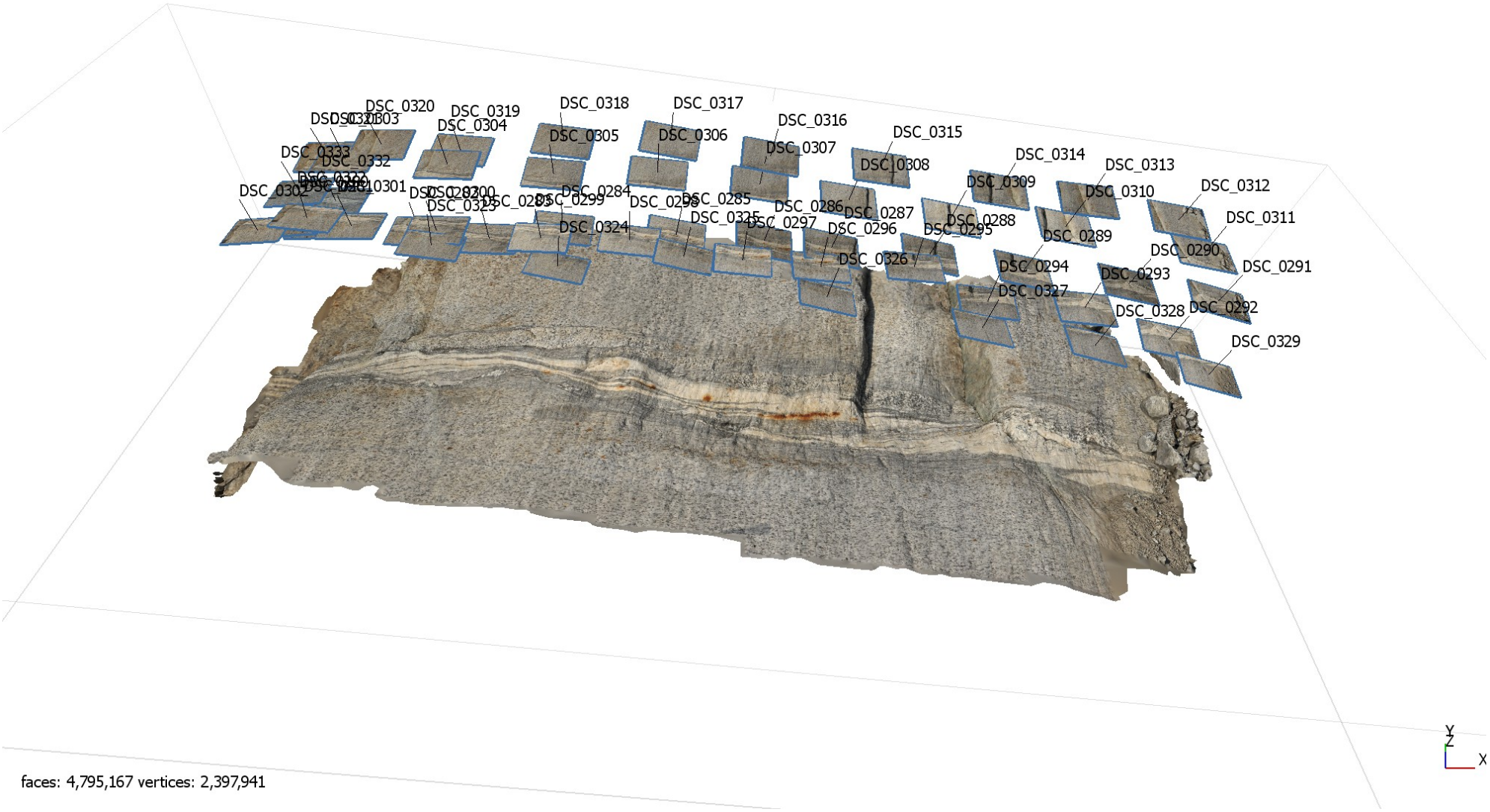
181436

14:30 – 18:30
DIGITAL GEOLOGICAL MAPPING - S2 - SC2597^1 - 002PD
Aula: 2H, POLO SCIENZE DELLA TERRA
Docenti: ANNA BREDA, GIORGIO PENNACCHIONI, MATTEO MASSIRONI
Proietta codice statico
Proietta codice dinamico
Proietta QR code dinamico
La rilevazione lato studenti sarà disponibile quando l'attività risulterà "in corso"


Perspective 60°
Snap: Axis, 3D
DSC_0320
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DSC_0297
DSC_0299
DSC_0324
DSC_0325
DSC_0326
DSC_0327
DSC_0328
DSC_0329
Y
Z
X
faces: 4,795,167 vertices: 2,397,941

AY 2021-22

DIGITAL GEOLOGICAL MAPPING SCQ1098841

2° Semester Academic Year 2021-2022

https://didattica.unipd.it/off/2021/LM/SC/SC2597/002PD/SCQ1098841/N0

TIMETABLE

- MONDAY: 14:30-18:30 classroom 2M/2F (COMPUTER ROOM)
- FRIDAY: 5 EXCURSIONS

- Any single **lecture unit** lasts **45 mins** with a **pause** of **15 mins** in between

	CREDITS	Assisted teaching hours	Individual study hours
ACTIVITIES FOR SMALL GROUPS	1.5	24	13.5
LABORATORY	3.0	36	39.0
LECTURE	1.5	12	25.5

LANGUAGE: ENGLISH

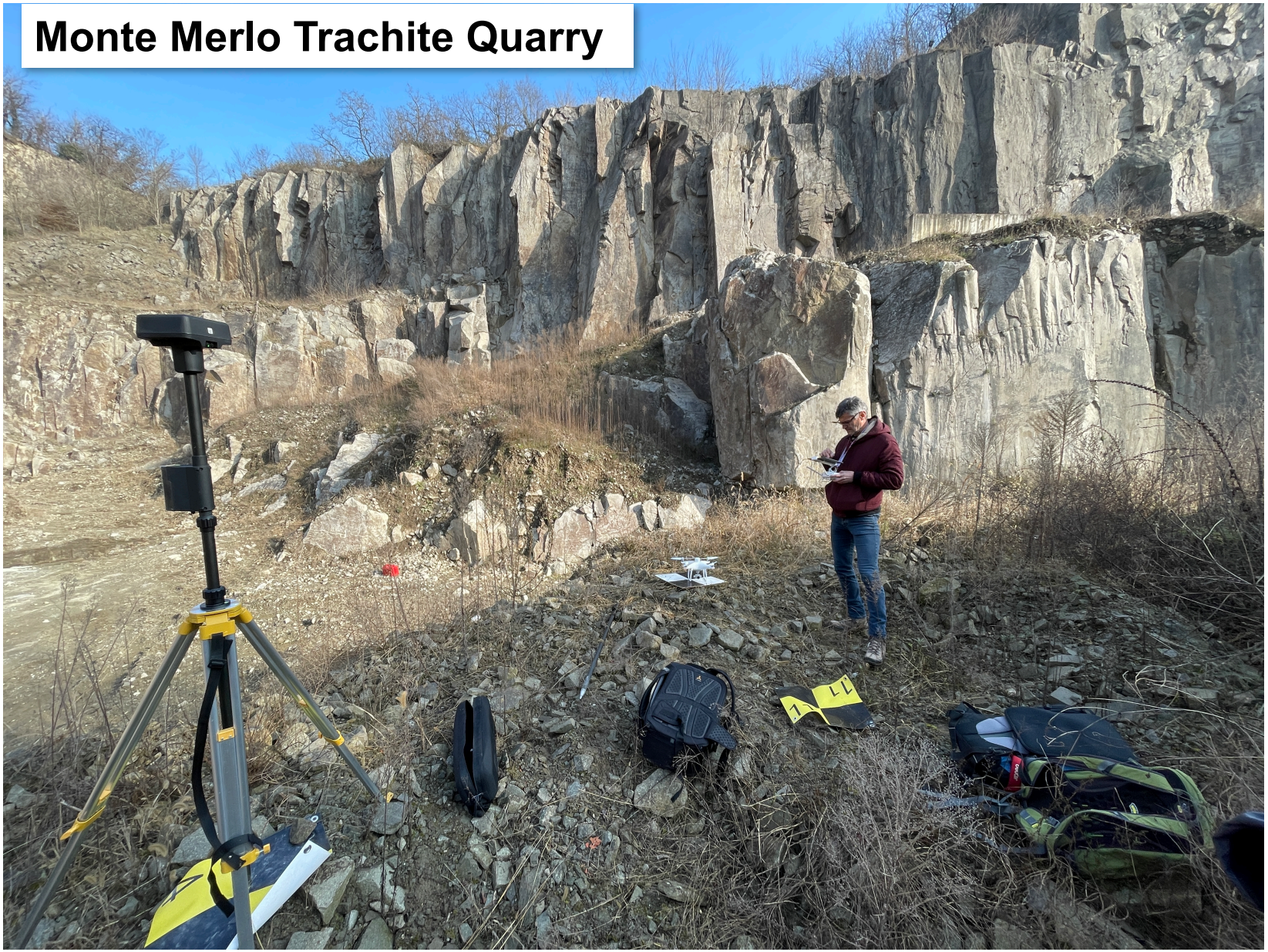
TIME TABLE

AY 2021-22

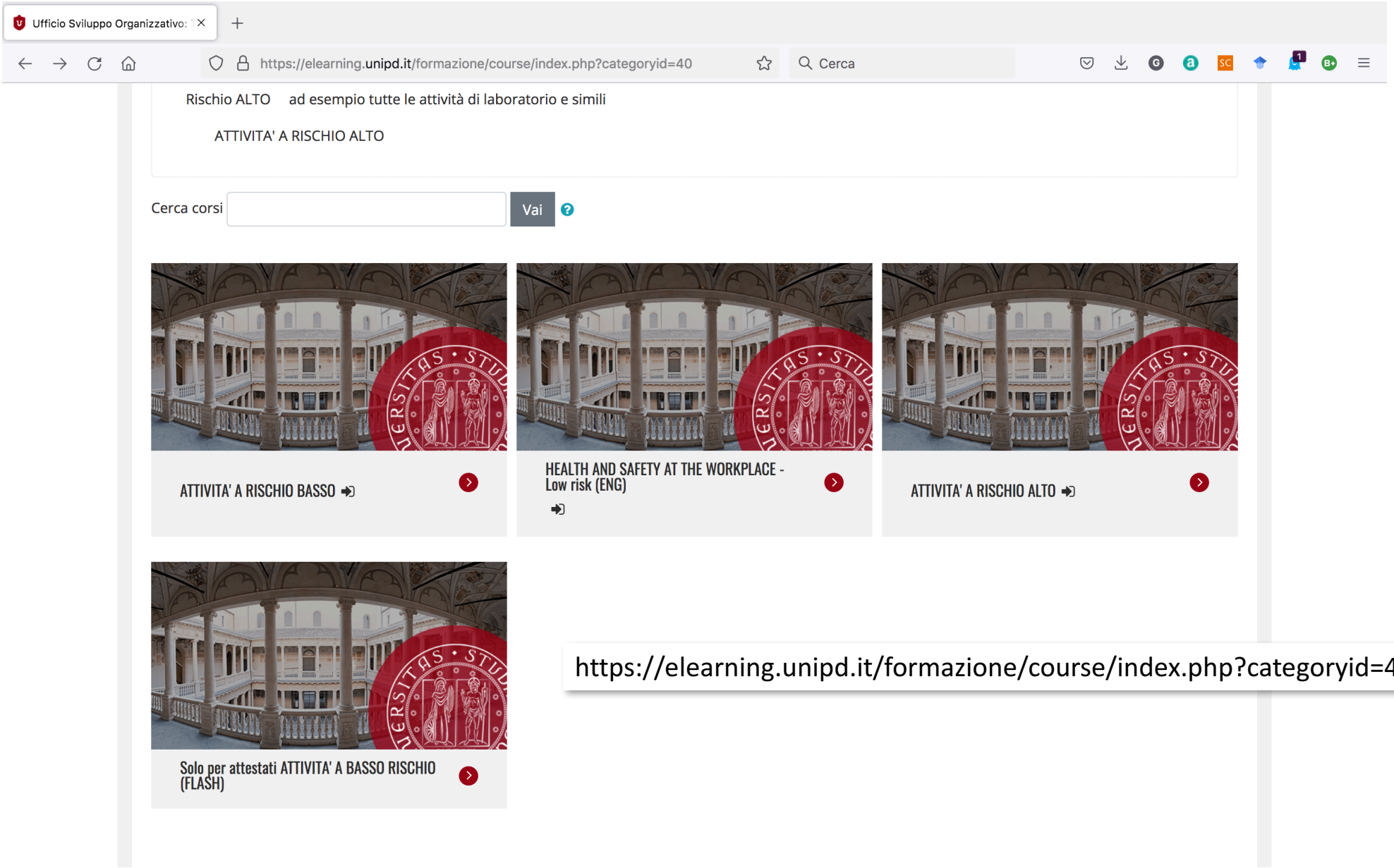
MASTER WEEKLY TIMETABLE 2021/22										
Ore	**LUNEDI'**	**Aula**	**MARTEDI'**	**Aula**	**MERCOLEDI'**	**Aula**	**GIOVEDI'**	**Aula**	**VENERDI'**	**Aula**
8.30-9.15									EXCURSIONS	
9.30-10.15	Sistemazione dei bacini idrografici (D'Alpaos)	**2H**	Sistemazione dei bacini idrografici (D'Alpaos)	**2H**	Sistemazione dei bacini idrografici (D'Alpaos)	**2H**	Idrogeologia Applicata (Piccinini)	**2G**		
10.30-11.15	Sistemazione dei bacini idrografici (D'Alpaos)	**2H**	Sistemazione dei bacini idrografici (D'Alpaos)	**2H**	Sistemazione dei bacini idrografici (D'Alpaos)	**2H**	Idrogeologia Applicata (Piccinini)	**2G**		
11.30-12.15	Idrogeologia Applicata (Piccinini)	**2G**	Geomorfologia Applicata (Fontana)	**2H**	Geomorfologia Applicata (Fontana)	**2H**	Geomorfologia Applicata (Fontana)	**2H**		
12.30-13.15	Idrogeologia Applicata (Piccinini)	**2G**	Geomorfologia Applicata (Fontana)	**2H**	Geomorfologia Applicata (Fontana)	**2H**	Geomorfologia Applicata (Fontana)	**2H**		
13.30-14.15										
14.30-15.15	Digital Geological Mapping (Pennacchioni, Breda, Massironi)	**2H**	Idrogeologia Applicata (Piccinini)	**2G**	Sic. Scavi e Fondamenti di Statica (Scotton)	**2H**	Sic. Scavi e Fondamenti di Statica (Scotton)	**2H**		
15.30-16.15	Digital Geological Mapping (Pennacchioni, Breda, Massironi)	**2H**	Idrogeologia Applicata (Piccinini)	**2G**	Sic. Scavi e Fondamenti di Statica (Scotton)	**2H**	Sic. Scavi e Fondamenti di Statica (Scotton)	**2H**		
16.30-17.15	Digital Geological Mapping (Pennacchioni, Breda, Massironi)	**2H**	SEMINARI	**Ard**	Sic. Scavi e Fondamenti di Statica (Scotton)	**2H**				
17.30-18.15	Digital Geological Mapping (Pennacchioni, Breda, Massironi)	**2H**	SEMINARI	**Ard**						

