

XI CONGRESO INTERNACIONAL DE AGRONOMÍA

Abril 2020



UNIwersytet
ROLNICZY
W KRAKOWIE

XI CONGRESO
LATINOAMERICANO DE
AGRONOMÍA
27, 28 y 29 de abril de 2020



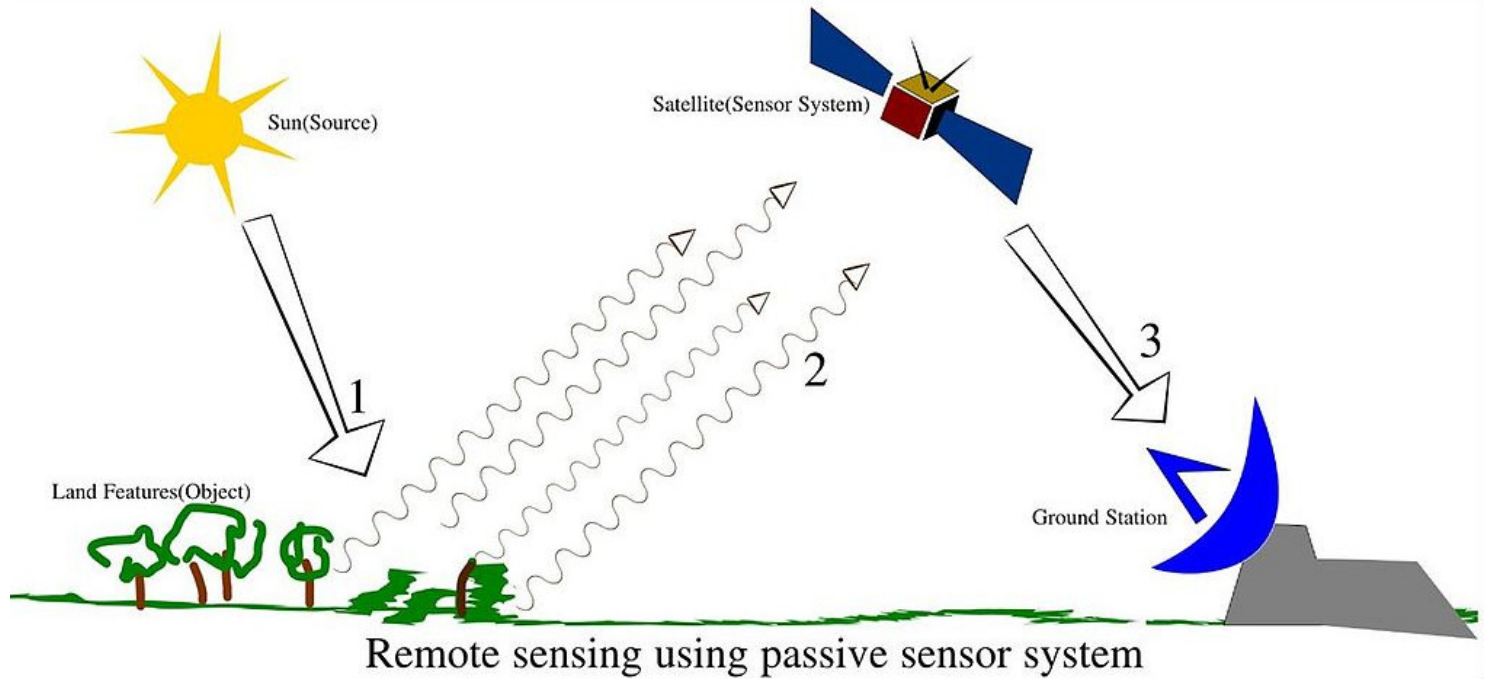
Uso de imágenes Sentinel-2 para la evaluación de la vegetación: aplicaciones y limitaciones

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Universidad Técnica de Manabí



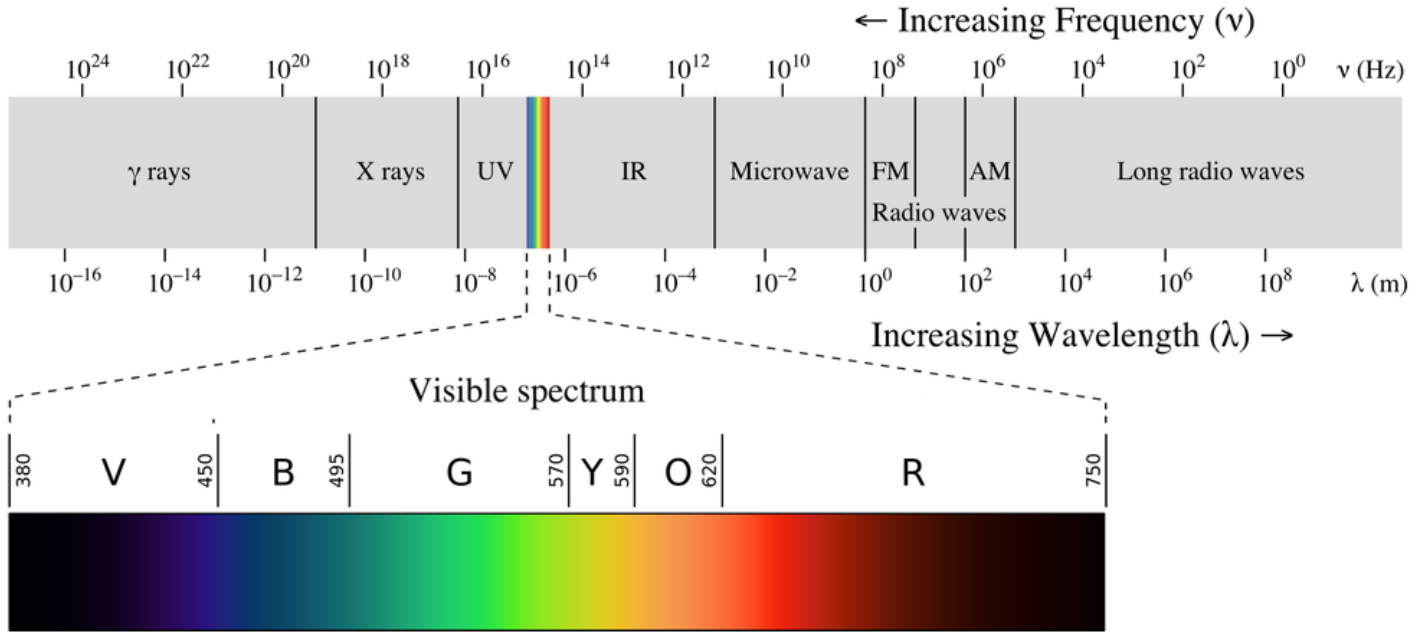
Teledetección



Source:

