



*Fragile srl is a Spin-Off Company
of the University of Bologna*

www.fragilesrl.it

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European Ground Motion Service, potenziale ed utilizzo

- Introduzione e tecnica di elaborazione
- Utilizzo dati EGMS (scaricamento ed implementazione in QGIS, visualizzazione)
- Esempi e confronto con risultati di analisi sito-specifiche

EGMS

introduzione



Place/coordinates (lat lon)            

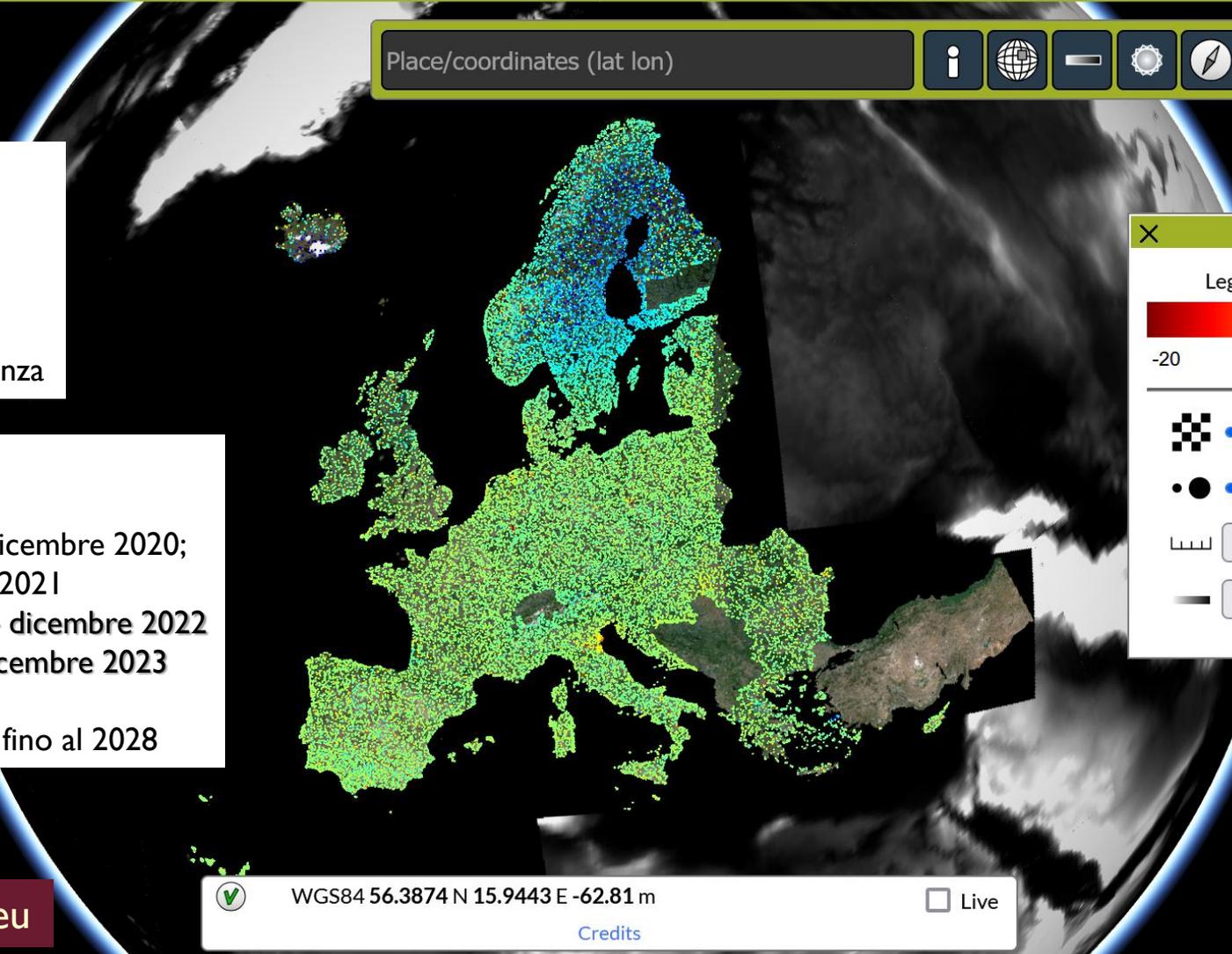
Immagini SAR Sentinel

- Disponibili da ottobre 2014;
- Gratuite per l'intero globo;
- Tempo di rivisita fino a 6 giorni;
- Buona qualità in termini di coerenza

Vari rilasci prodotti EGMS

- Primo dataset: febbraio 2015 – dicembre 2020;
- Primo aggiornamento: dicembre 2021
- Secondo dataset: gennaio 2018 – dicembre 2022
- Terzo dataset: gennaio 2019 – dicembre 2023

- Confermati futuri aggiornamenti fino al 2028



Legend

Legend across all datasets. Limits are in mm/year.



-20 20

 100%

 2.5 pixels

 Medium (-20 to 20)

 InSAR default

4 società elaborano le immagini SAR

Consortium ORIGINAL (Operational Groundmotion INsar Alliance), composed by:

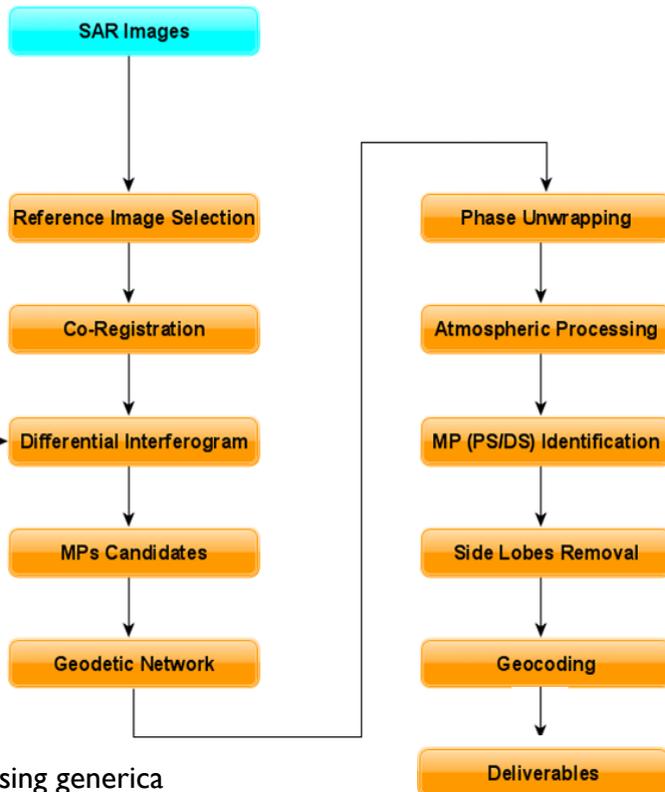
 AN ASI/TELESPAZIO COMPANY	 ALTAMIRA A U.S. Group Company		 an ASI/TELESPAZIO COMPANY
Italia	Norvegia	Germania	

in collaborazione con
the German Aerospace Centre (DLR), the Geological Survey of Norway (NGU), the Hungarian Satellite Geodetic Observatory (SGO), the UK's Earth Metrics, and the companies PPO.labs (Netherlands) and Nhazca (Italy)

Necessità di armonizzare le catene di elaborazione dei differenti fornitori!

Differenze principali relative a:

1. Algoritmi di coregistrazione,
2. Strategia di selezione dei riflettori stabili (PS)
3. Algoritmo di unwrapping
4. Rimozione disturbi atmosferici a piccola (turbolenze) e grande scala (atmosfera stratificata)
5. Utilizzo o meno di mappe per mascherare i corpi d'acqua
6. Uso di dati relativi alla copertura nevosa



PER CHI VUOLE APPROFONDIRE GLI ASPETTI TECNICI

End-to-end implementation and operation of the European Ground Motion Service (EGMS)



Algorithm Theoretical Basis Document

Esempio di una catena di processing generica

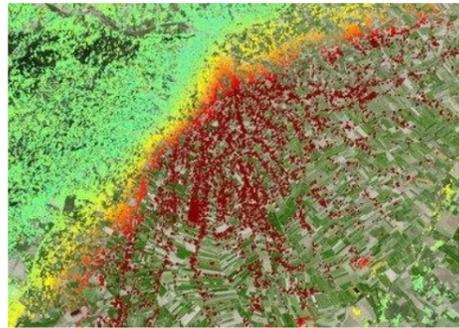
Browser address bar: <https://land.copernicus.eu/en/products/european-ground-motion-service?tab=documentation>

Navigation: User support | Production updates | News and Events | Register/Login | Search



Home > CLMS portfolio > European Ground Motion Service

European Ground Motion Service



- Overview
- Technical summary
- Documentation**

- Search in the following items
- Product specifications – European Ground Motion Service**
Publication date: 25.10.2023 Version: 2.0
 - End user requirements – European Ground Motion Service**
Publication date: 20.12.2021 Version: 1.0
 - Interface manual – European Ground Motion Service**
Publication date: 16.11.2023 Version: 3.0
 - Product user manual – European Ground Motion Service**
Publication date: 17.05.2022 Version: 1.6

- User manual – Guidelines for European Ground Motion Service data download, import and visualization** 3.1 MB
Publication date: 15.01.2024 Version: 1.1
- Algorithm theoretical basis document – European Ground Motion Service** 3.7 MB
Publication date: 25.10.2023 Version: 3.0
- GNSS calibration data – European Ground Motion Service** 273.1 KB
Publication date: 15.04.2023 Version: 1
- GNSS calibration data – European Ground Motion Service** 273.0 KB
Publication date: 25.10.2023 Version: 2.0
- GNSS calibration report – European Ground Motion Service** 3.7 MB
Publication date: 31.05.2024 Version: 5.1
- Patch note - European Ground Motion Service 2022 data update** 204.1 KB
Publication date: 25.07.2024 Version: 1.0



Egna



Come iniziare la ricerca?
Indicare la località di interesse o le coordinate (in WGS84)

Legend

Legend across all datasets. Limits are in mm/year.



-20 20

 100%

 2.5 pixels

 Medium (-20 to 20)

 InSAR default





Egna



▶ Background Layers

▶ BASIC (Level 2A)

▶ CALIBRATED (Level 2B)

▶ DROM

▼ ORTHO (Level 3)

East/West 2019-2023 *La croce indica layer disabilitato*

Vertical 2019-2023

1° informazione che visualizzo: dati ORTHO, componente verticale, griglia 100 m

Legend

Legend across all datasets. Limits are in **mm/year**.

-20 20

100%

2.5 pixels

Medium (-20 to 20) Min Max

InSAR default

Click on map to reveal location Live

[Credits](#)

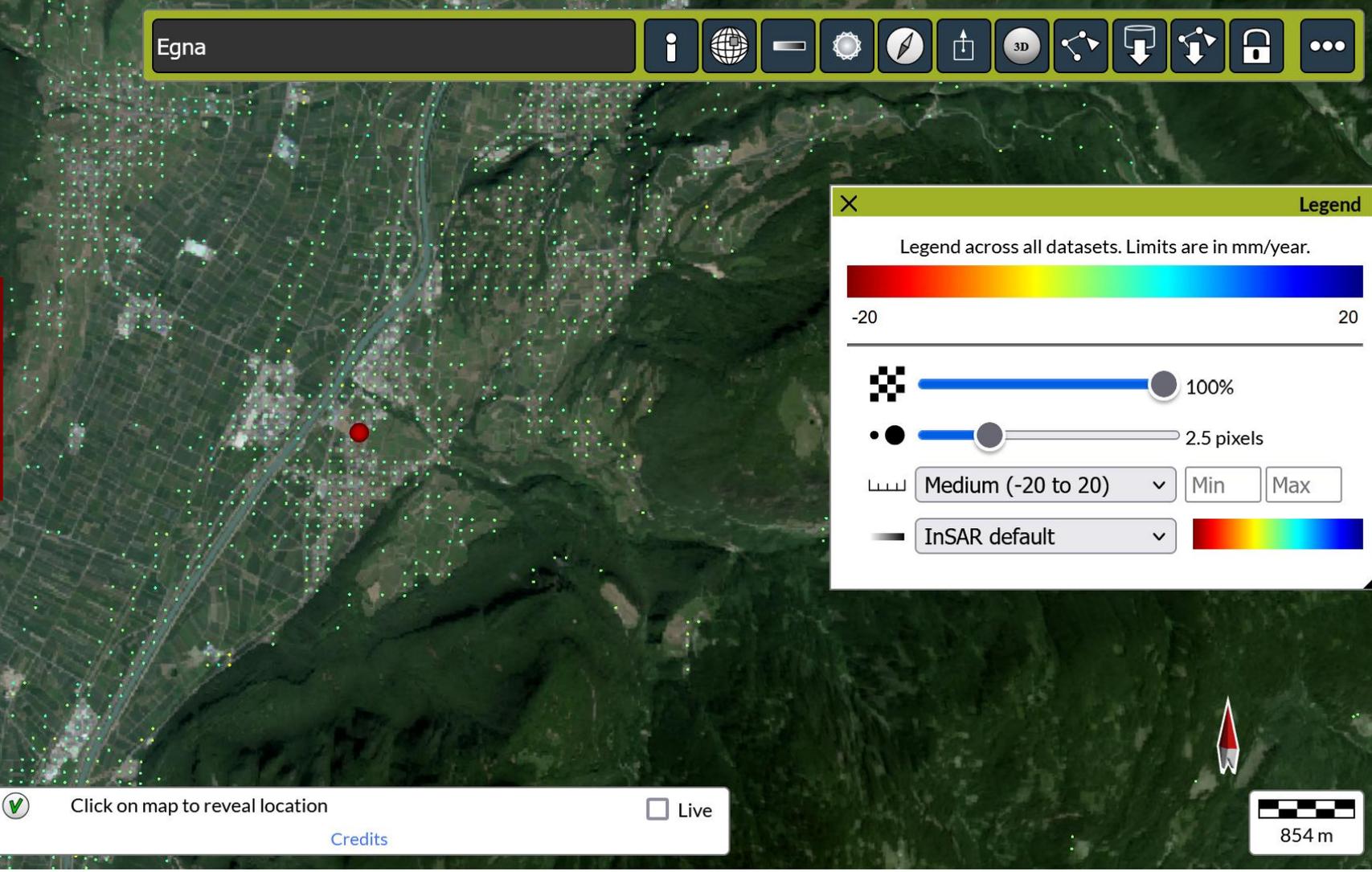


Navigation icons: Home, Layers, Data, Full Screen, Zoom In, Zoom Out

- Background Layers
- BASIC (Level 2A)
- CALIBRATED (Level 2B)
- DROM
- ORTHO (Level 3)**
 - East/West 2019-2023
 - Vertical 2019-2023 *La croce indica layer disabilitato*

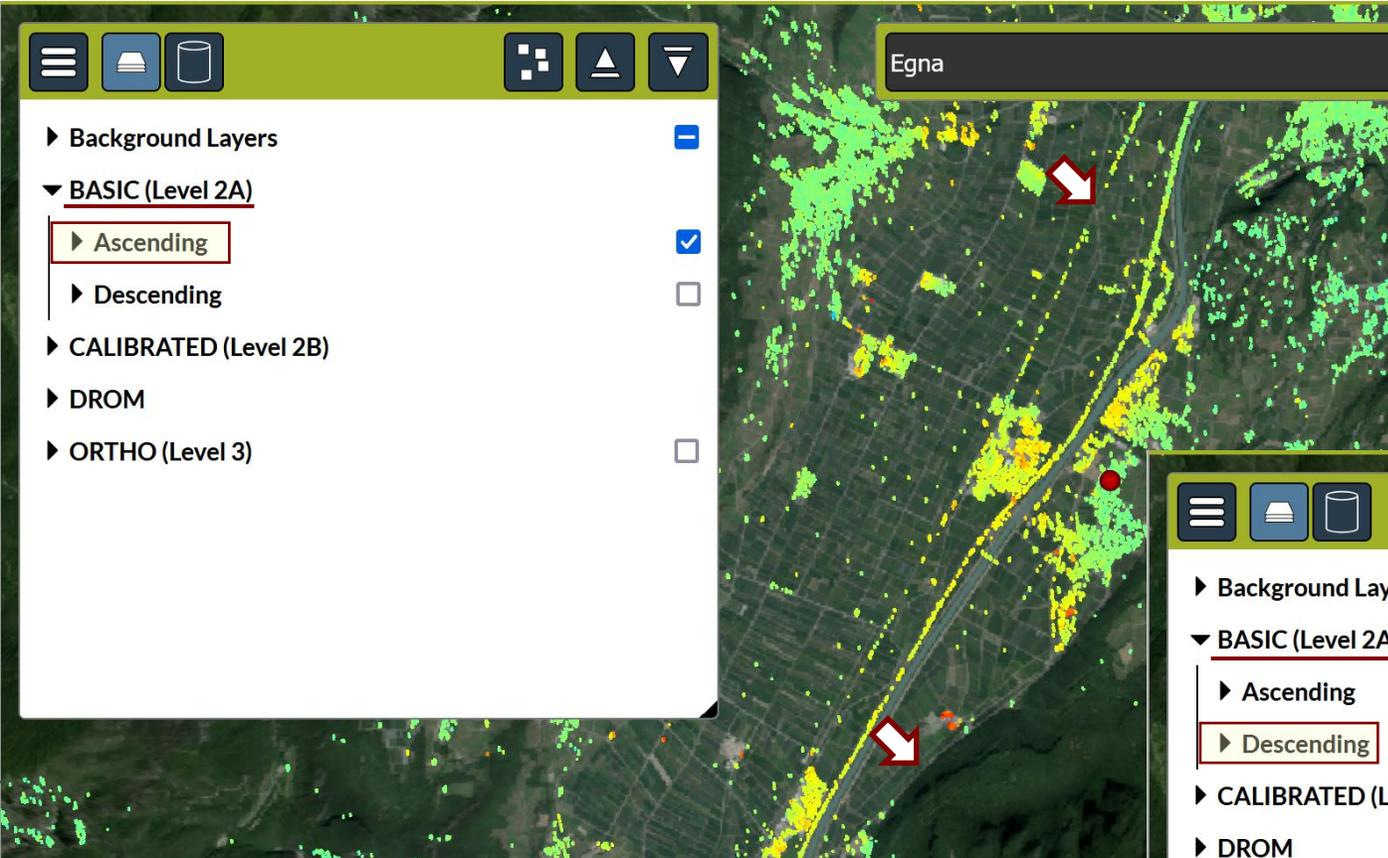
Egna

Map interaction icons: Info, Full Screen, Home, Settings, Compass, Print, 3D, Share, Download, Upload, Lock, More



Click on map to reveal location Live [Credits](#)

