Remote sensing

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https://www.unibo.it/sitoweb/duccio.rocchini

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Duccio Rocchini

European Commission

esa

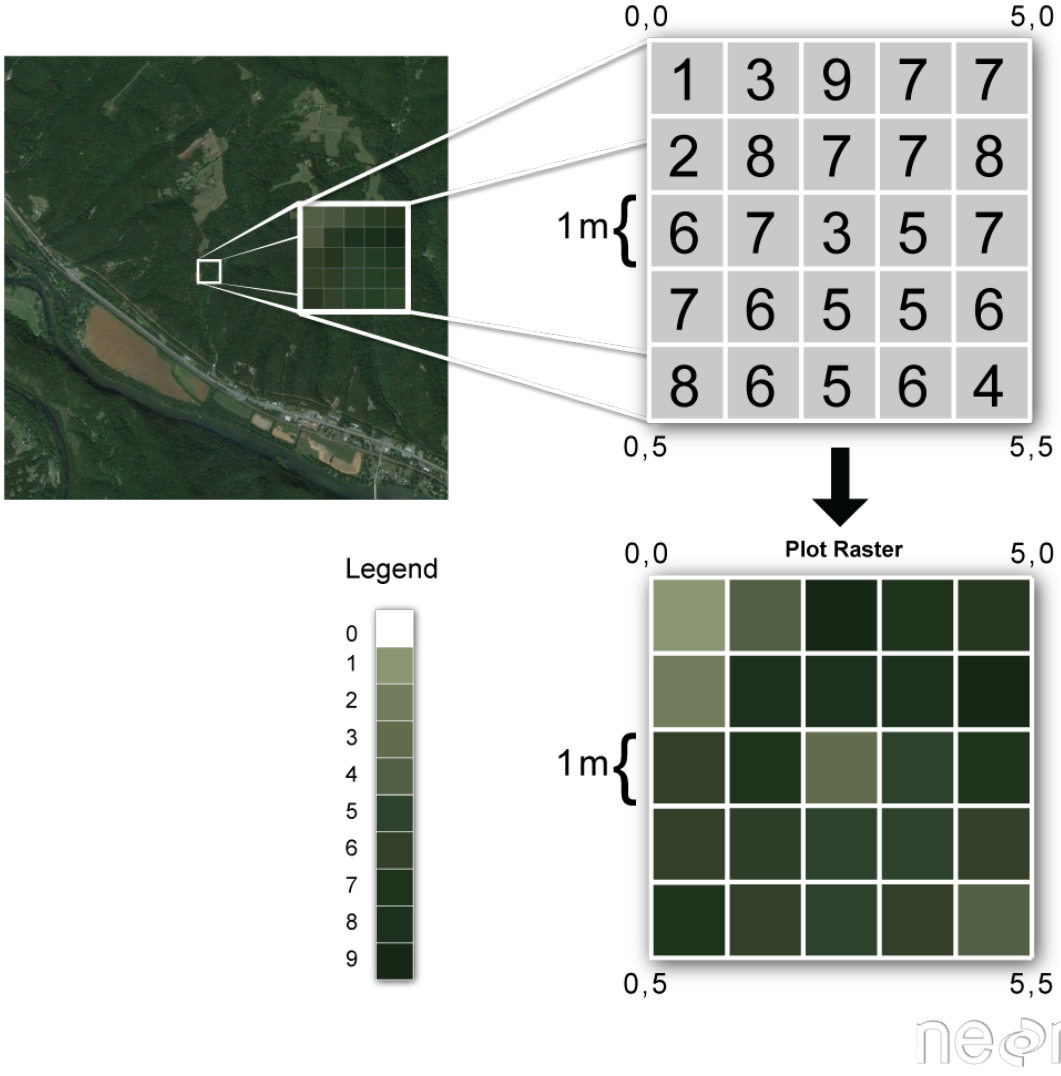
Nominated expert

by the European Commission and
the European Space Agency for the Biodiversity sector
for the development of the ESA Space program until 2030

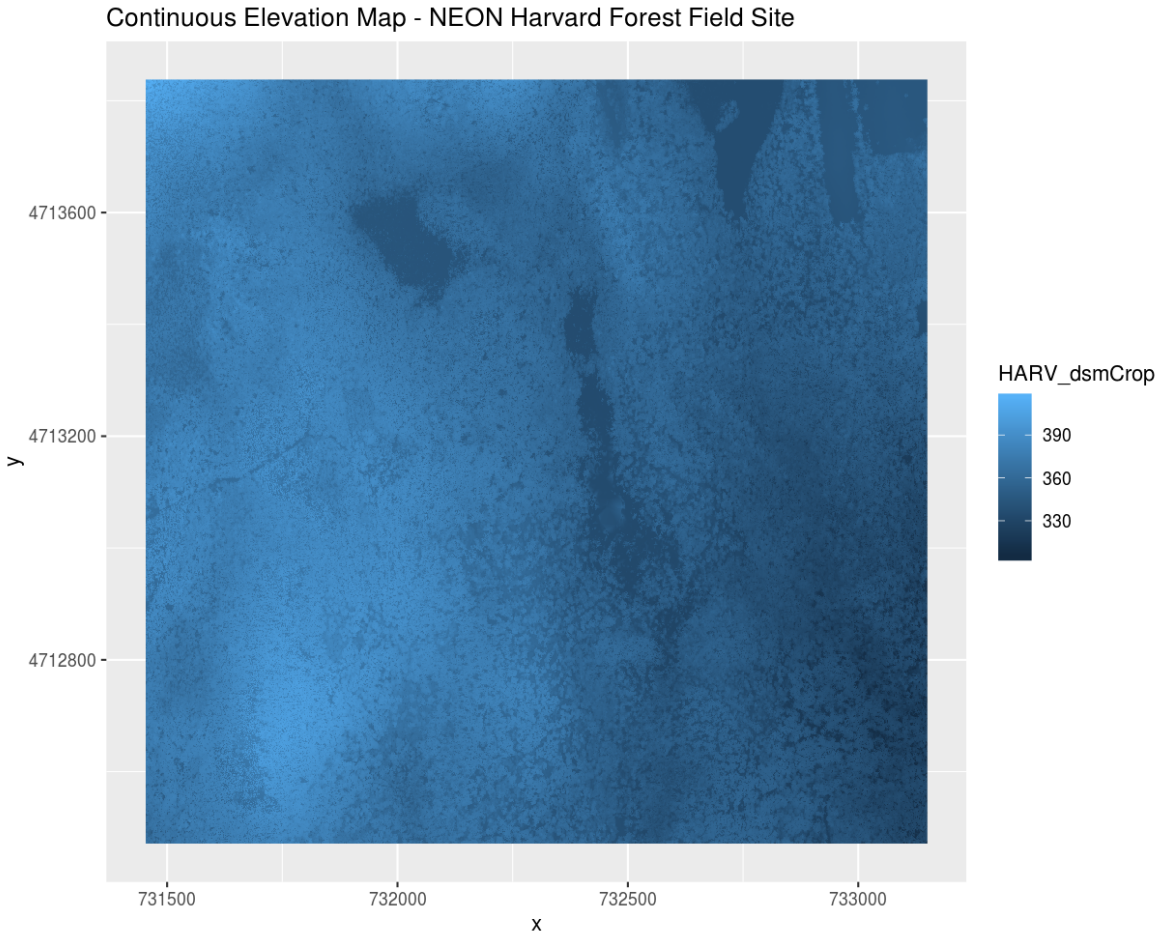
ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

Satellite images as matrices of numbers

Satellite images as matrices of numbers



Satellite images as matrices of numbers



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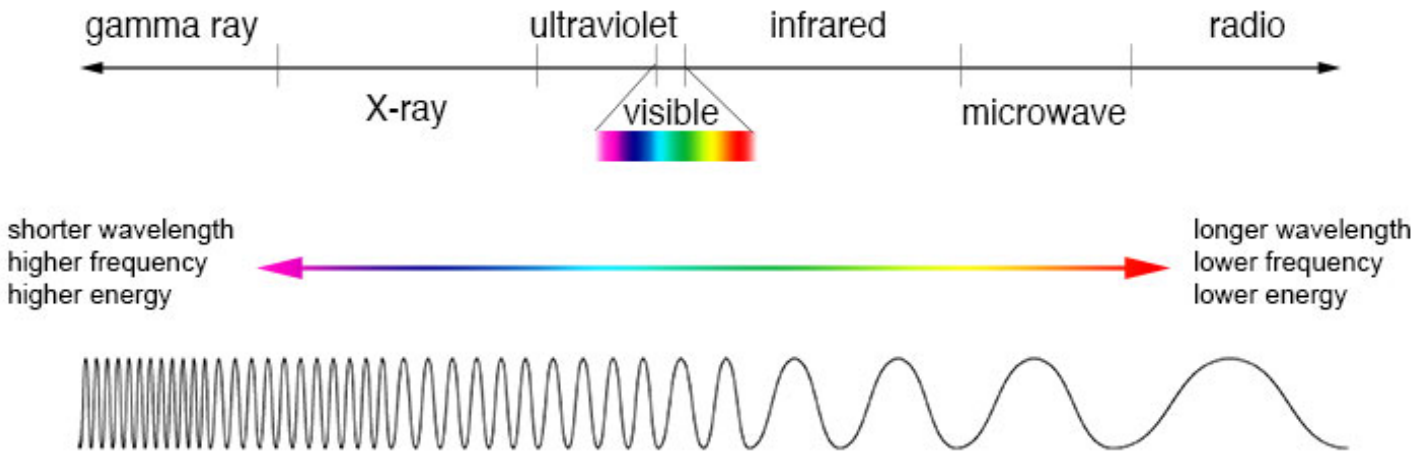

