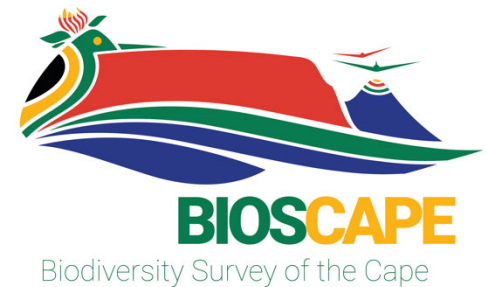


## Hands-On Field Spectroscopy Training and Data Skills Workshop – An Introduction to the NASA ARSET Program

Cape Town, South Africa

Juan Torres-Pérez (NASA Ames), Sativa Cruz (BAERI/NASA Ames),  
and Justin Fain (BAERI/NASA Ames)

October 7-11, 2024



# Ecological Conservation Team

**Sativa Cruz**

Applied Scientist

BAERI/NASA Ames Research  
Center



**Juan Torres-Pérez**

Research Scientist

NASA Ames Research Center

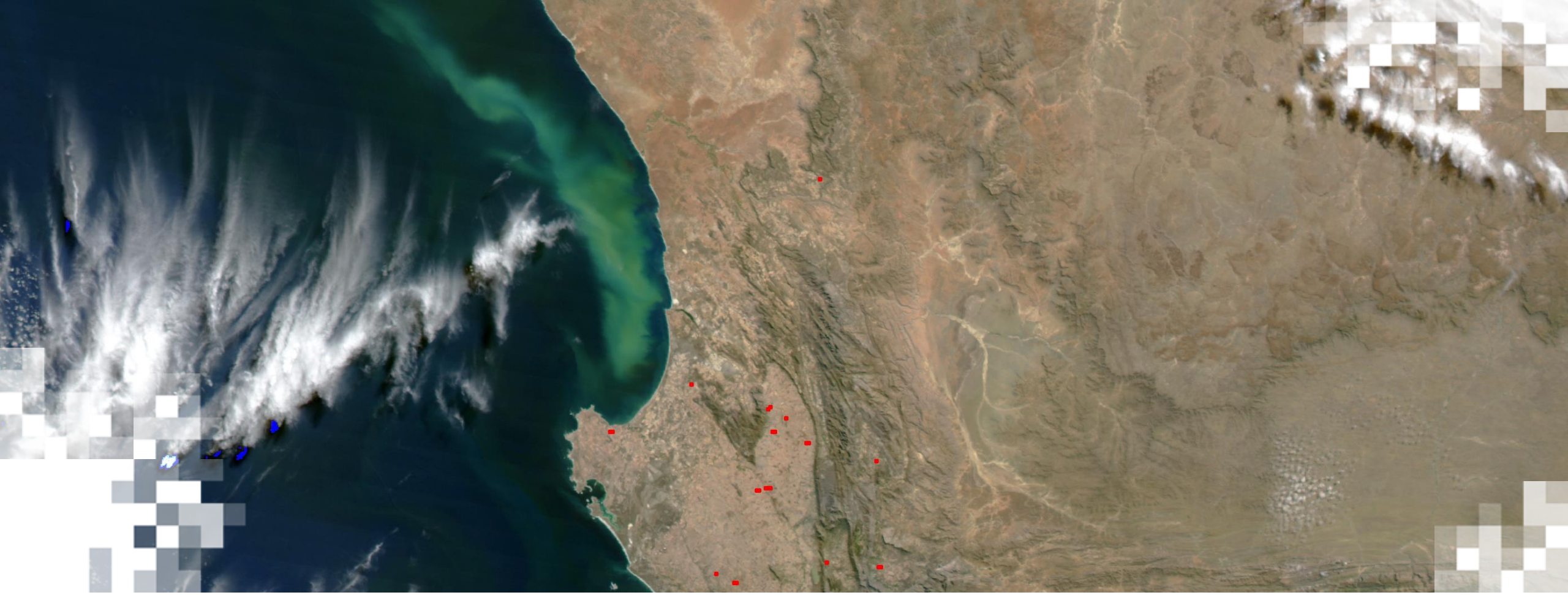


**Justin Fain**

Research Scientist

BAERI/NASA Ames Research  
Center





## About ARSET



# ARSET: Empowering the Global Community through Training

- ARSET provides accessible, relevant, and cost-free training on remote sensing satellites, sensors, methods, and tools. ARSET hosts online and in-person trainings.
- Trainings include a variety of applications of satellite data and are tailored to audiences with a variety of experience levels.

