STATUS UPDATE ON THE INAUGURAL NASA PLANETARY GEOLOGIC MAPPING WORKSHOP: SELECTED FOR JUNE 2022. D. M. Burr[1], J. Wolak Luna[2], Z. A. Learner Ponterio[3], J. A. Skinner, Jr.[4], Sarah R. Black[4]. [1]Northern Arizona University (Devon.Burr@nau.edu), [2]Tennessee Tech University (jluna@tntech.edu), [3]Cornell University (zap9@cornell.edu), [4] USGS Astrogeology Science Center (jskinner@usgs.gov, sblack@usgs.gov).

Introduction: Geologic maps have long been recognized as critical portrayals of rocks, sediment, and tectonic structures at a planetary surface [*e.g.*, 1]. These tools establish spatial and temporal context, promote comparability between regions of interest, support sound decisions in natural resource and land use, and (due to their cross-disciplinary nature) encourage partnerships across institutions and scientific disciplines. In the exploration of surfaces beyond those of our own planet, these contextual products within which to simultaneously report scientific results and promote further research is critical. The importance of geologic maps is highlighted by NASA Working Groups [2-3], Science Definition and Review Teams [4-5], community surveys [6], and exploratory missions, the latter of which routinely propose to create geologic maps as important mission data products. Though "preparation of geologic maps is a fundamental skill that is unique to the science of geology" [7], past studies recorded concern that this skill was being "curtailed" [8]. More recently, the advent of Global Positioning System (GPS) satellites, Geographic Information System (GIS) software, and geobrowsers, while promoting a "digital revolution in geologic mapping", brings a need for training in the use of these technologies [9, 10]. In addition, proficiency in geologic mapping requires education through a series of learning experiences to promote competence in "the logic of mapping" [11, 12]. A recent study found that a professional community of practice was vital in learning to map [12].

To help support and promote the critical skill of geologic mapping in the planetary community, we proposed a Planetary Geologic Mapping Workshop, as reported at the 2020 Planetary Geologic Mappers Meeting [9], to be held in coordination with the 2021 Mappers Meeting. The proposed purpose of the workshop is to familiarize planetary scientists from a range of disciplines and career stages with the process and product of planetary geologic mapping, specifically including comparisons with relevant field analogs.

We are glad to report that the proposal was selected for funding, with the workshop to be held in June 2022. This abstract provides an overview of the planned workshop activities by proposal investigators and by workshop participants

Summary of pre- and post-workshop activities: The pre- and post-workshop activities by the proposal team include the following:

Oct 2021: Scout possible sites for access, morphology, and comparison to remote imaging. Negotiate dates with lodging, food, and access providers for any limited access sites.

Nov 2021: Finalize and disseminate workshop announcement. Create website for applications. Determine most relevant ArcGIS tutorials for possible sites.

Dec 2021: Organize diverse application reviewers. Request meeting space at LPSC.

Jan 2022: Review applications, notify applicants, develop a list of backup selectees. Provide instructions for the on-line ArcGIS tutorials and implicit bias training. Provide an equipment list.

Feb 2022: Stay in communication with selectees, prepare for LPSC meeting. Begin developing mapping exercises for all possible sites (in case of weather or other issues with some terrestrial sites). Communicate / update plans with lodging and food providers.

Mar 2022: Meet with selectees at LPSC to: a) welcome them to the mapping community, b) talk with them about what to expect physically, mentally, scientifically, c) check on mapping tutorial progress, d) review Code of Conduct, and e) answer any questions.

Apr 2022: Make participant travel arrangements. Finalize Flagstaff lodging and food provisions.

May 2022: Finalize mapping exercises.

June 2022: Hold workshop immediately before the 2022 PGM meeting in Flagstaff.

Post-workshop: Compile and analyze the exit survey data. Write summary report for relevant Program Managers. Present workshop results to the PGM community at the 2023 PGM meeting and receive any input for a second planetary geologic mapping proposal.