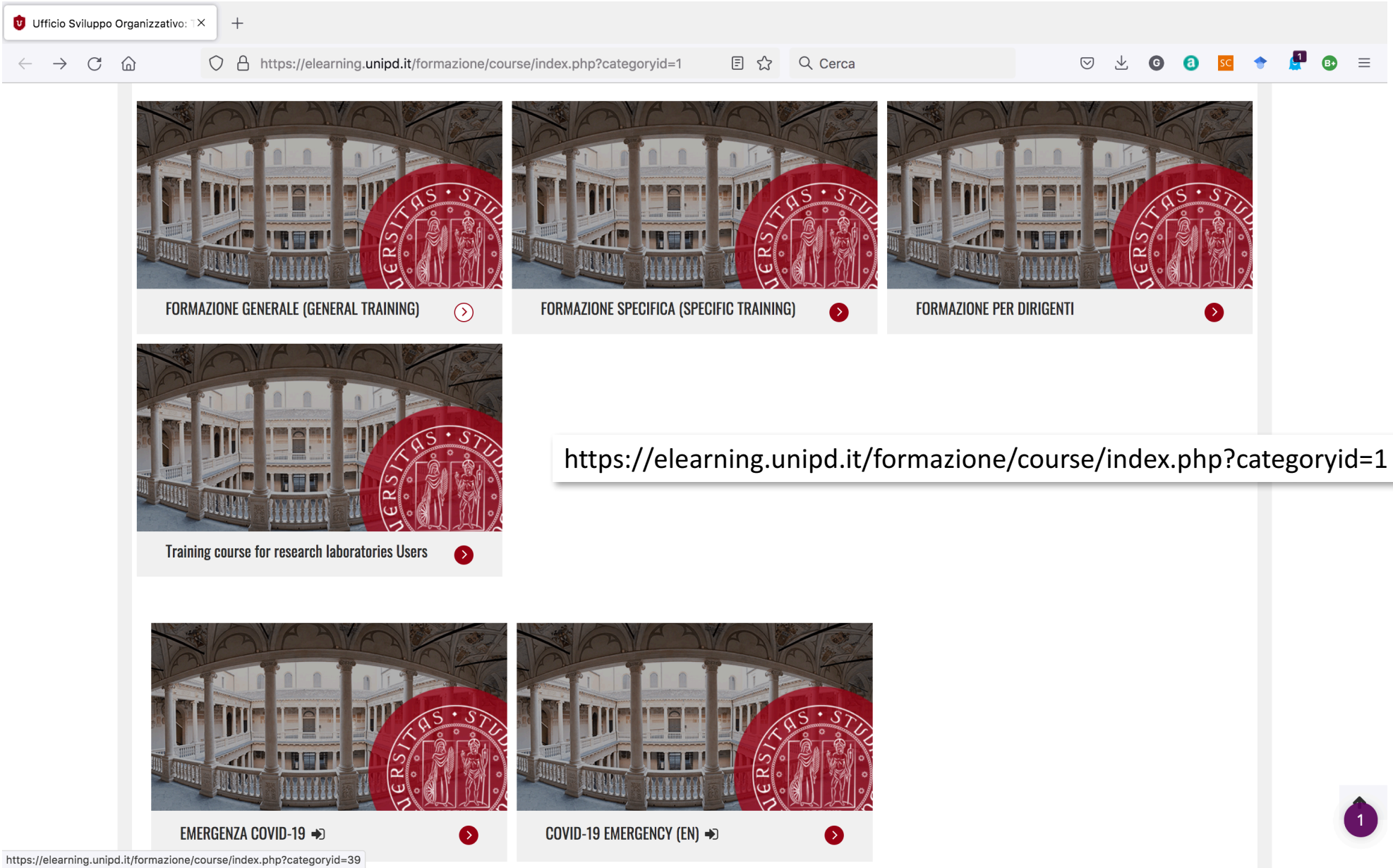
- **Monte Merlo Quarry Euganei Hills**
  → **March 18**
- **Lessini (mapping exc.)**
  → **May 6**
  → **May 13**
- **Bletterbach**
  → **May 6 (?)**

Monte Merlo Trachite Quarry



0 12,5 25 37,5 m
Lessini Hills
Mostra
3D


Ufficio Sviluppo Organizzativo:
https://elearning.unipd.it/formazione/course/index.php?categoryid=40
Cerca
Rischio ALTO ad esempio tutte le attività di laboratorio e simili
ATTIVITA' A RISCHIO ALTO
Cerca corsi
Vai
ATTIVITA' A RISCHIO BASSO
HEALTH AND SAFETY AT THE WORKPLACE - Low risk (ENG)
ATTIVITA' A RISCHIO ALTO
Solo per attestati ATTIVITA' A BASSO RISCHIO (FLASH)
https://elearning.unipd.it/formazione/course/index.php?categoryid=40


Ufficio Sviluppo Organizzativo:
https://elearning.unipd.it/formazione/course/index.php?categoryid=1
Cerca
FORMAZIONE GENERALE (GENERAL TRAINING)
FORMAZIONE SPECIFICA (SPECIFIC TRAINING)
FORMAZIONE PER DIRIGENTI
Training course for research laboratories Users
https://elearning.unipd.it/formazione/course/index.php?categoryid=1
EMERGENZA COVID-19
COVID-19 EMERGENCY (EN)
https://elearning.unipd.it/formazione/course/index.php?categoryid=39

Ufficio Sviluppo Organizzativo:

https://elearning.unipd.it/formazione/course/index.php?categoryid=39

Cerca

BASIC COURSE IN HEALT AND SAFETY: "GENERAL TRAINING" (4 hours)

Cerca corsi

Vai

CORSO BASE SULLA SICUREZZA: "FORMAZIONE GENERALE" (Base 4 h)

BASIC COURSE IN HEALTH AND SAFETY: "GENERAL TRAINING" (4 hours)

RILASCIO ATTESTATI anno 2017/2018 CORSO BASE SULLA SICUREZZA: FORMAZIONE GENERALE Per gli stagisti e i tirocinanti

RILASCIO ATTESTATI ante anno 2018 CORSO BASE SULLA SICUREZZA: FORMAZIONE GENERALE Per il personale e gli studenti 200 ore

https://elearning.unipd.it/formazione/course/index.php?categoryid=39

1

https://elearning.unipd.it/formazione/course/view.php?id=121

Ufficio Sviluppo Organizzativo

https://elearning.unipd.it/formazione/course/index.php?categoryid=30

Cerca

The course is for undergraduate, graduate and PhD students and any others who require access to the laboratories.

Enrolments on the course are managed by Servizio Prevenzione e Protezione. Please contact sicurezza@unipd.it.

Link: GUIDA AI FREQUENTATORI PER L'ACCESSO AI CORSI (Italian version)

Cerca corsi Vai

Part A - Chemical risk (6 h)

Part B - Biological Risk (2 h)

Part C - Animal facility (1 h)

Part D - Mechanical risk (1 h)

Part E - Risk from exposure to non-ionising radiation (1 h)

Part F - Magnetic fields risk (1 h)

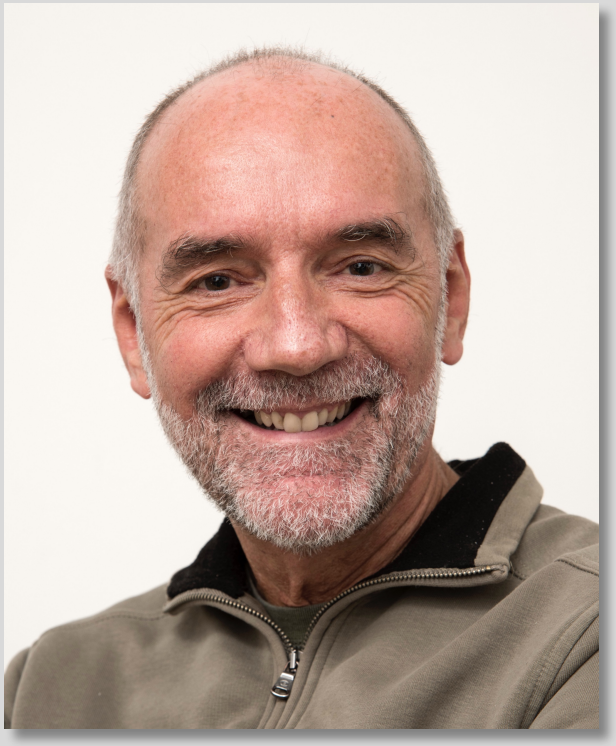
Part H - Electrical risk

Part I - Ionizing radiation

https://elearning.unipd.it/formazione/course/index.php?categoryid=30

TEACHERS

Giorgio Pennacchioni



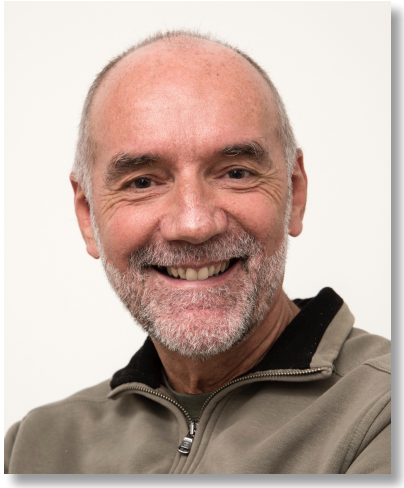
Structural Geologist

Matteo Massironi

Structural (Planetary) Geologist

Anna Breda

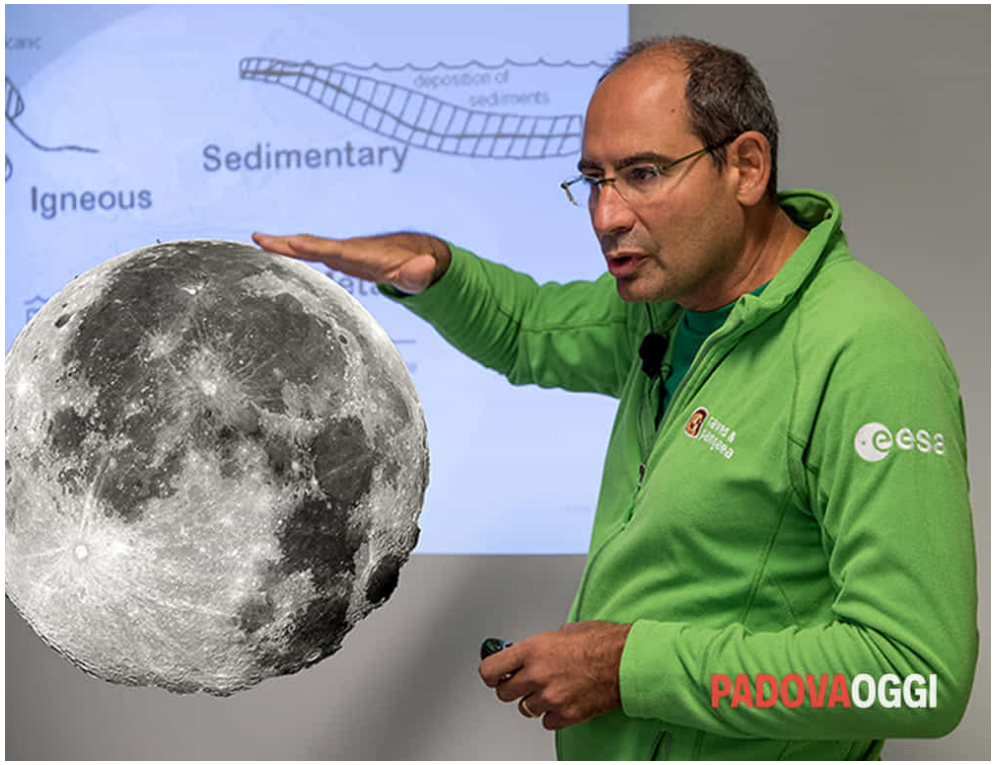
Sedimentologist



Brittle deformation

Ductile viscous deformation

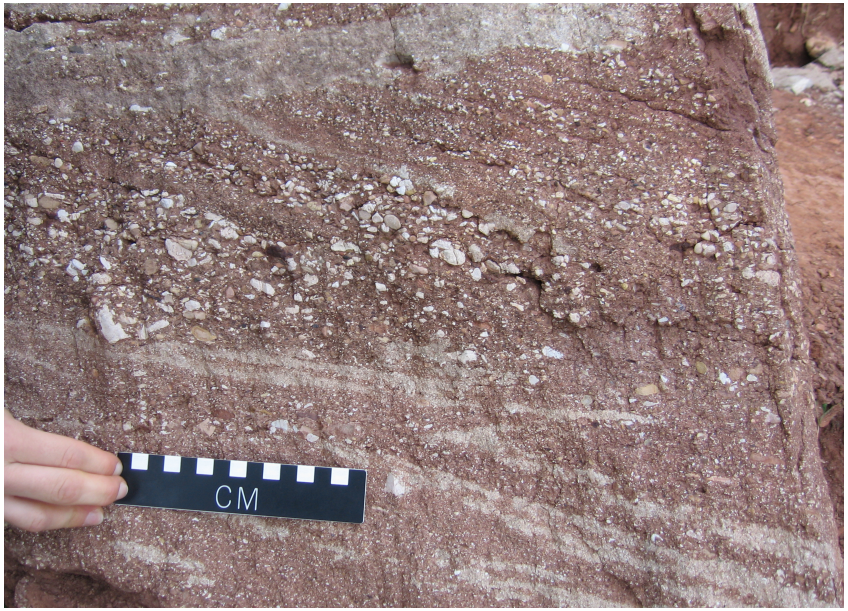
EGU


deposition of
sediments
Sedimentary
Igneous
esa
PADOVAOGGI

Anna Breda

Sedimentology and stratigraphy

Clastic and mixed sedimentary rocks



Facies analysis to reconstruct depositional processes and sedimentary environments

EXAM

- PRESENTATION OF A DIGITAL PROJECT

COURSE STRUCTURE

- LEARN BY DOING

MATERIALS FOR STUDY

WHICH:

a. LECTURE SLIDES
b. SOFTWARES
d. ON-LINE RESOURCES
    i. all used software have free available tutorials on-line

WHERE:

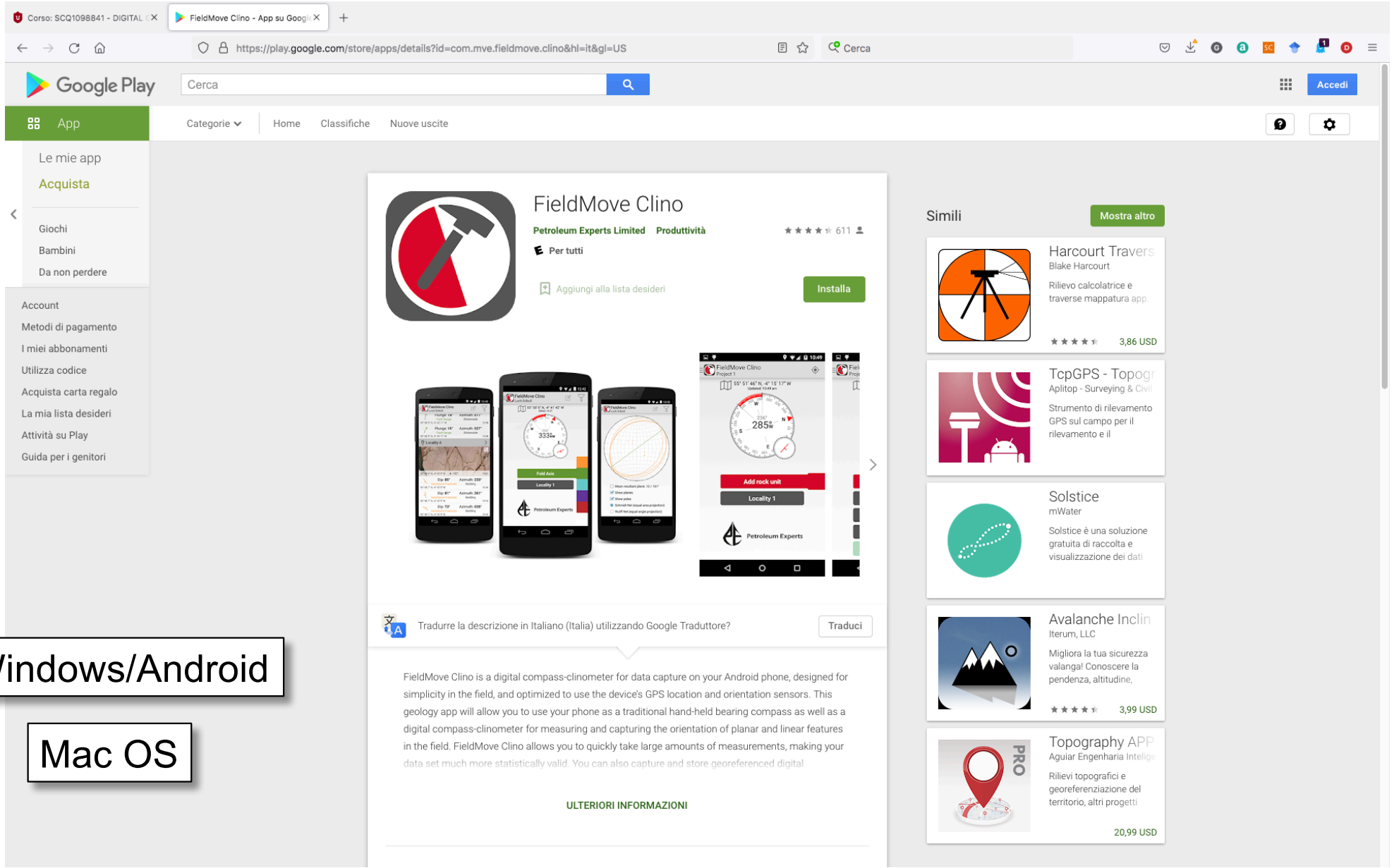
- a: MOODLE platform
- b: web(links provided)