854 m



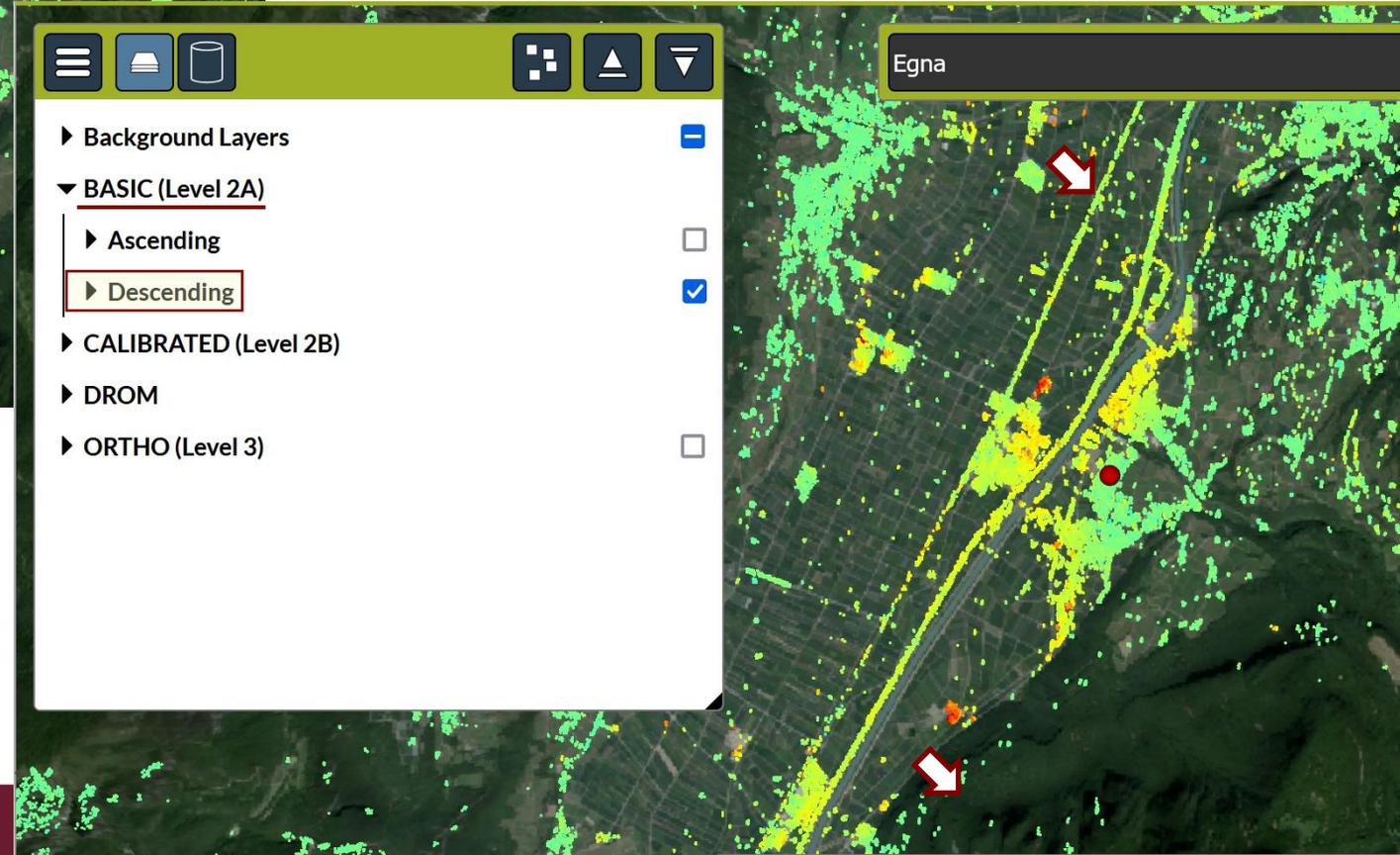
Dati BASIC

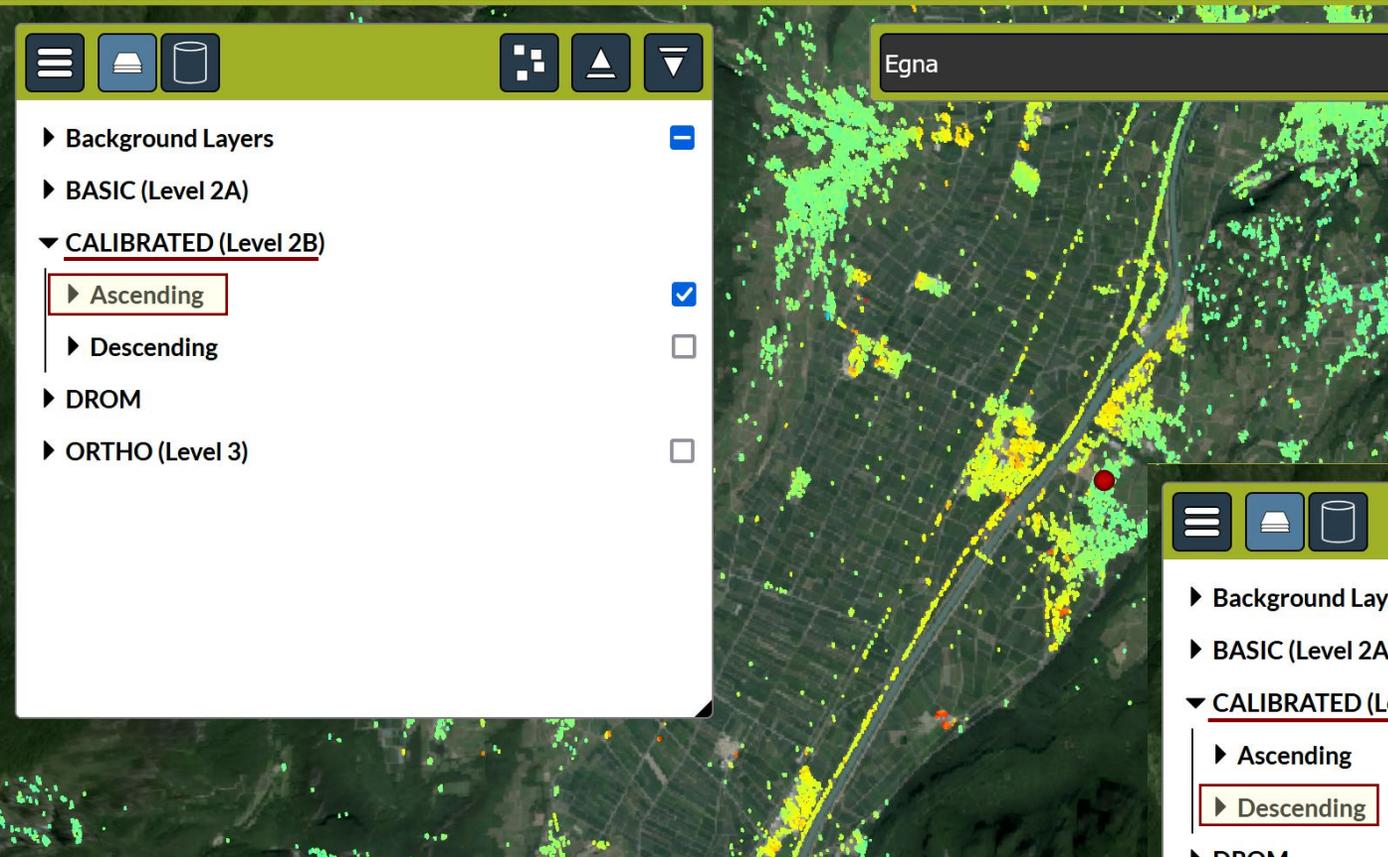
Valori lungo la **LOS** (Linea di Vista del Satellite)
'relativi' riferimento locale

Dataset ascendente + dataset discendente

Differente distribuzione dei riflettori stabili in orbita ascendente e discendente

Risoluzione 5 m nella direzione N-S e 20 m nella direzione E-W

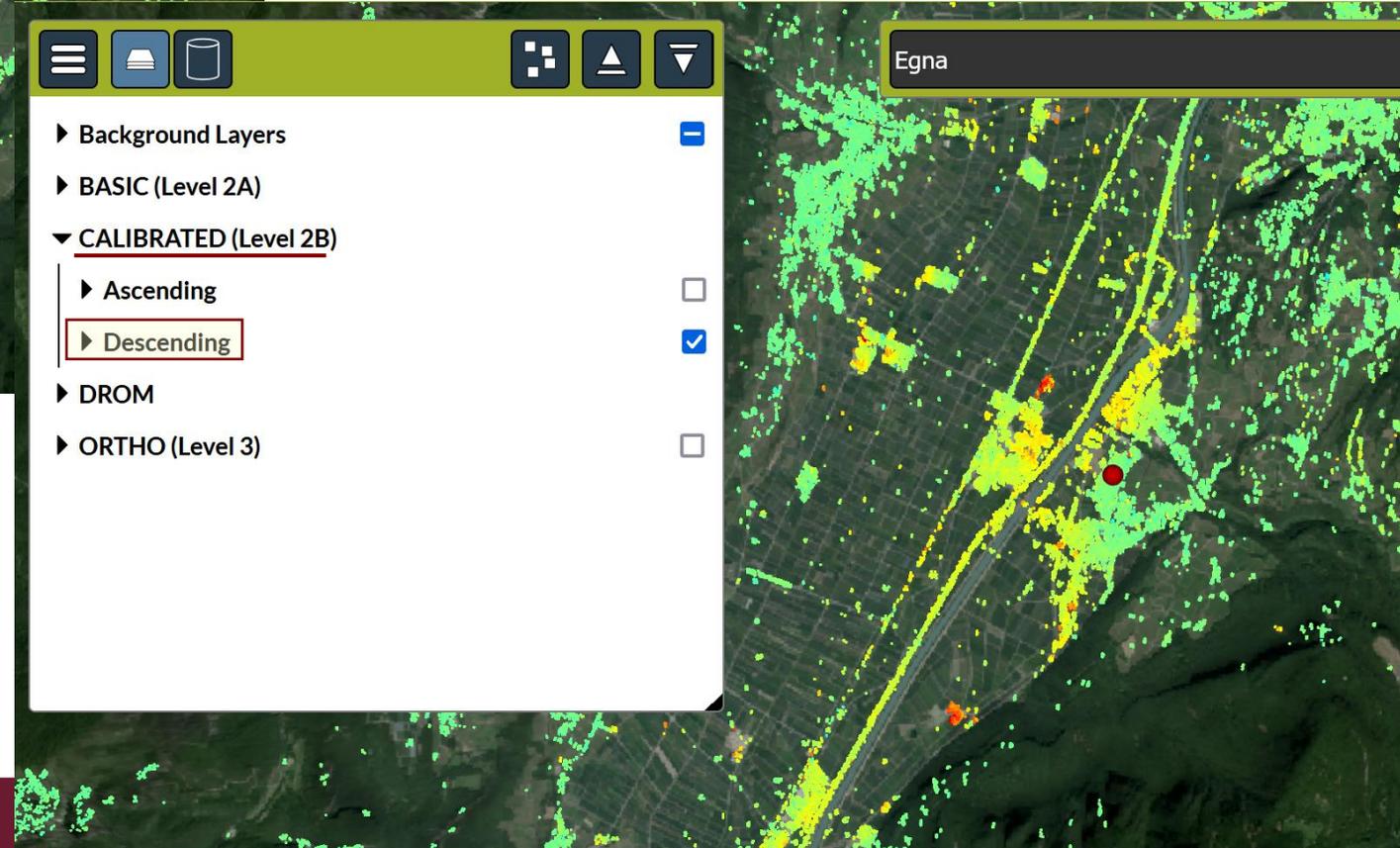




Dati CALIBRATED

Valori lungo la **LOS** (Linea di Vista del Satellite)
'assoluti' riferimento sistema GNSS (A-EPND gridded model, griglia 50 km)

Dataset ascendente + dataset discendente



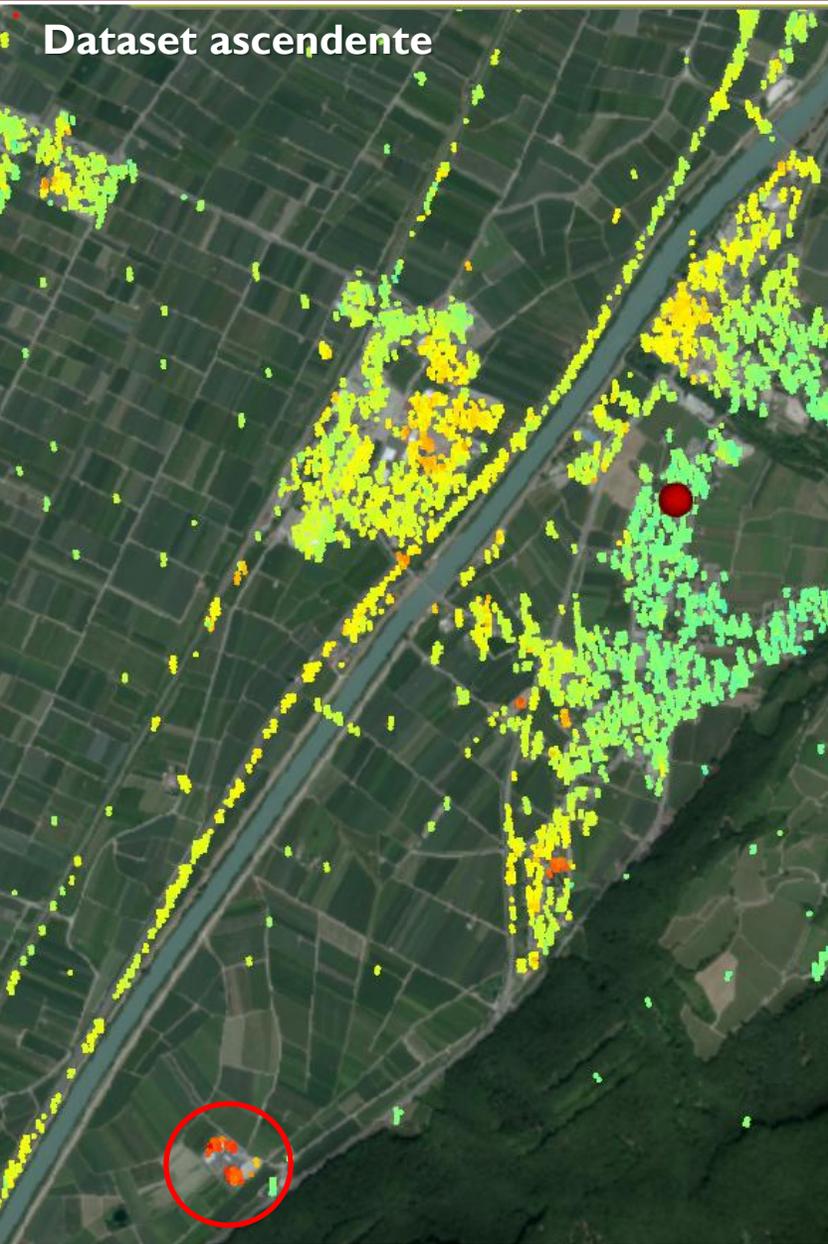
Differente distribuzione dei riflettori stabili in orbita ascendente e discendente