[Wikimedia commons](#)





Source:

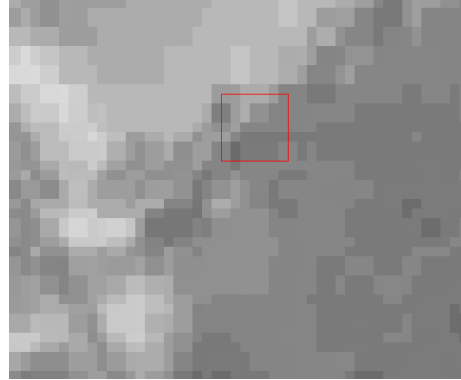
[Wikimedia commons](#)



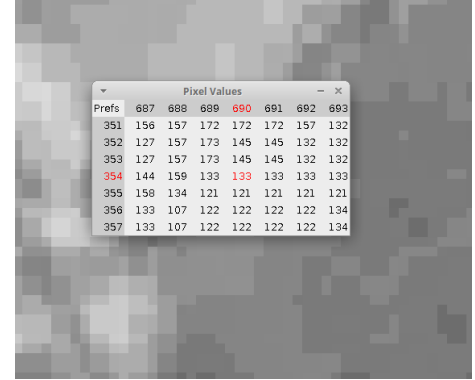
Imagen - Banda



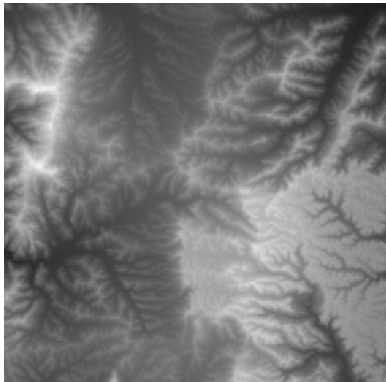
a. Imagen



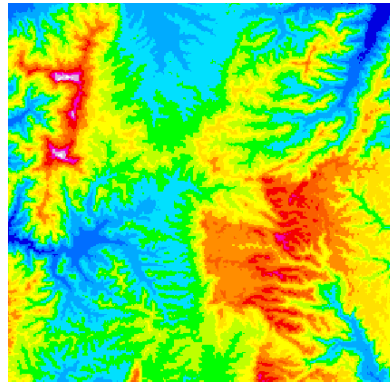
b. Pixeles



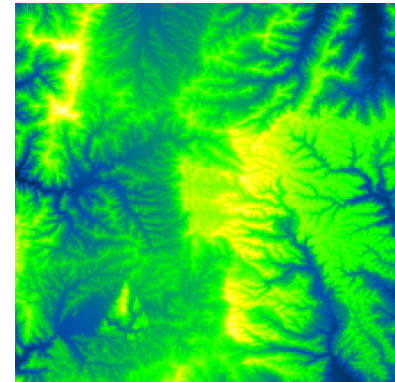
c. valor de pixel



d. Elevación



e. Colorized 1



f. Colorized 2



Composición en color



a. Red



b. Green



c. Blue



d. RGB



e. GRB



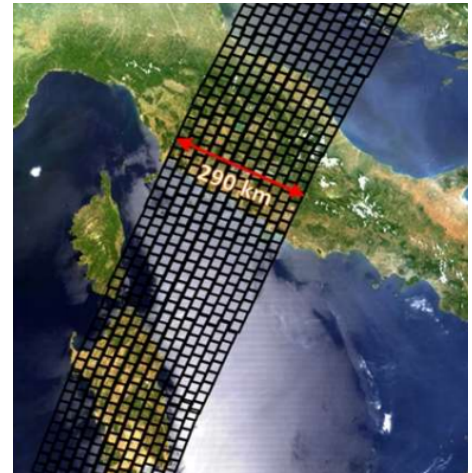
f. BGR



Sentinel-2

El programa Sentinel-2 del ESA comprende dos satélites de órbita polar cuyo objetivo es monitorear la variación de la superficie de la tierra.

- swath 290km
- tiempo de revisita (5 días)
- Cobertura 56° sur and 84° norte.
- MultiSpectral Instrument (MSI)
- products disponibles:
 - Level 1B --> TOA radiancia
 - Level 1C --> TOA reflectancia
 - Level 2C --> Bottom-of-atmosphere reflectance



Source:

https://www.esa.int/ESA_Multimedia/Videos/2016/



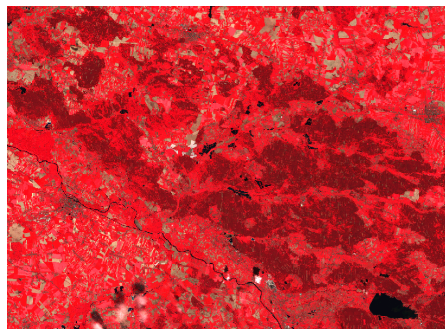
ID Banda λ (nm) Tamaño de pixel Rango espectral

1	B2	490		
2	B3	560	10 m	Visible
3	B4	665		
4	B8	842		
5	B5	705	20 m	NIR
6	B6	740		
7	B7	783		
8	B8a	865		
9	B11	1610	60 m	SWIR
10	B12	2190		
11	B1	443		
12	B9	940	60 m	NIR
13	B10	1375		