WHAT IS NEEDED

a. LAPTOP (your own or provided by the Dept.: Microsoft Surface)
   - ✓ **ArcGis** (or equivalent software: e.g. Qgis: https://www.qgis.org/it/site/)
   - ✓ **Agisoft Metashape**
   - ✓ **ImageJ** (free Image Analysis Software)

b. TABLET (your own or provided by the Dept.)
   - ✓ GPS, accelerometer and giroscope
   - ✓ Mapping software (e.g. **Field MOVE**)
   - ✓ DRONE FLIGHT SOFTWARE (DJI Fly, DJI GO 4 for Mac) https://www.dji.com/it/downloads/djiapp/dji-go-4

c. SMARTPHONE
   - ✓ Geo-compass App (e.g. Field Move; GeoID)


Corso: SCQ1098841 - DIGITAL
FieldMove Clino - App su Google
https://play.google.com/store/apps/details?id=com.mve.fieldmove.clino&hl=it&gl=US
Cerca
Google Play
Cerca
Accedi
App
Categorie
Home
Classifiche
Nuove uscite
Le mie app
Acquista
Giochi
Bambini
Da non perdere
Account
Metodi di pagamento
I miei abbonamenti
Utilizza codice
Acquista carta regalo
La mia lista desideri
Attività su Play
Guida per i genitori
FieldMove Clino
Petroleum Experts Limited
Produttività
611
Per tutti
Aggiungi alla lista desideri
Installa
Tradurre la descrizione in Italiano (Italia) utilizzando Google Traduttore?
Traduci
FieldMove Clino is a digital compass-clinometer for data capture on your Android phone, designed for simplicity in the field, and optimized to use the device's GPS location and orientation sensors. This geology app will allow you to use your phone as a traditional hand-held bearing compass as well as a digital compass-clinometer for measuring and capturing the orientation of planar and linear features in the field. FieldMove Clino allows you to quickly take large amounts of measurements, making your data set much more statistically valid. You can also capture and store georeferenced digital
ULTERIORI INFORMAZIONI
Simili
Mostra altro
Harcourt Travers
Blake Harcourt
Rilievo calcolatrice e traverse mappatura app
3,86 USD
TcpGPS - Topogr
Aplitop - Surveying & Civil
Strumento di rilevamento GPS sul campo per il rilevamento e il
Solstice
mWater
Solstice è una soluzione gratuita di raccolta e visualizzazione dei dati
Avalanche Inclin
Iterum, LLC
Migliora la tua sicurezza valanga! Conoscere la pendenza, altitudine,
3,99 USD
Topography APP
Aguiar Engenharia Intelig
Rilievi topografici e georeferenziazione del territorio, altri progetti
20,99 USD
Windows/Android
Mac OS

Corso: SCQ1098841 - DIGITAL | Nuova scheda | FieldMove Clino App Tutorial - Y | Scaricare video da YouTube gra | GeoID su App Store

https://apps.apple.com/it/app/geoid/id437190196

Cerca

Store Mac iPad iPhone Watch AirPods TV & Casa Solo con Apple Accessori Supporto

Anteprima **App Store**

Apri il Mac App Store per acquistare e scaricare le app.

GeoID 4+

Engineering Geology & GIS Lab., SNU.

Progettata per iPad

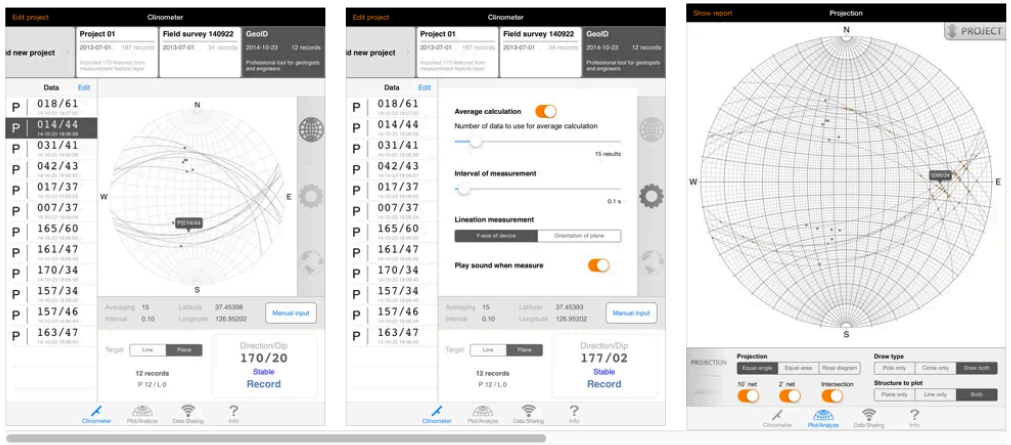
★★★☆☆ 3,0 • 3 valutazioni

5,99 €

Visualizza nel Mac App Store ↗

Screenshot

iPad iPhone



* Note : This app uses built-in magnetometer, so iPod Touch does not provides direction of structure/device.

GeoID is a professional tool for measuring and analyzing geological structures. This application includes geological compass, stereographic projection, instability analysis and wireless data sharing. altro

Mac OS

PARTICIPANTS

please register as participant on Moodle

→ NEEDED TO ACTIVATE YOUR ACCESS TO THE VIRTUAL SERVER HOSTING THE SOFTWARES (higher performance then in your laptops or the portable laptops we will provide)

→ download and install in your laptop:

- Vmware Horizon Client
- Agisoft Metashape (Photogrammetric software)

AY 2021-22

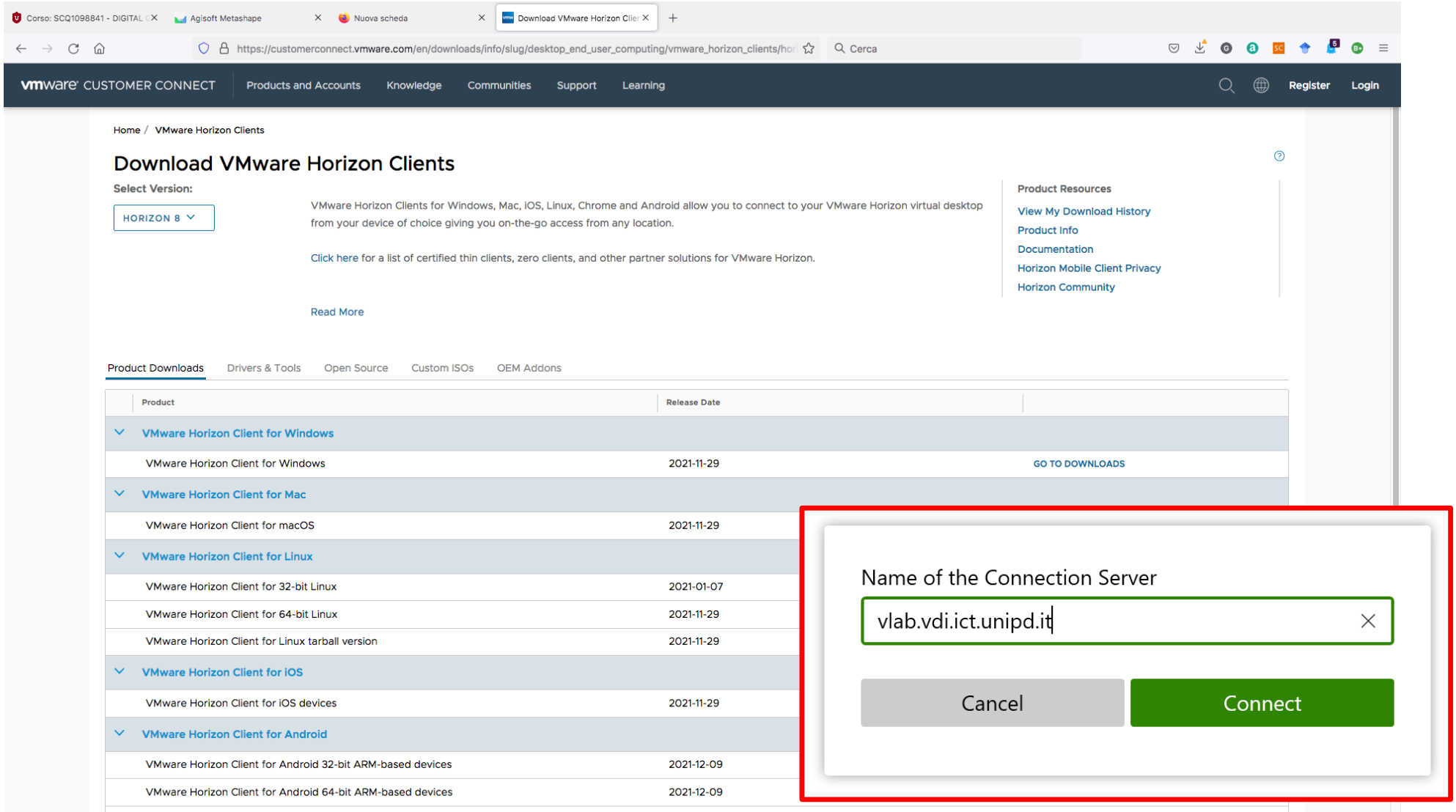
AIMS

a. How to **use available technological instruments** (e.g. tablet or smartphone) and software for collecting geological data in the field (e.g. orientation data) and for mapping.
b. How to **properly collect digital images** (over scales ranging from small areas, outcrops or samples) for quantitative 3D reconstruction
c. How to **process image datasets** to obtain 3D models of the target objects
d. How to **quantitatively analyse** the 3D models
e. How to **exploit virtual reality environments** for geological work

As a playground we will use

a. samples in the lab
b. different areas (targeting different geological environments) visited during the planned **excursions**

https://customerconnect.vmware.com/en/downloads/info/slug/desktop_end_user_computing/vmware_horizon_clients/horizon_8



A “MODERN” GEOLOGIST

HANDBOOK for FIELD GEOLOGISTS
by C.W. Hayes (1909)

AY 2021-22

HANDBOOK FOR FIELD GEOLOGISTS

PART I

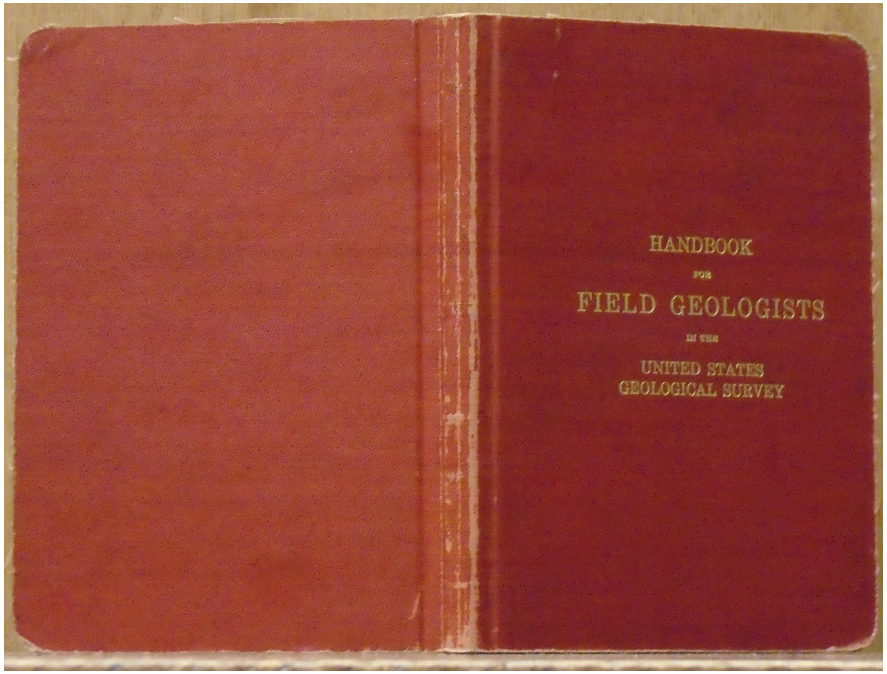
GENERAL INSTRUCTIONS

PRE-REQUISITES FOR A FIELD GEOLOGIST

Physical and mental qualities. To insure even a moderate degree of success as a field geologist one must possess certain physical and mental qualities, the lack of which may be in no wise to one's discredit and may involve no particular disability in many other professions. It is well therefore to determine in advance of the long apprenticeship required whether or not the candidate possesses these necessary pre-requisites. A responsibility not always realized rests upon teachers of geology to explain fully to their students the requirements of the profession, and to divert from it those who are manifestly lacking in the qualities essential for success.

The first qualification is a good physique and a strong constitution, for sooner or later severe and long-continued physical exertion will be required, and a defect in ability to sustain this exertion will be a serious handicap.

The second is adaptability. Few occupations present so wide a diversity in conditions under which work must be carried on as that of the field geologist. His surroundings may vary all the way from the luxuries of a summer resort hotel to the bare necessities which he can pack on his back, and he must be able to adapt himself with equal readiness to either extreme. If one cannot so adapt himself, but is dependent on any particular kind of surroundings, he should abandon the idea of becoming a field



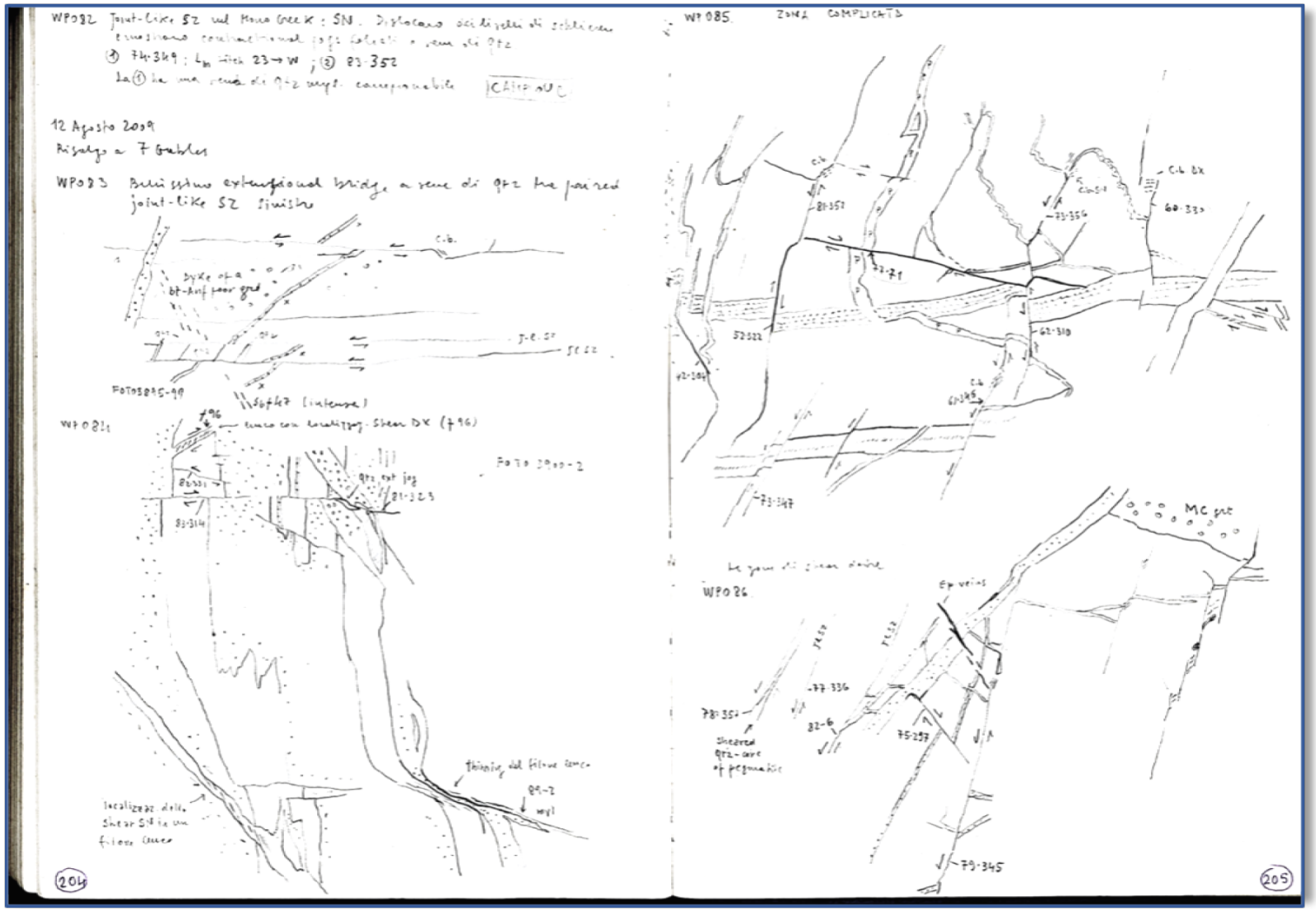
geologist, for he will find the occupation extremely unsatisfactory.

A geologist must possess a practical knowledge of horsemanship, of boating, and of general woodcraft, so that he will be equally at home in the saddle, in the canoe, or on foot in a trackless forest. One is fortunate who has already acquired this practical knowledge, but if he does not possess it he must be sure that he has an aptitude for acquiring it quickly.