## ARSET Trainings 2009-2023



180+ trainings



100,000+ participants



182 countries



17,000+ organizations



EARTH SCIENCE  
APPLIED SCIENCES



CAPACITY BUILDING



# ARSET Trains an International Audience

2009 – 2023



190+ Trainings



100,000+ Participants



182 Countries



17,000+ Organizations

2022

Number of Participants

□ No Participation

□ 0 - 5

□ 6 - 25

□ 26 - 50

□ 51 - 100

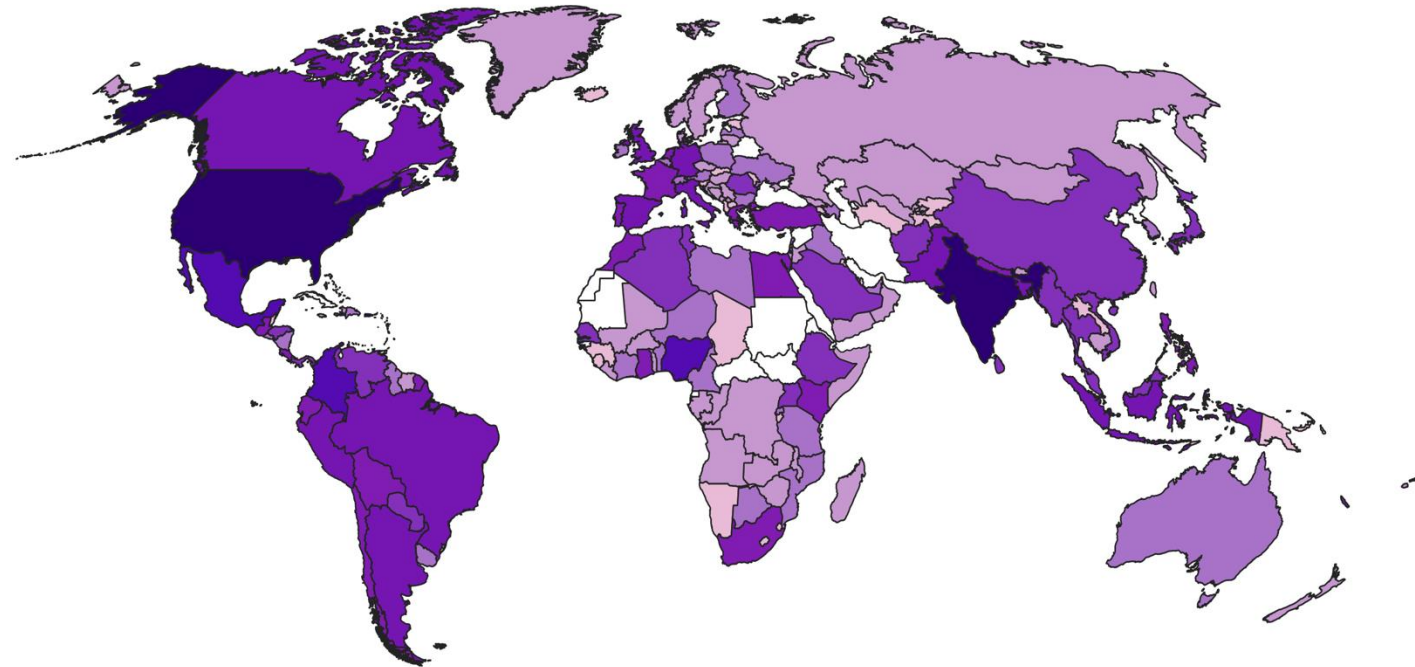
□ 101 - 250

□ 251 - 500

□ 501 - 1000

□ 1001 - 2000

□ 2000+



# About ARSET Trainings

- Online or In-Person
  - Online webinars are typically 3-4 sessions each
  - In-Person workshops are typically 2-3 days long
- Live and instructor-led or asynchronous and self-paced
- Cost-free
- Bilingual and multilingual options
- All materials are available through the ARSET website
- Only use open-source software and data
- Accommodate differing levels of expertise
  - From Introductory to Advanced
  
- Visit the [ARSET website](#) to learn more.

