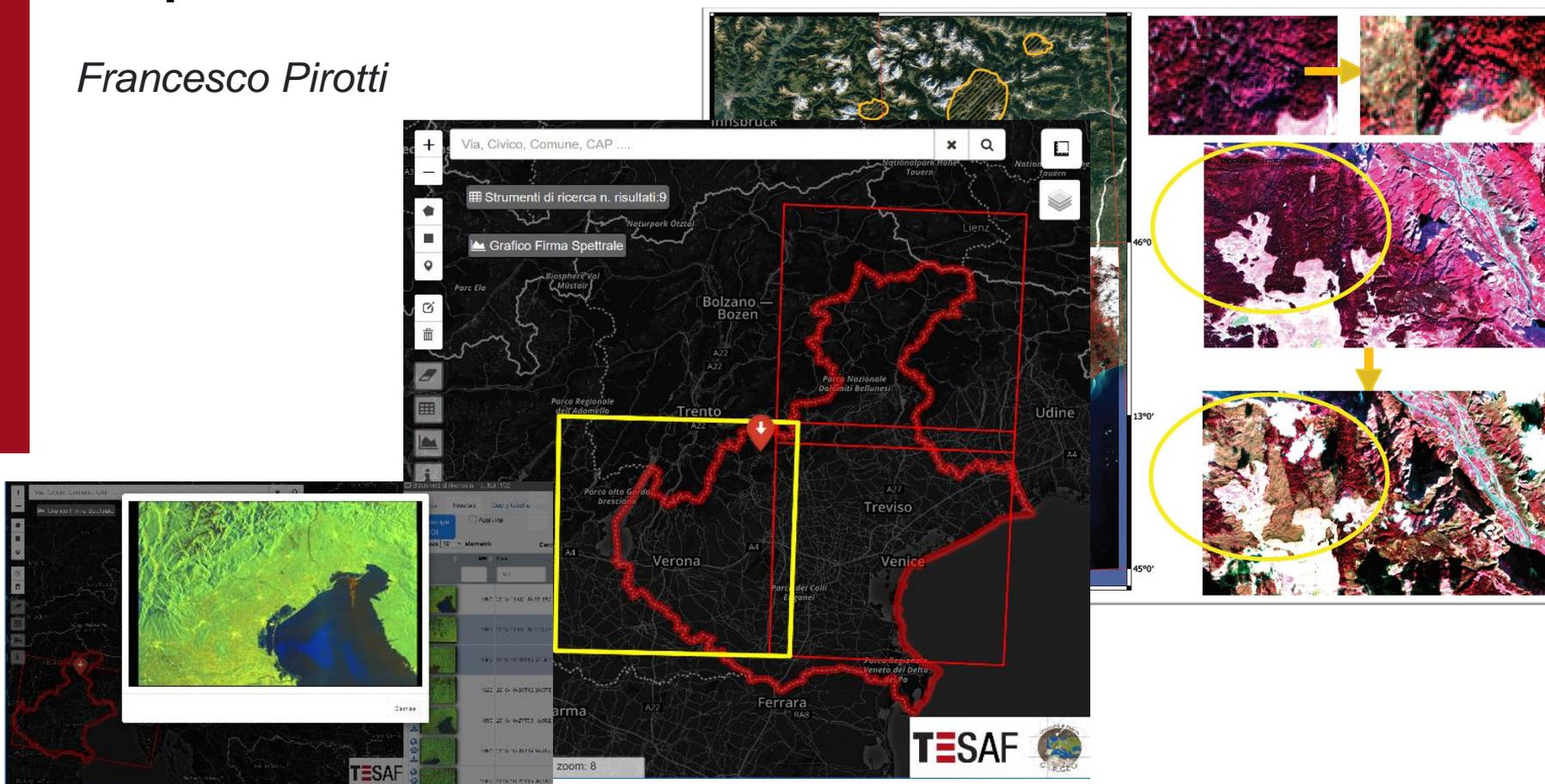
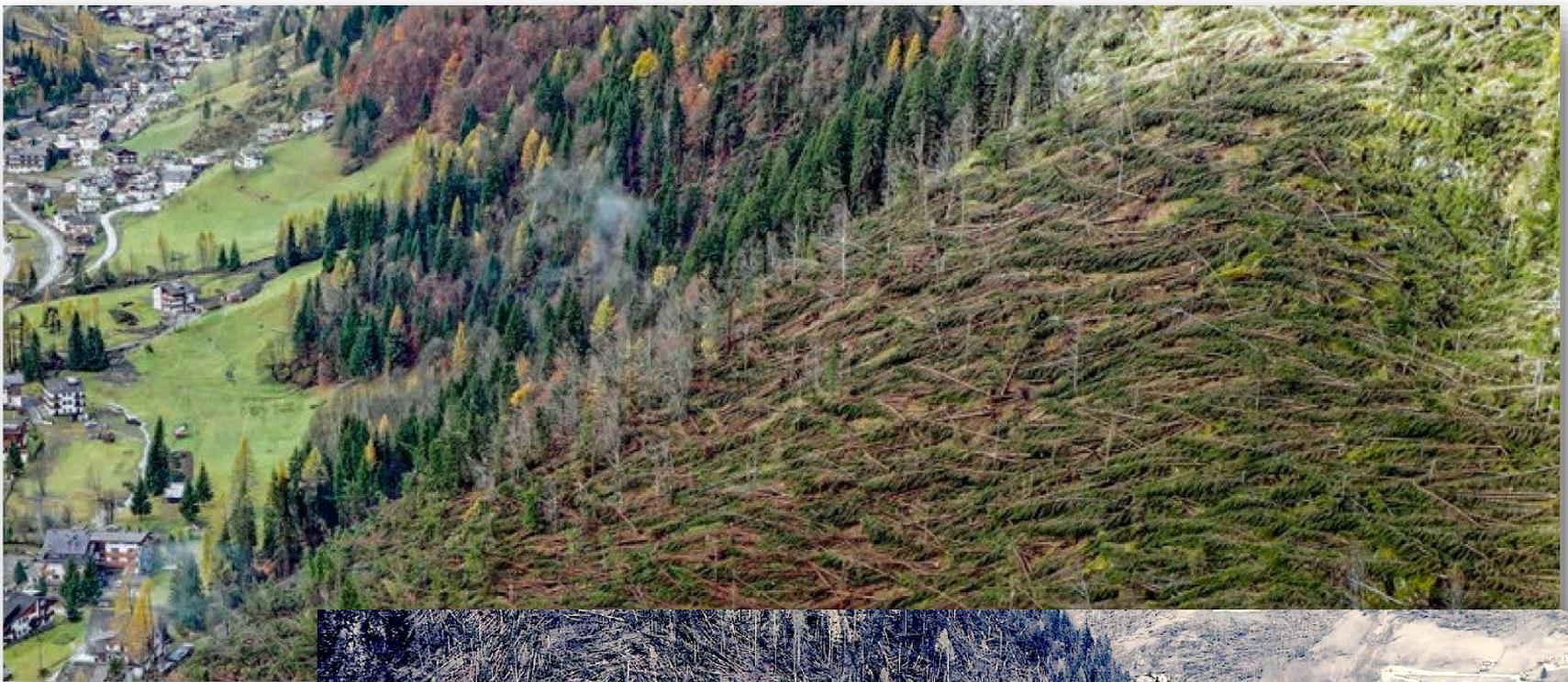


