

PML

Plymouth Marine
Laboratory

Listen to the ocean

Oceanographic measurements from surfers and satellites

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**National Centre for
Earth Observation**

NATURAL ENVIRONMENT RESEARCH COUNCIL

The coastal zone

↑ **Marine biodiversity**

Tittensor et al. 2010 Nature

↑ **Vulnerability**

Jickells (1998) Science

↑ **Economic value**

Costanza et al. (1999,2010)

Nature, Global Environ. Chang.

↑ **Variability** (temporal and spatial)

↑ **Challenging to sample**

Davidson et al. (2007) Coast. Eng. J.



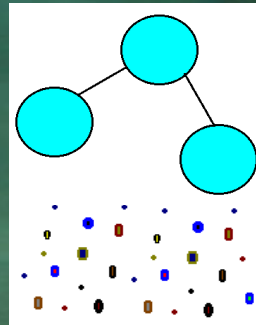
Land
contamination
and adjacency



Dissolved
Organic
Matter



Water complexity

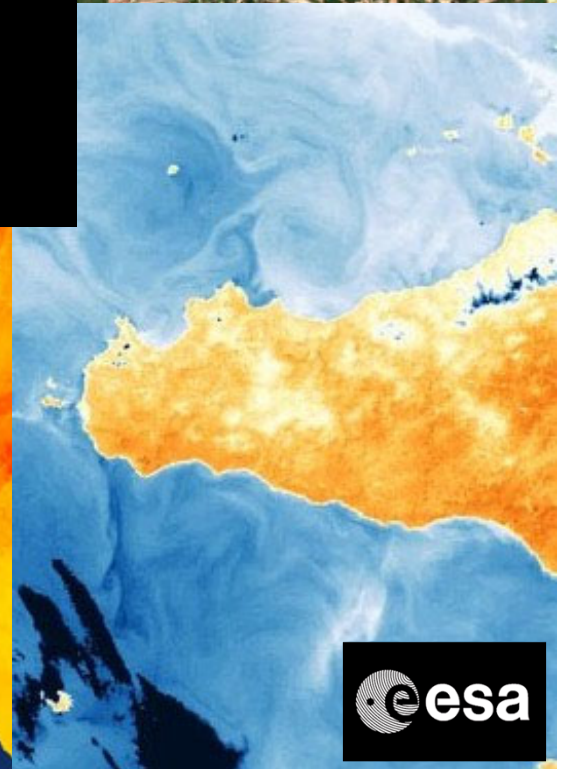
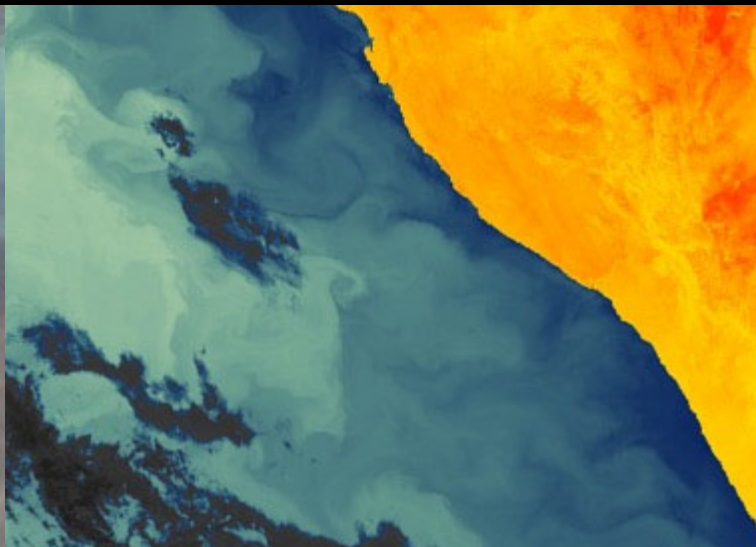


