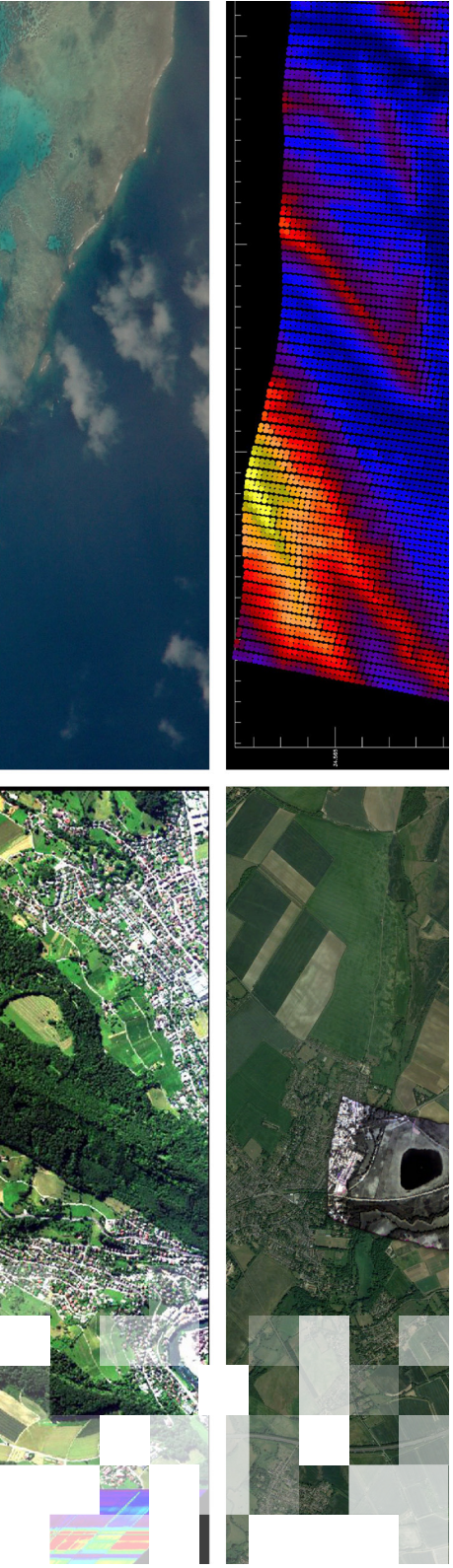


National Aeronautics and
Space Administration

Biodiversity Applications for Airborne Imaging Systems

March 27, 29 & April 3, 5, 2023

11:00-12:30 EDT (UTC-4)

Effective monitoring and management of critically important biodiverse ecosystems requires a comprehensive suite of data and analysis tools. The use of NASA Earth Observations (EO), in particular the combination of multispectral and hyperspectral optical imagery, thermal infrared data, and laser altimeter (LiDAR) data, can provide an increased understanding of ecosystem function. This training series will first highlight the use of hyperspectral visible to Shortwave Infrared (VSWIR) imaging spectroscopy data, for example from AVIRIS-NG and PRISM instruments, for measuring and monitoring terrestrial and aquatic biodiversity (e.g. mapping plant or phytoplankton functional types). Next, the series will focus on using thermal and LiDAR data for characterizing the structure and function of ecosystems including the Hyperspectral Thermal Emission Spectrometer (HyTES) and NASA's Land, Vegetation, and Ice Sensor (LVIS). This training will also prepare participants for the use of data from upcoming NASA satellite missions and airborne campaigns such as the anticipated Surface Biology and Geology (SBG) mission and the NASA Biodiversity-focused field campaign in the Greater Cape Floristic Region of South Africa (BioSCape).

