



REMOTE SENSING BASICS

FUNDAMENTALS OF REMOTE SENSING



Participants will become familiar with satellite orbits, types, resolutions, sensors, and processing levels. In addition to a conceptual understanding of remote sensing, attendees will also be able to articulate its advantages and disadvantages. Participants will also have a basic understanding of NASA satellites, sensors, data, tools, portals, and applications to environmental monitoring and management.

NASA'S EARTH OBSERVING FLEET



Get familiar with Earth observing satellites in NASA's fleet, sensors that collect data you can use in ARSET trainings, and their potential applications.

LAND/ECO-FORECASTING

INTRODUCTION TO REMOTE SENSING FOR CONSERVATION MANAGEMENT



This webinar series focuses on regional and global observation resources for conservation management. It provides a basic overview of remote sensing, tools for accessing and visualizing relevant NASA Earth science data, and case study applications for utilizing these tools for conservation management. The target audience for this series are NGOs (national and international) focused on conservation and biodiversity issues.

INTRODUCTION TO REMOTE SENSING FOR SCENARIO-BASED ECOFORECASTING



Assessing the ecological impacts of a changing climate is crucial for natural resource management decision-making. NASA Earth observations can be used to help make these decisions. This four-week webinar series, in collaboration with the USGS North Central Climate Center, will include an overview of the satellites, sensors, and tools relevant to ecological forecasting; available climate products and data for ecological modeling; scenario planning; and the application of modeling for species distribution and state-and-transition simulations.



LAND/ECO-FORECASTING

REMOTE SENSING FOR CONSERVATION AND BIODIVERSITY



Conservation and biodiversity management play important roles in maintaining healthy ecosystems. Earth observations can help with these efforts. This online webinar series introduces participants to the use of satellite data for conservation and biodiversity applications. The series will highlight specific projects that have successfully used satellite data.

EARTH OBSERVATIONS FOR INDIGENOUS-LED LAND MANAGEMENT



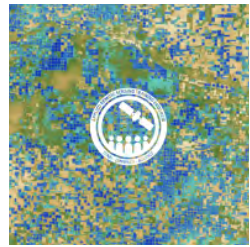
This introductory webinar series will share lectures, case studies, and demonstrations with representatives of indigenous peoples' organizations and will focus on how Earth observations (EO) data and tools can provide spatial information for forest monitoring, mapping, and responding to ecosystem threats. This series will help attendees strengthen their technical capacities to use EO data and tools to enhance their sustainable land management practices.

A Q&A SESSION ON RADAR REMOTE SENSING



Previous ARSET online webinar series' focused on building the skills needed to acquire and understand SAR data, including polarimetric and interferometric SAR (PolSAR and InSAR), as well as their potential applications. The demand for guidance using SAR is extensive. The goal of this live, two-hour question and answer session was to provide participants with the opportunity to ask questions to a panel of experts.

NEW SENSOR HIGHLIGHT: ECOSTRESS



This webinar will focus on a NASA instrument that was launched and installed on the International Space Station in Summer 2018. Designed to study terrestrial ecosystems and plant water stress from the ISS, ECOSTRESS can also be used to better understand crop health, volcanoes, urban heat, wildland fires, coastal systems, and much more.

USING THE UN BIODIVERSITY LAB TO SUPPORT NATIONAL CONSERVATION AND SDGs



There is a global demand for more NASA ARSET trainings focused on biodiversity, conservation, the UN Sustainable Development Goals (SDGs), and how to link NASA satellite data to ecological and human-influenced systems. This training aims to fill that gap by extending the influence of this NASA-supported tool and increasing its dissemination, use, and overall success. UN Biodiversity Lab makes global datasets on biodiversity and sustainable development easily accessible, supporting our broad audience.



LAND/ECO-FORECASTING

UNDERSTANDING PHENOLOGY WITH REMOTE SENSING



This training will focus on the use of remote sensing to understand phenology: the study of life-cycle events. Phenological patterns and processes can vary greatly across a range of spatial and temporal scales, and can provide insights about ecological processes like invasive species encroachment, drought, wildlife habitat, and wildfire potential.

