PTAL database and website: developing a novel information system for the scientific exploitation of the Planetary Terrestrial Analogues Library

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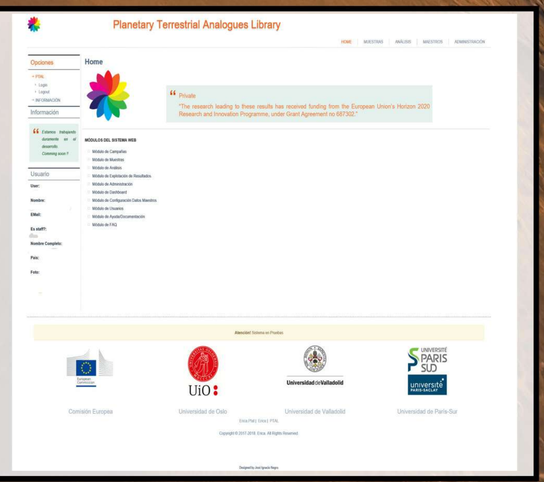
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PLANETARY TERRESTRIAL ANALOGUES LIBRARY (PTAL) INFORMATION SYSTEM

The study of terrestrial analogues has become an essential tool for defining geological or biological processes that could have been occurred on Mars and other extraterrestrial bodies [1,2]. In spite of the critical importance of this field of study, the results collected so far are still dispersed across the scientific literature. To overcome this limitation the University of Valladolid, the University of Oslo, the University of Paris-Sud and the University of Toulouse are developing -in the framework of the PTAL project [3,4]- an extensive database of planetary terrestrial analogues.

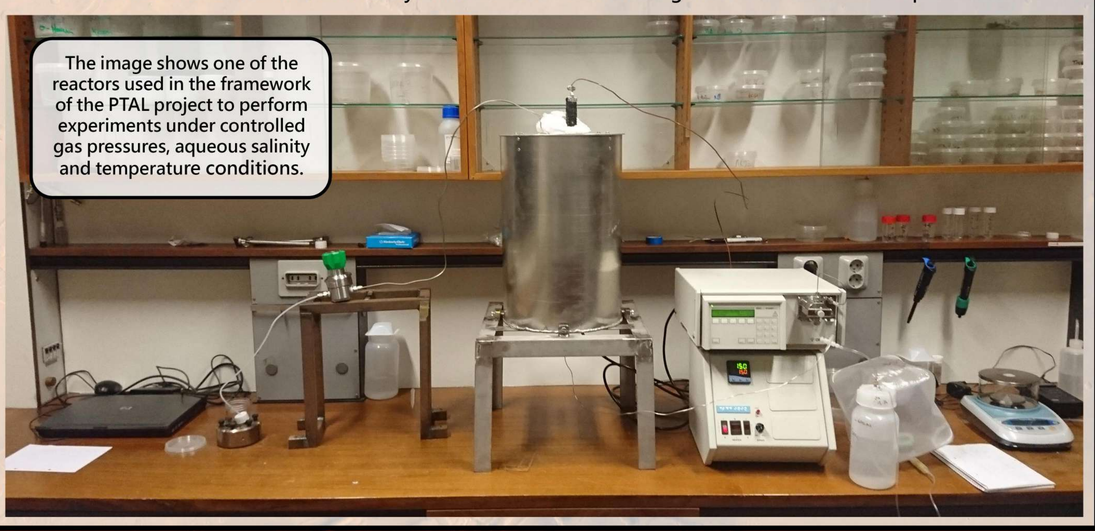
To maximize the exploitation of analytical data, the consortium is working on a web page-based information system (to be released on 2020) that, in addition to making available the spectroscopic database, supports the scientific community with the numerous innovative tools described in this poster.

