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.

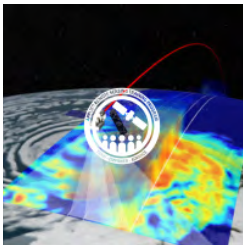
ARSET Website

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.

Water Resources - Hydrology & Agriculture

Introduction to Global Precipitation Measurement (GPM) Data and Applications



This training introduces participants to the data and applications of the Global Precipitation Measurement (GPM) mission. GPM is an international satellite mission that provides next-generation observations of rain and snow worldwide every three hours.

Introductory

2015

Water Resource Management using NASA Earth Science Data

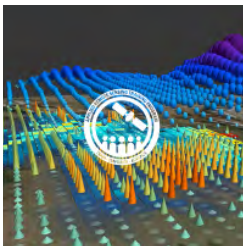
This five week course covers precipitation (rainfall and snow fraction), soil moisture, evapotranspiratoin, runoff and streamflow, groundwater, and lake level heights. Attendees are introduced to a number of NASA data products.

Introductory

2015

Water Resources - Hydrology & Agriculture

Introduction to Using the VIC Hydrologic Model with NASA Earth Observations



The Variable Infiltration Capacity (VIC) Model uses inputs to better understand hydrological processes in near real-time. Many of the inputs are available from NASA remote sensing and Earth system models, allowing the model to provide soil moisture, evapotranspiration, and runoff as outputs. Together with precipitation data, these outputs provide quantitative assessment of a regional water budget. This introductory training will include an overview of the model, sources of satellite-derived input data, and implementation of the model.

Introductory

2018

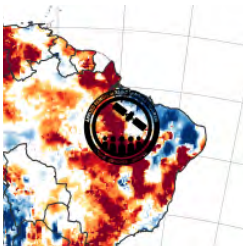
Satellite Remote Sensing for Agricultural Applications

This training addresses how to use remote sensing data for agriculture monitoring, specifically drought and crop monitoring. The webinar also provides end-users the ability to evaluate which regions of the world have agricultural productivity above or below long-term trends. This informs decisions pertaining to market stability and humanitarian relief.

Introductory

2020

Groundwater Monitoring using Observations from NASA'S GRACE Missions



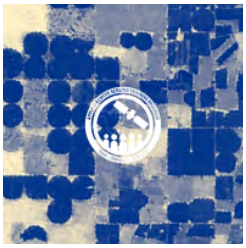
GRACE observations have been used for detecting groundwater depletion and for drought and flood predictions. This lightning-style training is designed to answer the demand and interest from the applications community in technologies that can be used to support water resources management. The webinar will provide an overview of the GRACE missions, groundwater data availability, and their applications in the monitoring and management of water resources.

Introductory

Bilingual

2020

Applications of Remote Sensing to Soil Moisture and Evapotranspiration



This webinar series was intended to help attendees learn about NASA soil moisture and evapotranspiration products and how to access and apply them for water resource management. Throughout the five sessions you will learn how to monitor and manage water resources with techniques learned in training.

Intermediate

2016

Agricultural Crop Classification with SAR and Optical Remote Sensing

This five-part, intermediate webinar series will focus on the use of synthetic aperture radar (SAR) from Sentinel-1 and/or optical imagery from Sentinel-2 to map crop types and assess their biophysical characteristics. The webinar will cover a SAR and optical refresher along with pre-processing and analysis of Sentinel-1 and Sentinel-2 data using the Sentinel Application Platform (SNAP) and Python code written in JupyterLab, a web-based interactive development environment for scientific computing and machine learning.

Intermediate

Bilingual

2021

Water Resources - Hydrology & Agriculture

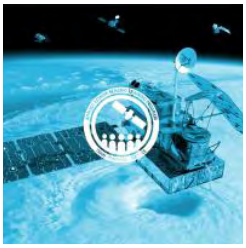
Applications of Remote Sensing-Based Evapotranspiration Data Products

This three-part webinar series focuses on introducing newly available ET products derived from remote sensing observations. It will specifically cover a web portal called OpenET (https://openetdata.org/), which includes ET products estimated by using six models as well as Landsat satellite observations. These ET products cover the western United States. In addition, information about global ET products derived from ECOsystem Spaceborne Thermal Radiometer Experiment on the Space Station (ECOSTRESS) will also be covered.