# Il ruolo delle tecnologie di telerilevamento e GIS nel supporto alle operazioni di risposta all'evento VAIA

Francesco Pirotti





# Geomatica per il territorio

- Telerilevamento
  - Ottico passivo
  - RADAR / SAR
  - Laser scanner
  - Fotogrammetria
- SIT / GIS



# TELERILEVAMENTO



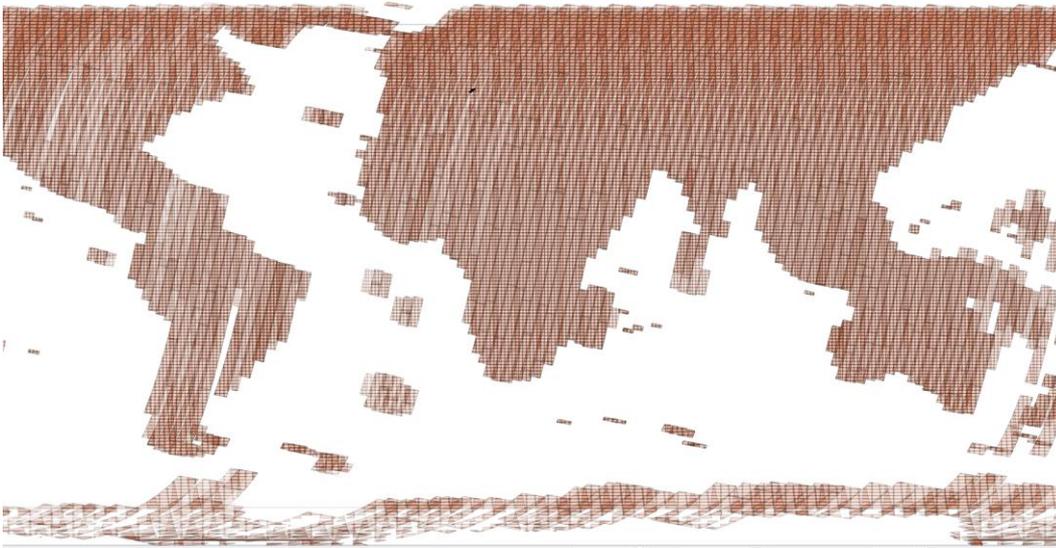
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# TELERILEVAMENTO



## Costruttore di interrogazioni

Imposta filtro della sorgente dati su s2

**Campi**

- ingestiondate
- beginposition
- endposition
- orbitnumber
- relativeorbitnumber
- cloudcoverpercentage
- uuid
- format

**Operatori**

= < > <= >=

**Espressioni filtro specifiche del gestore**

"beginposition" > '2019-02-08'

**Valori**

Cerca...

