



Partner

OSTST meeting, October 31 – November 4, 2022, Venice, Italy

Citizen science in FloatEco and GOSEA projects

2017-2022

Floating Ecosystem

<https://www.floateco.org/>

James Carlton
Luca Centurioni
Verena Hormann
Cathryn Murray
Gregory Ruiz
Andrey Shcherbina
Cynthia Wright

Nikolai Maximenko
Mary Crowley
Jan Hafner
Linsey Haram

2021-2023

Global Ocean Surface Ecosystem Alliance

<https://goseascience.org/>

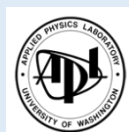
Lauren Biermann
Rebecca R. Helm
Justin Stopa
Davida Streett
Chela Zabin

**Multidisciplinary
cutting edge science**



**Unique opportunities
provided by citizen
scientists**

marine debris, pelagic ecosystem, ocean transport and phenomena, synergy of in situ reports,
satellite observations and modeling



Help from citizen scientists: instrument deployment

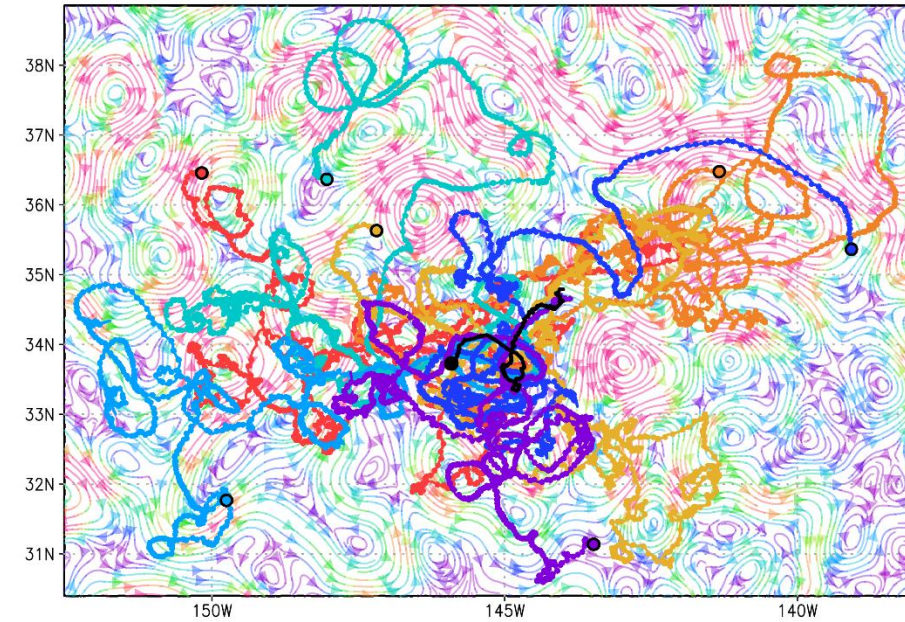
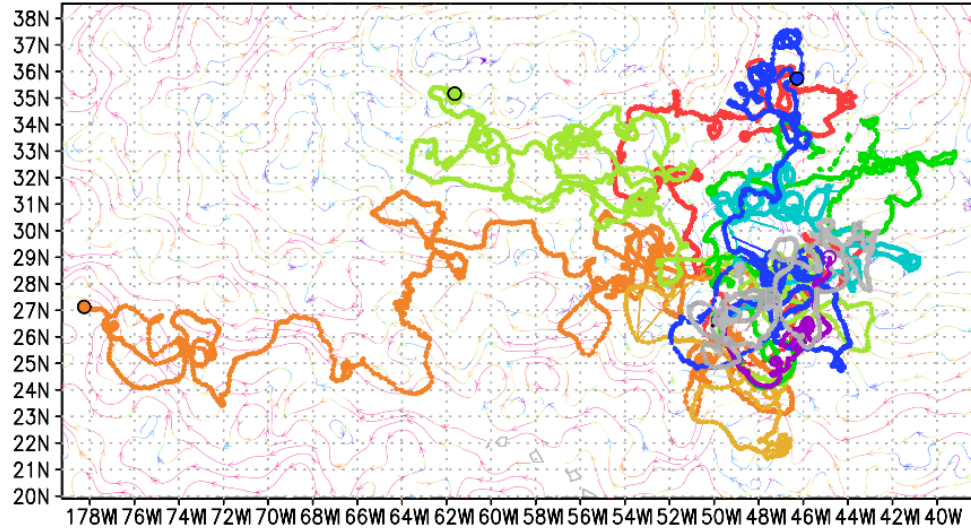
drifter
deployment