Training. It is questionable if geology can be regarded as a distinct science, in the same sense as chemistry or physics. More properly, it is the application of a number of special sciences to the solution of a particular class of problems. It follows that the best preparation for geologic work is a thorough grounding in these fundamental sciences, particularly chemistry, physics, zoology, and botany. Mathematics and modern languages are also essential. The student who is thoroughly trained in the

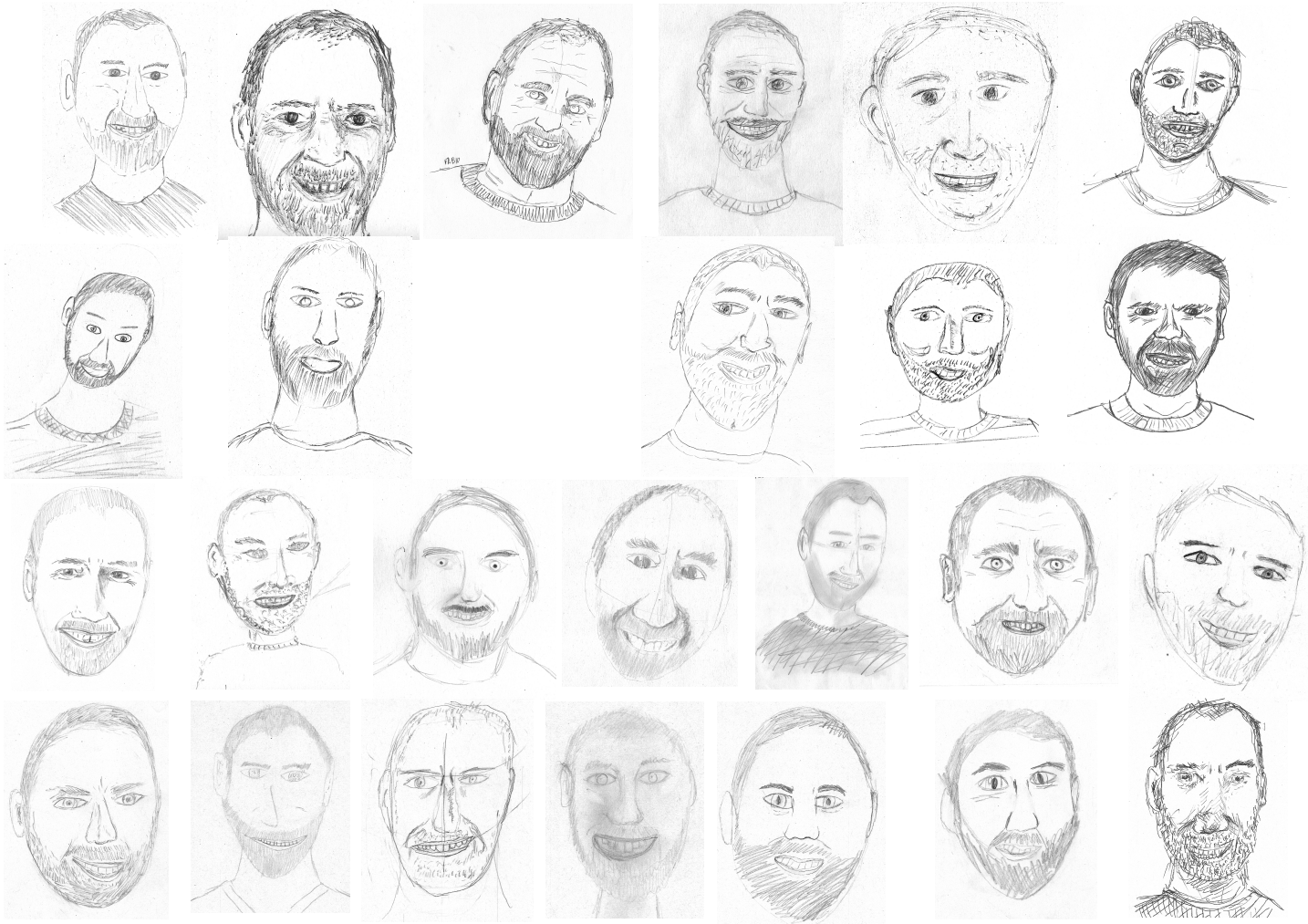
GEOLOGIST GEAR CHECKLIST
1. Hand Lens
2. Sunscreen
3. Hiking boots
4. Geo-vest
5. Backpack
6. Protractor
7. Chisel
8. Bush knife
9. Headlamp
10. Bear bangers
11. Scribe
12. Food/Snacks
13. Machete
14. Geo-hammer
15. Leatherman
16. Bear Spray
17. Sample bags
18. Sample tags
19. Ear protection
20. Notebook
21. GPS
22. Compass
23. Radio
24. Raingear
25. Matches
26. Bug Spray
27. HCL acid
28. Flagging
29. Toque
30. Gaiters
31. Work gloves
32. Chopper flag
33. Sun hat
34. Maps
35. Eye protection
36. Water/hot drink
37. Spare batteries
38. Emergency blanket
39. In-reach
40. First aid kit

FIELD BOOK NOTES from 2009

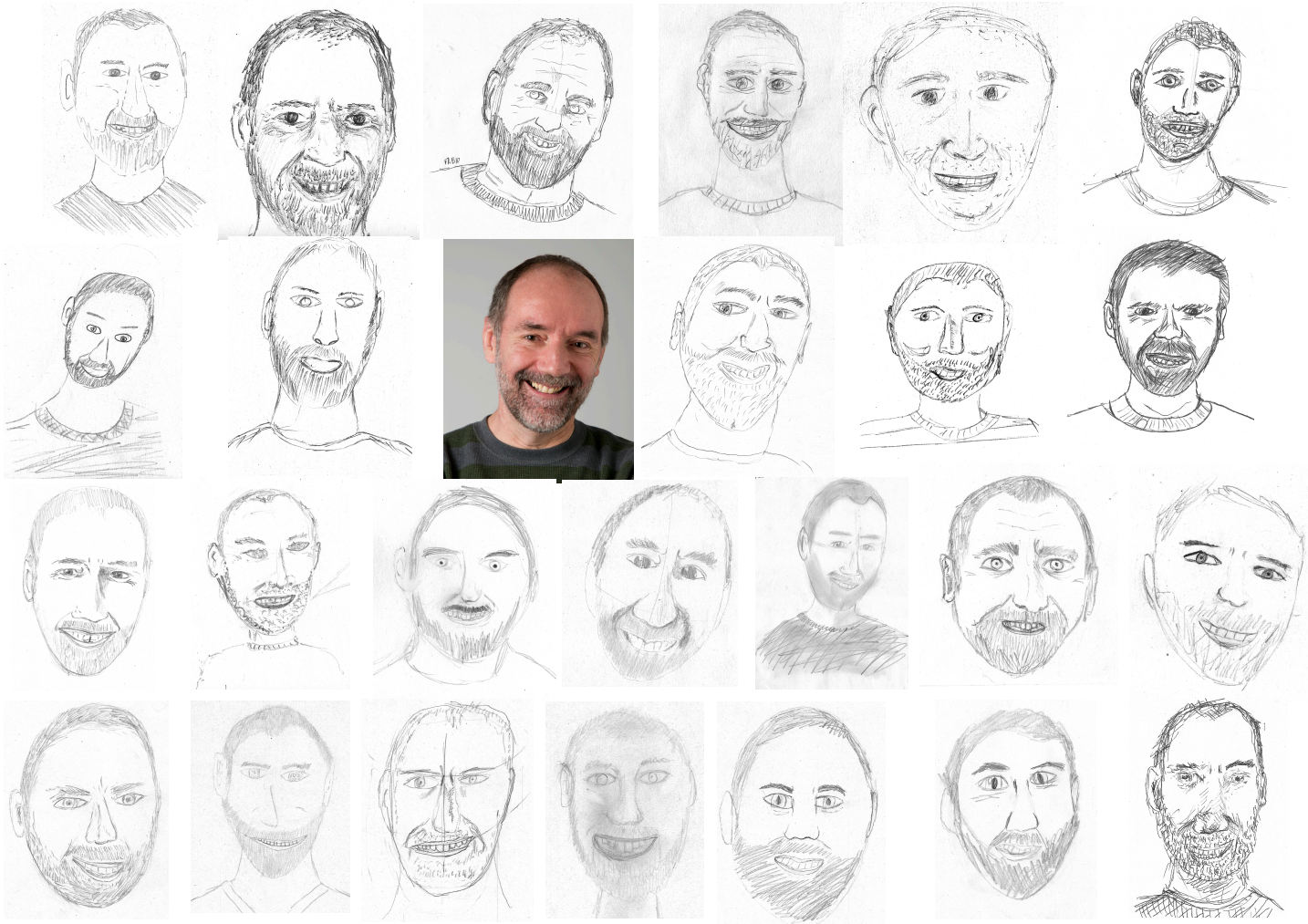


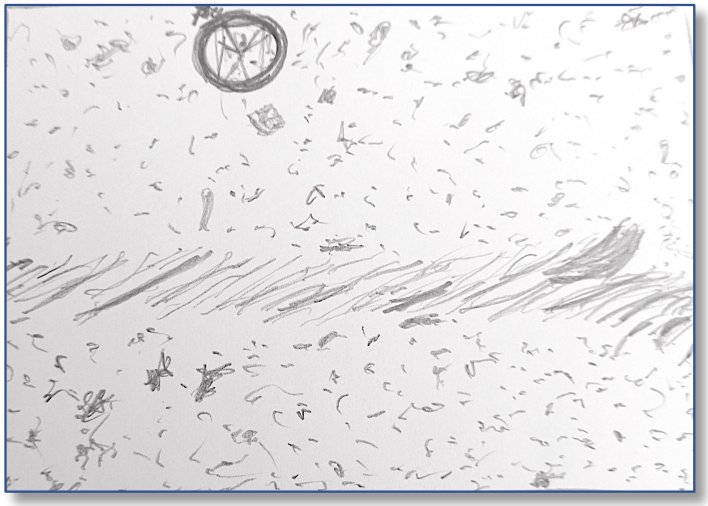
- TURNING TO DIGITAL DOES NOT SIMPLY ALLOWS FAST COLLECTION OF DATA
- DOES (NOT) SUBSTITUTE THE GEOLOGIST

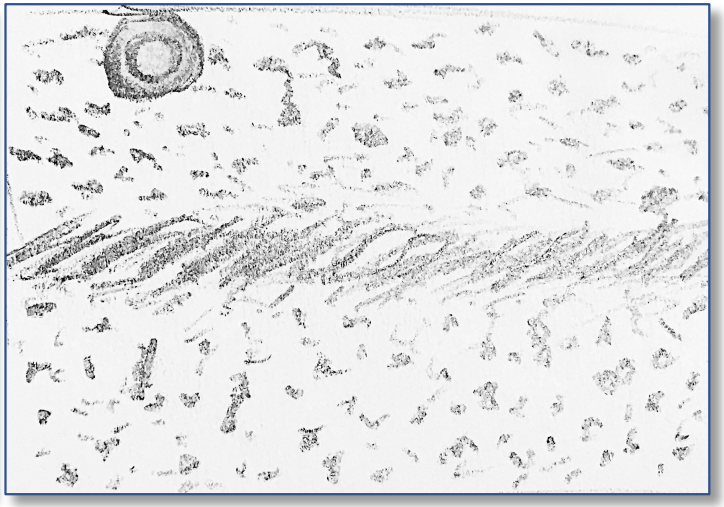
WHY DO WE NEED QUANTITATIVE GEOLOGICAL MAPPING?



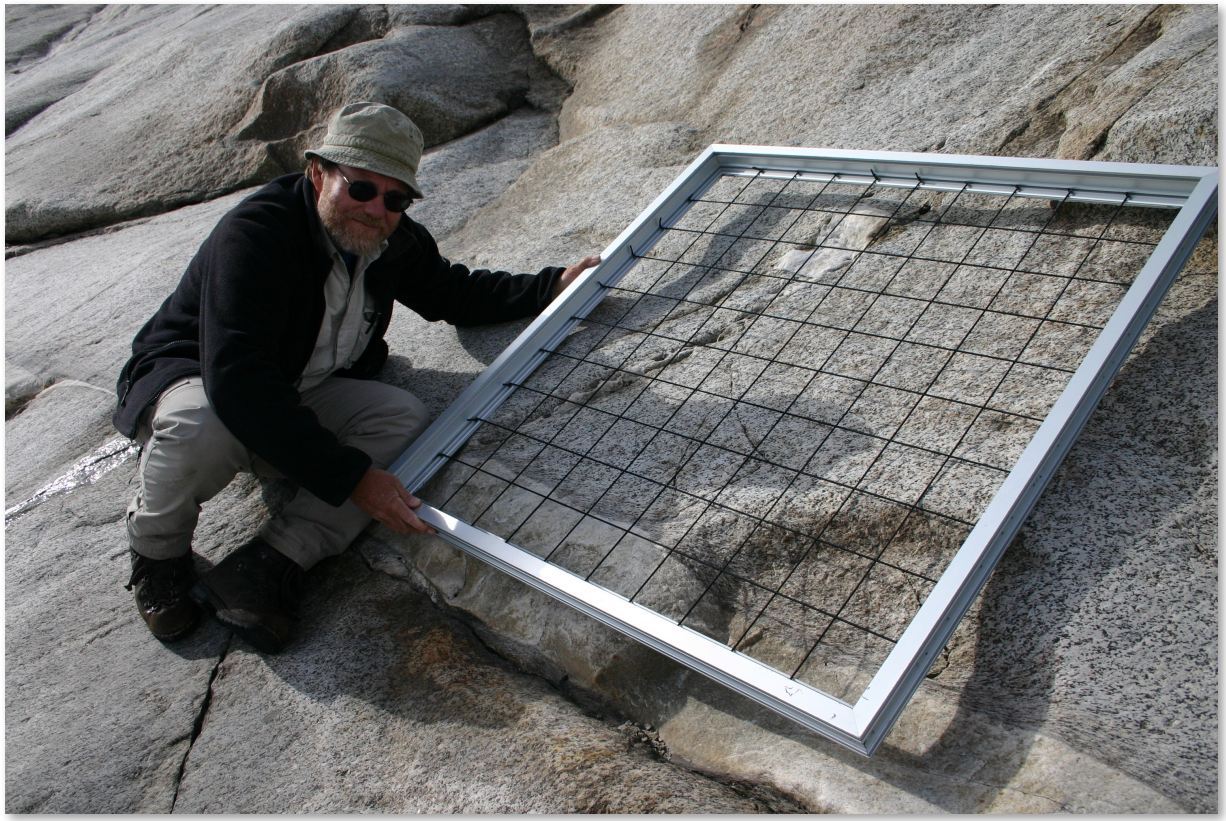
WHY DO WE NEED QUANTITATIVE GEOLOGICAL MAPPING?



