

WP

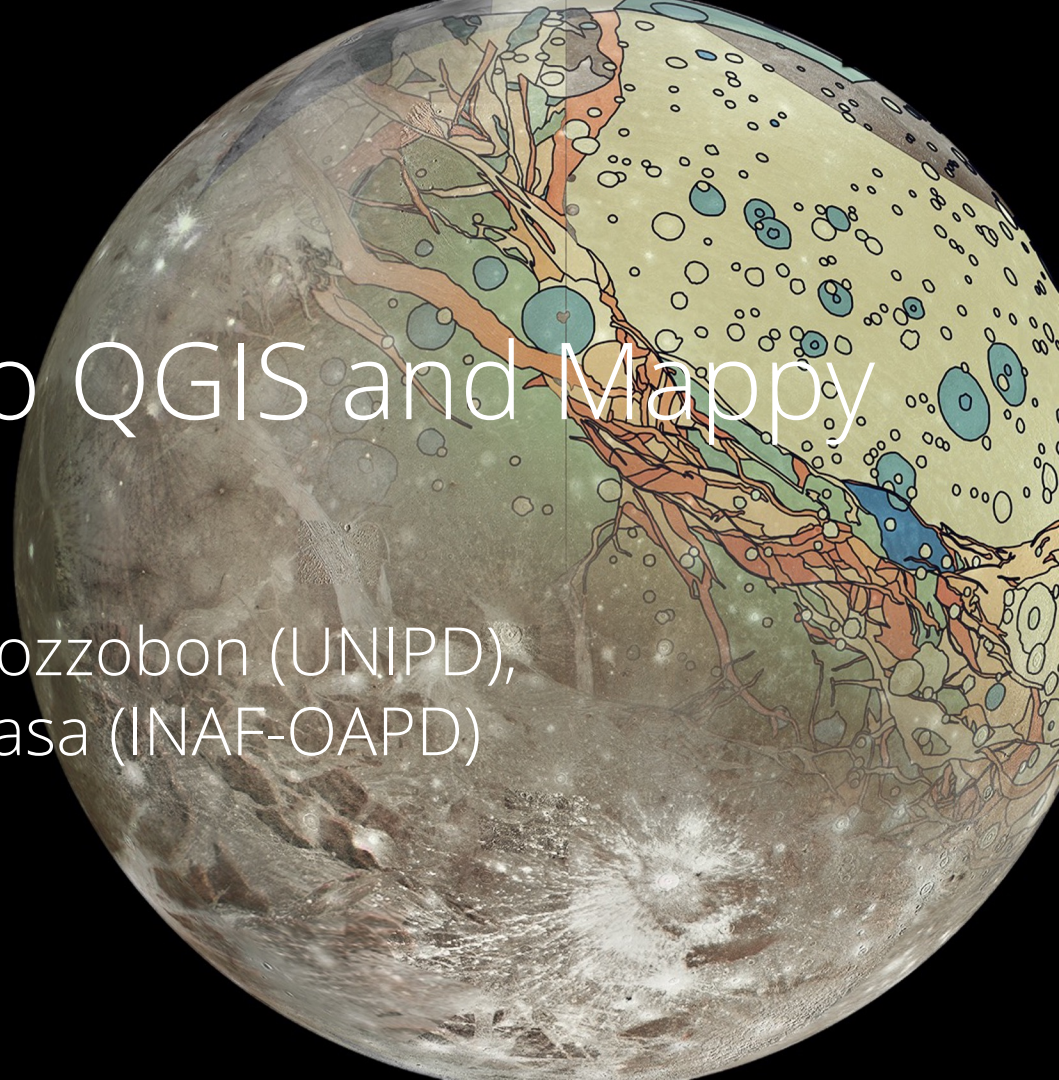
# eur PLANET 2024

Research Infrastructure



# Introduction to QGIS and Mappy

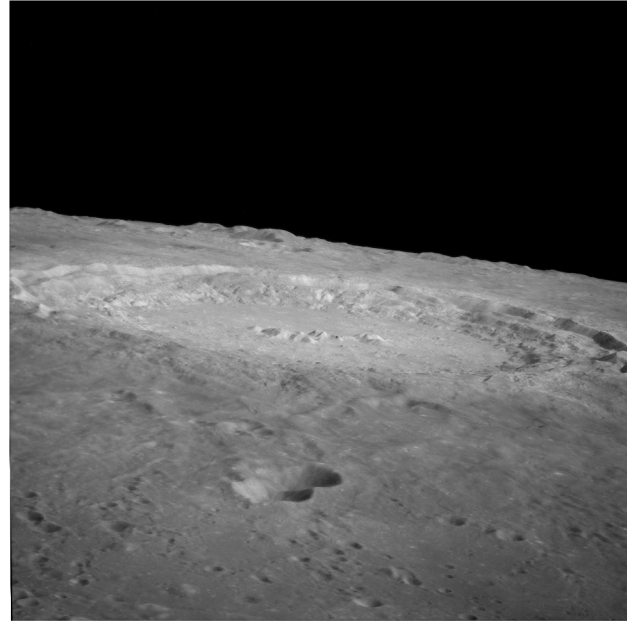
Riccardo Pozzobon (UNIPD),  
Luca Penasa (INAF-OAPD)



# Data for QGIS + OpenCrater Tool demo

The dataset:

<https://zenodo.org/doi/10.5281/zenodo.10477754>



<http://www.lpi.usra.edu/resources/apollo/frame/?AS12-52-7739>

A view of Copernicus crater taken from lunar orbit by Apollo 12. The view is looking north. The keyhole-shaped double crater in the foreground are Fauth and Fauth A.

