An Update On The ExoMars 2022 Rover Data Archive

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Introduction

The ExoMars 2020 Rover is the first Rover mission to be archived within the Planetary Science Archive (PSA). The current PSA User interfaces, developed for remote sensing missions, will not be sufficient to aid exploration of such unique (to ESA missions) data. Therefore a new set of views are currently being designed to support this mission.

In addition to normal PSA views, the search functionalities can be used in conjunction with the Rover Traverse View. This view is intended to be the launch point for the other dedicated views to support the rover mission archive.

ExoMars Timeline and Landing Site
- Launch: September 2023
- Mars Arrival: June 2024
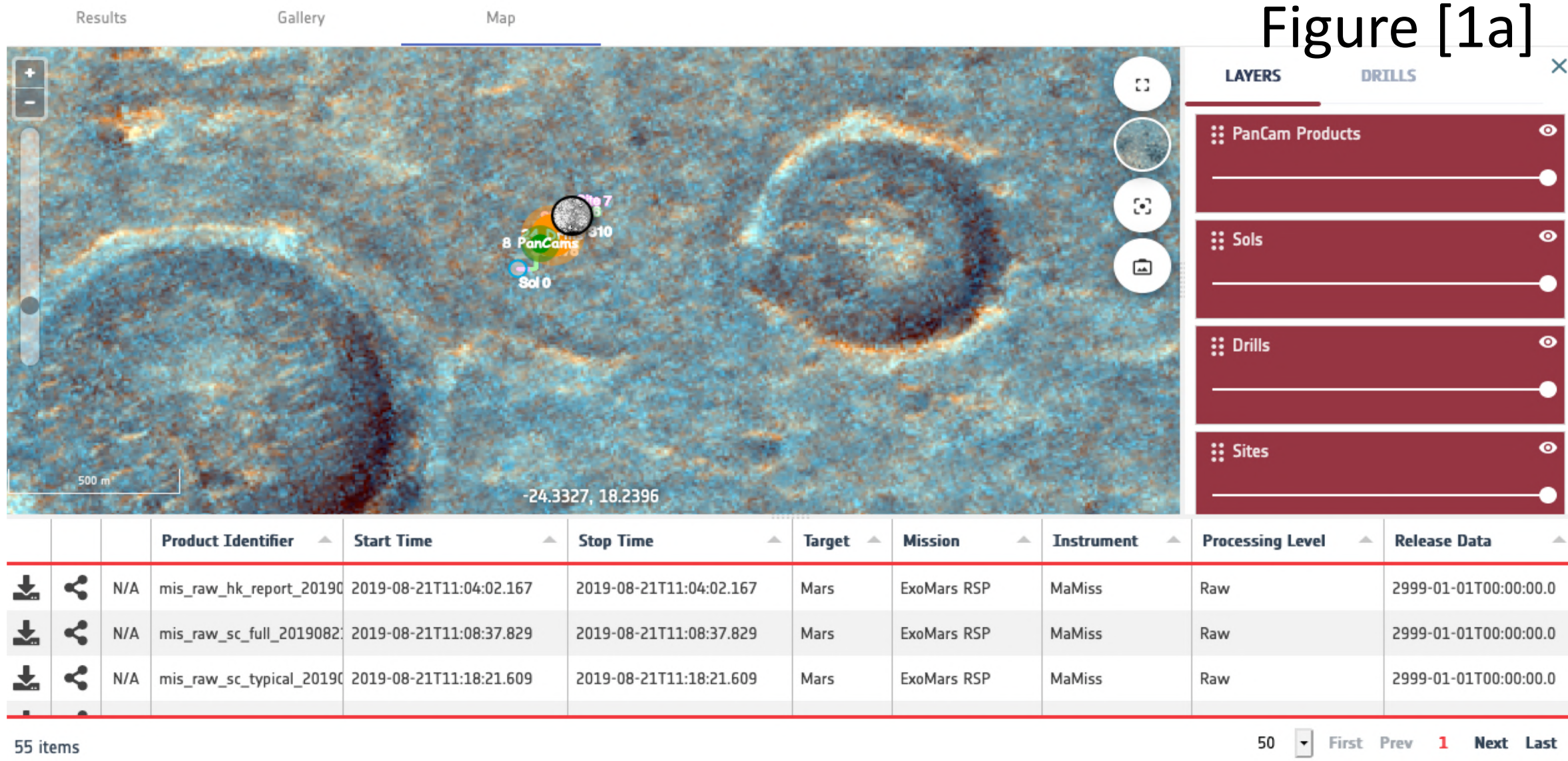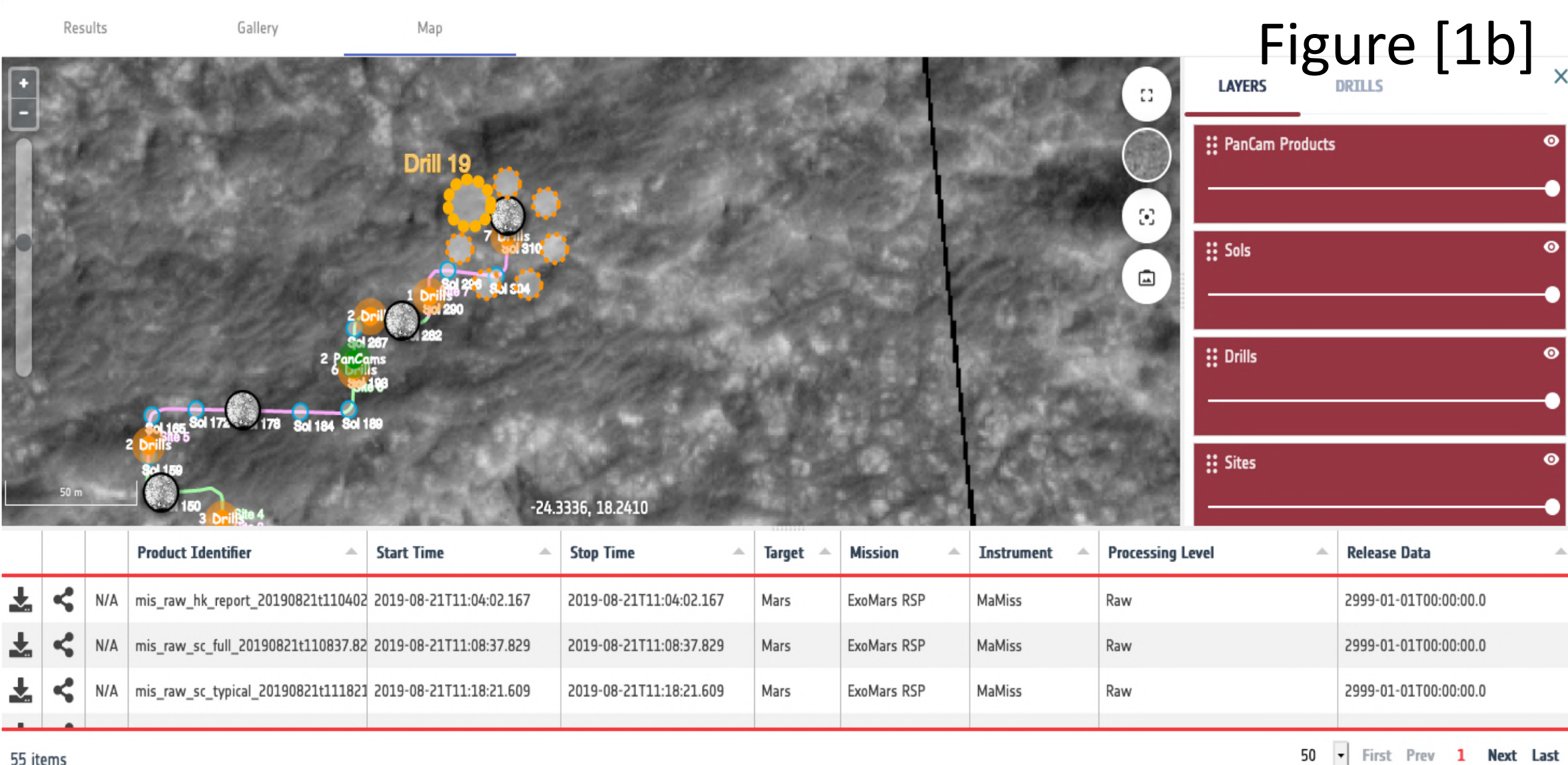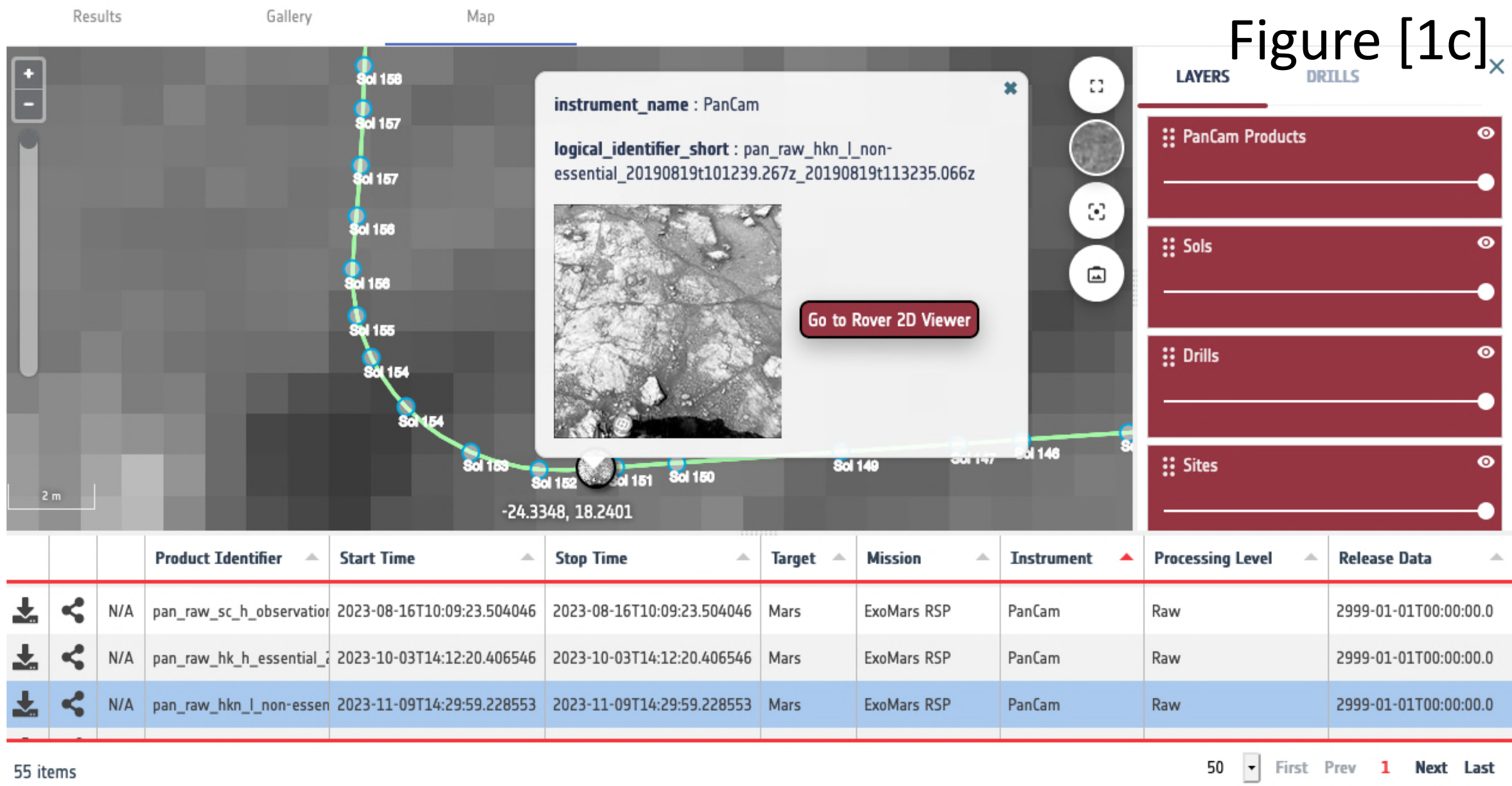- Landing Site: Oxia Planum