Front page of the PTAL website



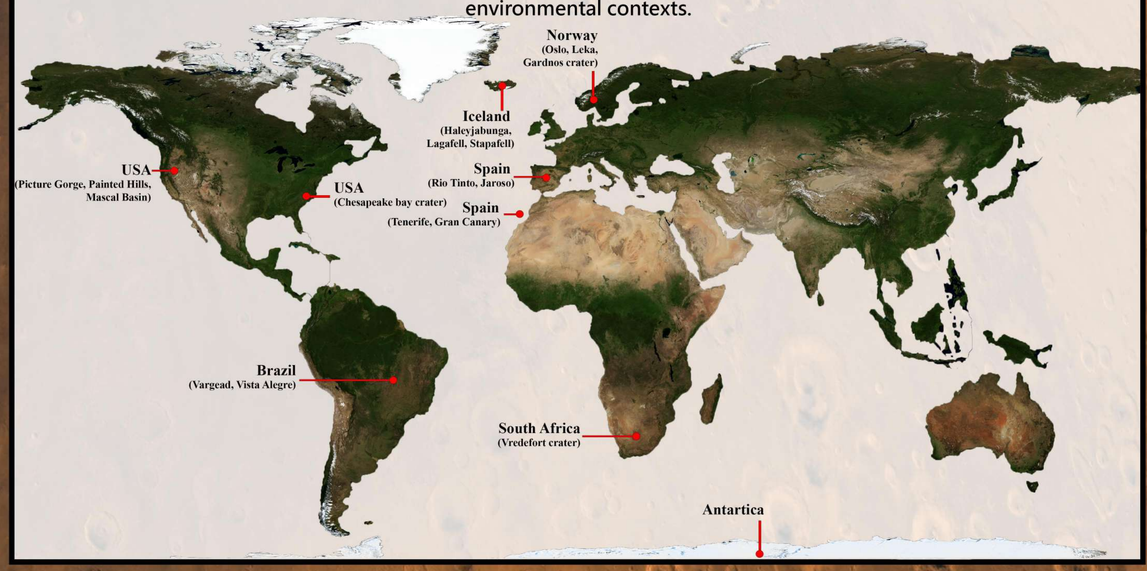
Artificial samples altered under controlled environmental conditions

The information system includes data collected from artificial samples (replicating Martian protoliths composition) altered in the laboratory under controlled environmental conditions. The purpose is to provide to users essential data about chemical and thermo dynamical models that shed light on Martian alteration processes.



Geological samples from several terrestrial analogue sites

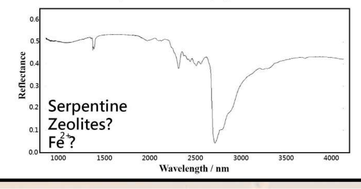
The PTAL website will deliver an extended multi spectral database of materials collected from terrestrial analogues sites (see below) that have been selected on the basis of their congruence to well-known Martian geological and environmental contexts.



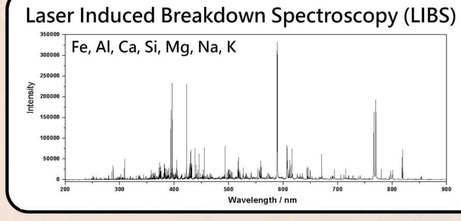
Spectroscopic database of analogues samples and syntetized materials

The mineralogical and geochemical characterization of all samples is performed through commercial and dedicated spacecraft spectroscopic instrumentation. The PTAL webpage will provide to users free access to both raw and treated data. The multi analytical results collected from sample LE16-001 (Leka, Norway) are summarized below.

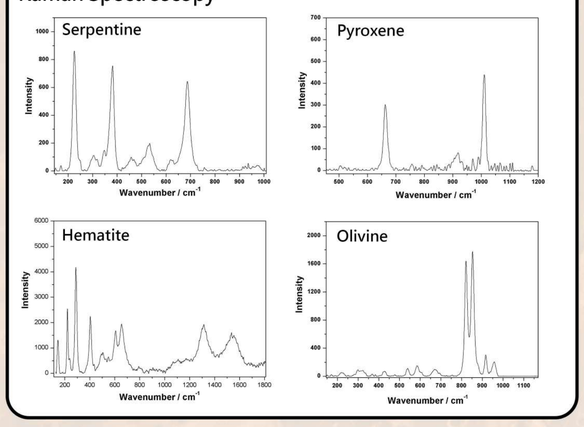
Near Infrared Spectroscopy (NIR)



Laser Induced Breakdown Spectroscopy (LIBS)