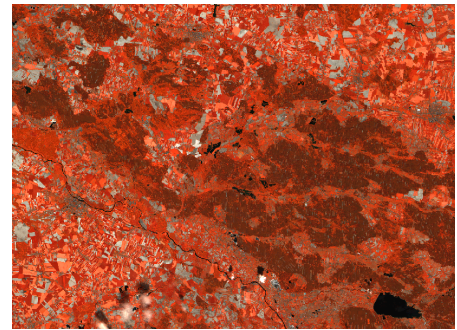




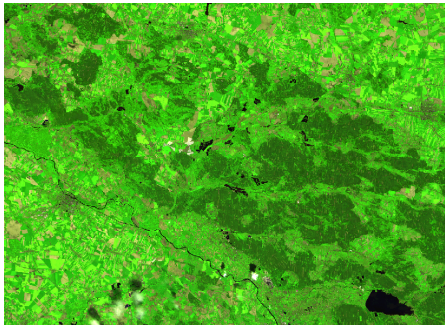
1. Natural Color



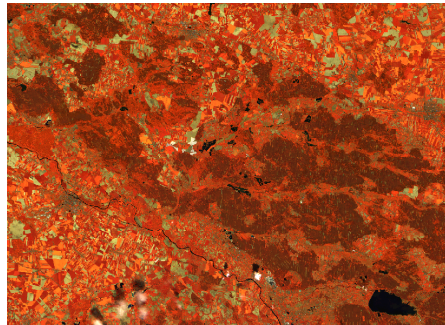
2. Vegetation



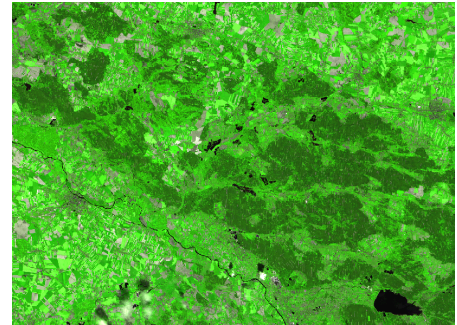
3. Vegetation-2



4. Healthy Vegetation



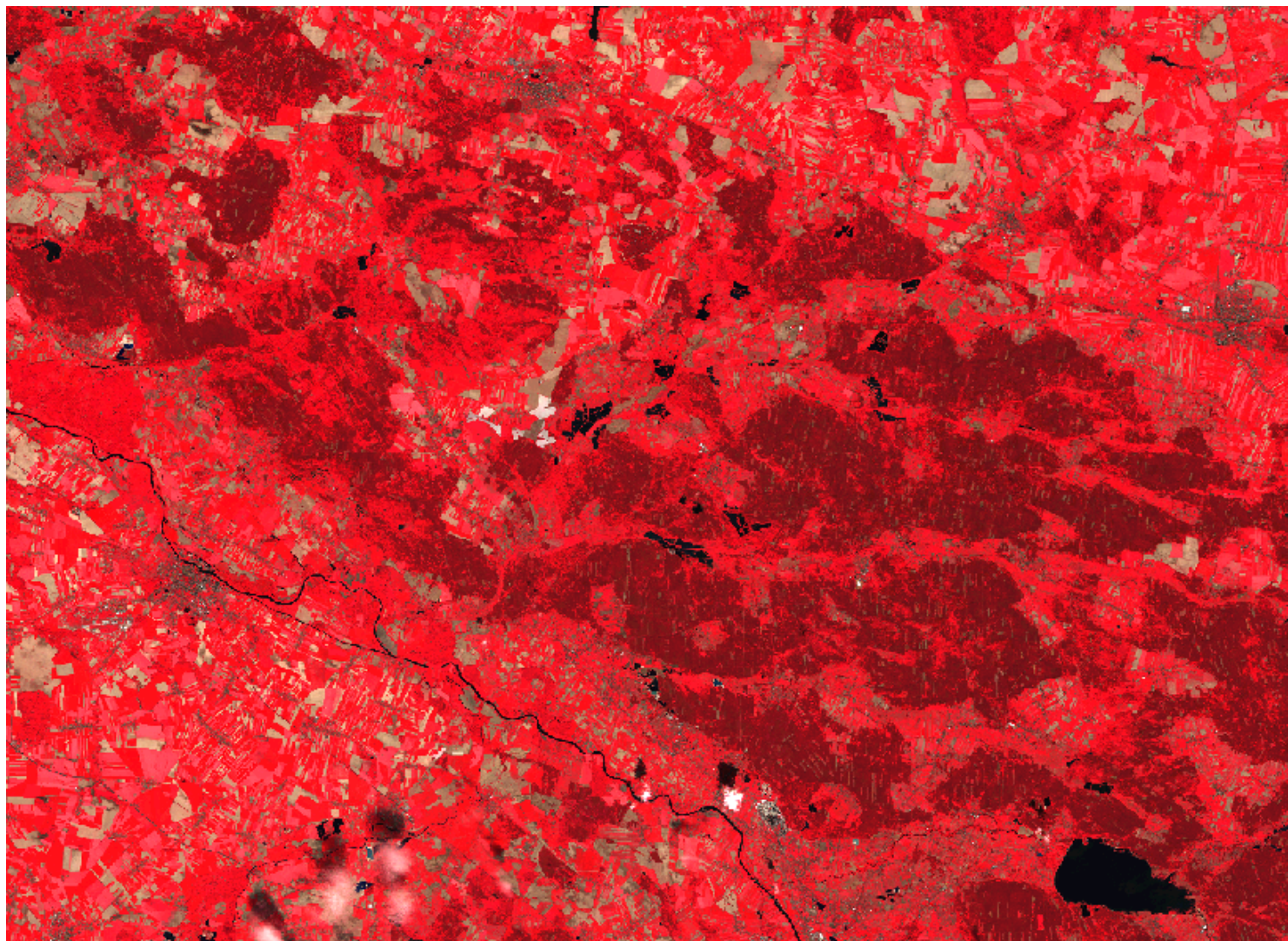
5. Agriculture

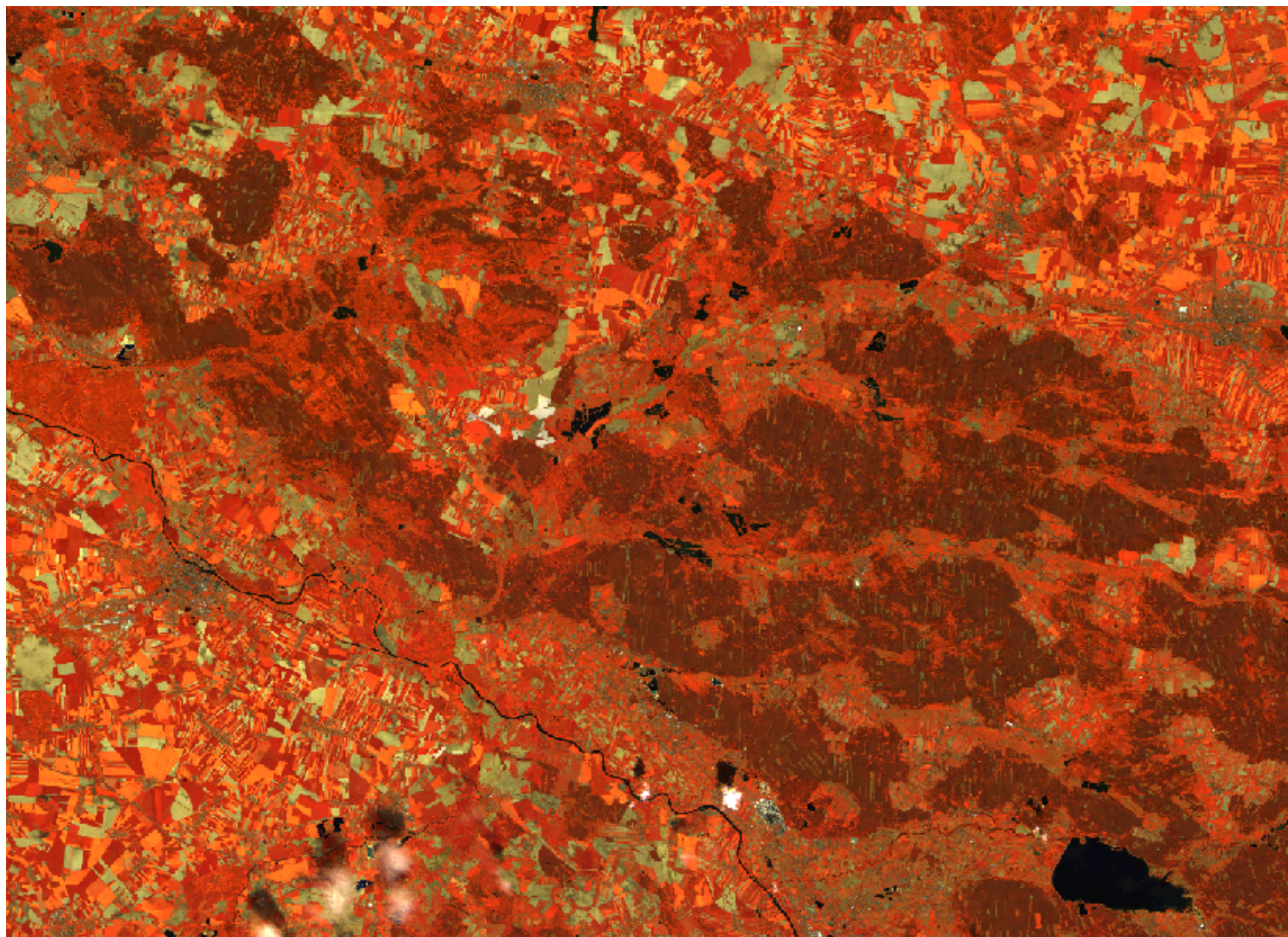


6. Land-water









Combinaciones de Bandas

- Natural Colors: 4 3 2
- False color Infrared: 8 4 3
- False color Urban: 12 11 4
