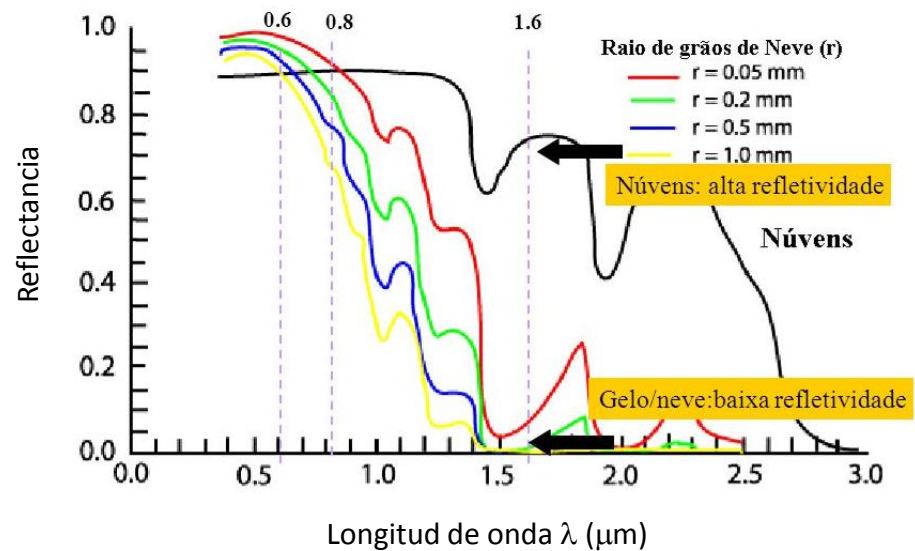
LC80010812015195LGN0



Cuenca del rio Maipo. Mosaico de imagenes Landsat 8/OLI

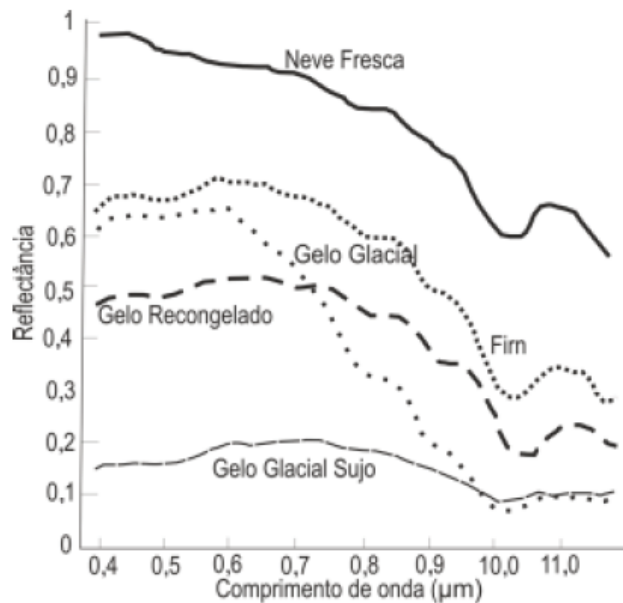
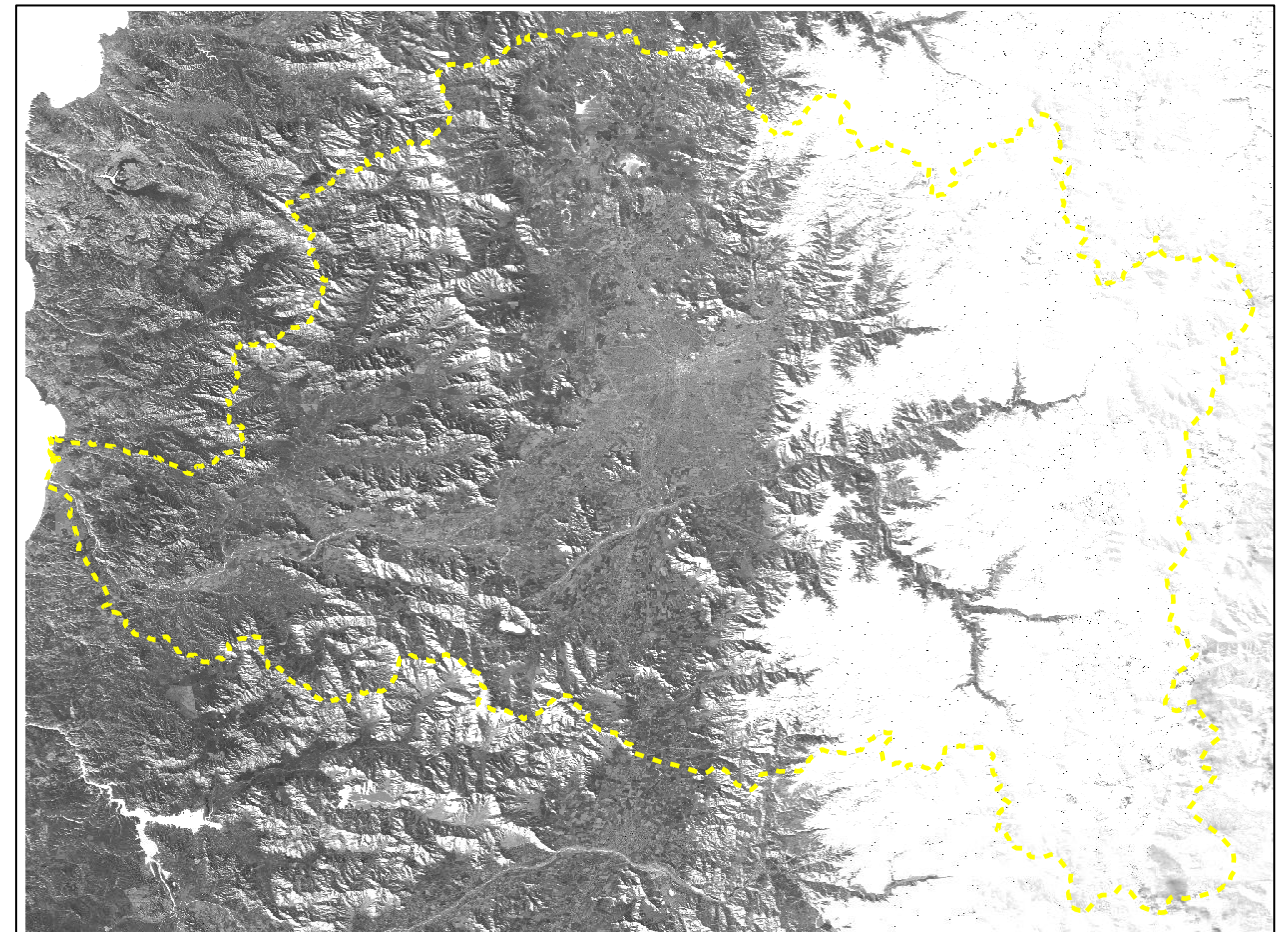


