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***Climate and
Resources Lab***

With the support of the
Erasmus+ Programme
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JG|U



Sedimentary Records of Earth's Past Climate - JOINT COURSE

<https://climate-and-resources.forthem.uni-mainz.de/>

<https://www.forthem-alliance.eu/objectives/labs/climate-and-resources/>



Molinos, Spain, September 2021

Sedimentary Records of Earth's Past Climate – FORTHEM representatives

- Institut für Geowissenschaften, Johannes Gutenberg Universität – Mainz: Tectonics and structural geology group



- Departament of Earth and Marine Sciences, Università degli Studi di Palermo, Italy



- Departamento de Geologia, Universitat de Valencia: Paleontology



- Laboratoire Biogéosciences, University of Burgundy, France



Sedimentary Records of Earth's Past Climate – course structure

Online lecture series
March-June 2022

Asynchronous lectures
(summer semester 2022)

Blended groups of students

In person group:
field mapping
at Molinos, Spain
(August 2022)

Remote group:
analyses of digital data
from Molinos, Spain
(August 2022)

Submission of group reports

- **JGU:** (i) How to unravel the history of tectonic deformation? How to determine original depositional geometries?; (ii) Basics and methods of geological field mapping.
- **UV:** (i) fossil identification; (ii) interpretation of past earth environments and (iii) geological ages of rock units from fossil records.
- **UNIPA:** (i) How calcareous plankton records during the last glacial period show the response of marine ecosystems to abrupt climate change? (ii) Evolution of the Mediterranean Sea and surrounding land mass during Holocene climate changes.
- **UB:** (i) How environmental signal (T, salinity) is captured by isotopic compositions of biological archives (i.e. fossils)? (ii) How to access these signals and how to interpret them?