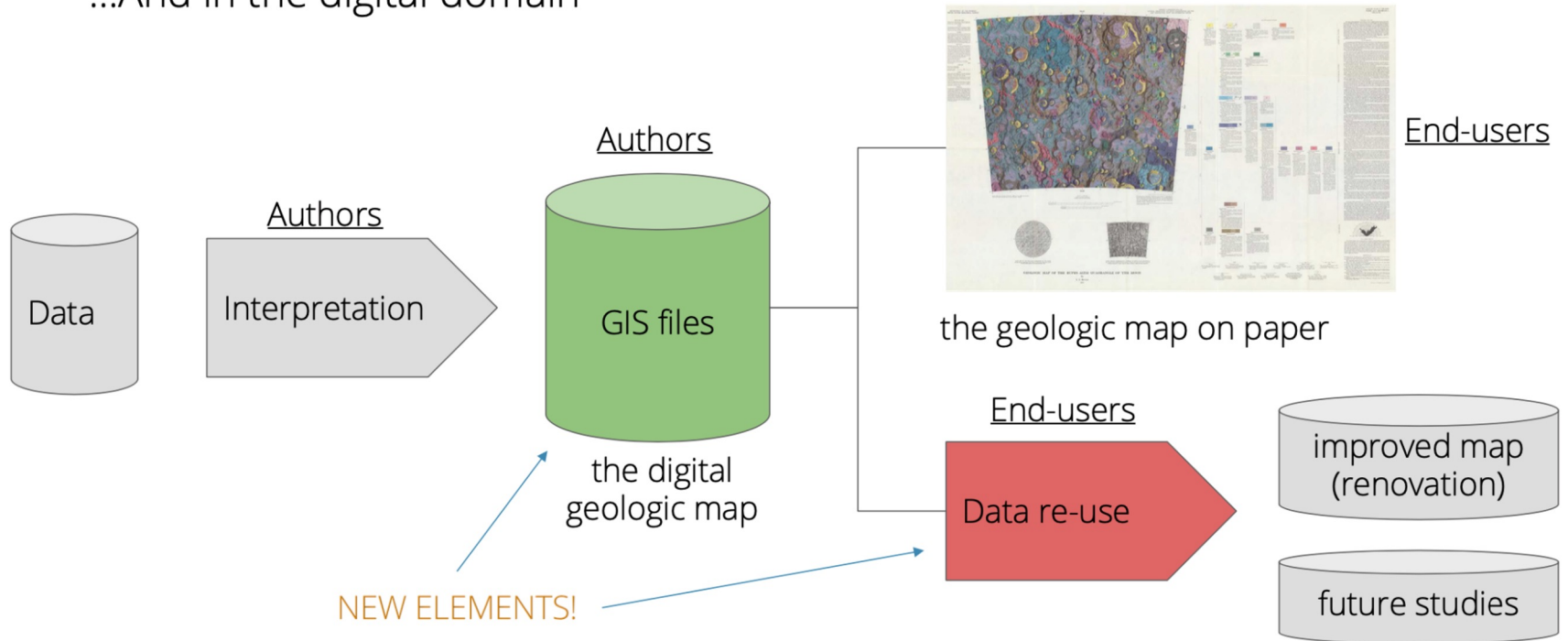
# Traditional cartography

Planetary geologic maps in the paper domain



# Digital cartography

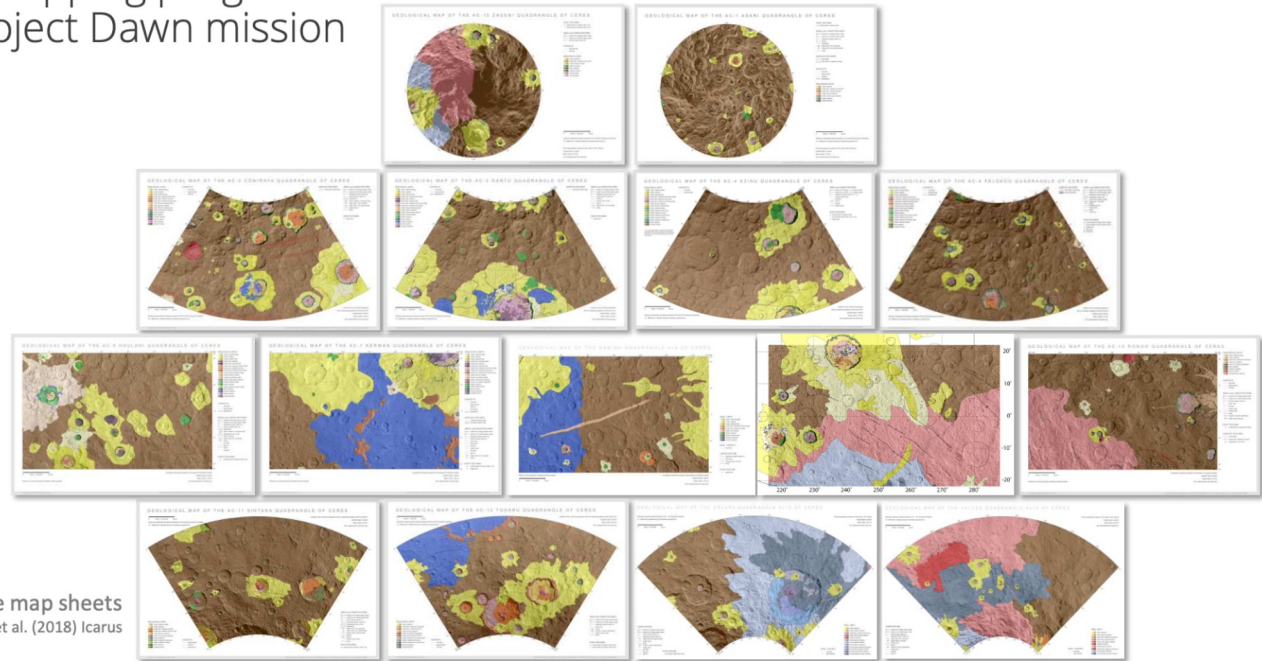
...And in the digital domain





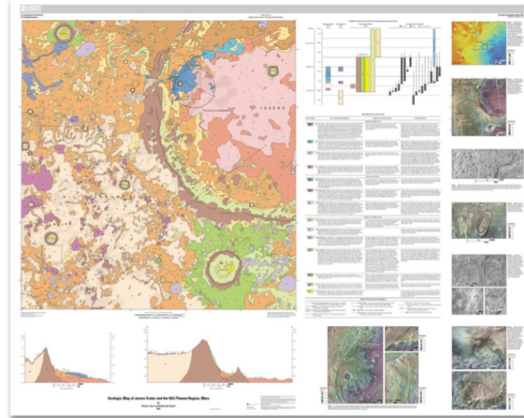
# Systematic mapping

Systematic mapping programs  
mapping project Dawn mission  
(Ceres)

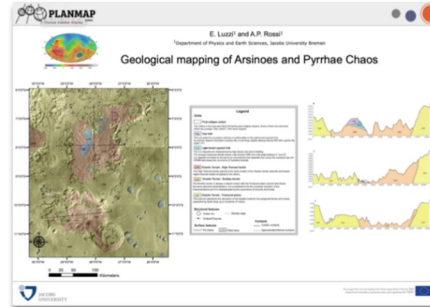


