

Release of a Seaglider from an AutoNaut surface vehicle: demonstration mission in the Eurec4a project

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ERC advanced grant COMPASS has designed a way to carry and deploy a Seaglider into a remote, challenging or inaccessible location, such as the central Indian Ocean, or an Antarctic polynya. This will enable glider campaigns to be initiated cost-effectively and safely.

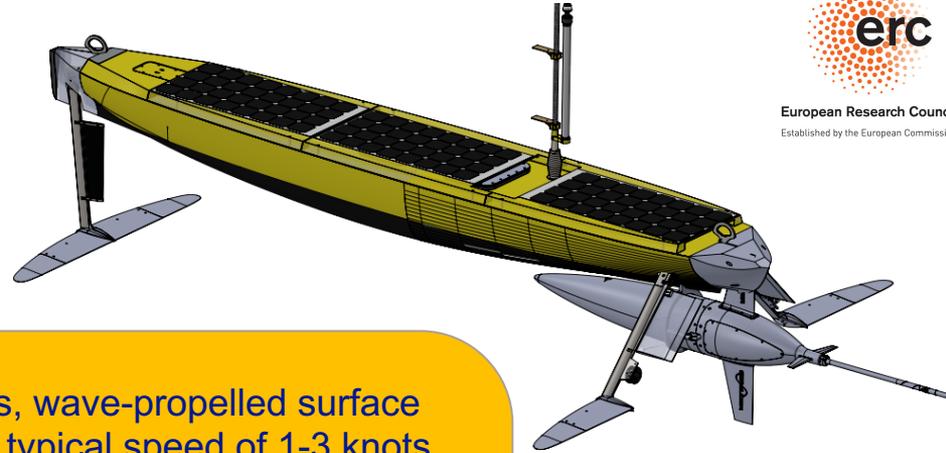


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Introducing *Caravela*, an AutoNaut designed to carry and release a Seaglider



