CAFE – A NEW ON-LINE RESOURCE FOR PLANNING SCIENTIFIC FIELD INVESTIGATIONS IN PLANETARY ANALOGUE ENVIRONMENTS. L. J. Preston[1], S. J. Barber[1], M. M. Grady[1,2], and the CAFE Team.[1]The Open University, Walton Hall, Milton Keynes, MK7 6AA. [2]Department of Mineralogy, The Natural History Museum, Cromwell Road, London, SW7 5BD (louisa.preston@open.ac.uk).

Introduction: Before humans begin to explore beyond the Earth-Moon system, a considerable amount of supporting research and technology development has to take place on the Earth. The Concepts for Activities in the Field for Exploration (CAFE) project aims to support such aims in an international context by preparing a complete catalogue of terrestrial analogue environments that are appropriate for testing human space exploration-related scientific field activities.

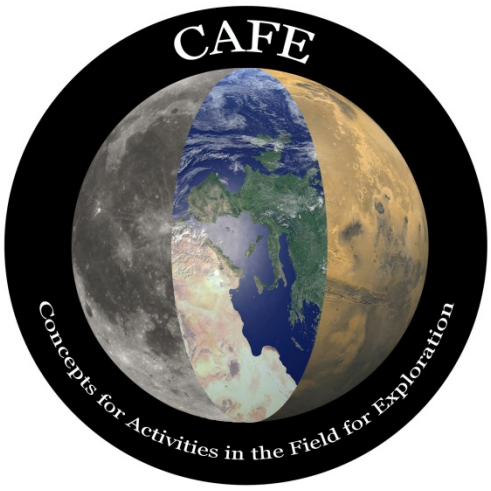

Figure 1. The CAFE logo.

As no single analogue can provide an identical representation of landforms, materials and processes found on the Moon and Mars, it is necessary to select those analogues that best represent particular regions or processes of interest. A large part of the selection process depends on the planetary body of interest so it is necessary to understand the overall geological evolution of that body. Without this understanding the choice of analogue could impede or prevent key discoveries or capabilities, or at worst the chance of mission success.

Programme of Work: The programme of work starts with the categorization of different terrains on the Moon and Mars and summarizes their main characteristics. These are then matched with a complementary catalogue of relevant terrestrial analogue environments. In terms of human planetary exploration, terrain categorization must be first assessed in terms of the physical, chemical and astrobiological aspects of a potential analogue environment.

Physical. In terms of human planetary exploration there are terrains that should be avoided, either because they are hazardous or too difficult to access e.g. steep slopes, cliffs, deep dust deposits etc.

Chemical. The composition of the surface environment provides a chemical constraint on analogue selection, especially if the area is to be exploited for resource utilization.

Astrobiological. The presence of life, or the possibilities of life (extant, dormant or extinct) can create exploration limits that include planetary protection requirements and ethical considerations of extraterrestrial life and its habitats.

Although the Moon and Mars have had differernt evolutionary histories, there are common processes and characteristics that can be exploited in planetary analogue environments. Using broad categories of physical, chemical and astrobiological characteristics, together with the characterisitcs of the lunar or martian surface that are the result of geological evolution, will enable classification of different terrains/regions on the Moon and Mars. The above categories have been subdivided into feature classes such as impact or volcanic environments. Within these there are individual feature types such as crater and ejecta, or lava flow and volcanic shield, which enable us to identify and classify specific terrestrial analogue environments.

The lunar analogues to be included in the catalogue must reflect elements of the extreme age, and harsh and complex impact-dominated history of the Moon which has led to a heavily altered primary lunar crust. Regions of the Moon's surface also display typical volcanic features similar to those observed on the Earth, and so must be included.

Martian analogues will reflect a range of environments created through impact cratering, volcanism, weathering, aqueous alteration, fluvial processes and possible plate tectonics. All these environments are also covered to some extent by a layer of sand- to dust-sized material that is mobilized by wind. In general, it could be argued that Mars offers the most Earth-like environments and is therefore a rich target for analogue studies.

Example scenarios of future human activities on the lunar and martian surface will be outlined for these analogue environments and these, along with the tools required for undertaking the activities, and the tech-

nology developments necessary to support them, will all become part of the final catalogue.

Results: The outcome of this project will be the production of a living database of terrestrial analogue environments which will be converted into a publically accessible web portal. The database will give users the ability to select analogue environments tailored to specific regions of interest on the Moon and Mars in order to test or evaluate instrumentation and planetary activities. The catalogue will develop over time through contributions from the academic community, and it is envisaged that it will become a valuable resource for researchers planning Lunar and Martian analogue activities in the field.

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