ARSET

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.
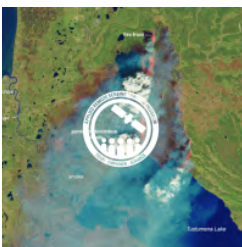
ARSET Website

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.

Disasters - Wildfires

Introduction to Remote Sensing for Wildfire Applications

This webinar series provides a basic overview of remote sensing tools for accessing and visualizing NASA Earth science data relevant to wildfires and case study applications for utilizing tools for pre- and post-burn wildfire conditions.

Introductory

2015

Satellite Observations and Tools for Fire Risk, Detection, and Analysis

Remote sensing can be used to monitor pre-, during-, and post-fire conditions; including weather and climate conditions, fuel characterization, fire risk, smoke detection, monitoring, and forecasting, fire behavior, and the post-fire landscape. This 6-part, intermediate training will provide lectures and case studies focused on the use of Earth observations for operational fire monitoring: pre-, during-, and post-event.

Intermediate

Bilingual

2021

Disasters - Wildfires

Techniques for Wildfire Detection and Monitoring

With more frequent and severe droughts, certain areas are experiencing longer fire seasons. Wildfire detection, monitoring, and mitigation is increasingly important in these regions. Satellite remote sensing data is useful for identifying active fires, evaluating burned areas, and assessing fire emissions. This advanced training will highlight tools useful for local fire managers. Presentations and exercises will introduce participants to tools to identify active fires, visualize fire emissions, and calculate burn severity.

Advanced

2018

### Using Earth Observations for Pre- and Post-Fire Monitoring

During the first session, this training will review pre-fire risk assessment by investigating land surface variables (e.g., vegetation type and height, fuel regimes, fuel moisture, and topography) and climate variables (e.g., temperature and precipitation). In the second session, this training will teach you to conduct post-fire mapping of burned area and burn severity using vegetation indices such as the Normalized Burn Ratio (NBR).

Advanced

2022
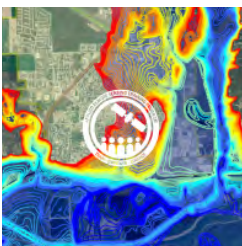
Disasters - Floods

NASA Remote Sensing Observations for Flood Management
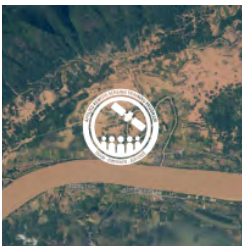
This training introduces remote sensing resources available for monitoring extreme precipitation and flooding, as well as flood mapping tools for flood management and planning.

Introductory

2015

Monitoring Urban Floods using Remote Sensing

According to the UNDP, by 2050, two thirds of the world's population is likely to live in cities. Urban flooding is already a major risk for cities. Increasing impervious surface area, inadequate storm water drainage, and aging infrastructure all contribute. As a result, growing urban populations will face a greater risk of flooding from extreme weather events. This webinar series will focus on the components of urban flooding that satellite data can track extreme precipitation, flooding, and waterlogged and ponded surfaces.

Introductory

2018

Monitoring and Modeling Floods using Earth Observations

ARSET has offered several trainings on flood monitoring based on optical and SAR observations in the past. This two-part training focuses on recent developments and updates in flood monitoring tools and flood modeling techniques. Specifically, an overview of the Hydrological Modeling and Analysis Platform (HyMAP), a routing model used with NASA's Land Information System (LIS), and examples of flood modeling cases is presented in this training.

Intermediate

2022

Disasters - Floods

Using NASA Remote Sensing for Flood Monitoring and Management

This webinar provides demonstrations and hands-on experience in using NASA remote sensing observations and flood mapping tools useful for flood management. Participants learn to access rainfall, stream-flow, and surface inundation extent data for regional flood cases. In addition, participants learn to access digital elevation and terrain data, as well as socioeconomic data, to facilitate flood risk assessment and post-flood relief planning using a GIS framework.

Advanced

2016

Disasters - SAR

Introduction to Synthetic Aperture Radar
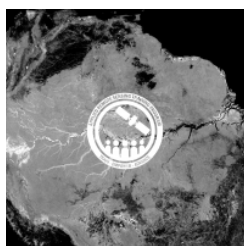
SAR can observe the Earth's surface day and night, through most weather conditions, and the signal can penetrate the vegetation canopy. There are a number of existing SAR datasets from current and past airborne and satellite missions, as well as exciting upcoming missions. This online webinar will focus on building the skills needed to acquire and understand SAR data, including polarimetric and interferometric SAR (PolSAR and InSAR), as well as potential applications.

