DEVELOP National Program

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https://develop.larc.nasa.gov
https://develop.larc.nasa.gov/projects.php
Caribbean Oceans (2016 Spring DEVELOP California – Ames): Utilizing NASA Earth Observations to Detect, Monitor, and Respond to Unprecedented Levels of Sargassum in the Caribbean Sea

• Partners: Consorcio de Instituciones de Investigación Marina del Golfo de México y del Caribe (CiiMarGoMC); Regional Activity Center for Specially Protected Areas and Wildlife (SPAW-RAC); Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO); University of Puerto Rico, Department of Marine Sciences

• Video: https://www.youtube.com/watch?v=RO1lpzKCMrc&list=PLL8pCbx5gnDYax2OGc9XjIBlo6SeEUMhN&index=21

Related SDG: Goal 6, Goal 14
Related ILAC priority area: Water resources management

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• **Video:**
  [https://www.youtube.com/watch?v=0A6YwE0NrtE&list=PLL8pCbx5gnDYUM084cxFpmidjGJJ1b0wf&index=8](https://www.youtube.com/watch?v=0A6YwE0NrtE&list=PLL8pCbx5gnDYUM084cxFpmidjGJJ1b0wf&index=8)

Related SDG: Goal 6, Goal 14
Related ILAC priority area: Water resources management
Caribbean Oceans II
Investigating Inundation Events: A Study of Remote Sensing Techniques and Novel Data Sources for Sargassum Detection and Quantification in the Caribbean Sea

Jordan Ped
Maria Lopez-Peña
Emma Accorsi
A 2016 survey of 45 marine researchers showed that 80% (36/45) agreed that the amount of Sargassum in the Caribbean in 2015 was significantly higher than in previous years.
Objectives

Detect Sargassum

Compare Indices and Sensors

Asses accuracy of Instagram

Image Credit: Dr. Juan Torres-Perez
Data Acquisition I

Aqua MODIS

Terra MODIS

Landsat 8 OLI

GLOVIS
glovis.usgs.gov

Earth Explorer
everthexplorer.usgs.gov

Ocean Color Web
oceandata.sci.gsfc.nasa.gov
Data Acquisition II

Stakeholder and Community Survey:

- 45 responses
- Topics addressed: Sargassum sighting locations, 2015
  Sargassum levels, year-to-year differences, removal strategies, future research, Sargassum seasonality, environmental concerns
Data Acquisition II

What time of the year do you observe Sargassum?

Main categories of environmental problems caused by Sargassum influx

How is Sargassum most commonly removed from the shoreline?
Data Acquisition III

#Sargassum

Instagram
Methods Overview

- Imagery Analysis
  - Sargassum Identification
  - Pre-processing
  - Application of Indices

- Instagram Assessment
  - Database Geolocation
  - Accuracy Estimate
Methods: Image Analysis
Results: Image Analysis

MODIS FAI

Landsat True Color (RGB)

Landsat 8 FAI
Results: Image Analysis

Mona Island, Puerto Rico
21.55 mi²

29.59 mi of Sargassum
Methods: Instagram Assessment

Instagram Database

Totals:
- 103 Instagram reports
- 128 Landsat images
Results #Instagram

79% of images contained Sargassum

Impact of Landsat Flyover Date Difference on Accuracy of Instagram Reports

Relationship Between Number of Instagram Reports and Sargassum Presence

Number of Instagram Reports vs. Landsat Images Containing Sargassum (%)

Date Difference = Landsat Flyover Date - Instagram Report Date (Days)
Conclusions:

- NASA Earth Observations detect Sargassum in the Caribbean Sea
- Instagram can be used as a novel data source for hypothesis generation

#Sargassum
#SargassumSeaweed
Acknowledgements

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**Others**
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Questions?

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