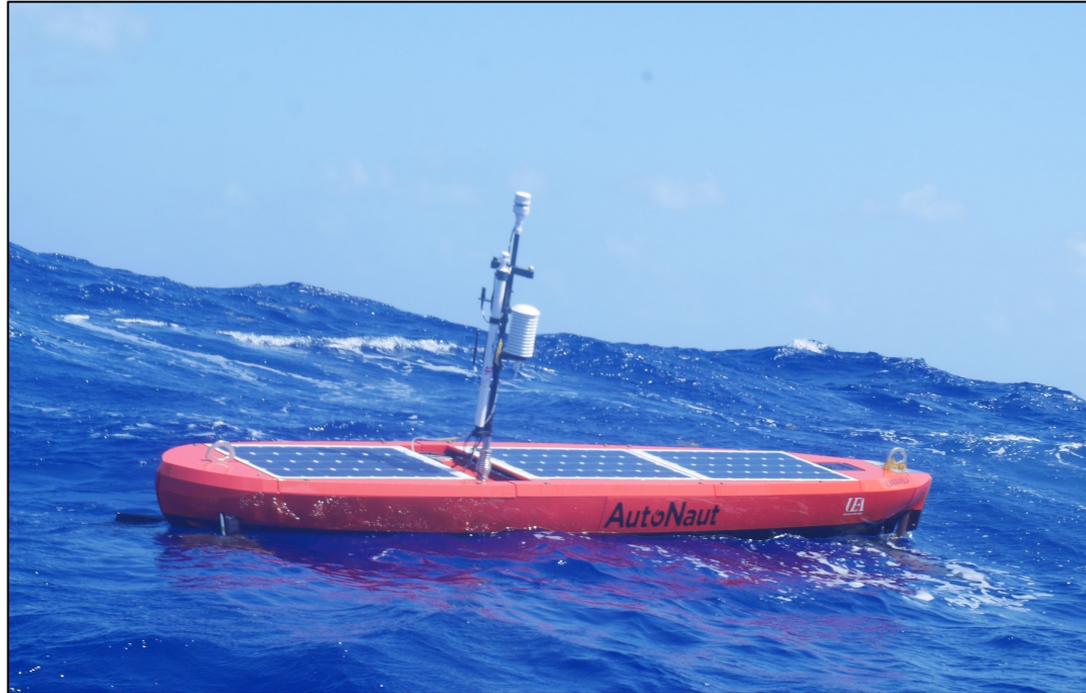
AutoNaut



- Autonomous, wave-propelled surface vehicle with typical speed of 1-3 knots ($0.5-1.5 \text{ m s}^{-1}$).
- Shallow draft so can be easily transported and deployed from a beach or a ship.
- Carries a range of solar-powered sensors for meteorology and oceanography.
- Designed to withstand heavy seas, self-righting, piloted using iridium.
- Has collision avoidance via AIS.

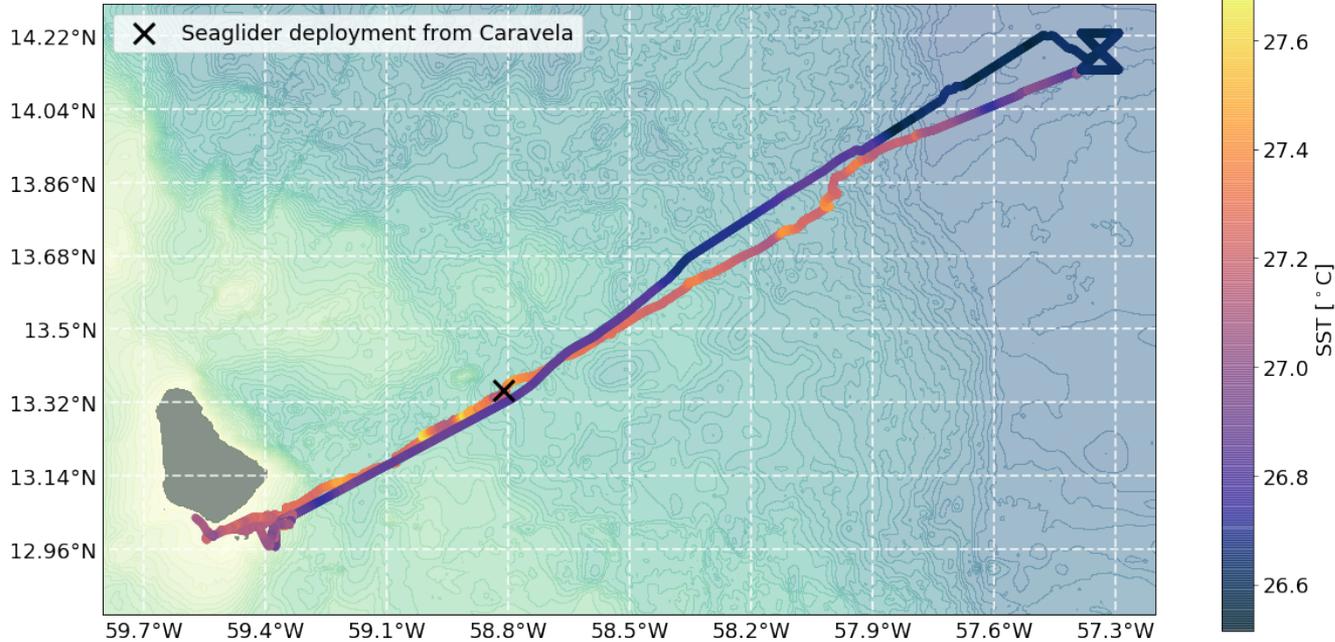
Caravela's science sensors

- AirMar 120 WX weather station for wind velocity and air temperature
- Vaisala PTB110 barometer for atmospheric pressure
- Rotronic HC2A - S3, Rotronic MP402H-082000, Rotronic AC1003 for air temperature and humidity