Sedimentary Records of Earth's Past Climate – Molinos field area



Sedimentary Records of Earth's Past Climate – fossil records



The rocks
contain
spectacular
fossils

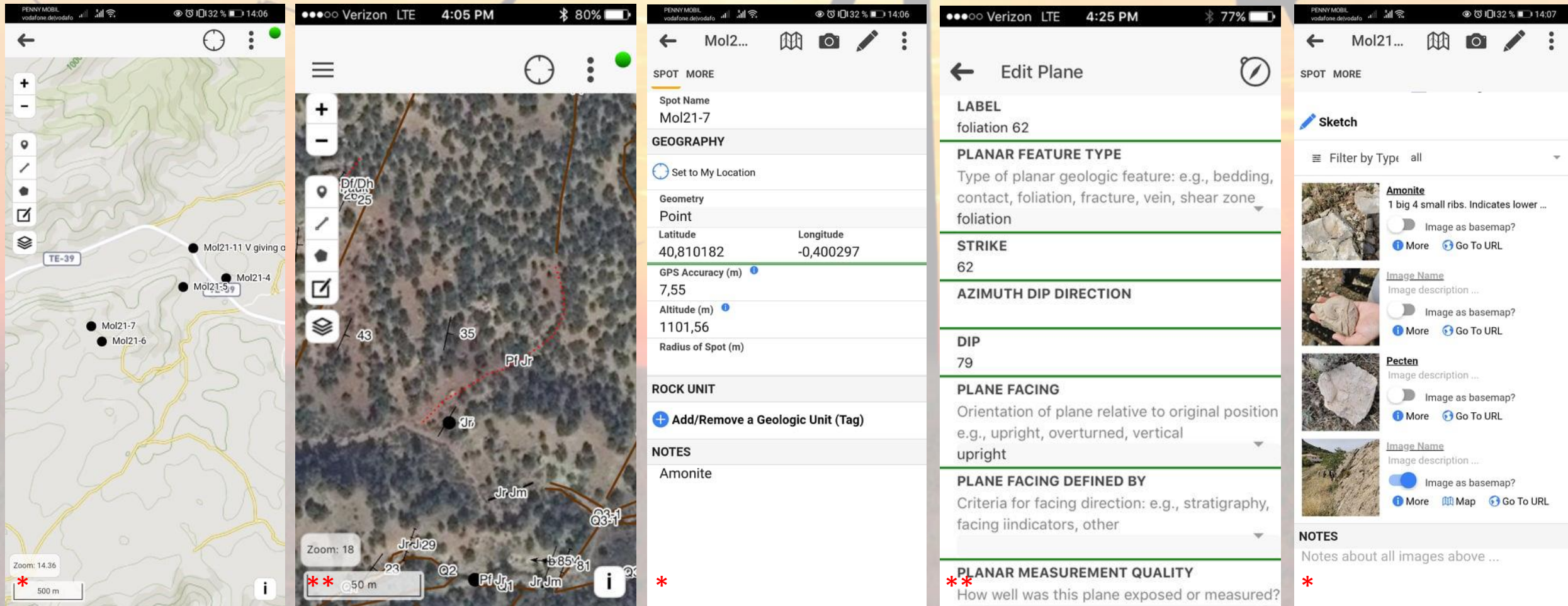


Sedimentary Records of Earth's Past Climate – structural complexities



Sedimentary Records of Earth's Past Climate – StraboSpot

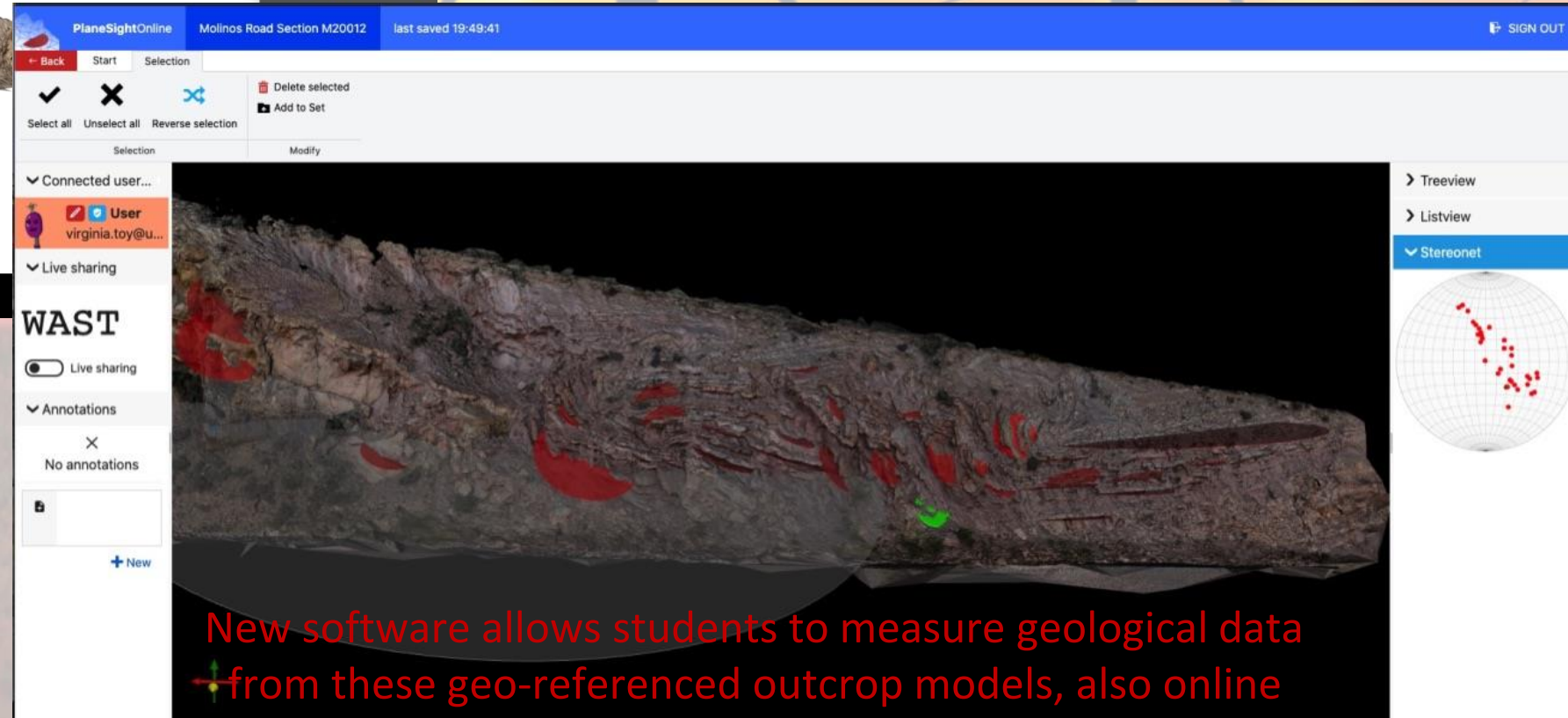
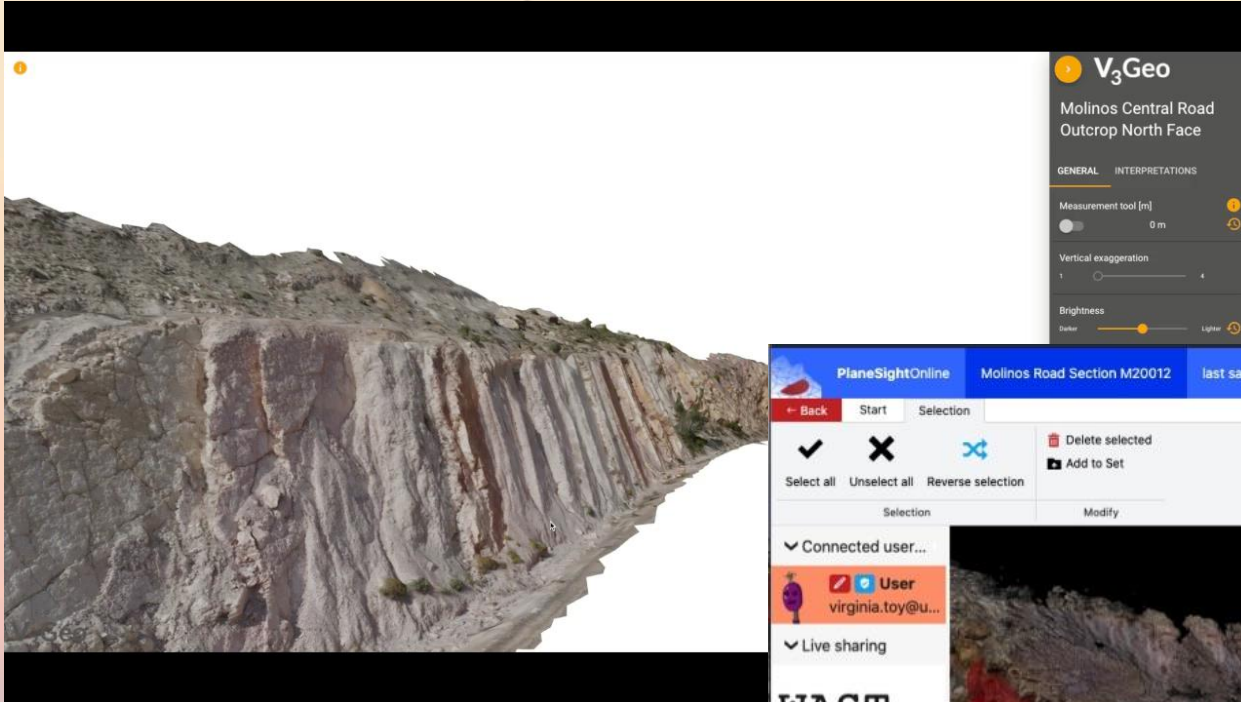
We will teach students to use tablet/phone-based data acquisition apps that link to global scientific databases (strabospot.org)



*Screenshots from my personal StraboSpot project. **Screenshots from <https://www.strabospot.org/downloadapp>

Sedimentary Records of Earth's Past Climate – digital methods

This class offers many innovations in
digital teaching.



We have online 3D
outcrop models
(v3geo.com)

New software allows students to measure geological data
from these geo-referenced outcrop models, also online

Sedimentary Records of Earth's Past Climate – learning outcomes

Generic skills:

- Teamwork
- Ability to work without supervision
- Ability to design and implement own field-based research
- Quantitative skills
- Reporting skills
- Use of computers and iOS/Android devices to record and analyze field geological data

Topic-specific skills:

- Description of sedimentary units and fossils
- Description of current geometry of geological units and how these may relate to original depositional geometry
- Knowledge of depositional environments and ability to infer them from observed deposits
- Knowledge of Mediterranean climate variations during the last glacial period
- Understanding of how to employ isotopic signatures in biorecords to understand past environmental conditions.

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