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Harrison H. Schmitt[1] (1) University of Wisconsin, Albuquerque, NM

Lunar Field Geology: Past and Future

In December 1972, the Apollo 17 Mission became the most recent field trip to the Moon by human explorers. This 13 day adventure in space took Gene Cernan and Harrison Schmitt to the Valley of Taurus-Littrow in the southeastern rim of the 740 km. diameter basin filled by Mare Serenitatis. After 72 hours on the lunar surface, including 22 hours outside the lunar module Challenger, the astronauts returned over 250 pounds of documented samples to Earth.

The samples, and the visual observation, photographs, and geophysical data related to them, completed the documentation of the first human exploration of the Moon. Apollo activities on the Moon, and the international scientific studies related to them, have given us a first order understanding of the evolution of the Moon as a small planet. Our understanding of the early history of the Earth has been greatly enhanced as a consequence. In particular, it now seems unlikely that the Moon formed as a result of a giant asteroid impact on the Earth but rather was captured after forming independently as a small planet in the same part of the solar system.

Proximity to the Earth, lack of atmosphere, gravity only one-sixth that of the Earth, planetary position as the smallest of the terrestrial planets, and potential life-sustaining resources almost certainly assure a role for the Moon in future lunar activities in support of human exploration, utilization, and settlement of space. The Moon can be considered as a stepping stone towards Mars and beyond and also as the low cost supply depot for deep space exploration and settlement. A privately financed approach to the return of humans to the Moon and deep space appears to be the most likely means of being successful in such an endeavor.