El comportamiento espectral de la cobertura de nieve

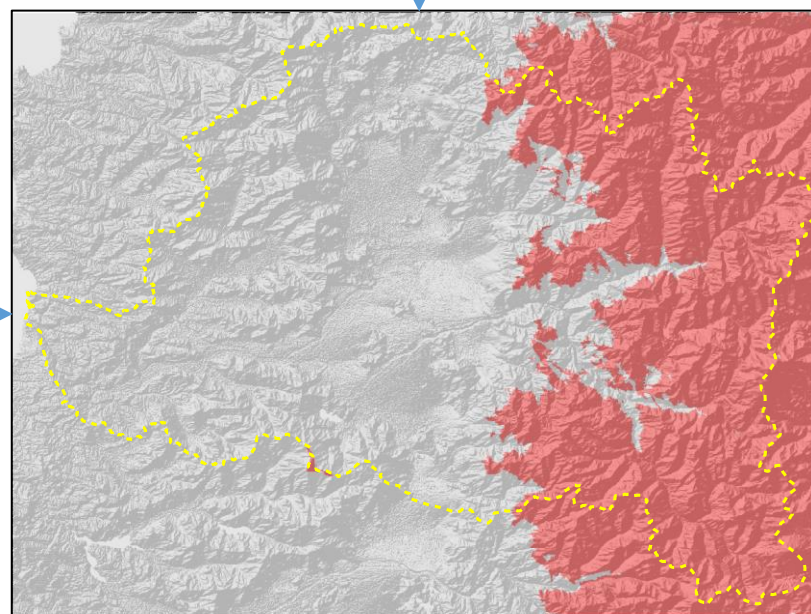
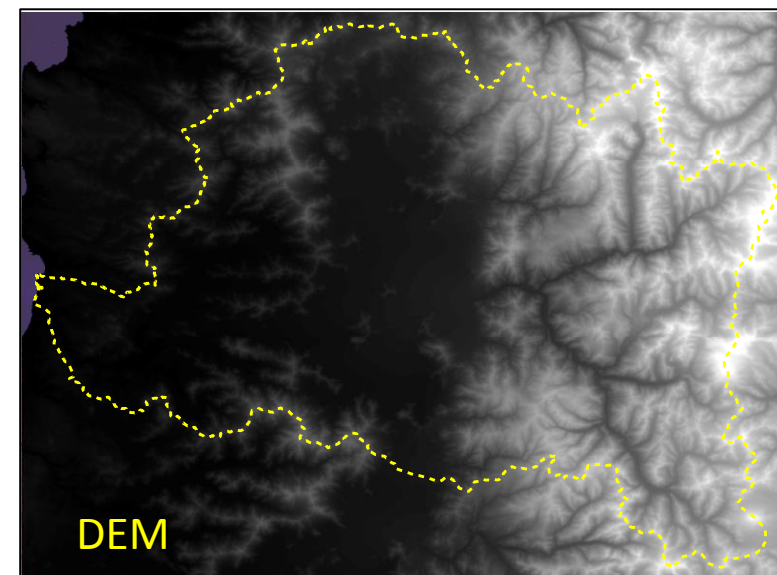
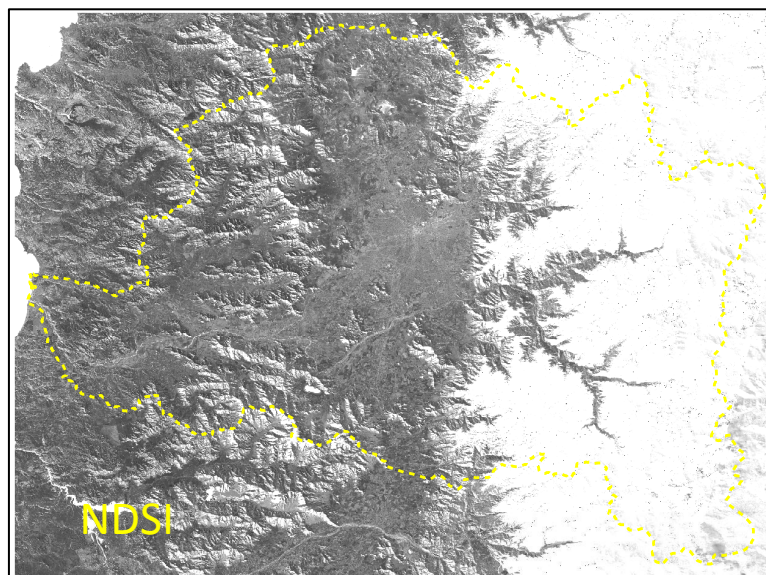
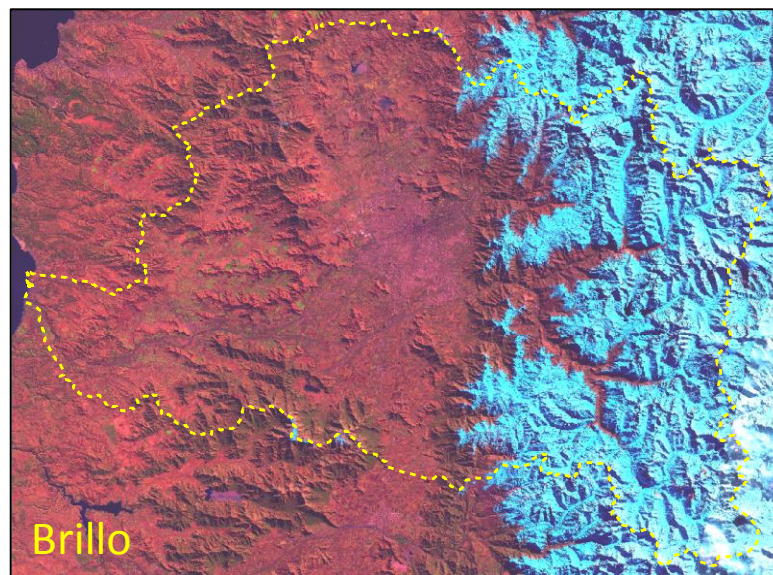


Índice de Diferencia Normalizada de Nieve

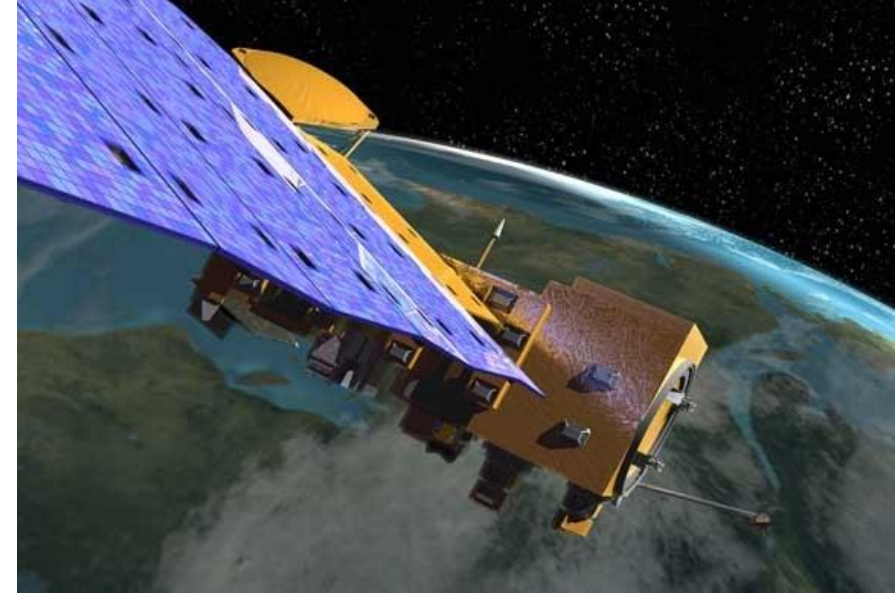
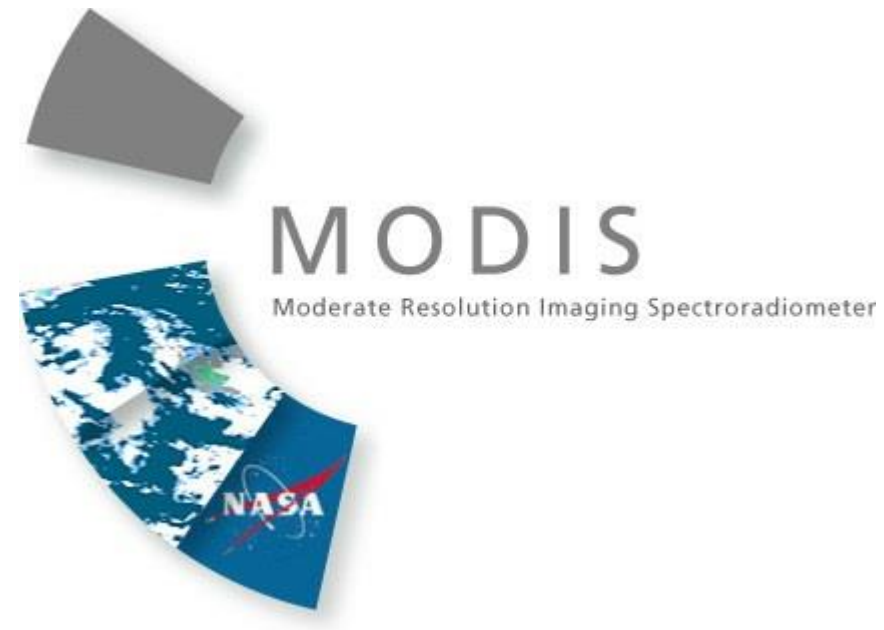
$$\text{Landsat OLI NDSI} = \frac{\lambda_{\text{GREEN}} - \lambda_{\text{SWIR}}}{\lambda_{\text{GREEN}} + \lambda_{\text{SWIR}}}$$