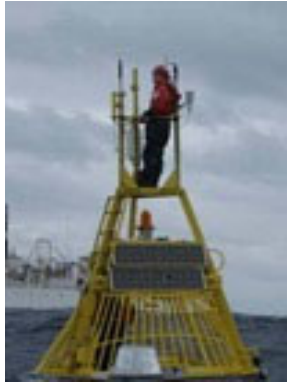
Coastal aerosols



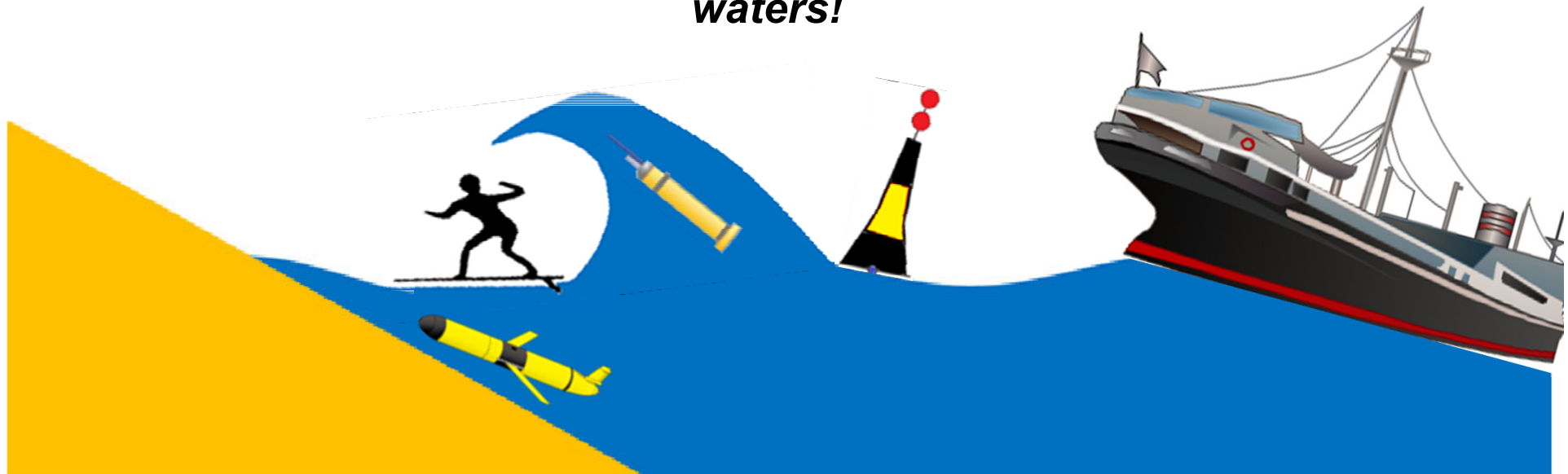
Clouds

***In situ* data essential to
determine accuracy and
precision of satellite data
(ground truth)!**





New solutions are needed to improve in situ data collection in nearshore coastal waters!







Wright et al. (2016)
Scientific Reports
Egi et al (2018)
Appl. Sci.

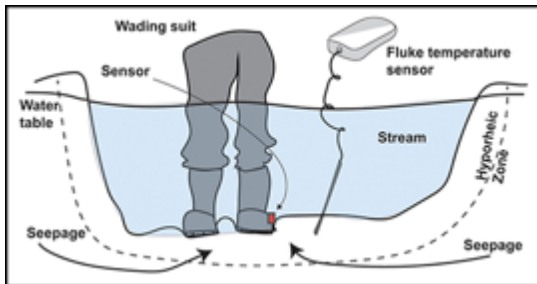


Bresnahan et al. (2016)
Methods in Oceanogr.



Brewin et al. (2015) *PLoS One*

<https://smartfin.org/>



Hut et al. (2016)
Geosci. Instrum. Method. Data Syst.