- Apogee CS301 pyranometer for shortwave radiation
- Apogee SL-510 for longwave radiation
- Valeport Mini CTD for sea surface temperature and salinity
- Nortek Signature 1000 ADCP for near surface current velocity

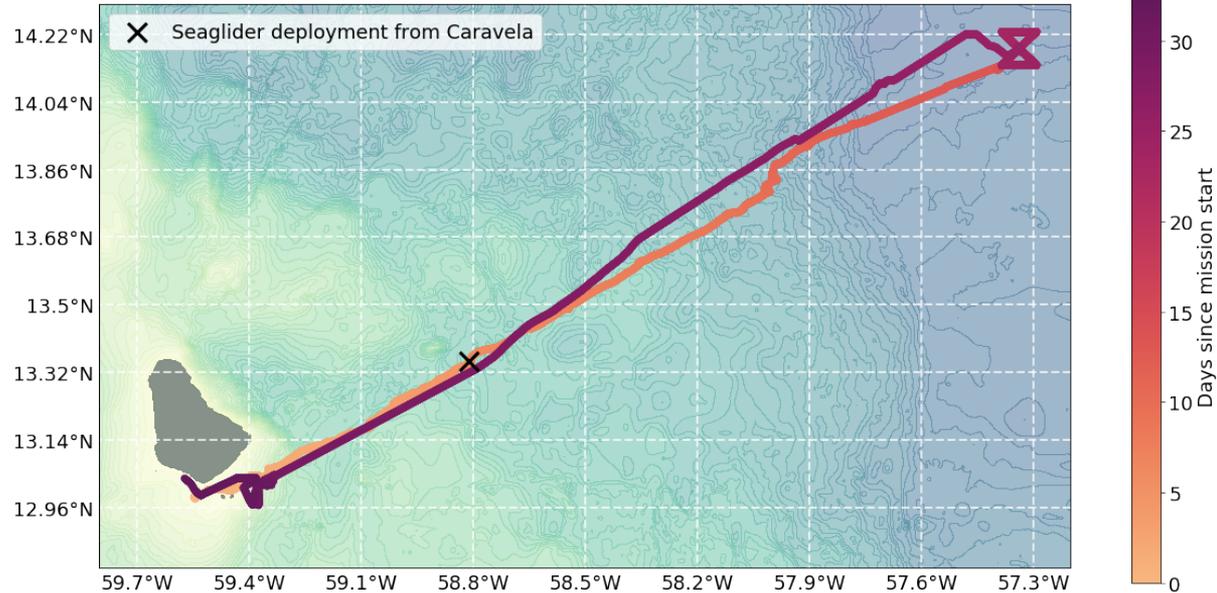
Powered by three 100 W rated solar panels charging four lithium ion batteries



- First science mission of *Caravela* in January-February 2020 with French-German project Eurec⁴a (eurec4a.eu) that included a wealth of atmospheric and oceanographic platforms, aircraft, ships etc.
- *Caravela* was launched from Barbados and carried Seaglider *Humpback*.
- *Humpback* was successfully released after 6 days, and both vehicles continued northeast together.
- After occupying a time series site, *Humpback* was recovered by RV Meteor and *Caravela* returned to Barbados.

AutoNaut

- 33 days total time of deployment
- 6 days carrying Seaglider
- 1300 km total distance travelled
- 150 km travelled carrying Seaglider
- 400 km repeating bow-tie pattern
- 0.49 m s⁻¹ mean speed over ground during deployment
- 0.34 m s⁻¹ mean speed carrying Seaglider





- *Caravela* and *Humpback* occupied a time series site to provide co-located atmospheric and oceanic measurements.
- The Seaglider measured hourly upper ocean (250 m) profiles of temperature, salinity, velocity, chlorophyll fluorescence and solar radiation.
- We will use the combined measurements to calculate air-sea heat and momentum fluxes and determine the upper ocean heat budget.