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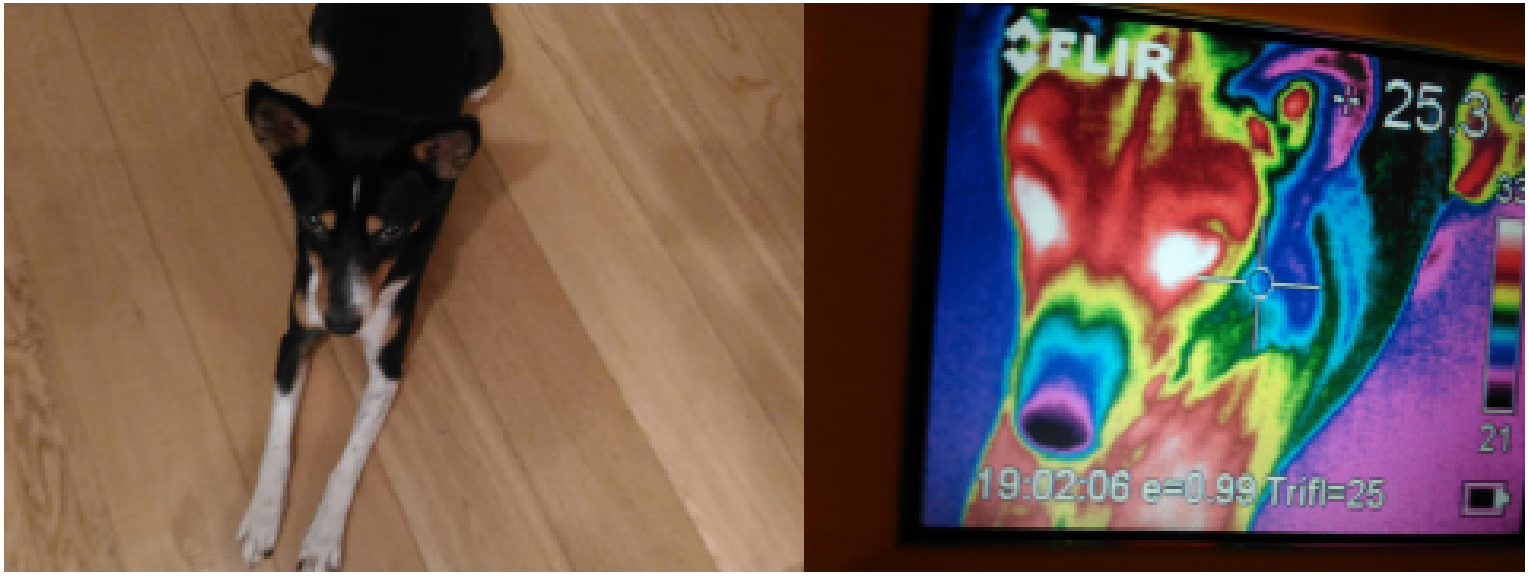

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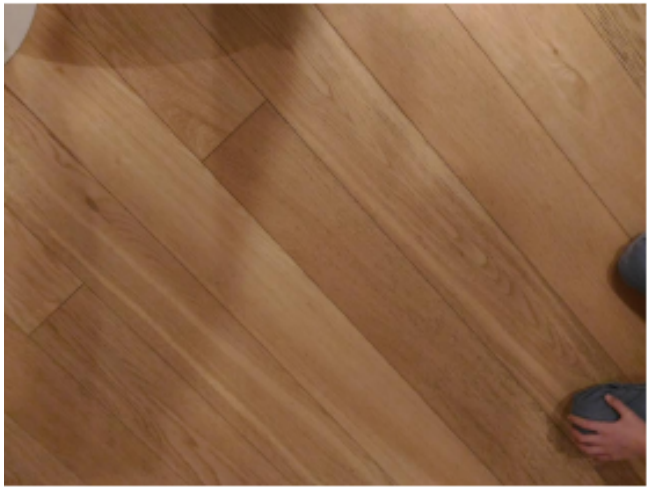
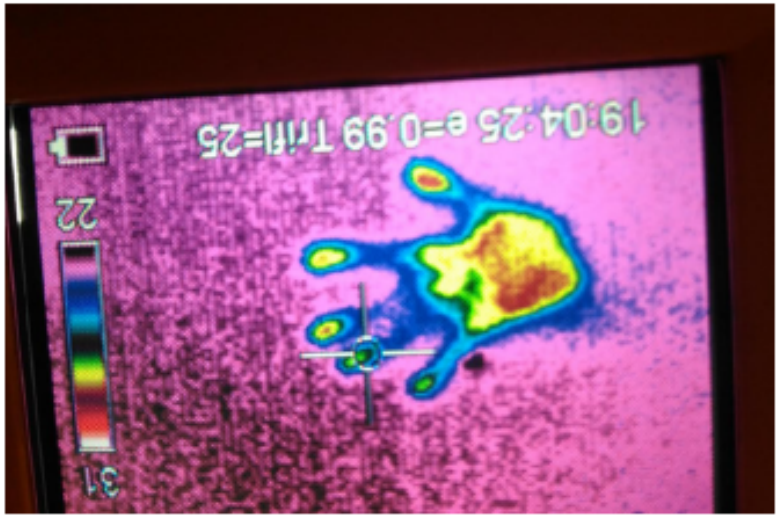
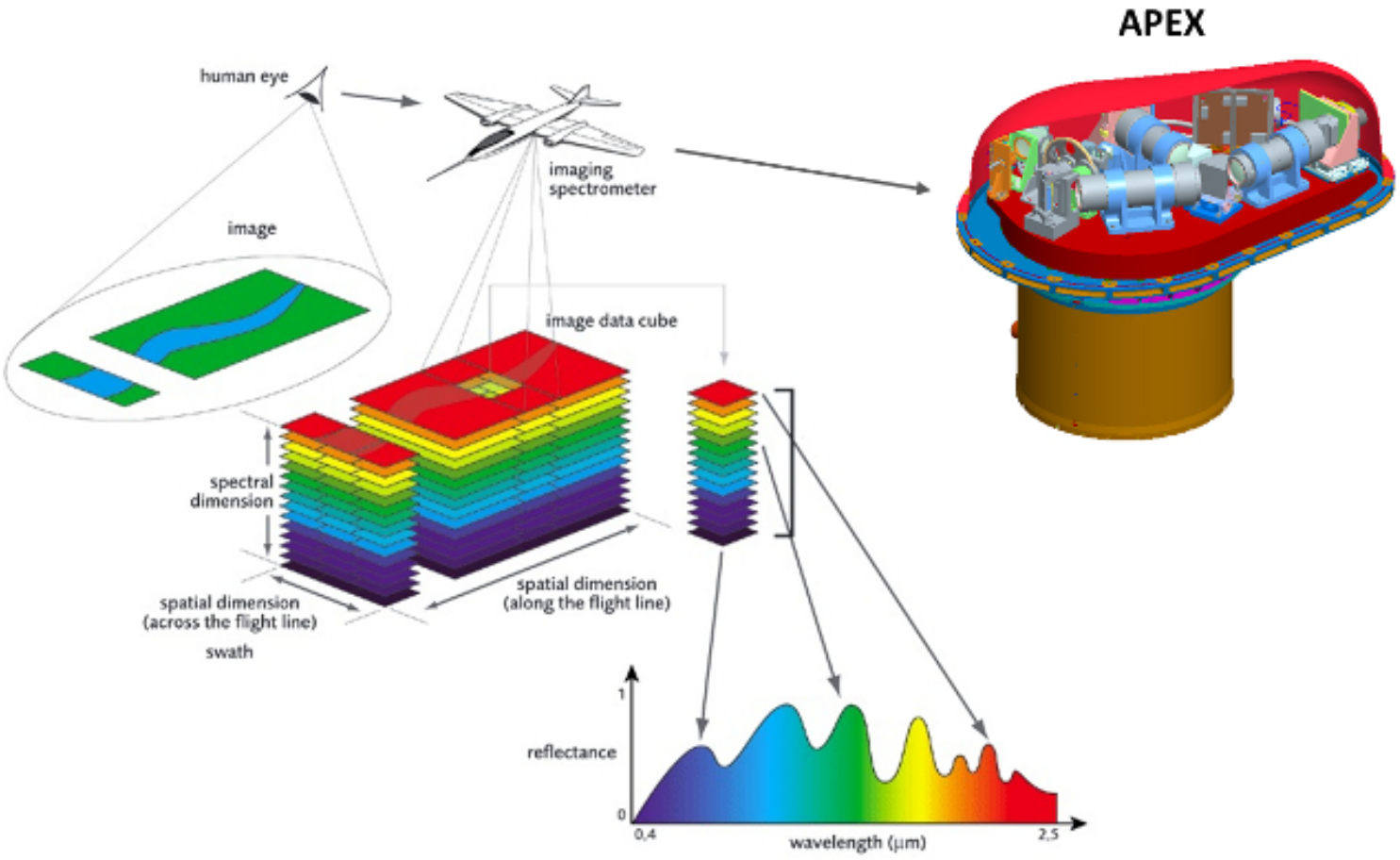




