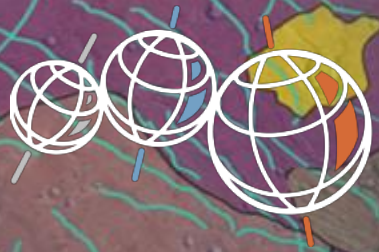

we
europlanet 2024
Research Infrastructure



Geology & Planetary Mapping
Winter School

Welcome and Introduction

Matteo Massironi, Riccardo Pozzobon, Angelo Pio Rossi

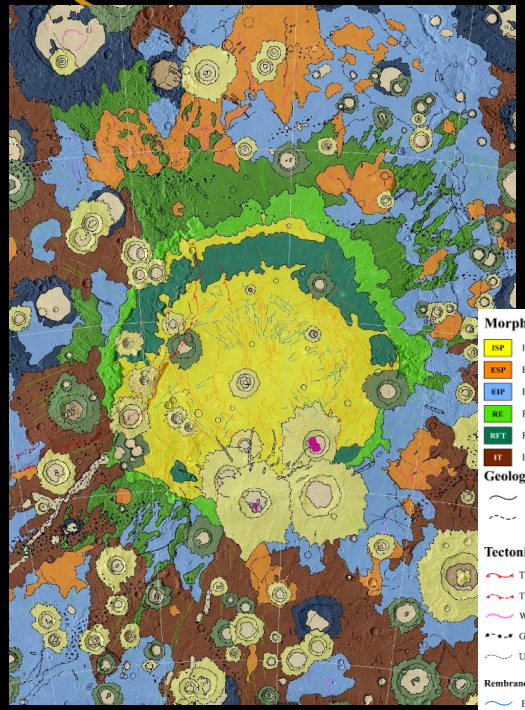
europlanet 2024 Research Infrastructure

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 871149.

Welcome to the 3rd Geology and Planetary Mapping Winter School

The Geological Drama

Semenzato et al 2020



A geological map is a representation on a topographic base of a territory, showing rocks and deposits distribution and ages. From geological maps it is inferable the territory geological evolution and the subsurface geometry of rock bodies.

Morpho-stratigraphic units

- ISP — Interior smooth plains
- ESP — Exterior smooth plains
- EIP — Exterior intermediate smooth plains
- RE — Rembrandt ejecta deposits
- RFT — Rembrandt Rough Floor Terrain
- IT — Intercrater plains

Crater materials

- SCF — Smooth crater floor
- HCF — Hummocky crater floor
- C3 — Crater material - well preserved
- C2 — Crater material - degraded
- C1 — Crater material - heavily degraded

Geologic contacts

- Certain
- Approximate

Linear features

- Crest of crater rim (diam. >20km)
- Crest of small crater rim (diam. >10km)
- Crest of subdued or buried crater
- Striped basin-related features
- Irregular pit

Tectonic features

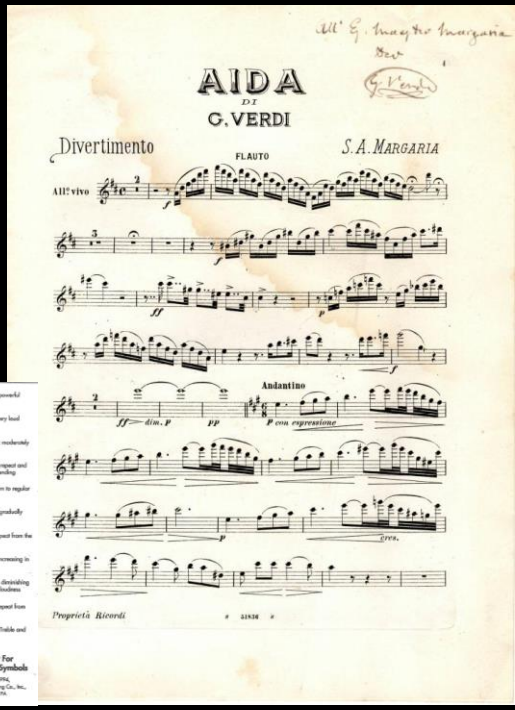
- Thrust - certain
- Thrust - uncertain
- Wrinkle ridges
- Graben - uncertain
- Uncertain structure