tagging
marine debris
with GPS
trackers



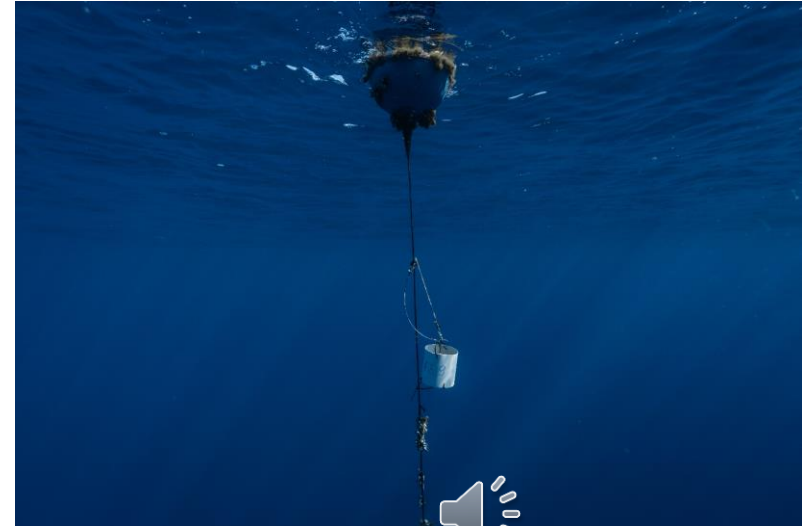
Outcome:



- Large collection of trajectories helped to understand movement of real debris items and
- its dependence on geometry .
- Drift model has been improved and used in cleanup operations.
- Paper in preparation. See Maximenko et al slides in the Forum.



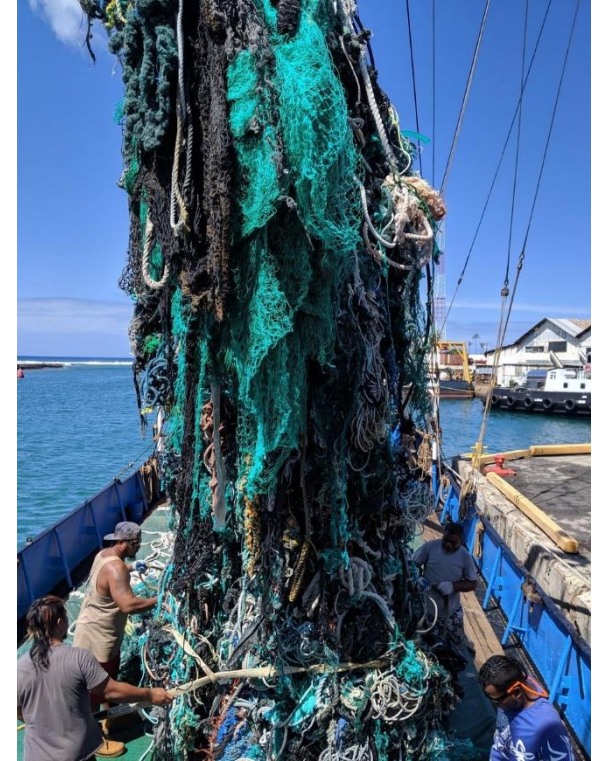
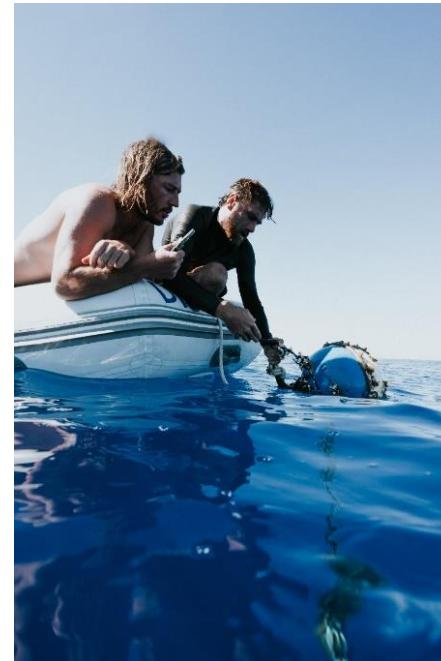
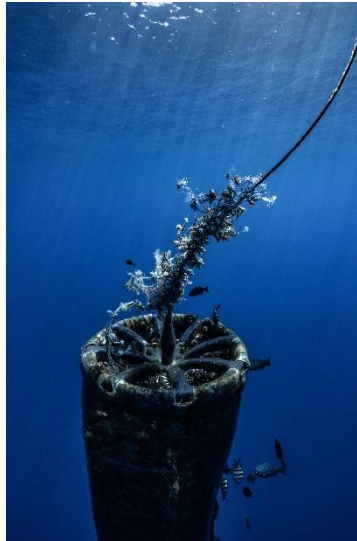
Help from citizen scientists: instrument inspection