Campione Tutto

Usa layer non filtrato

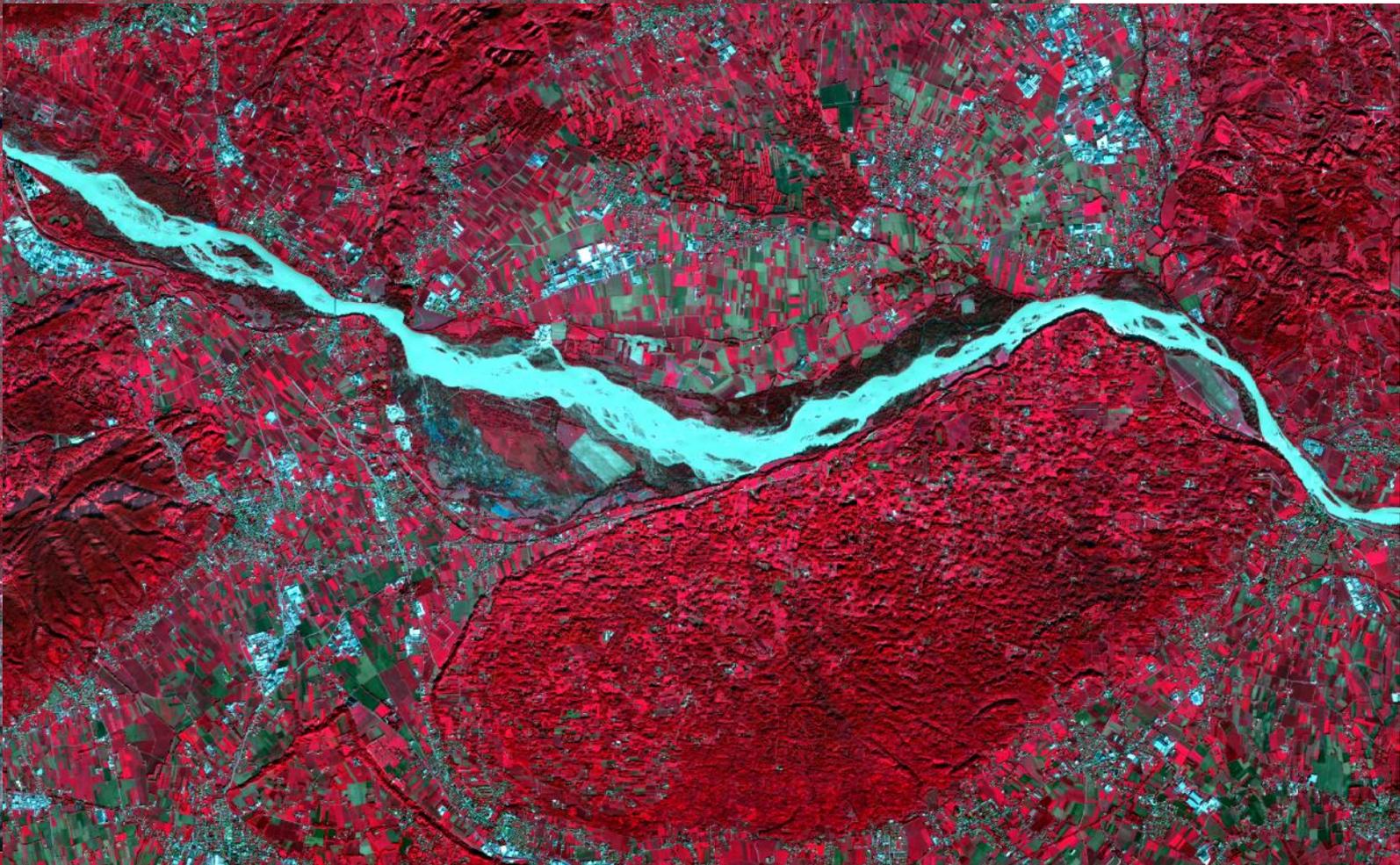
OK Test Pulisci Annulla

**Risultato dell'interrogazione**

**i** Clausola di condizione (where) restituisce 201783 righe.

OK

# OTTICO PASSIVO



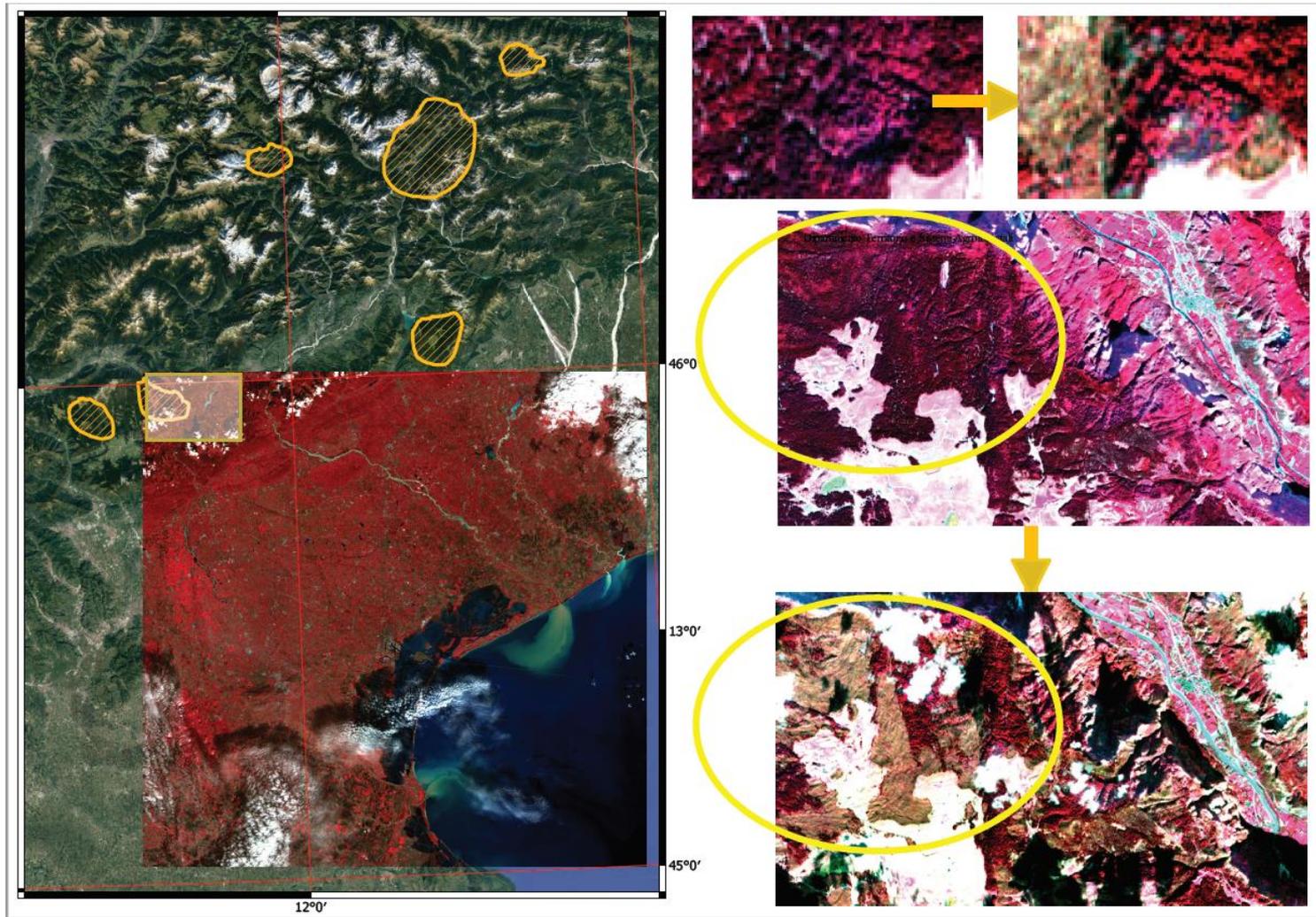