Satellite images as matrices of numbers



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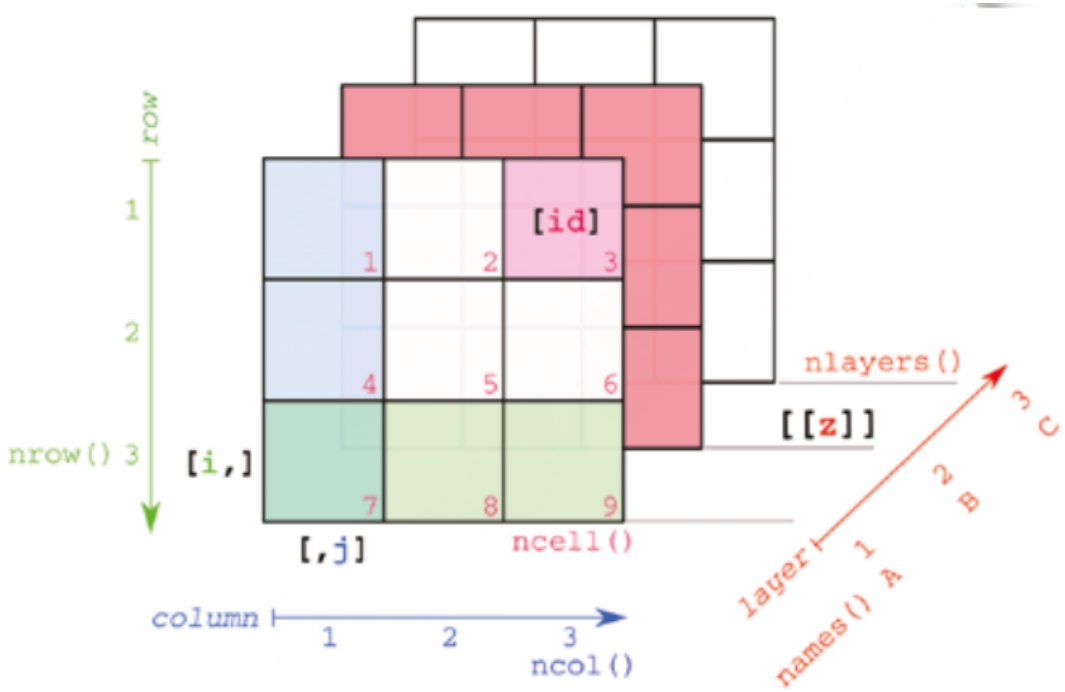

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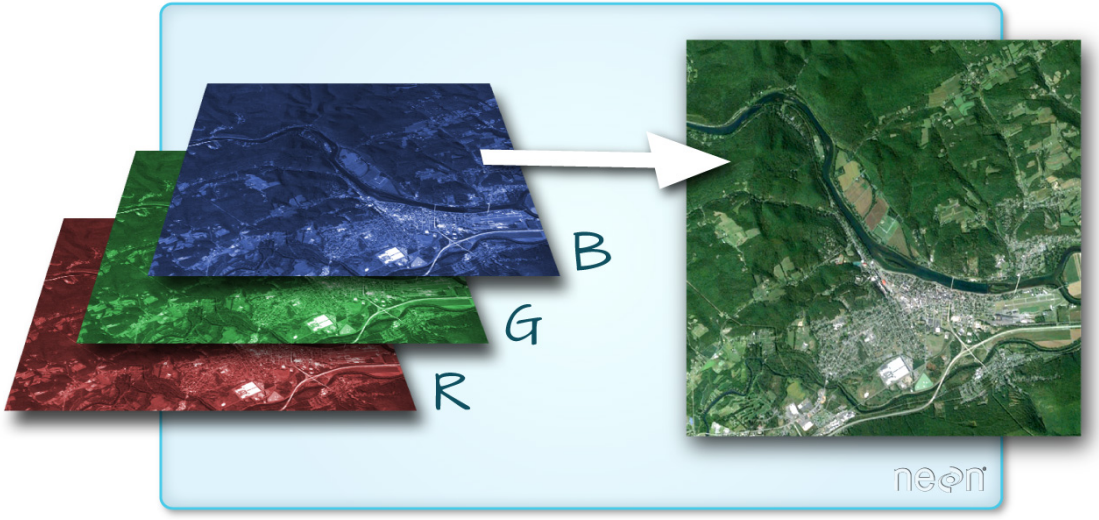
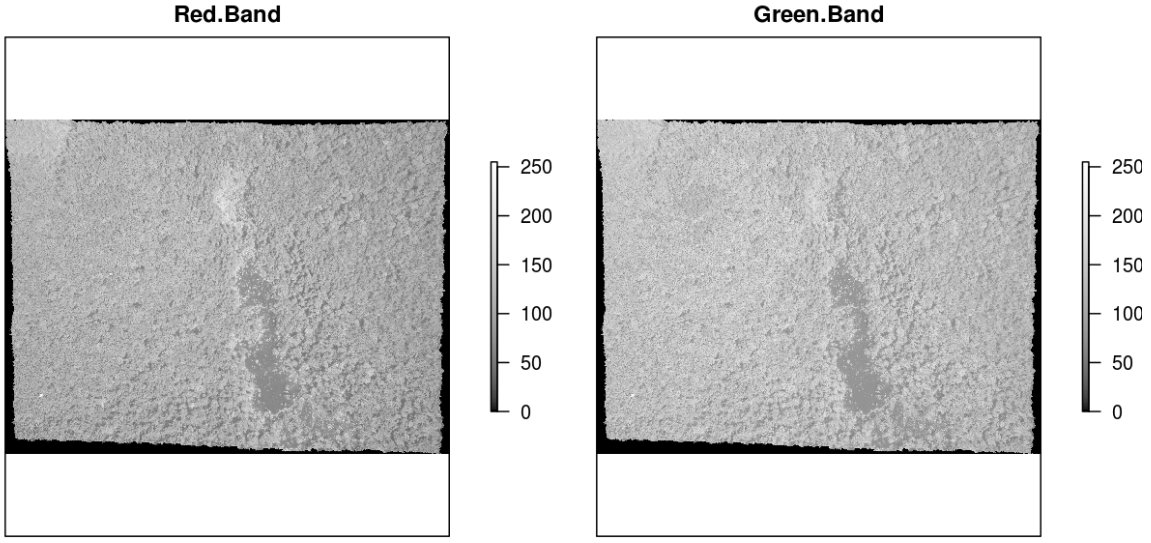
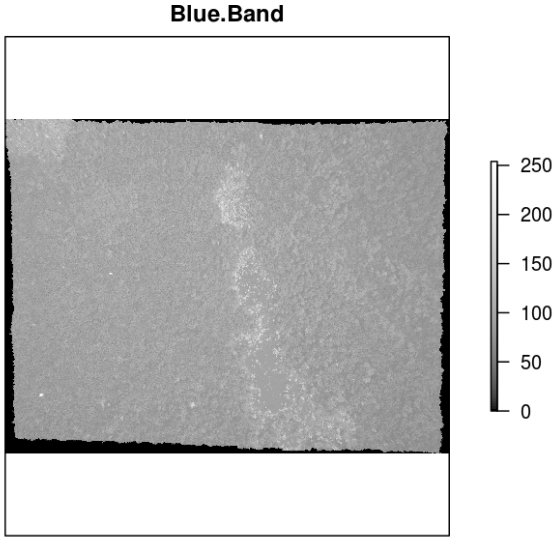


