

Air-sea interactions and autonomous vessels in the Tropical North Atlantic: Combining an AutoNaut and Seaglider for surface flux investigation.



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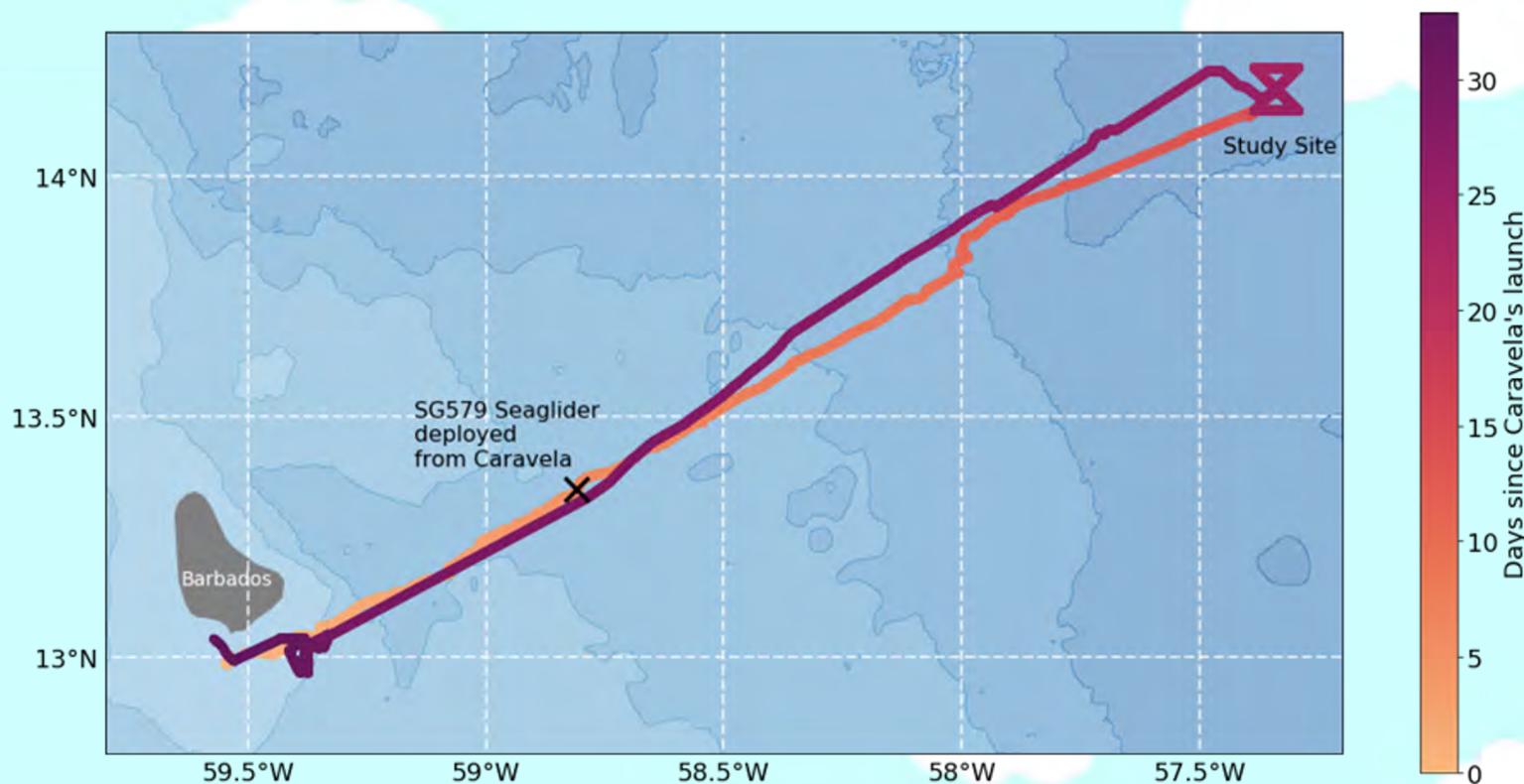
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1. The Campaign

Caravela travelled from Barbados to the study site and back over 33 days. This included 11 days occupying a 10 km wide hourglass shaped sampling pattern at the study site (upper right of figure).

Caravela travelled approximately 150 km before the Seaglider was released. This was earlier than first planned as *Caravela* was travelling slower than desired.

Track taken by *Caravela* during Eurec4a, coloured by days since launch. Bathymetry shown in blue from www.gebco.net/



This research was part of the wider Eurec4a campaign to study clouds, climate and circulation.

