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Commentary

Remote Sensing in Geology

Pascal Audigane*

Department of Geology, Al-Azhar University, Nasr City, Cairo, Egypt

DESCRIPTION

Remote sensing in geology refers to the use of remote sensing in the geological sciences as a data collecting approach that complements field observation by allowing the mapping of geological properties of regions without having to physically interact with the places being examined. Remote sensing is the study of gathering information about objects or regions at a distance without coming into close contact with the target. Emitted and reflected radiation acquired by sensors on aeroplanes, satellites, and drones, as well as ground-based devices, are used in remote sensing approaches. Remote sensing takes advantage of the fact that the Earth's atmosphere has three main atmospheric windows, each of which allows radiation to pass through. The two primary types of remote sensing are active and passive approaches, which use naturally supplied radiation or radiation actively produced by devices, respectively. Geologists have been using visual observations, pictures, and, eventually, aerial imagery to map and comprehend the Earth's surface for decades. Satellite photography is now utilised in conjunction with older methods or, in some cases, in instead of them. Geoscientists can now explore and analyse the land surface, acquire data and generate maps, and evaluate the geo-potential of any specific area on the globe at unprecedented scales and speeds, thanks to recent advances in remote-sensing technologies, particularly the rapid increase in the number of satellites and, as a result, in image acquisition frequency. Remote sensing has become an indispensable tool in the geosciences in general, and in geology in particular, with a wide range of applications including geologic and geo-structural mapping, mineral and water exploration, hydrocarbon exploration, natural hazards research, and geomorphology.About a quarter of the Earth's total surface area is exposed land, where data from comprehensive earth observation via remote sensing can be retrieved.Remote sensing is accomplished by using sensors to detect electromagnetic waves. The radiation can be reflected off the Earth's surface from natural sources (passive remote sensing) or from devices (active remote sensing). For two key variables, electromagnetic radiation serves as an information carrier. First, the reflectance intensities at various wavelengths are measured and plotted on a spectral reflectance curve. The physio-chemical qualities of the target object's surface determine this spectral fingerprint, which aids mineral identification and thus geological mapping, for example by hyperspectral imaging. In the simplest terms, remote sensing is the process of acquiring information about an object without physically touching it. It has two aspects: data acquisition through a device positioned at a distance from the item, and data processing for interpreting the physical features of the object, both of which are intertwined. Remote sensing arose mostly from aerial photography and picture interpretation tools. It is a relatively new scientific subject, as well as an area of emergent technology that has grown at a breakneck pace over the last three decades. It has greatly improved man's ability to explore and chart resources, as well as monitor the Earth's ecosystem on a local level.

Correspondence to: Pascal Audigane, Department of Geology, Al-Azhar University, Nasr City, Cairo, Egypt, E-mail: Pascal@hotmail.com

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