Risoluzione 5 m nella direzione N-S e 20 m nella direzione E-W

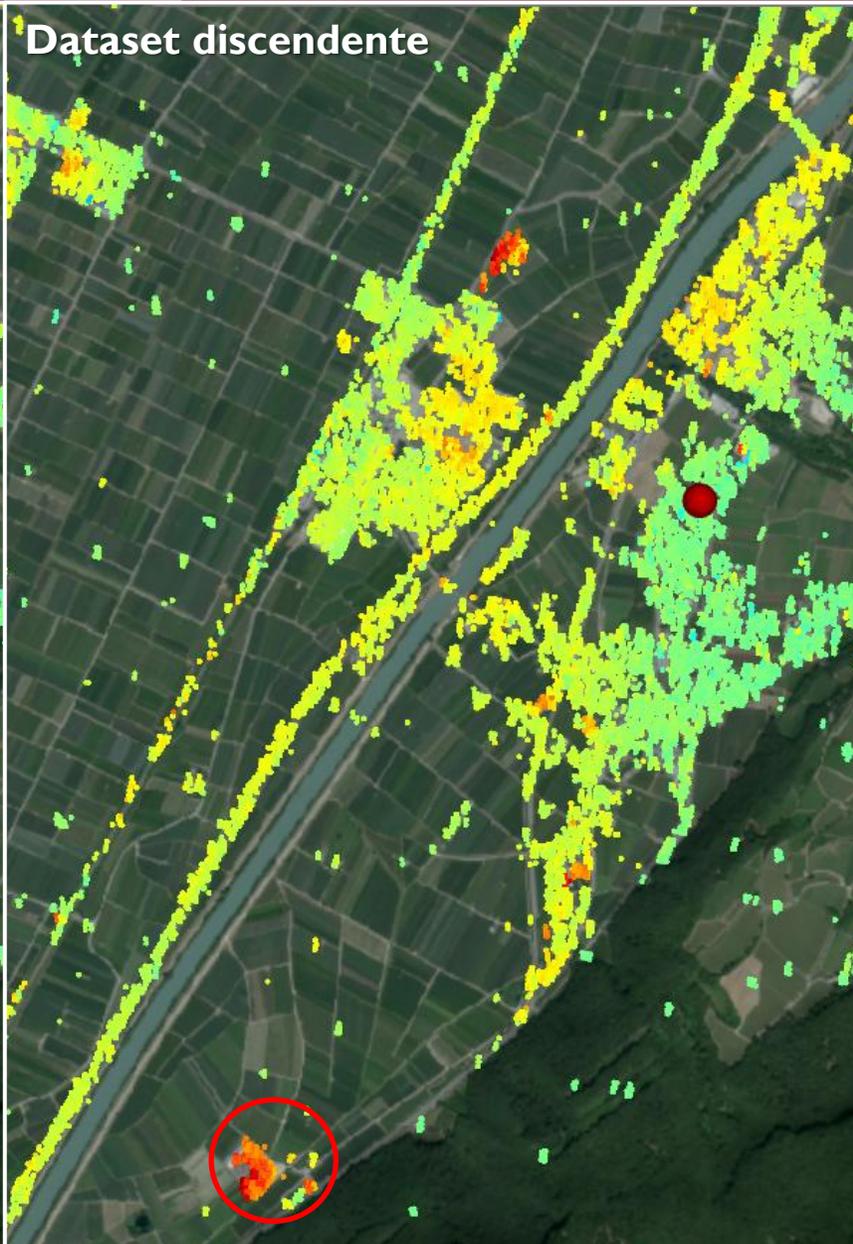
EGMS

Interpretazione dei dati

Dataset ascendente



Dataset discendente



Il segnale **rosso** in entrambe le geometrie di volo indica un **cedimento**



Image © 2025 Maxar Te
Image © 2025 CNES

EGMS: interpretazione dei dati

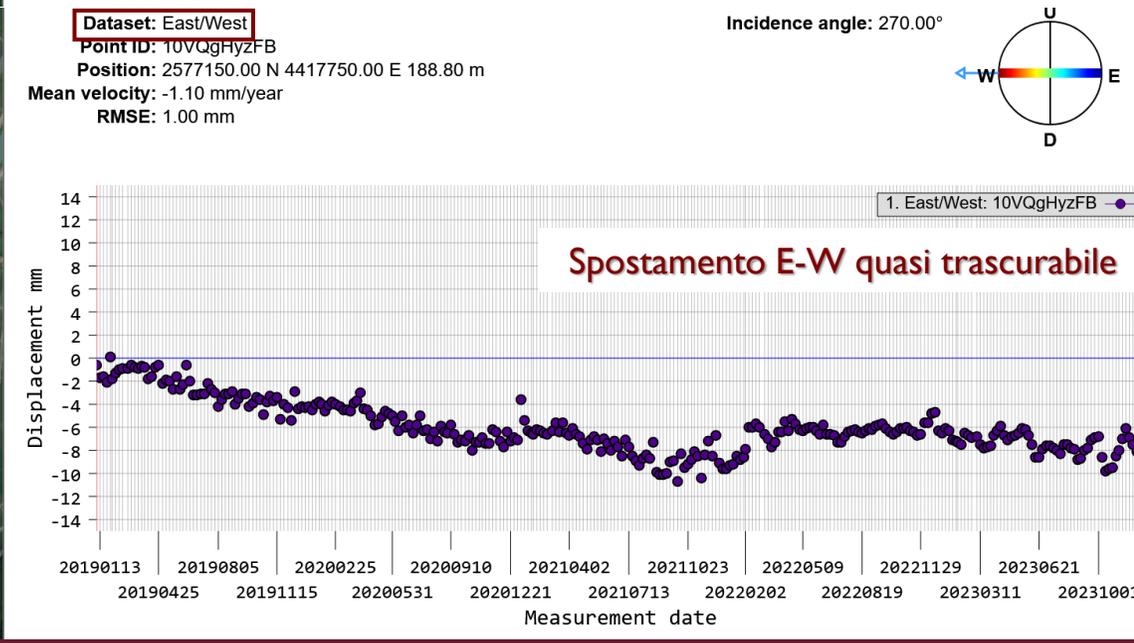
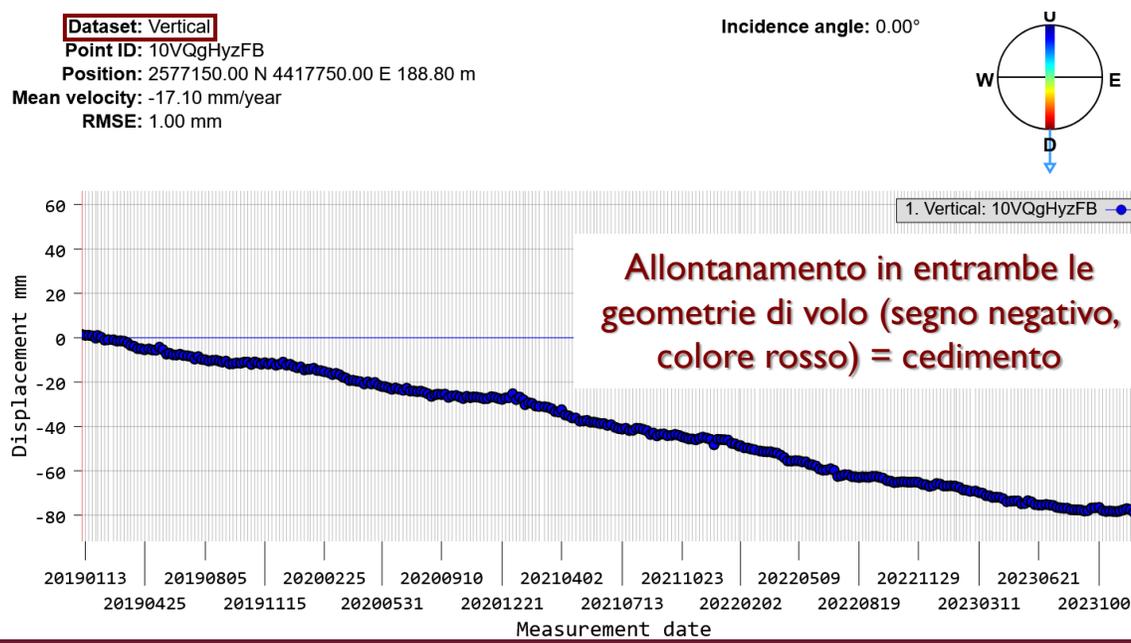
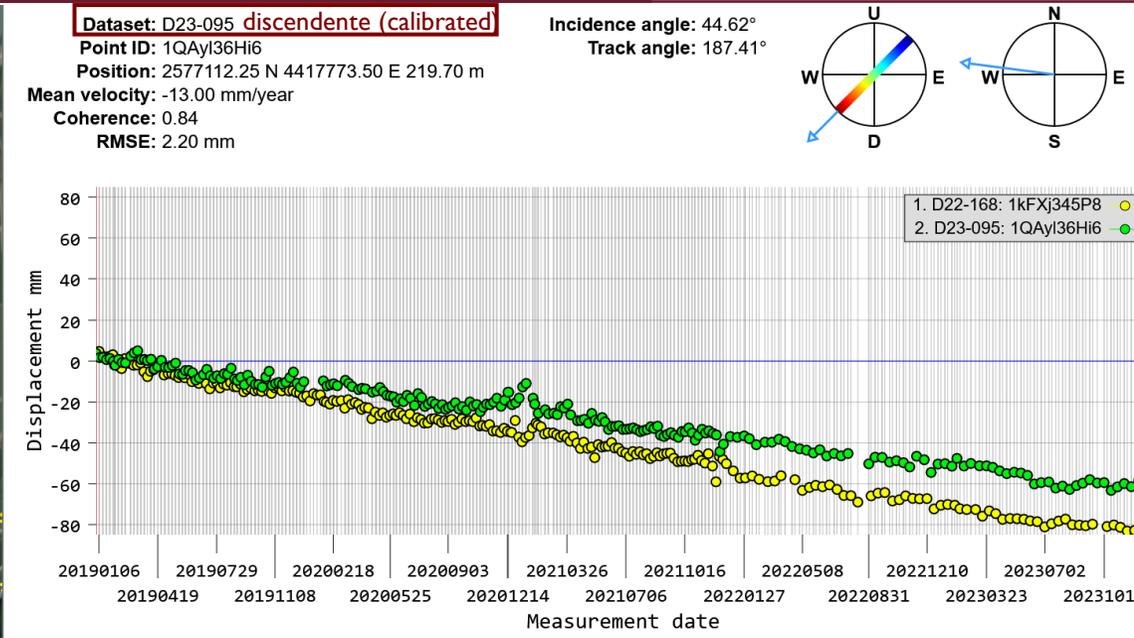
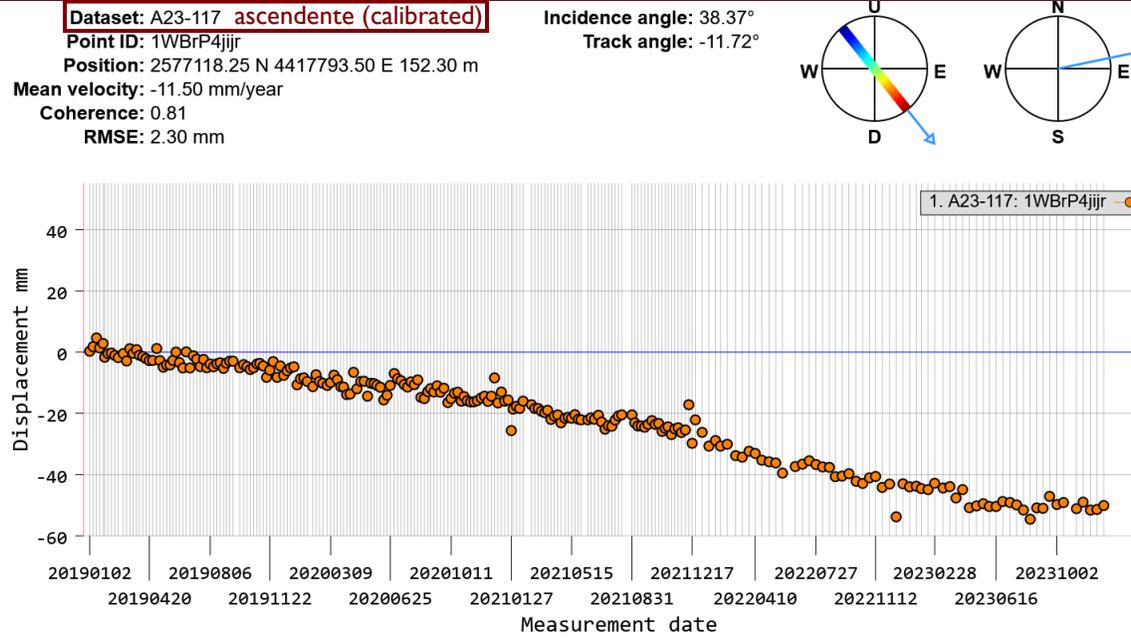




Immagine Google Earth: Acquisizione 26/10/2015

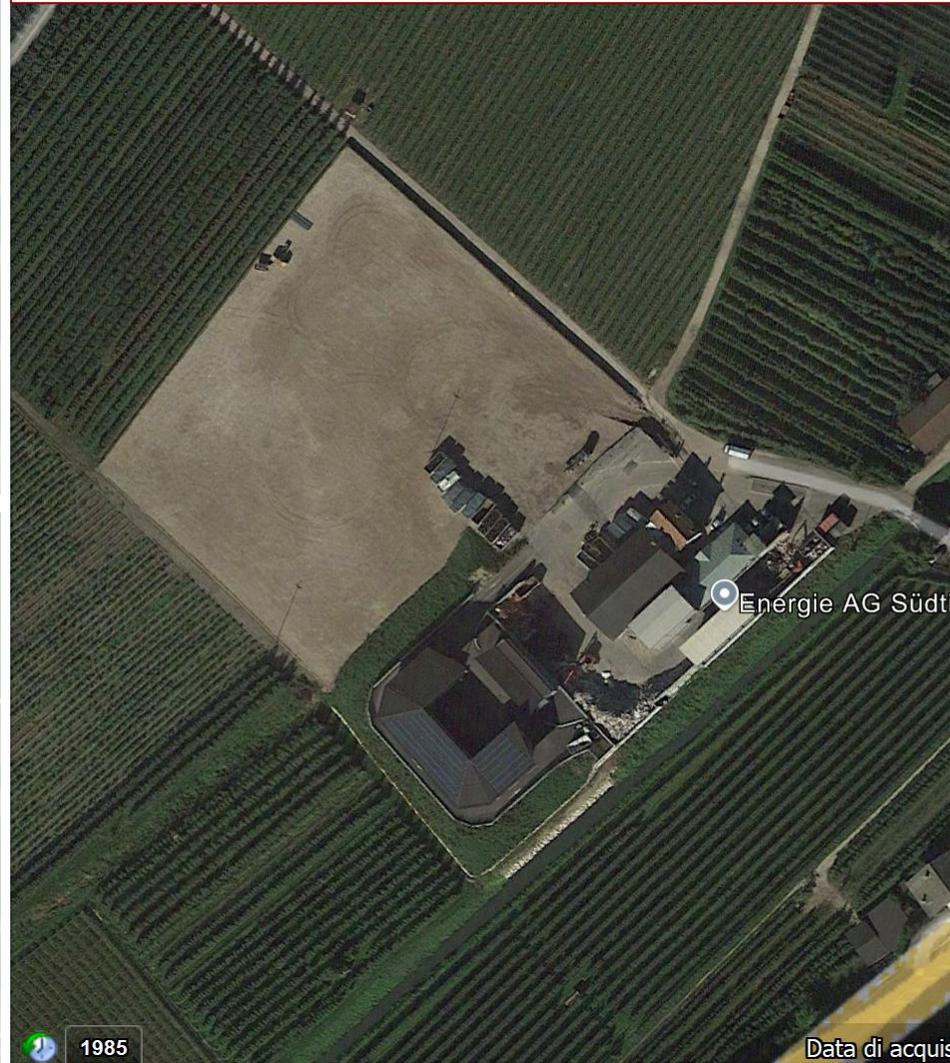
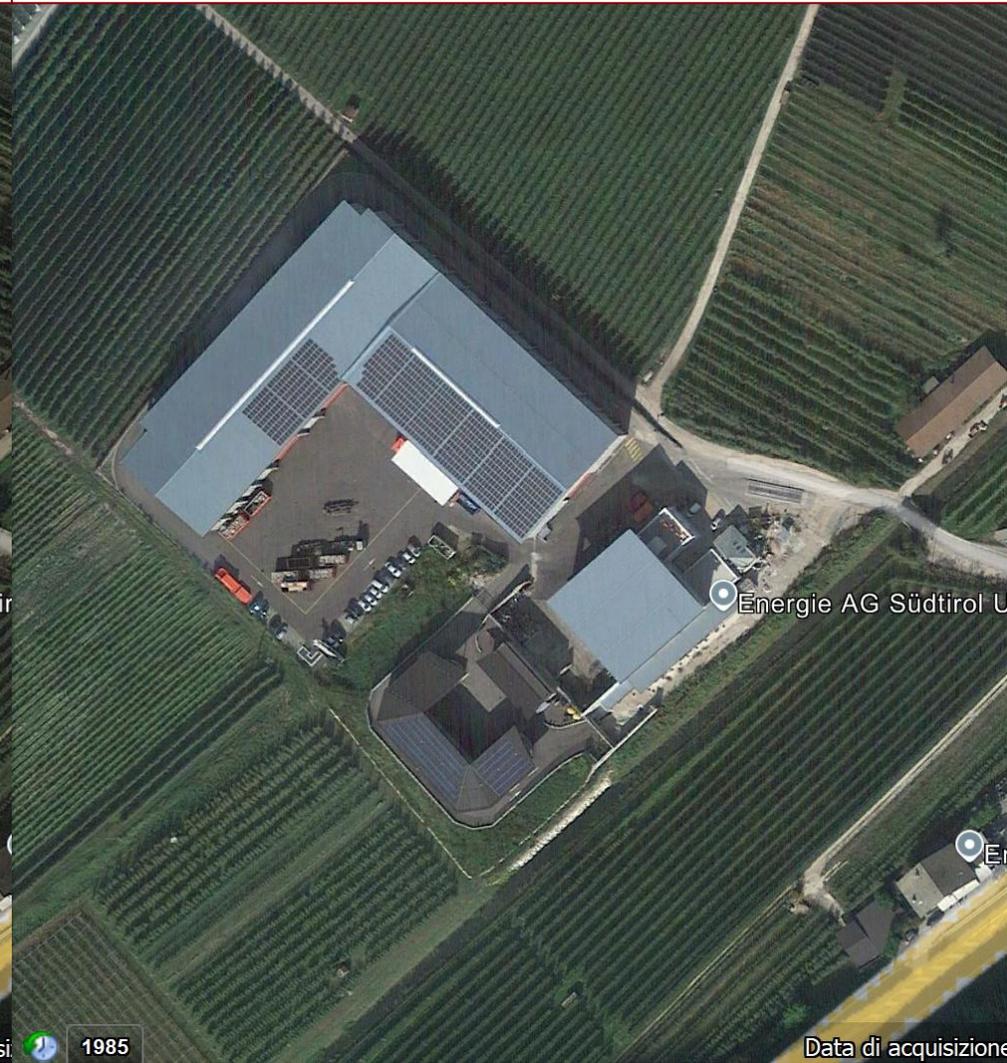


Immagine Google Earth: Acquisizione 19/10/2017

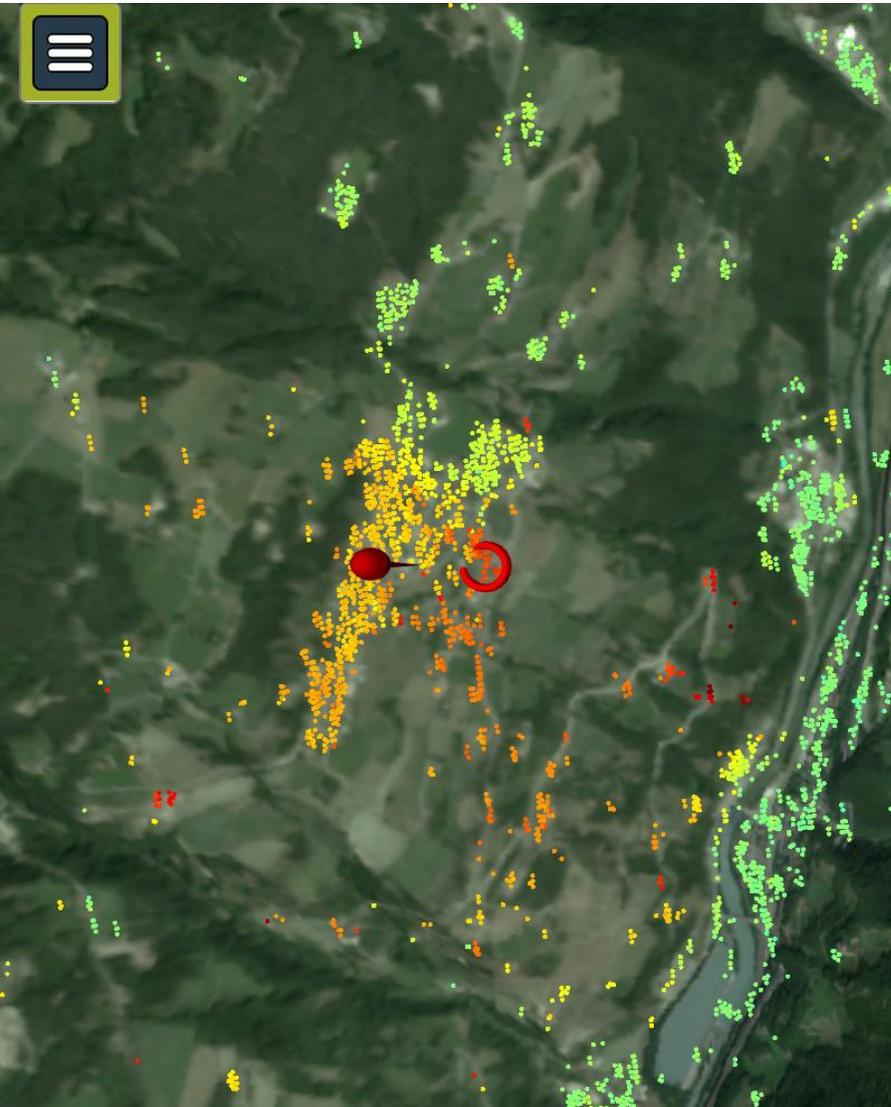


1985

Data di acquisi

1985

Data di acquisizione



Barbiano



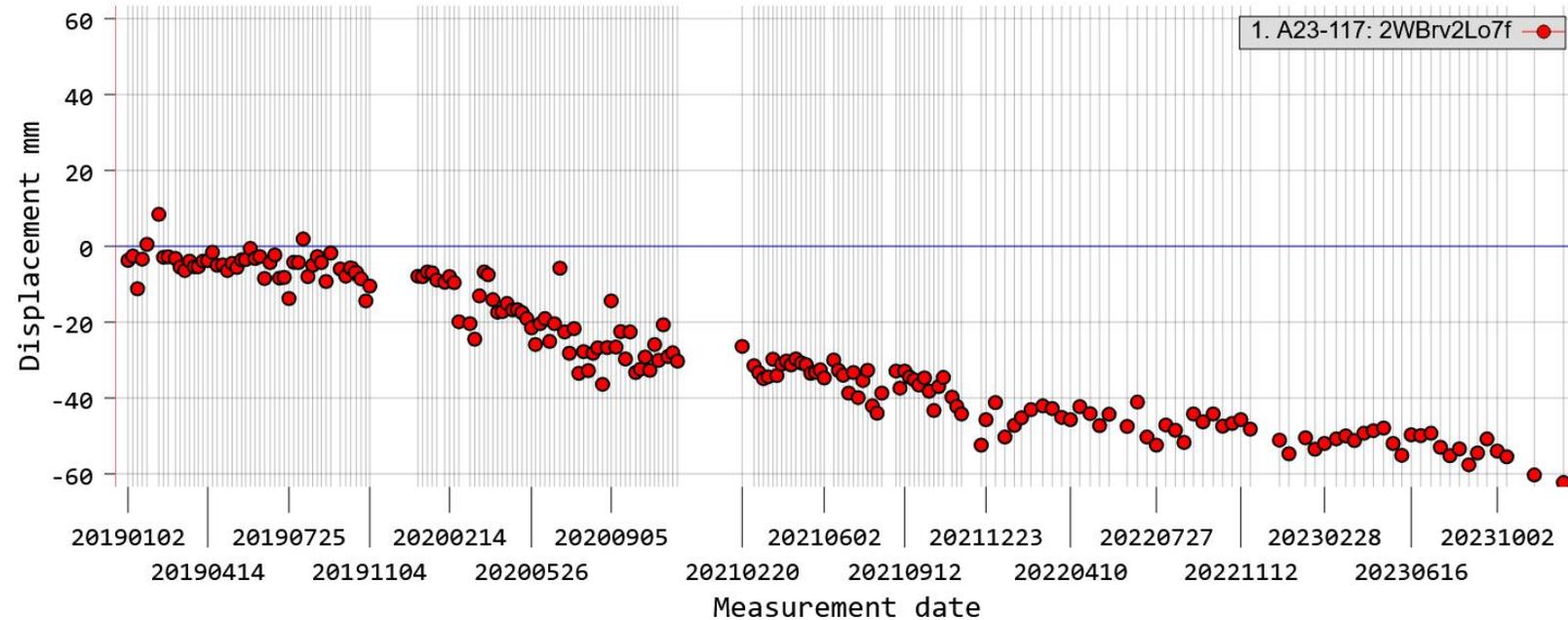
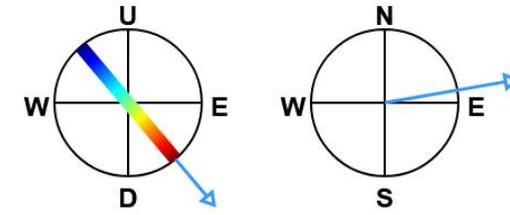
Plot of 1 point



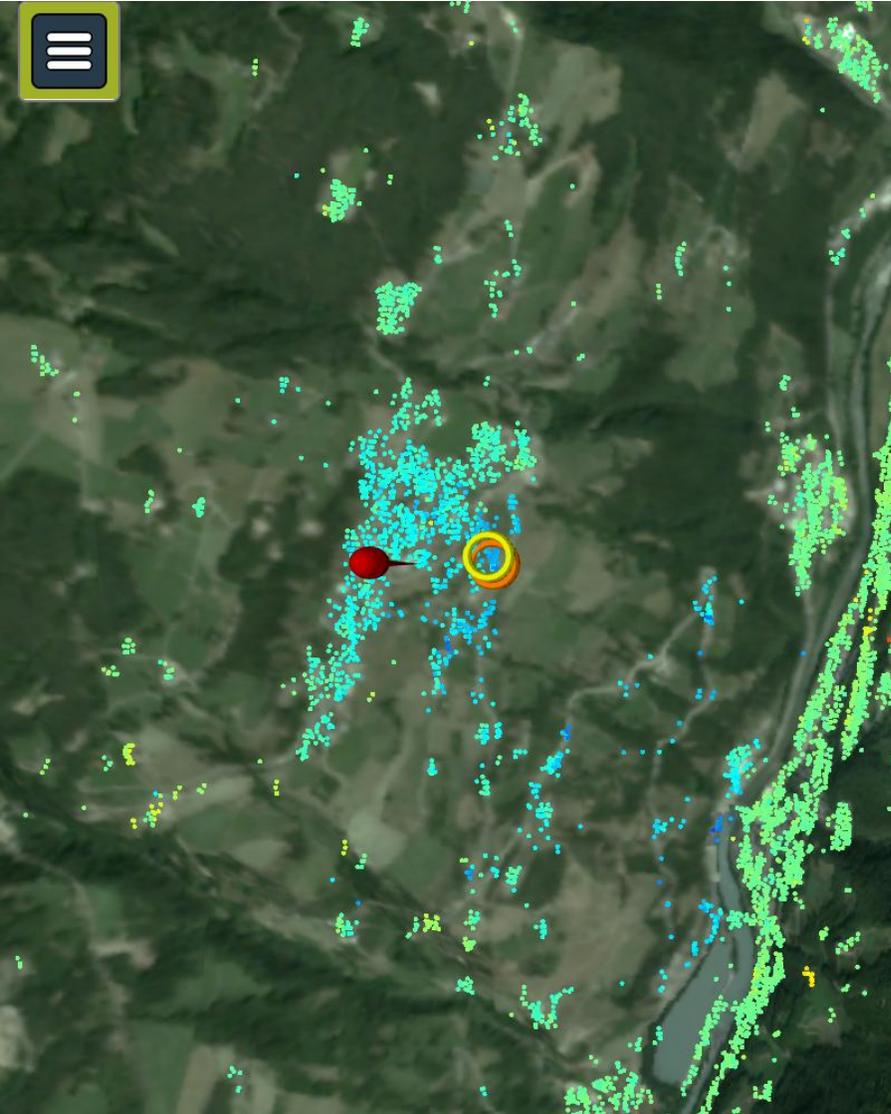
1. A23-117: 2WBrv2Lo7f

Dataset: A23-117
Point ID: 2WBrv2Lo7f
Position: 2611290.25 N 4437807.50 E 774.20 m
Mean velocity: -12.40 mm/year
Coherence: 0.54
RMSE: 4.30 mm