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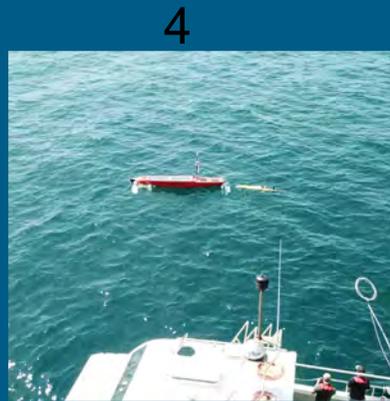
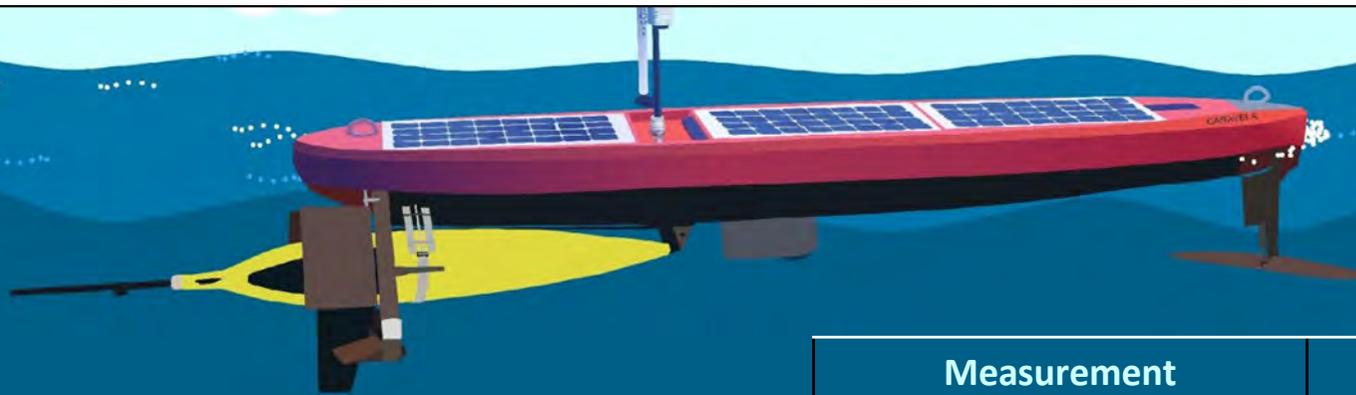
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2. The Equipment



Release of the Seaglider from *Caravela*

Measurement	Instrument on <i>Caravela</i>
Incoming shortwave radiation	Apogee SP-110 pyranometer
Incoming longwave radiation	Apogee SL-510 pyrgeometer
Near surface current velocity	Nortek Signature1000 ADCP
Sea surface temperature, Salinity	Valeport MiniCTD
Wind velocity, Air temperature	Airmar 120 WX weather station
Air temperature, Humidity	Rotronic HC2A - S3, Rotronic MP402H 082000, Rotronic AC1003