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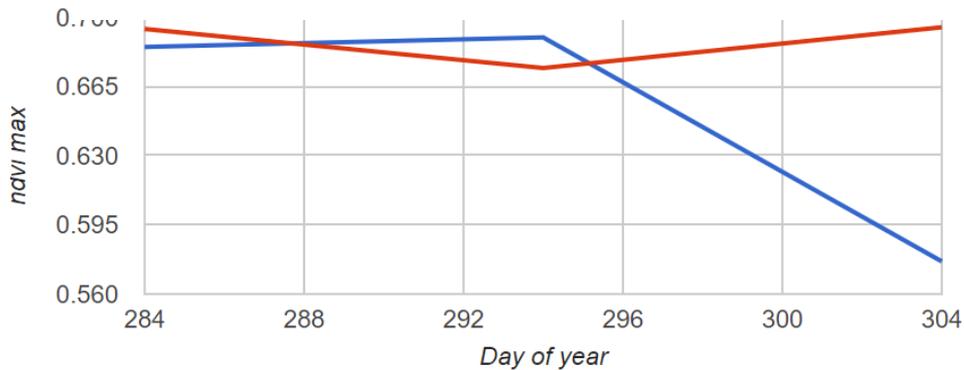
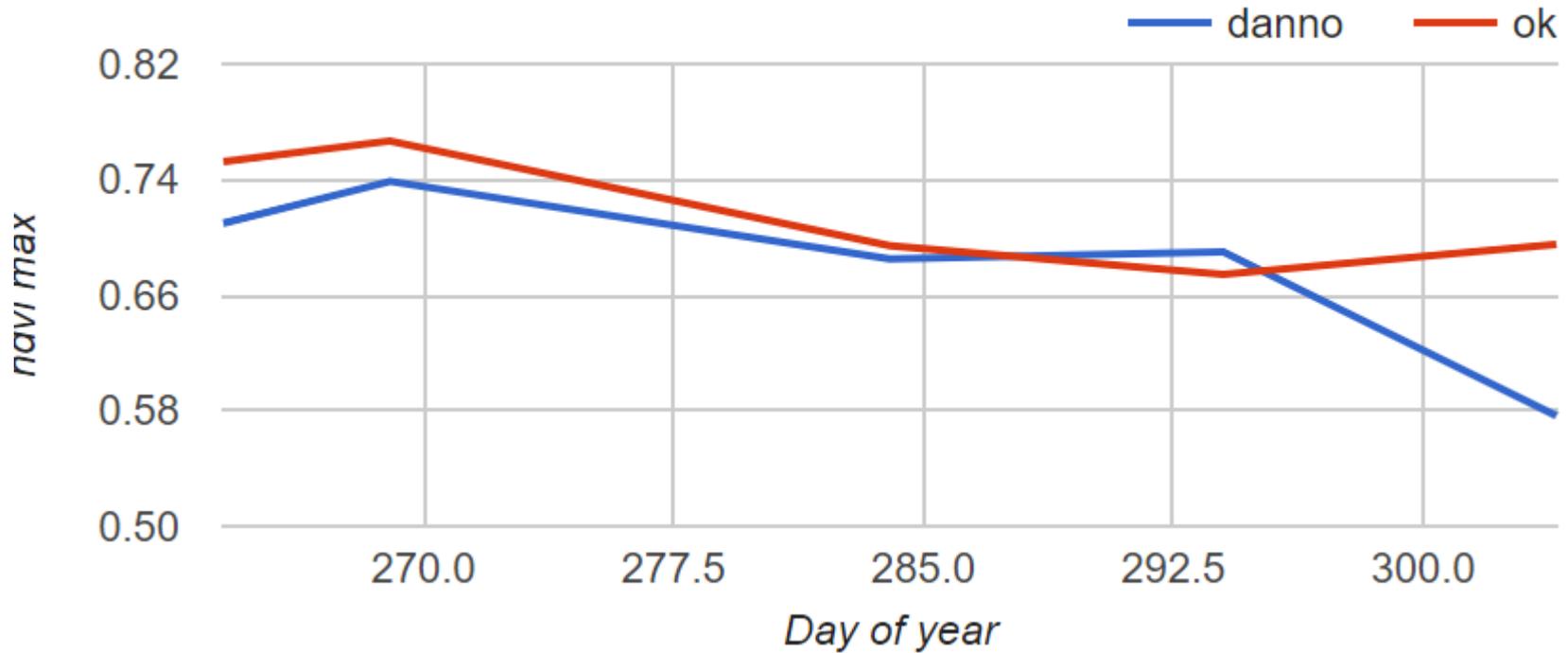
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# VAIA: identificare e quantificare