## ARSET Training Themes

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**AGRICULTURE**



**CLIMATE & RESILIENCE**



**DISASTERS**



**ECOLOGICAL CONSERVATION**



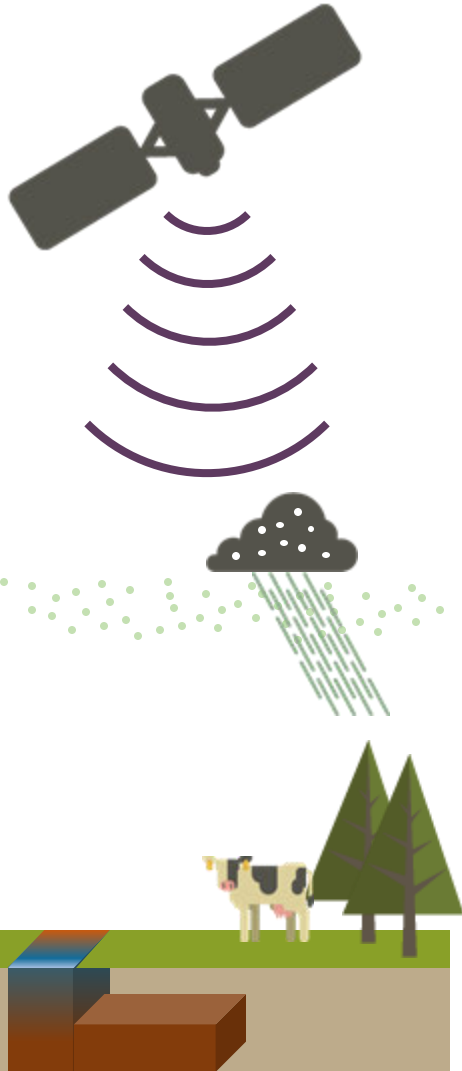
**HEALTH & AIR QUALITY**



**WATER RESOURCES**



# ARSET Trainings Are Designed to Meet Audience Knowledge Levels



## **Advanced**

Requires introductory or intermediate training or equivalent knowledge  
In-depth and highly focused topics  
*Tools for Analyzing NASA Air Quality Model Output*

## **Intermediate**

Requires introductory training or equivalent knowledge  
Covers specific applications  
*Introduction and Access to Global Air Quality Forecasting Data and Tools*

## **Introductory**

Requires fundamentals training or equivalent knowledge  
Covers broad applications  
*An Inside Look at How NASA Measures Air Pollution*

## **Fundamentals**

Assumes no prior knowledge of remote sensing  
*Fundamentals of Remote Sensing*



# Training Content

## Lectures

**What are Ecosystem Services?**

- Ecosystem services are the benefits people obtain from ecosystems.
- There is a wide range of conditions and processes through which natural ecosystems, and the species that are part of them, help sustain and fulfill human life.



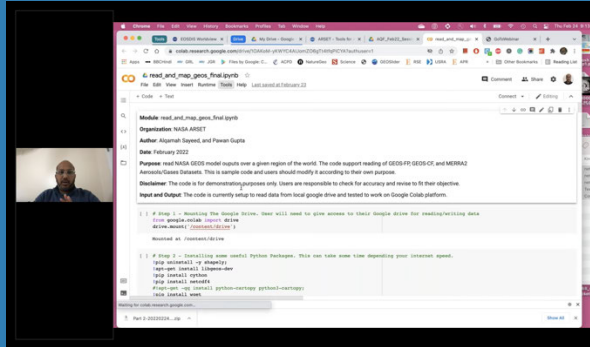
Image Credit: NOAA    Image Credit: Upalish    Image Credit: Science.com

NASA's Applied Remote Sensing Training Program


## Demonstrations



## Hands-on Exercises



## Homework



**Disaster Assessment Using Synthetic Aperture Radar**

This assignment includes questions from the 3 parts of the webinar series "Disaster Assessment Using Synthetic Aperture Radar". We recommend writing down your answers on a piece of paper or in a Word document before submitting. You will not be able to save your answers and complete this form at a later time.


To receive a course completion certificate, you must have attended all 3 live parts and completed this assignment by Nov. 17, 2022. When you submit the assignment, you will receive an email with a copy of your responses.

Once you click to submit, you can click "View Score" to see your results.

melanie.f.cook@gmail.com [Switch account](#)

\* Required

## Q&A



Evaluating Ecosystem Services with Remote Sensing  
August 23 - 30, 2022


**Questions & Answers Part 1**

Please type your questions in the Question Box. We will try our best to get to all your questions. If we don't, feel free to email Amber McCullum ([amberjean.mccullum@nasa.gov](mailto:amberjean.mccullum@nasa.gov)) or Juan Torres-Pérez ([juan.j.torresperez@nasa.gov](mailto:juan.j.torresperez@nasa.gov)).

**Question 1: What are the parameters to be used in assessing the Economic Ecosystem Service Valuation of a freshwater wetland?**

Answer 1: The variables you use will depend on your local study area and desired outcomes. Some that may be of interest are wetland extent and change, which can be


## Training Evaluation



**Climate Change Monitoring and Impacts Assessment using NASA Earth Observations (Pecora Symposium)**

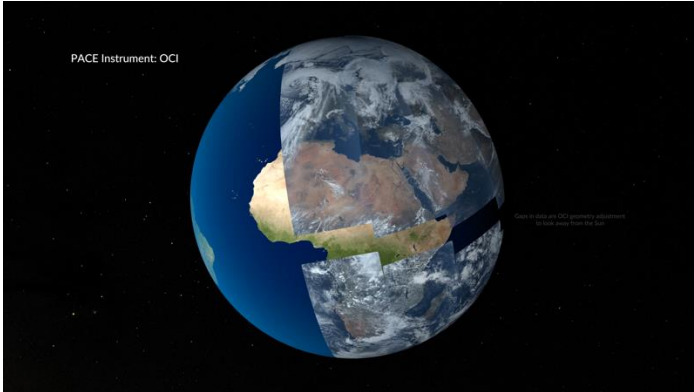
Thank you for taking part in this ARSET training! We welcome your constructive criticism and thoughtful responses to help us evaluate and improve the program. All responses are confidential, and participation is optional.

