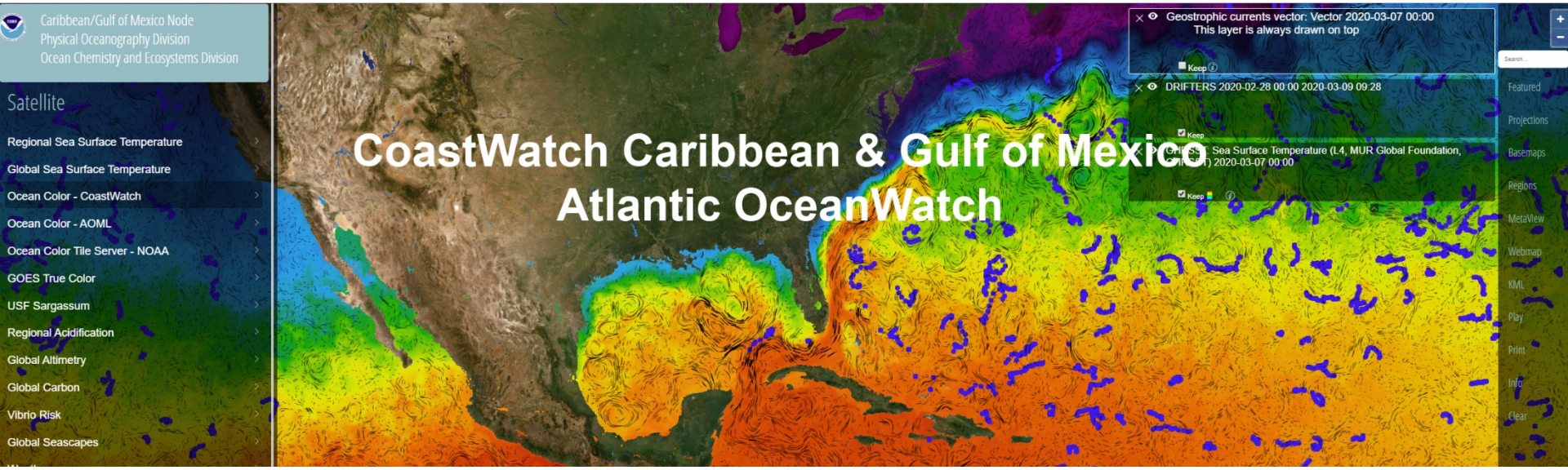


Joaquin A. Trinanes
Joaquin.Trinanes@noaa.gov

NOAA/AOML

- Mission statement
  - The Atlantic Oceanographic and Meteorological Laboratory conducts research to understand the physical, chemical, and biological characteristics and processes of the ocean and the atmosphere, both separately and as a coupled system. The principal focus of these investigations is to advance knowledge that leads to more accurate forecasting of severe storms, better use and management of marine resources, better understanding of the factors affecting both climate and environmental quality, and improved ocean and weather services for the nation.
- AOML is organized in 3 research divisions: Physical Oceanography (PhOD), Ocean Chemistry&Ecosystems (OCED) and Hurricane Research (HRD).
- AOML hosts the CoastWatch (CW) Caribbean and Gulf of Mexico, and the Atlantic OceanWatch (OW) nodes

CoastWatch/OceanWatch

- Mission statement
  - NOAA CoastWatch/OceanWatch provides easy access for everyone to global and regional satellite data products for use in understanding, managing and protecting ocean and coastal resources and for assessing impacts of environmental change in ecosystems, weather, and climate
- Managed by NOAA National Environmental Satellite Data and Information Service (NOAA/NESDIS).
- Two components: Central Operations and Regional Nodes.
- Central Operations, operated within NOAA NESDIS, coordinates the processing, delivery, quality control and storage of data products.
- Other NOAA line offices participate in the NOAA CoastWatch Program by hosting equipment and personnel.

Interests in Marine Debris

- Marine debris is one of the most widespread pollution problems facing the world's ocean.
- Huge amounts of plastic, metal, rubber, derelict fishing gear, and other lost or discarded items enter the ocean every day, negatively impacting the marine environment.
- Debris items can be carried far from their origin, which makes it difficult to determine exactly where an item entered the ocean.
- Depending on ocean currents, wind velocity, and object shape, weight, and buoyancy, marine debris could follow countless different trajectories and travel at different speeds.
- It is essential to understand the windage effects for different debris.
- Results can apply to many other applications (e.g. Sargassum forecasting, search&rescue, ocean pollution)

Activities Related to Marine Debris

- PhoD:
  - AOML hosts the Drifter Operations Center (DOC) and the Drifter Data Assembly Center (DAC) of the Global Drifter Program (GDP). They contribute to understand how the ocean transports properties, tracers and debris at 15m and at the surface.
  - Field experiments with GPS-tracked, undrogued buoys of varying shapes, simulating debris and Sargassum. This project will help us better understand the trajectories of floating debris, sargassum, and plankton including marine larva.
- CW/OW:
  - Real time monitoring of ocean currents
  - Prototype of web application for debris trajectory simulation under different windage scenarios.
- Collaboration with CARICOOS, IOCARIBE and SARGNET