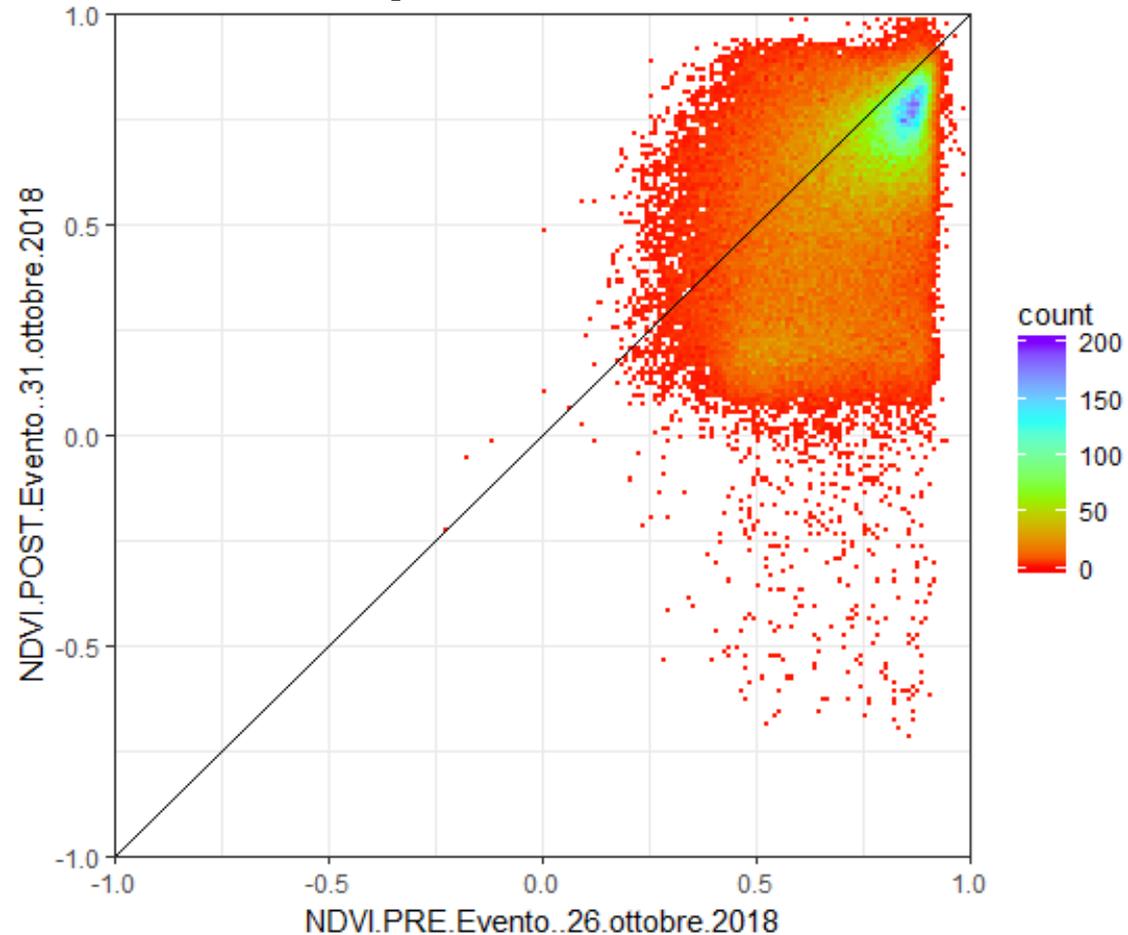


# VAIA: identificare e quantificare

ndvi max by day of year in 2 regions



# VAIA: identificare e quantificare

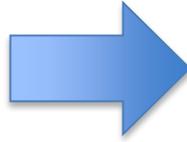


## Sentinel 2 NDVI

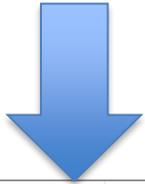
Pre-elab: mask snow, cloud e SCL classe vegetazione

# VAIA: identificare e quantificare

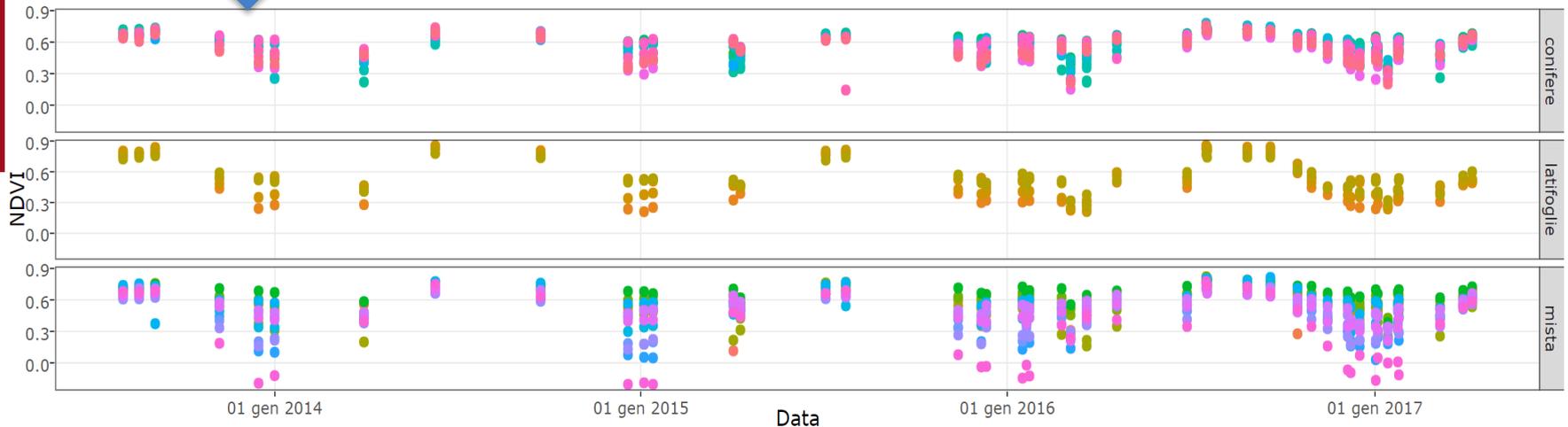
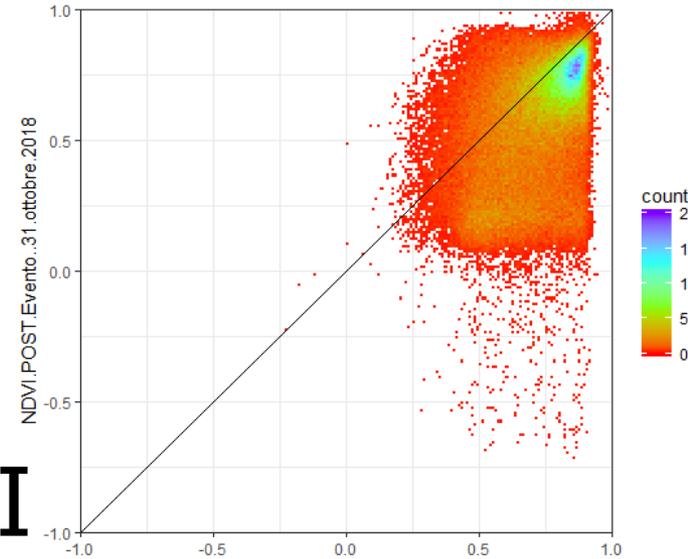
Calo NDVI  
area Marcesina