Unified map of 15 single map sheets  
e.g. Williams, D. et al. (2018) Icarus

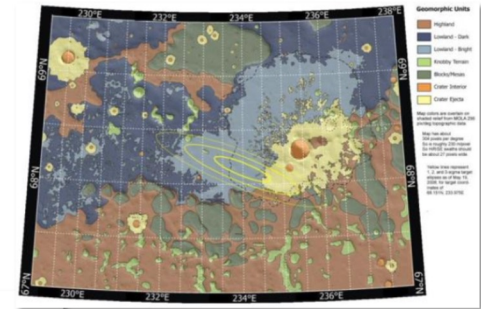
# Single map sheets



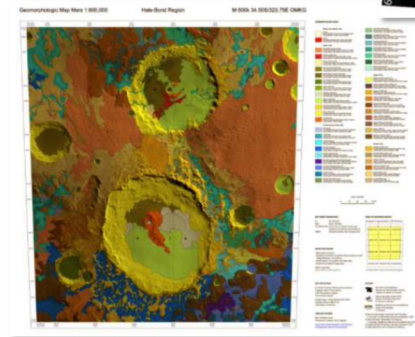
Geologic map of Jezero Crater (Sun and Stack, 2020)



Morphostratigraphic map of Arsinoes Chaos (Luzzi et al., 2020)



Phoenix landing site map as of May 19 (2008)



Geomorphologic Map of the Hale and Bond Crater Region, Mars (Albertz et al., 2008)





# GIS: geographic information system

A geographic information system (GIS) is a system designed to capture, store, manipulate, analyze, manage, and present all types of geographical data. [1]



Bringing advanced geospatial technologies to the world



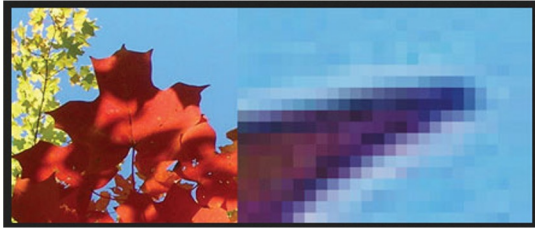
[1] <https://researchguides.library.wisc.edu/GIS>