Incidence angle: 39.95°
Track angle: 350.12°



1. A23-117: 2WBrv2Lo7f



Barbiano



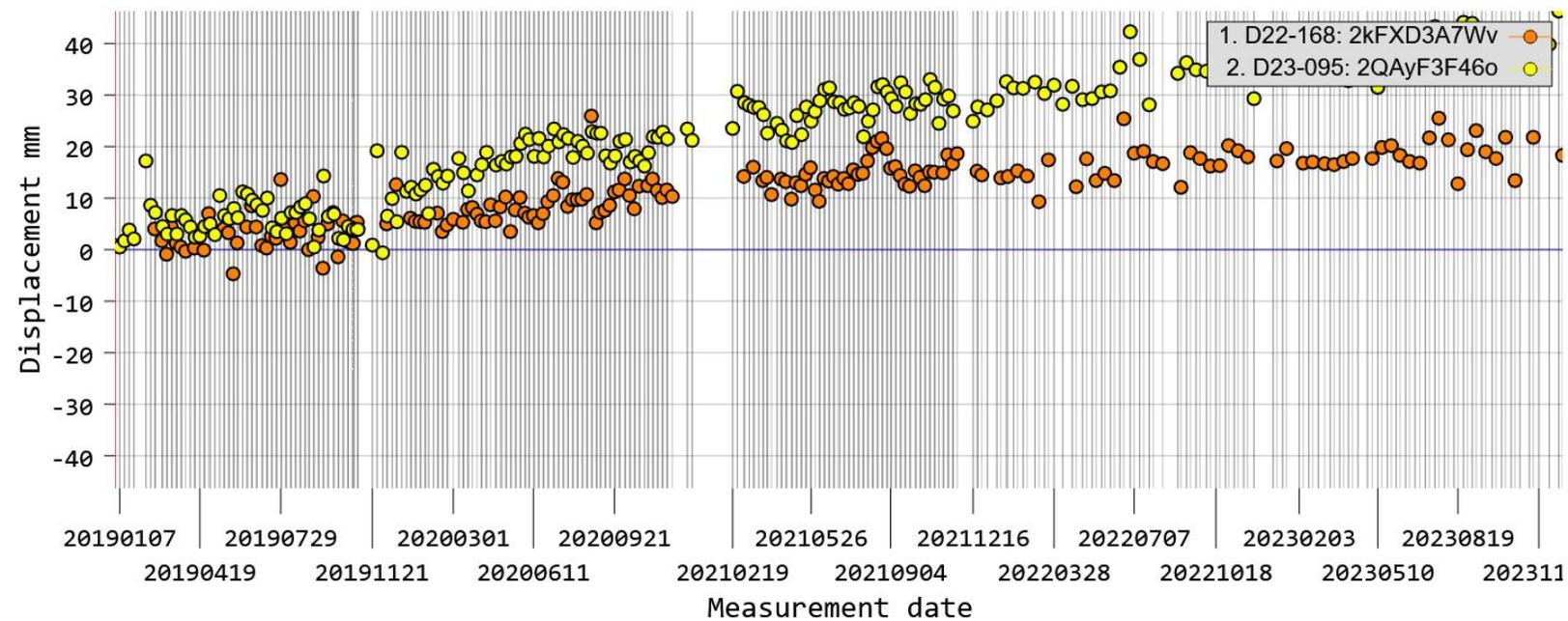
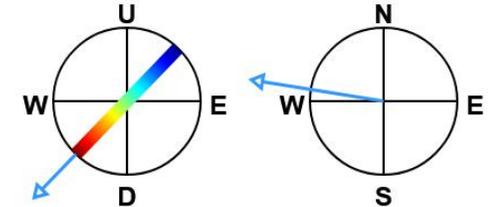
Plot of 1 point

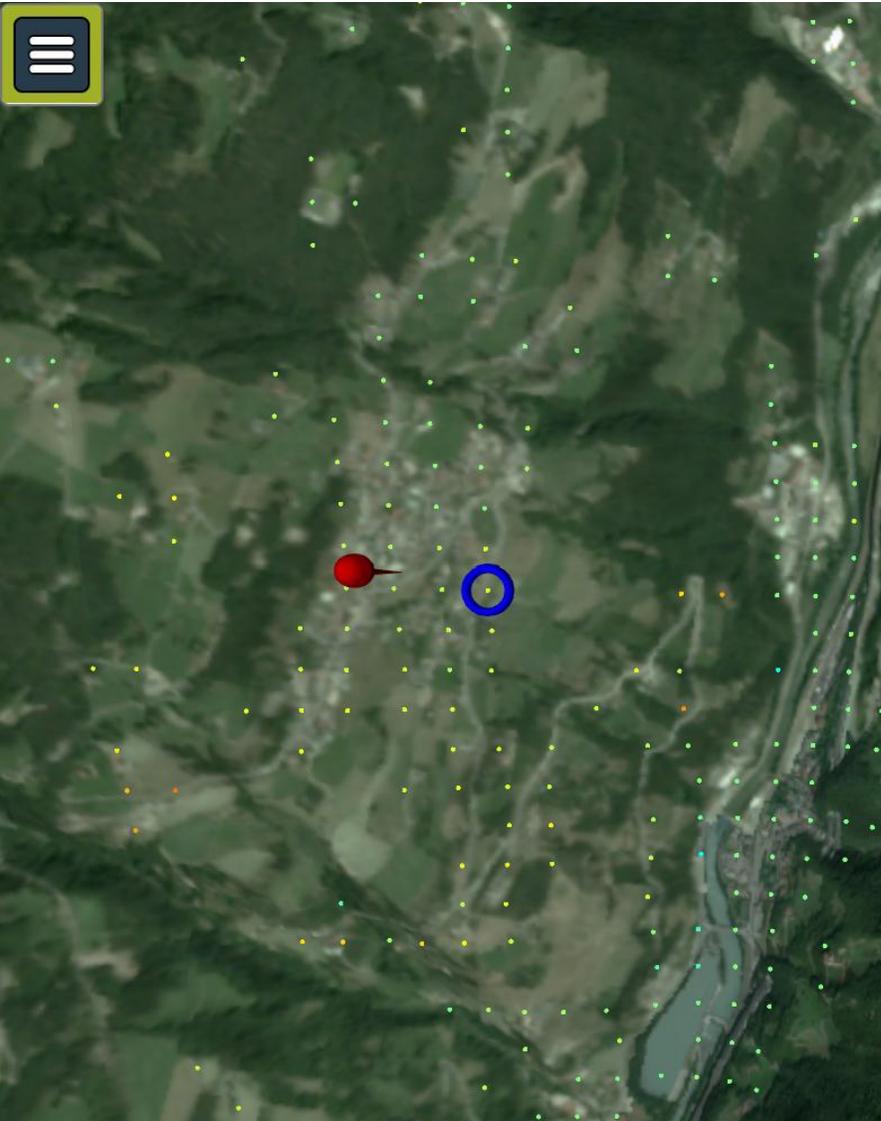
X

2. D23-095: 2QAYF3F46o

Dataset: D23-095
Point ID: 2QAYF3F46o
Position: 2611313.25 N 4437823.50 E 780.60 m
Mean velocity: 8.20 mm/year
Coherence: 0.68
RMSE: 3.40 mm

Incidence angle: 43.85°
Track angle: 189.19°





Barbiano

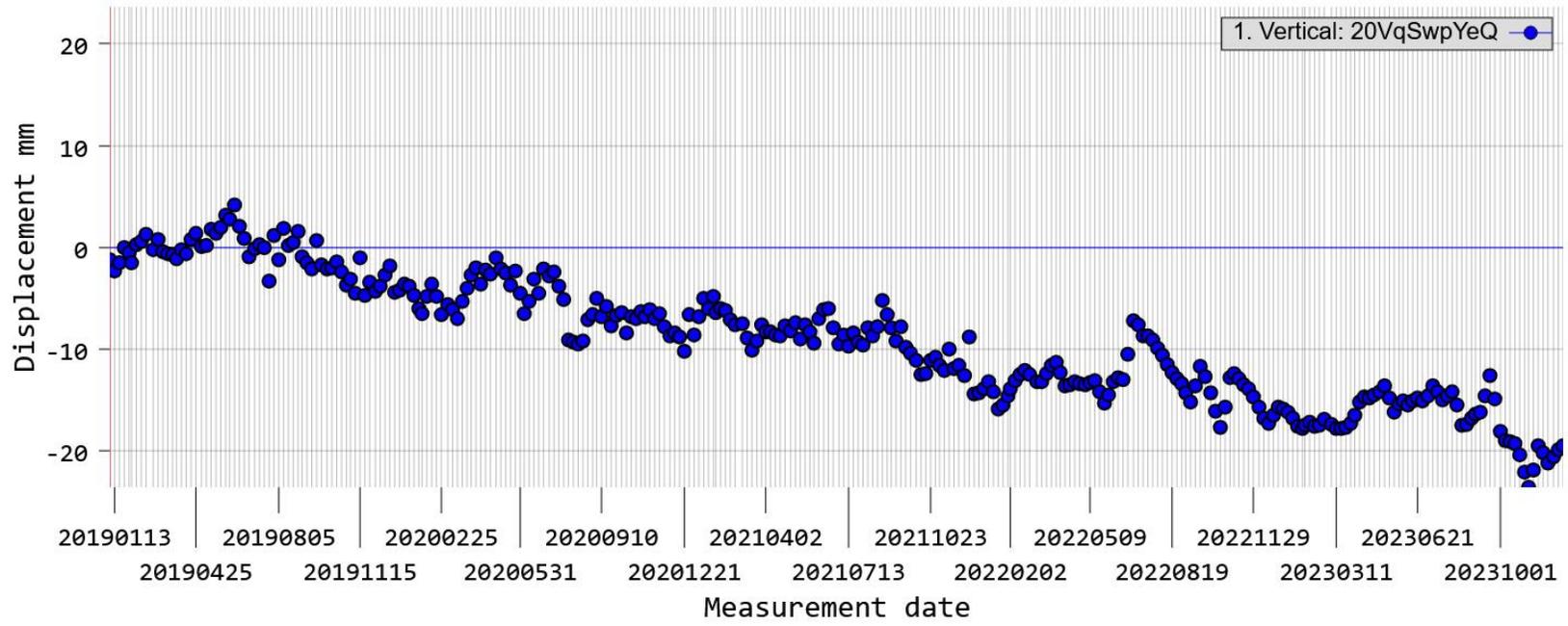
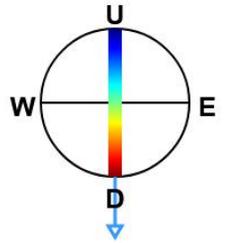


Plot of 1 point

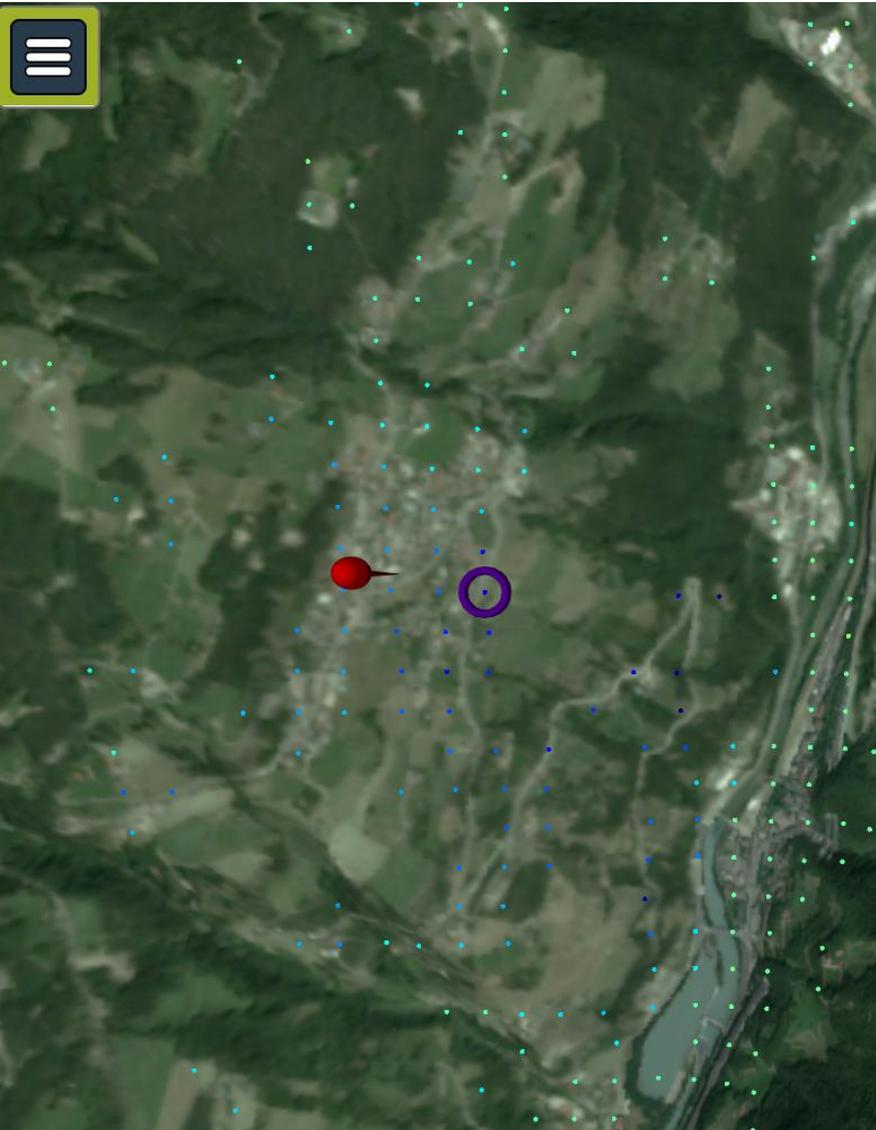
1. Vertical: 20VqSwpYeQ

Dataset: Vertical
Point ID: 20VqSwpYeQ
Position: 2611250.00 N 4437850.00 E 769.30 m
Mean velocity: -4.00 mm/year
RMSE: 1.60 mm

Incidence angle: 0.00°



1. Vertical: 20VqSwpYeQ



Barbiano



Plot of 1 point

1. East/West: 20VqSwpYeQ

Dataset: East/West

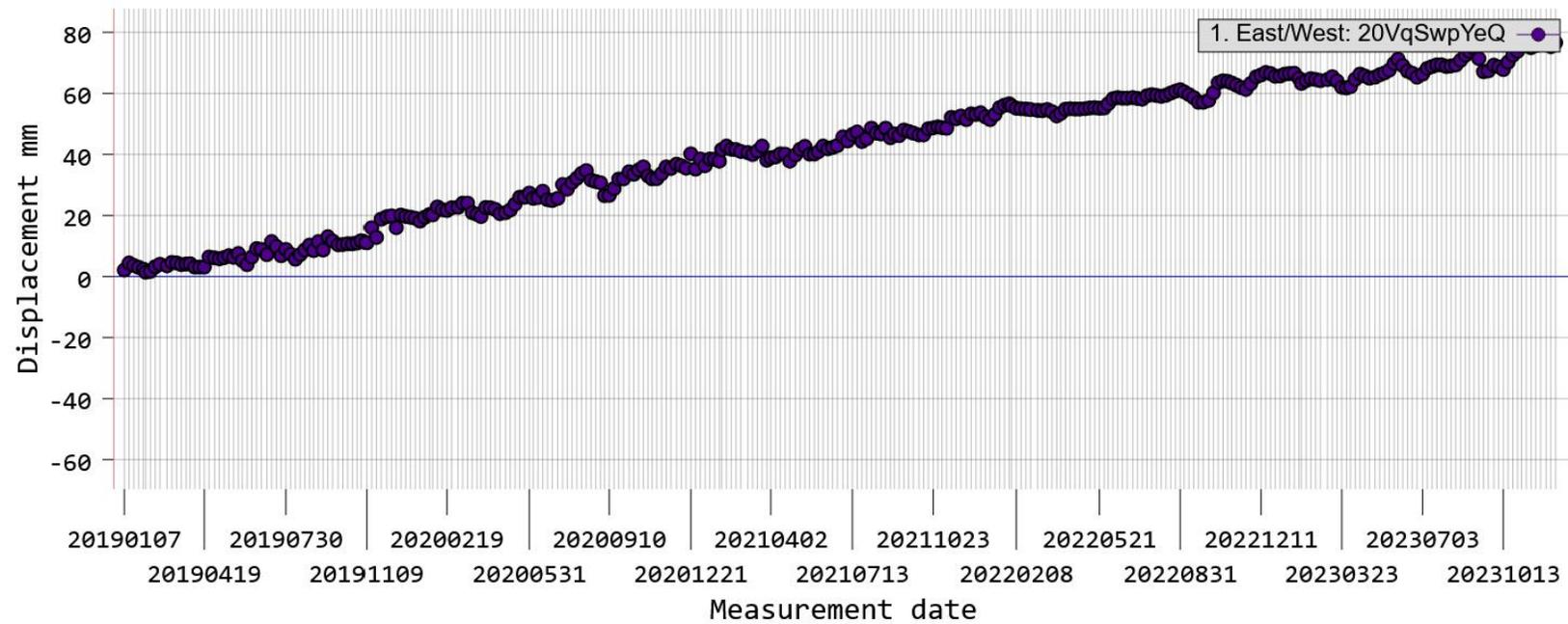
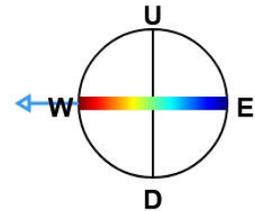
Point ID: 20VqSwpYeQ

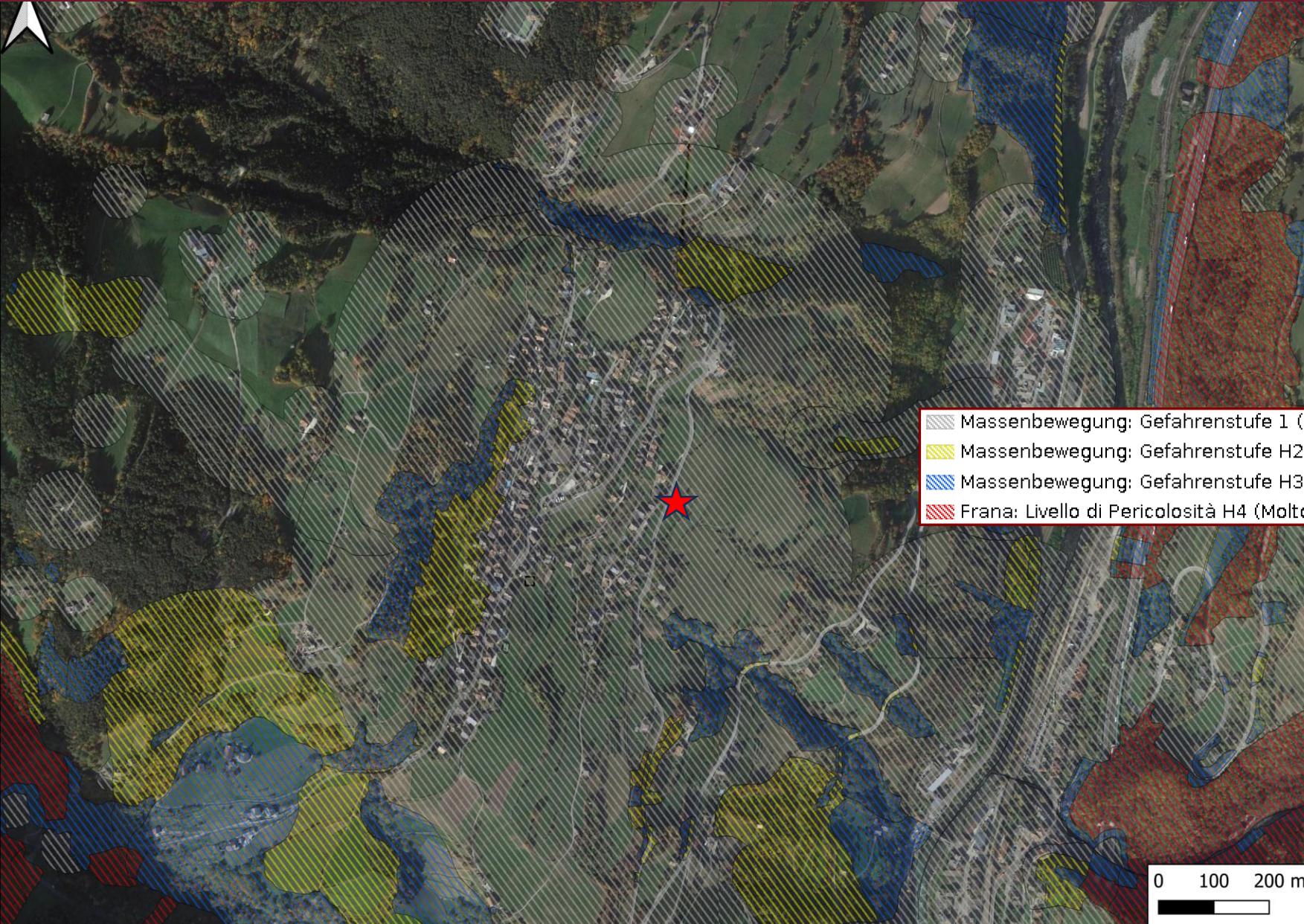
Position: 2611250.00 N 4437850.00 E 769.30 m

