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Introduction: The Space Science Data Center (SSDC) MATISSE (Multi-instrument Advanced Tool for the Instruments for the Solar System Exploration, [1]) webtool, whose v2.0 update [2] is available at https://tools.ssdc.asi.it/Matisse/, allows access to data of the planetary exploration missions.

The MATISSE tool uses some protocols provided by the Virtual European Solar & Planetary Access (VESPA) [3], including EPN-TAP, and allows access to a series of services without necessarily having to download the data, but viewing the maps directly online. In this context the work here presented points at improving and expanding the functionalities of the MATISSE tool to the planetary geology, by including some already published geological maps. These will be essential in order to make MATISSE a useful tool for the study and analysis of the planetary bodies surface of the Solar System.

MATISSE for planetary geology: The geological maps involved in this project will be of fundamental help to the scientific community in the geological characterization of landing sites and to obtain useful information for the study of the surface of the planetary bodies.

In collaboration with PlanMap and GMap teams we are currently working to include Martian, Hermean and Cerean surfaces so that both recently ended missions (e.g., NASA's Dawn) and missions still not in their scientific phase (e.g., ESA's Bepicolombo) would benefit for this work.

Once the geological maps have been selected in the interface of the instrument defined the instrument to be observed, the selected area will be automatically displayed on the global map of the target (Figure 1).

When the maps will be finally included in the MATISSE database they can be exploited as a sort of "query masks": users will be able to search for observational data included in areas belonging to specific geological units.

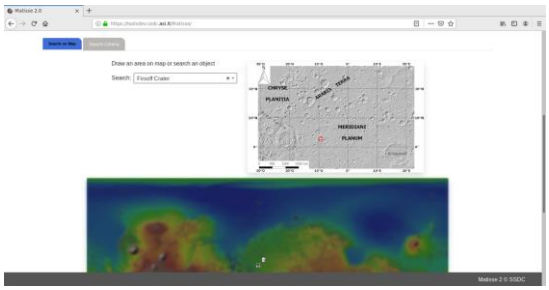

Figure 1: MATISSE homepage with the geographical framework of the area to be analyzed.

Work methodology: The geological maps of interest will be downloaded in appropriate formats, so that it would be possible to insert them, with every polygon representing a geological unit mapped, into the geospatial database of MATISSE.

At this point the user can choose one or some of the polygons to be selected as input for the geographical query after selecting the target and the instruments of interest, so that the capabilities of MATISSE could be better exploited.

Two craters were initially selected, used as sites of primary interest in this project, with the collaboration of the PLANMAP team. These sites, Firsoff Crater and Commelin Crater, are located in the Martian region called Arabia Terra. After a careful geological analysis of the two craters, similar morphological characteristics were identified [4].

After starting the query, the user will see the area with the selected lithologies displayed (Figure 2) and carry out the appropriate analyses.

Figure 2: MATISSE output corresponds to the selected lithology

Expected outcomes: We plan to make available the first release of MATISSE with geological maps in the next months, even if starting with only limited capabilities.

The inclusion of these functionalities in the tool could produce a sensible step forward in the study of planetary geology, with the possibility of better exploiting different datasets and taking also into account the collaboration of different teams already leaders if this field.

Another goal will be to expand the use of the tool, making it similar to the Geographic Information System (GIS). We will add the possibility of selecting specific areas to be analyzed, having clear the geographical position of the data. It will also be possible to obtain topographic profiles, select more data to be observed. All these analyzes will be performed directly

on the 3D models, thus making it of great interest for missions directed to small bodies, such as the upcoming NASA DART [5] and ASI LICIACube [6] planned to reach the Didymos-Dimorphos asteroidal system, where the shape of the target make it not feasible to correctly use common 2D projections.

References: [1] Zinzi A. et al. (2016) *Astron. Comput.*, 15, 16-28. [2] Zinzi A. et al. (2019) *EPSC-DPS Joint Meeting 2019*, id. EPSC-DPS2019-1272. [3] Erard S. et al., (2020) *Data Science Journal*, 19(1), 22. [4] Pondrelli M. et al. (2010) *Earth and Planetary Science Letters*, 304, 511-519. [5] Cheng A. F. et al. (2018) *Planet. Space Sci.*, 157, 104-115. [6] Dotto E. et al. (2021) *Planet. Space Sci.*, Vol. 14, EPSC2020-496.