Modelando el conocimiento para classificar cobertura de nieve



Cobertura de nieve
14/23 de Julio de 2015



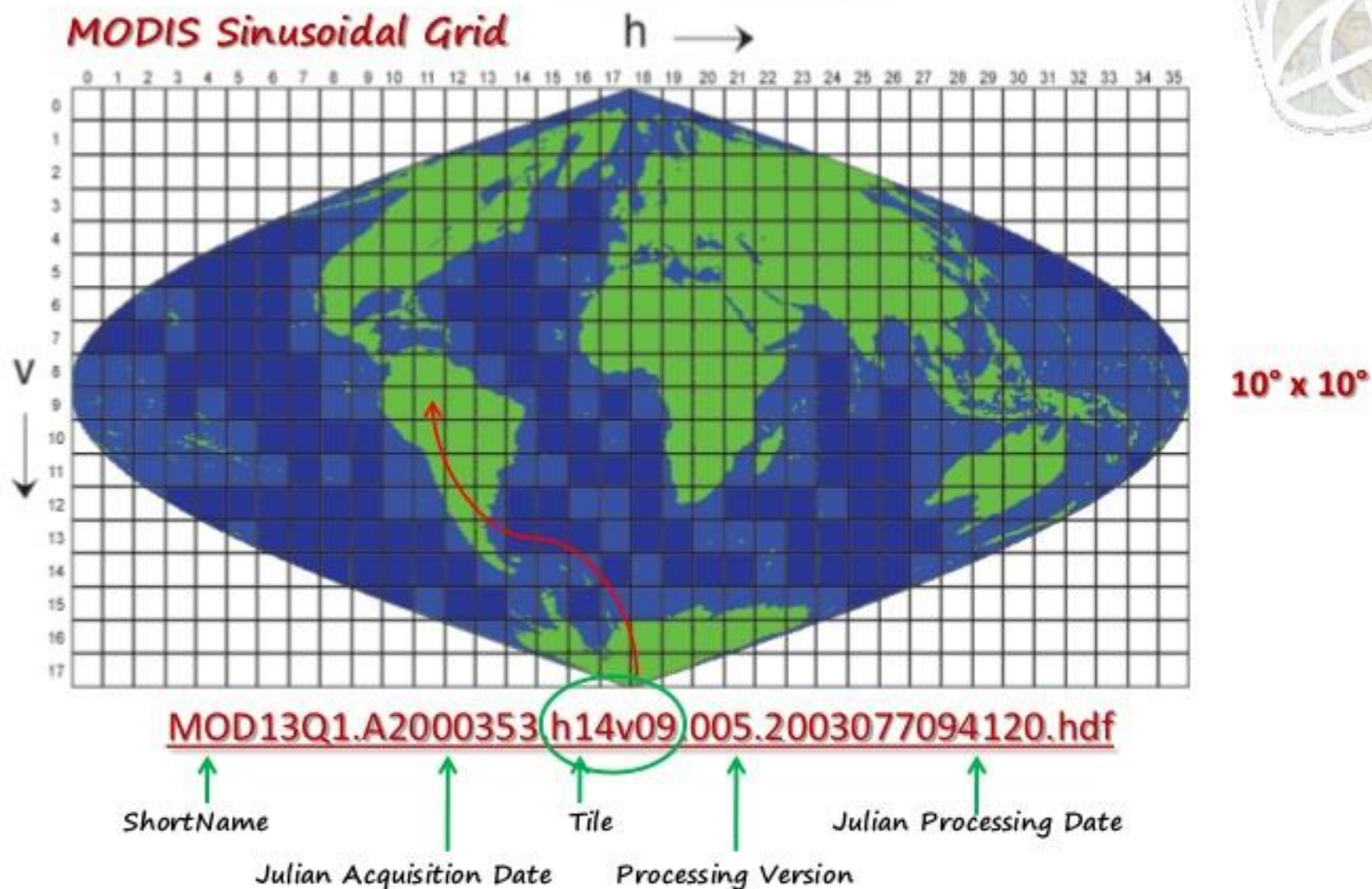
Terra MODIS e Aqua MODIS

Cobertura entre 1 y 2 días

36 bandas espectrales

Resoluciones espaciales de 250, 500 y 1000 metros

MODIS Tiles



Los programas de instalación para pre-procesamientos de los datos se encuentran disponibles en la página de USGS: <https://lpdaac.usgs.gov/lpdaac/tools>



Productos MODIS

Level 1

[MODIS Raw Radiances](#)

[MODIS Calibrated Radiances](#)

[MODIS Geolocation Fields](#)

MODIS Atmosphere Products

[MODIS Aerosol Product](#)

[MODIS Total Precipitable Water](#)

[MODIS Cloud Product](#)

[MODIS Atmospheric Profiles](#)

[MODIS Atmosphere Joint Product](#)

[MODIS Atmosphere Gridded Product](#)

[MODIS Cloud Mask](#)

MODIS Land Products

[MODIS Surface Reflectance](#)

[MODIS Land Surface Temperature and](#)

[Emissivity](#)

[MODIS Land Cover Products](#)

[MODIS Vegetation Index Products \(NDVI and](#)

[EVI\)](#)

[MODIS Thermal Anomalies - Active Fires](#)

[MODIS Fraction of Photosynthetically Active](#)

[Radiation \(FPAR\) / Leaf Area Index \(LAI\)](#)

[MODIS Evapotranspiration](#)

[MODIS Gross Primary Productivity \(GPP\) /](#)

[Net Primary Productivity \(NPP\)](#)

[MODIS Bidirectional Reflectance Distribution](#)

[Function \(BRDF\) / Albedo Parameter](#)

[MODIS Vegetation Continuous Fields](#)

[MODIS Water Mask](#)

[MODIS Burned Area Product](#)

MODIS Cryosphere Products

[MODIS Snow Cover](#)

[MODIS Sea Ice and Ice Surface Temperature](#)

MODIS Ocean Products

[MODIS Sea Surface Temperature](#)

[MODIS Remote Sensing Reflectance](#)

[MODIS Sub-surface Chlorophyll-a](#)

[Concentration](#)

[MODIS Diffuse Attenuation at 490 nm](#)

[MODIS Particulate Organic Carbon](#)

[MODIS Particulate Inorganic Carbon](#)

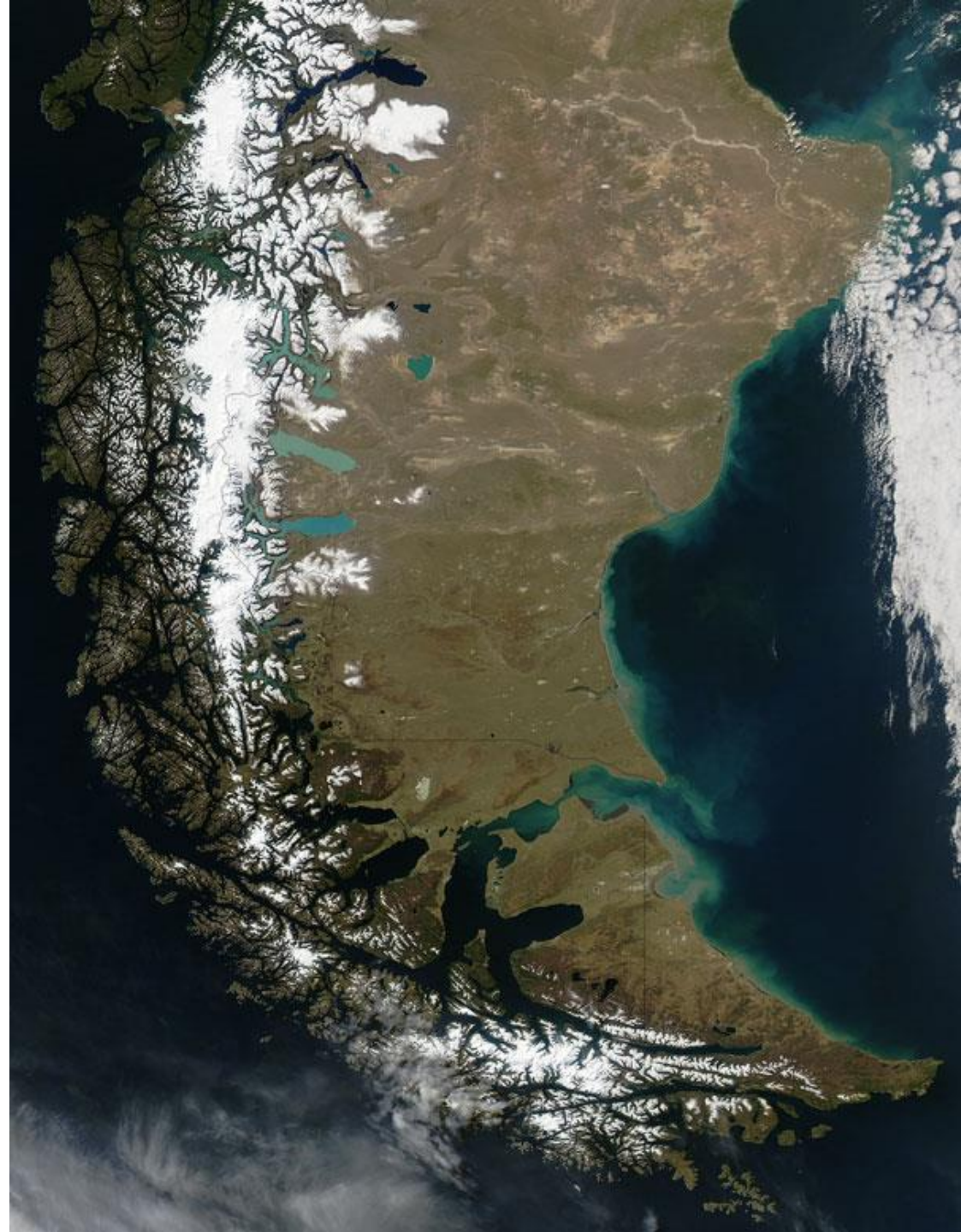
[MODIS Fluorescence Line Height \(FLH\)](#)