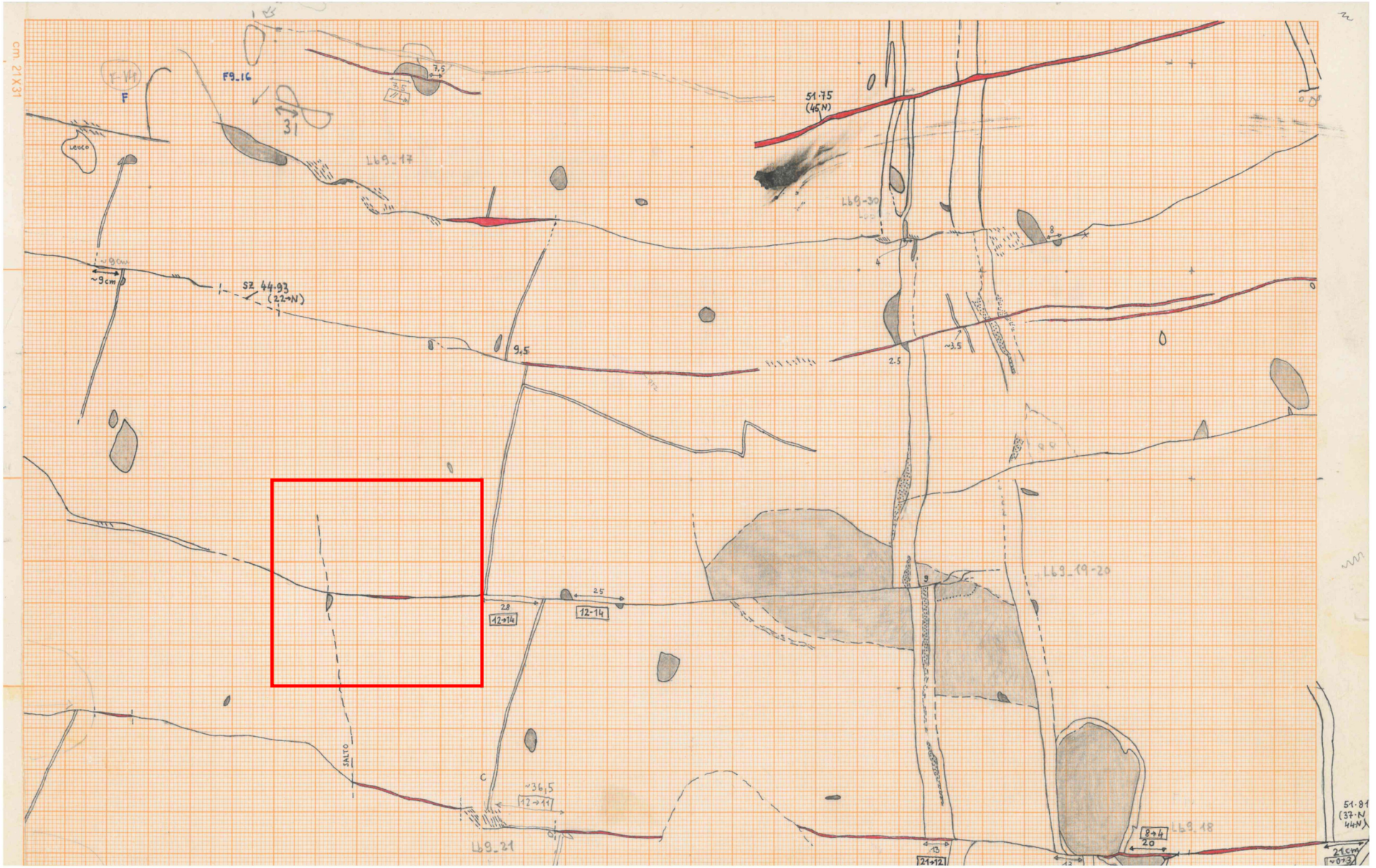


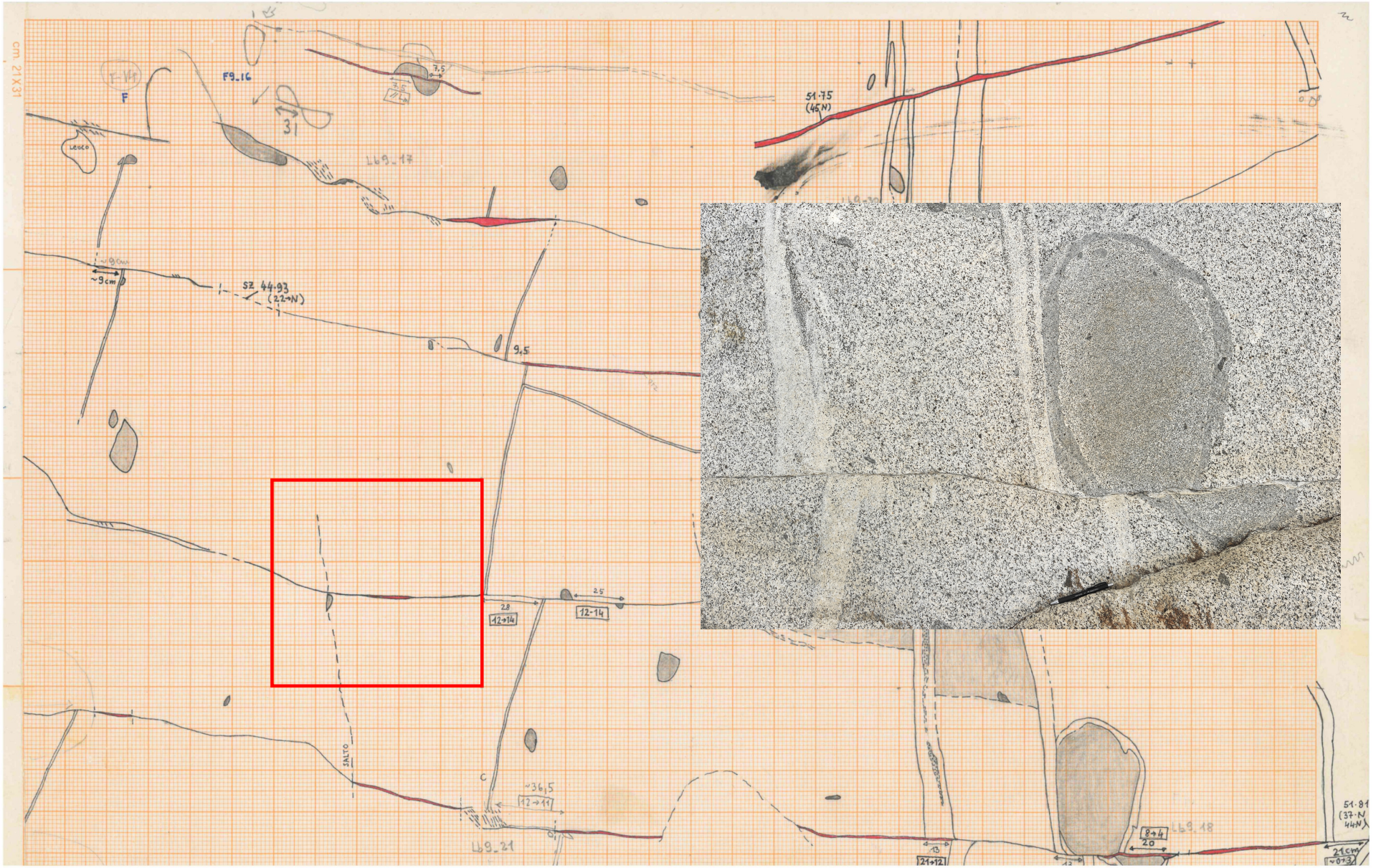


GRID-ASSISTED DRAWING



GRID-ASSITED FIELD DRAWING AND MAPPING


F9_16
F
31
L69_17
51.75
(46,N)
L69-30
~9cm
SZ 44:93
(22→N)
9,5
2.5
~3.5
2.8
12→14
2.5
12-14
L69_19-20
SALTO
~36,5
12→11
L69_21
L69_18
8→4
20
21cm
~0→3


F9_16
F
31
LEGCO
~9cm
SZ 44:93
(22→N)
9,5
51.75
(46,N)
2.8
12→14
2.5
12-14
ALTO
~36,5
12→11
L69_21
L69_17
L69_18
8→4
20
21cm
21→12
51.81
(37,N
44N)

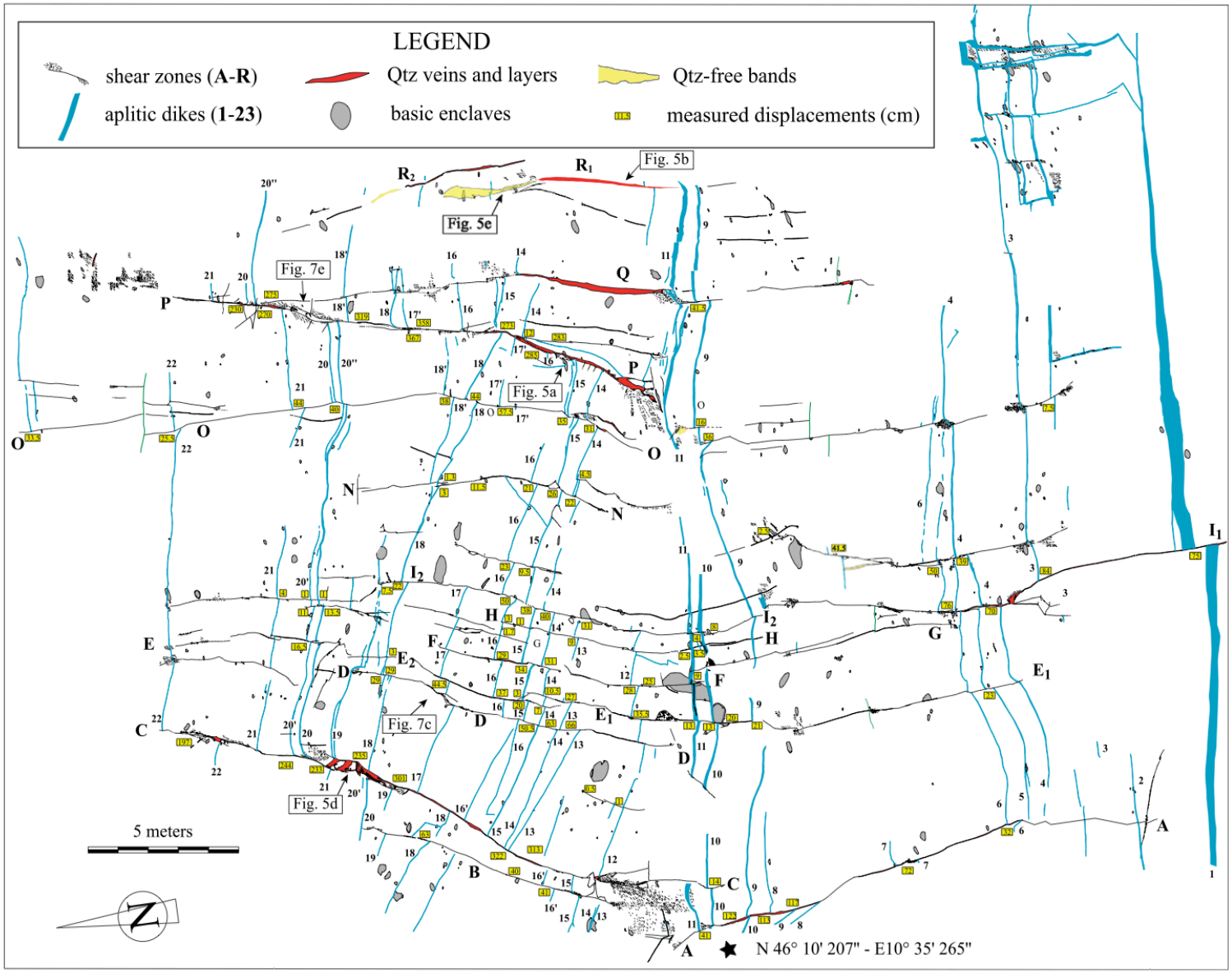
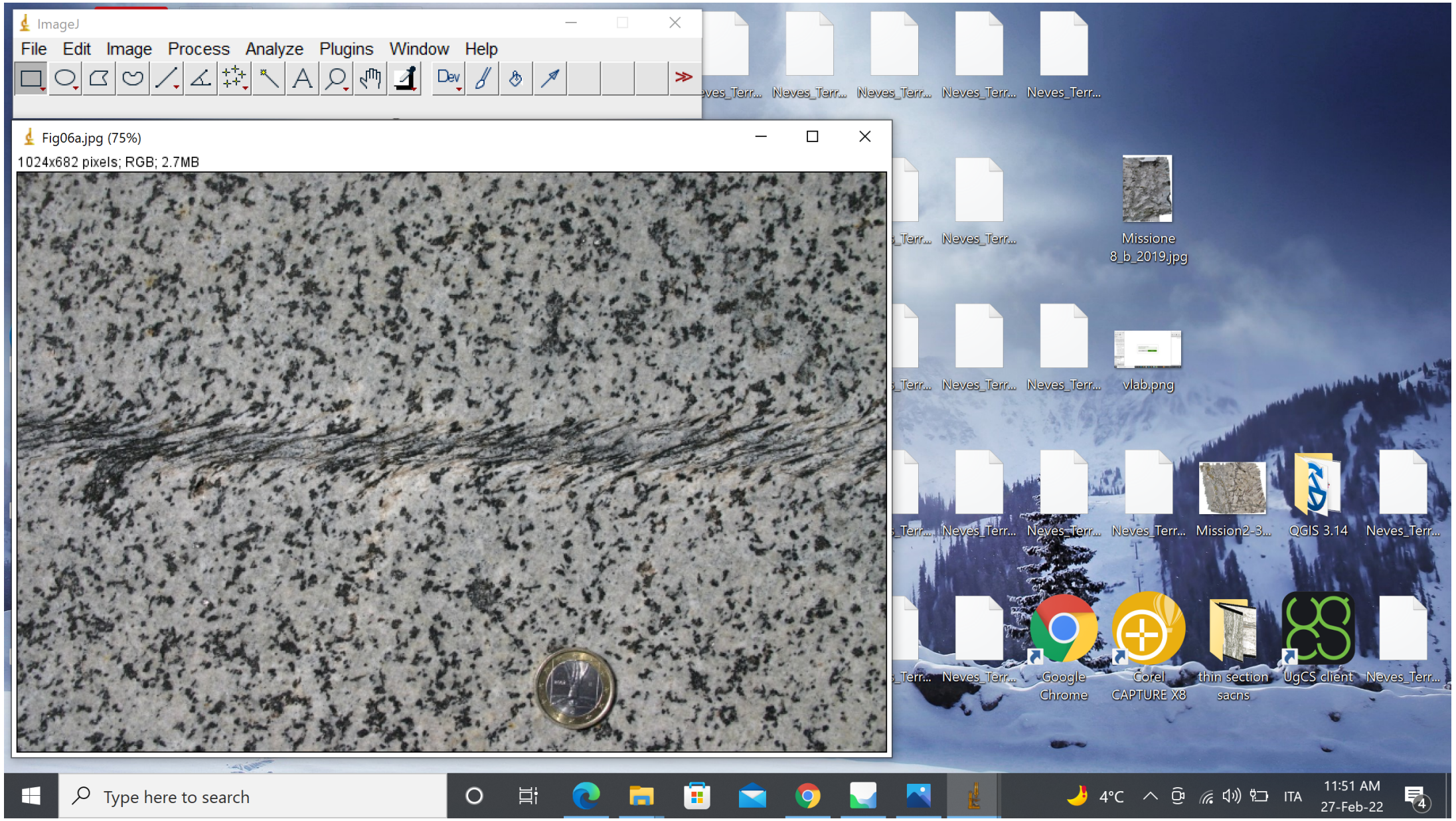