Intermediate

2022

Applications of GPM IMERG Reanalysis for Assessing Extreme Dry and Wet Periods

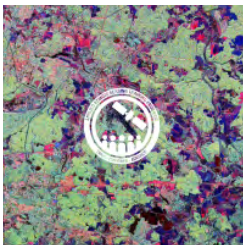


Past ARSET trainings on water resources and flood management covered TMPA and IMERG data and their applications in detail. This advanced webinar will focus on analysis and interpretation of the new long-term IMERG data, focused on extreme dry and wet period monitoring and management. The webinar will include lectures and hands-on exercises to derive regional precipitation statistics.

Advanced

2020

Mapping Crops and their Biophysical Characteristics with Polarimetric SAR and Optical Remote Sensing



This four-part, advanced training builds on the previous ARSET agricultural training. Here we present more advanced radar remote sensing techniques using polarimetry to extract crop structural information. We also present Sen4Stat – an open source system demonstrating the potential of optical and SAR satellite Earth observations for monitoring and reporting of the SDG targets related to agriculture.

Advanced

Bilingual

2022

Water Resources - River Basins & Water Bodies

Mapping and Monitoring Lakes and Reservoirs with Satellite Observations

This training focuses on introducing remote sensing observations for monitoring the water level of lakes; a critical surface water component affecting the residential, economical, and recreational sectors in the area. Recent observations of lake bathymetry based on remote sensing observations will also be presented.

Introductory

2021

River Basin Delineation Based On NASA Digital Elevation Data

This lightning-style webinar will focus on describing NASA digital elevation data and its application in deriving river basin information by using Hydrological data and maps based on SHuttle Elevation Derivatives at multiple Scales (HydroSHEDS) database. Exercises with instructions for river basin delineation using HydroSHEDS will be provided.

Introductory

2019

Water Resources - River Basins & Water Bodies

Using Earth Observations to Monitor Water Budgets for River Basin Management

Rivers are a major source of freshwater. They support aquatic and terrestrial ecosystems, provide transportation, and generate hydropower. Managing river basin watersheds is critical for developing policies for sustainable water allocation and development. Over the course of four sessions, this introductory webinar series will address using satellite data and Earth system modeling data sources to estimate surface water budgets.

Introductory

2019

Using Earth Observations to Monitor Water Budgets for River Basin Management II

Past ARSET trainings on monitoring water budgets for river basins focused on data sources relevant for river basin monitoring and management, and provided case studies for estimating the water budget of a watershed using remote sensing products. This advanced webinar will include lectures and hands-on exercises for participants to estimate water budgets for a given river basin.

Advanced

2020

Water Resources - Water Quality

Introduction to Remote Sensing of Harmful Algal Blooms

Harmful algal blooms (HABs) can have a negative impact on the ecosystem and human health. Satellite remote sensing is able to collect data frequently and over a large area to identify impaired water quality from HABs. This data can help decision-makers decide where to take water samples, determine what toxins are in the water, decide whether they need to change or move drinking water intakes, and decide whether a fishery needs to be closed.

Introductory

2017

Monitoring Coastal and Estuarine Water Quality: Transitioning from MODIS to VIIRS

This intermediate-level webinar will provide an overview of recent satellites and sensors used for extending the MODIS long-term water quality time series, specifically focusing on VIIRS image processing using the NASA Ocean Color software, SeaDAS. This webinar will point out similarities and differences between MODIS and VIIRS and demonstrate water quality monitoring procedures using these sensors in selected coastal and estuarine regions.

Intermediate

Bilingual

2021

Processing Satellite Imagery for Monitoring Water Quality

This webinar series will help attendees perform advanced image processing of satellite data and learn about using satellites to track indicators of harmful algal blooms. This will include monitoring water temperature and chlorophyll-a concentrations. Attendees can also use this information for reporting around UN SDG 6.

Advanced

Bilingual

2018

Water Resources - Water Quality

Integrating Remote Sensing into a Water Quality Monitoring Program

This webinar series will help attendees perform advanced image processing of satellite data and learn about using satellites to track indicators of harmful algal blooms. This will include monitoring water temperature and chlorophyll-a concentrations. Attendees can also use this information for reporting around UN SDG 6.

Advanced

2019

Monitoring Coastal and Estuarine Water Quality using Remote Sensing and In Situ Data

This two-part, advanced webinar series is a follow-on to the training on coastal and estuarine water quality held in September 2021. It is a hands-on training with demos provided by instructors, followed by an hour of lab time for participants to use Level-1 MODIS and VIIRS data provided by the Ocean Biology DAAC (OB.DAAC) and SeaDAS and OCSSW software for deriving water quality parameters.

Advanced

2021