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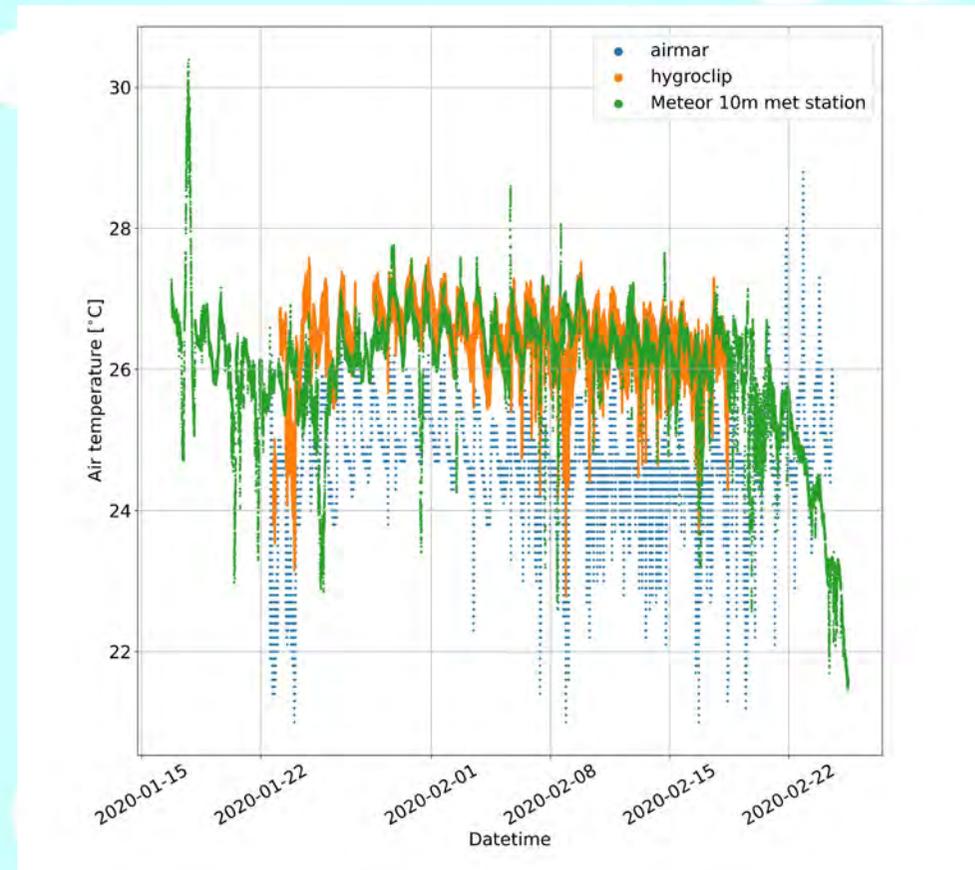
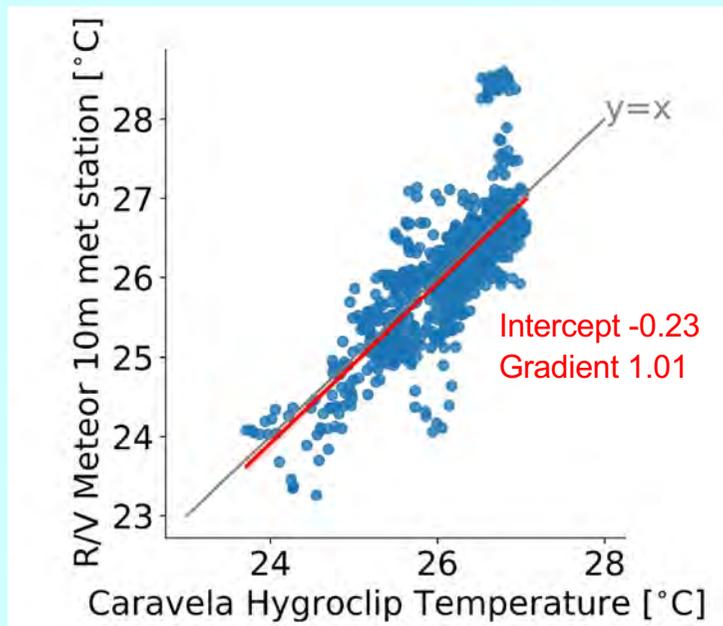
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3. Calibration of air temperature measurements from *Caravela*

The timeseries of air temperature from both *Caravela's* Hygroclip and Airmar, compared with a weather station on the R/V *Meteor* (right - timeseries) (left - correlation).

Based on this analysis, we have concluded that the Hygroclip provides the better air temperature measurement and does not require a correction. The Airmar air temperature will not be considered in further analysis.



