Royal Astronomical Society
Specialist Discussion Meeting

Science Enabled by the Global Exploration Roadmap

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Integrated robotic and human exploration of the Moon within the context of the 2013 Global Exploration Roadmap

The Moon is the most accessible target for space exploration beyond low-Earth orbit. It provides technical challenges that will sharpen our ability to explore more distant targets. It is a destination worthy of exploration: we have never been to the far side of the Moon, the western limb, or either one of the polar regions. Most of the Moon remains unexplored. It is also a noble scientific destination: it is the best target to evaluate the origin and evolution of the entire Solar System, including the earliest evolutionary phase of our own planet, Earth, a period of geologic activity that has since been erased from Earth's rock record. The Moon contains evidence of planetary accretion, the production of magma oceans and planetary differentiation, and the collisional processes that shape planetary surfaces, the latter of which is essential to our evaluation of environmental and biologic consequences of impact cratering events, both on Earth and other potentially habitable worlds like Mars. Recent work suggests there may be an intriguing array of volatile element deposits on the Moon, which can both be used to further tease apart the collisional evolution of the Earth-Moon system and provide in situ resources that may ease the economic hurdles of exploration beyond the Moon.