Surface features

- Hollow cluster
- Pyroclastic deposit
- Secondary crater chain/cluster

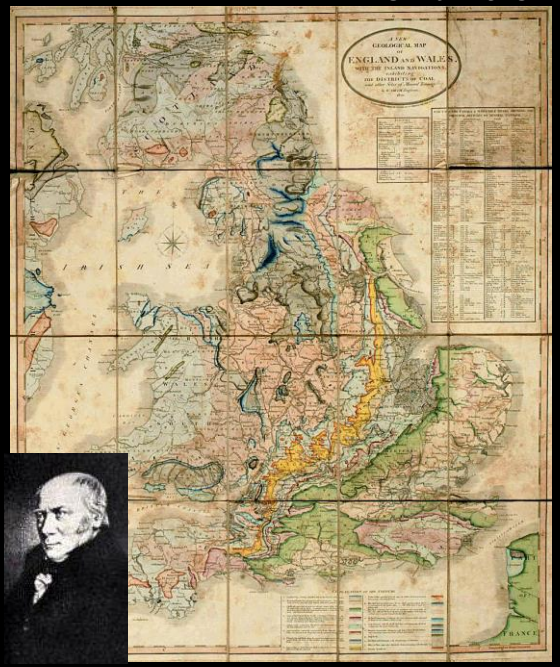
Rembrandt basin tectonics

- Extensional feature
- Contractional feature



Why Geological Maps

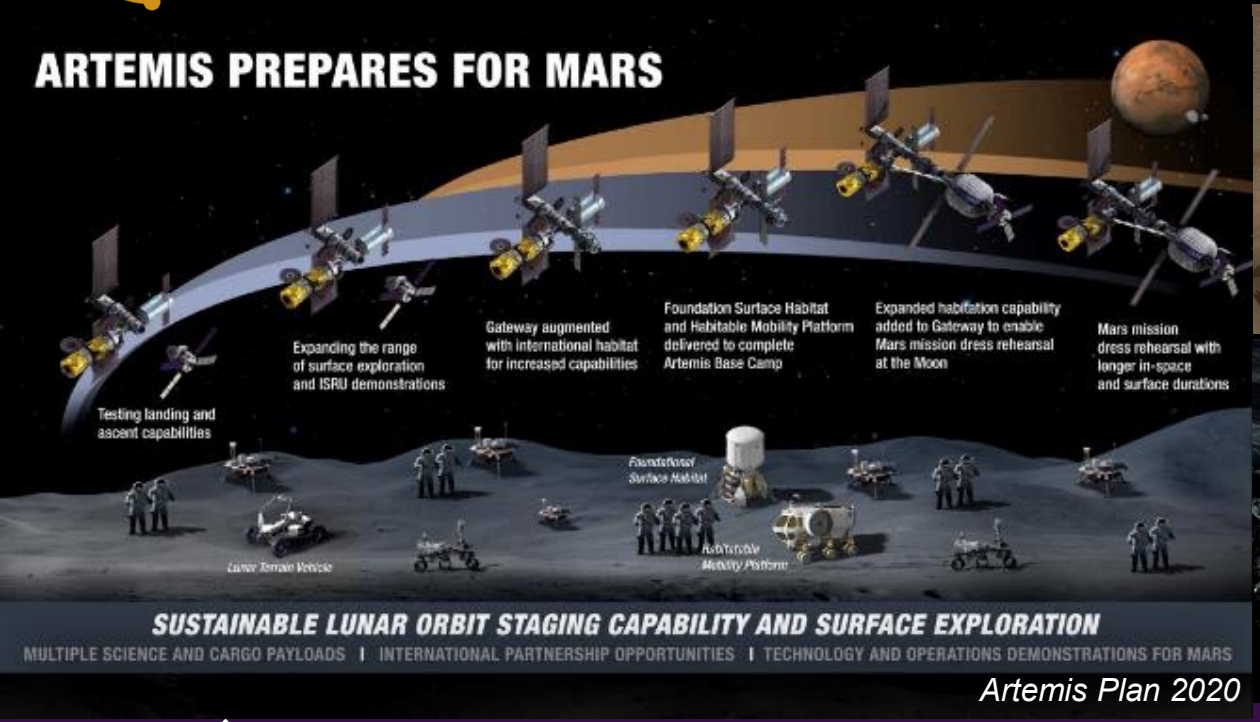
Smith 1815



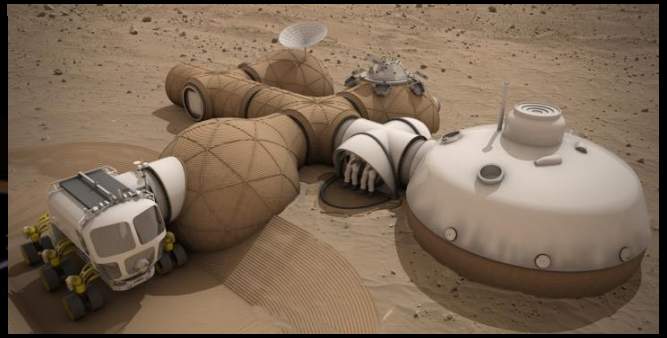
- Science investigation
- Resource exploration
- Resources evaluation, exploitation and management
- Hazard and Risk assessment
- Land use and Infrastructure planning
- Environment protection

Shoemaker 1960

Future in situ Exploration: From the Moon to Mars



Artemis Plan 2020



We need to land !

What we are going to learn
Lectures and Practicals

How to produce Planetary Geological Maps

- Base data extraction and handling
- Reference Systems
- Mapping in GIS environment
- Geological mapping of Lunar and Martian surfaces
- Compositional data handling

How to enable landing and traverses

- Trafficability and landing site safety
- Landing site characterization on Moon and Mars
- How to define science and in situ resource targets

Tools and resources

- Mapping tools
- GMAP Jupiter Lab functionalities
- Gmap portal

Seminars and Special Events

The state of the Art

- Earth vs Planetary Geological maps
- Landing sites mapping on Moon and Mars
- Venus geological maps
- Titan Geological maps
- Geostructural mapping on Planets

Perspectives

- Machine learning
- Digital Outcrop geomodelling
- Virtual Reality
- Human exploration on Moon and Mars

.....and GMAP community lightening on geological mapping of Mars in different contexts

General logistics and schedule

- Schedule is flexible for asynchronous use, but tight →Not much time for speaker introductions
- No audio questions, in general
- Q&A = OK (next slide)

How to ask questions

- If questions come up during a talk, please write them down on the Q&A of Zoom
- If questions come up ealier/later, please write them clearly and concisely on Discord

Data access

- Data available from:
  https://www.planetarymapping.eu/414/info-for-participants.html

- Info & references on:
  https://github.com/europlanet-gmap/winter-school-2023

Certificates

3 options:

A. Acceptance of participation→ No strings attached (but no certificate)
B. Attendance & quizzes (no grading, only >50% correct =OK) → Basic certificate
C. Mapping tasks completed (=map produced) → Advanced certificate