[MODIS Instantaneous Photosynthetically](#)

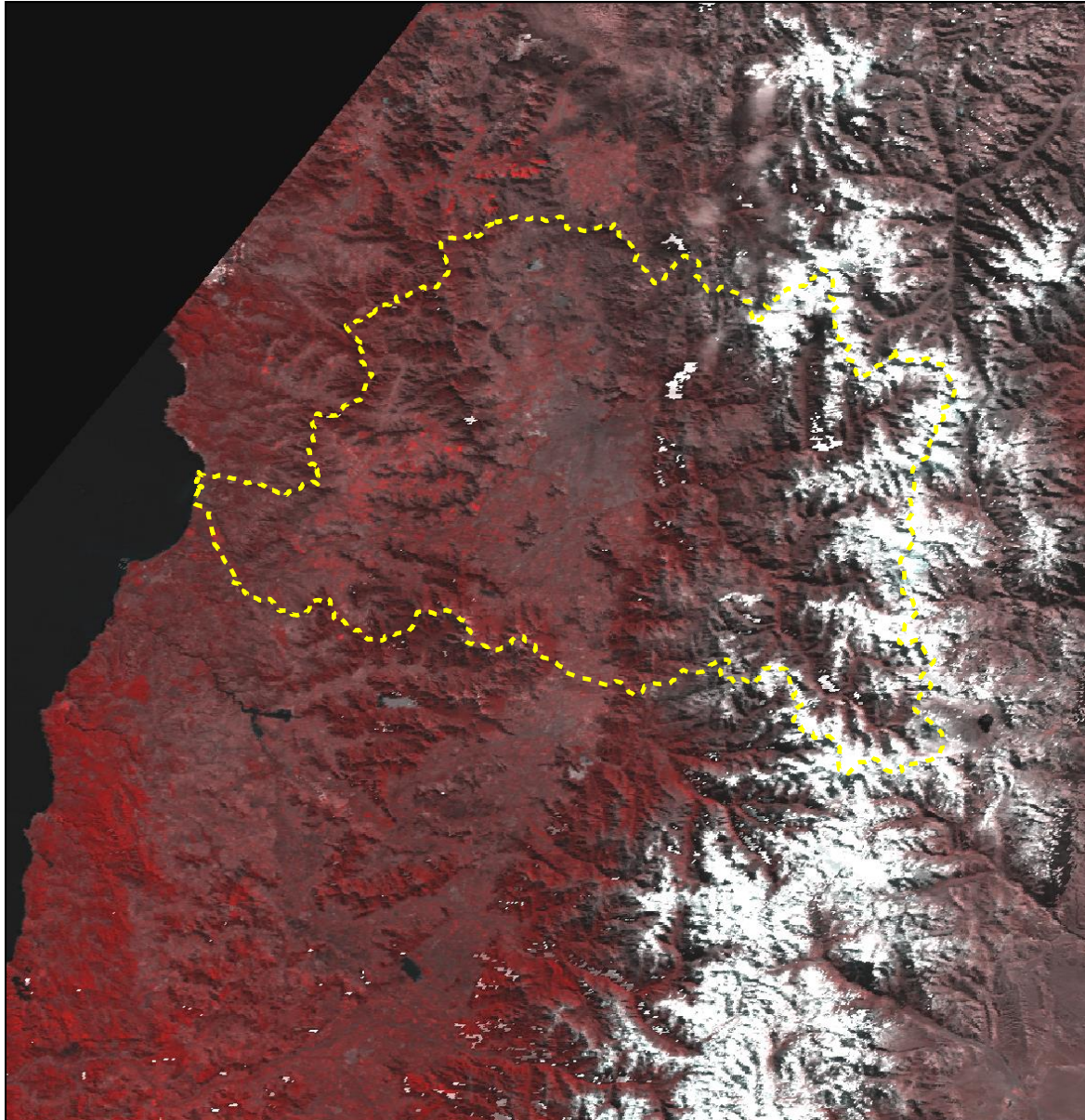
[Available Radiation](#)

[MODIS Daily Mean Photosynthetically](#)

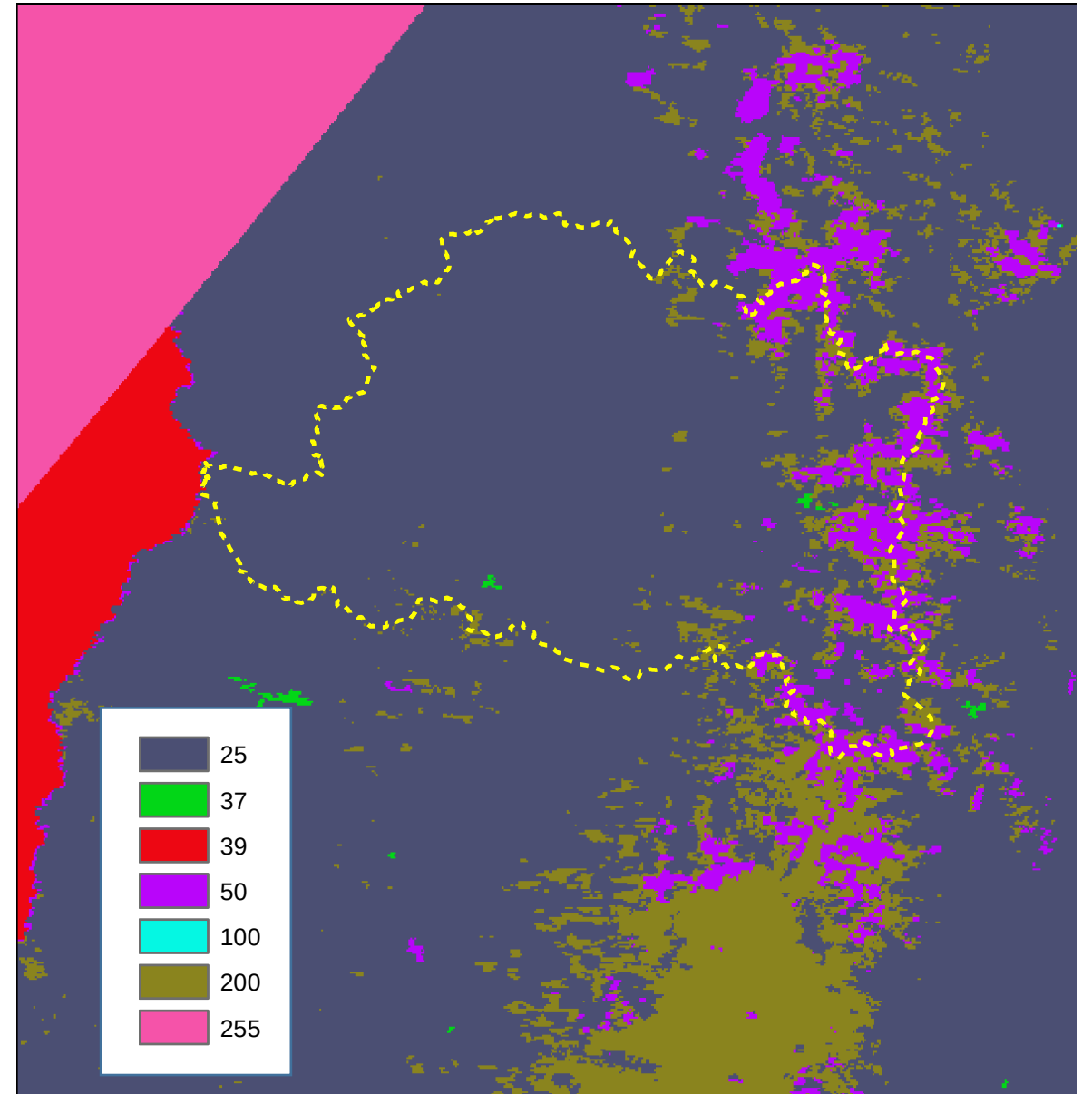
[Available Radiation](#)