- Agriculture: 11 8 2
- Atmospheric penetration: 12 11 8a
- Healthy vegetation: 8 11 2
- Land/Water: 8 11 4
- Natural Colors with Atmospheric Removal: 12 8 3
- Shortwave Infrared: 12 8 4
- Vegetation Analysis: 11 8 4

Source:

ESA BC



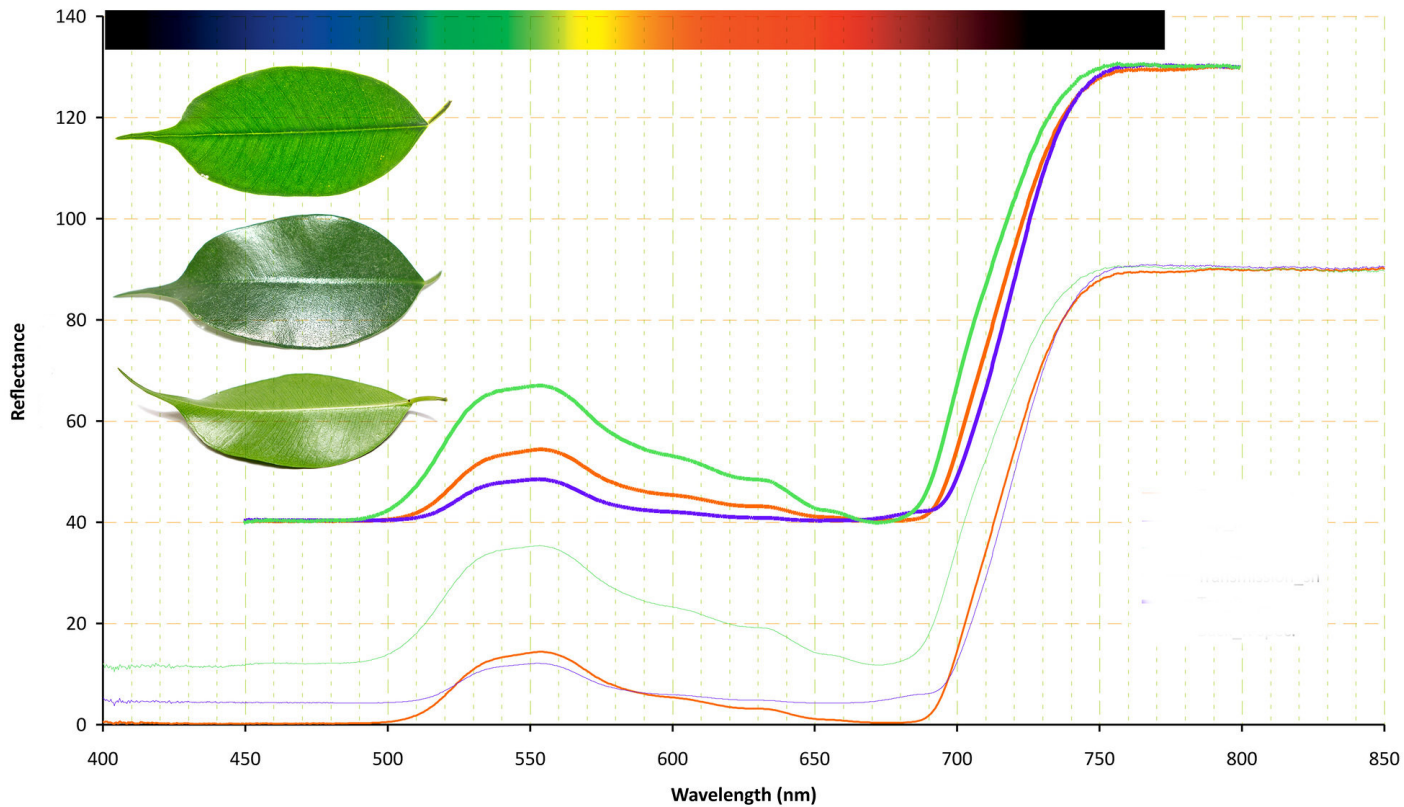
Índices de vegetación

En teledetección, un índice de vegetación usualmente se utiliza para discriminar densidad, condición y vitalidad de la vegetación, aumentando el contraste entre la vegetación y el suelo.