Calo NDVI fisiologico

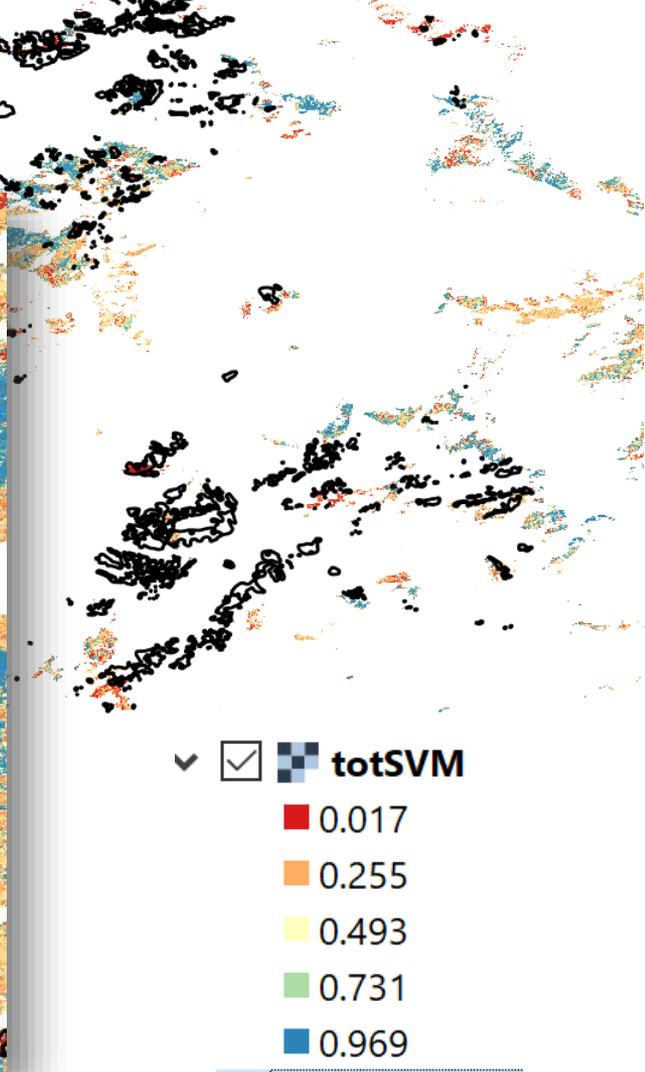
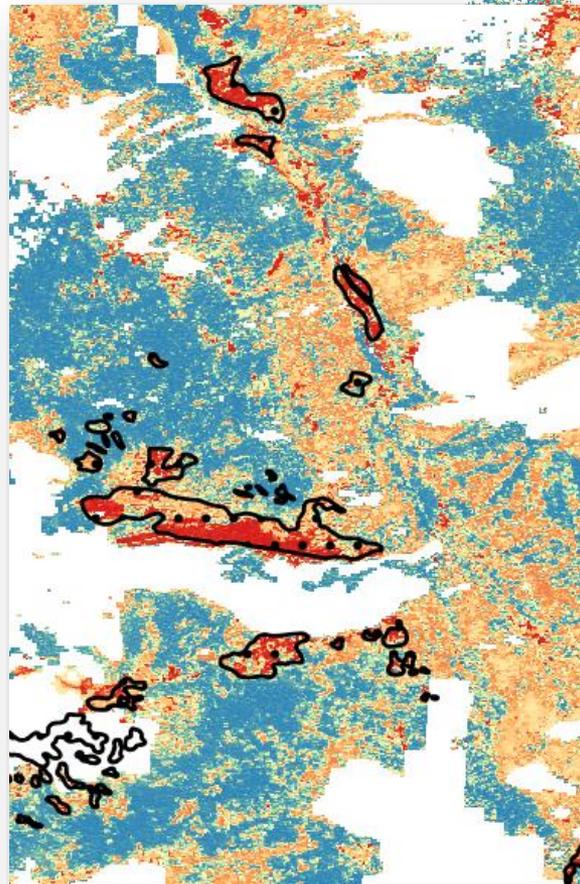
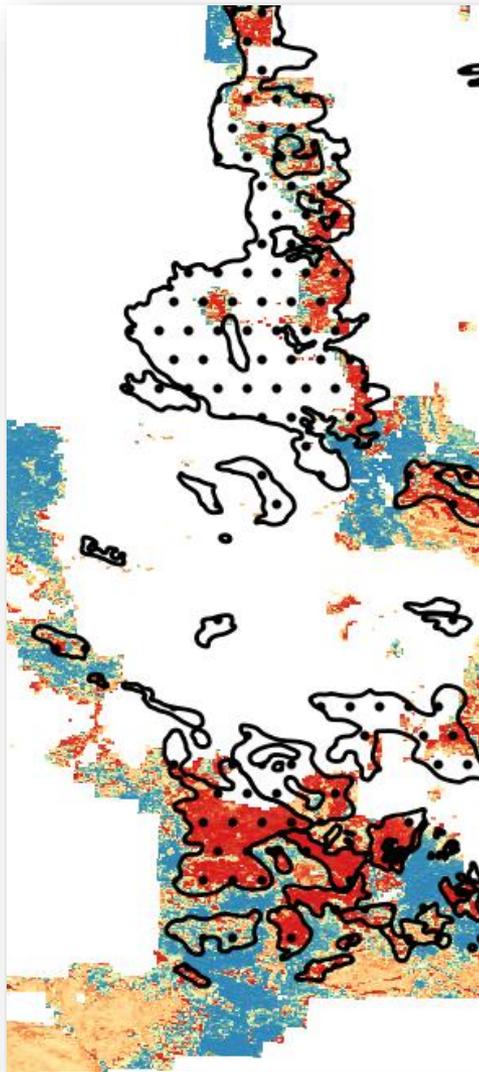


## Sentinel 2 NDVI



\*D'Este, M., Pirotti, F., 2017. Stima della proporzione di specie forestali decidue sfruttando NDVI. *XXI Conferenza Nazionale ASITA*, 417-424