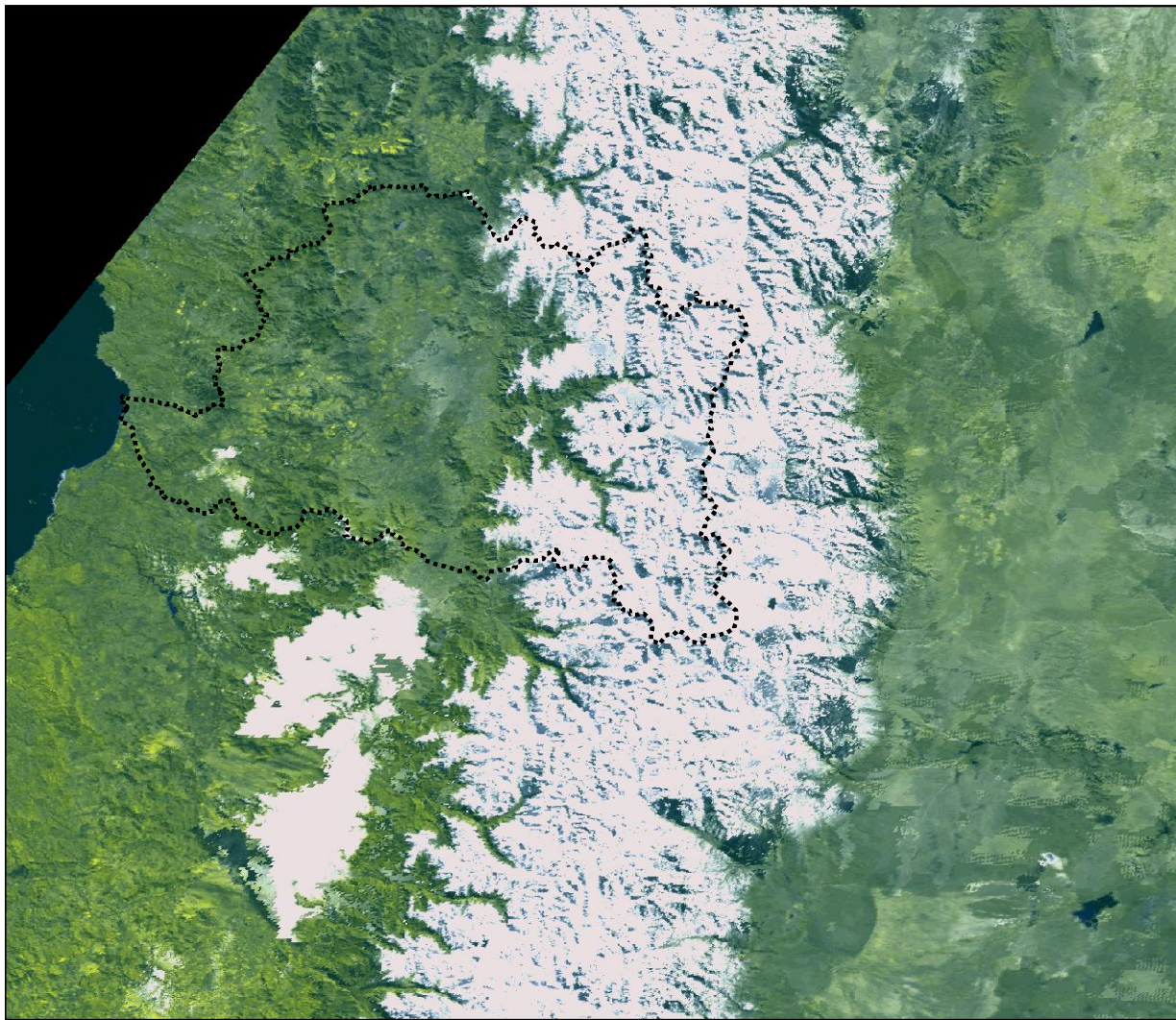
MOD09Q1: Surface Reflectance 8-Day L3 Global 250m



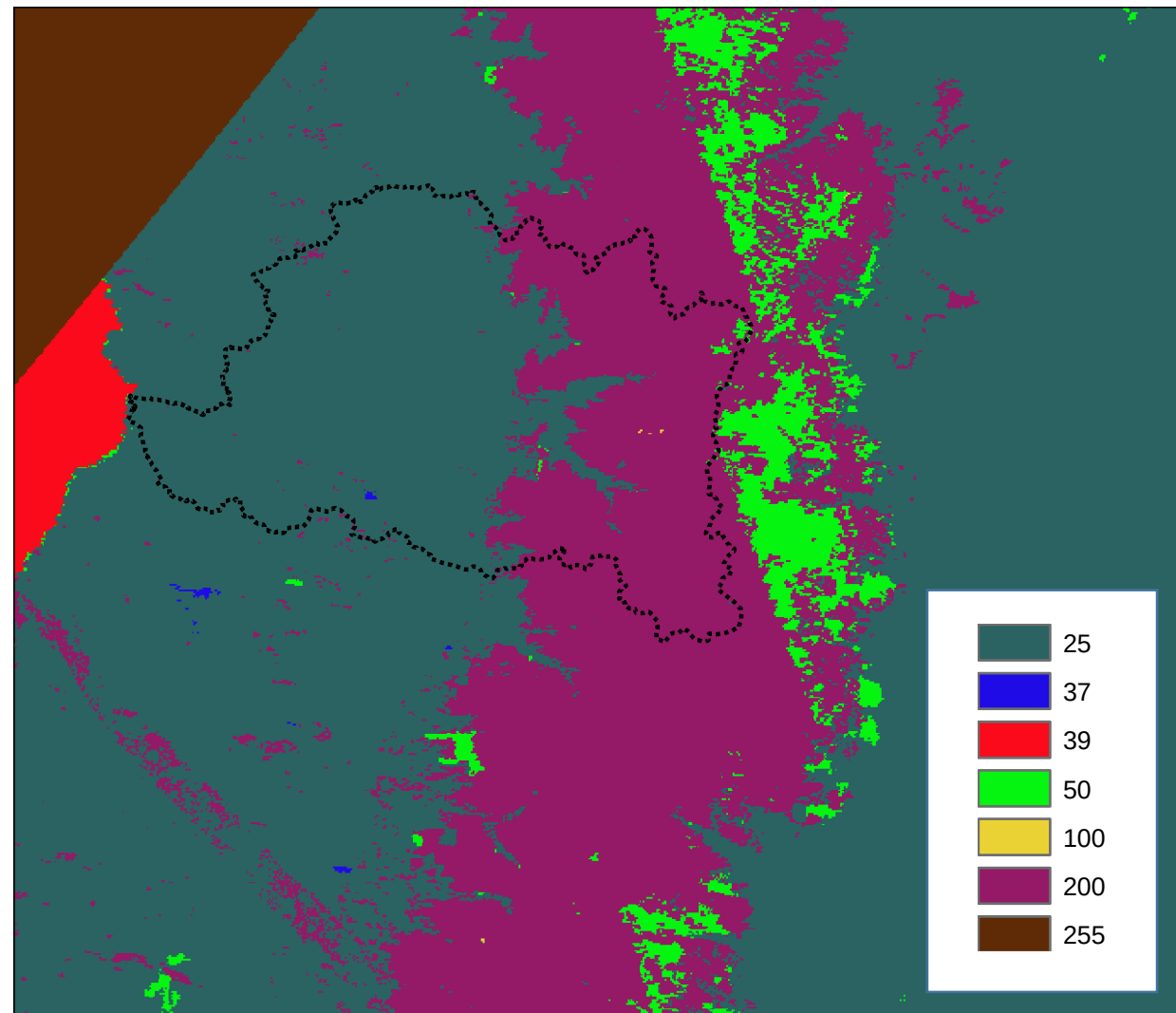
MOD10A2: Maximum Snow Extent 8-Day L3 Global 500m