Figure [1a]

Figure [1b]

Figure [1c]

These images are from the current functional PSA prototype of the Traverse View which has been fully integrated with the other parts of the PSA UI. The data used for this has been simulated in SPICE kernels and the Rover Motion counter plus some backend additions to the archive. Test data from the Rover System Validation Test (SVT1b) has also been included.

Figure [1a] on the left shows the entry point for the traverse view, in this case using a CaSSIS colour image as the base map. This initial view will show the entire track in the context of the surrounding area. All of the overlays are by default 'on' showing as different colours on the track but with this zoomed out view will be hard to tell apart. The menu on the right shows the possible overlays to display or not and the table below gives the science observations from the results of a search, with the default being all results.

Figure [1b] now has the base map switched to a HiRISE image and the track zoomed in. The orange dots represent simulated dill sites, the blue dots are the underlying waypoints, green are where panoramas are taken and the grey dots are direct links to images. Drill 19 was expanded as the user had selected this site. Currently the main purpose of this prototype UI is to demonstrate functionality and we expect significant refinement before release probably consolidating more information into the waypoints.

Figure [1c] is now a highly zoomed part of the track which contains an image indicator which can be selected and eventually the user may opt to open a "2D View" dedicated to the panoramas. This UI is not yet in implementation. For each waypoints, the mission will generate a number of daily reports, currently both in PDF and xml format and these will be available via a waypoint popup. What will be done in terms of archiving the xml format reports in PDS4 is an open question.

One of the challenges of a Rover mission is how to handle the multiple different local target types. Figure [2a] below shows an overview of the target types identified with the landing site, Oxia Planum. The landing site is identified as a set of geographic locations forming a boundary, then each of the three regions defined within Oxia Planum are also defined as local targets.

During the Rover Traverse areas known as locales will be defined using geological constraints. At certain points in the traverse, sites will be identified as a location and radius. There are 4 types of more local, local targets defined, observations of the sky, the surface, the sub-surface via radar or neutron measurements and boreholes. Then from the drill, cores, doses and spots (on the samples) also form a set of small and micro scale target types.
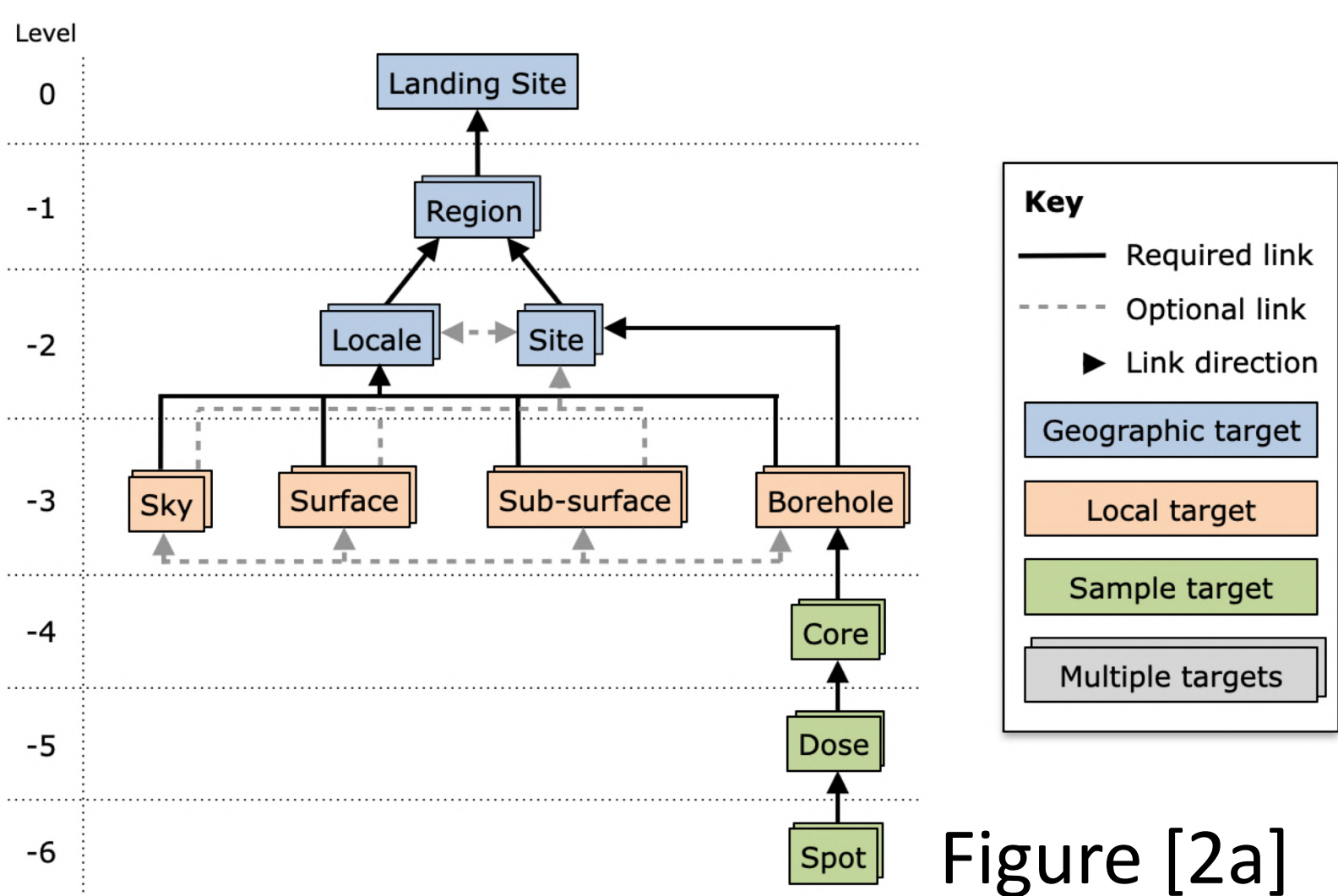
Each target type has been broken down into the information required to define that target and whether this information is required once or multiple times.