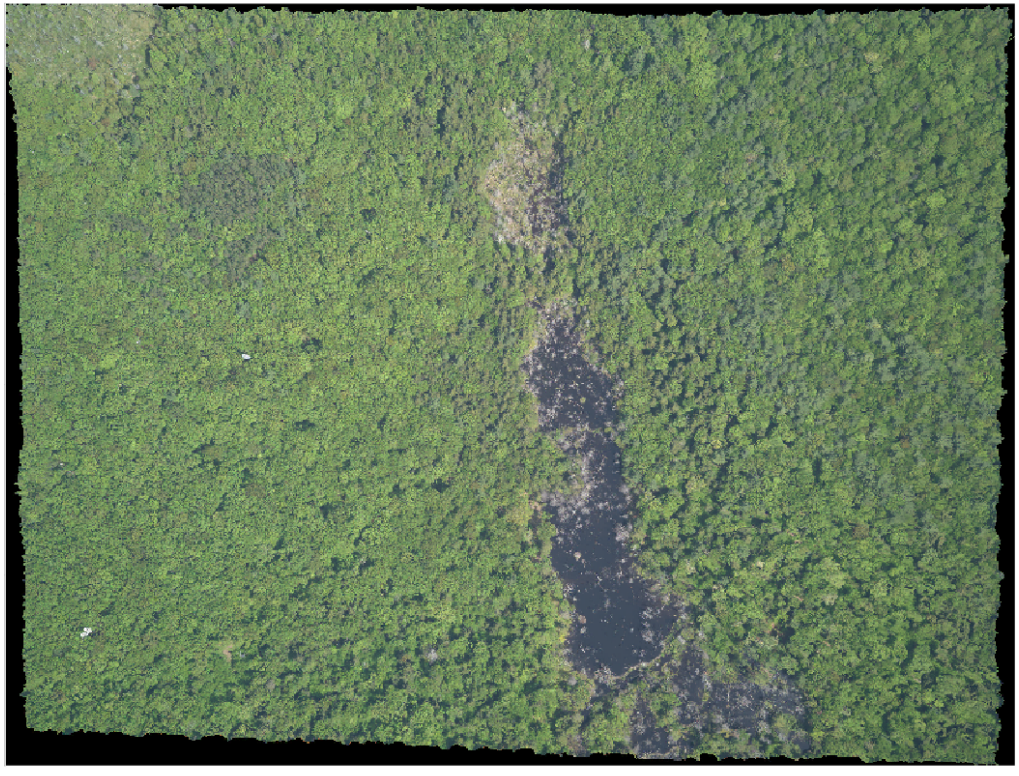
Satellite images as matrices of numbers



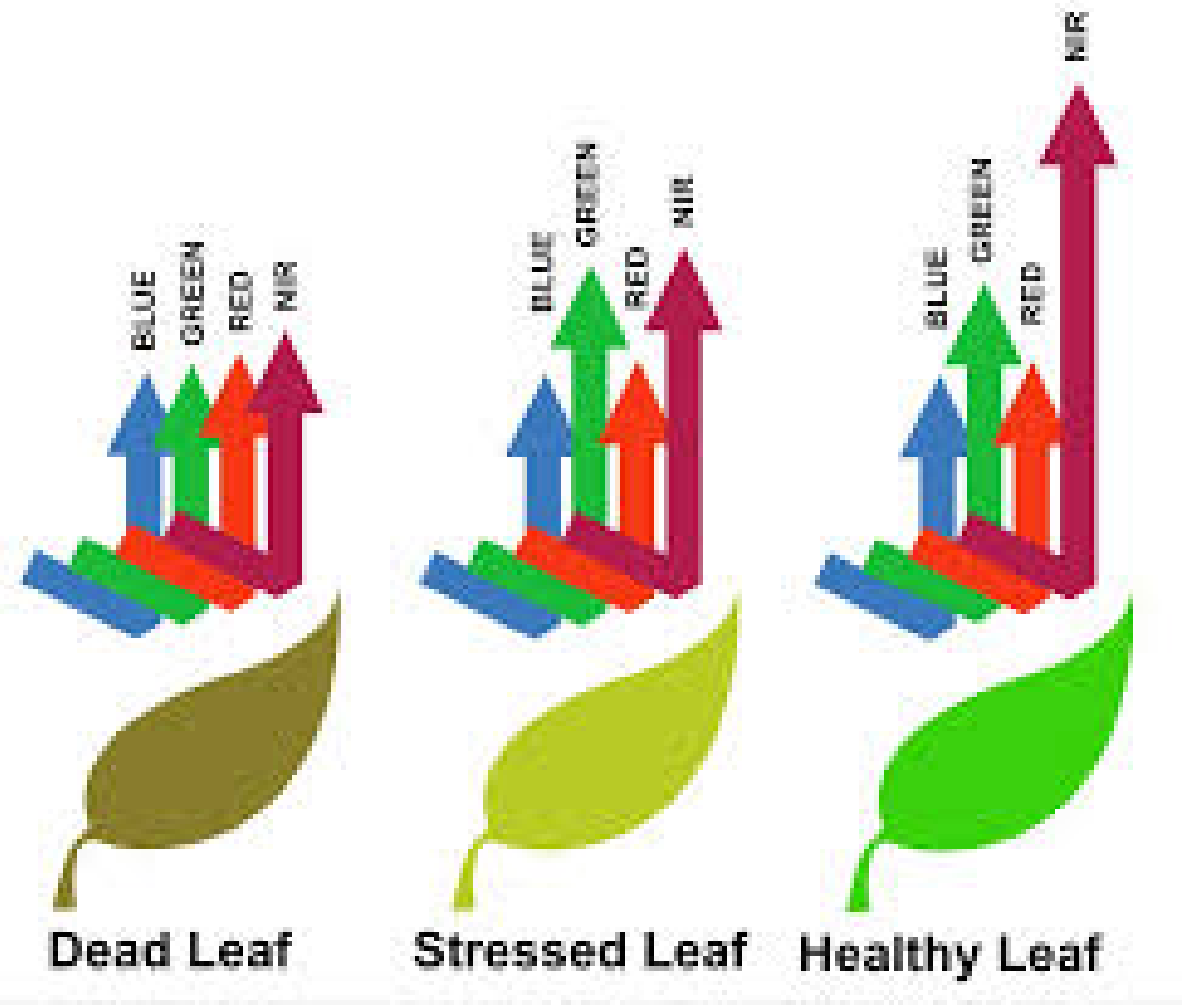


Satellite images as matrices of numbers

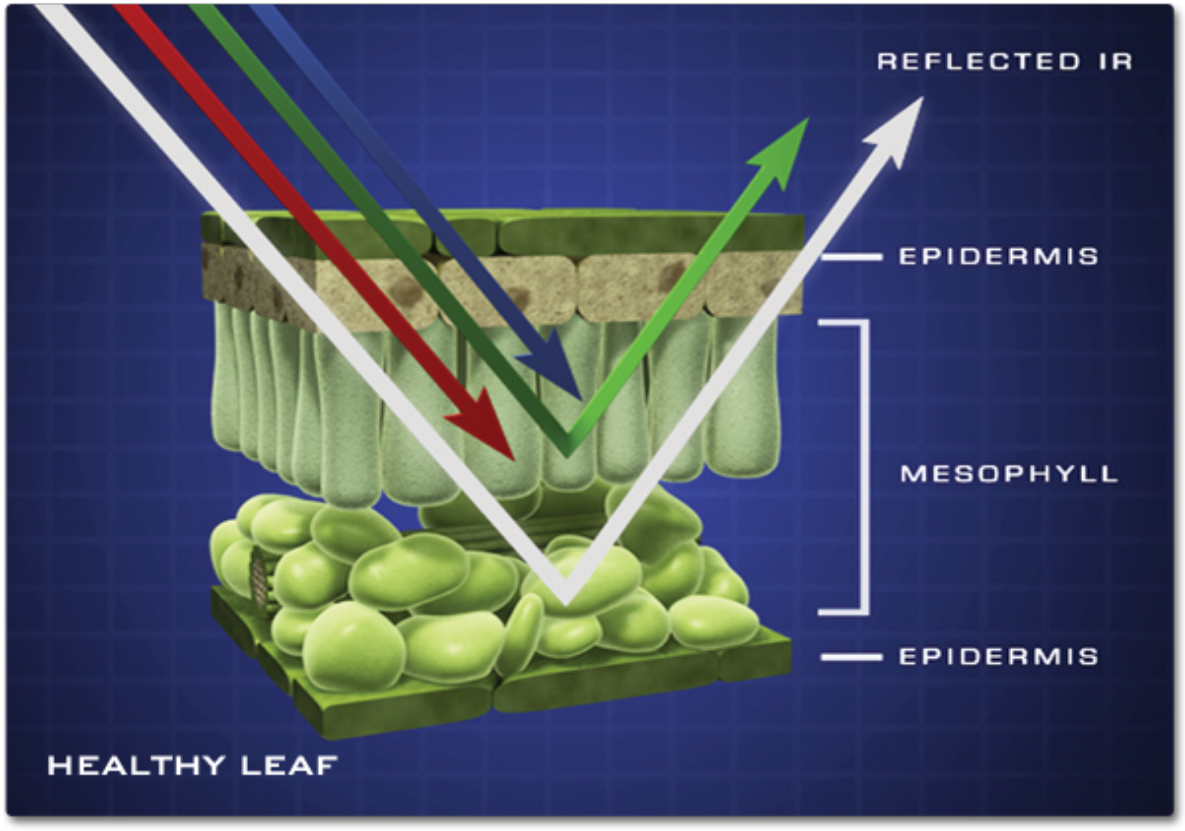
3 Band Color Composite Image
NEON Harvard Forest Field Site