Mean velocity: 15.20 mm/year

RMSE: 2.00 mm

Incidence angle: 270.00°





- Massenbewegung: Gefahrenstufe 1 (Untersucht und nicht gefährlich) - Frana: Livello di Pericolosità 1 (Basso)
- Massenbewegung: Gefahrenstufe H2 (Mittel) - Frana: Livello di Pericolosità H2 (Medio)
- Massenbewegung: Gefahrenstufe H3 (Hoch) - Frana: Livello di Pericolosità H3 (Elevato)
- Frana: Livello di Pericolosità H4 (Molto elevato) - Frana: Livello di Pericolosità H4 (Molto elevato)

EGMS
*download dei dati ed
implementazione in ambiente GIS*

   **DATI DISPONIBILI**   

▼ CALIBRATED L'area è coperta da due dataset ascendenti e due discendenti

▼ Descending

EGMS_L2b_095_0800_IW3_VV_2019_2023_1.zip  
Level: L2B Type: CALIBRATED
Size: 138.53 MB (145258317 bytes) **Per scaricare i dati**
Burst ID: 095-0800-IW3-VV Burst cycle: 0800 **Per visualizzare dataset su mappa**
Polarization: VV Relative orbit: 095 Swath: IW3

EGMS_L2b_168_0799_IW1_VV_2019_2023_1.zip  
Level: L2B Type: CALIBRATED
Size: 150.25 MB (157546956 bytes)
Burst ID: 168-0799-IW1-VV Burst cycle: 0799
Polarization: VV Relative orbit: 168 Swath: IW1

▼ Ascending

EGMS_L2b_117_0273_IW2_VV_2019_2023_1.zip  
Level: L2B Type: CALIBRATED
Size: 182.51 MB (191377865 bytes)
Burst ID: 117-0273-IW2-VV Burst cycle: 0273
Polarization: VV Relative orbit: 117 Swath: IW2

EGMS_L2b_117_0274_IW2_VV_2019_2023_1.zip  
Level: L2B Type: CALIBRATED
Size: 160.01 MB (167782432 bytes)
Burst ID: 117-0274-IW2-VV Burst cycle: 0274
Polarization: VV Relative orbit: 117 Swath: IW2

▼ ORTHO-EAST

EGMS_L3_E44N25_100km_E_2019_2023_1.zip  
Level: L3 Type: ORTHO-EAST
Size: 83.07 MB (87106611 bytes)

▼ ORTHO-UP

EGMS_L3_E44N25_100km_U_2019_2023_1.zip  
Level: L3 Type: ORTHO-UP
Size: 81.09 MB (85028110 bytes)

Egna            

Product Archive



Click the  button to enter geographical search mode. Once in this mode, click in the map to draw a polygon representing your area of interest. Double-click to close the polygon and perform the product archive search. Once a search completes, an overview of results will appear here.

2. Disegnare poligono area di interesse e chiuderlo con doppio click

You are logged in as n00ciz0z.

1. Scegliere i prodotti che si vogliono scaricare

 Archive search returned 6 results

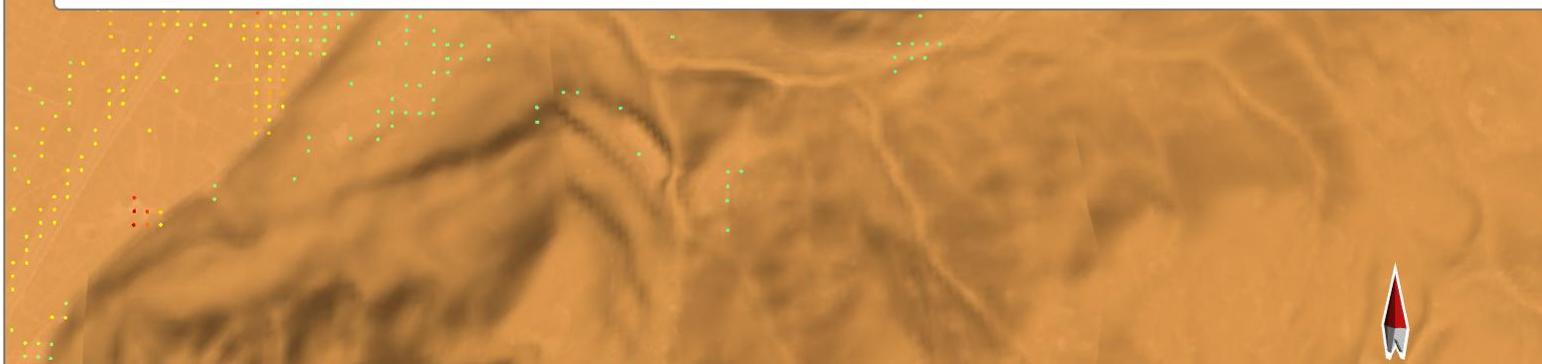
Release: 2018-2022 2019-2023

Level: BASIC (Level 2A) CALIBRATED (Level 2B) ORTHO (Level 3)

[Download links](#)

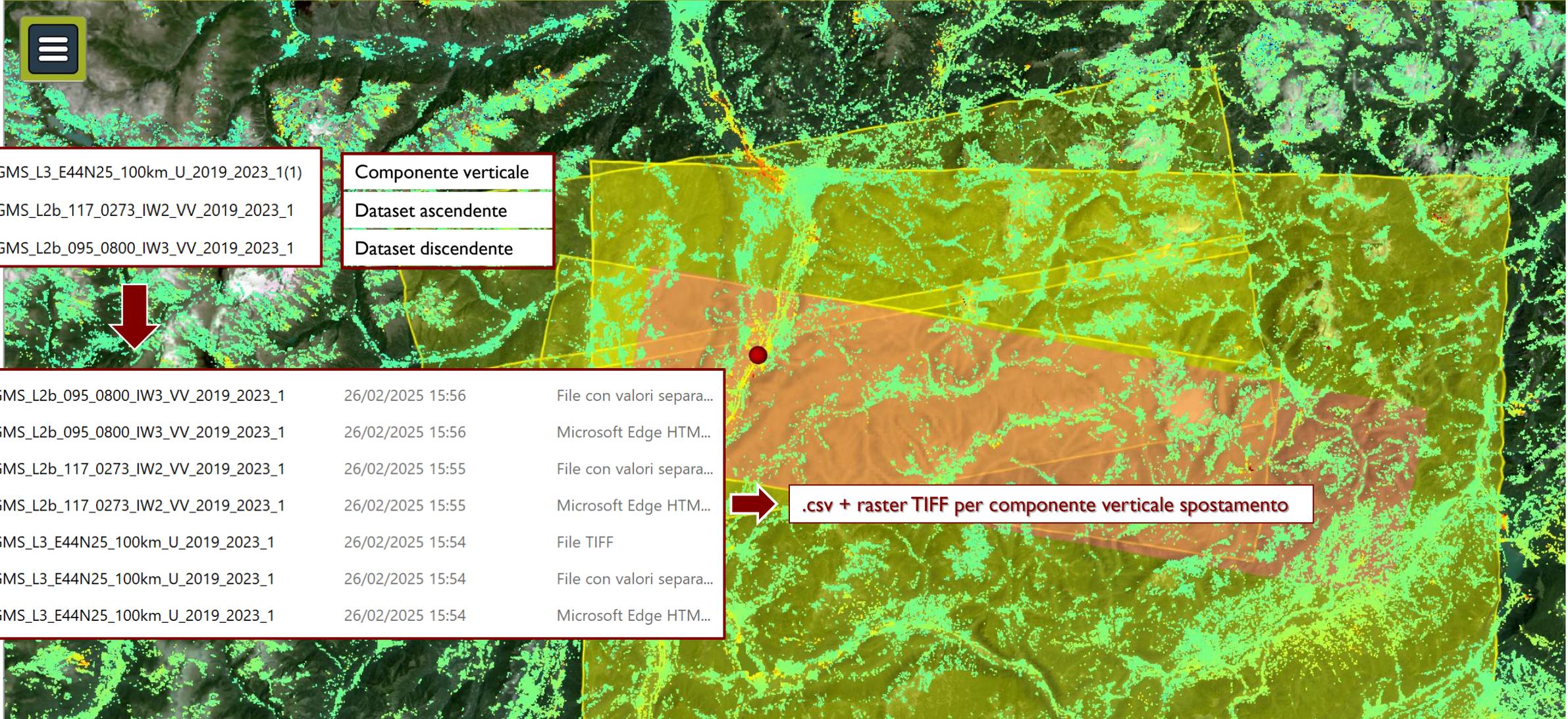
[Clear results](#)

[View results](#)



Per poter scaricare i dati EGMS è necessario effettuare la registrazione, ed essere loggati

You are not logged in. You must [log in](#) before performing a search



- EGMS_L3_E44N25_100km_U_2019_2023_1(1)
- EGMS_L2b_117_0273_IW2_VV_2019_2023_1
- EGMS_L2b_095_0800_IW3_VV_2019_2023_1

- Componente verticale
- Dataset ascendente
- Dataset discendente

EGMS_L2b_095_0800_IW3_VV_2019_2023_1	26/02/2025 15:56	File con valori separa...
EGMS_L2b_095_0800_IW3_VV_2019_2023_1	26/02/2025 15:56	Microsoft Edge HTM...
EGMS_L2b_117_0273_IW2_VV_2019_2023_1	26/02/2025 15:55	File con valori separa...
EGMS_L2b_117_0273_IW2_VV_2019_2023_1	26/02/2025 15:55	Microsoft Edge HTM...
EGMS_L3_E44N25_100km_U_2019_2023_1	26/02/2025 15:54	File TIFF
EGMS_L3_E44N25_100km_U_2019_2023_1	26/02/2025 15:54	File con valori separa...
EGMS_L3_E44N25_100km_U_2019_2023_1	26/02/2025 15:54	Microsoft Edge HTM...

.csv + raster TIFF per componente verticale spostamento

Google qgis

Tutti Video Immagini Notizie

QGIS

https://qgis.org › download · Traduci questa

Download · QGIS Web Site

Browser

- Preferiti
- Segnalibri Spaziali
- Home
- C:\ (Acer)
- G:\ (Google Drive)
- GeoPackage
- SpatiaLite
- PostgreSQL
- SAP HANA
- MS SQL Server
- Oracle
- WMS/WMTS
- Scene

Layer

- AOI Egna
- Google Satellite

Gestore delle Sorgenti Dati — Testo Delimitato

Nome file **C:\Users\silvi\OneDrive\Desktop\2025\Bozen\Egna\Egms_L2b_095_0800_IW3_VV_2019_2023_1.csv**

Nome layer EGMS_L2b_095_0800_IW3_VV_2019_2023_1 Codifica UTF-8

Formato file

- CSV (formato testo delimitato)
- Delimitatore espressione regolare
- Delimitatori personalizzati

Opzioni Record e Campi

Definizione della Geometria

- Coordinate del punto
 - Campo X longitudo Campo Z
 - Campo Y latitudine Campo M
 - Coordinate GMS
- Well known text (WKT)
- Nessuna geometria (solo tabella degli attributi)

SR della geometria SR Progetto: EPSG:4326 - WGS 84

Impostazioni del Layer

Dati Campione

	pid	mp_type	latitudo	longitudo	
	abc Testo (stringa)	t/f Booleano	1.2 Decimale (doppia precisione)	1.2 Decimale (doppia precisione)	1.2 Dec
1	1QAyl6jQW4	0	46.119542	11.93746	447091
2	1QAyl6jQW5	0	46.119549	11.937401	447091
3	1QAyl6jhZ6	0	46.119417	11.937445	447091
4	1QAyl6jhZ7	0	46.1194	11.937592	447093
5	1QAyl6j9T3	0	46.119677	11.937384	447091
6	1QAyl6j9T2	0	46.119669	11.937456	447091

Browser

- Preferiti
- Segnalibri Spaziali
- Home
- C:\ (Acer)
- G:\ (Google Drive)
- GeoPackage
- SpatialLite
- PostgreSQL
- SAP HANA
- MS SQL Server
- Oracle
- WMS/WMTS
- Scene

Layer

- EGMS L2b 095 0800 IW3 VV 2019 2023
- AOI_Egna
- Google Satellite

Digita per localizzare (Ctrl+K)

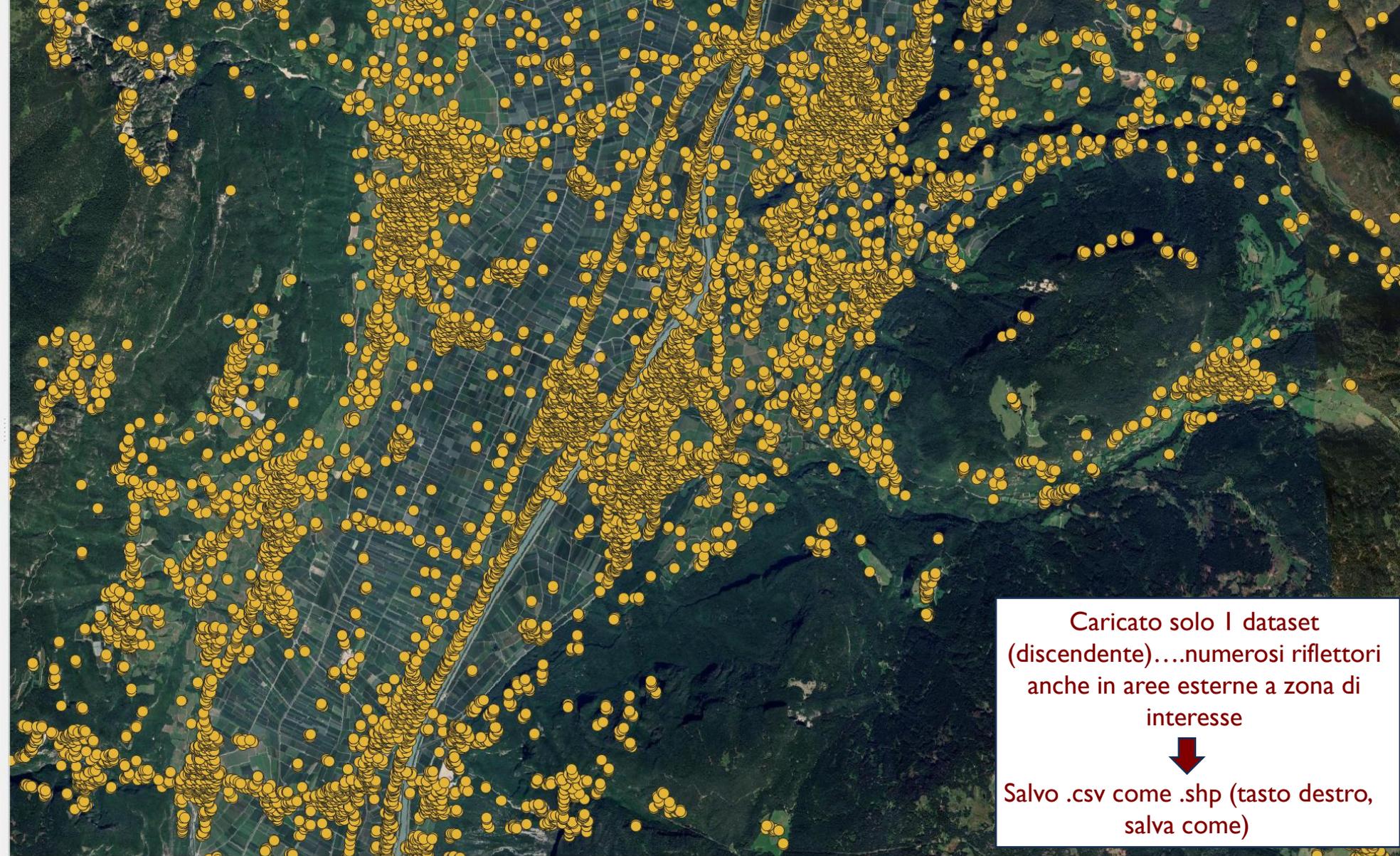
Coordinata 670394 5134093

Scala 1:55967

Lente d'ingrandimento 100%

Rotazione 0,0°

Visualizza EPSG:32632



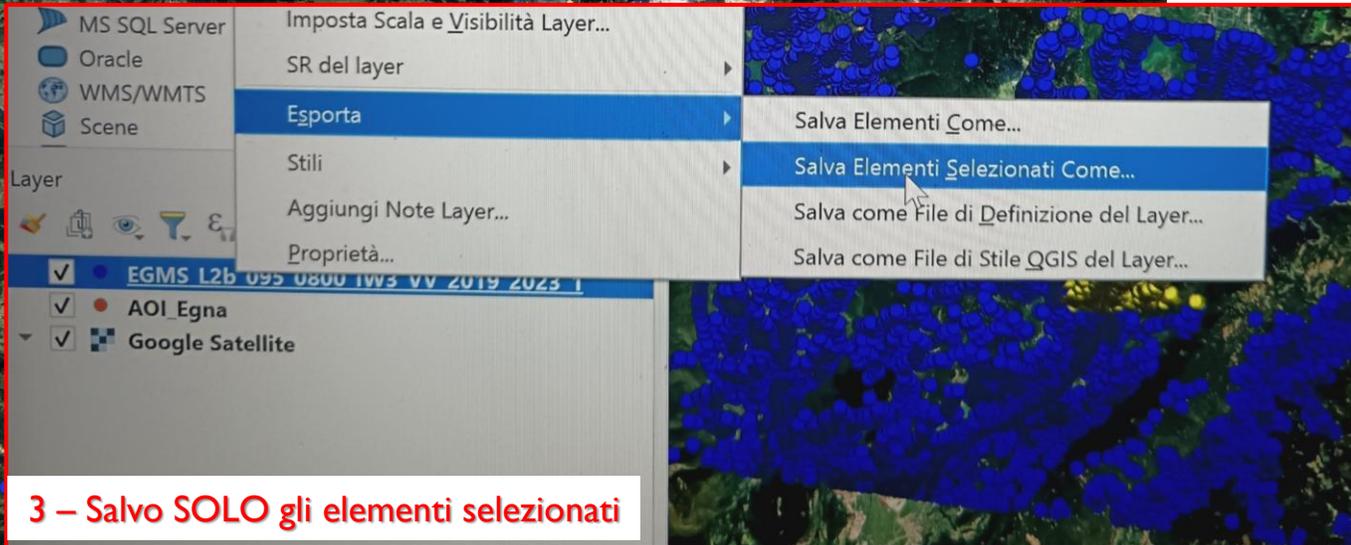
Caricato solo 1 dataset
(discendente)...numerosi riflettori
anche in aree esterne a zona di
interesse

↓

Salvo .csv come .shp (tasto destro,
salva come)

