

Virtual European Solar & Planetary Access (VESPA): accessing Solar System data in the VO

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30 Sept 2026
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VESPA history

Bottom-up initiative in European programmes:

Europlanet-RI

(FP7, 2009-2012)

Assessment study

Europlanet 2020 RI

(H2020, 2015-2019)

Basic set-up

Europlanet 2024 RI

(H2020, 2020-2024)

Consolidation, sustainability

Objective:

Find data of interest in various environments (space missions, telescopes, lab, simulations)

Architecture:

Virtual Observatory (VO), adapted to Solar System data

=> Contributive, interoperable, Open Science environment, providing FAIR access to the data

VESPA elements

- Vocabulary to describe Solar System data

TAP/ADQL + EPNCore = EPN-TAP

- Data services

Provided by research teams, labs, observatories, space agencies...

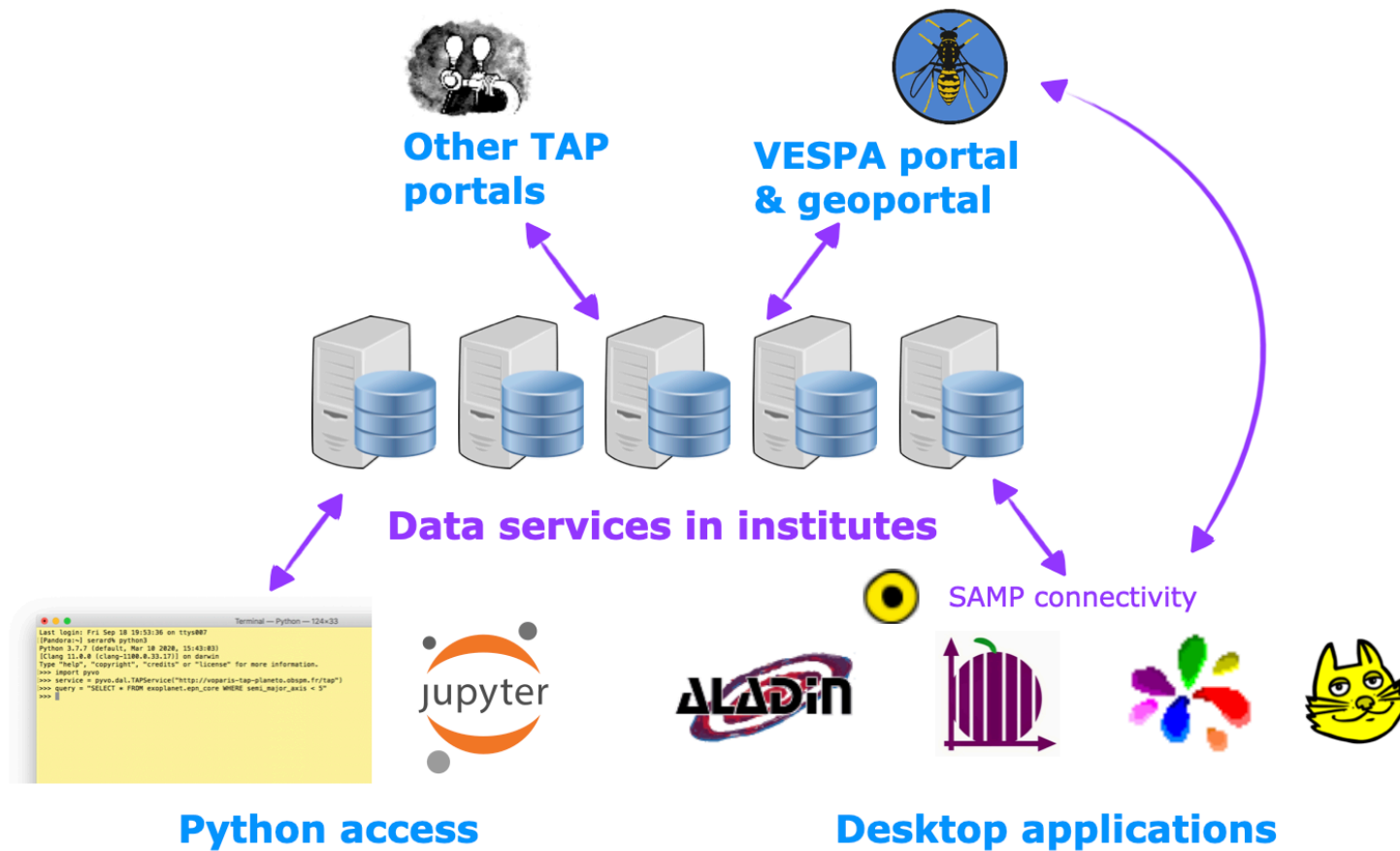
- Data access

VESPA portal / geoportal (dedicated) + VO tools (generic)