Part 1: March 27th

Trainers: Amber McCullum, Juan L. Torres-Pérez, Britnay Beaudry

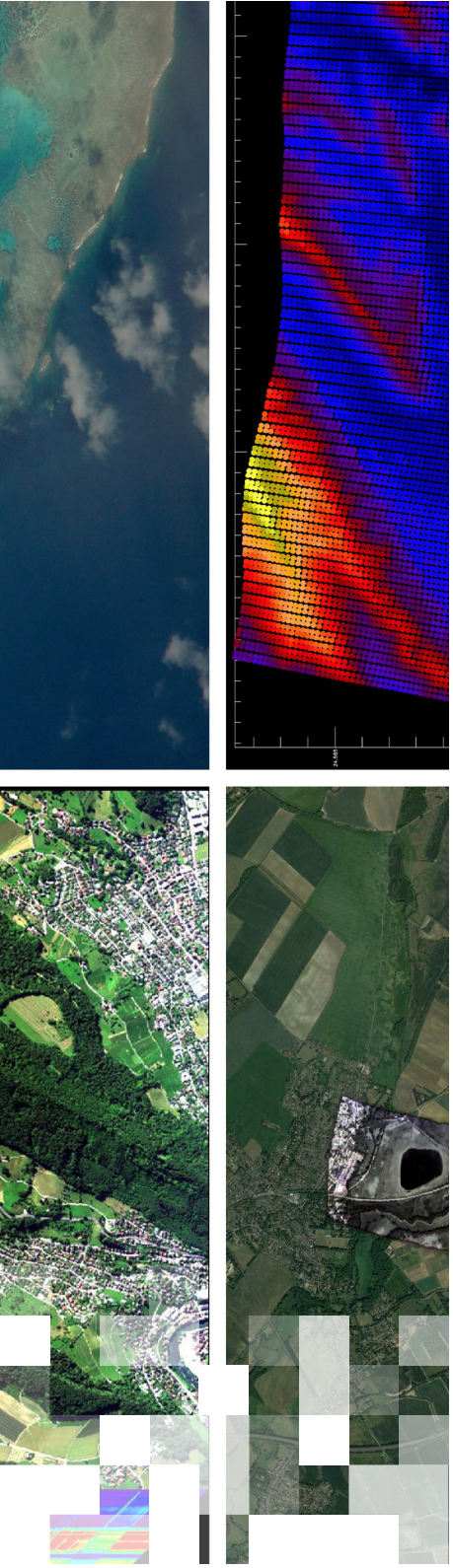
- Overview of hyperspectral visible to Shortwave Infrared (VSWIR) imaging spectroscopy data
- Highlight of hyperspectral instruments for measuring and monitoring terrestrial and aquatic biodiversity, such as AVIRIS-NG and PRISM
- Highlight upcoming mission development such as the Surface Geology and Biology (SBG) mission and the Plankton, Aerosol, Cloud, ocean Ecosystem (PACE) mission
- Q&A Session

Part 2: March 29th

Trainers: Amber McCullum, Juan L. Torres-Pérez, Britnay Beaudry

- Thermal and LiDAR data for characterizing the structure and function of ecosystems using airborne campaigns
- Highlight thermal and LiDAR missions such as the Hyperspectral Thermal Emission Spectrometer (HyTES) and NASA's Land, Vegetation, and Ice Sensor (LVIS)
- Highlight the upcoming NASA Biodiversity field campaign in the Greater Cape Floristic Region of South Africa (BioSCape)

ARSET empowers the global community through remote sensing training.



Part 3: April 3rd

Trainers: Amber McCullum, Juan L. Torres-Pérez, Britnay Beaudry

Guest Speakers: Atticus Stovall, University of Maryland/NASA Goddard Space Flight Center and Phil Townsend, University of Wisconsin–Madison

- Capturing the structural component of wetland biodiversity with airborne LiDAR with Atticus Stovall
- Assessing biodiversity with plant functional traits using hyperspectral visible to Shortwave Infrared (VSWIR) imaging spectroscopy data and LiDAR data
- Q&A Session

Part 4: April 5th

Trainers: Amber McCullum, Juan L. Torres-Pérez, Britnay Beaudry

Guest Speakers: Natasha Stavros, Director of the Earth Lab Analytics Hub, Cooperative Institute for Research in Environmental Studies (CIRES), University of Colorado Boulder and Liane Guild, NASA Ames Research Center

- Watershed scale monitoring of biodiversity at multiple scales using eDNA, remote sensing, and field sampling
  - Highlight of HyTES and AVIRIS-NG data and analogous satellite data from ECOSTRESS and EMIT
  - Overview of how spatial scale influences diversity metrics to inform how we can go from big data to manageable data
- Monitoring aquatic systems using imaging spectroscopy and airborne campaigns
  - Highlight of PRISM applications
  - Highlight of PACE preparatory data
- Q&A Session

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