ISSN: 2332-2519
Journal of Astrobiology & Outreach
OPEN ACCESS Freely available online
Opinion Article

Advancements of Imaging Spectroscopy in Study of Earth and Planetary Science

Steve Dalton*

Department of Geology, University of Regina, Saskatchewan, Canada

DESCRIPTION

Since many years ago, especially in laboratories, spectroscopy has been a useful instrument for identifying, comprehending, and quantifying solid, liquid, or gaseous components. Spectroscopic measurements are utilized in fields ranging from chemistry to astronomy to identify absorption signatures caused by certain chemical bonds, and thorough analysis are employed to ascertain the quantity and physical characteristics of the observed absorbing species. Earth and planetary science have traditionally used spectroscopic observations. Up until the 1990s, multispectral imaging experiments that acquire high quality images in a few, typically broad spectral bands dominated remote spectroscopic assessments of Earth and planets. The new field of imaging spectroscopy was established by a new generation of sensors that integrate imaging and spectroscopy.

Hyperspectral imaging, and ultraspectral imaging in the remote sensing sector. Argues that the term "spectrometry" should only be used to refer to measurements that do not include photons, as in mass spectrometry. Imaging spectrometers collect data at every pixel in a raster image with sufficient spectral range, resolution, and sampling to enable the identification and spatial mapping of specific absorption characteristics. Some established methods of remote sensing analysis that date back to the advent of multispectral imaging are based on statistical techniques that take advantage of the numerous samples (pixels) included in remotely sensed data. The enormous gain in information richness that results when the number of spectral bands is increased from the order of 10 to the order of 100 greatly multiplies the potency of these approaches, as has been proved.

Such scene statistical results are by definition scene-specific cannot be generalized, and the statistical methodologies do not take advantage of the information included in each unique spectrum regarding the chemical and makeup of the remotely sensed surface. Utilizing vector filter techniques, analysis tools from the field of signal processing have had good success in the detection of particular spectral signatures across data sets. But for this method to work, the signature must remain constant from the lab to the field. This standard is not met by the majority of geology and many biologic materials.

Our group is a product of the spectroscopic field, which is concerned with the data that each spectrum contains. Over the past ten years, we have created a software system that approaches "hyperspectral" analysis expressly spectroscopically. That is, identifying the chemical, mineralogical, or biological origin of each spectrum as an individual, separate from the other hundreds to millions of companion spectra in the data set, is the goal driving our method. Additionally, the analysis must be completed efficiently enough to allow for quick, automated study of very massive data sets. Robust detection of geologic and biological materials using visible and near Infrared (IR) spectroscopic observations has been one of our main research goals. Our software system has a wide range of other features and is constantly being improved, but the focus of this paper is on our original material identification approach.

Correspondence to: Steve Dalton, Department of Geology, University of Regina, Saskatchewan, Canada, Email: dalton.s@email.com

Received: 02-Jan-2023, Manuscript no: JAO-23-19889; **Editorial assigned:** 05-Jan-2023, Pre QC no. JAO-23-19889(PQ); **Reviewed:** 19-Jan-2023, QC no. JAO-23-19889; **Revised:** 25-Jan-2023, Manuscript no. JAO-23-19889(R); **Published:** 03-Feb-2023, DOI: 10.35248/2332-2519.23.11.277.

Citation: Dalton S (2023) Advancements of Imaging Spectroscopy in Study of Earth and Planetary Science. J Astrobiol Outreach.11:277.

Copyright: © 2023 Dalton S. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.