Fig. 3. Surface map of the studied outcrop in the Lobbia area. Shear zones are labelled with upper case bold letters (**A–R**) and aplite dykes with bold numbers (**1–23**).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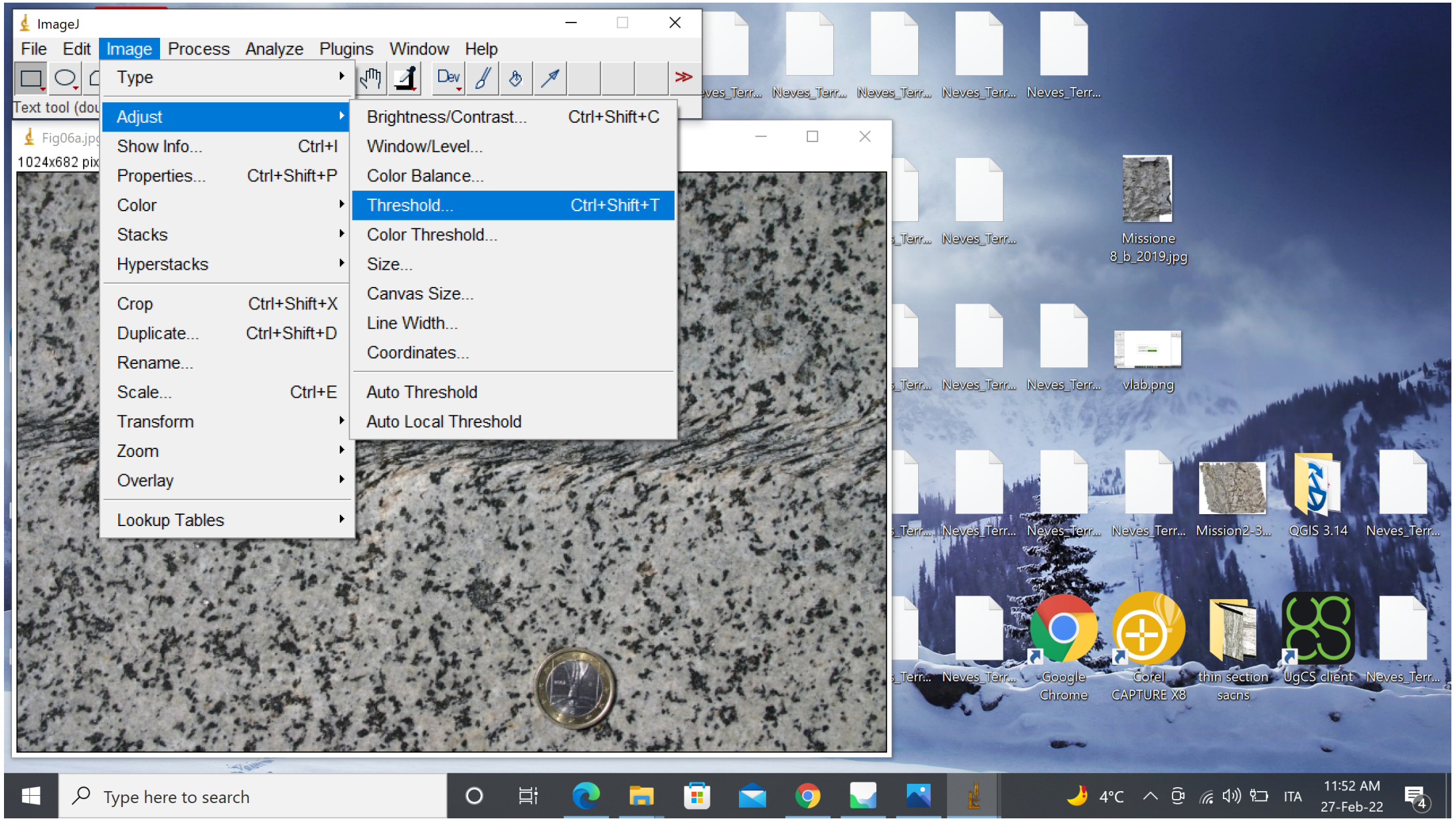
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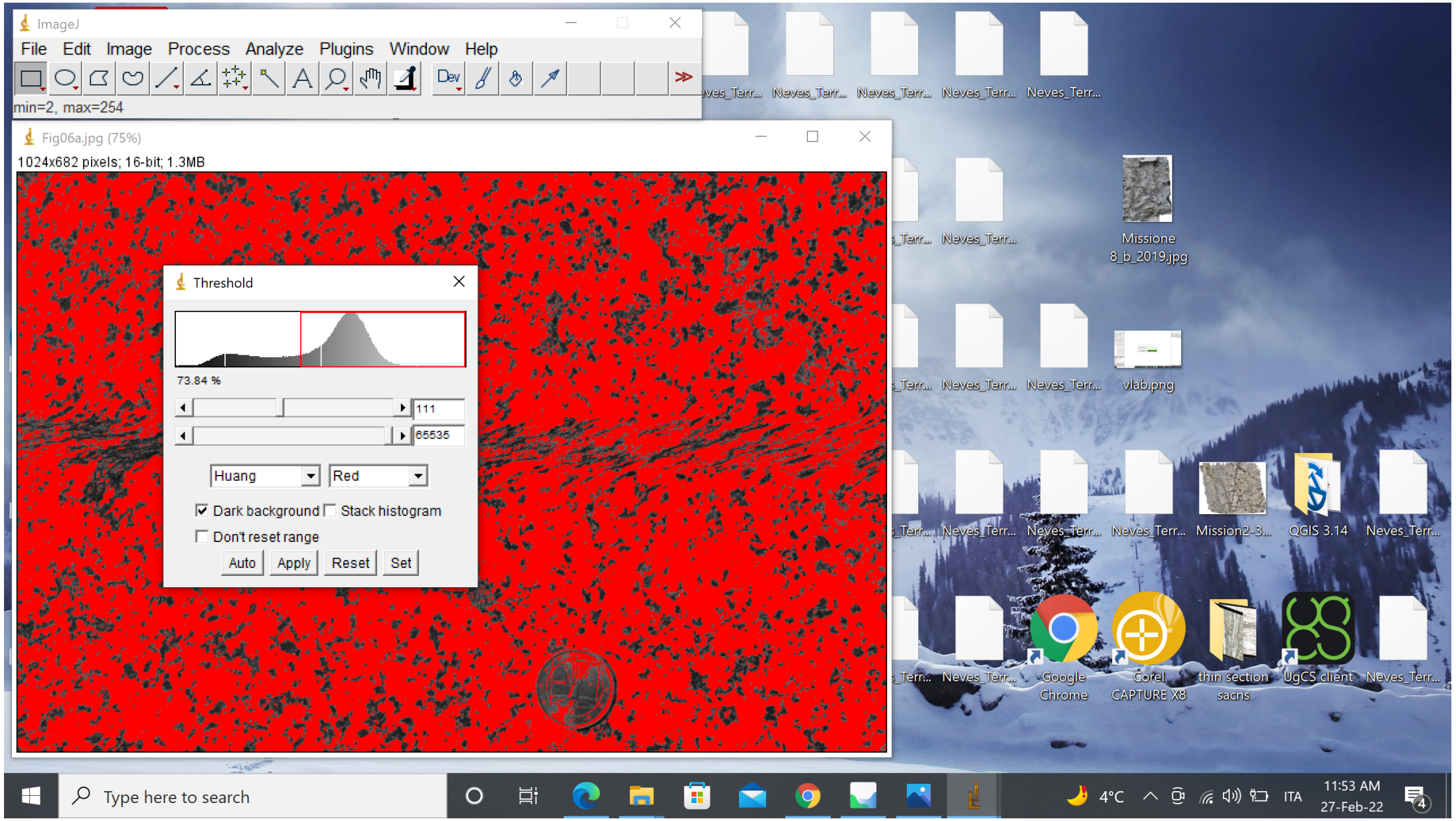
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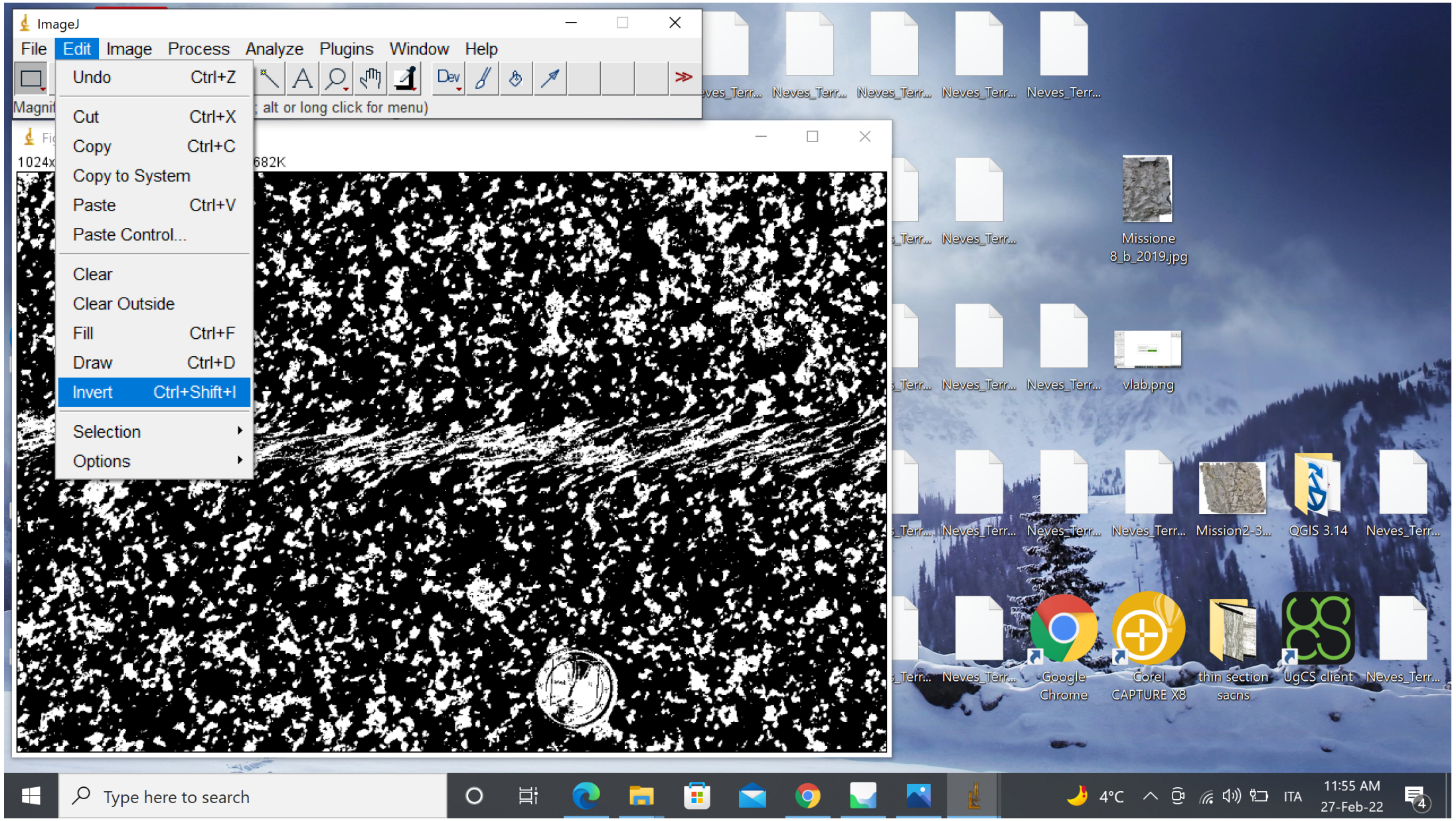
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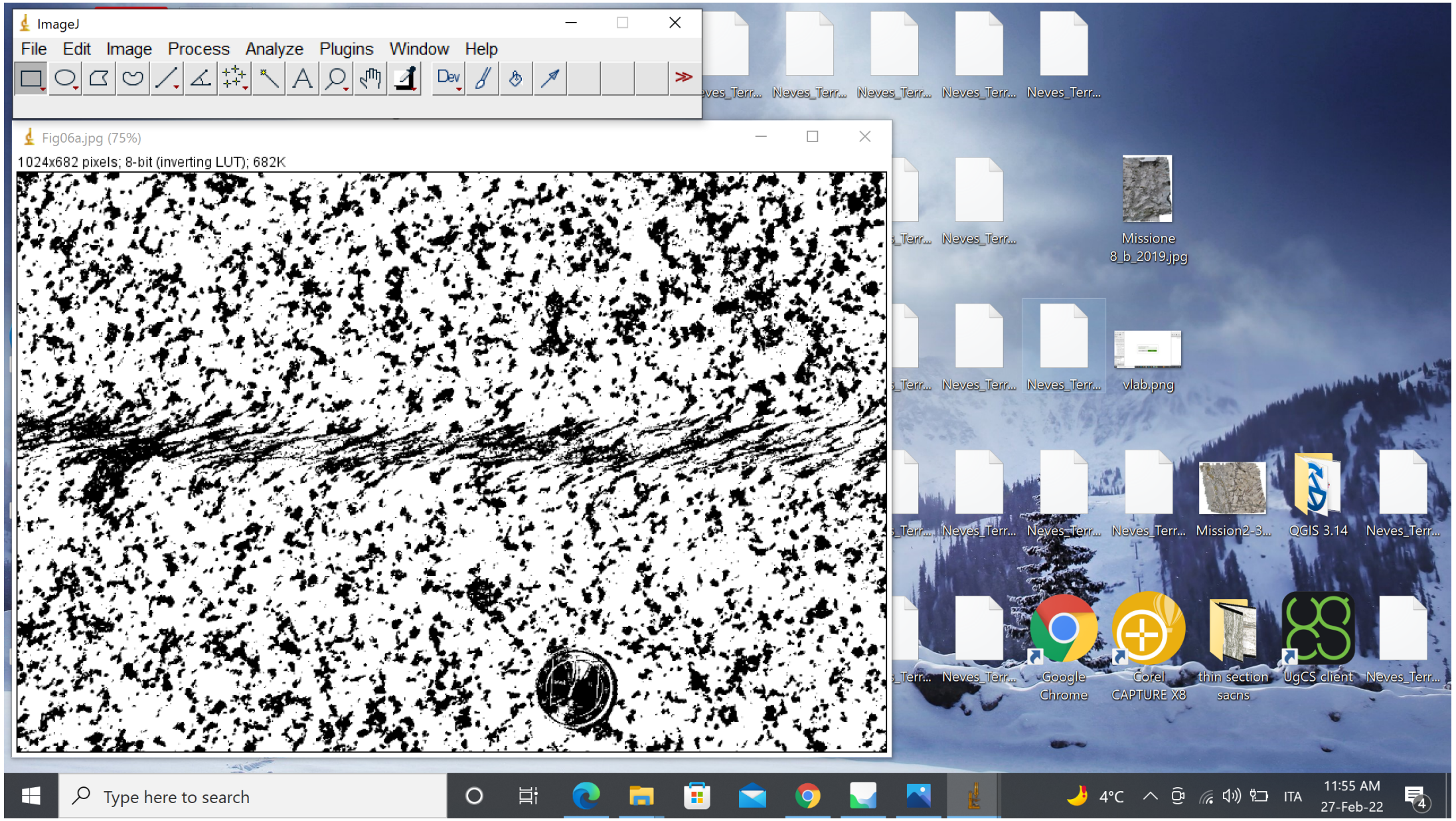
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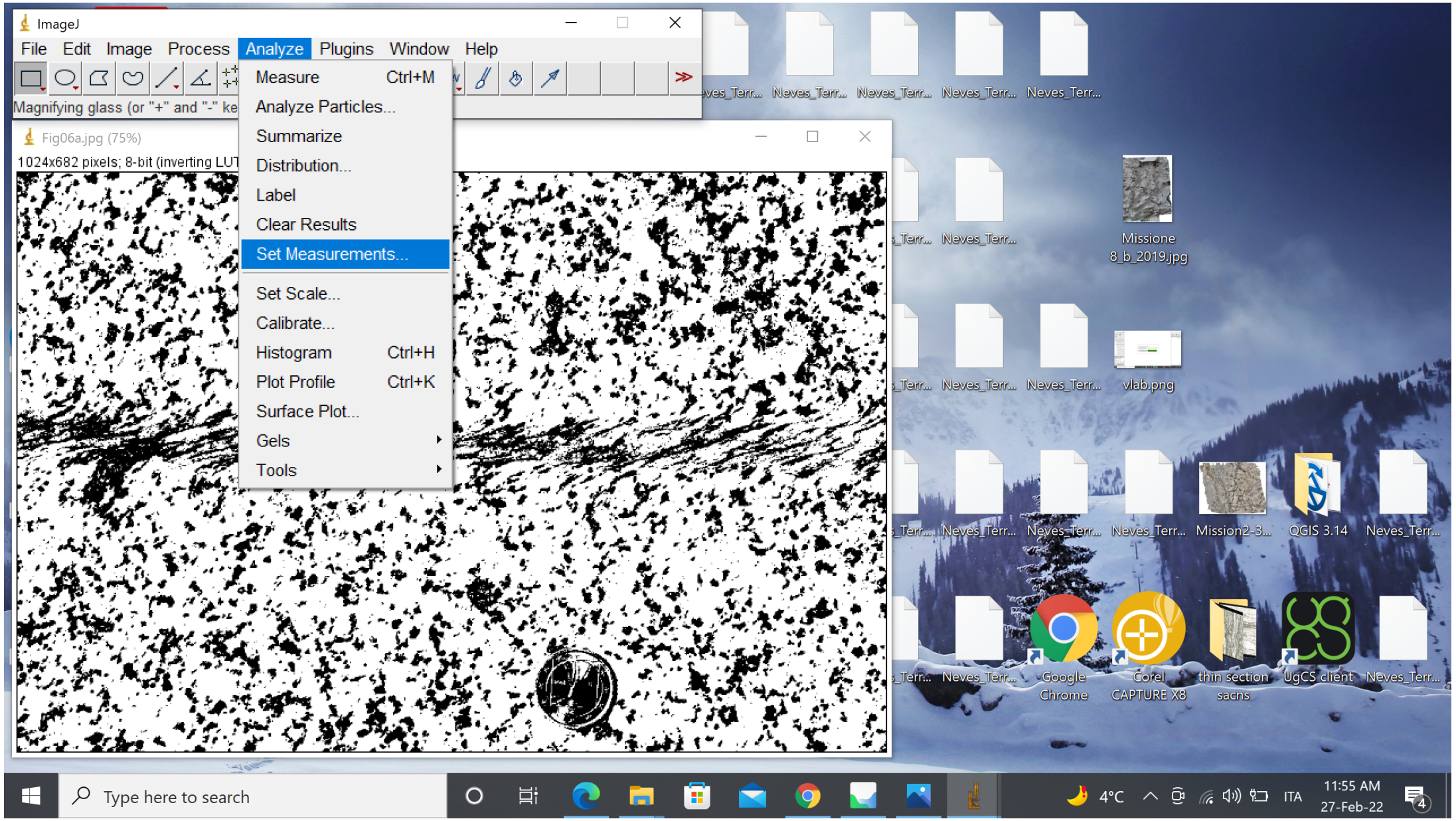