Introductory

Bilingual

2017

Disaster Assessment using Synthetic Aperture Radar

This training includes theoretical portions for each disaster as related to the SAR signal interaction with surface conditions and demonstrations using Google Earth Engine, Jupyter Notebooks, and the SNAP Toolbox, all freely and openly available tools.

Intermediate

Bilingual

2022

Radar Remote Sensing for Land, Water, and Disaster Applications
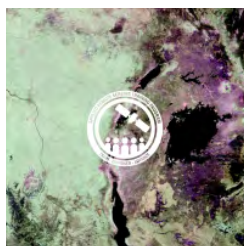
This webinar series builds on ARSET's previous webinar, Introduction to Synthetic Aperture Radar. The training will focus on different techniques such as time-series', polarimetry, and interferometry for mapping and monitoring disasters, water, and land cover applications such as deforestation, crops, flooding, and earthquakes.

Advanced

Bilingual

2018

SAR for Landcover Applications

This webinar series will build on the knowledge and skills previously developed in ARSET SAR trainings. Presentations and demonstrations will focus on agriculture and flood applications. Participants will learn to characterize floods with Google Earth Engine and learn to analyze synthetic aperture radar (SAR) for agricultural applications, including retrieving soil moisture and identifying crop types.

Advanced

Bilingual

2019

Disasters - SAR

SAR for Disasters and Hydrological Applications
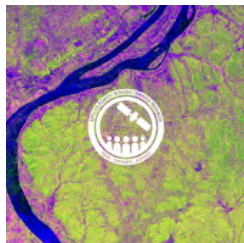
This training builds on the skills taught in previous ARSET SAR trainings in terms of the use of Google Earth Engine for flood mapping with radar data. This training presents two new topics; the use of InSAR for characterizing landslides and the generation of a digital elevation model (DEM).

Advanced

Bilingual

2019

Disasters - Urban Heat Islands

Satellite Remote Sensing for Urban Heat Islands
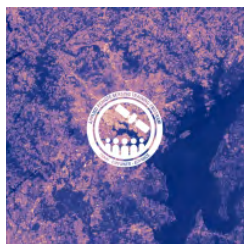
This training will address the use of remote sensing in determining where "hot spots" of land surface temperature are located in urban areas, why these areas are experiencing increased temperature, which populations are most vulnerable, and ways to mitigate the effects through adaptive land use planning.

Introductory

2020

Satellite Remote Sensing for Measuring Urban Heat Islands and Constructing Heat Vulnerability Indices

Once UHIs have been mapped, incorporating socioeconomic data pertaining to population, demographics, and health information into heat vulnerability indices (HVI) can help guide interventions to manage heat related risks to public health. This four-part, advanced webinar builds on ARSET's urban heat island training held in November 2020 with hands-on exercises for participants to measure UHI and construct HVIs for their areas of interest.

Advanced

2022

Disasters - Other

**Monitoring Tropical Storms for Emergency Preparedness**
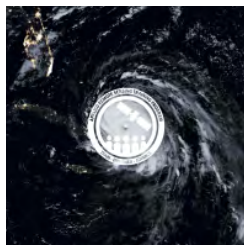
Tropical storms have major impacts, including loss of life and destruction of property. In 2017 alone, the United States experienced three tropical storms with more than $1 billion in losses. Open source satellite data can be used before, during, and after a storm for monitoring and response. A storm's intensity, path, wind, precipitation, storm surge, and flooding can be derived from historical and near real-time satellite observations. In this introductory webinar, participants will learn about the NASA data and tools they can use to monitor tropical storms.

Introductory

2018

Disasters - Other

Overview of the Global Disasters Alert and Coordination System (GDACS)
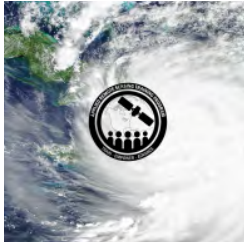
The Global Disaster Alert and Coordination System (GDACS) provides near real-time data, alerts, and impact assessments that can be accessed online. In this two-hour webinar, participants learn how to use GDACS to monitor real-time disasters, assess the impacts of an event, and develop response strategies for both national and international events.