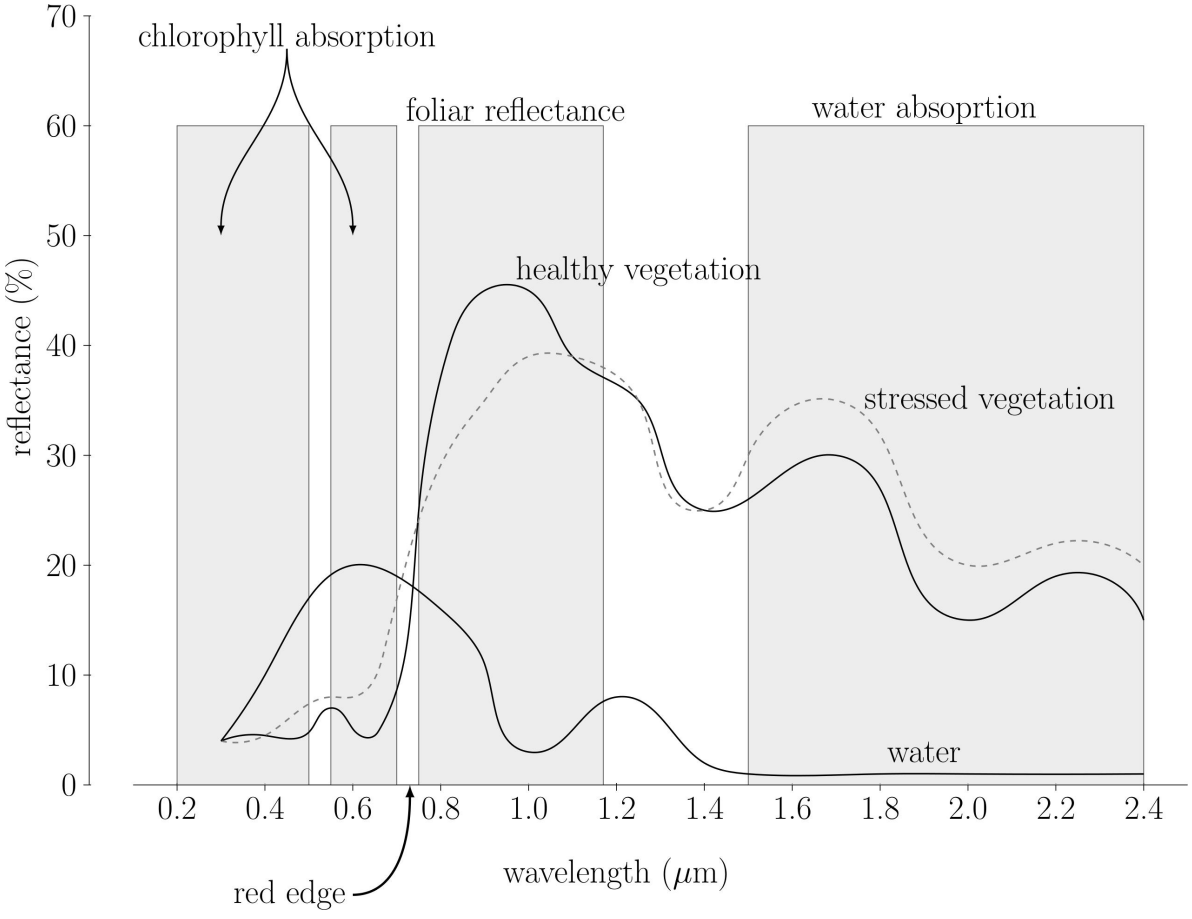
Leaves reaction to light



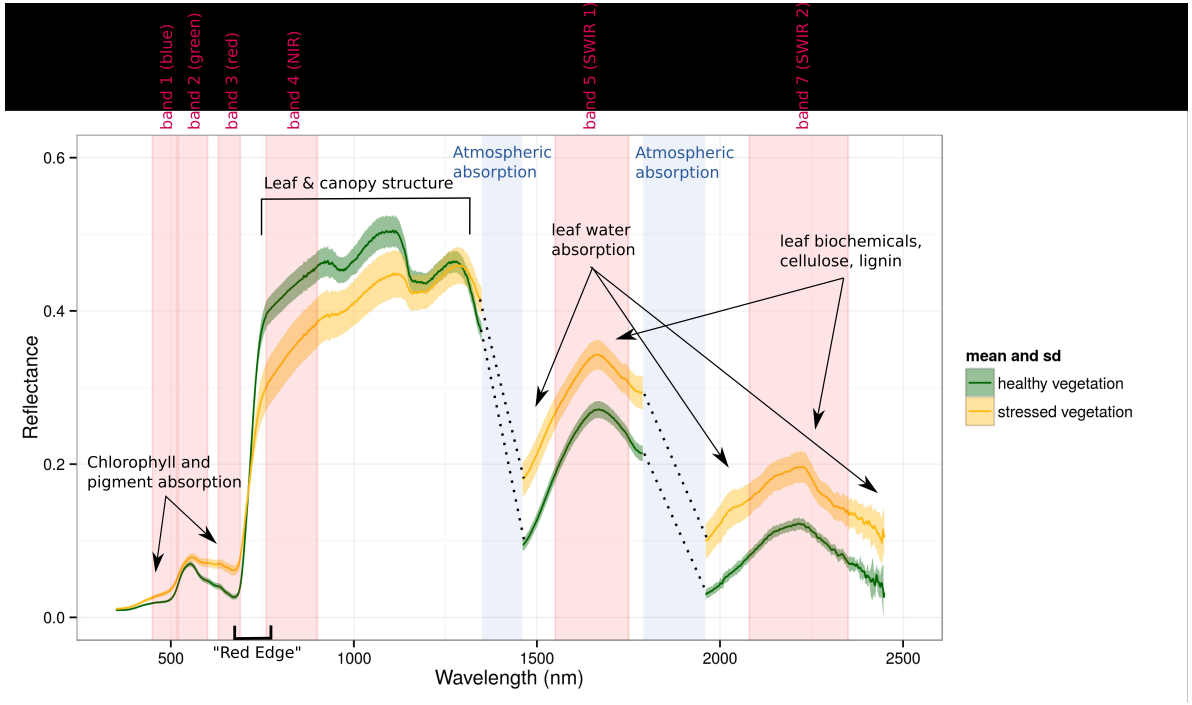
Leaves reaction to light



Spectral signatures



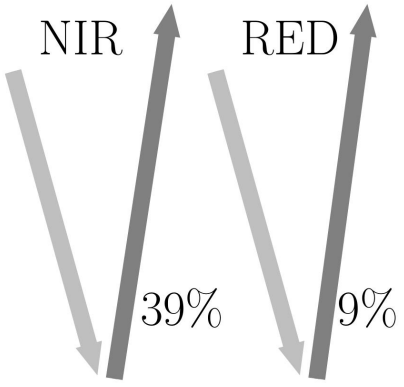
Monitoring vegetation health

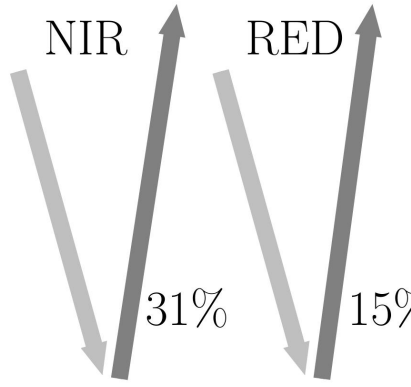


Vegetation indices

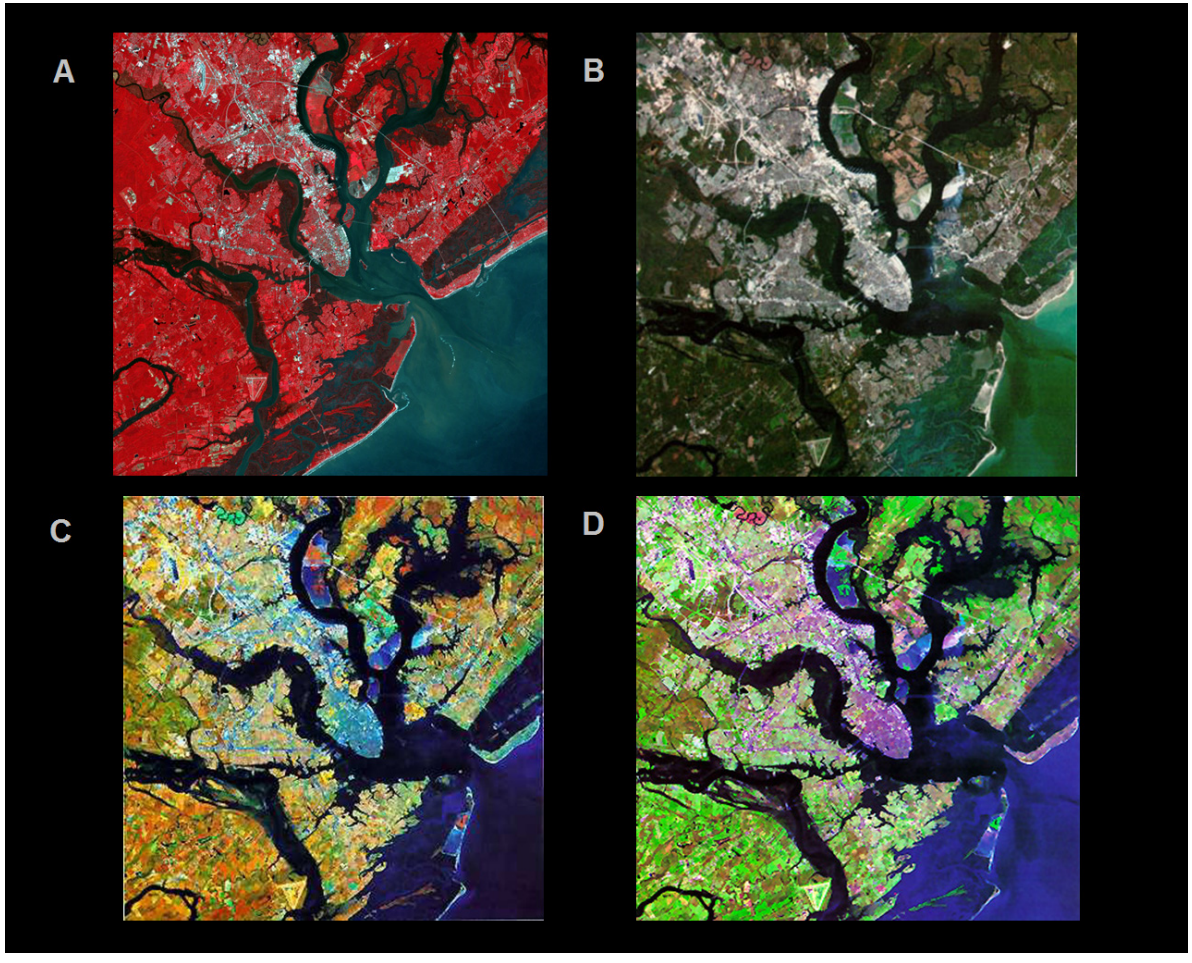
$$\frac{NIR - RED}{NIR + RED} = \textbf{NDVI}$$

$$\frac{0.39 - 0.09}{0.39 + 0.09} = \textbf{0.63} \qquad \frac{0.31 - 0.15}{0.31 + 0.15} = \textbf{0.35}$$