REMOTE SENSING OF COASTAL ECOSYSTEMS



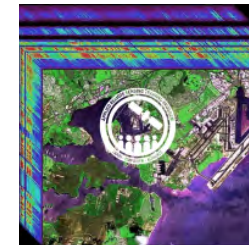
Coastal and marine ecosystems serve key roles for carbon storage, nutrients and materials cycling, as well as reservoirs of biodiversity. They also provide ecosystem services such as sustenance for millions of people, coastal protection against wave action, and recreational activities. Users, particularly those with little remote sensing experience, stand to benefit from this training covering some of the difficulties associated with remote sensing of coastal ecosystems, particularly beaches and benthic communities such as coral reefs and seagrass.

REMOTE SENSING FOR MANGROVES IN SUPPORT OF THE UN SUSTAINABLE DEVELOPMENT GOALS



This training focuses on mapping and monitoring mangroves and how it relates to UN sustainable development indicator 6.6.1: Change in the extent of water-related ecosystems over time. Indicator 6.6.1 is used in determining progress toward meeting Sustainable Development Goal 6, which is to "Ensure availability and sustainable management of water and sanitation for all."

HYPERSENSITIVE DATA FOR LAND AND COASTAL SYSTEMS



The ability of hyperspectral data to characterize chemical, physiological, and morphological traits allows decision-makers to better understand critical components of ecosystem dynamics such as invasive species encroachment, forest decline and pest infestation, and ocean dynamics. This training is also an opportunity to build capacity in a large user community prior to the launch of the highly anticipated global hyperspectral SBG mission.

MONITORING AQUATIC VEGETATION WITH REMOTE SENSING



This training will combine basic information on the remote sensing of AVs, spectrometry of aquatic/coastal vegetation, and a demonstration of the NASA-funded Floating Forests citizen science tool.



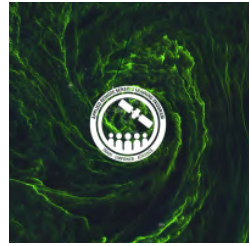
LAND/ECO-FORECASTING

REMOTE SENSING OF FOREST COVER AND CHANGE ASSESSMENT FOR CARBON MONITORING



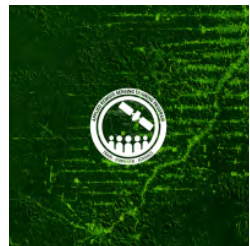
In this intermediate course participants are provided with an overview of carbon monitoring for terrestrial ecosystems. This includes background information about the Intergovernmental Panel on Climate Change (IPCC), Greenhouse Gas (GHG) inventories, the United Nations Framework Convention on Climate Change (UNFCCC), and development of the Reducing Emissions from Deforestation and Degradation (REDD+) program. This course covers products from Landsat, MODIS, Sentinel, and other sensors commonly used for land management applications.

INTRODUCTION TO REMOTE SENSING FOR COASTAL AND OCEAN APPLICATIONS



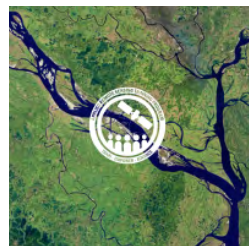
In this intermediate course participants will be provided with an overview of remote sensing for coastal and ocean applications. This includes a background in aquatic remote sensing, data access and tools for processing and analyzing imagery, and examples and live demonstrations of tools that have been developed for NASA and partner organizations. This course will cover data products from MODIS, VIIRS, HICO, and other sensors commonly used for ocean applications.

REMOTE SENSING OF LAND INDICATORS FOR SUSTAINABLE DEVELOPMENT GOAL 15



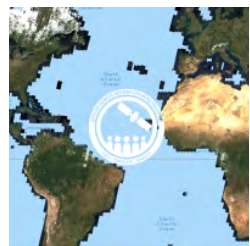
In this webinar, participants learn how to access and apply satellite data relevant to land indicators, such as estimating total forest area and forest change. The webinar includes an overview of the SDGs, as well as an introduction to image classification and change detection.

REMOTE SENSING FOR FRESHWATER HABITATS



This webinar series will guide participants through using NASA Earth observations for habitat monitoring, specifically for freshwater fish and other species. This training will also provide a conceptual overview, as well as the tools and techniques for applying landscape environmental variables to genetic and habitat diversity in species.

USING GOOGLE EARTH ENGINE FOR LAND MONITORING APPLICATIONS



This training will cover the GEE Code Editor, hands-on exercises on change detection, time series analysis, land cover classification, and accuracy assessment of optical imagery. These processes are an integral part of optical imagery analysis for many applications, including monitoring forest disturbance, wildfire mapping, identifying land cover degradation, mapping ecosystem connectivity, and identification of land surface changes due to urban growth.