Outcome: understanding rates of degradation and biological interactions, improved design

Help from citizen scientists: biological and debris samples

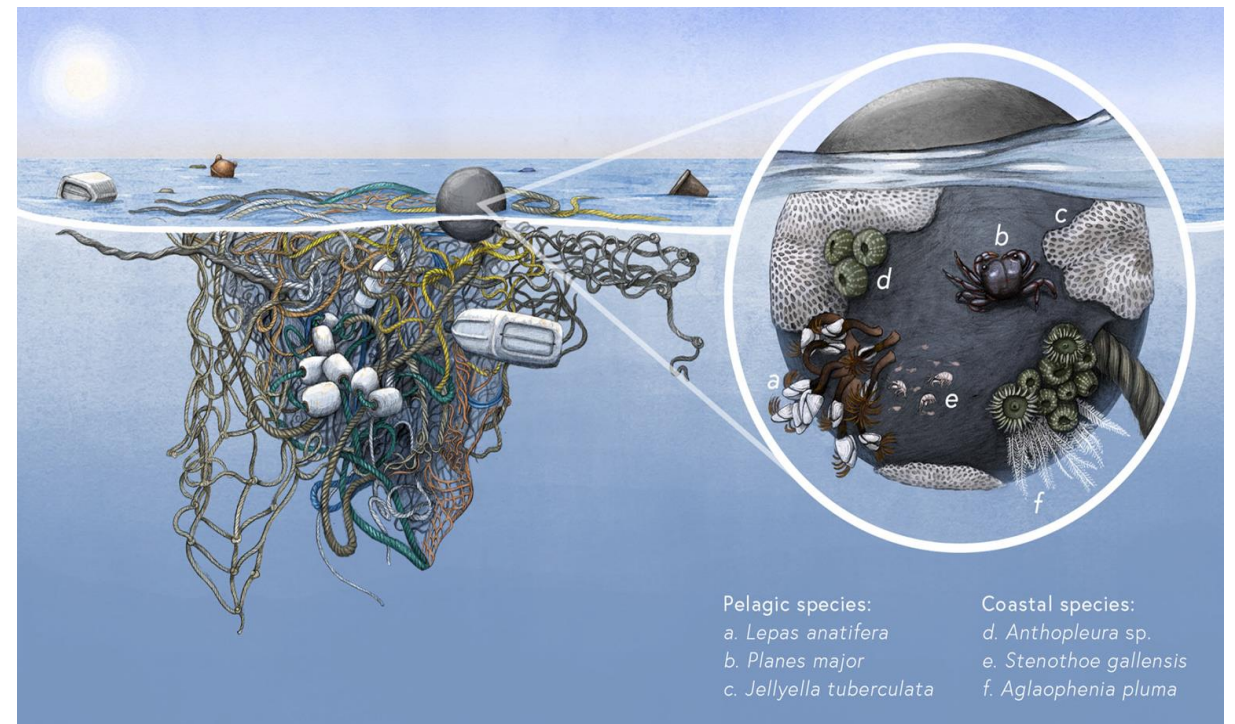
Photo: Ocean Voyages Institute



Outcome:

- Discovery of neopelagic ecosystem, developing on anthropogenic debris
- Publications in Nature Communications, Marine Pollution Bulletin, etc.