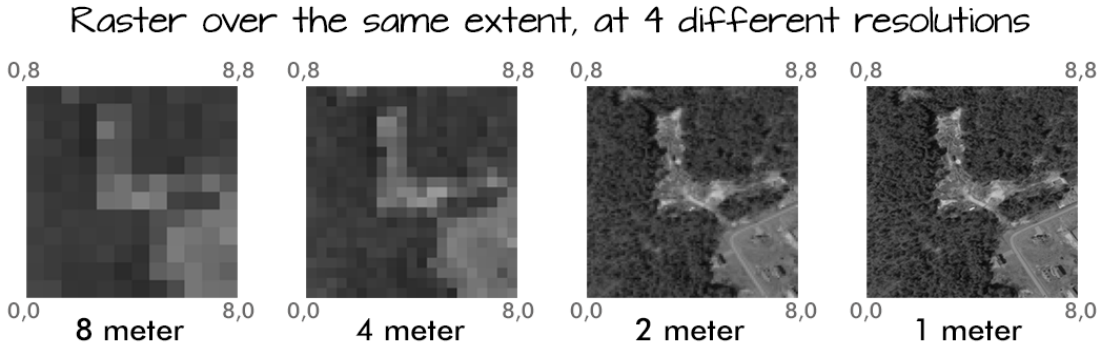


Colour composites



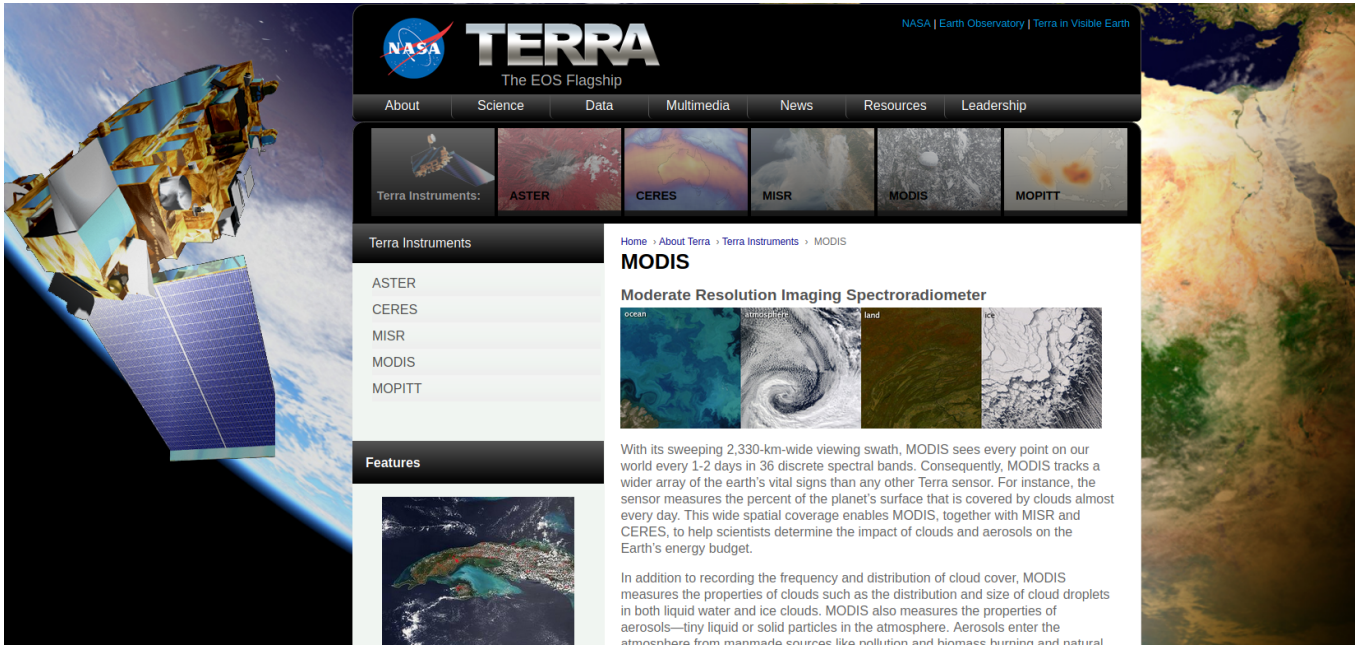
Remote sensing data

Remote sensing data



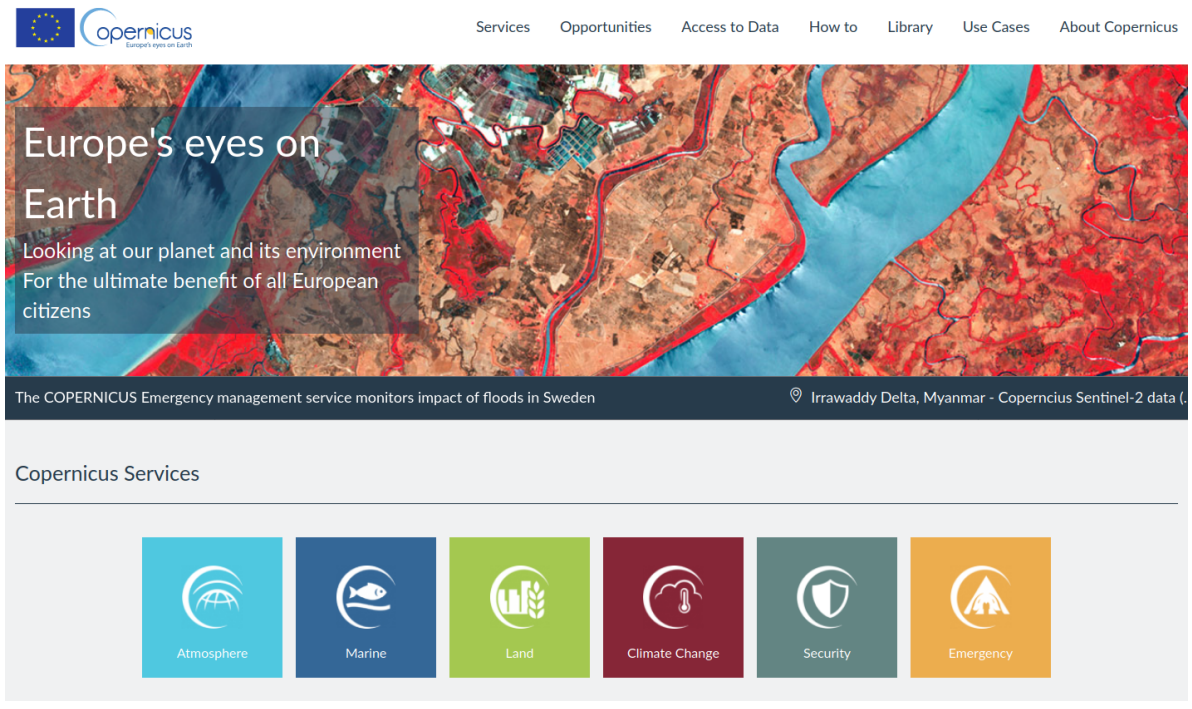
MODIS (NASA)

Moderate Resoluion Image Spetroradiometer
Minimum pixel size: 500m

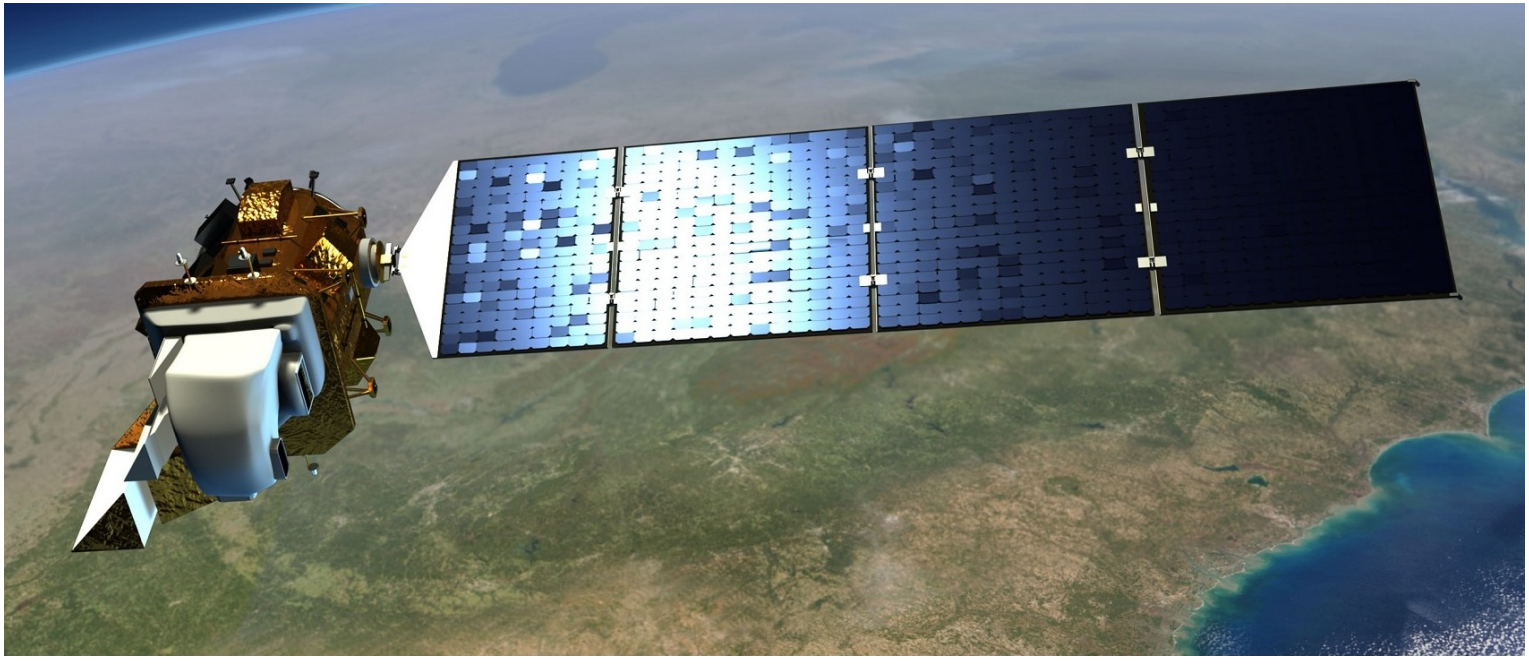


MODIS (NASA)