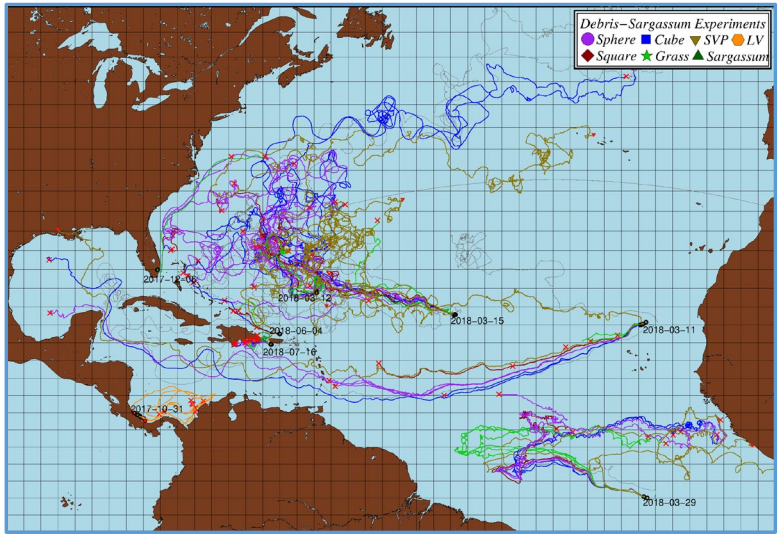
Activities Related to Marine Debris

- Key Publications:

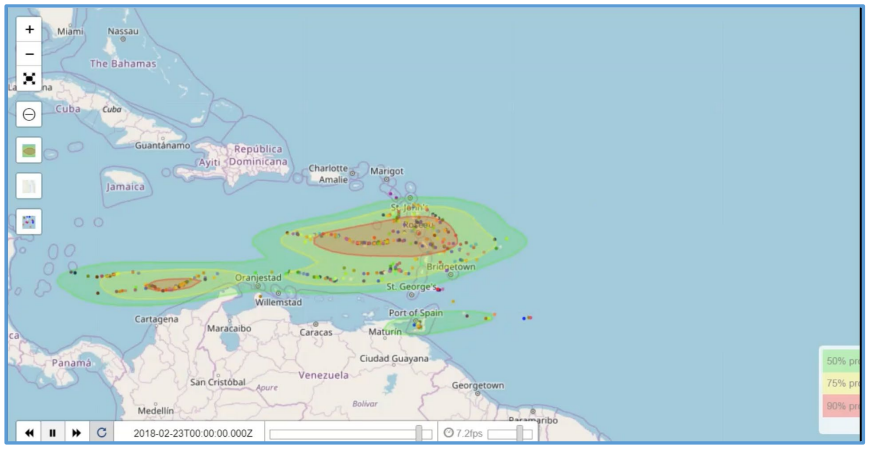
- Olascoaga, M.J., F.J. Beron-Vera, P. Miron, J. Trinanes, N.F. Putman, R. Lumpkin, and G.J. Goni. Observation and quantification of inertial effects on the drift of floating objects at the ocean surface. Physics of Fluids, 32(2):026601, https://doi.org/10.1063/1.5139045 2020
- Maximenko, N. et al. Towards the integrated marine debris observing system. Frontiers in Marine Science, 6:447, doi:10.3389/fmars.2019.00447 2019
- Duffy, J.E. et al. Toward a coordinated global observing system for seagrasses and marine macroalgae. Frontiers in Marine Science, 6:317, doi:10.3389/fmars.2019.00317 2019
- Putman, N.F., G.J. Goni, L.J. Gramer, C. Hu, E.M. Johns, J. Trinanes, and M. Wang. Simulating transport pathways of pelagic Sargassum from the equatorial Atlantic into the Caribbean Sea. Progress in Oceanography, 165:205-214, doi:10.1016/j.pocean.2018.06.009 2018
- Trinanes, J.A., M.J. Olascoaga, G.J. Goni, N.A. Maximenko, D.A. Griffin, and J. Hafner. Analysis of flight MH370 potential debris trajectories using ocean observations and numerical model results. Journal of Operational Oceanography, 9(2):126-138, doi:10.1080/1755876X.2016.1248149 2016
- Lumpkin, R. Global characteristics of coherent vortices from surface drifter trajectories. Journal of Geophysical Research-Oceans, 121(2):1306-1321, doi:10.1002/2015JC011435 2016
- Beron-Vera, F.J., M.J. Olascoaga, and R. Lumpkin. Inertia-induced accumulation of flotsam in the subtropical gyres. Geophysical Research Letters, 43(23):12,228-12,233, doi:10.1002/2016GL071443 2016

Resources/Expertise Available at NOAA/AOML

- Resources:
  - GDP: DAC&DOC and other components of the Global Ocean Observing System (including gliders) providing information about currents and winds.
  - Historical and operational satellite products



- Expertise
  - Remote Sensing and Algorithm Development
  - Operational Oceanography
  - Trajectory Modeling
  - Machine Learning and Data Management



Opportunities/Needs for Interagency Collaboration

- Resources:
  - Field Observations for validation purposes. We are creating a centralised database for Sargassum in-situ observations. They will serve to validate satellite products and forecasts.
  - High resolution (< 100m) satellite products
  - Migration to Cloud
- Expertise
  - Biological models
  - Coastal ecosystems
  - ML/AI
- Joint/coordinated activities
  - [Research] Integration of radar&optical sensors for oil spill and sargassum detection and tracking. Feature extraction using neural networks.
  - [Workshops/Meetings/Studies] Sargassum Inundation events
  - [International outreach] Training courses