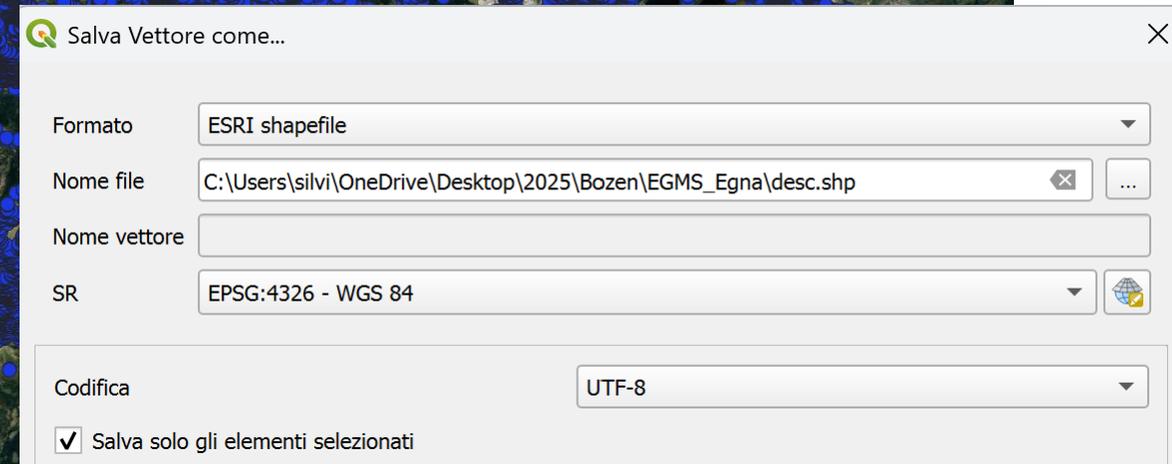


1 - Tasto matita per rendere layer editabile



3 - Salvo SOLO gli elementi selezionati

- Ho lo .shp, lo rendo editabile (click sopra e poi tasto matita nella barra in alto)
- Selezione con apposito strumento  l'area di interesse (che si evidenzia in giallo)
- Tasto destro sul layer (a sinistra) e salvo con nome SOLO gli elementi selezionati
- Rimuovo i layers superflui



Proprietà layer - desc — Simbologia

Categorizzato

Valore 1.2 mean_veloc

Simbolo

Scala colore

Simbolo	Valore	Legenda
<input checked="" type="checkbox"/>	-17,4	-17,399999999999999
<input checked="" type="checkbox"/>	-14,9	-14,900000000000000
<input checked="" type="checkbox"/>	-14,4	-14,400000000000000
<input checked="" type="checkbox"/>	-13,9	-13,900000000000000
<input checked="" type="checkbox"/>	-13,8	-13,800000000000001
<input checked="" type="checkbox"/>	-13,7	-13,699999999999999
<input checked="" type="checkbox"/>	-13,4	-13,400000000000000
<input checked="" type="checkbox"/>	-13,2	-13,199999999999999
<input checked="" type="checkbox"/>	-13,1	-13,100000000000000
<input checked="" type="checkbox"/>	-13	-13,000000000000000
<input checked="" type="checkbox"/>	-12,8	-12,800000000000001
<input checked="" type="checkbox"/>	-12,7	-12,699999999999999
<input checked="" type="checkbox"/>	-12,6	-12,600000000000000
<input checked="" type="checkbox"/>	-12,5	-12,500000000000000
<input checked="" type="checkbox"/>	-12,4	-12,400000000000000
<input checked="" type="checkbox"/>	-12,3	-12,300000000000001
<input checked="" type="checkbox"/>	-12,2	-12,199999999999999
<input checked="" type="checkbox"/>	-12,1	-12,100000000000000
<input checked="" type="checkbox"/>	-12	-12,000000000000000
<input checked="" type="checkbox"/>	-11,9	-11,900000000000000
<input checked="" type="checkbox"/>	-11,8	-11,800000000000001
<input checked="" type="checkbox"/>	-11,7	-11,699999999999999
<input checked="" type="checkbox"/>	-11,6	-11,600000000000000
<input checked="" type="checkbox"/>	-11,5	-11,500000000000000
<input checked="" type="checkbox"/>	-11,4	-11,400000000000000

Classifica + Elimina Tutto

Visualizzazione Layer

Stile

Visualizzazione dei valori di velocità media di spostamento (vestizione del layer)

1. Tasto destro sul layer, PROPRIETA'
2. Definizione della tipologia di simbolo: CATEGORIZZATO (permette di impostare classi di vel di spostamento)
3. Scelta della variabile da visualizzare (VALORE): MEAN_VELOC
4. Scelta del simbolo
5. Scelta della scala di colore (TURBO)
6. Definizione dei valori limite delle classi e dei colori (attenzione alla riproduzione legenda EGMS...valori positivi avvicinamento, negativi allontanamento)
7. Valore definisce limiti 'classi', Legenda è il valore 'pubblicato' in Legenda
8. Applica OK

In ALTERNATIVA, se ho già una scala di colori, STILE, a sinistra e CARICA STILE

OK Annulla Applica Aiuto

Se è disponibile uno stile di colore da caricare

Valore: 1.2 mean_veloc

Simbolo

Scala colore

Simbolo Valore

✓	●	-17,4
✓	●	-14,9
✓	●	-14,4
✓	●	-13,9
✓	●	-13,8
✓	●	-13,7
✓	●	-13,4
✓	●	-13,2
✓	●	-13,1
✓	●	-13
✓	●	-12,8
✓	●	-12,7
✓	●	-12,6
✓	●	-12,5
✓	●	-12,4
✓	●	-12,3
✓	●	-12,2
✓	●	-12,1
✓	●	-12
✓	●	-11,9
✓	●	-11,8
✓	●	-11,7
✓	●	-11,6
✓	●	-11,5
✓	●	-11,4

Gestore Stili Database

Carica stile: Da file

File

Seleziona un file

« Bozen » EGMS_Eгна

Organizza Nuova cartella

Nome: stile_EGMS

Nome file: stile_EGMS

File di Stile

Apri



EGMS: implementazione in QGIS

Plugins Vettore Raster Database Web Mesh
Gestisci ed Installa Plugin...
Console python Ctrl+Alt+P

Plugin | Tutti (1454)
Tutti
Installati
Non installati
Installa da ZIP
Impostazioni

InSA

InSAR Explorer
THYRSIS

InSAR Explorer

InSAR Explorer is a QGIS plugin that allows for dynamic visualization and analysis of InSAR time series data

InSAR Explorer is a QGIS plugin designed for interactive visualization and analysis of InSAR time series results. With a user-friendly interface, it allows users to dynamically plot and explore ground displacement data over time. You can find the source code on GitHub (<https://github.com/luhipi/insar-explorer>). A sample shapefile containing time series data for testing the plugin is available on Zenodo (<https://zenodo.org/records/14052814>). Currently, vector data from SARvey, MintPy, MintPy, and EGMS and raster data from GMTSAR are supported. Please refer to the documentation for more information (<https://luhipi.github.io/insar-explorer/>)

★★★★★ 24 voto(i), 2327 download

Etichette [displacement](#), [time series](#), [sentinel](#), [plot](#), [sentinel-1](#), [deformation](#), [terrasar-x](#), [insar](#), [sarvey](#), [persistent scatterer](#), [sbas](#), [small baseline](#), [psi](#), [miaplpy](#), [mintpy](#)

Maggiori informazioni [homepage](#) [bug tracker](#) [repository del codice](#)

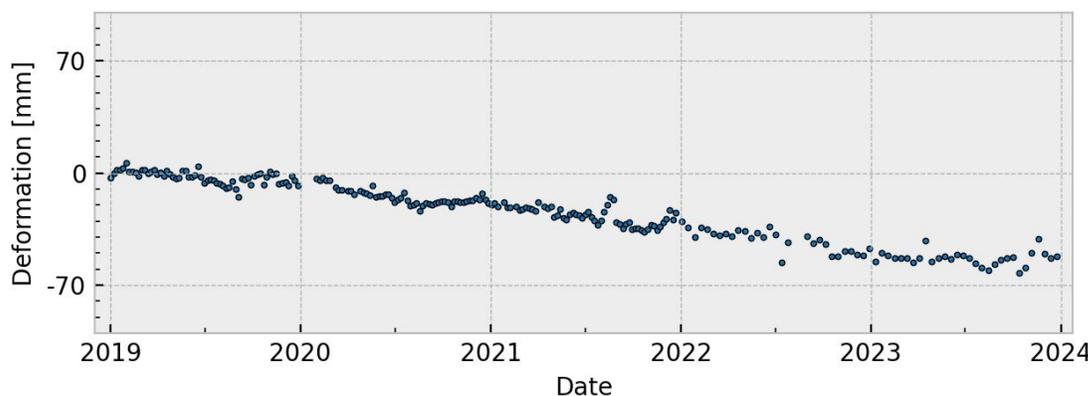
Autore Mahmud Haghighi, Andreas Piter, Erik Rivas

Versione disponibile (stabile) 0.8.0 aggiornato al 29/01/2025 12:16

COME VISUALIZZARE LE SERIE STORICHE DI SPOSTAMENTO DA QGIS? PLUGIN InSAR EXPLORER!



Clicco sul punto in mappa ed ottengo la serie storica



Per modificare grafico, titolo, assi, scala

x=2019 y=-22

Aggiorna Tutto

Installa Plugin

InSAR Explorer

Map Time series Log

Select point

Reeset reference

Replica

28 mm

Fit model

Residual

Plot Residuals

Figure options

Deformation [mm]

70

0

-70

2

2019

Axes

Title

X-Axis

Min 17867.0

Max 19745.0

Label Date

Scale linear

Y-Axis

Min -100.0

Max 100.0

Label Cedimento [mm]

Scale linear

(Re-)Generate automatic legend

OK Annulla Applica

InSAR Explorer

Map Time series Log

Select point

Reeset reference

Replica

28 mm

Fit model

Residual

Plot Residuals

Settings and Export

Per modificare le serie storiche (es titolo assi)

Per esportare le serie storiche

Save plot as image

« Bozen » EGMS_E...

Organizza Nuova cartella

silvia - Personale

ts_plot

Desktop Download Documenti Immagini

Nome file: ts_plot

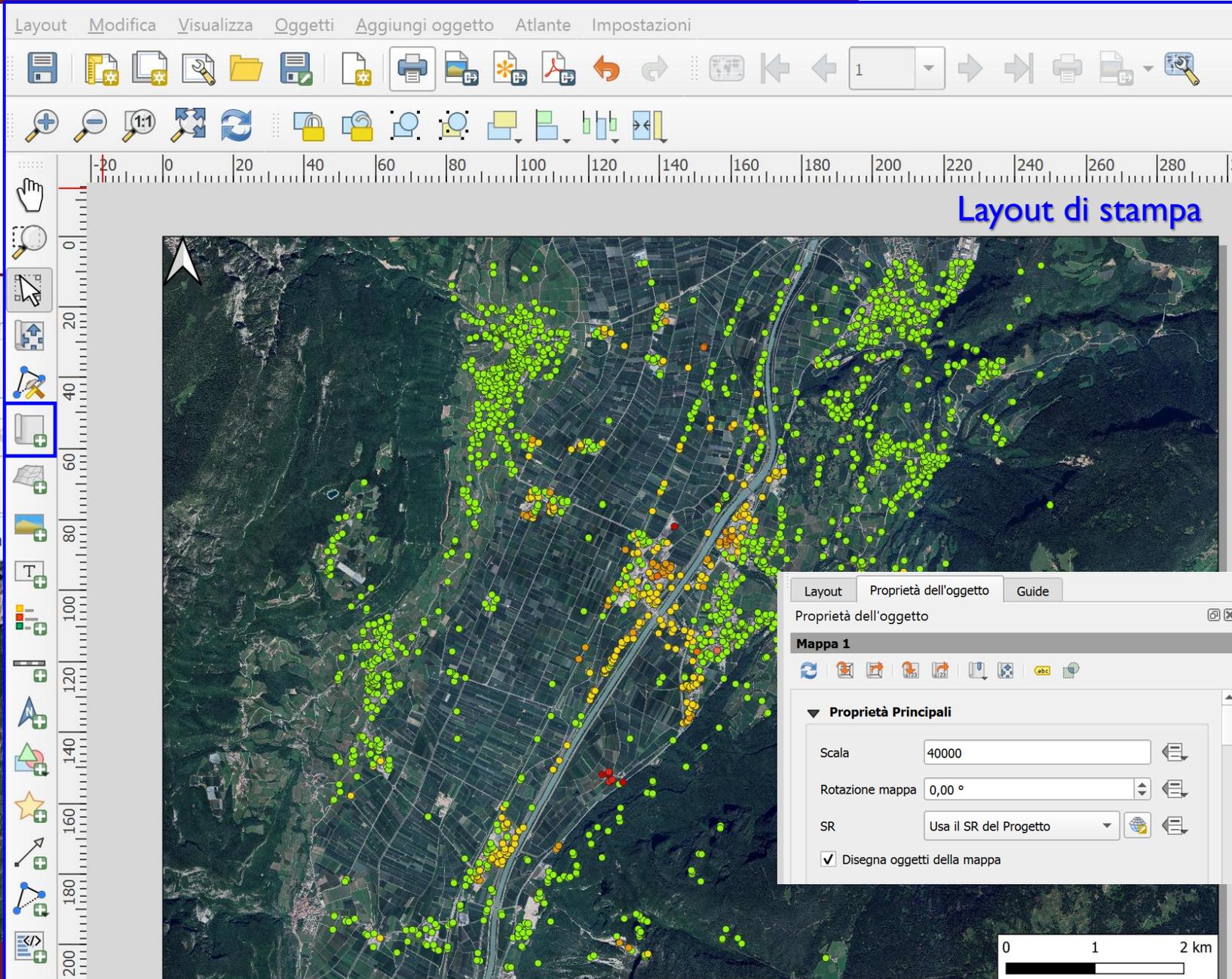
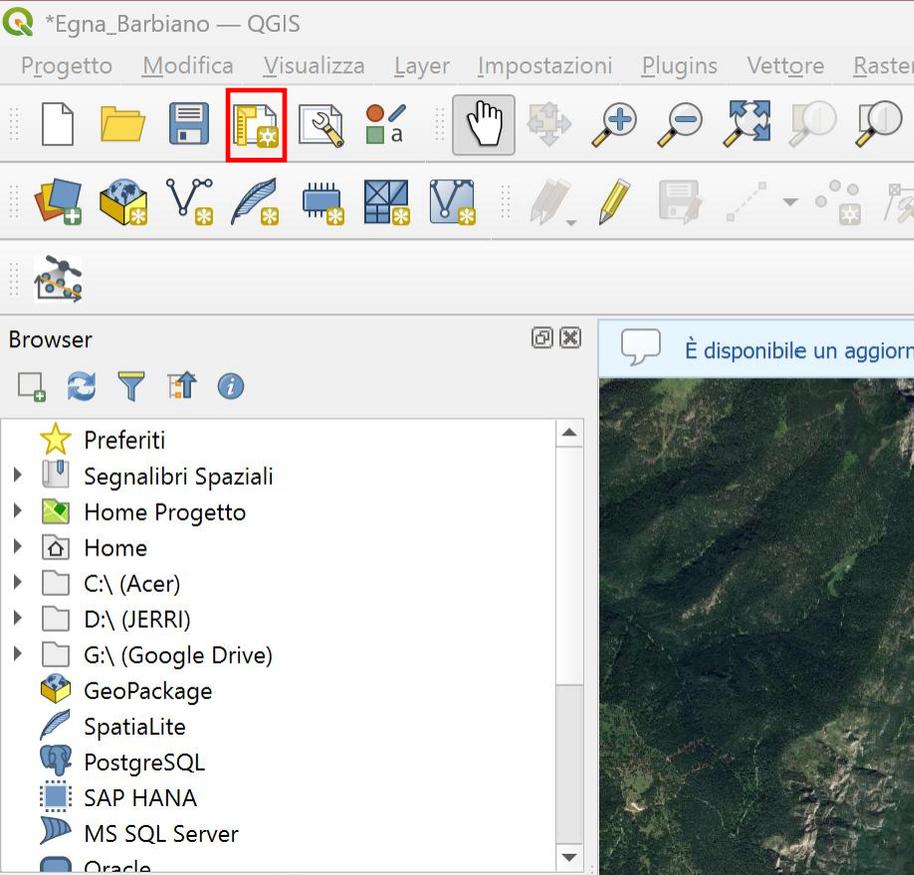
Salva come: Images (*.png *.jpg *.svg *.pdf)



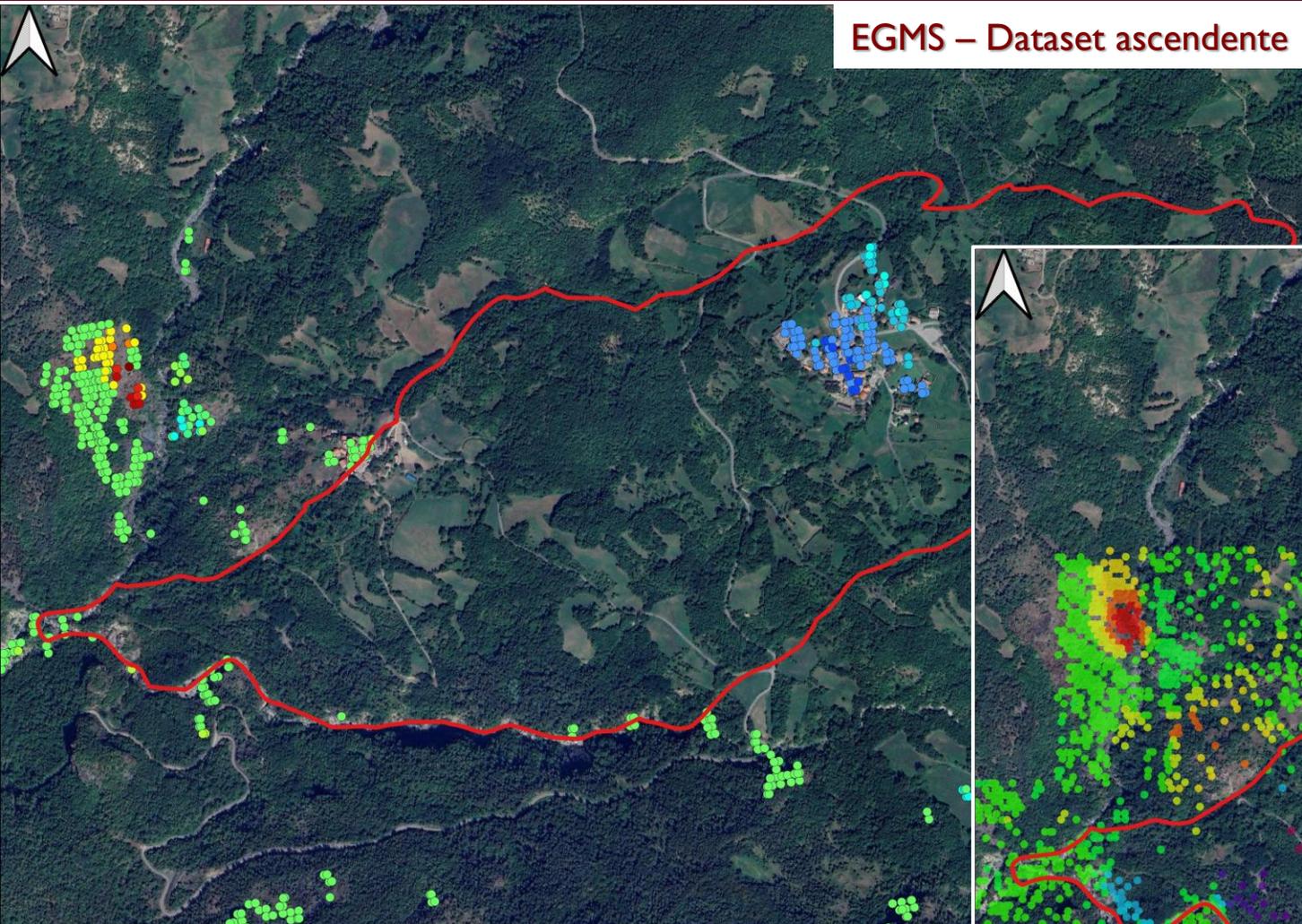
^ Nascondi cartelle

Per esportare le mappe dei riflettori

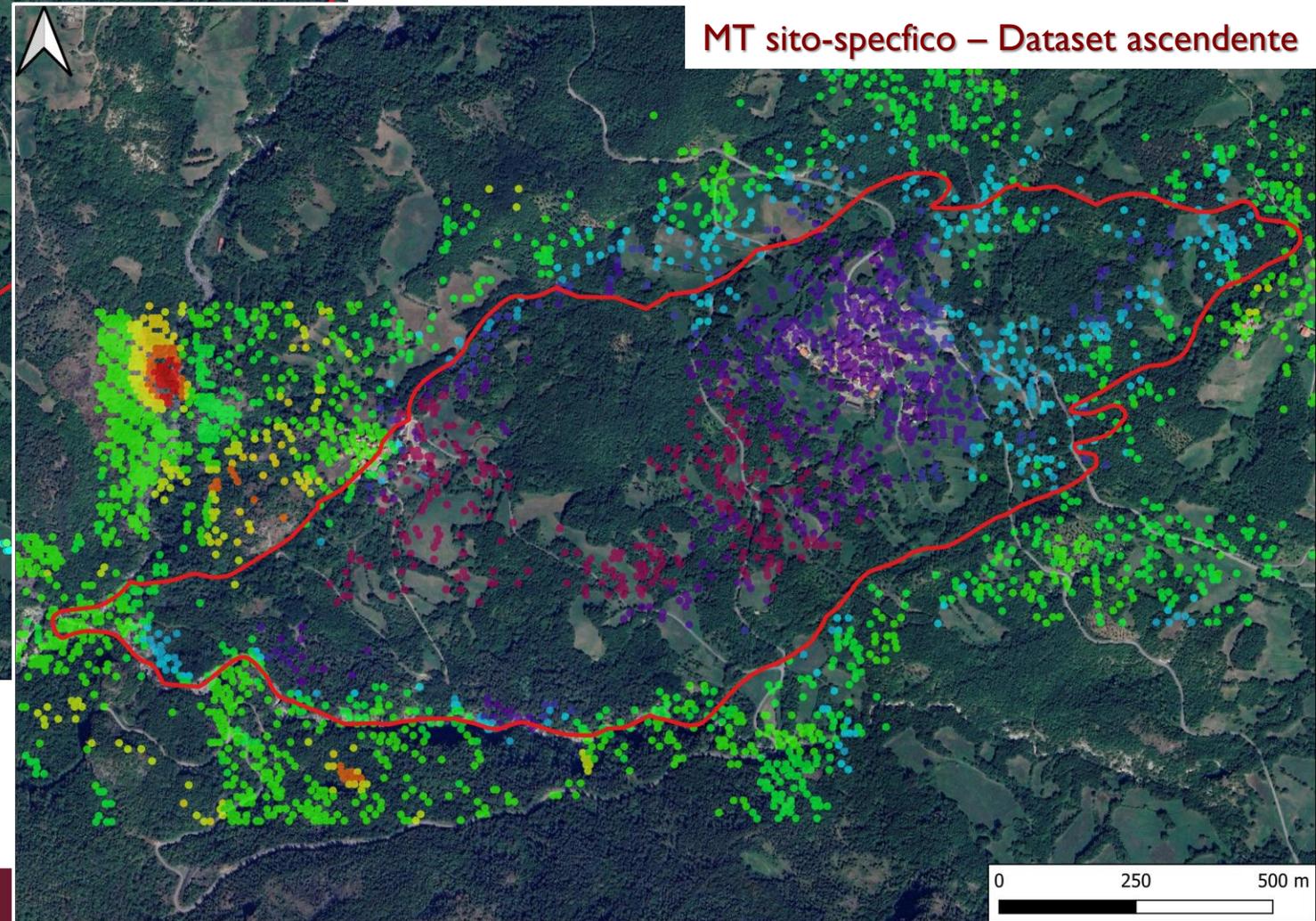
1. Tasto  per aprire il layout di stampa
2. Tasto  per impostare il layout di stampa



