

## Soil spectroscopy through the years: sensors, platforms and data analysis

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In the last two decades, the soil spectroscopy discipline has progressed quite remarkably. During that time, many portable point spectrometers became available, and more recently, image spectrometers have also become quite popular. The technology, used in the laboratory, in the field and in the air, provided a new capability for rapid and quantitative views of a large number of samples. At the same time, platforms were developed to carry the new family of sensors for remote-sensing applications of large areas using ground and airborne vehicles (manned and unmanned) and recently, even satellites. This progress has led to a large number of activities exploiting spectroscopy for many applications within the soil science discipline. As data acquisition increases and the soil spectral database expands, new techniques to compile the soil spectral database, together with methods to effectively analyze it, have also been developed. Activities to deal with the data-mining process using big databases have been successfully adopted from other disciplines, while some have also been developed specifically for soil spectroscopy activity. Results have demonstrated that soil spectroscopy can be used for many applications from different domains, such as soil mapping, precision agriculture and laboratory work, and can progress from the soil science discipline onward. In this talk, we will review the history of soil spectroscopy from the first spectrometer and platform to the present situation. Special emphasis will be given to the future capability of this important technology from all perspectives and to the new horizons to which it might lead.