Solar Induced Fluorescence (SIF) Observations for Assessing Vegetation Changes Related to Floods, Drought, and Fire Impacts

October 15, 22, & 29, 2025

12:00-14:00 (English) or 16:00-17:00 (Spanish) EDT (UTC-4)

Solar-Induced Chlorophyll Fluorescence (SIF) provides a unique remote sensing approach for measuring photosynthetic activity, offering real-time insights into vegetation stress and productivity that surpass traditional indices (e.g. NDVI) in sensitivity and accuracy. This intermediate training builds on a previous ARSET training introducing the SIF measurement and covers several case studies of the impact of floods and droughts on agricultural systems and the impacts of fire on forested ecosystems.

Participants will learn fundamental principles of SIF remote sensing and its practical applications for monitoring vegetation dynamics across cropland and natural systems. The course demonstrates how SIF data can assess agricultural flood and drought impacts as compared to normal conditions, evaluate fire damage and recovery patterns in wildlands, and quantify relationships between SIF observations and Gross Primary Production (GPP). Participants will gain hands-on experience analyzing SIF datasets from NASA missions including OCO-2 and OCO-3, as well as using gap-filled data products derived using machine learning techniques.

Part 1 - Solar Induced Chlorophyll Fluorescence (SIF) Measurements from Space

ARSET Instructor: Erika Podest

Guest Instructors: Nick Parazoo (NASA JPL), Jacqueline Ryan (NASA JPL)

- SIF Overview and SIF from Space
- Setting up your environment to work on SIF data sets
- Retrieving and spatially gridding SIF data

Part 2 - Overview of OCO-2 and OCO-3 Observing Modes and SIF Observations

ARSET Instructor: Erika Podest

Guest Instructors: Junjie Liu (NASA JPL), Jacqueline Ryan (NASA JPL)

- SIF measurements in science and applications
- OCO-3 Snapshot Area Map (SAM) mode
- Comparison with flux tower data
- Case study: fire conditions and SIF in Oregon, 2020

Part 3 - Working with Gap-Filled SIF Products

ARSET Instructor: Erika Podest (NASA JPL)

Guest Instructors: Karen Yuen (NASA JPL), Jaqueline Ryan (NASA JPL)

- Use of gap-filled SIF data products
- Case study: 2019 Midwestern US floods and impacts to agriculture

ARSET empowers the global community through remote sensing training.