# Raster

Image



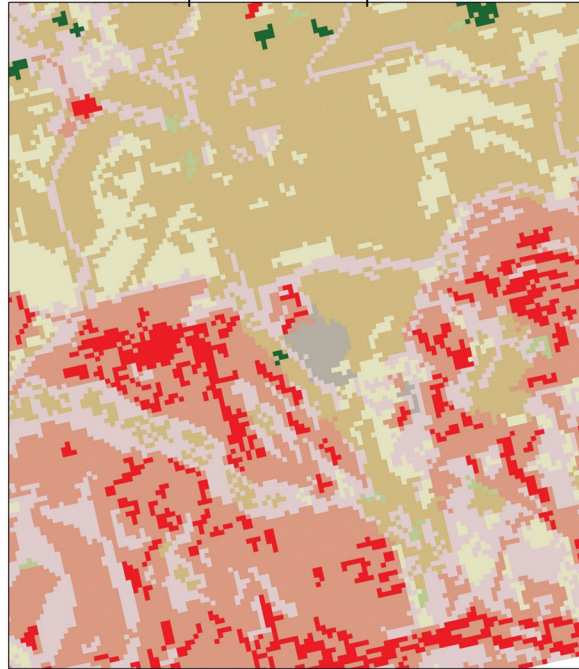
Raster: a matrix of pixels of a given size

Size in the ground is defined as raster resolution (e.g. meters/pixel)

Rasters can represent:

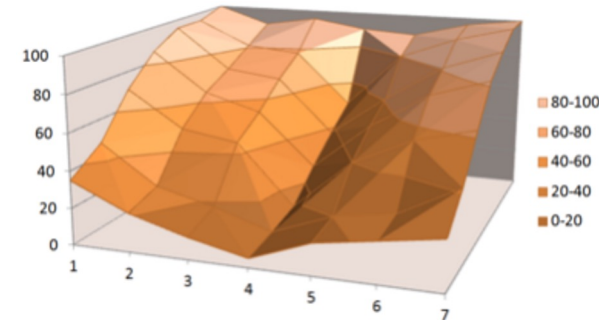
- Images
- Altimetry
- Classes
- Any other quantifiable property

Multispectral/classified  
E.g. classes of land  
use/spectral map



Topography

100	90	95	90	88	96	100
95	81	78	49	80	92	100
95	72	68	38	61	81	92
86	64	55	26	52	72	82
70	50	45	12	40	55	63
47	26	18	8	20	25	42
35	21	12	5	17	22	27



[https://serc.carleton.edu/download/images/36309/raster\\_dem.v3.pr](https://serc.carleton.edu/download/images/36309/raster_dem.v3.pr)

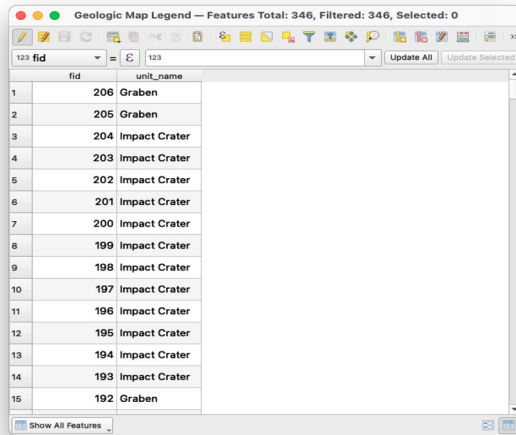


# Vector

Vector spatial data:

- Points
- Lines (polylines)
- Polygons (areas)

Additional information can be stored in their attribute table



fid	unit_name
1	206 Graben
2	205 Graben
3	204 Impact Crater
4	203 Impact Crater
5	202 Impact Crater
6	201 Impact Crater
7	200 Impact Crater
8	199 Impact Crater
9	198 Impact Crater
10	197 Impact Crater
11	196 Impact Crater
12	195 Impact Crater
13	194 Impact Crater
14	193 Impact Crater
15	192 Graben