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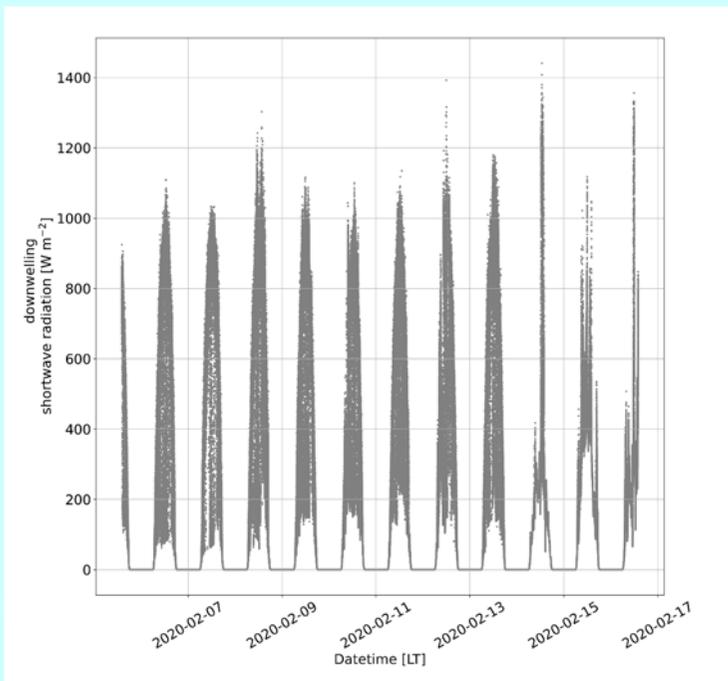
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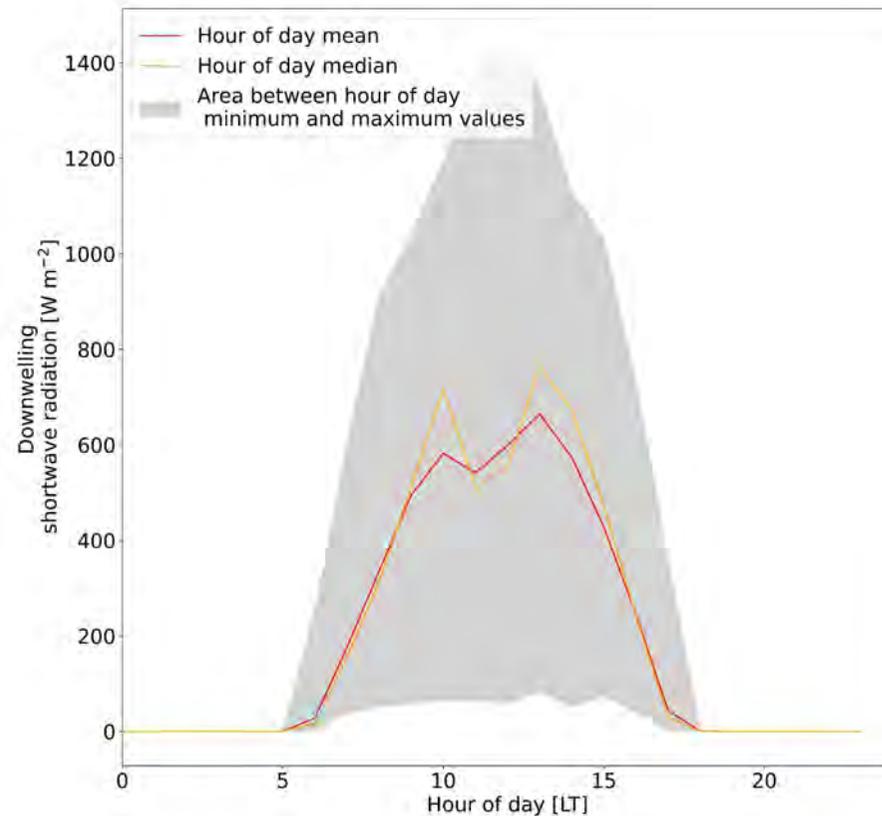
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4. Analysis of downwelling radiation

An overview of downwelling shortwave radiation [W m^{-2}] at the 10 km x 10 km study site, where LT represents local time (UTC - 4). There is large variation in the hourly averages. This is assumed to be predominantly due to changing cloud cover. Investigations are ongoing to consider the potential effect of mast shadowing on the data.



Downwelling shortwave radiation measured during *Caravela's* 11 days at the study site and averaged by hour of day (0-24).