Coastal taxa found on 73% of pelagic debris



Haram et al., 2022

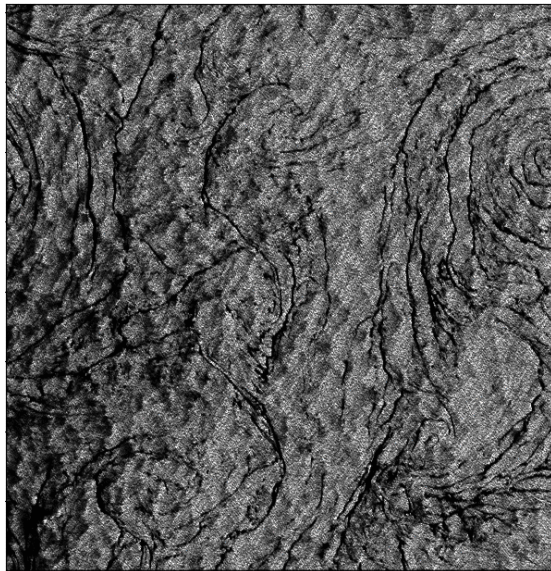
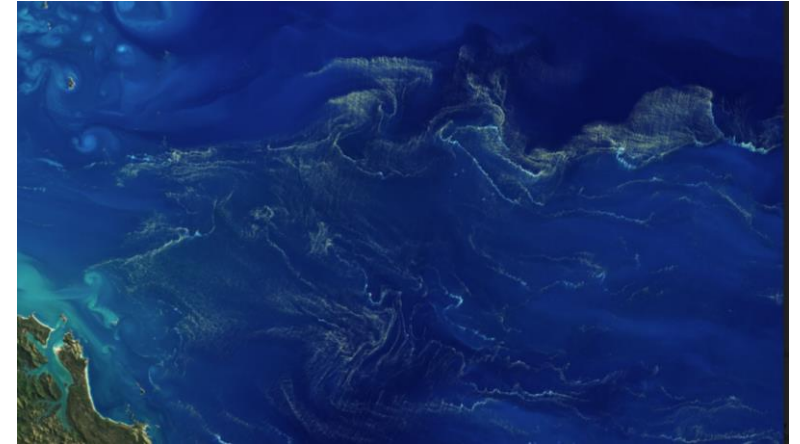


Help from citizen scientists: ocean surface observations

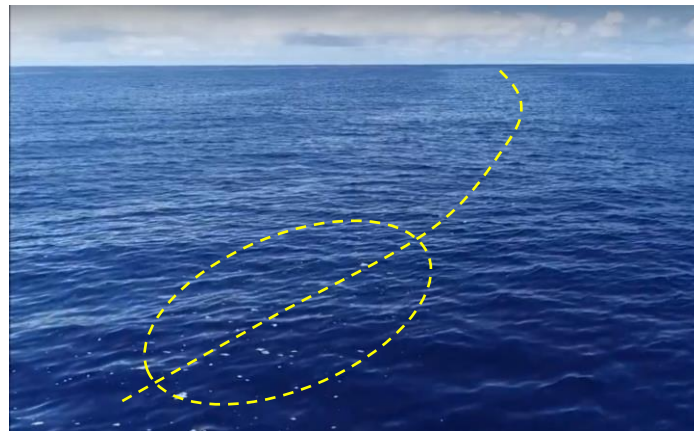
Bloom of *Trichodesmium* bacteria in ocean slick reported in Aug 2022 by SV Double Espresso