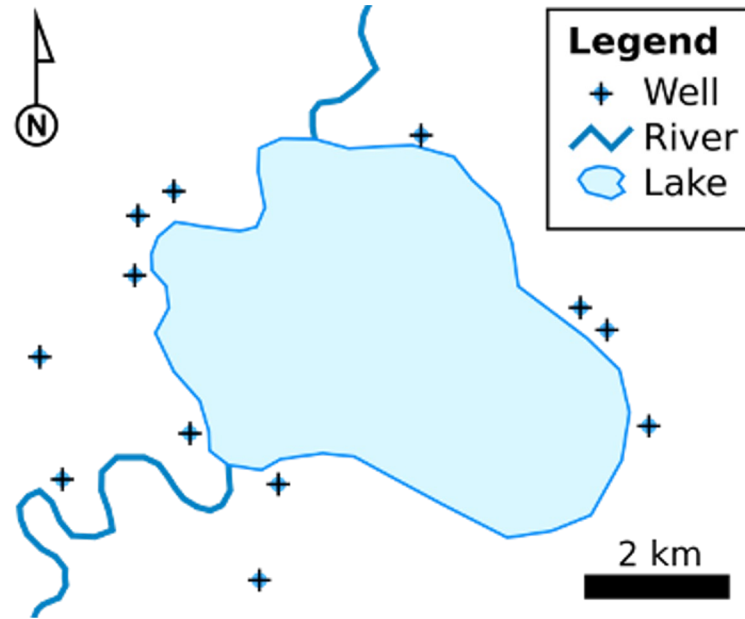
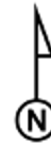
MULTIPOINT INPUT



LINE INPUT

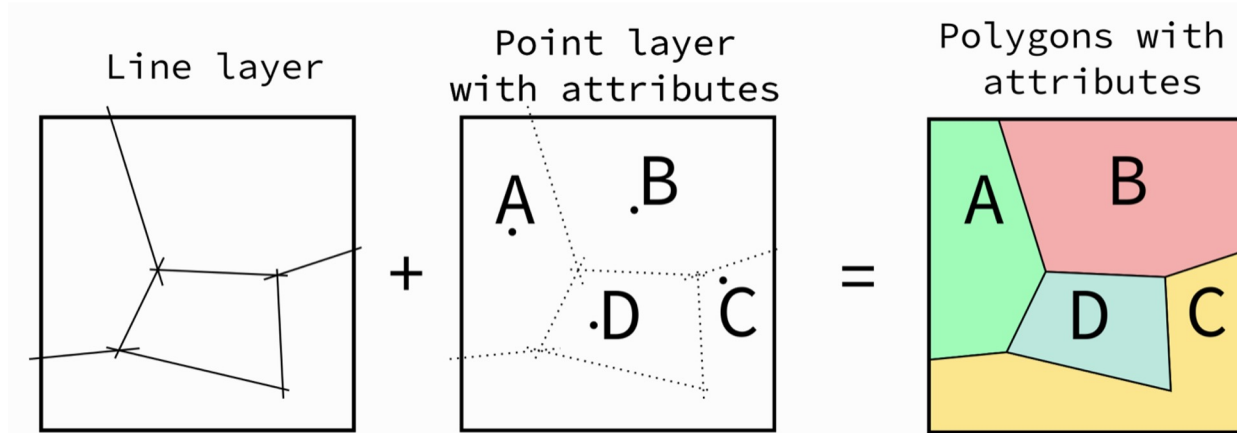


POLYGON INPUT



# Mapping project

We will be using raster data as basemap for the mapping, while the mapping will be performed editing vector layers. In particular we will be editing a **"lines"** layer and a **"points"** one.



