



## The PVOL database in Europlanet 2024 RI

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PVOL is an online database of amateur observations of solar system planets hosted by the University of the Basque Country at <http://pvol2.ehu.es/> [1]. PVOL stands for Planetary Virtual Observatory and Laboratory and is one of the data services integrated in VESPA: a large collection of data services integrated in the Virtual European Solar and Planetary Access services using the same data access protocol (EPN-TAP) [2]. VESPA is an integral part of the Europlanet 2020 and 2024 Research Infrastructures and PVOL is one of its most used services. PVOL accumulates images provided by more than 300 amateur observers distributed through the globe and currently contains more than 47,000 image files. Most of the data correspond to image observations of Jupiter (67%) and Saturn (22%), but PVOL contains also useful data from Venus, Mars, Uranus and Neptune and some smaller collections of objects with no atmosphere (the Moon and Galilean satellites). In this contribution we document future plans for the service which will be carried out through 2021-2023 and we show the scientific potential of the data available in PVOL.

Future plans for PVOL include frequent observation alerts, integration in the database of navigation files of the images from the popular WinJupos software (ims files), addition of amateur spectra of the giant planets, and a search engine and new data service of Jupiter maps obtained from the JunoCam instrument on the Juno mission that will also be integrated in PVOL/VESPA. This will allow to perform combined searches of data obtained close in time from amateurs (PVOL), HST (queries of HST images are also integrated in VESPA) and JunoCam (new service).

The science potential of amateur data comes from the availability of long-term data (PVOL contains Jupiter data since 2000 and Mars and Venus data since 2016), frequent observations (several daily observations of each planet close to their oppositions capable to cover complete longitudes of each planet) and high-resolution images provided by key contributors, with some of them capable to resolve highly-contrasted features of 0.05-0.10 arcsec. We review recent trends in analysis of this data from an analysis of scientific publications partially or highly based on data obtained from PVOL. We show that amateur observations remain as a valuable resource for high-impact science on modern research on different planets (3-5).

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amateur astronomers sending their data to PVOL. We are in debt by the quality of many of these observations and the regular observations provided by many of them requiring long sleepless nights and even longer days of detailed image processing.

## **References**

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