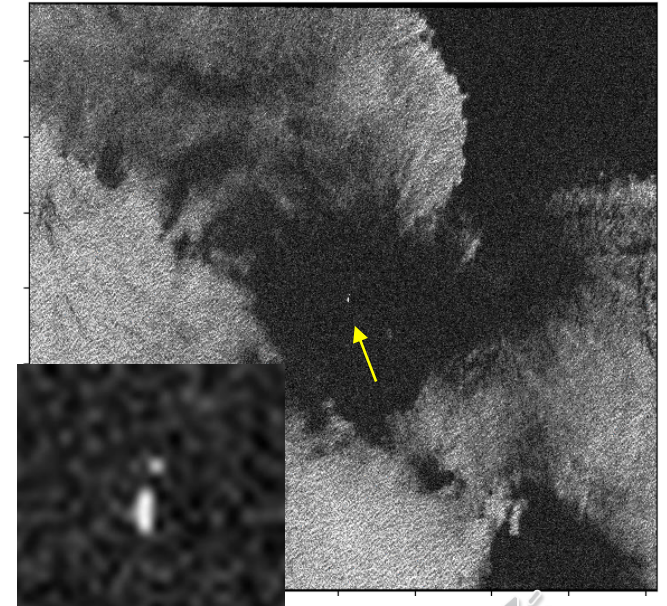
Example of SAR image of slicks



20 km



Microplastics in a slick, observed in August 2019 by Algalita



IAMOCAM boat on Sentinel 1A SAR image taken July 23, 2019

Work in progress

2022 Pacific Cup

61 participant boats

12 volunteer boats



Meeting with sailors



Cali



City Lights



Dogma



Double Espresso



Duende



Eskorin



Kynntana



Rage



Total Eclipse



Vera Cruz



Westerly



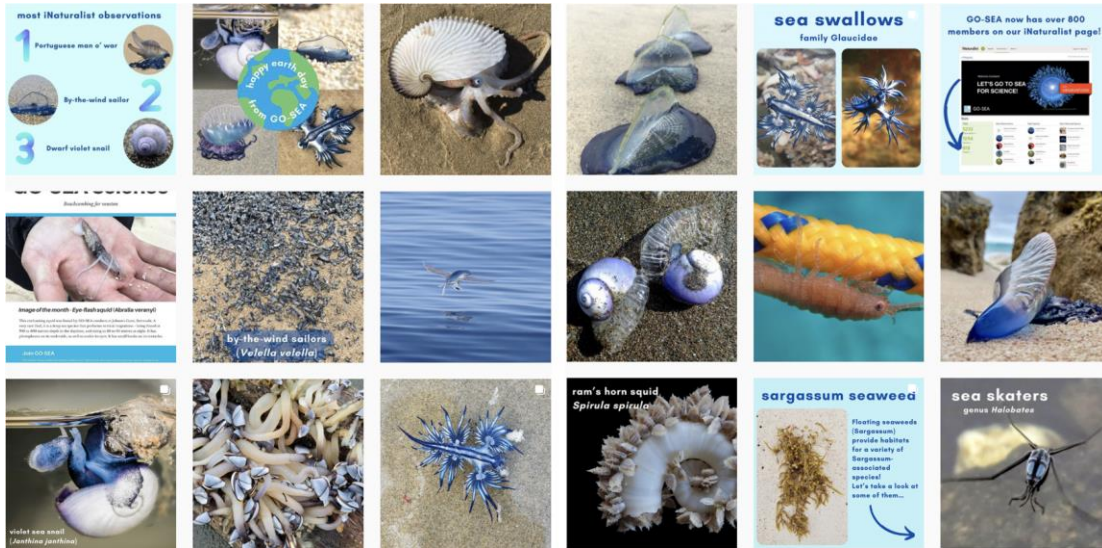
Zvi

Work in progress



Help from citizen scientists: extending coastal observations collected through iNaturalist into the open ocean