MOD09Q1: Surface Reflectance 8-Day L3 Global 250m

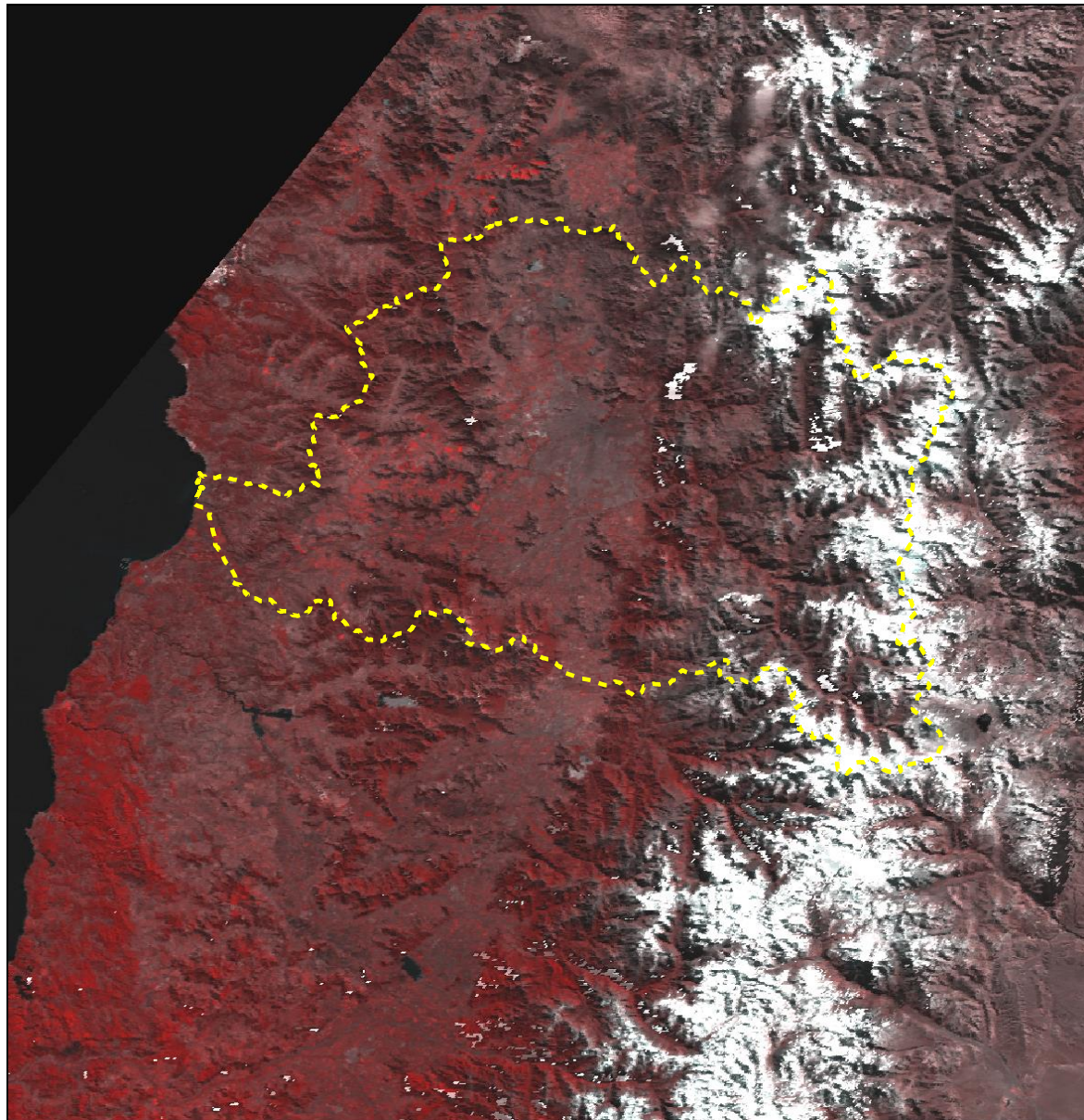


MOD10A2: Maximum Snow Extent 8-Day L3 Global 500m

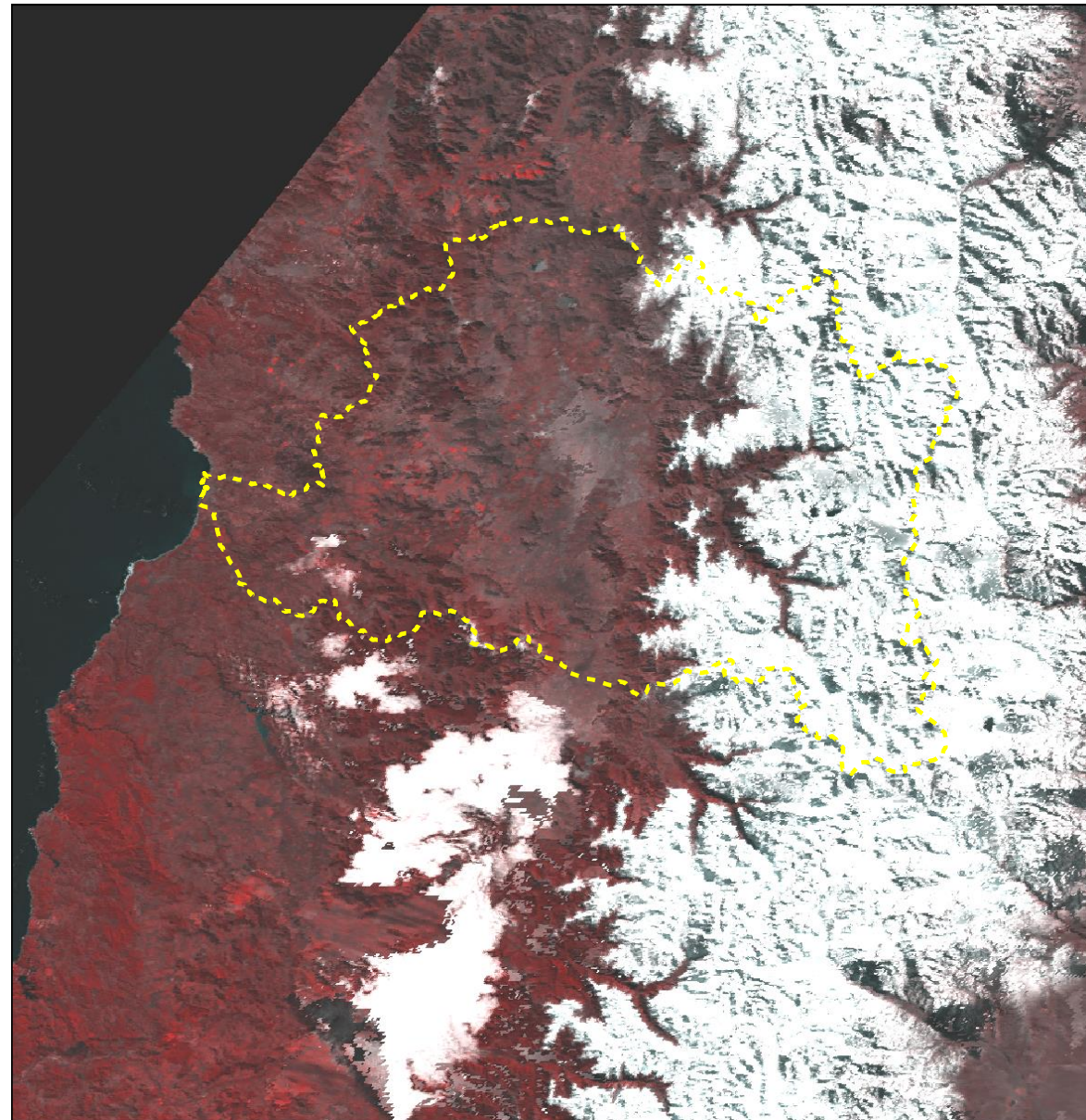


MOD09Q1: Surface Reflectance 8-Day L3 Global 250m

04 de Julho de 2015



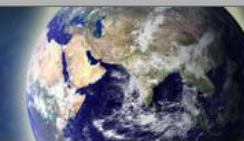
20 de Julho de 2015





MODIS

MODERATE RESOLUTION IMAGING SPECTRORADIOMETER



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Level 1

Raw Radiances
Calibrated Radiances
Geolocation Fields

Atmosphere Products

Aerosol Product
Total Precipitable Water
Cloud Product
Atmospheric Profiles
Atmosphere Joint Product
Atmosphere Gridded Product
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Land Surface Temperature
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Thermal Anomalies/Fires
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Evapotranspiration
Gross Primary Productivity
BRDF / Albedo
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Water Mask
Burned Area Product

Cryosphere Products

Snow Cover
Sea Ice & Ice Surface Temperature

Ocean Products

Sea Surface Temperature
Remote Sensing Reflectance
Sub-surface Chlorophyll-a Concentration
Diffuse Attenuation at 490 nm
Particulate Organic Carbon
Particulate Inorganic Carbon
Fluorescence Line Height (FLH)
Instantaneous Photosynthetically Available Radiation
Daily Mean Photosynthetically Available Radiation

Data

The MODIS Data section contains everything from ATBDs to Product Descriptions to Product ordering information, including from Direct Broadcast data providers. Visit the Data section for more information.

[Learn More About MODIS Data >>](#)

News

[Updated User Guide for Cloud Optical Properties Released on MODIS Atmosphere Website](#)

[LP DAAC Releases Beta Version of AppEEARS](#)

[View More MODIS News >>](#)

Tools

The MODIS Tools section has a complete listing of web-based tools that can be used to access a wide variety of MODIS Data, along with an array of links and a summary of each tool.

