Paper ID: 16436
poster
student

SPACE EXPLORATION SYMPOSIUM (A3)
Moon Exploration – Poster session (2D)

Author: Ms. Abigail Calzada Diaz
Birkbeck College London, United Kingdom, abigailcalzada@gmail.com

Dr. Scott C. Mest
Planetary Science Institute, United States, mest@psi.edu

CARTOGRAPHY OF MARE MOSCOVIENSE ROI AND FUTURE SCIENTIFIC TRAVERSES

Abstract

During NASAs Constellation Program, 50 Regions of Interest (ROI) were identified as high-value locations in preparation for an eventual return to the Moon. These regions are geographically distributed and geologically diverse to achieve a variety of goals and objectives such as described by the Committee on the Scientific Context for Exploration of the Moon in 2007. The Moscoviense Basin is a multiringed impact basin located on the northern hemisphere of the far side of the Moon (26.2°N, 150.5°E). It has a 445-Km diameter and it covers an area of 35,000 Km2. It is within highlands terrain and it was formed 3.85-3.92 Ga. The basin was filled with mare basalts, which vary in composition. 5 individual units were identified using Clementine and Selene data: Nectarian Highland Unit (Nbo), low Fe-low Ti Imbriam mare (Im), a low Ti Imbrian mare (Ilm), high-Ti Erasthothenian mare (Ehtm) and an Imbrian mare associated with Ko-marov Crater (Ikm). Using spectral and topographic data sets from Clementine and Lunar Reconnaissance Orbiter spacecrafts. Remote sensing techniques and ArcGIS v.10.1 software was used to develop a geologic and geomorphologic cartography of a 40x40 kilometer area around Mare Moscoviense ROI of the Moon.

Discrimination between materials was done based in their reflectance and absorption patterns over the UV/VIS spectrum. In the LRO WAC image, differences in maturity are reflected in variations in albedo. Based on this and in differences in surface texture, a first discrimination among units could be done. Topography from LRO LOLA allowed greater accuracy in delimiting the contacts and the mineral ratio mosaic from Clementine displays element content enabling unit characterization.

Three hypothetical traverses were designed for either human-led or robotic missions. The aim of these traverses is to address lunar science questions proposing experiments that allow to obtain as much geological return as possible. The methods proposed vary from petrologic and geochemical characterization experiments, such as samples and drill cores, to geophysical experiments using gravimetry, magnetometry and seismicity methods.

Mare Moscoviense localization in the hidden side of the Moon and the fact that it is the largest mare on the lunar far side, formed by, at least, 4 different types of mare basalts, are the main interests of the region. The first step for a comprehensive study of the feasibility of the region for future scientific missions is the elaboration of a map to place the geomorphological and geological characteristics of the region in context.