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Introduction: The past, present, and future exploration of Mars has captured the public's imagination and is an exciting topic for students. Current missions to Mars sending back stunning images (the High Resolution Imaging Science Experiment, HiRISE, camera aboard the Mars Reconnaissance Orbiter) and the anticipation of exciting discoveries on the ground (Phoenix Mars Lander) make using Mars as a topic of discovery even more compelling. Through an ongoing collaboration between the National Optical Astronomy Observatory (NOAO), the Lunar and Planetary Lab (LPL) at The University of Arizona, local Tucson classrooms, and classrooms in Chili, students have been involved in exciting cross-cultural remote sensing activities of their hometowns on Earth and different sites on Mars. Through a series of teacher trainings, classroom activities, and culminating video-conferences, students learn about different kinds of light, remote sensing, and Martian geology using multiple remote sensing data sets.

The Mars Odyssey Gamma Ray Spectrometer (GRS), HiRISE, and Phoenix Lander teams from The University of Arizona collaborated with NOAO to create a remote sensing activity using Viking and HiRISE data sets of Mars. Education and Science Team members from NOAO and LPL collaborated with local master science teachers to use current Mars science for teacher professional development, as well as making an inquiry activity to be used in classrooms, after-school programs, and as a topic for sharing information between classrooms across countries.

Professional Development: Participating teachers were provided with a workshop in which University of Arizona Science Team members presented Mars science and the inquiry Mars activity. Workshops were conducted for both local Tucson teachers and teachers in Chili via video-teleconference. Workshops for the Chilean teachers were conducted in English and Spanish. Ongoing support from LPL, NOAO, and master teachers was available during the enactment of the activity in individual classrooms. Teachers often worked together for the activity

Inquiry Mars Activity: The main goals of the activity were to get students using past and current data from Mars and to get them excited about new discoveries being made by current and future missions to Mars. Teachers were assigned one or more sites on Mars to work on from a set of twelve developed by The University of Arizona team. In addition to the image sets, teachers and students were provided basic information about their selected site on Mars in the form of a HiRISE caption written by a HiRISE Science Team member which gave them information about how large the image was, where the Sun was coming from in the image, and where the image was located on the planet. No more information about surface geology was provided. Students were given surface identification charts [1] as a guide to identifying features at each image resolution. Students were guided to explore their area of Mars at three different resolutions (global, 20x20 degrees, and HiRISE 0.25-0.5 m/pixel). and then asked to characterize their piece of Mars using all the information they had collected. Students used the activity to prepare to present their unique part of Mars during a final video-teleconference. Each group was asked to present what kind of mission they might send to their part of Mars and any important information that would need to be considered for landing a mission. All activities were provided in English and Spanish.

Image Sets: Students were provided with a set of images to explore their area on Mars in either paper or electronic form depending on the needs and resources of each classroom. A set of unique surface geology features (dunes, gullies, craters, polygonal ground, a volcano, polar layered deposits, a valley network, a canyon, a delta) were used to create the image sets. Each image set included a complete Viking MDIM (Mars Digital Image Mosaic) map of Mars with their region highlighted with a box, a zoomed-in Viking image of this box, and a HiRISE image. In addition, if classes were using paper copies of the image sets, zoomed in images of parts of the HiRISE image set were included as well.

Student Presentations: As a final activity, students presented their work and findings through a video-teleconference in which their peers, from Tucson and Chili, and scientists also participated.

References: [1] http://marsed.asu.edu/pages/pdfs/ImageAnalysisLessonPlan_IDChartsv100.pdf

Additional Information: Information about the HiRISE instrument can be found at http://hirise.lpl.arizona.edu.

Information about the Phoenix Mars Lander can be found at http://phoenix.lpl.arizona.edu.

Information about NOAO educational programs can be found at http://www.noao.edu/education/.

Copies of the activities and image sets will be available on CD during the poster session. For more information on this program or to get a copy of the materials please contact Sanlyn Buxner at sanlyn@lpl.arizona.edu or Connie Walker at cwalker@noao.edu.