IAA Study Group Status Report SG 1.10

Responsible Commission: Commission 1

Study Number and Title: 1.10 Terrestrial Analogue Comparison of Terrestrial and Planetary Geology

Short Study Description (repeat from Study Group Proposal):

The cosmic study will investigate the synergy and commonality of studying geology on Earth and on another planet.

Terrestrial analogues are places on Earth that approximate, in some respect, the geological, environmental and putative biological conditions on a particular planetary body, either at the present-day or sometime in the past. Analogue studies are driven by the need to understand processes on Earth in order to interpret and groundtruth data sent back from Mars and other planetary bodies by unmanned orbiters and rovers.

Sedimentary formations as windows into Mars' geologic history. How similar are the fluvial and deltaic deposits on Earth and Mars, their formation, alteration, and possible diagenetic processes, and the geometries and accumulation mechanisms of their sedimentary bodies? What evidence of the transition from early conditions to the present frigid desert environment is preserved in sedimentary deposits? Can stratigraphic reconstruction of sequences and geometries be modeled using terrestrial deposits? Ancient depositional systems on Mars and terrestrial facies models include fluvial sedimentary environments, hydrothermal deposits, subsurface ice and permafrost deposits, and aqueously altered volcanic terrains and regolith.

Potential paleobiological repositories include glaciers, ice (polar) caps and their associated sediments. Terrestrial deserts be used as proxies for evidence of major Martian global climate changes.

Terrestrial volcanoes in all climatic areas from Iceland to Sicily, can be considered as analogue to the Martian volcanic edifices whose lifetime embraced and conditioned several climatic stages of Mars.

Human exploration and testing of Analogue campaigns can assist in the design and validation of technologies and systems to ensure full operability and functionality once deployed at the surface of Mars. Integrated analogue campaigns allow to test exploration strategies and operations planning to maximize the achievement of the mission objectives (e.g. scientific return or production of O2) and to ensure interoperability between the different elements of the mission.

One of the main goals is to investigate existing laboratory and university capacities and solicit interest, from developing countries and space emerging countries. A particular focus will be made to offer affordable access to space exploration in Latin America and Africa in using the IAA network.

The cosmic study will engage selected international experts to suggest a global space planetology sciences education and public outreach (EPO) model that: (1) strengthens Latin America's and Africa's future space exploration workforce; and (2) promotes science, technology, engineering, and mathematics (STEM) education and public engagement to communicate the benefits of space for understanding our planet and living in Latin America and Africa; and (3) underlining the importance for involving countries, organizations and individuals who can provide new contributions to the Robotic and Human Exploration endeavor.

A review of on-going study Terrestrial Analogues will be duly taken into account and will represent the starting point of this activity.

Progress in past six months:

The study has just started. We are putting the team together and compiling documentation of past activities.

Website Study Information up to date? (Study Group Membership, Study Plan and Schedule):

Issues requiring resolution? (recommend approach):
No issues.

Product Deliveries on Schedule? (If modified explain rationale):
Yes.

Study Team Member Changes? (List any Study Team Members that you wish to discontinue, and provide names plus contact coordinates of any Members you wish to add on the second page of this Study Update form.) Note: Complete contact information including email, tel. and fax must be provided for all additions. Only Members with complete contact information will be listed and receive formal appointment letters from the IAA Secretariat.)

Name of person providing Study Group Status (Study Group Chair or Co-Chair):

Name: Karen McBride
University of California, Los Angeles (UCLA)

Status Report Date:

September 2013

Study Team Membership Changes

Effectivity Date:

Discontinue: None

Add:

Name: Prof John Zarnecki

Name: Valeria Souza

Name: Mary Voytek

Name: Victoria Hipkin

Name: Diana L. Blaney

Name: Douglas Galante

Name: David Pieri

Name: Andrew Steele

Name: Gian Gabriele Ori