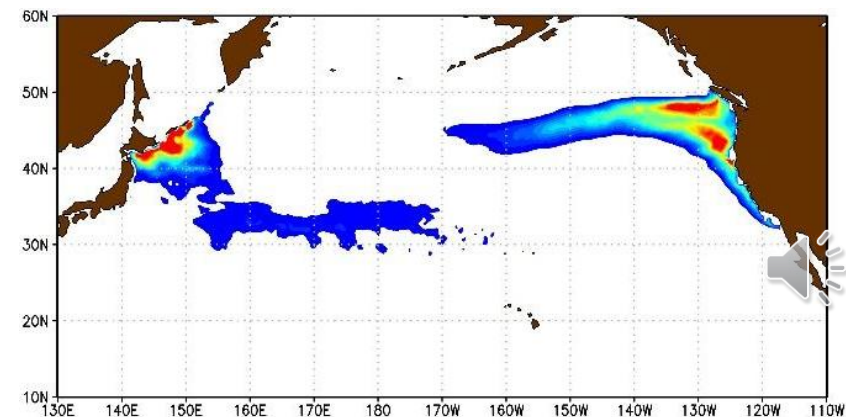
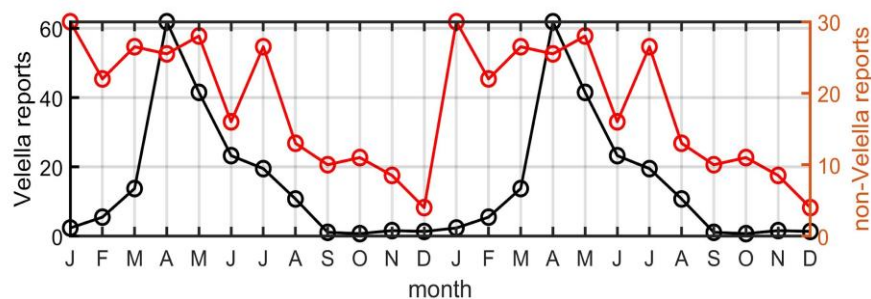
Examples of neustonic species reported by iNaturalist members



Coverage of reports

Model suggests origin of this *Velella* from the Okhotsk and Japan Seas

Seasonal cycle of *Velella* reports from the US West Coast



Conclusions:

- Scientific research can greatly benefit from the help of citizen scientists.
- Especially, in the areas where other resources are limited.
- “Citizen scientists” are also “voters”, funding agencies increasingly encourage collaborations.



Conclusions:

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 - Especially, in the areas where other resources are limited.
 - “Citizen scientists” are also “voters”, funding agencies increasingly encourage collaborations.
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- Yet, such collaborations often carry high level of risk and require significant effort.
 - Lots of work is needed to align interests and capabilities of researchers and volunteers and to create sustained and mutually rewarding system.



Thank you for your attention!

Acknowledgements:

- **Partial support from the NASA Biodiversity and Ecological Forecasting, Physical Oceanography, Ocean Surface Topography Science Team, and Citizen Science for Earth System Program**
- **Partnerships with and contributions from many NGO's, volunteers, and citizen scientists, including:** Ocean Voyages Institute and crew of SV Kwai and Machias, The Swim, Algalita Marine Research and Education Foundation, The Ocean Cleanup, eXXpedition, Sea Education Association, Greenpeace, Polynesian Voyaging Society, Figure 8 Voyage, 2021 Transpac, Rick Pelton S/V Anais, Ray McCormack S/V Firefly, Erden Eruc, Jim Linderman S/V Lyric, Russ Johnson S/V Blue Moon, Russ Lewis, John Anderson (Washington), Drew McWhirter (HPU), Jackie Lindsey, Julia Parrish (COASST, UW), Carl Berg (Surfrider Foundation, Kauai Chapter), Mark Manuel (NOAA MDP), Ruth Yender (NOAA), Scott Walker (Southeast Alaska), Ben Boulton (British Columbia), Crews of SV Lady Amber, Jolly Dogs, and Pilgrim Heart, 2022 Pacific Cup yacht crews, NWHI (Midway & Kure), Papahānaumokuākea Marine De
and many-many others...

