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PALI: A coordinated geological specimen library and experimental data resource for the planetary research community.

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The Planetary Analogue LIbrary (PALI) is a centrally co-ordinated geological resource (both physical in terms of samples and virtual in terms of experimental data) available to a wide group of participating planetary researchers and space instrument/tool developers/providers. The library is not restricted to a single device, mission, planet or indeed scientific discipline so is therefore generic. The samples are predominantly of terrestrial origin and represent close or part analogues of planetary material. Applications include planetary instrument/tool "field" testing, payload optimization, mission operation scenario "blind testing" and sample focused studies.

The PALI concept is based on a hierarchical set of sample formats organized into thematic sub-collections of well characterized materials for planetary geology and geophysics, astrobiology and rock/soil mechanics. The defined formats include hand specimens (maintaining natural features, form and texture i.e field representative), rock "slabs" (geometrically constrained but otherwise mineralogically/petrologically intact) and powders (homogenised material - loose, compressed or vitrified). Standardising sample sizes ensures sharability of resources between several instruments and test facilities. Some degree of flexibility is provided, but the emphasis is generally on simplicity.

Materials, ideally in sufficient quantity to satisfy the format requirements described above, can either be incorporated (donated) directly into the library and retained centrally or alternatively remain within external collections and accessed on request via an identification scheme. Adopting this philosophy takes advantage of established heritage and expertise where it exists and avoids excessive effort in acquiring and

preparing duplicate samples. Samples are made available to participating members on a “loan and return” basis unless sufficient quantity of “residual” material is available for more specific studies (i.e. destructive testing). Alternatively, several instruments or tools can be brought together in a dedicated laboratory (i.e. at the University of Leicester) where more holistic experiments can be performed on suites of appropriately selected samples.

Irrespective of sample “ownership”, all data obtained from experiments involving any sample in the collection are subsequently stored in a central database and made available to the participating members. One caveat to this applies to the case of “research in progress”. Samples and associated data are allocated “shared” status only when the results of experiments have been published and/or the research team conducting the experiments agrees. This allows for proprietary research to benefit from aspects of PALI during the study phase.

PALI is currently being used by a number of research groups who have helped to stock the library over the last few years. Preliminary results from a study investigating morphological biosignatures using part of the astrobiology sub-collection and a variety of planetary in-situ instruments will be published soon. Other studies are ongoing.

The library is expanding as more participating researchers donate specimens and recognise the benefits of sharing resources. Given adequate funding PALI could provide a useful facility to wider planetary research community.