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LithoSpace – A unique cloud-based extra-terrestrial geochemistry data platform

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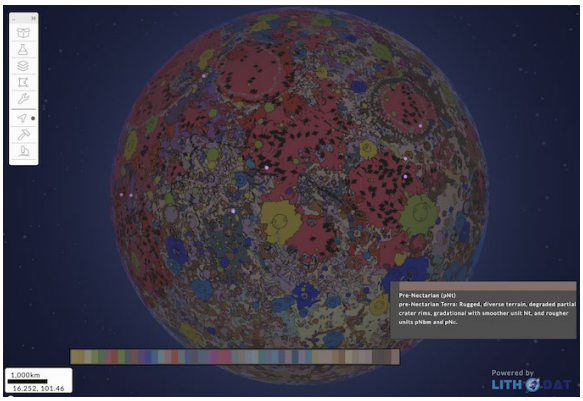

The importance of visualising spatial data from extraterrestrial bodies such as the Moon, Mars and asteroids is increasing with the renewed interest in space exploration and its associated search for usable resources. LithoSpace provides the digital infrastructure to visualise extraterrestrial spatial data including points of interest and samples collected, along with corresponding geochemistry and other analytic data.

Figure 1: LithoSpace displaying the geology of the moon[2] and Apollo and Luna mission sample localities[3].

LithoSurfer's proven technology for terrestrial data types[1], is easily extended to benefit the expanding frontiers of space exploration projects. The highly detailed relational data models enable the platform to analyse disparate data types and find relations and patterns in data collected from rovers or probes in relation to satellite imagery and topographic features.

Figure 2 shows Total Alkali Silica (TAS) plots which is just one of the many plots allowing the easy classification of rocks and soils from space missions. It shows (left) data from the Mars mission Curiosity and Opportunity showing a wide range of compositions, and (right) data from moon missions Apollo 11, 12 and Luna 16, 20, 24 which trend to be more primitive mafic rocks with a smaller spread of compositions.

Slight variations in geochemical composition can be visualised and pointed out on-the-fly by using LithoSpace's unique cloud-based geochemistry tools.

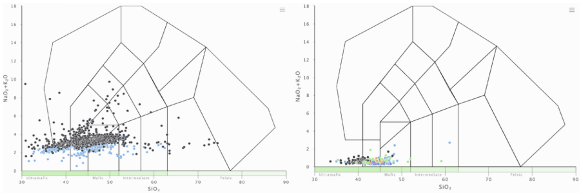

Figure 2. TAS plots of moon and Mars samples.

This free public platform will help researchers to create and access clean geochemistry data collected from extraterrestrial bodies leading to new discoveries and even unlocking the hidden resources of our extraterrestrial neighbours.

[1] Boone S. C., Dalton H., Prent A., Kohlmann F., Theile M., Gréau Y., Florin G., Noble W., Hodgekiss S., Ware B., Phillips D., Kohn B., O'Reilly S., Gleadow A., McInnes B. and Rawling T. (2022) AusGeochem: An Open Platform for Geochemical Data Preservation, Dissemination and Synthesis. Geostand. Geoanalytical Res. Available at:
https://doi.org/10.1111/ggr.12419.

[2] NASA 2022. https://curator.jsc.nasa.gov/lunar/ (Accessed November 2022)

[3] USGS, 2022. https://www.usgs.gov/news/national-news-release/usgs-releases-first-ever-comprehensive-geologic-map-moon (Accessed November 2022).