- Data visualization & analysis

Mostly VO tools + use cases

Tutos: Accessing the data

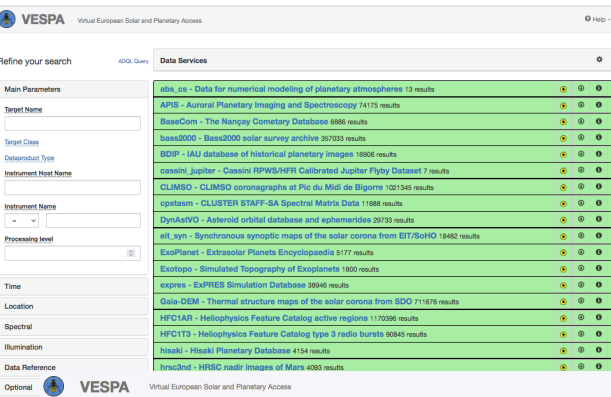


Tutos: Accessing the data

Main portal

(interactive discovery)

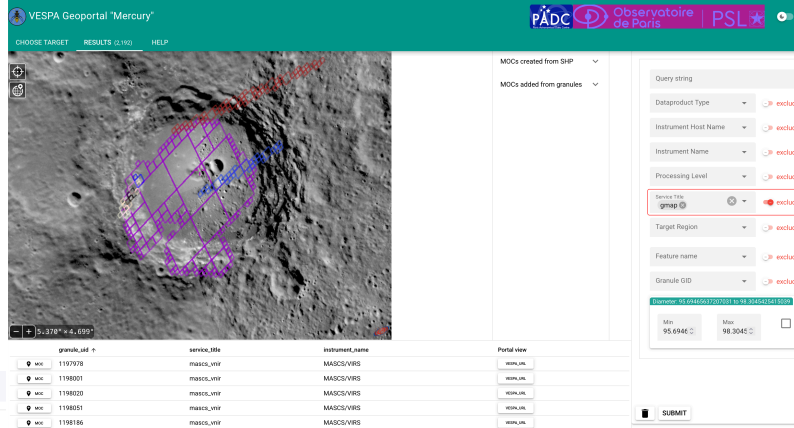
<https://vespa.obspm.fr>



Geoportal

(georeferenced data)