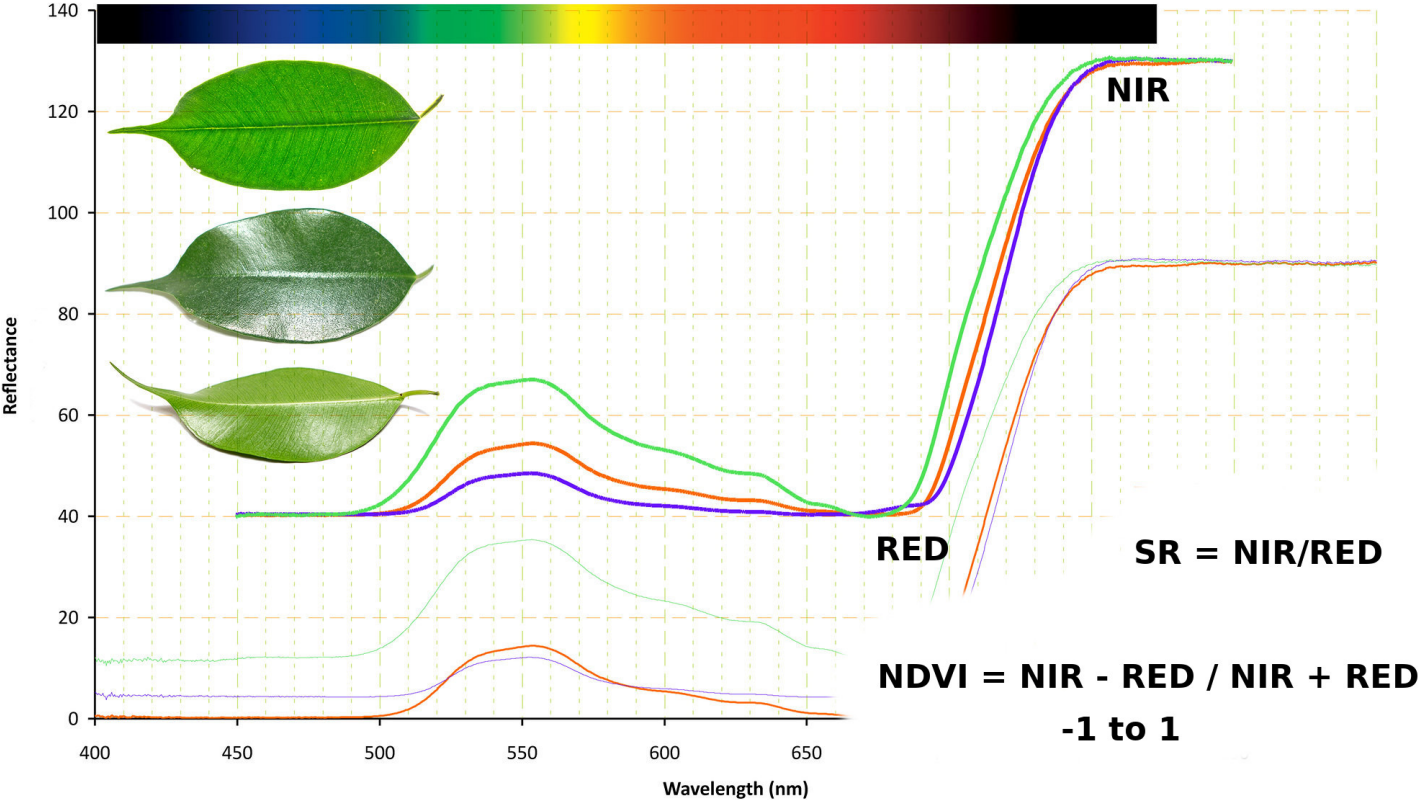
Se calcula bajo el criterio de que la vegetación fotosintéticamente activa tiene máxima absorción de la radiación en el canal rojo debido a los pigmentos de clorofila, y tiene reflectividad máxima en el infrarrojo cercano debido a la estructura celular de la hoja



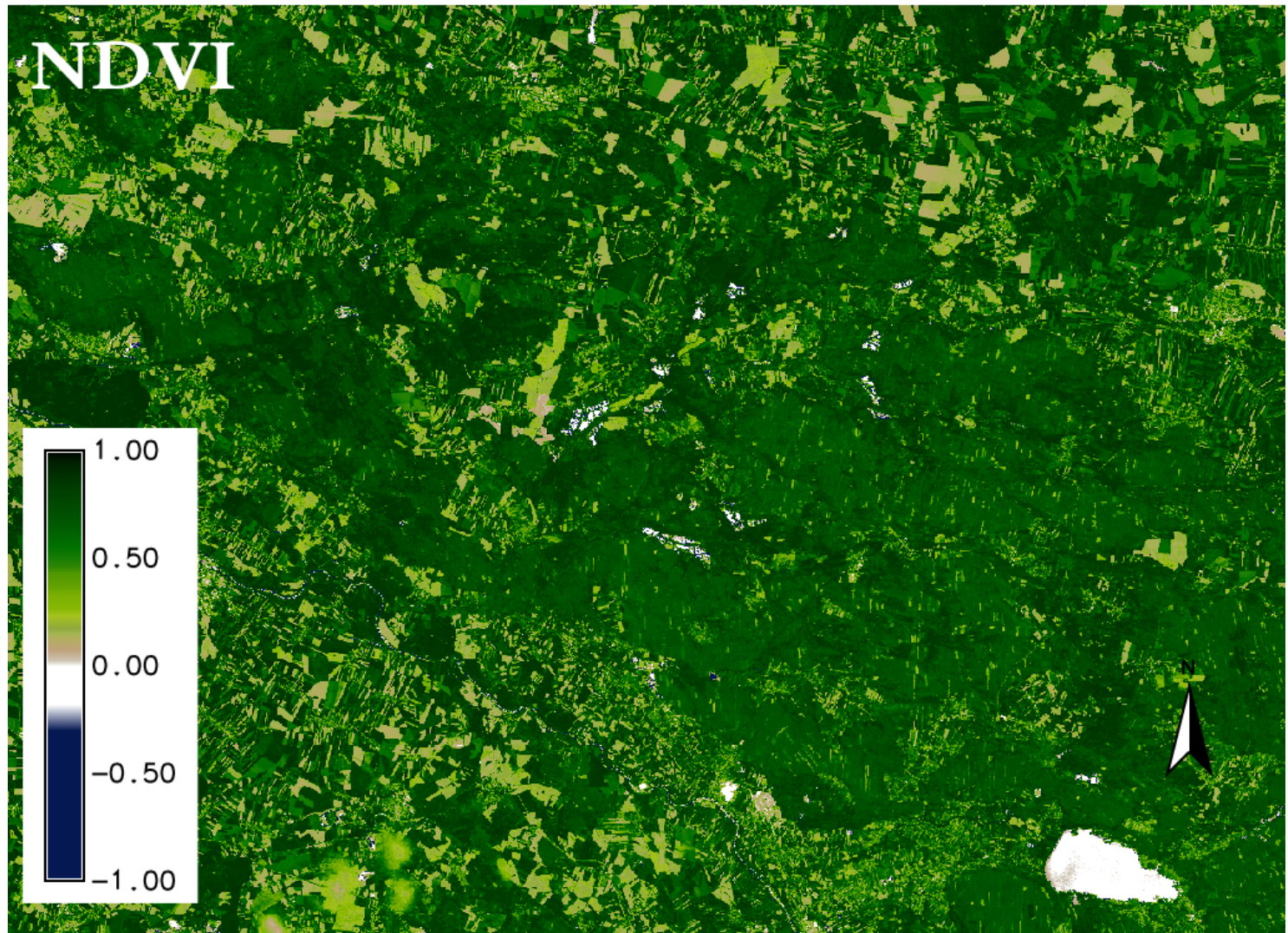
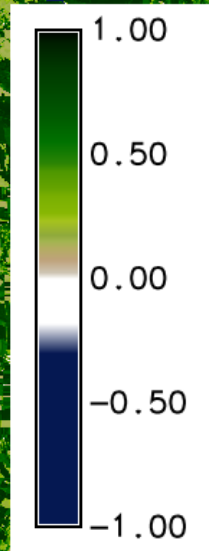
Ficus leaf, reflectance and transmission; RAEF; 12 February 2016