Moderate Resoluion Image Spetroradiometer
Maximum spatial resolution: 500m

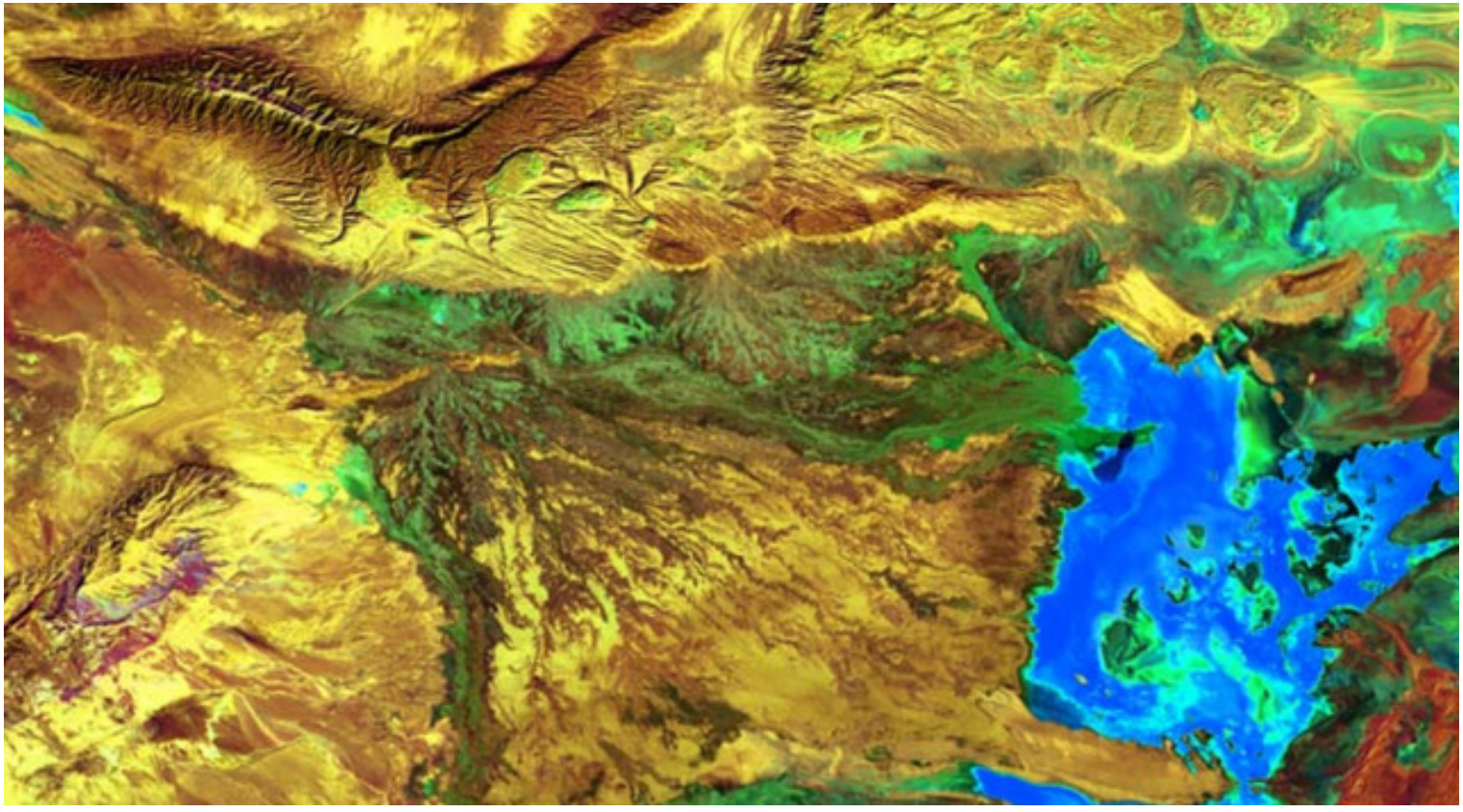


Landsat (NASA)

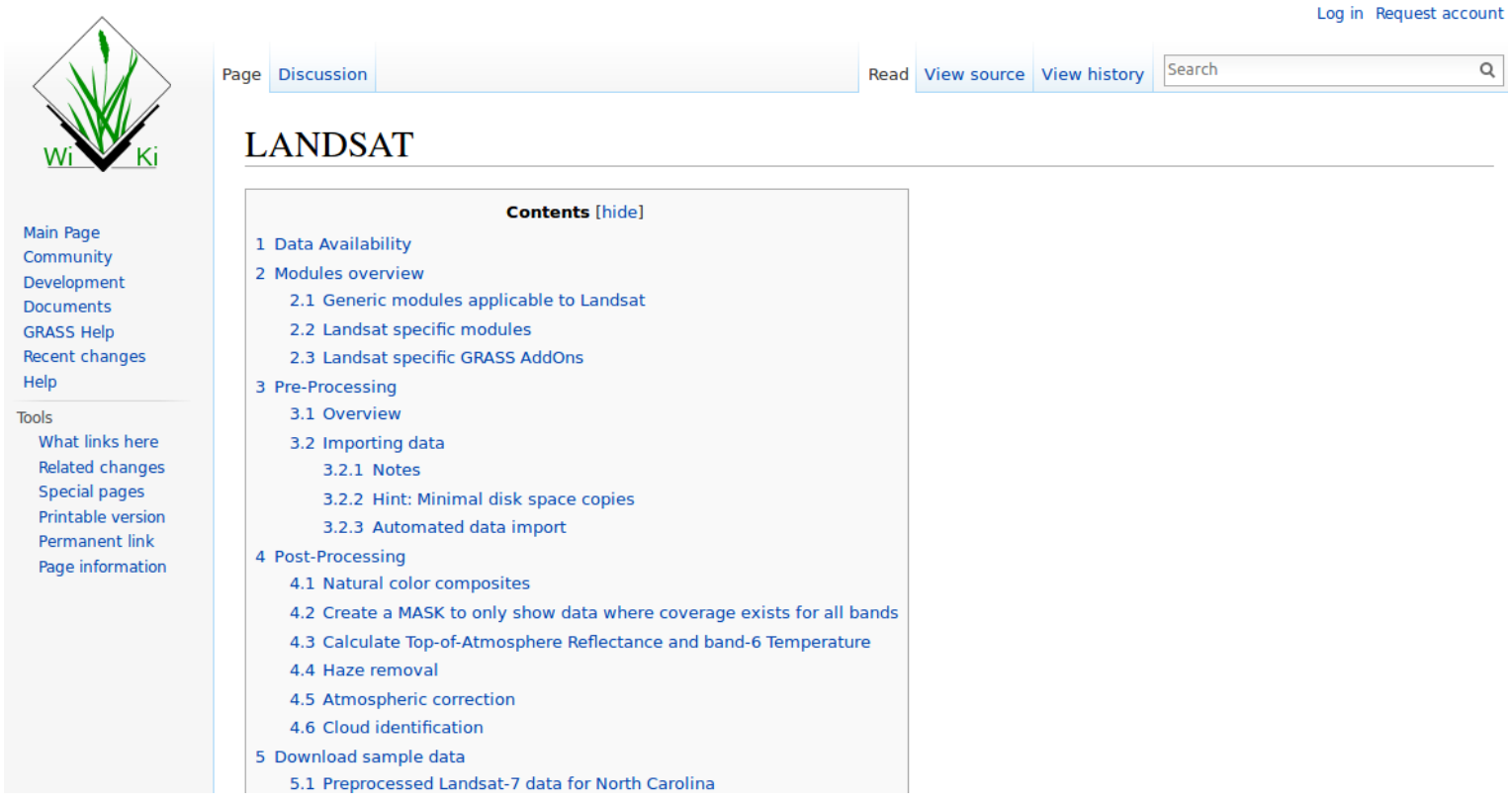


Landsat (NASA)

Spatial resolution: 30m



Landsat (NASA)



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LANDSAT

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Landsat (NASA)

Landsat (NASA)

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INFORMAZIONI UTILI A DEFINIRE STRATEGIE DI PROTEZIONE AMBIENTALE

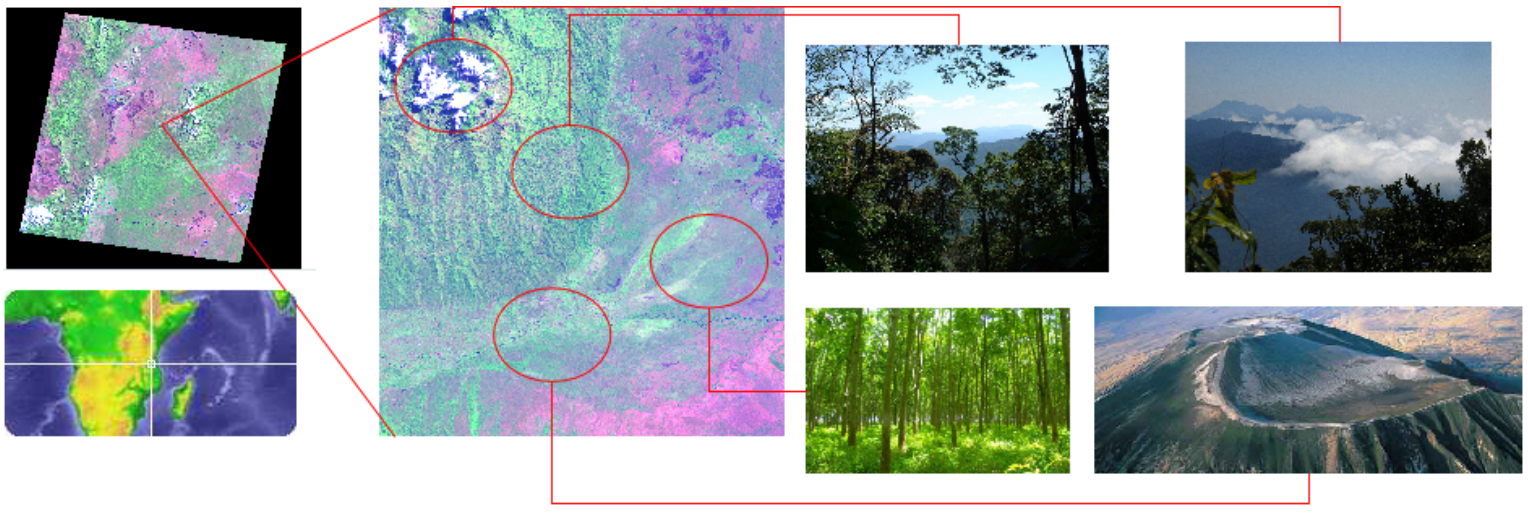
La biodiversità si controlla dal satellite