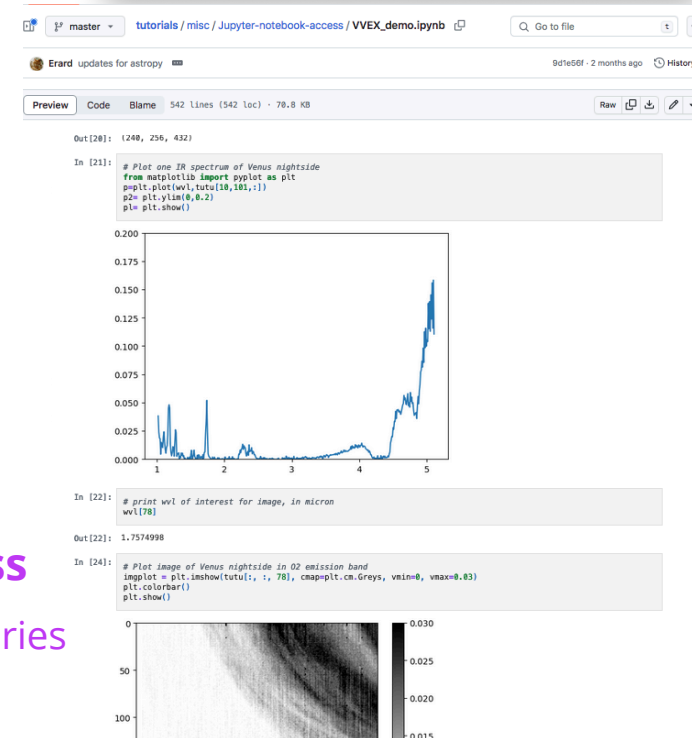
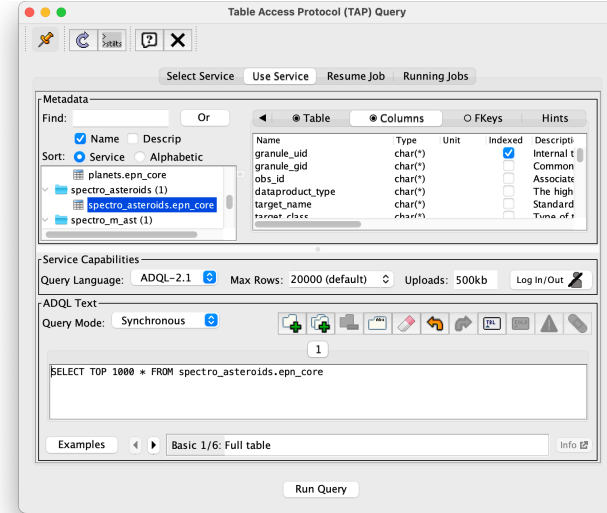
<https://padc-findme.obspm.fr>



A Mercury volcanic unit in VESPA geoportal
+ intersecting spectral footprints

VO tools

(TOPCAT, Aladin
web clients, etc)



Programmatic access

(astropy & other VO libraries
=> workflows)

Tutorials

More tutos here: <https://github.com/ept-vespa/tutorials>

1) VESPA portal, live demo

Based on (broader) https://github.com/ept-vespa/tutorials/blob/master/misc/data-access/Data_access.md

Reference page: <https://github.com/ept-vespa/tutorials/blob/master/misc/vespa-portal/vespa-portal.md>

2) Tutorials

- **spectroscopy**: observations vs lab measurements in TOPCAT + VESPA Portal + SPLAT

https://github.com/ept-vespa/tutorials/blob/master/surfaces/asteroid_spect/Spectro_asteroids.md

- **Aladin in planetary science**

https://github.com/ept-vespa/tutorials/blob/master/surfaces/Aladin_Hips_MOC/Images_Aladin.md

- **python access**

(easy) https://github.com/ept-vespa/tutorials/blob/master/misc/Jupyter-notebook-access/VVEX_demo_private.ipynb

(hard) https://github.com/ept-vespa/tutorials/blob/master/misc/Jupyter-notebook-access/EPN_TAP_request.ipynb

- **trajectories, mining observatory archives**

https://github.com/ept-vespa/tutorials/blob/master/misc/searching_archives/stmoc-jupiter.ipynb

EPN-TAP queries / VESPA portal

Locate individual data products meeting certain conditions (observational or instrumental)

Typical request for surfaces:

Mars, a given region (Tharsis volcanoes area) — images, spectra or spectral-cubes

Illumination conditions ($i \leq 20^\circ$, phase $\leq 50^\circ$)

Local time or season range (L_s)

Minimum resolution

Spectral range / filter

etc

The portal displays a simple parameter form to build the query

Returns results from each service
=> need to be described at similar level

The VESPA portal is a simplified, single-entry point to validated data services:

<https://vespa.obspm.fr>

The screenshot shows the VESPA portal interface. At the top, the header reads "VESPA Virtual European Solar and Planetary Access" with a "Help" link. Below the header, there's a "Refine your search" section with an "ADQL Query" link. The search form includes fields for "Main Parameters" (Target Name, Target Class, Dataproduct Type, Instrument Host Name, Instrument Name, Processing level), "Time", "Location", "Spectral", "Illumination", "Data Reference", and "Optional". A red bracket labeled "TAP query" points to the "Spectral" field. To the right of the search form, a list of data services is displayed, each with a result count and icons. Below this list, a "Generated WHERE clause of ADQL statement:" is shown, followed by a complex SQL query. At the bottom, a green bar indicates "EPN-TAP compilation results".

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