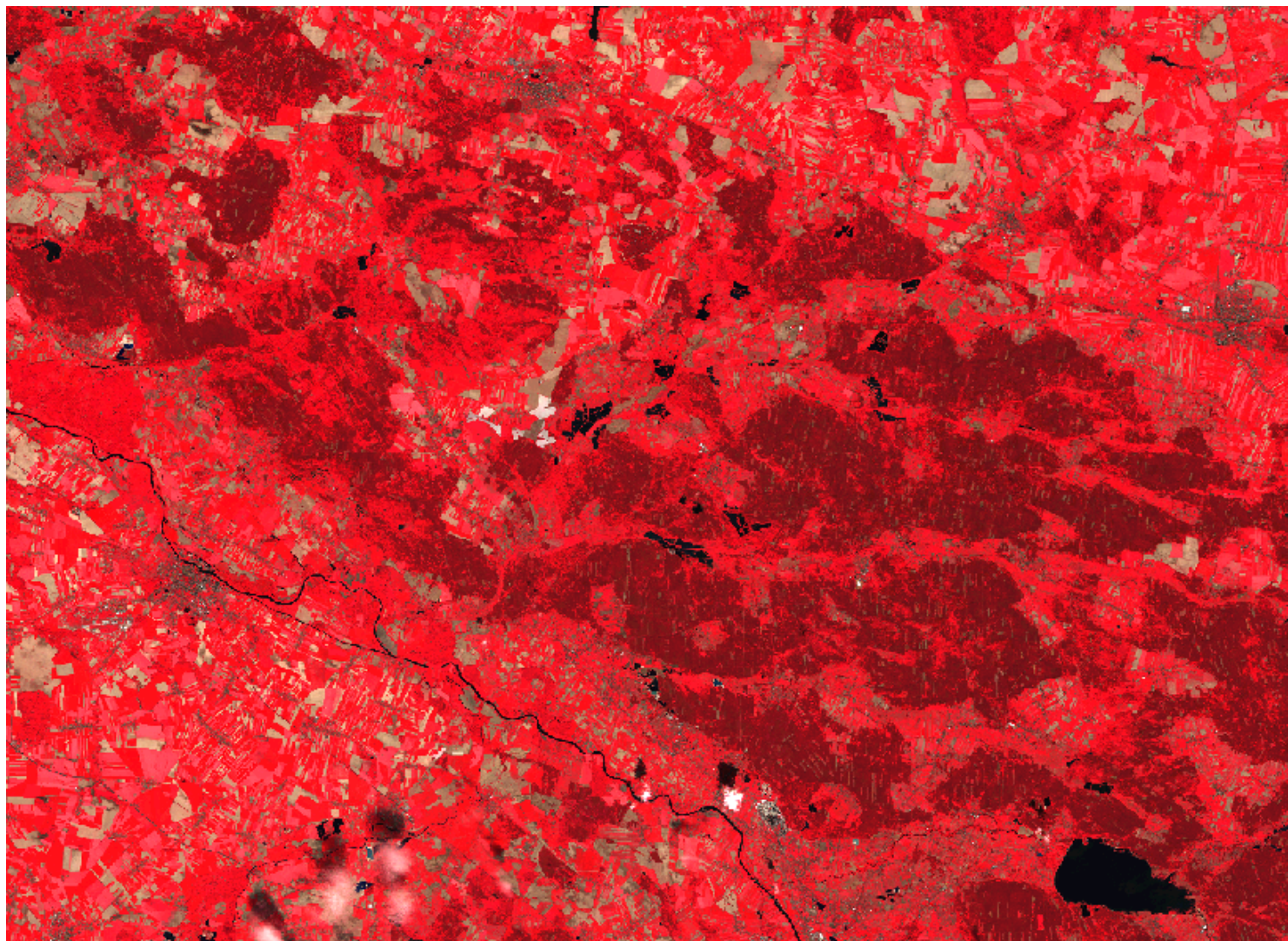


Ficus leaf, reflectance and transmission; RAEF; 12 February 2016

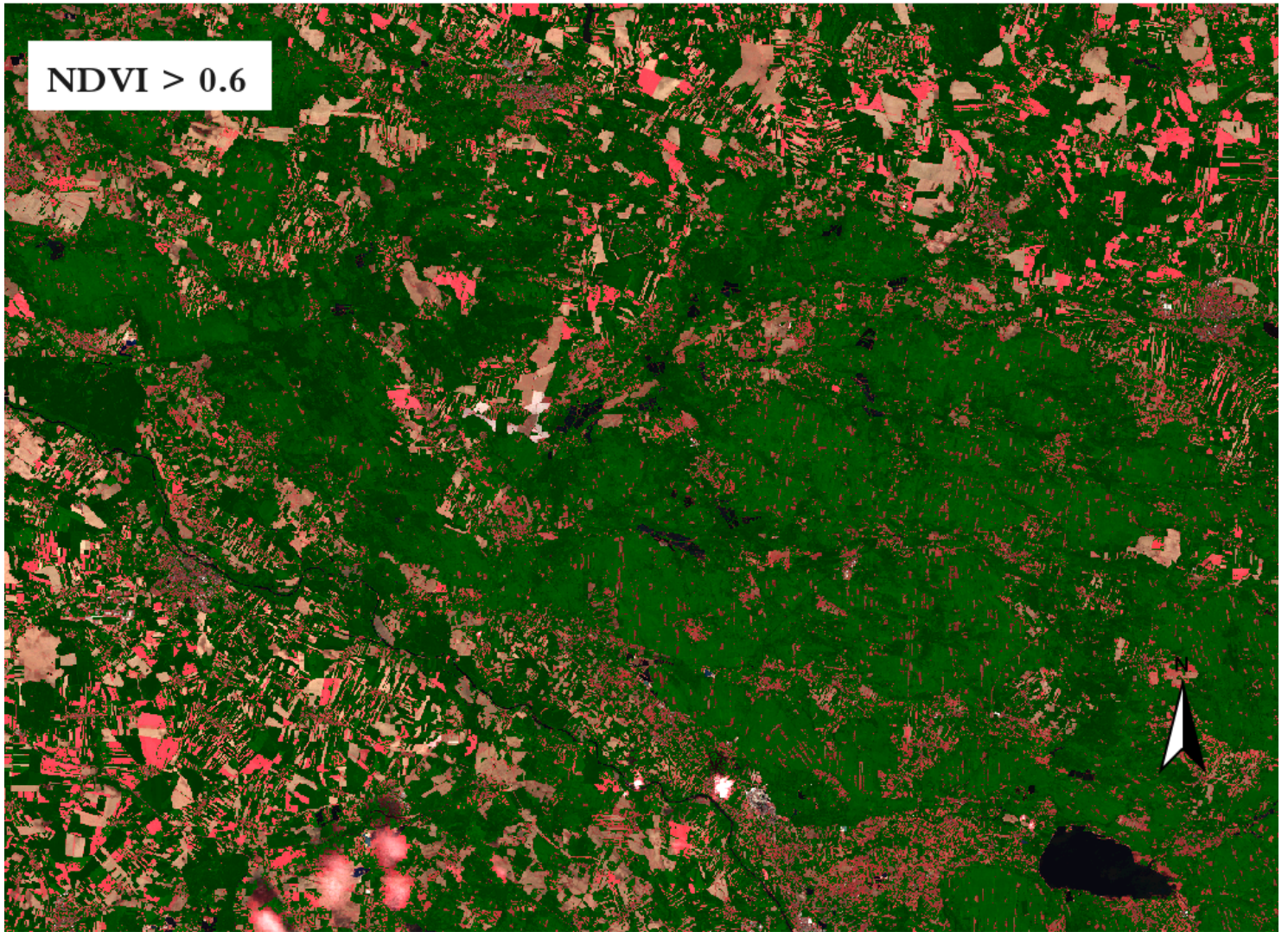


NDVI

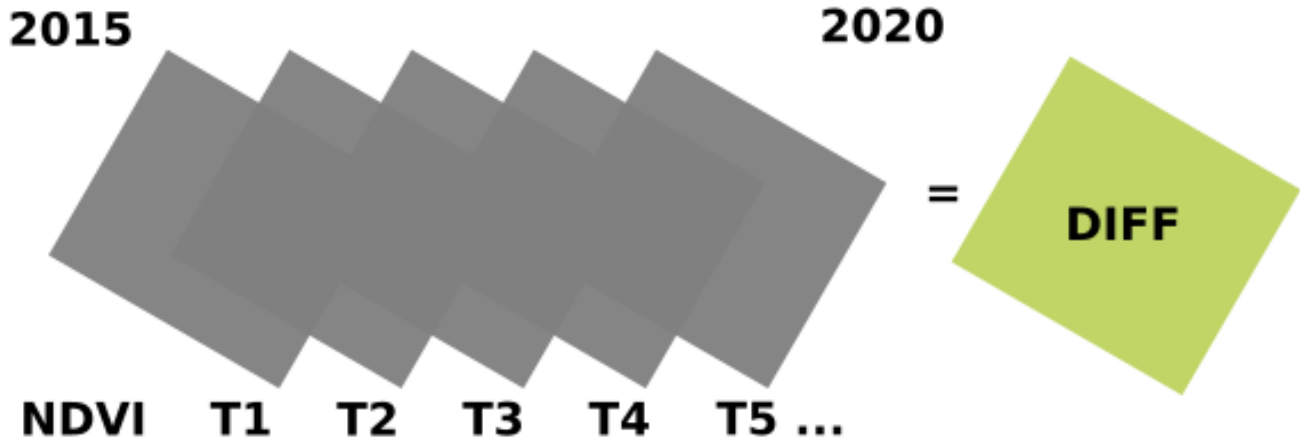