This has then be re-arranged into metadata classes and file areas, with the aim to reuse classes across multiple target types. A dedicated local target dictionary was created to define these classes along with product ancillary templates for each target type.

Figure [2b] shows on the left the core 7 classes in the dictionary with the Position and Site_Identification expanded on the right. The core class is Local_Target which will appear in all target files. The use of the other classes will depend on the target type.

The target scheme shown here is the current draft and both the scheme, the target definitions and the dictionary are likely to evolve as the mission progresses.
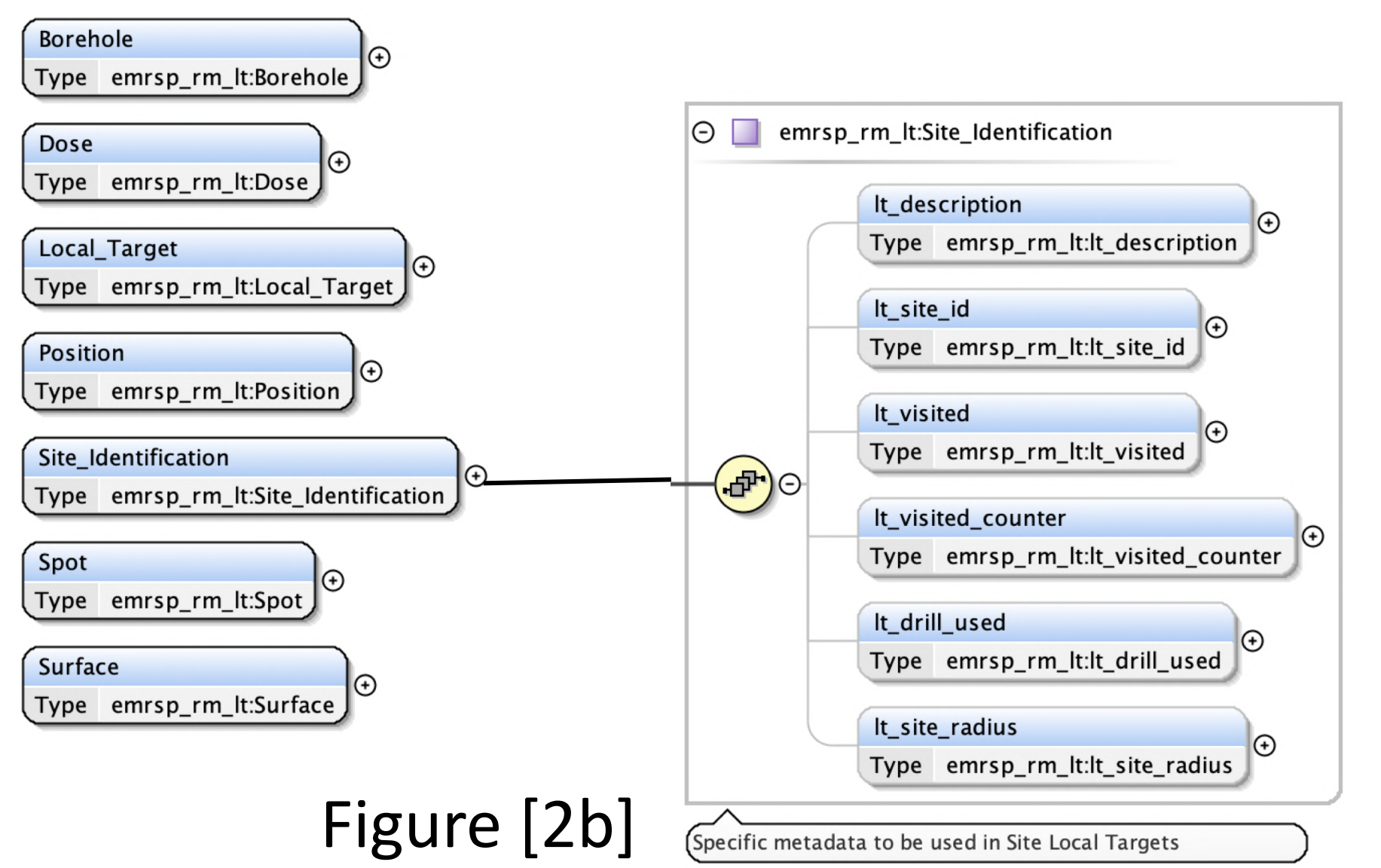

Figure [2a]

Figure [2b]