



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

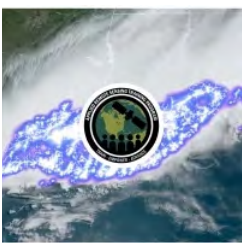


Get familiar with Earth observing satellites in NASA's fleet, sensors that collect data you can use in ARSET trainings, and their potential applications.



Disasters - 2024

Introduction to Lightning Observations and Applications



As the intensity and frequency of extreme weather events are likely to increase due to climate change impacts, lightning activity will likely increase as well, causing more power outages, increased risks of wild-fire ignition, and increased numbers of injuries and fatalities. Therefore, information about lightning activity is critical for better preparedness against these disasters. This three-part, introductory training focuses on global and regional lightning data products that can be applied to disaster risk preparedness.

Introductory - 2024



Earth Observations for Humanitarian Applications



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Intermediate - 2024

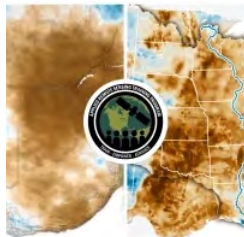


Disasters - 2024



Drought Monitoring, Prediction, and Projection using NASA Earth System Data

Advanced - 2024



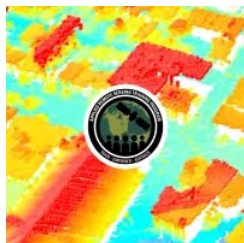
This four-part, advanced training builds upon previous ARSET trainings and provides hands-on data analysis exercises for monitoring different types of drought (meteorological, hydrological, and agricultural). Moreover, the training includes drought prediction analysis on sub-seasonal to seasonal (S2S) time scales and climate change projection analysis of drought conditions.



Disasters - 2023

Transforming Earth Observation (EO) Data into Building Infrastructure Data Sets for Disaster Risk Modeling

Intermediate - 2023

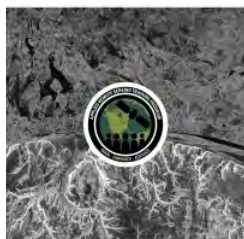


In this short course, we cover the basics of natural hazard risk modeling and exposure development with a focus on fusing data from multiple datasets expressly for the purposes of risk assessment. We also present examples applying the techniques to applications related to flood risk assessment, climate adaptation, and earthquake modeling.



SAR for Detecting and Monitoring Floods, Sea Ice, and Subsidence from Groundwater Extraction

Advanced - 2023

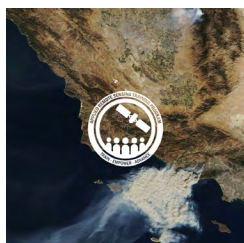


This training is a follow-on to the SAR training held in October 2022, which covered detection and monitoring of oil spills, landslides, and floods. This training expands on the theory and applications of SAR data to detect and monitor floods through the use of SAR time-series in order to more closely monitor the increase/recession of flood waters. This training also covers two new application areas: the use of InSAR to measure subsidence due to groundwater extraction, and the use of SAR to detect and monitor sea ice.



Assessing the Impacts of Fires on Watershed Health

Advanced - 2023



This advanced-level training will focus on using remote sensing observations for monitoring post-fire impacts on watershed health, building off the ARSET training offered in 2021: Satellite Observations and Tools for Fire Risk, Detection, and Analysis. Specifically, this training will highlight uses of NASA Earth observations (EO) for pre-fire land cover mapping, watershed delineation and stream mapping, post-fire burn severity mapping, and pre- and post-fire riverine and freshwater water quality.





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



Disaster Assessment using Synthetic Aperture Radar

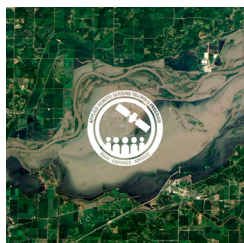


This training includes theoretical portions for each disaster as related to the SAR signal interaction with surface conditions and demonstrations using Google Earth Engine, Jupyter Notebooks, and the SNAP Toolbox, all freely and openly available tools.