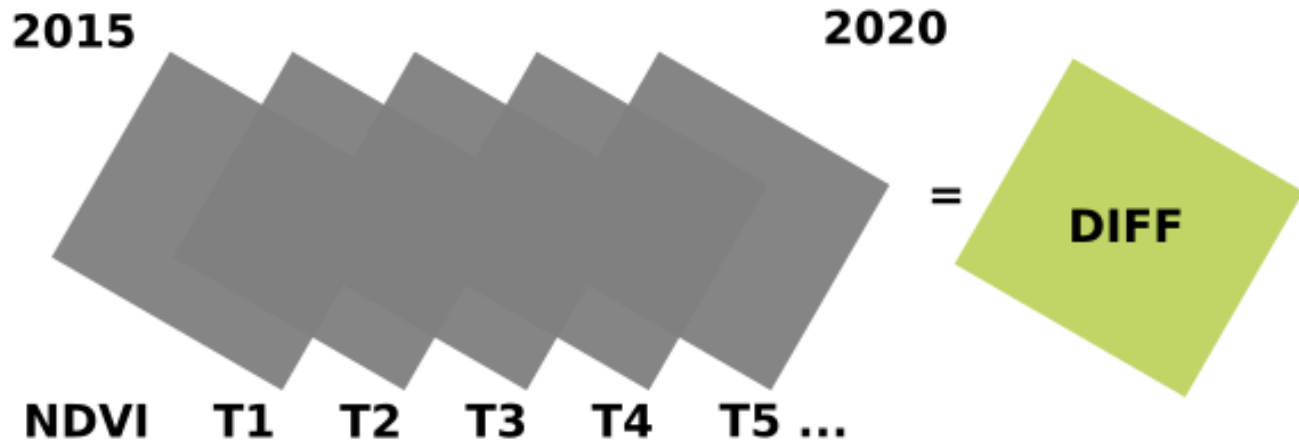
NDVI > 0.6



Estudio multitemporal



Estudio multitemporal



"Estudio multitemporal de la dinámica de la vegetación de la cuenca x para el periodo 2015-2020 con imágenes Sentinel-2"



