SPACE TECHNOLOGY IN THE DISCOVERY AND DEVELOPMENT OF MINERAL AND ENERGY RESOURCES

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Space-derived techniques and technology can be applied to the discovery, evaluation, and extraction of mineral and energy resources in several ways. This paper will outline, with examples, some applications of remote sensing from orbit, orbital geophysical surveys, and satellite relay of data from ground-based data collection platforms (DCP's).

Orbital remote sensing for geological purposes is now widely applied with Landsats 1 and 2. Landsat imagery has proven extremely useful in basic geologic mapping, particularly in delineating large structures; examples from California, Asia, and the eastern U.S. will be presented. It is also being routinely applied in oil, gas, and mineral exploration; examples from Saudi Arabia, Pakistan, and the western U.S. will be presented.

Orbital geophysical surveys predate orbital imaging in that tracking of even the earliest satellites revealed information about the Earth's gravity field and shape, but such data are only now being studied for possible utility in the mineral and energy industries. Satellite data have been used to construct a global magnetic map, which has shown a major anomaly in central Africa now being investigated on the ground. Progressively better global gravity maps have similarly shown anomalies of undetermined origin related to upper mantle structures such as suspected mantle plumes. Such geophysical data will probably not be applicable directly to the search for resources because of their low spatial resolution, but can be used to construct crust and mantle models, as well as reference fields, which should be of value to conventional geophysical surveys.

Data collection platforms using satellite relay are being used for environmental monitoring. Of particular interest to the mineral and energy industries is the use of such DCP's to relay data on phenomena related to seismic activity such as ground tilt and eventually microearthquakes. This technique should be of value to the extractive industries for protection against environmental hazards and, more generally, basic understanding of crustal structure.

BIBLIOGRAPHY

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