[https://mappy.readthedocs.io/en/master/quick\\_start.html#initial-setup](https://mappy.readthedocs.io/en/master/quick_start.html#initial-setup)

# Example of Mappy workflow

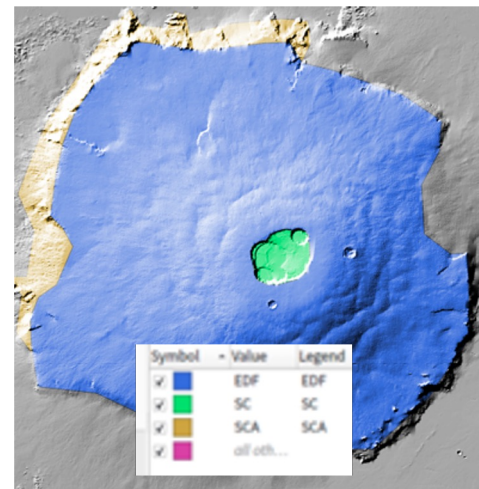
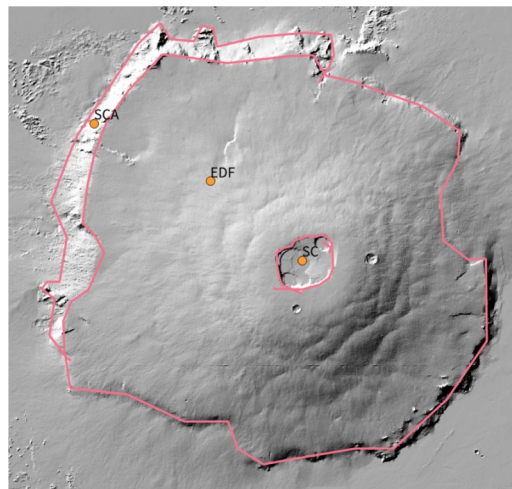
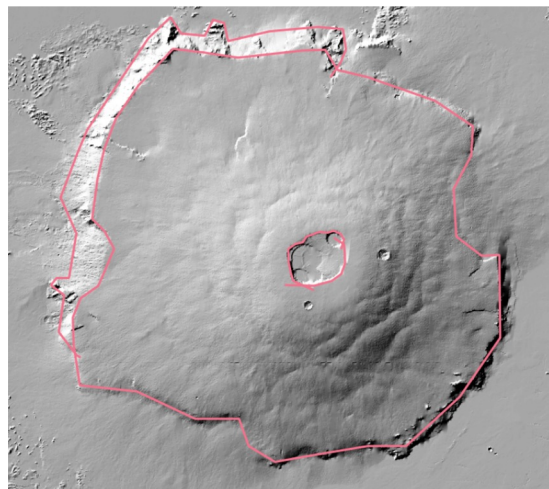
Draw the contacts



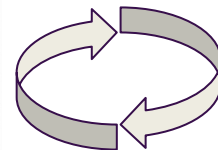
Define indicator points (i.e. your units)