[Learn More About MODIS Tools >>](#)

DISCIPLINARY TEAMS

Atmosphere

Land

Ocean

Calibration



MODIS

MODERATE RESOLUTION IMAGING SPECTRORADIOMETER



About Data Tools

Science Team Images News Related Sites MODARCH

Data Products

MODIS Snow Cover

Algorithms

Direct Broadcast



Dust storm over the Caspian Sea
09-04-2014



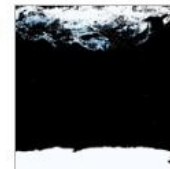
Hurricane Igor in the Atlantic Ocean
09-17-2010



Sea ice off western Alaska
02-04-2015

Overview

These products are generated using the MODIS calibrated radiance data products (MOD02HKM and MYD02HKM), the geolocation products (MOD03 and MYD03), and the cloud mask products (MOD35_L2 and MYD35_L2) as inputs. The MODIS snow algorithm output (MOD10_L2 and MYD10_L2) contains scientific data sets (SDS) of snow cover, quality assurance (QA) SDSs, latitude and longitude SDSs, local attributes and global attributes. The snow cover algorithm identifies snow-covered land; it also identifies snow-covered ice on inland water.



Product Information

- Product PI: [Dorothy Hall](#)
- Validated Stage: [Stage 2](#)
- [PI Product Page URL](#)
- [User Guide Download](#)
- [ATBD](#)
- DOI: Hall, D. K., G. A. Riggs, and V. V. Salomonson. 2006. MODIS/Terra Snow Cover 5-Min L2 Swath 500m. Version 5. Boulder, Colorado USA: NASA National Snow and Ice Data Center Distributed Active Archive Center. <http://dx.doi.org/10.5067/ACITYZB9BEOS>.

All MODIS Snow Cover DOI's can be found at NSIDC: https://nsidc.org/data/modis/data_summaries

Product Details

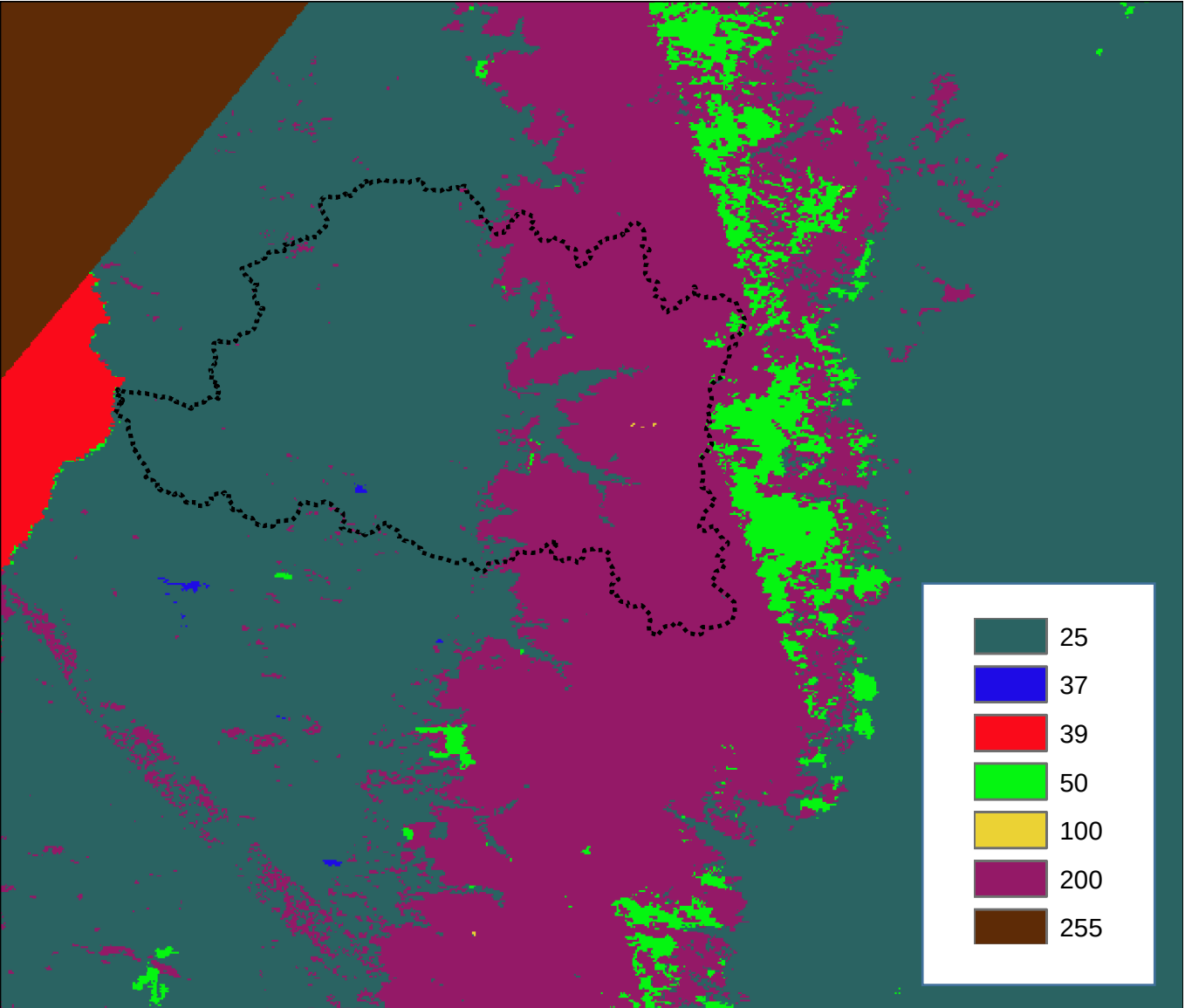
Product Name	Terra Prod ID/ DAAC Link	Aqua Prod ID/ DAAC Link
MODIS Snow Cover 5-Min L2 Swath 500m	MOD10_L2	MYD10_L2
MODIS Snow Cover Daily L3 Global 500m Grid	MOD10A1	MYD10A1
MODIS Snow Cover Daily L3 Global 0.05Deg CMG	MOD10C1	MYD10C1
MODIS Snow Cover 8-Day L3 Global 500m Grid	MOD10A2	MYD10A2
MODIS Snow Cover Daily L3 Global 0.05Deg CMG	MOD10C2	MYD10C2
MODIS Snow Cover Monthly L3 Global 0.05Deg CMG	MOD10CM	MYD10CM