Thank you --  
The ARSET Training Team

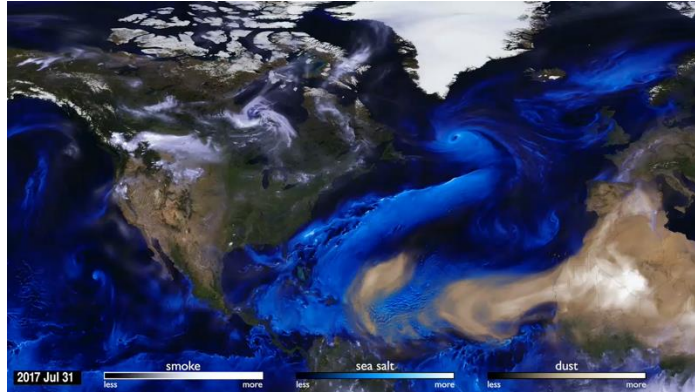




# ARSET Biodiversity Trainings



- Remote Sensing Basics
- Imagery
- Data Products
- Satellite Orbits and Observation Techniques
- Biodiversity Monitoring



- Spectral Indices
- Wildfires Detection and Monitoring
- Water Quality Analysis
- Satellite and Model Comparison



- How to Access Data
- Data Formats
- How to Visualize Data
- Tools for Data Analysis



# Remote Sensing of Coastal Ecosystems – Example of Introductory Training

**Water Quality Indicators Measurable from Satellite Sensors**

- Colored Dissolved Organic Matter (CDOM)
- Sea Surface Temperature (SST)
- Chlorophyll-a (phytoplankton)
- Salinity
- TSS (Total Suspended Solids) or Total Suspended Matter (TSM)
- Fluorescence Line Height
- Euphotic Depth

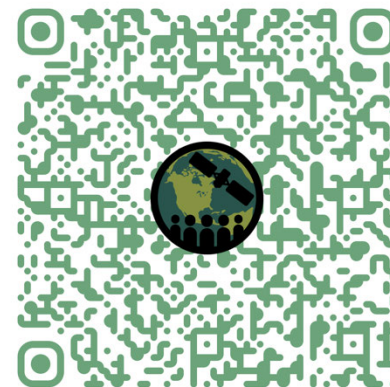
Tucuman Peninsula. Credit: GSFC.

NASA's Applied Remote Sensing Training Program

## Three Sessions

- How light attenuates in water?
- What are the main contributors to light attenuation in the water column?
- Which are some existing satellite sensors used for ocean color and shallow-water ecosystems analysis?
- Which methods can be used for shoreline beach analysis?

[English](#)



[Spanish](#)



# Monitoring Coastal and Estuarine Water Quality: Transition of MODIS to VIIRS – Example of Intermediate Training



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

Overview of Remote Sensing Observations for Water Quality Monitoring in Estuaries  
Amrita Mehta, Juan Torres-Pérez, Sean McCartney  
September 14, 2021



### Learn to Use MODIS and VIIRS Data for WQ Monitoring

#### Case Studies:

- Study Regions:
  - Chesapeake Bay
  - Río de la Plata
- Search and obtain MODIS and VIIRS Level-1 data from NASA Ocean Color Web
- Derive MODIS and VIIRS Level-2 data
  - Spectral Reflectance
  - Geophysical Parameters (e.g., sea surface temperature, chlorophyll-a concentration, attenuation coefficient)



Río de la Plata



Credit: NASA

NASA's Applied Remote Sensing Training Program

## Three Sessions

- Identify recent useful satellite data for water quality analysis
- Processing MODIS and VIIRS imagery using the SeaDAS platform (demonstration)
- Compare selected coastal or estuarine zones based on remotely-sensed water quality datasets (practical exercise)

### English



### Spanish



# Monitoring Coastal and Estuarine Water Quality: Transition of MODIS to VIIRS – Example of Intermediate Training



Demonstration of MODIS and VIIRS Water Quality Monitoring for the Chesapeake Bay and Rio de la Plata

[English](#)



[Spanish](#)





**Thank You!**