LAND/ECO-FORECASTING

SPECIES DISTRIBUTION MODELING WITH REMOTE SENSING



SDMs contextualize future scenarios based on known or projected ecological parameters and are the cornerstone for adaptive management planning around short- and long-term changes to complex landscapes. This training will provide an overview of SDMs, show how to use remote sensing data for landscape characterization, and highlight multiple Applied Sciences projects that have developed tools for conducting SDM for a variety of ecosystems.

USING THE UN BIODIVERSITY LAB TO MONITOR THE PULSE OF THE PLANET



This training will focus on using remote sensing and geospatial data within the NASA-supported UN Biodiversity Lab (UNBL) to take action on national conservation and sustainable development priorities. With over 400 of the world's best global data layers on biodiversity, ecosystem services, and sustainable development, UNBL enables decision-makers and policymakers to access essential global data, upload national datasets, and calculate dynamic indicators for any area of interest - all without any background in remote sensing and GIS.

CREATING AND USING NORMALIZED DIFFERENCE VEGETATION INDEX (NDVI) FROM SATELLITE IMAGERY



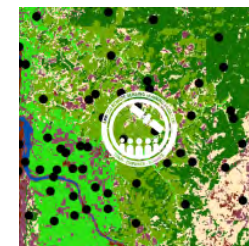
In this advanced webinar participants will learn how to acquire, use, and derive NDVI imagery from Landsat and MODIS. Weekly webinars include lectures, hands-on demonstrations of exercises, and written instructions on how to conduct the exercises. The exercises use QGIS, a cross-platform open source GIS application.

LAND COVER CLASSIFICATION WITH SATELLITE IMAGERY



Land cover classification is an important first step to assessing land cover and land use. This advanced webinar provides lectures and hands-on activities focused on using satellite imagery for land cover classification. In two four-hour sessions, attendees will learn how to acquire Landsat imagery, display it in an open-source Geographic Information System (GIS), analyze spectral signatures of land cover types, and conduct a supervised land cover classification.

ACCURACY ASSESSMENT OF A LAND COVER CLASSIFICATION



The next step to using land cover classifications is being able to evaluate the performance of a land cover map using accuracy assessments. This training will equip attendees with the skills necessary to conduct an accuracy assessment on a land cover map and identify which classes might be misrepresented.



LAND/ECO-FORECASTING

CHANGE DETECTION FOR LAND COVER MAPPING



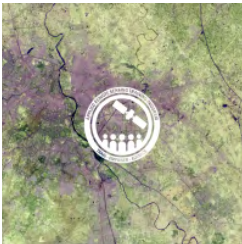
This advanced series focuses on using satellite imagery to map changes in land cover. Attendees will learn change detection methods, including image subtraction and classification. They will also conduct their own change detection analysis. This training will use QGIS, the R statistical program, and the Random Forest algorithm.

INVESTIGATING TIME SERIES OF SATELLITE IMAGERY



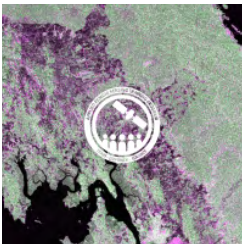
This training will focus on two tools, AppEEARS from the LPDAAC, and LandTrendr via Google Earth Engine (GEE). AppEEARS enables users to integrate point or polygon ground-based data with satellite imagery. The GEE implementation of LandTrendr enables users to analyze land cover dynamics, including short-term disturbances and long-term trends.

REMOTE SENSING FOR MONITORING LAND DEGRADATION AND SUSTAINABLE CITIES SDGs



In this training, attendees will learn to use a freely-available QGIS plugin, Trends.Earth, created by Conservation International (CI), and includes special guest speakers from the United Nations Convention to Combat Desertification (UNCCD) and UN Habitat. Trends.Earth allows users to plot time series of key land change indicators. Attendees will learn to produce maps and figures to support monitoring and reporting on land degradation, improvement, and urbanization for SDG indicators 15.3.1 and 11.3.1.

FOREST MAPPING AND MONITORING WITH SAR DATA



This advanced webinar series will introduce participants to 1.) SAR time series analysis of forest change using Google Earth Engine (GEE), 2.) land cover classification with radar and optical data with GEE, 3.) mapping mangroves with SAR, and 4.) forest stand height estimation with SAR.