EGMS
VS
analisi InSAR sito-specifiche



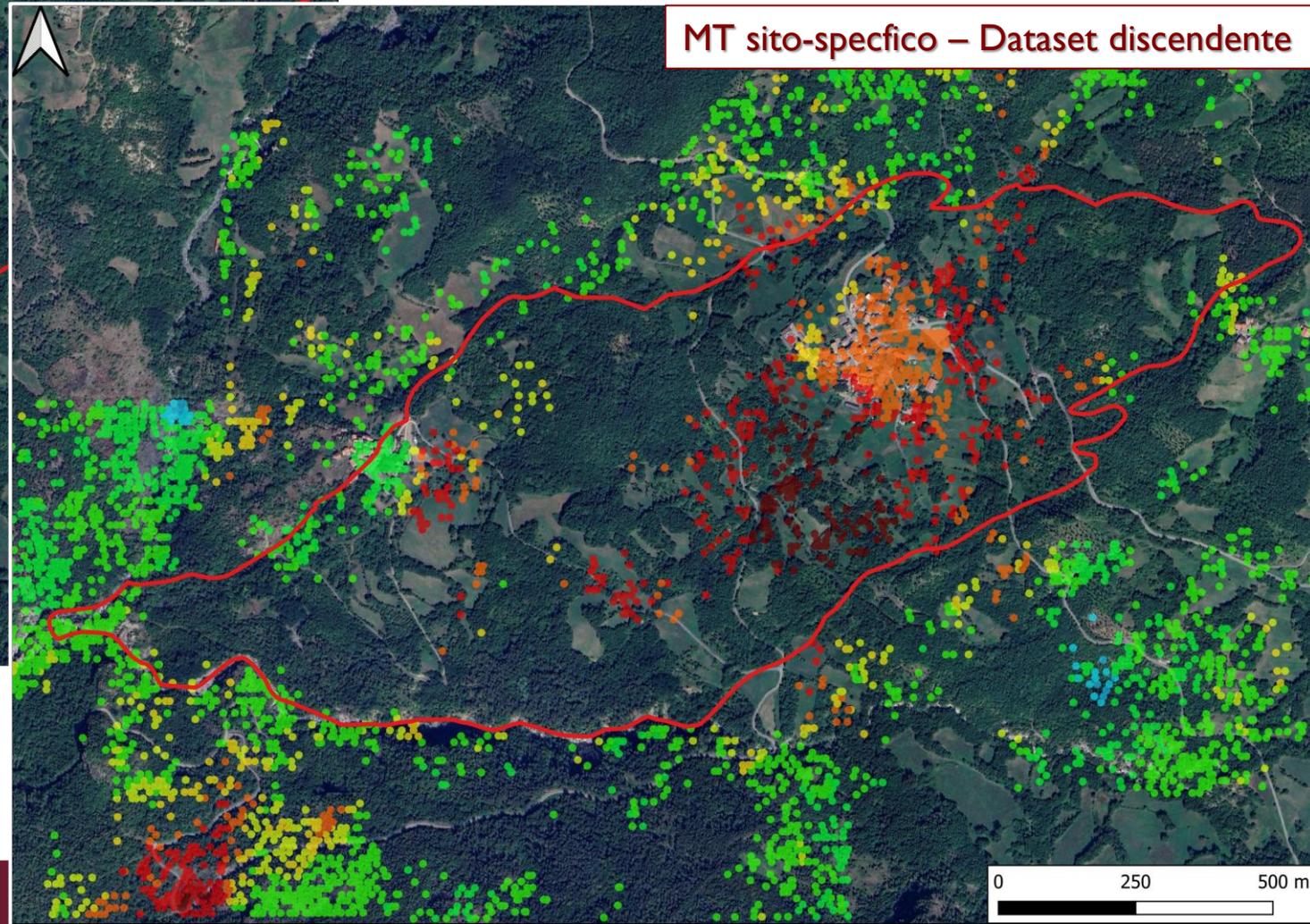
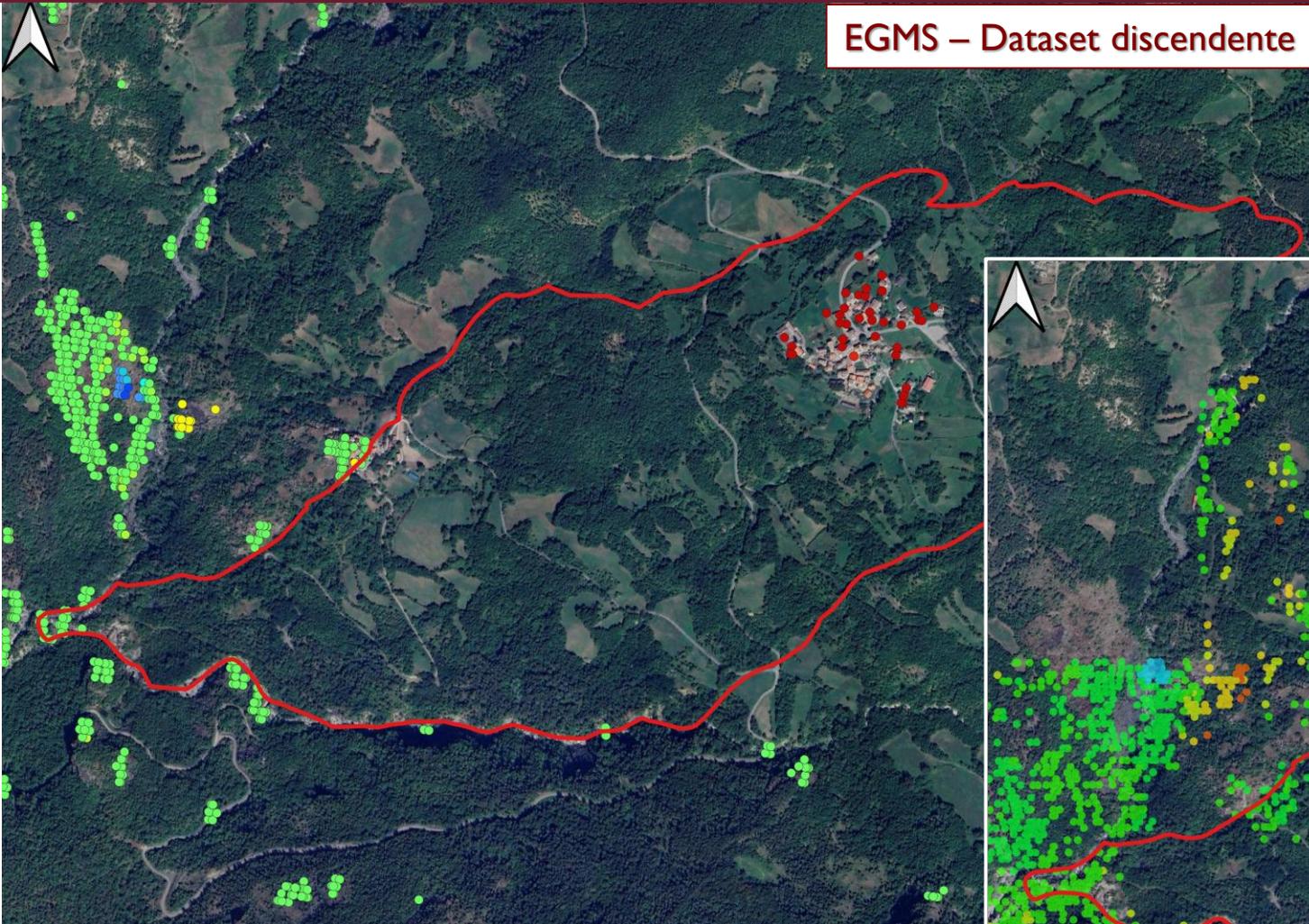
EGMS – Dataset ascendente



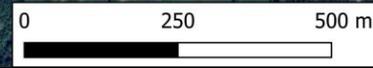
MT sito-specifico – Dataset ascendente

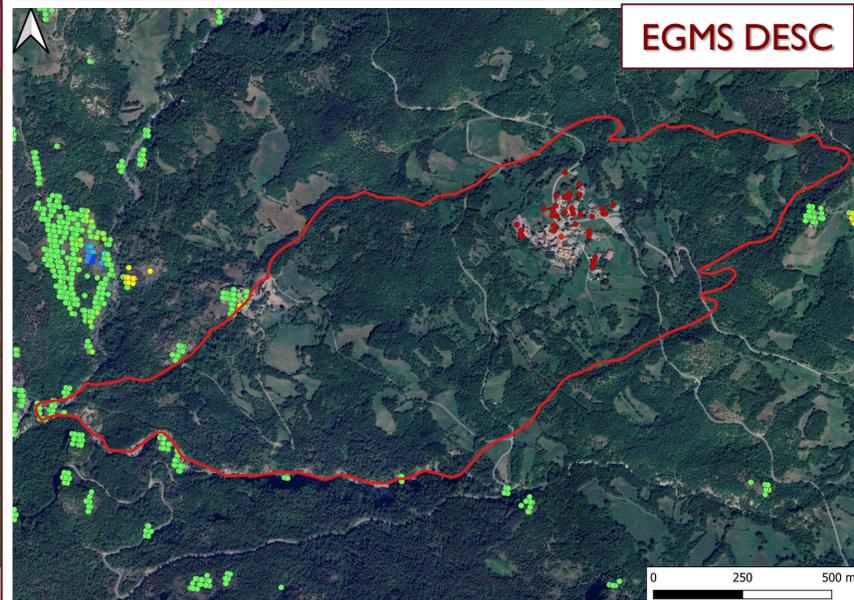
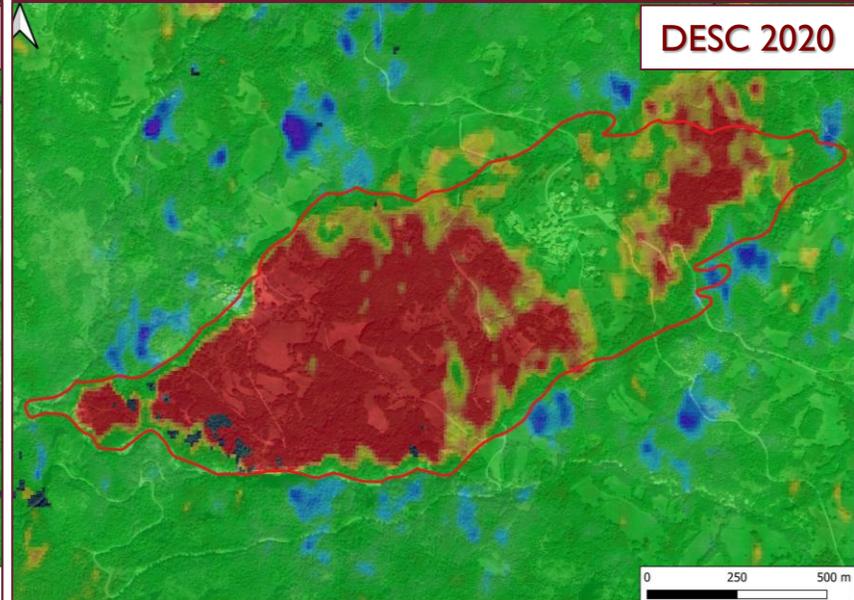
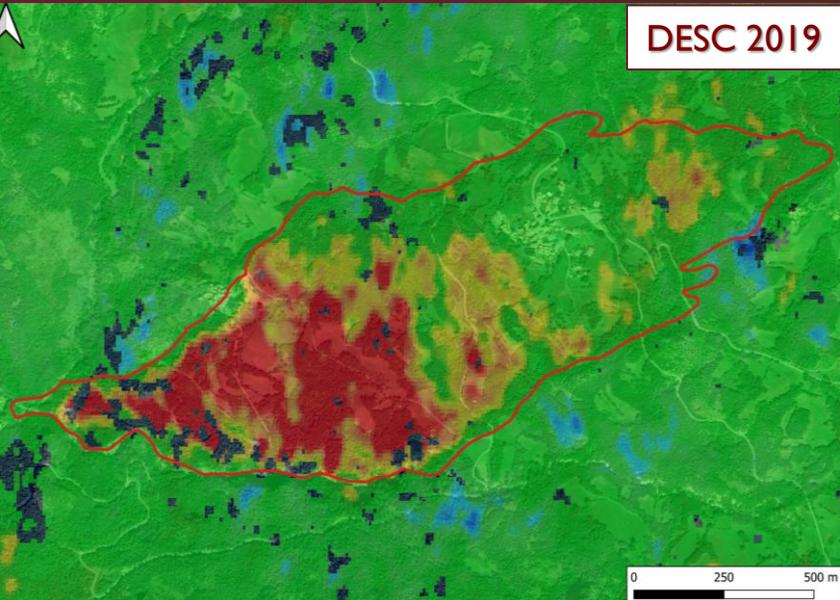
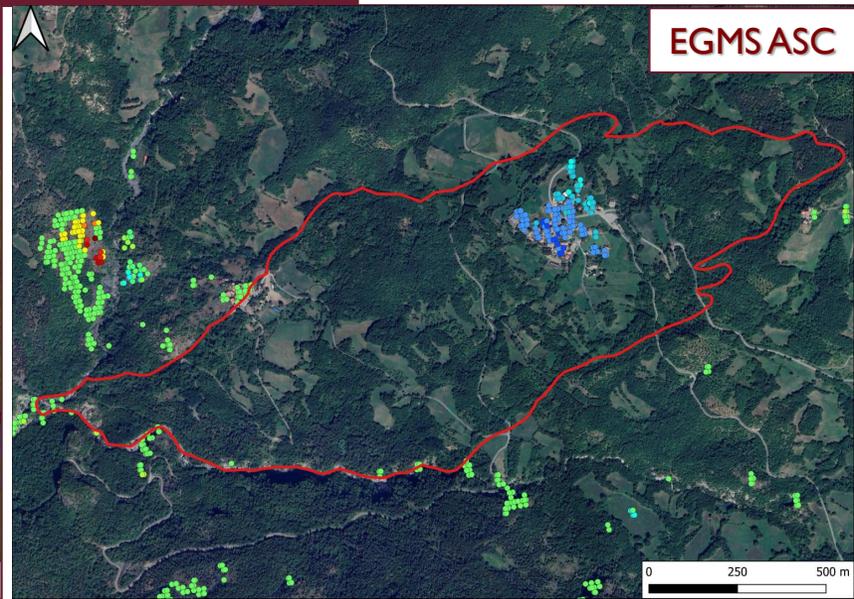
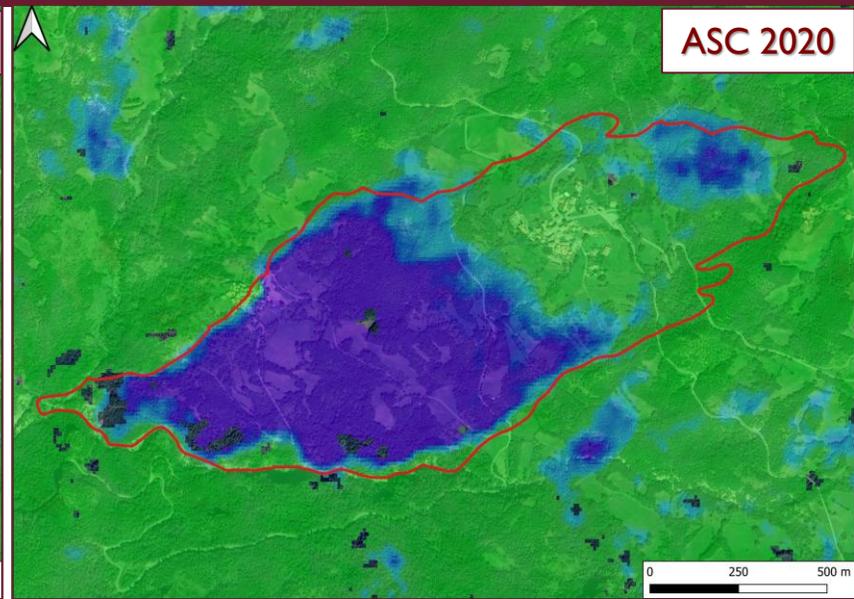
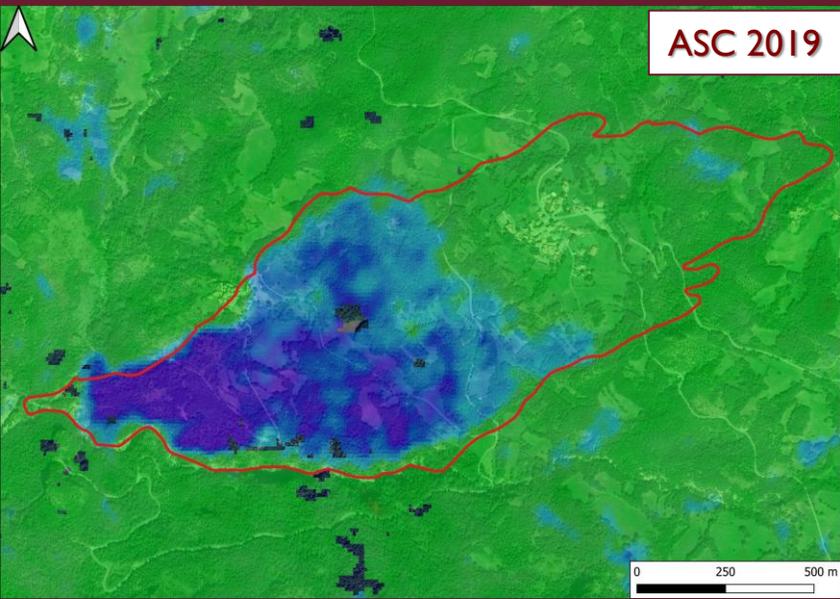
Appennino emiliano, versante interessato da un deposito di frana attiva per scivolamento