Otros índices

Indices

Nr.	Name	Specific Formula	Calculated	Comment
1	Adjusted transformed soil-adjusted VI	$1.22 \frac{g-1.22s-0.03}{1.22g+5-1.22\cdot 0.03+0.08(1+1.22^2)}$	Automatic	
2	Aerosol free vegetation index 1600	$(g - 0.66 \frac{11}{g+0.6611})$	Automatic	
3	Aerosol free vegetation index 2100	$(g - 0.5 \frac{12}{g+0.5612})$	Automatic	
4	Alteration	$\frac{11}{12}$	Automatic	
5	Anthocyanin reflectance index	$\frac{1}{3} - \frac{1}{5}$	Automatic	
6	Ashburn Vegetation Index	$2.0g - 4$	Automatic	
7	Atmospherically Resistant Vegetation Index	$\frac{g-s-y(s-1)}{g+s-y(s-1)}$	Automatic	
8	Atmospherically Resistant Vegetation Index 2	$-0.18 + 1.17 \left(\frac{g-5}{g+5} \right)$	Automatic	
9	Blue-wide dynamic range vegetation index	$\frac{0.1g-1}{0.1g+1}$	Automatic	
10	Browning Reflectance Index	$\frac{\frac{1}{3} - \frac{1}{5}}{g}$	Automatic	
11	Canopy Chlorophyll Content Index	$\frac{\frac{g-5}{g+5}}{\frac{g-Red}{g+Red}}$	Automatic	
12	Chlorophyll Absorption Ratio Index	$\left(\frac{5}{4} \right) \frac{\sqrt{\left(\frac{5-s}{150} \cdot 670 + 4 + \left(3 - \left(\frac{5-s}{150} \cdot 550 \right) \right)^2 \right)}}{\left(\frac{5-s}{150^2} + 1 \right)^{0.5}}$	Automatic	
13	Chlorophyll Absorption Ratio Index 2	$\left(\frac{\left \left(\frac{5-s}{150} \cdot 4 + 4 + 3 - (a \cdot 3) \right) \right }{(a^2+1)^{0.5}} \right) \left(\frac{5}{4} \right)$	Automatic	
14	Chlorophyll Green	$\left(\frac{2}{3} \right)^{(-1)}$	Automatic	
15	Chlorophyll Index Green	$\frac{g}{3} - 1$	Automatic	
16	Chlorophyll IndexRedEdge	$\frac{g}{5} - 1$	Automatic	
17	Chlorophyll Red-Edge	$\left(\frac{2}{5} \right)^{(-1)}$	Automatic	

Source:

<https://www.indexdatabase.de/>

Multitemporal



1



2



3



4



5



6



Muestreo



1 / Table points_filtered

Attribute data - right-click to edit/manage records

cat	X_92	Y_92	WATER_LEVE	LITHOLOGYC	SIG_INDEX	SUM_CLAY_S	N2_C	SUM_ACIDIT	INDEX_ACID
1	558207.0935	328407.6851	180	1	7	51.23	0.00132	64.7304	1.264
2	558430.4118	327172.1035	110	1	17	0	0.0059	181.5665	1.82
3	558649.5554	326009.3068	130	1	16	64.97	0.01309	103.6777	1.596
4	555436.3101	325586.8875	130	1	11	45.44	0.00744	95.5345	2.102
5	555770.4867	325965.4548	130	1	13	31.59	0.01753	83.3331	2.638
6	556217.169	327175.7536	180	1	9	51.41	0.00197	46.2649	0.9
7	552025.6731	326275.6859	170	1	9	62.87	0.00291	115.8168	1.842
8	552566.717	326391.6276	110	1	10	81.69	0.00119	108.8728	1.333
9	552536.9049	325519.4848	40	1	28	0	0.0138	75.3199	0.75

SQL Query

Simple Builder

SELECT * FROM points_filtered WHERE

cat

=

Apply

Browse data Manage tables Manage layers

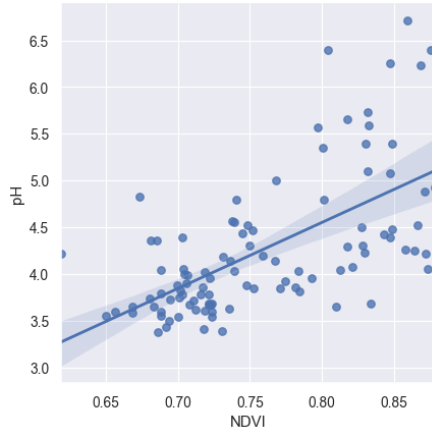
Clear

Refresh

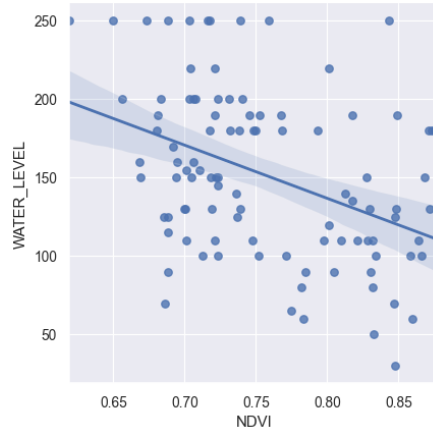
Close

Number of loaded records: 99

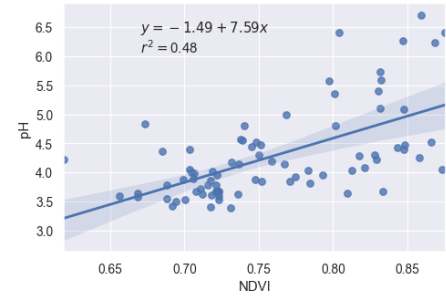
Modelo



1



2



3



Limitaciones

- Presencia de nubes
- Temporalidad
- Información de campo
- Escala de trabajo
- Modelos offside



Descarga

The screenshot displays the EO Browser interface. On the left, a sidebar contains the following elements:

- EO Browser** logo and a **Login** button.
- Navigation tabs: **Search**, **Results**, **Visualization**, and **Pins**.
- Data sources:** A list of satellite providers with checkboxes and status icons:
 - Sentinel-1 (disabled)
 - Sentinel-2 (active)
 - L1C (active)
 - L2A (disabled)
 - Sentinel-3 (active)
 - Sentinel-5P (active)
 - Landsat (active)
 - Envisat Meris (active)
 - MODIS (active)
 - Proba-V (active)
 - GIBS (active)
- Max. cloud coverage:** A slider set to 100%.
- Time range:** A date range from 2020-03-28 to 2020-04-28.
- A **Free sign up** link for all features.
- Footer text: "Powered by **Sinergise** with contributions from the European Space Agency v2.20.26".

The main map area shows a satellite view of Ecuador with city labels such as QUITO, GUAYAQUIL, AMBATO, and LATAGUNGA. A search bar at the top right contains the text "Go to Place". A vertical toolbar on the right side includes icons for home, location, layers, and other map functions. At the bottom, there are links for **About EO Browser**, **Contact Us**, and **Get data**, along with coordinates (Lat: -1.648, Lng: -79.140) and a 50 km scale bar.

Source:

<https://apps.sentinel-hub.com/eo-browser/>



Software

- QGIS
- GRASS GIS

<https://grass.osgeo.org/>

<https://qgis.org/>



Preguntas...



Contacto

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