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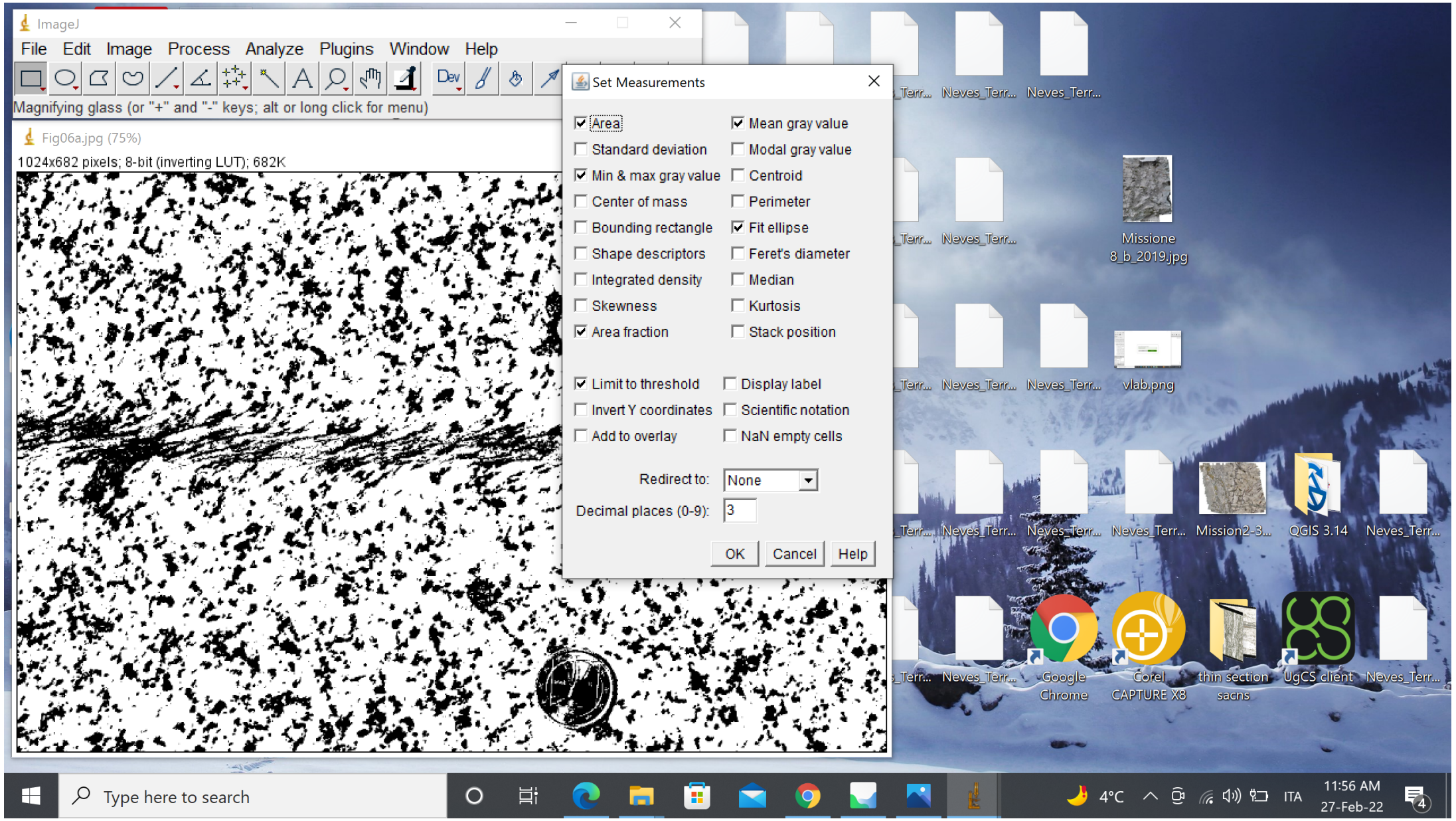
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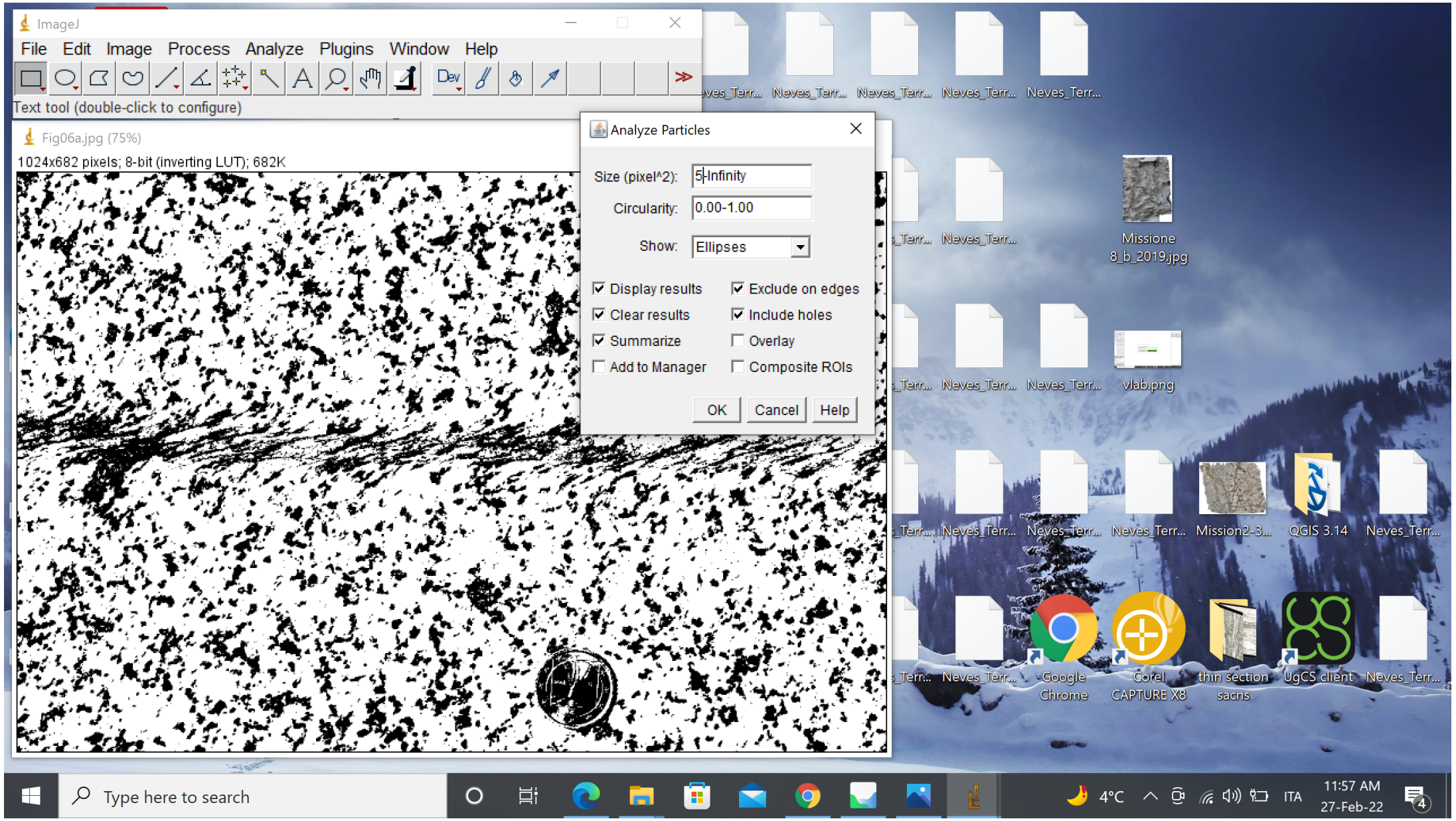
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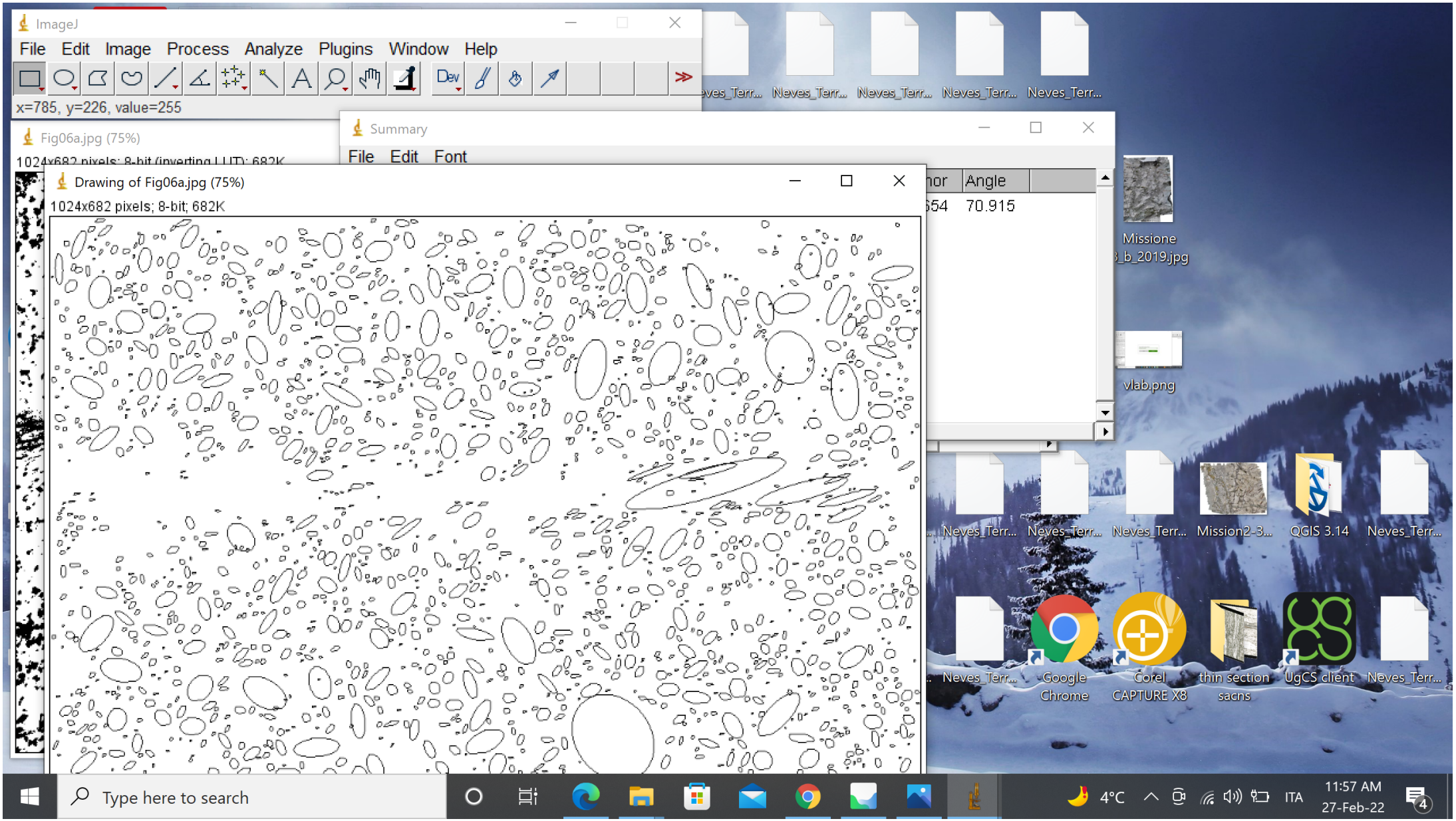
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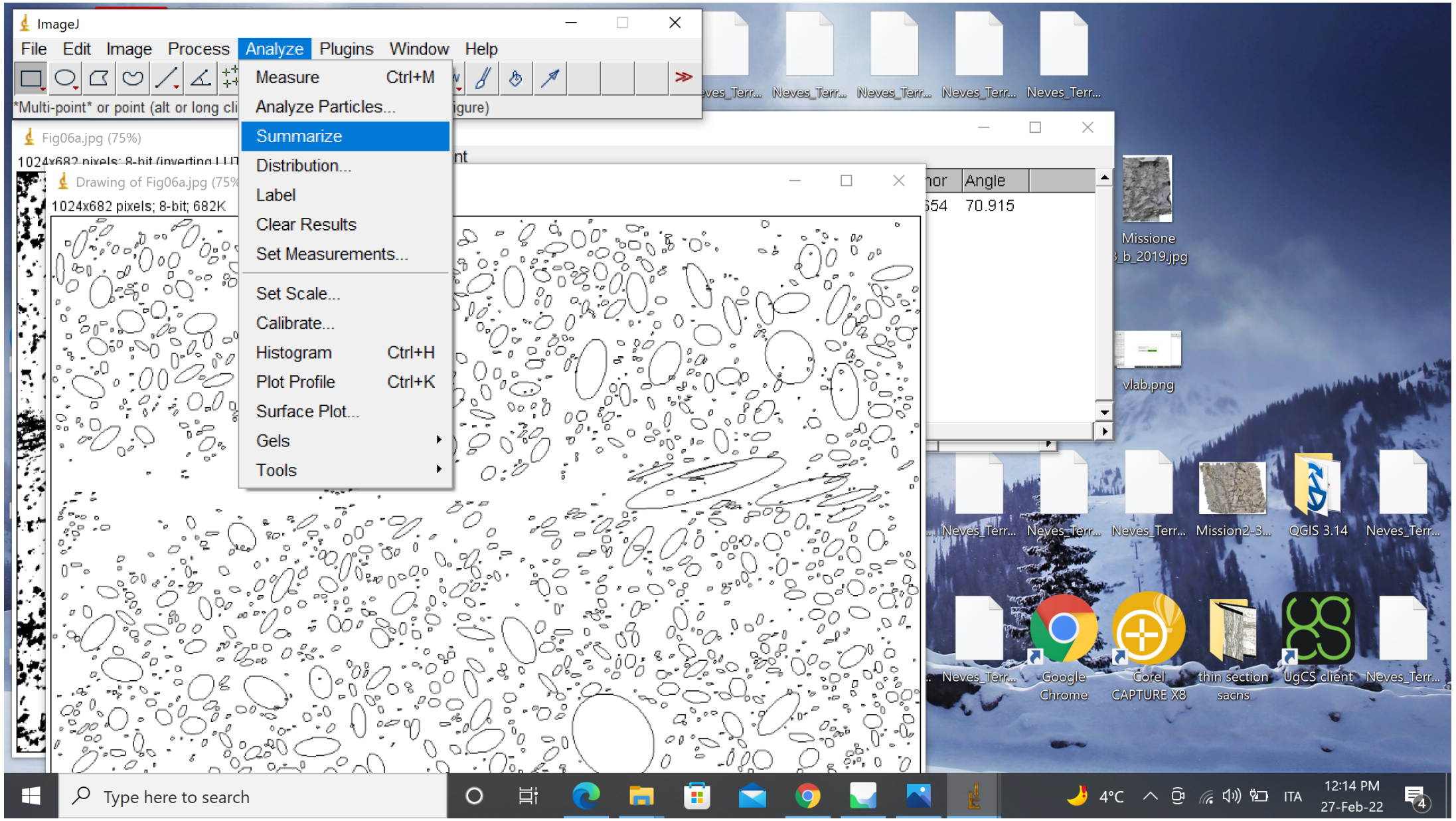
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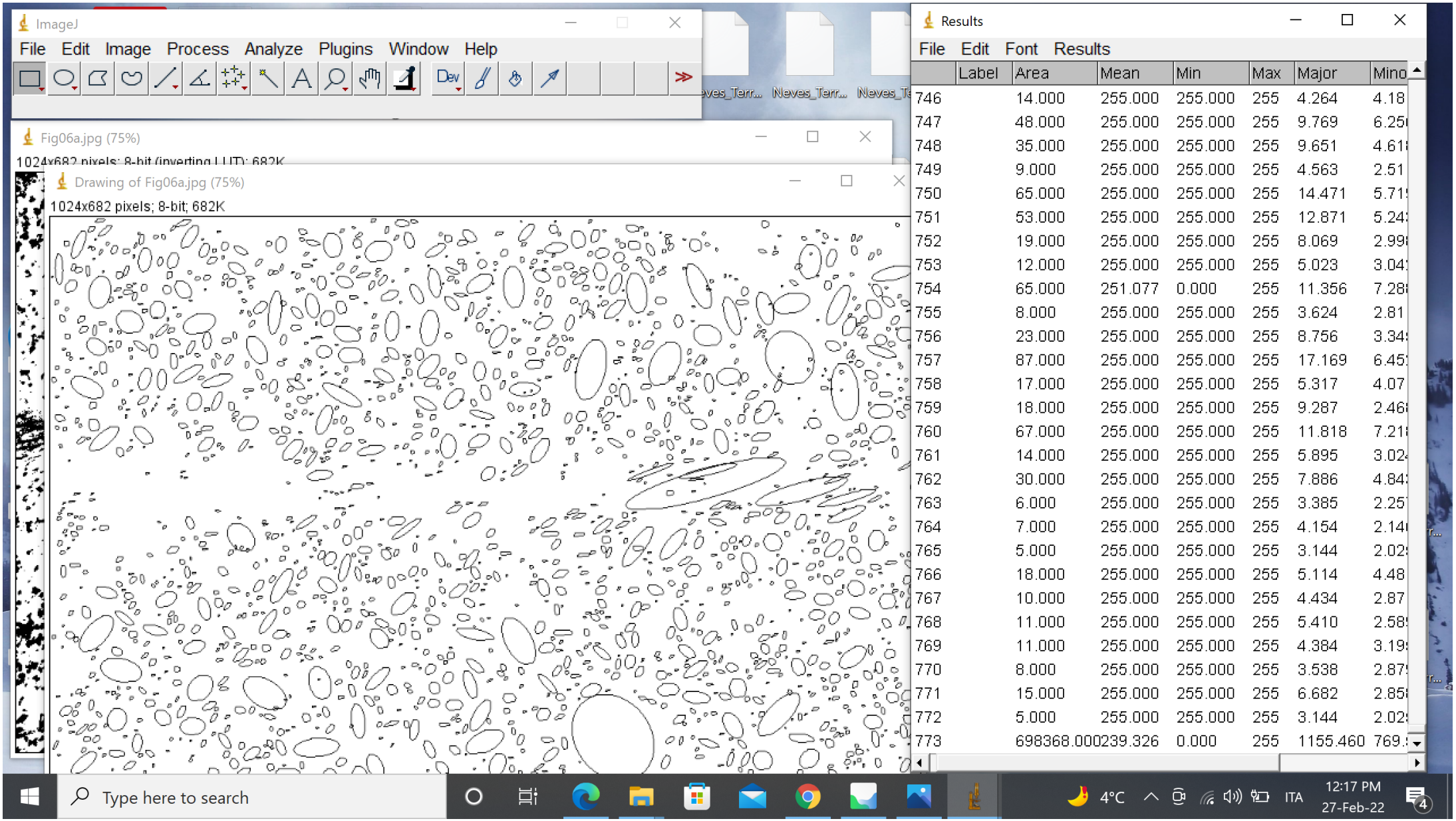
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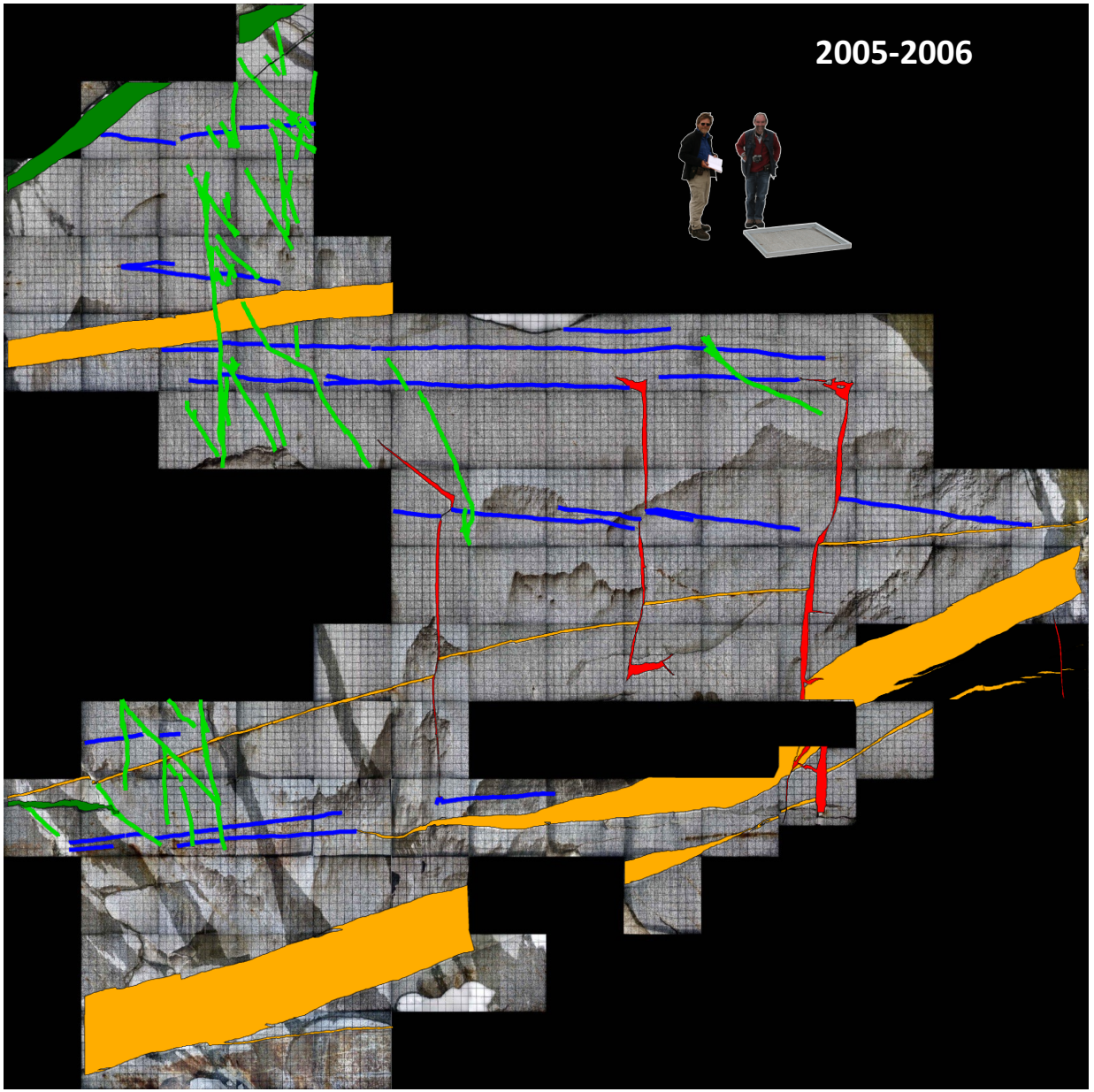
PROBLEMS