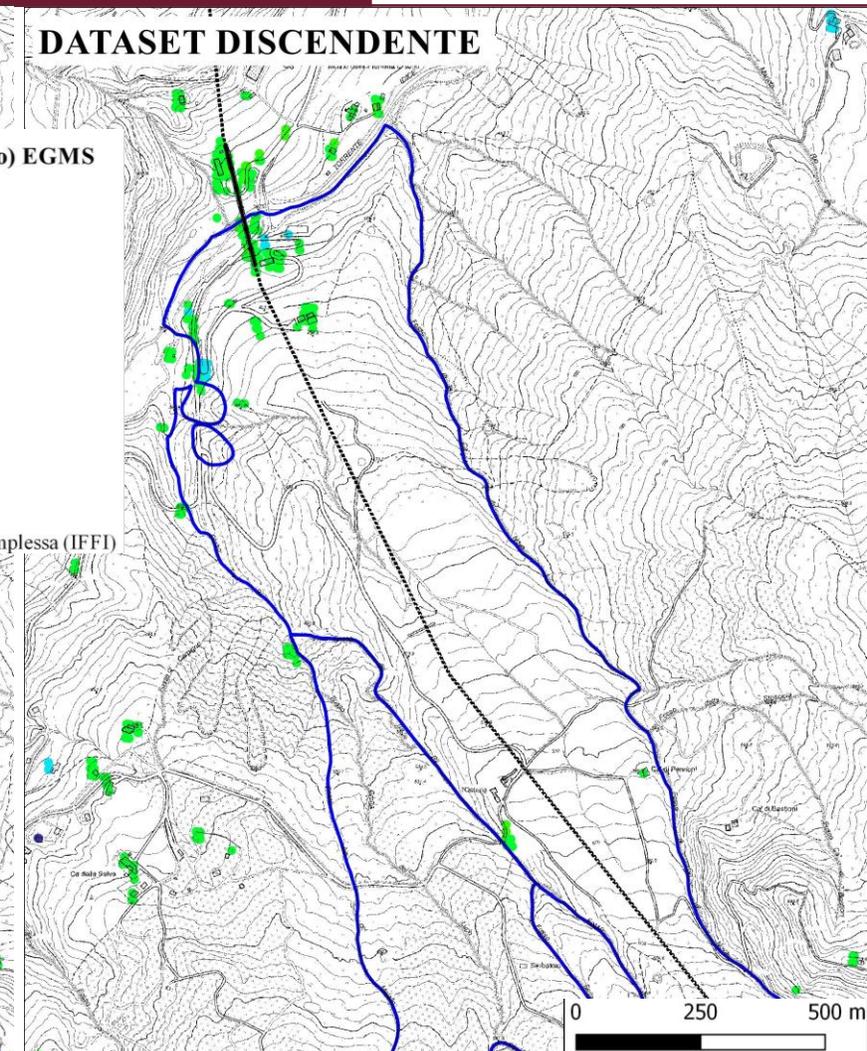
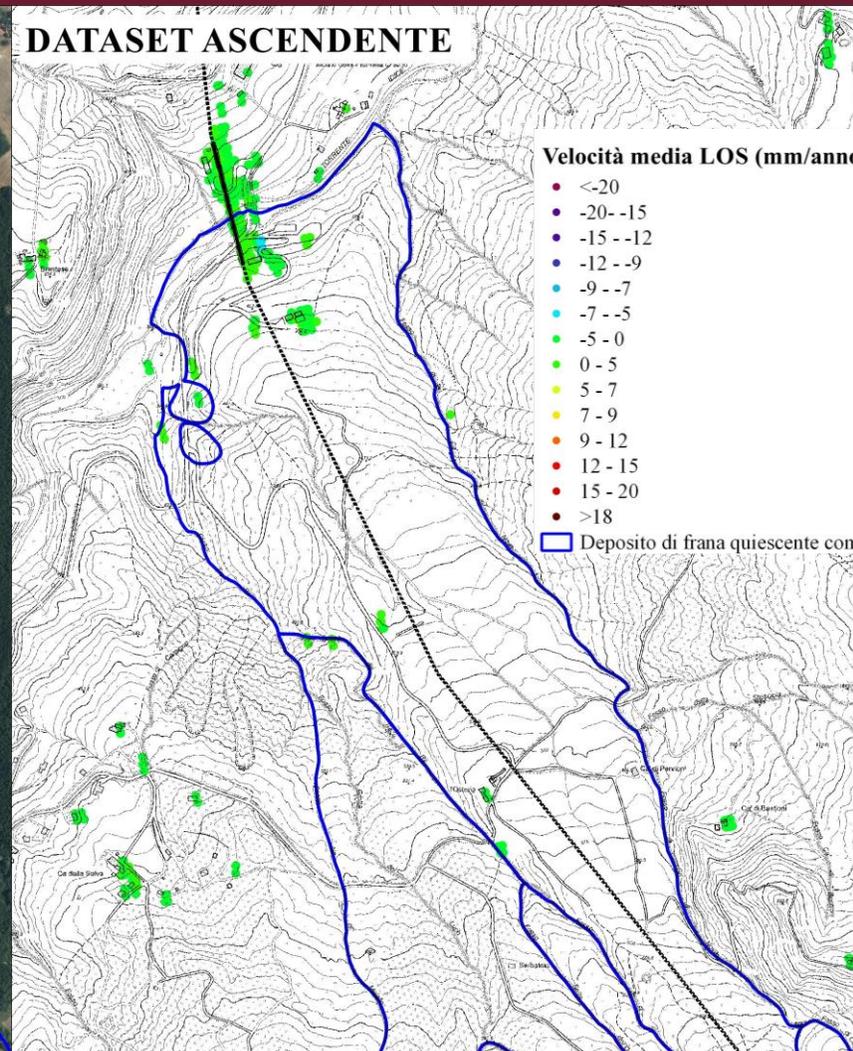
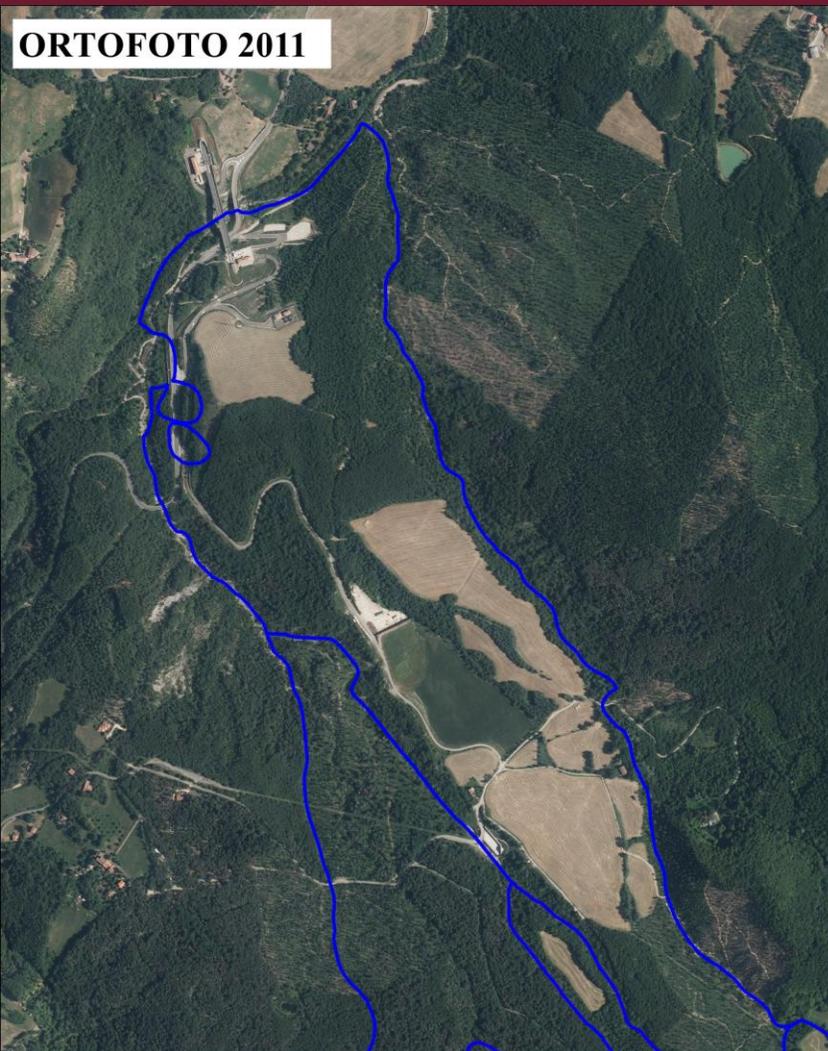




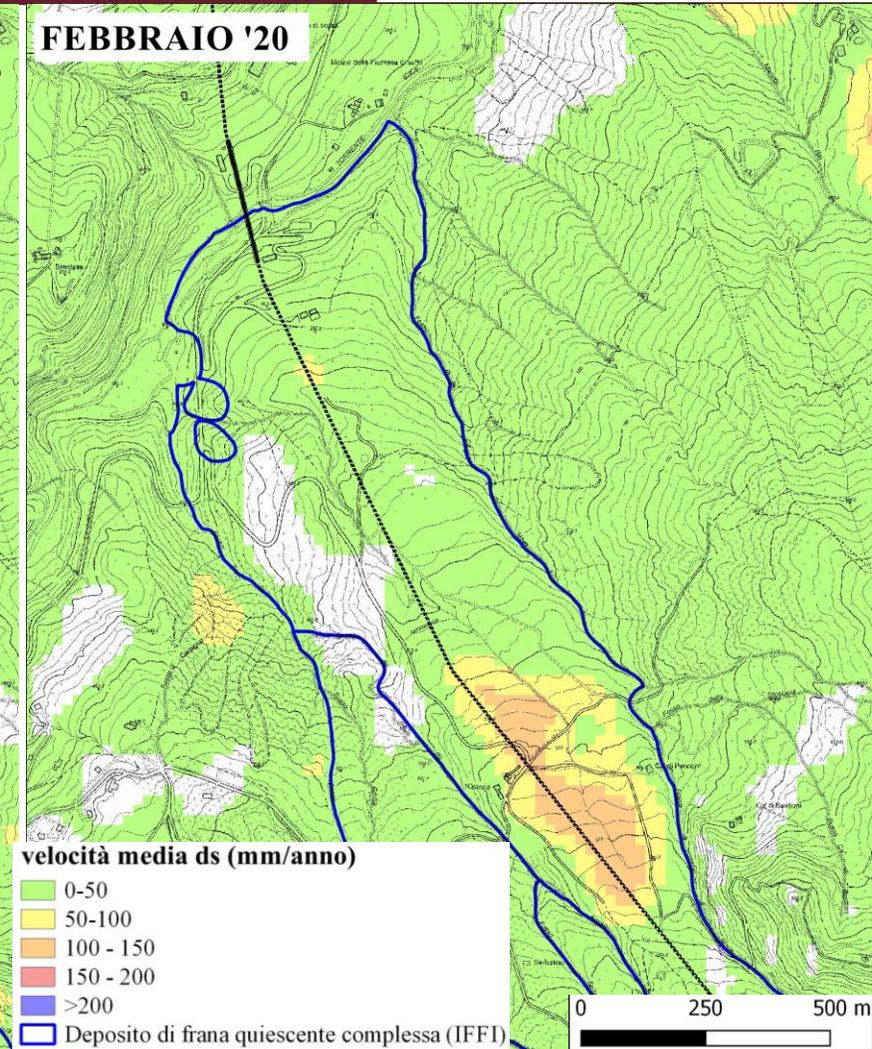
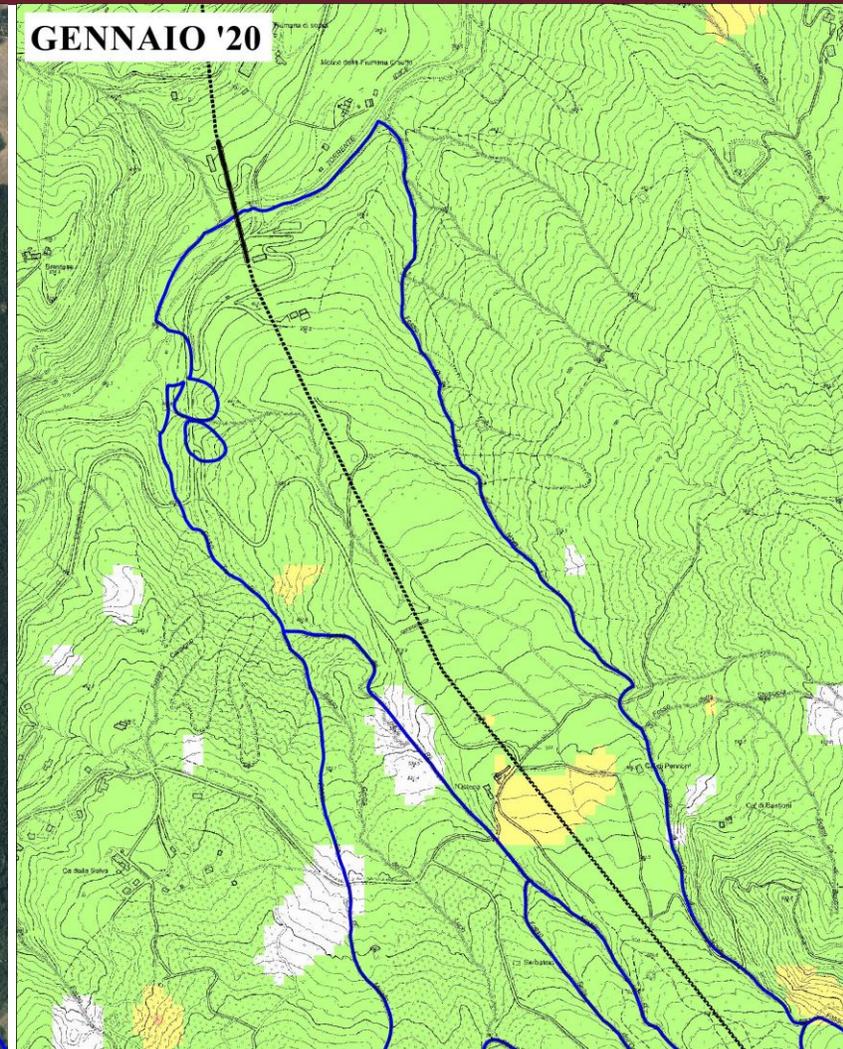
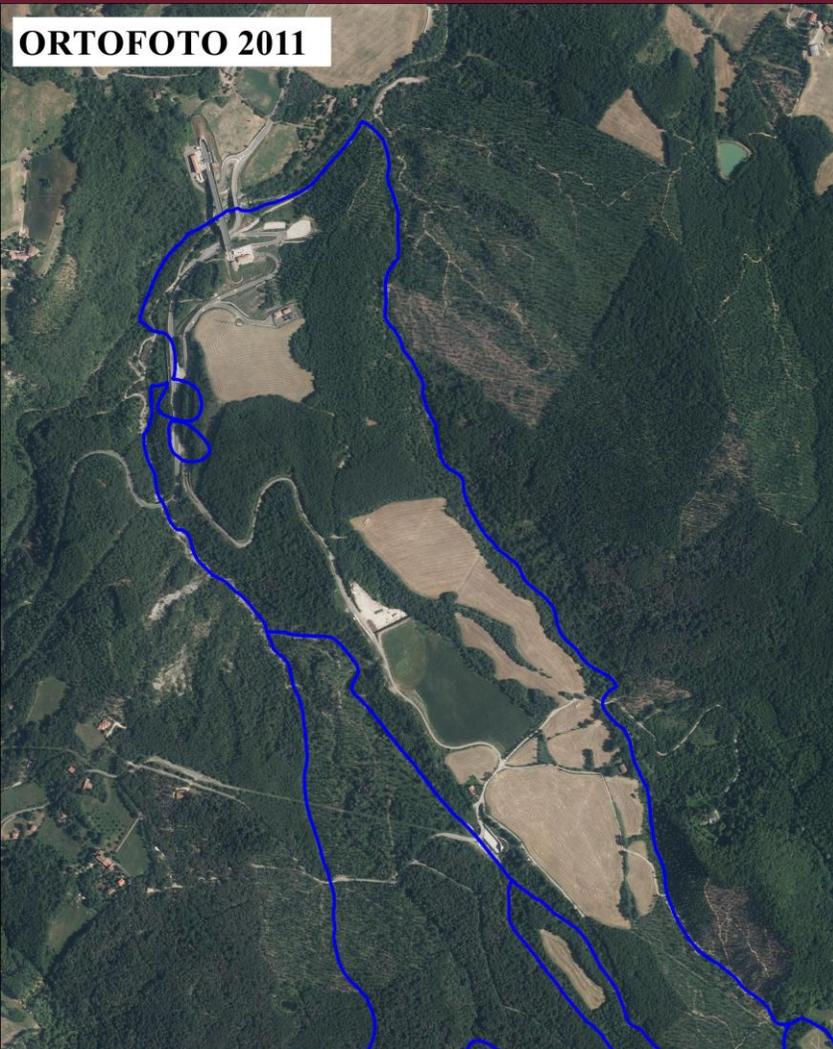
Appennino emiliano, versante interessato da un deposito di frana attiva per scivolamento



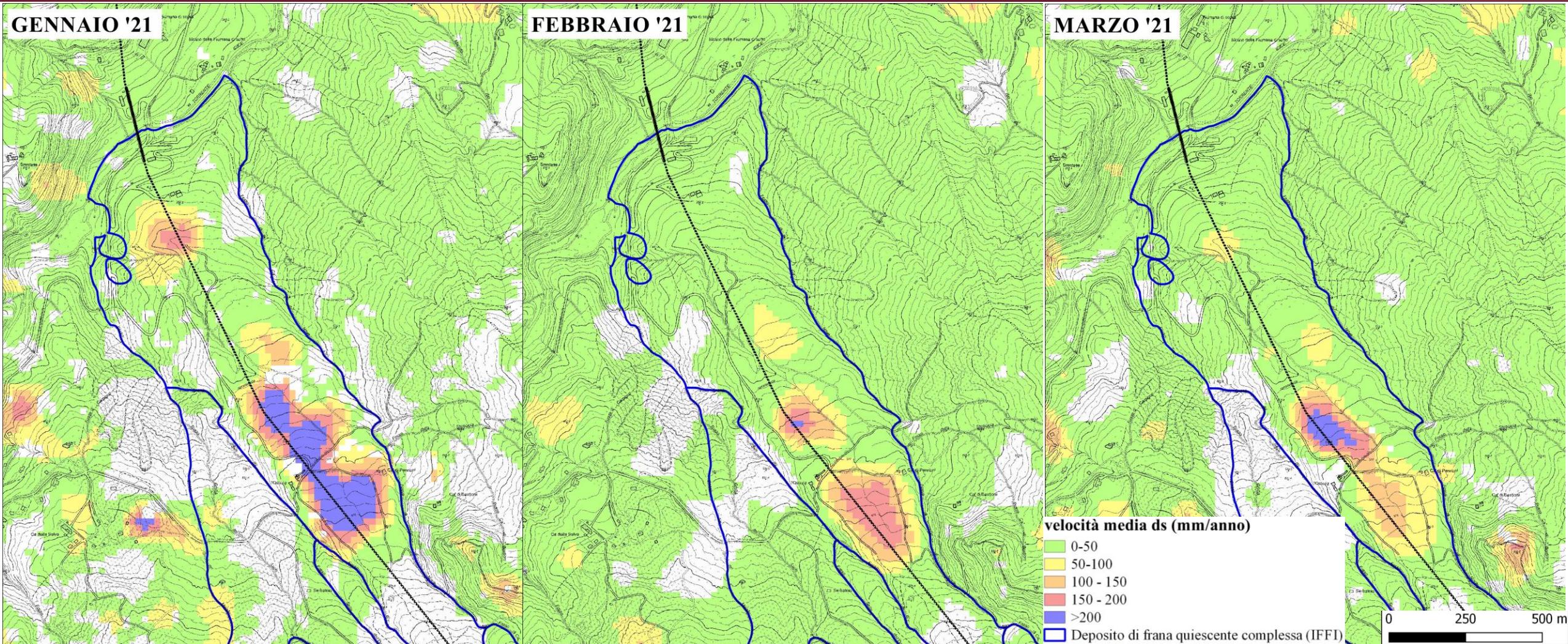




Appennino settentrionale, versante interessato da un esteso deposito di frana quiescente complessa ed attraversato da un'importante infrastruttura lineare



Appennino settentrionale, versante interessato da un esteso deposito di frana quiescente complessa ed attraversato da un'importante infrastruttura lineare



Appennino settentrionale, versante interessato da un esteso deposito di frana quiescente complessa ed attraversato da un'importante infrastruttura lineare

EGMS: PUNTI DI FORZA

- Informazioni di spostamento in corrispondenza dei riflettori antropici/ aree prive di vegetazione
- Dati disponibili gratuitamente e già previsti aggiornamenti annuali fino al 2028
- Sforzo dei partner tecnici di ottimizzare il servizio

EGMS: PUNTI DI DEBOLEZZA

- Informazioni di spostamento in aree rurali talvolta lacunose
- Necessaria accettazione compromessi data ampia estensione areale processing

EGMS: CONSIGLI PRATICI

Guardare sempre dati lungo la LOS: CALIBRATED asc e desc (> copertura spaziale, info – ‘diluite’)

Per maggiori info
silvia@fragilesrl.it

7 marzo '25