Introductory

2017

Earth Observations for Disaster Risk Assessment and Resilience
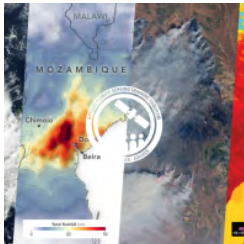
This webinar series will focus on Earth observation (EO) data useful for disaster risk assessment. The series will cover disasters including tropical cyclones, flooding, wildfires, and heat stress. The training will also cover access of socioeconomic and disaster damage data. Sessions 3 & 4 will cover case studies and operational applications of EO for disaster risk assessment.
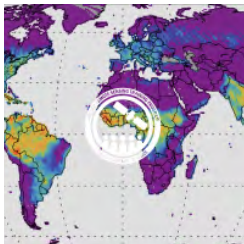
Introductory

2019

Introduction to NASA's "Black Marble" Night Lights Data
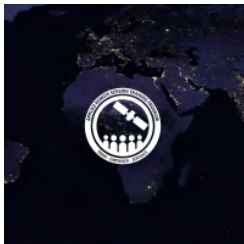
This webinar will focus on building the skills needed to choose the appropriate night lights product, acquire and understand Black Marble data, and how to use the data in analyses for tracking urbanization, electrification, and disaster monitoring.

Introductory

Bilingual

2020

Use of Solar Induced Fluorescence and LiDAR to Assess Vegetation Change and Vulnerability

This introductory webinar series will cover the fundamentals of Solar Induced Fluorescence (SIF) and LIDAR, their applications, and an overview of different satellite data sources that are openly available. In addition, it will also include a step-by-step guide on how to access, open, and interpret SIF and LIDAR data.

Introductory

Bilingual

2021

Introduction to Population Grids and their Integration with Remote Sensing Data

This 2-part training, developed and presented by members of the POP-GRID Data Collaborative, will focus on the different global population grids and their application to a range of topics related to development planning and monitoring of the SDGs (e.g., environment, hazards, and access to resources). Attendees will be exposed to the latest data and methods used to produce global grids, how the grids incorporate remote sensing inputs, and how population grids can be used in conjunction with other types of data.

Introductory

**2021**

Disasters - Other

Humanitarian Applications using NASA Earth Observations

This four-part introductory training will focus on using NASA data products for monitoring human settlements and landscapes during armed conflict and forced displacement. This ARSET training is the first dedicated to humanitarian applications of NASA satellite imagery with topics including monitoring urban damage, mapping refugee settlement dynamics, and gauging climate hazards at refugee settlements.

Introductory

2022

Using NASA Remote Sensing for Disaster Management
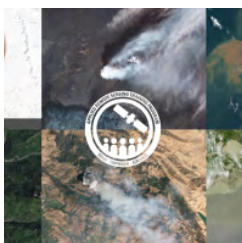
NASA remote sensing and modeling resources are useful for managing a variety of disasters - including earthquakes, tsunamis, volcanoes, floods, landslides, wildfires, and oil spills - particularly in regions with very little in situ data. This intermediate course will provide an overview of NASA remote sensing data and applications for disaster management.

Intermediate

2016

Remote Sensing for Disasters Scenarios
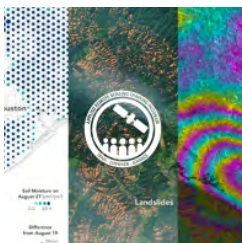
According to the WHO, every year disasters "kill around 90,000 people and affect close to 160 million people worldwide." This training will show participants how NASA remote sensing data can be used to characterize and monitor disaster-related events and support relief efforts. Each session will cover a different disaster and its supporting data. Disaster scenarios include tropical storms, flooding, earthquakes, and landslides.

Intermediate

Bilingual

2019

Satellite Observations for Analyzing Natural Hazards on Small Island Nations
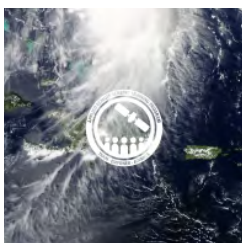
This three-part training series will focus on small island nations while introducing the data, methods, and tools useful for monitoring natural hazards. Case studies will be used to demonstrate methodologies applying satellite and model data and open access tools to analyze storm impacts, sea level rise, and landslides on small island nations.

Intermediate

Bilingual

2021