[< Return to Data Products Page](#)



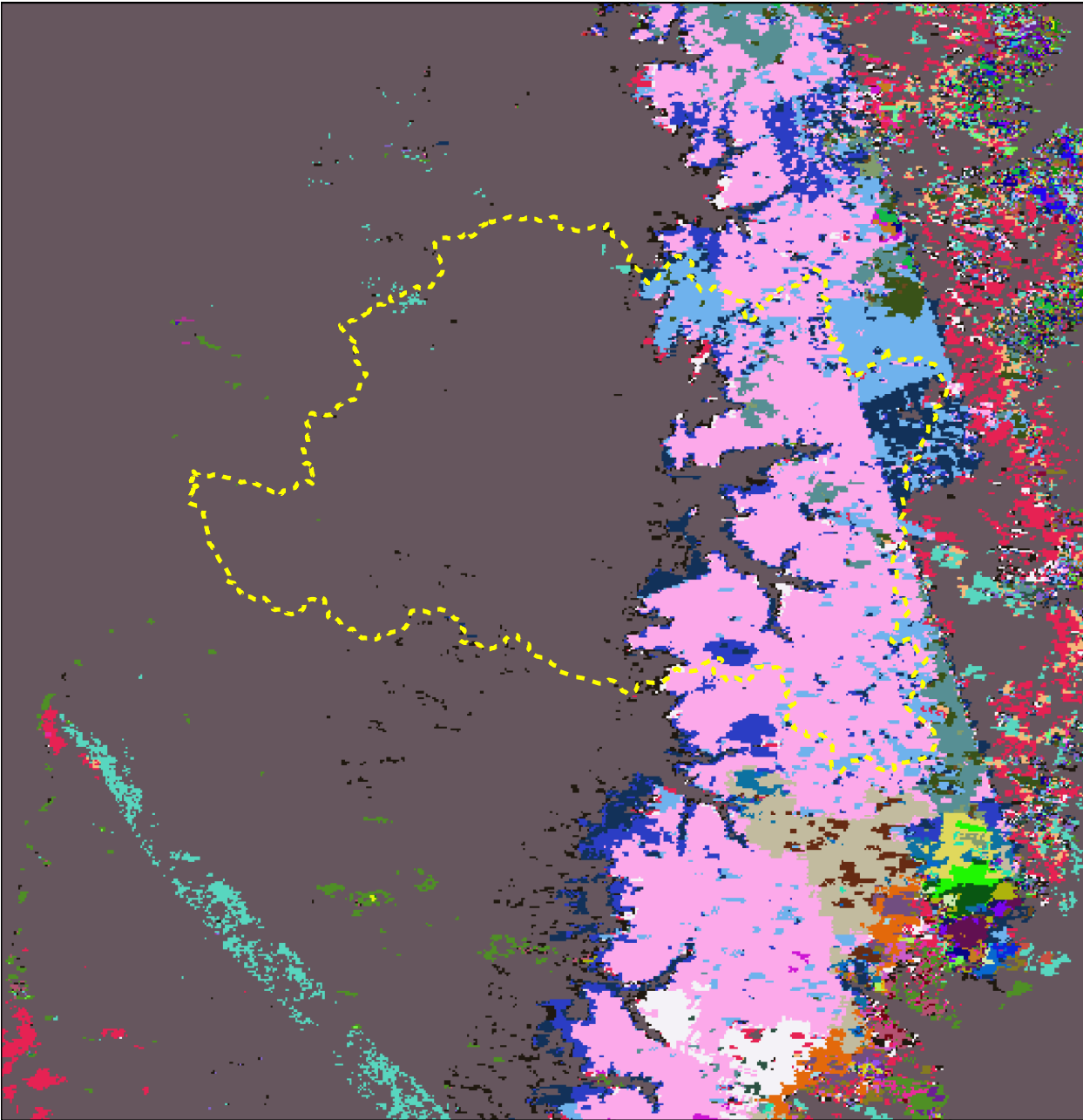
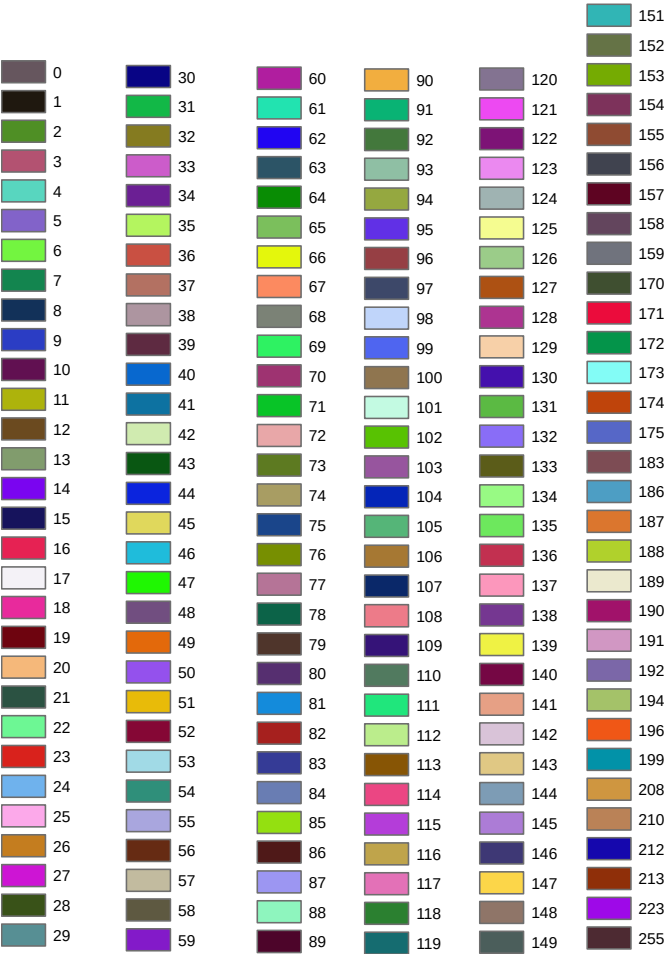
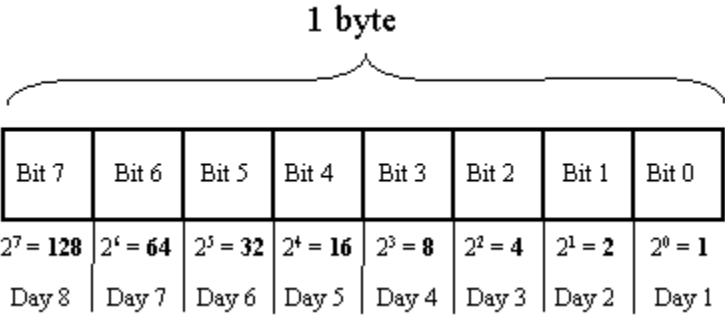
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 MOD10A2.A2015185.h12v07.005.2015194073958.hdf	2015-07-13 01:43	78K
 MOD10A2.A2015185.h12v07.005.2015194073958.hdf.xml	2015-07-15 05:33	6.3K
 MOD10A2.A2015185.h12v08.005.2015194071707.hdf	2015-07-13 01:21	102K
 MOD10A2.A2015185.h12v08.005.2015194071707.hdf.xml	2015-07-15 05:33	6.3K
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 MOD10A2.A2015185.h13v09.005.2015194073012.hdf.xml	2015-07-15 05:33	6.3K

MOD10A2: Maximum Snow Extent 8-Day L3 Global 500m



Sample Value	
0	
Value	Description
0 = missing data	data missing
1 = no decision	no decision
11 = night	darkness, terminator, or polar night
25 = no snow	snow-free land
37 = lake	lake or inland water
39 = ocean	open water
50 = cloud	cloud obscured
100 = lake ice	snow-covered lake ice
200 = snow	snow-covered land
254 = detector saturated	detector saturated
255 = fill	fill

MOD10A2: 8-Day Cronology L3 Global 500m





Fin