Intermediate - 2022



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



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



Using Earth Observations for Pre- and Post-Fire Monitoring



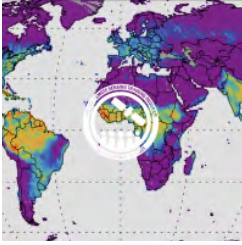
During the first session, this training will review pre-fire risk assessment by investigating land surface variables (e.g., vegetation type and height, fuel regimes, fuel moisture, and topography) and climate variables (e.g., temperature and precipitation). In the second session, this training will teach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

Advanced - 2022





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 - 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



Satellite Observations for Analyzing Natural Hazards on Small Island Nations

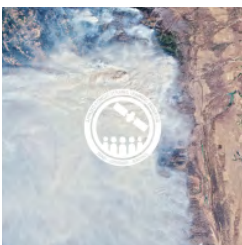


This three-part training series will focus on small island nations while introducing the data, methods, and tools useful for monitoring natural hazards. Case studies will be used to demonstrate methodologies applying satellite and model data and open access tools to analyze storm impacts, sea level rise,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

Intermediate - 2021



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 - 2021



Disasters - 2020



Introduction to NASA's "Black Marble" Night Lights Data

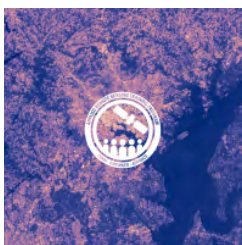


This webinar will focus on building the skills needed to choose the appropriate night lights product, acquire and understand Black Marble data, and how to use the data in analyses for tracking urbanization, electrification, and disaster monitoring.

Introductory - 2020



Satellite Remote Sensing for Urban Heat Islands



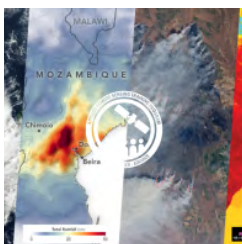
This training will address the use of remote sensing in determining where "hot spots" of land surface temperature are located in urban areas, why these areas are experiencing increased temperature, which populations are most vulnerable, and ways to mitigate the effects through adaptive land use planning.

Introductory - 2020



Disasters - 2019

Earth Observations for Disaster Risk Assessment and Resilience

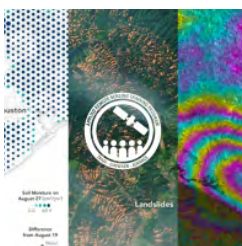


This webinar series will focus on Earth observation (EO) data useful for disaster risk assessment. The series will cover disasters including tropical cyclones, flooding, wildfires, and heat stress. The training will also cover access of socioeconomic and disaster damage data. Sessions 3 & 4 will cover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

Introductory - 2019



Remote Sensing for Disasters Scenarios

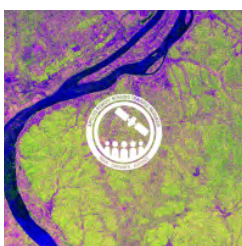


According to the WHO, every year disasters "kill around 90,000 people and affect close to 160 million people worldwide." This training will show participants how NASA remote sensing data can be used to characterize and monitor disaster-related events and support relief efforts. Each session will cover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

Intermediate - 2019



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 - 2019



Disasters - 2019



SAR for Landcover Applications



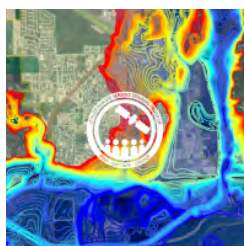
This webinar series will build on the knowledge and skills previously developed in ARSET SAR trainings. Presentations and demonstrations will focus on agriculture and flood applications. Participants will learn to characterize floods with Google Earth Engine and learn to analyze synthetic aperture radar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

Advanced - 2019



Disasters - 2018

Monitoring Urban Floods using Remote Sensing

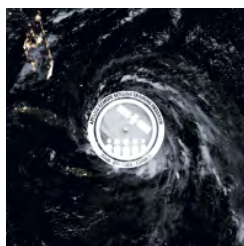


According to the UNDP, by 2050, two thirds of the world's population is likely to live in cities. Urban flooding is already a major risk for cities. Increasing impervious surface area, inadequate storm water drainage, and aging infrastructure all contribute. As a result, growing urban populations will 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 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



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 - 2018



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



Disasters - 2017

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



Introduction to Synthetic Aperture Radar



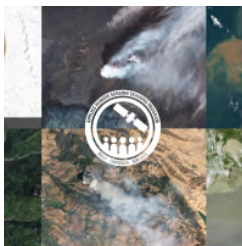
SAR can observe the Earth's surface day and night, through most weather conditions, and the signal can penetrate the vegetation canopy. There are a number of existing SAR datasets from current and past airborne and satellite missions, as well as exciting upcoming missions. This online webinar will focus 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 - 2017



Disasters - 2016

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



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, streamflow, 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