Summary of workshop program: Based on reviewer input (see next section) and on post-award discussions, the current schedule for workshop participants is as follows:

Day 0 (Thurs). Travel day. Group dinner, workshop overview. Optional: Lowell Observatory.

Day 1 (Fri). *Introduction to Mapping I*. Morning in the classroom: i) Brief history of planetary geologic mapping. ii) Principles of geologic mapping I. Afternoon: i) Field trip to nearby terrestrial analog sites (e.g., Bonito lava flow, Blackpoint flow, SP Crater). ii) Return to NAU, discussion of field observations.

Day 2 (Sat). *Introduction to Mapping II (all day in classroom)*. i) Principles of geologic mapping II. ii) Photogeologic mapping exercise on paper of a San Francisco Volcanic Field (SFVF) site *not* visited on previous day, including radar data. iii) Individual/pairwise evaluation of maps. iv) Preview of Monday's activities: ArcGIS mapping.

Sunday – No workshop activities. Opportunity to work on mapping and/or visit local geological sites, e.g., the Grand Canyon, Sunset Crater Dune field.

Day 3 (Mon). *Mapping technology transition day – same SFVF site as on paper, now with ArcGIS (all day in classroom).* i) Short debrief on pre-workshop exercises. ii) Start geologic mapping exercise for the SFVF site in the NAU DAPS computer lab using the same data (including radar) as for the paper mapping.

Day 4 (Tues). *Continued ArcGIS mapping work.* i) Continued mapping on SFVF site. ii) Instruction and practice in production of Description of Map Units (DMU), Correlation of Map Units (CMU). iii) Print out maps, CMU, DMU, and input data. iv) Individual / pairwise discussion including strategizing of where to answer important questions; presenting / sharing among group.

Day 5 (Wed). *Evaluate mapping (all day in the field)*. Field trip to SFVF site with participant maps, CMU, DMU, and input data. Individual and pairwise self-evaluation of maps, CMU, DMU.

Day 6 (Thurs). *Debrief, optional activities (all day in classroom).* Morning: i) Short debrief of results from previous day's field evaluation of individual maps. ii) Options for extraterrestrial mapping, e.g., Titan, with students working in groups according to their body of interest. Presentation of results as a group. Afternoon: i) Presentation session for Flagstaff planetary science community and any early-arriving PGM meeting participants. ii) Summary, synthesis, exit survey of the course.

Day 7 (Fri). Travel day. Optional local geology travel (self-funded). Option to stay on for PGM meeting the following week.

Extracurricular work: Possible extracurricular mapping activities are under discussion.

Reviewer feedback and future work: We received helpful feedback from reviewers. In response to a reviewer comment that the schedule of the workshop might be overambitious in terms of time and / or skills acquisition, we scaled back the work according to the above schedule. Other reviewer feedback is indicated below by bullets. Related plans for the workshop are indicated by chevrons.

- The application and selection process was not sufficiently detailed. For example, what criteria would be used to prioritize applicants?
  - ➢ Develop an inclusive and transparent application and selection process; disseminate information about this workshop and the application process via PEN and LPI newsletters, through the Geological Society of America Planetary Geology Division emails, via email to SSW- and DAP-funded PIs, and on Social Media.
- The code of conduct (or "principles or policies") and exit survey were not sufficiently detailed.
  - ➢ Develop a code of conduct and an exit survey with input from the NAU Equity and Access Office;
- Bystander intervention training might be good.
  - ➢ Provide bystander intervention training.

Summary: This workshop is one component of broader efforts by the community to teach geologic mapping using remote data sets. With the support of the Planetary Geologic Mappers Annual Meeting Conveners, we intend to schedule the workshop immediately adjacent to the 2022 Planetary Geologic Mappers Meeting to enable interactions between the workshop participants and the planetary mapping community. We look forward to community participation in this effort, e.g., during the map presentations on the final day of the workshop, and welcome any feedback.

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