# VAIA: identificare e quantificare

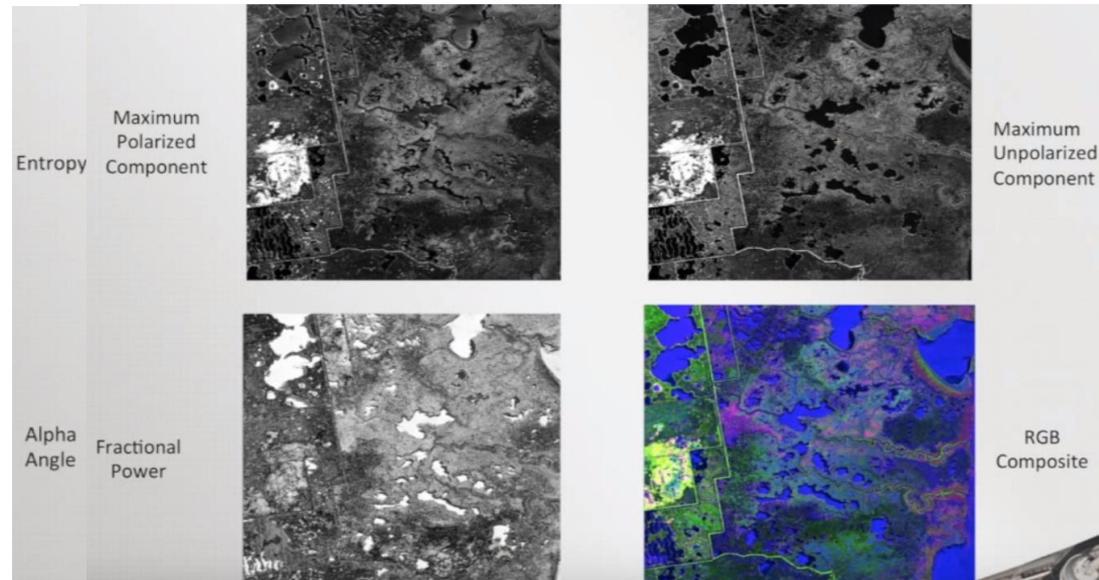
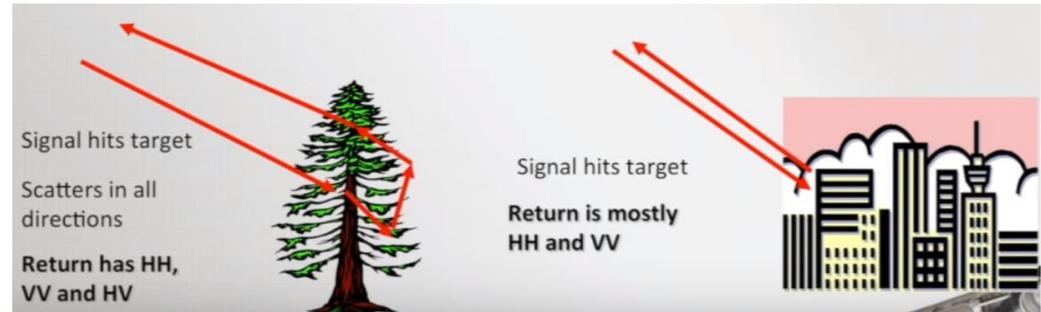


# SAR RADAR

2 «classi» di  
utilizzo

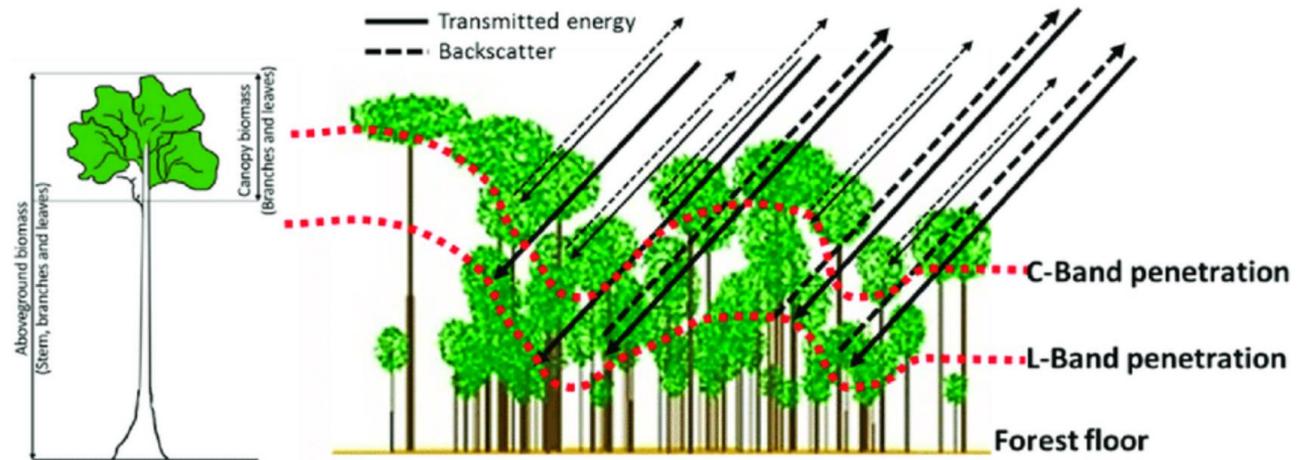
- Deformazioni (mm) – interferometria ( $\Delta$ fase)
- Backscatter segnale + polarizzazione +  $\Delta$ coherence
- ...

