Spaceborne Lidar for Monitoring Vegetation Structure and Biomass using GEDI

October 23, 30, & November 6, 2025

11:00-13:00 (English) or 14:00-16:00 (Spanish) EDT (UTC-4)

This three-part training builds on a fundamental understanding of LiDAR (Light Detection and Ranging), including its strengths, limitations, and distinguishing characteristics compared to other active and passive remote sensing observations. A central focus of the training is NASA's Global Ecosystem Dynamics Investigation (GEDI) mission, a novel spaceborne lidar sensor that began collecting data in April 2019. GEDI is the first mission specifically designed for observing the vertical structure of forests and vegetation. Through case studies and an overview of available GEDI data products, participants will explore how GEDI informs analyses of canopy structure and supports biomass estimation for forests. The training introduces the sensitivity of waveform lidar by guiding participants through plotting waveforms and deriving key vegetation structure metrics, such as canopy cover, elevation, relative height, and plant area indices. In addition, participants will learn how to work with GEDI-derived biomass estimates in combination with data fusion products. The course covers the theoretical background of GEDI's capabilities and demonstrations on accessing, plotting, and interpreting GEDI data. The training concludes with an introduction to interpreting biomass datasets for decision support, which can be accessed through Google Earth Engine using the OBIWAN (Online Biomass Inference using Waveforms And iNventory) Application Programming Interface (API).

Part 1: Introduction to Full-Waveform Lidar

ARSET Trainers: Savannah Cooley

Guest Instructors: Naiara Pinto

- The ARSET Program
- Training Overview
- Introduction to Session 1
- Fundamentals of Lidar Remote Sensing
- Review of Different Types of Lidar Data
- Full Waveform Lidar Data from the GEDI Mission
- Demonstration 1: Access, Plot, and Interpret GEDI Waveform Data
- Demonstration 2: Access and Plot Relative Height Metrics
- Summary of Session 1
- Q&A Session

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Part 2: Introduction to the GEDI Mission and its Derived Products

ARSET Trainers: Juan Torres-Pérez

Guest Instructors: Stephanie Jimenez

- Introduction to Session 2
- GEDI Mission Objectives and Application Areas
- Overview of GEDI Products and Tools
- Accessing, Downloading and Visualizing GEDI Products
- Summary of Session 2
- Q&A Session

Part 3: Estimating Biomass Change with GEDI and the OBIWAN API

ARSET Trainers: Erika Podest

Guest Instructors: Sean Healey, Zhiqiang Yang

- Introduction to Session 3
- GEDI Mission Biomass Estimation: Theory and Products
- OBIWAN: Estimating Biomass Change with GEDI and Landsat Time Series
- Customize OBIWAN Through its API and Compare Carbon Gains to Climate Scenarios
- Summary of Session 3
- Training Overview
- Q&A Session

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