Duccio Rocchini, primo italiano premiato da fondazione Usa per il monitoraggio degli habitat dallo spazio

MILANO - Ambiente: cosa proteggere? Ce lo dice il satellite. Dalle enormi matrici numeriche provenienti dallo spazio è possibile ricavare mappe territoriali dettagliate. Queste immagini, opportunamente elaborate, possono essere utilizzate per individuare le zone a più alta biodiversità, ipotizzare l'andamento dei cambiamenti climatici e raccogliere informazioni utili a definire strategie di protezione ambientale. Ne sa qualcosa Duccio Rocchini, ricercatore della Fondazione Edmund Mach appena premiato dalla Earth and Space Foundation per essersi distinto nel campo assai specialistico della «stima della biodiversità da immagini satellitari».

TELERILEVAMENTO - Il ragionamento pare semplice. Rocchini utilizza i meccanismi propri del telerilevamento, che trasformano in pixel i dati numerici prodotti inizialmente dal satellite. Un pixel dopo l'altro viene composta la «fotografia» del territorio, che può essere ripreso anche con lunghezze

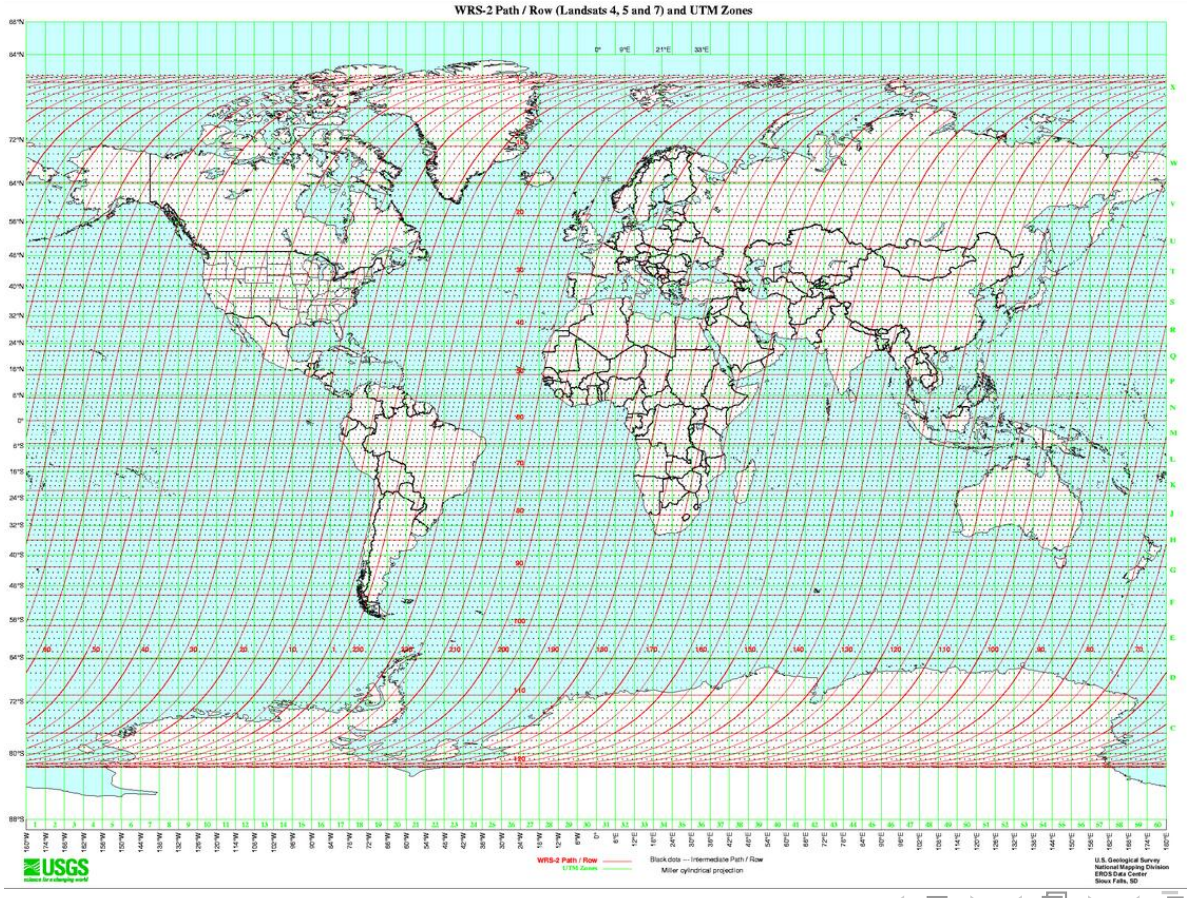
Landsat (NASA)



Landsat (NASA)

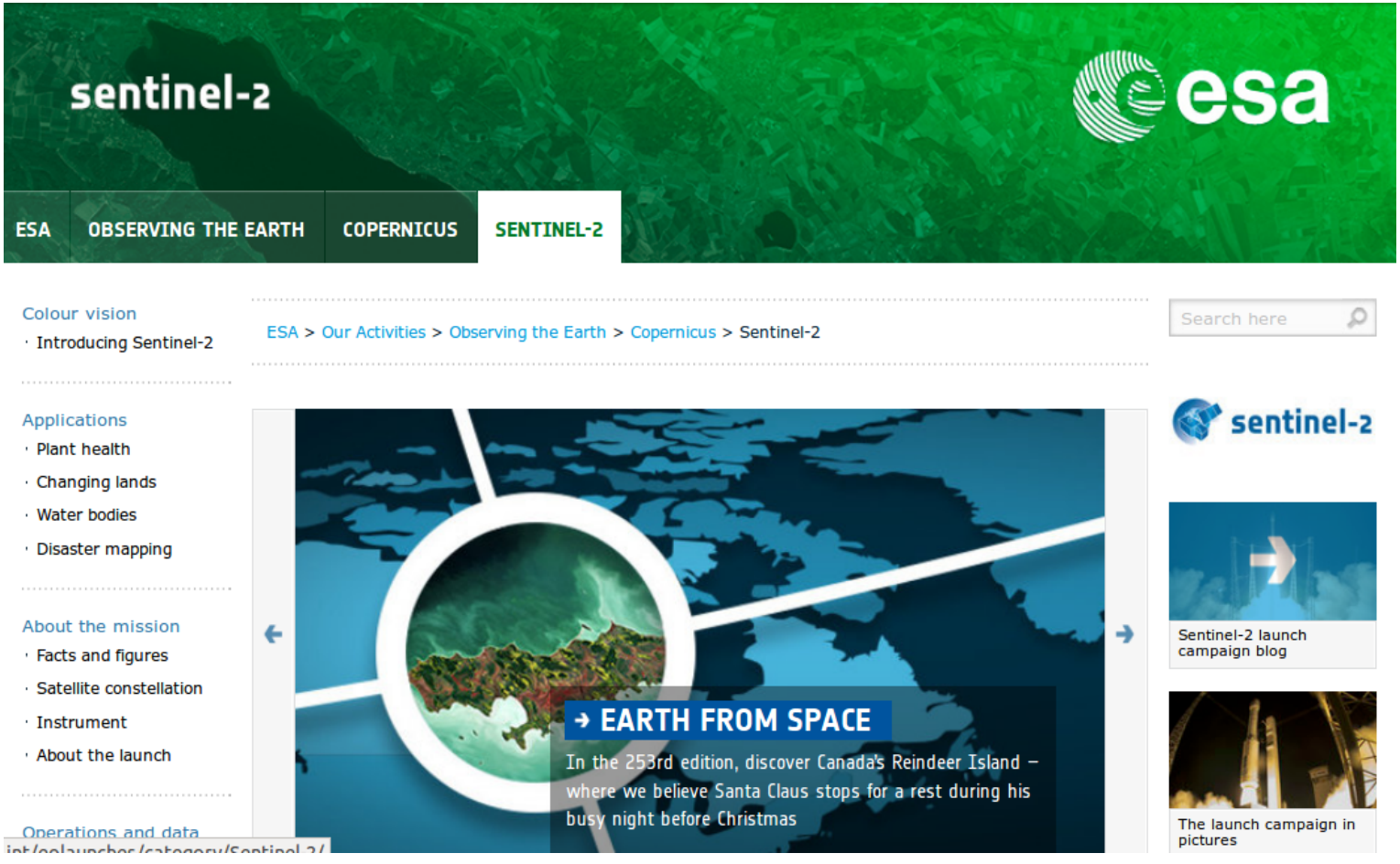
Landsat orbits (path and row system)

`https://www.youtube.com/watch?v=yPF2jpjB3Qw`



Sentinel (ESA)

Spatial resolution: 10m



Sentinel (ESA)

Sentinel (ESA)

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