Courtesy of PCI Geomatica

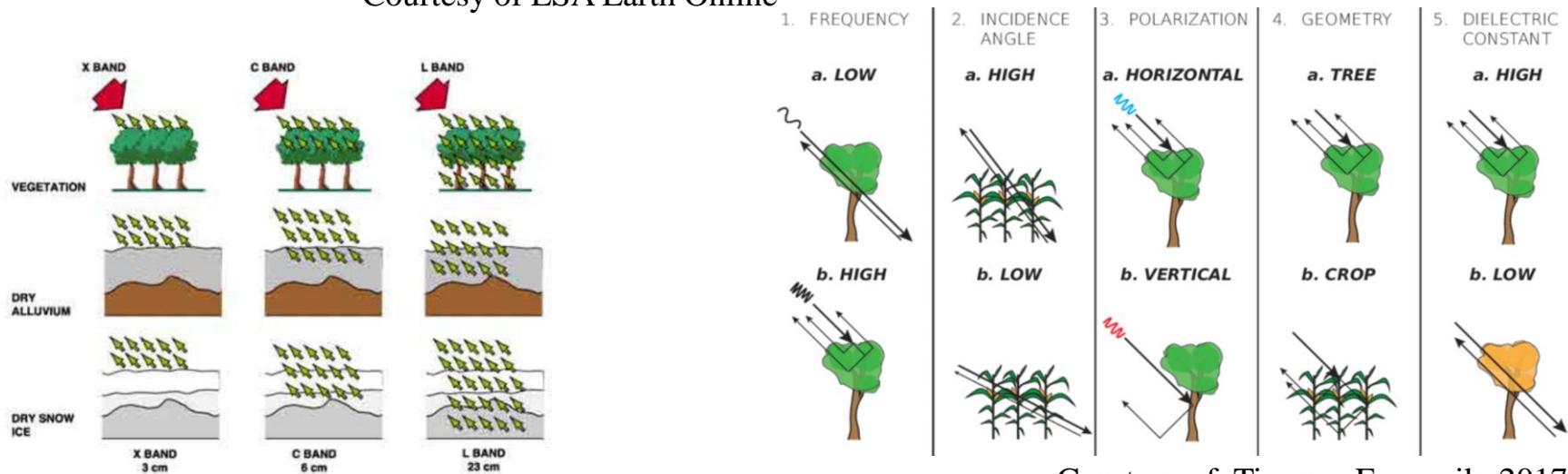


Courtesy of PCI Geomatica

# SAR RADAR



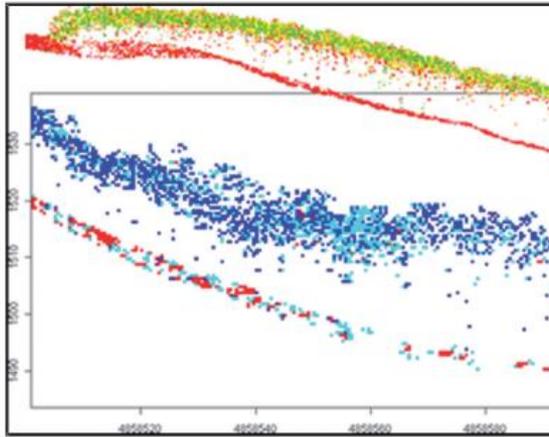
Courtesy of ESA Earth Online



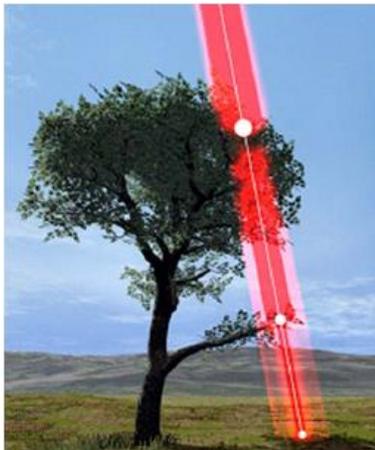
Courtesy of ESA Earth Online

Courtesy of Tim van Emmerik, 2017. Water stress detection using radar.

# Lidar



Pirotti, F., Grigolato, S., Lingua, E., Sitzia  
Environmental Sciences. *Italian Jou.*



Courtesy of Jan Skaloud  
École Polytechnique Fédérale de Lauanne

# VAIA: identificare e quantificare

The screenshot shows the PFN web application interface. The browser address bar displays the URL `geolab.vs-ix.net:3636/pfn/#`. The main map area shows a satellite view of a region in Northern Italy, with a red outline indicating a search area. A search bar at the top left contains the text "Via, Civico, Comune, CAP ...". A dropdown menu labeled "Carica dati extra" is set to "AVEPA".

The "Strumenti di ricerca" (Search Tools) panel is open, showing the following options:

- Ricerca** (selected), Risultati, Query tabella
- Piattaforma:** Sentinel-2
- Data:** 2014-06-15 to 2019-02-20
- Stringa identificatore:** e.g. S2A\_MSIL2A\_20180323T102021\_N0206\_R065\_T32TPR\_20180323T123106
- Mese:** seleziona mese(i)
- G. sett.:** seleziona giorno/i de
- G. mese:** seleziona i
- Orbita:** ASCENDING (checked), DESCENDING
- Copertura nuvolosa massima (%):** Slider set to 10 (range 0-100)
- Liv. Elab.:** [Empty field]
- SEARCH** button
- Solo immagini caricate nel DB

At the bottom of the interface, there is a "Grafico Firma Spettrale" (Spectral Signature Graph) section with a "Scarica tabella" (Download table) button.

# VAIA: identificare e quantificare

- Aree definite con telerilevamento
- Validazione con aree rilevate a terra
- Inserimento in contesto GIS per supporto alle decisioni mediante analisi geospatial:
  - Logistica
  - Scenari di aumento rischio (valanghe ARPAV)
  - Monitoraggio interventi con web-gis
  - Dati aggregati e distribuiti sul territorio (volume per comune, ranking comuni più impattati etc...)

# VAIA: identificare e quantificare

The image displays a QGIS interface with a 3D terrain model and a 2D map view. The 3D model shows a mountainous area with yellow and red markers. The 2D map view shows the same area with yellow and red outlines. A metadata window is open on the right, showing the following information:

Geometria	Valore
veneto	
Name	
> (Derivato)	
> (Azioni)	
Name	
description	
timestamp	NULL
begin	NULL
end	NULL
altitudeMode	
tessellate	-1
extrude	0
visibility	-1
drawOrder	NULL
icon	
objectid_1	8209
codice_istat	05
comune	

Coordinate: 703372,5143106 | Scala: 1:439468 | Lente d'ingrandimento: 100% | Rotazione: 0,0 ° | Visualizza | EPSG:32632