- **3D topography**
  - ✓ *distortion*
  - ✓ *difficulty in mosaicing*
- **Time-consuming**
- **Selective/incomplete**

2005-2006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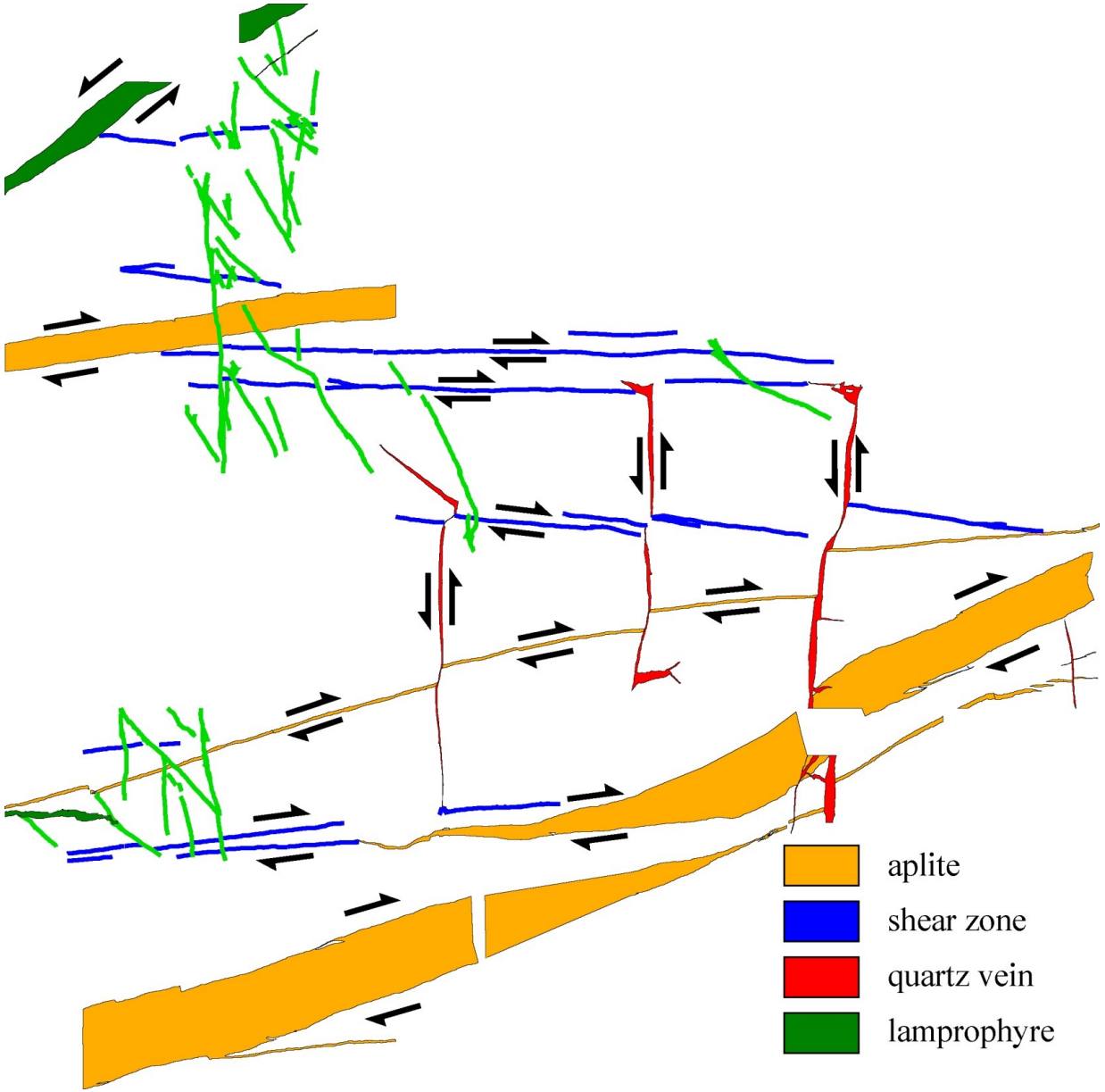
aplite
shear zone
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lamprophyre

2014-2015

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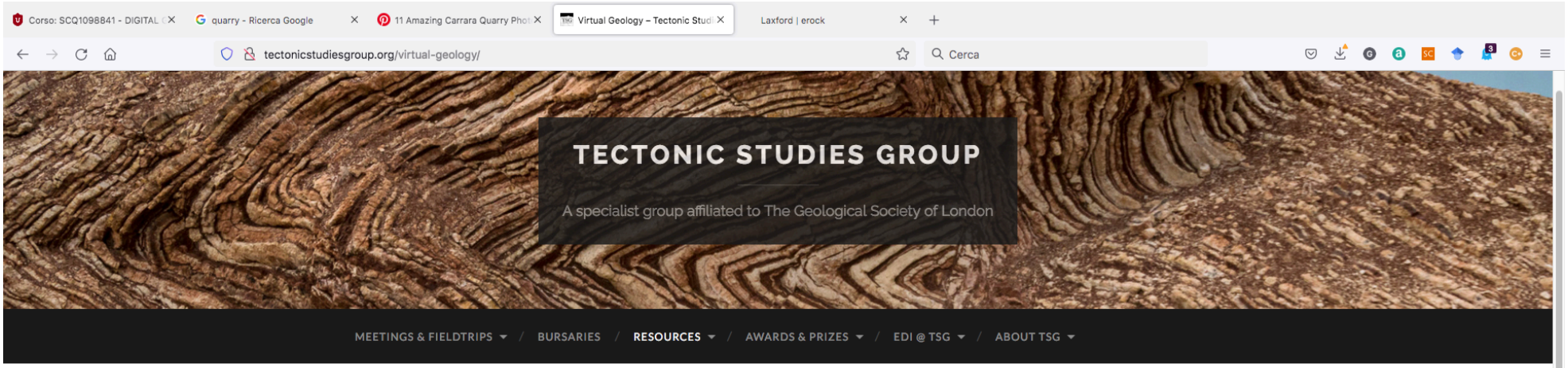
MOSAIC OF 580 HR PHOTOGRAPHS
(Agisoft software)

ACCESSIBILITY & OUTCROP SIZE

Dinosaur footprint track (Bolivia)

Carrara Marble Quarry



Virtual Geology

After the Covid-19 pandemic put a halt to classroom and field teaching the geoscience community made a host of digital resources available online. We want to do our part by collating the most valuable of these to make them more accessible. If you come across anything you think should be included here, please forward it to TSG.

Field Trips & Digital Outcrops

- Virtual Landscapes (Leeds): A resource for virtual fieldtrips for geological mapping – including our 2021 Rhoscolyn Virtual Fieldtrip
- eGEW-GeoTrips: How to create online Google Earth field trips by Josh Williams & Ben van der Pluijm
- Streetcar2Subduction method: How to create Google Earth field trips by Christie Rowe et al.
- Designing Remote Geology Field Courses: A YouTube Webinar by IAGD
- eGEW-GeoTrip: Geology of the Maryland Appalachians
- Streetcar2Subduction: Plate Tectonics in the San Francisco bay Area
- Designing Remote Field Experiences: A collection of available field trips and resources on how to design them by NAGT

TSG
Tectonic Studies Group

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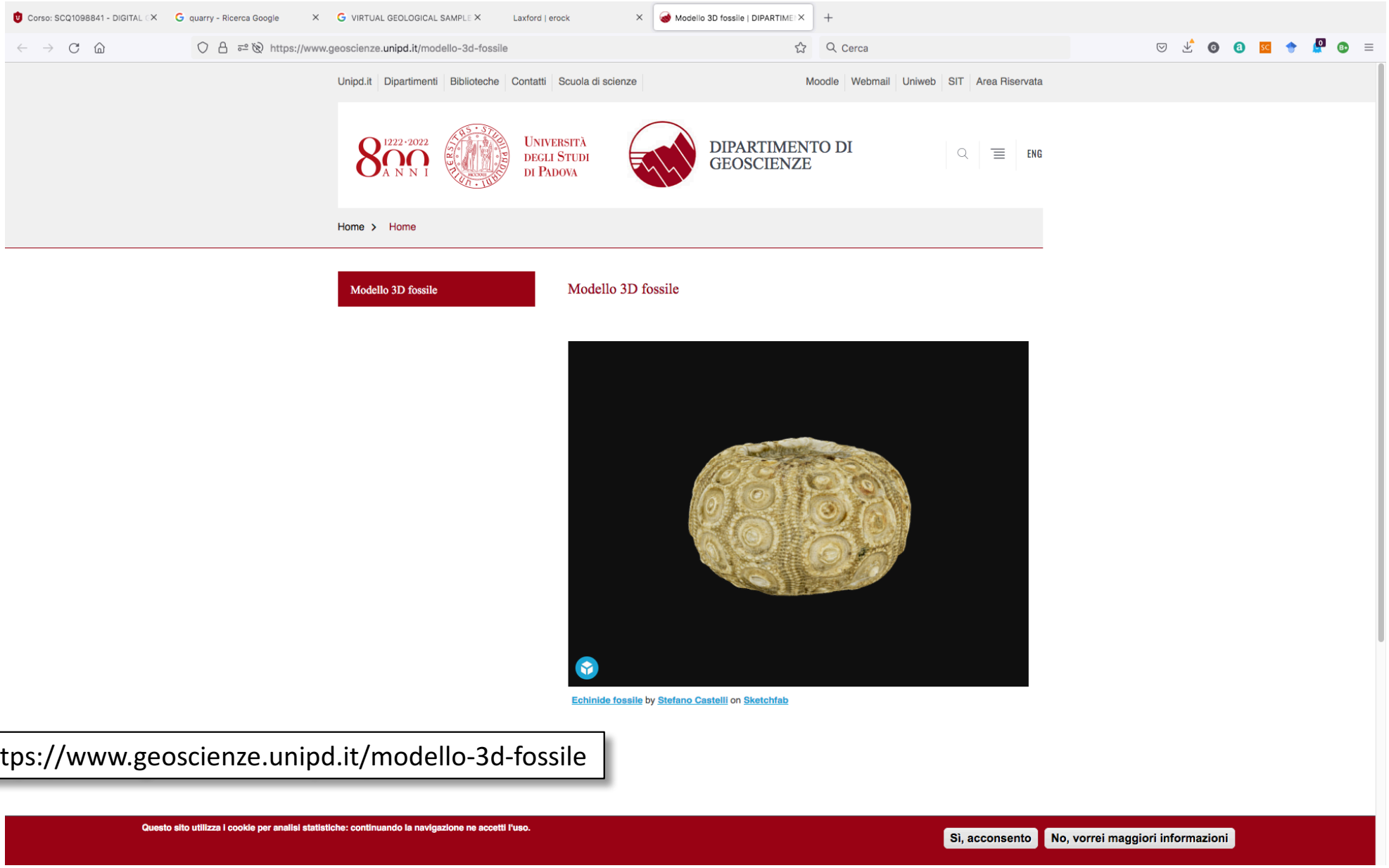

https://www.geoscienze.unipd.it/modello-3d-fossile