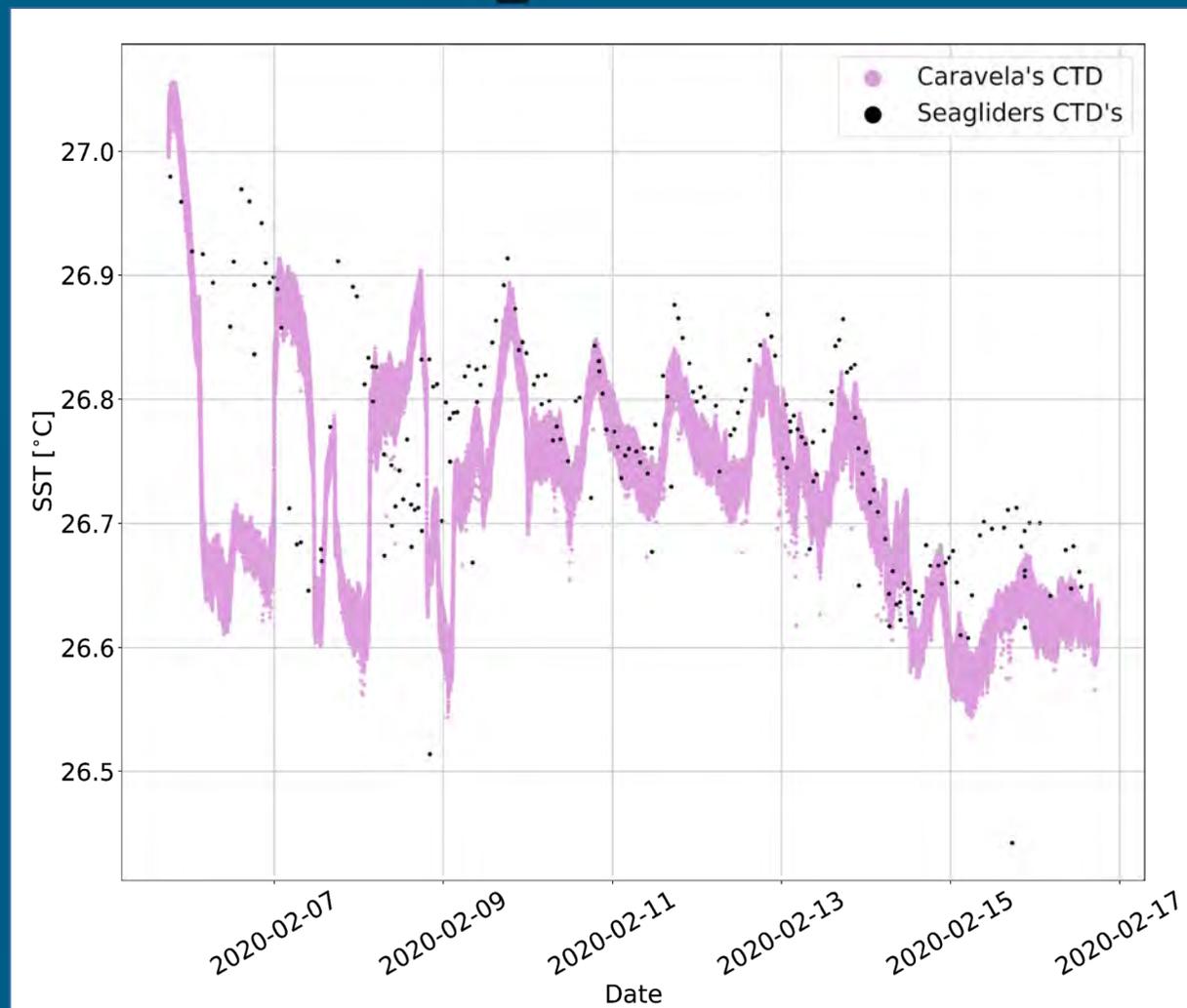
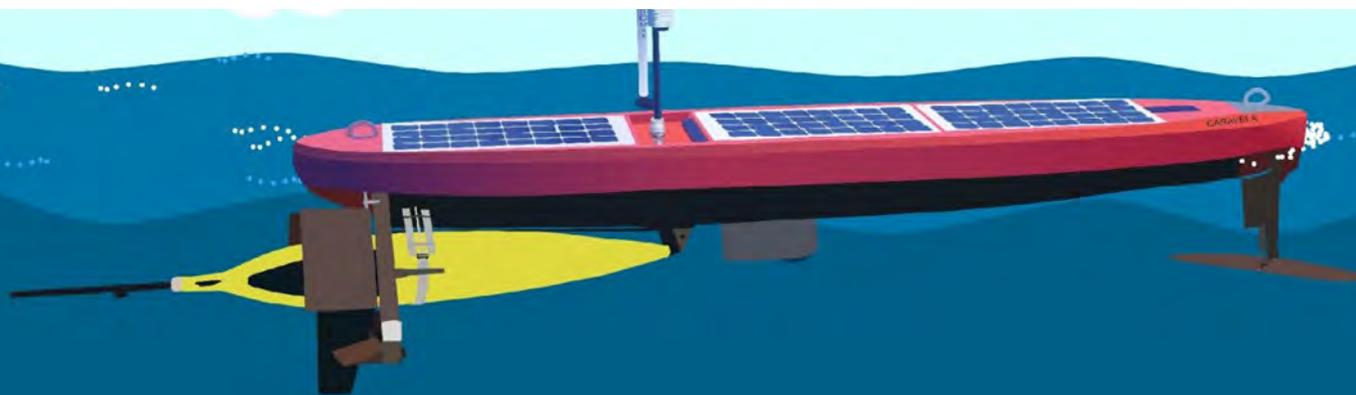
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Time series of sea surface temperature (SST) as measured by *Caravela* and the 3 Seagliders at the study site. Seaglider data uses the nearest to surface temperature measurement on the upcast of each dive.

Clear diurnal SST cycling is visible between 11-14 February. There is a small offset between the measurements during this time.

Concerns over flow rate whilst *Caravela* is at slow speeds has led us to change to a pumped CTD for future missions.

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Acknowledgments and References

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