Generate and style your polygonal map



Iterate and refine



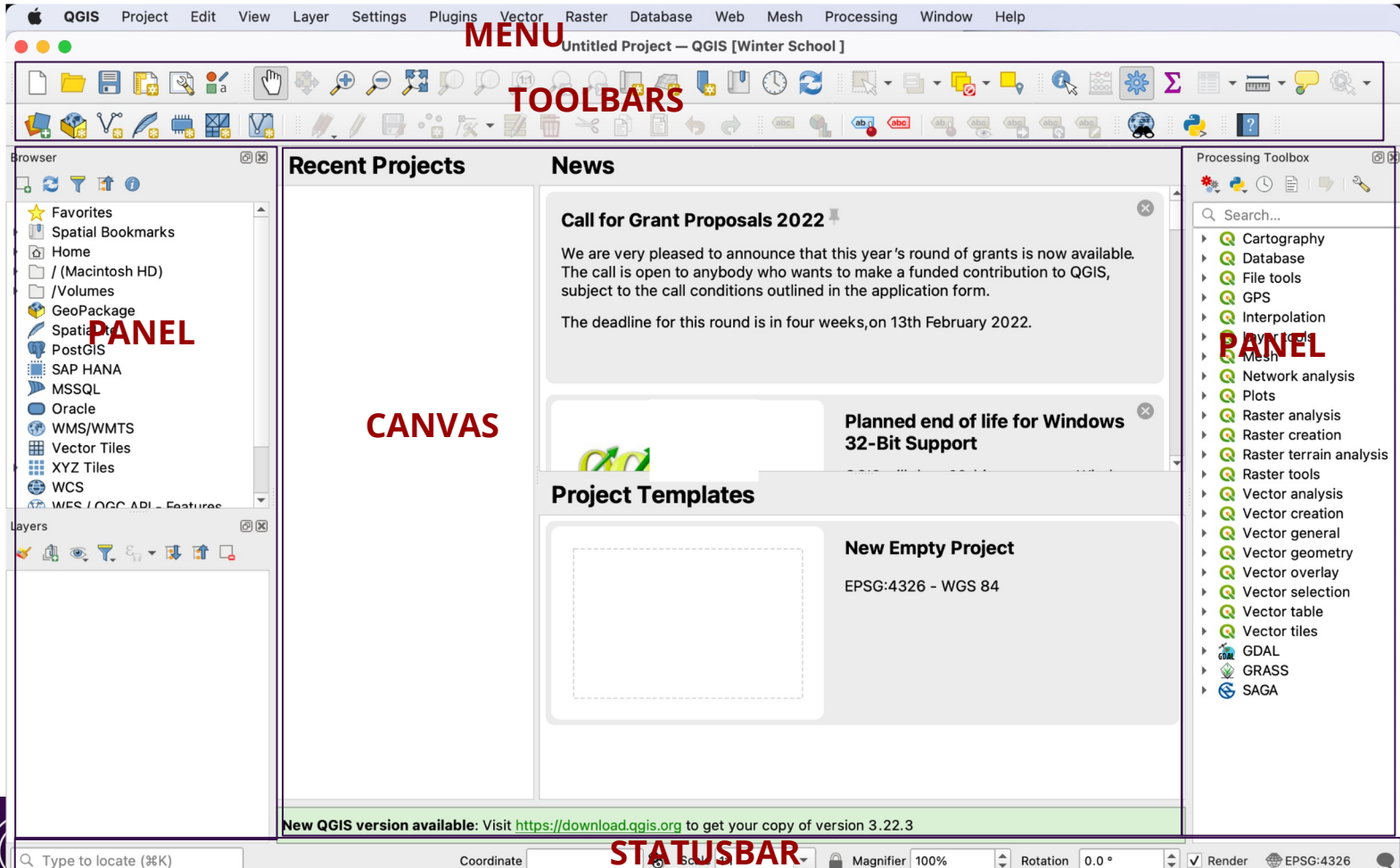
Source: [https://mappy.readthedocs.io/en/master/quick\\_start.html#drawing-the-contacts](https://mappy.readthedocs.io/en/master/quick_start.html#drawing-the-contacts)



# QGIS demo: outline

- **QGIS overview**
  - The interface: quick overview: panels, toolbars (open advanced digitizing options), settings and menus
  - Quick look at the QGIS project, project folder, mouse interaction
- **Plugin manager**
  - The interface, search bar, local installation from .zip, experimental
  - How to install Mappy
- **Mapping project creation from scratch**
  - Loading rasters: styling and properties of DTMs and imagery (styling transfer)
  - CRS: project and layer CRSs
  - Bookmarks and Decorations
  - Mappy project creation
  - First steps in geometry creation: Add Point/Line/Polygon Feature and populate fields.
  - Attribute table editing
  - Polygonal map creation
  - Measuring Distances, Identify Features tool, features selection
  - Saving as project. Mappy autosave function
- **Map editing**
  - Editing point layer: Node Moving (Vertex tool), selecting and deleting, the attribute table, saving layers
  - Editing line layer: Node Editing (Vertex tool), selecting and deleting a line and nodes, Split Features
  - Advanced: using Snapping
  - Styling vectors using the fields







# Useful links

- QGIS official documentation  
<https://docs.qgis.org/3.28>
- Mappy documentation  
<https://mappy.readthedocs.io>
- Books  
<https://qgis.org/en/site/forusers/books/index.html>