Raman Spectroscopy



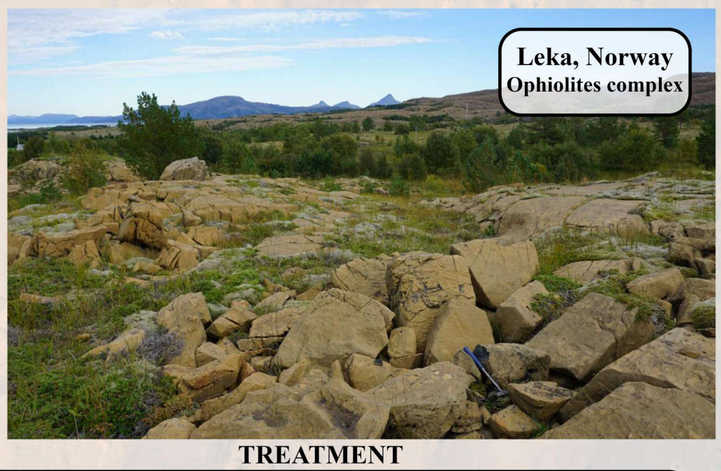
LIBS, NIR [5] and Raman results are supported by the complementary use of other analytical techniques. (e.g. X-ray diffraction). As a whole, the multi analytical database aims at expanding knowledge on alteration processes of analogues materials and their possible correlation with the geological evolution of Mars and other extraterrestrial bodies.

Terrestrial analogues sampling, treatment and avaibility

Both altered and unaltered rocks are sampled from each selected analogue site: Information of key importance about geological processes can be obtained from the characterization of their mineralogical differences.

After sampling, analogues are submitted to grinding and thin section preparation to facilitate spectroscopic analysis and microscopic observations respectively.

Physical samples are stored in a dedicated warehouse and they will be made available to the PTAL users willing to carry out additional analyses in their laboratories.



SAMPLING

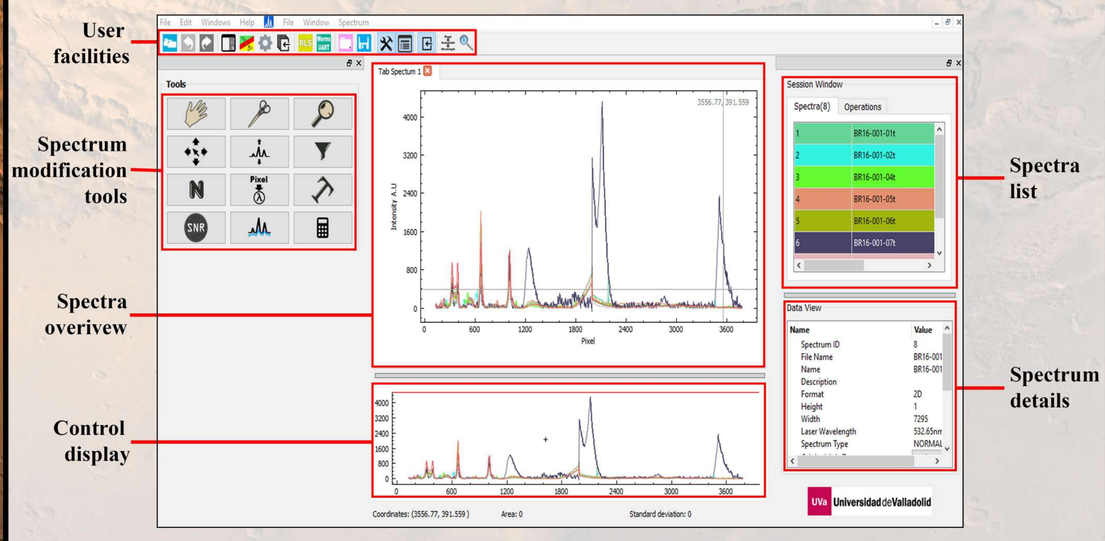


TREATMENT



Access to an easy-to-use data processing software

An external platform is integrated to the information system. The developed software provides several tools for advanced spectra processing, including intensity normalization, baseline correction, instrument response correction and lineal combination of spectral data. The software interface is displayed below.



CONCLUSIONS

The PTAL information system is scheduled to be released on 2020.

Raman, NIR and LIBS techniques, supported by complementary analytical systems will provide to users a comprehensive mineralogical and geochemical overview of an extensive collection of analogues samples.

The external software integrated to the system will supply tools for advanced spectra processing.

The platform under development will allow the physical access to the samples.

In a whole, the PTAL information system aims to become a cornerstone platform for the scientific community interested on deepens the understanding of geological aspects and processes of solar system planets and other extraterrestrial bodies.

References

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