

“Soil Characterization by Vis-NIR-SWIR Spectroscopy”

Dr Cécile Gomez

Research Scientist at IRD (French Research Institute for Sustainable Development)
Associated with the Indo-French Cell for Water Sciences at IISc, Bangalore



Thursday, 26th March 2020, 4 PM

Lecture Hall, ICWaR
Indian Institute of Science

Abstract

Soil provides key environmental functions such as water storage and redistribution, pollutant filtering, provisions of food, fiber, carbon sequestration, climate regulation and nutrient cycling. So an accurate characterization of soil properties over cultivated areas, including soil organic matter, soil texture or iron content, is essential for integrated watershed modelling and for agricultural engineering work such as land consolidation, drainage management, soil erosion limitation and irrigation systems. The current soil databases that exist in the world (primary properties including texture and soil surface conditions including soil moisture) are neither exhaustive nor precise enough to meet the demands of soil data for assisting decisions at global, national and local levels, as for being used as inputs in environmental modelling.

To address this situation, visible, near-infrared and short-wave infrared (Vis-NIR-SWIR, 400–2500 nm) spectrometry can be considered as an adequate technology for estimating some key soil surface properties (on Lab or on Field). Used on-board platform (UAV, airborne or satellite), Vis-NIR-SWIR imaging sensors can be considered as promising for accurate mapping and monitoring of some key soil surface properties.

This talk will provide a review of state of the art, achievements and perspectives in soil mapping and monitoring based on Vis-NIR-SWIR imaging spectroscopy. Selected application cases will be presented for the modelling of some key soil surface properties, related to environmental functions such as water storage and redistribution. Further, current challenges, gaps and new directions toward enhanced soil properties modelling will be presented.

About the Speaker

Dr Cécile Gomez is a French Research Scientist at IRD (French Research Institute for Sustainable Development) since 2007. She is also associated with the Indo-French Cell for Water Sciences at IISc Bangalore. She is involved in research dealing with Vis-NIR-SWIR (400 – 2500 nm) Hyperspectral Remote Sensing imagery for continental surfaces studies.

In 2005, she was a member of the Mars Express/OMEGA team at the IAS laboratory (Paris University, France), and worked on the mapping of some hydrated minerals in order to understand the geological history on Mars. In 2006, she pursue a Post Doctoral position at the Sydney University and worked on Organic Carbon content prediction using Vis-NIR-SWIR Hyperspectral satellite data.

Dr Cécile Gomez has now around 12 years experiences in lab and field soil spectroscopy, and in imaging spectroscopy (airborne and satellite supports) for extraction of physico-chemical soil properties (Clay, CaCO₃, iron, SOC...). She was and is currently P.I. and Co-P.I. in national research projects and contributes to the soil science program of the French hyperspectral satellite HYPXIM.