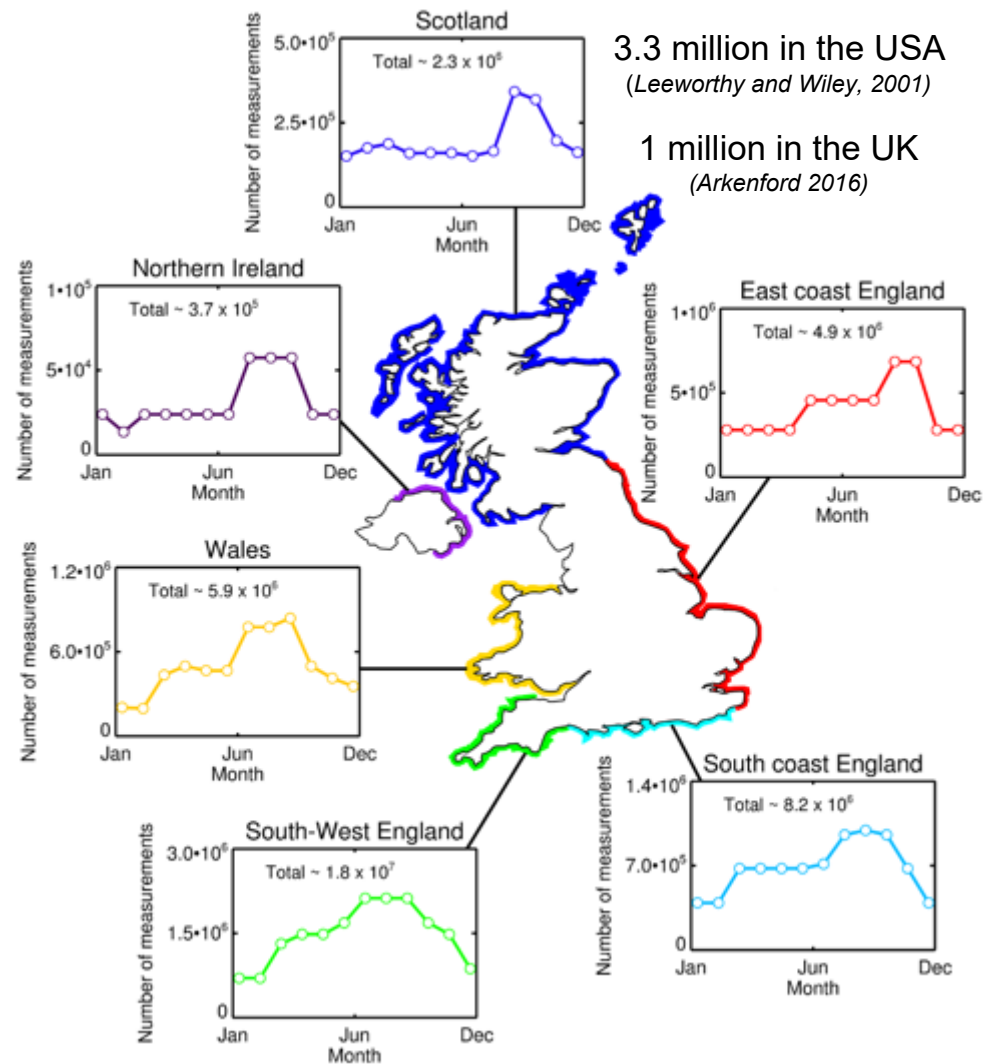
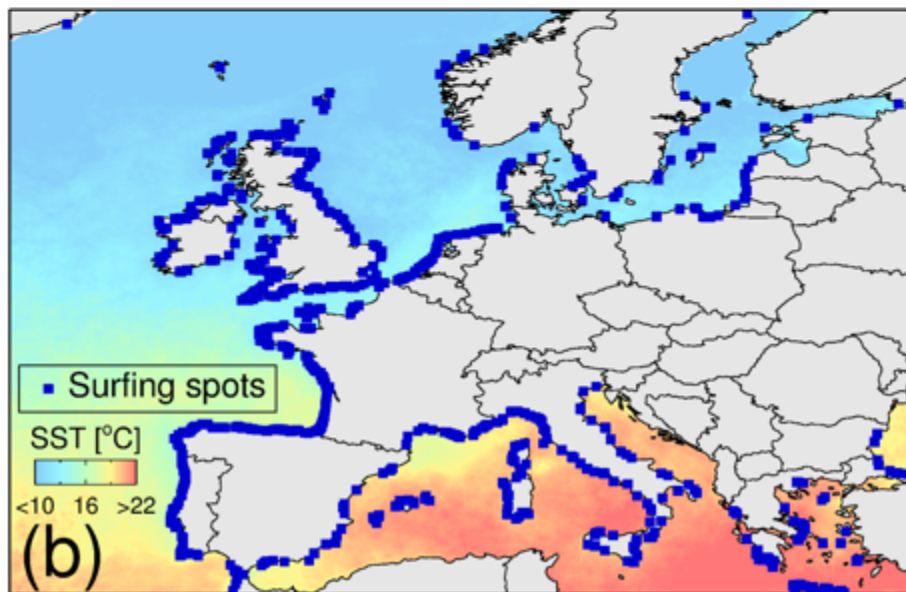
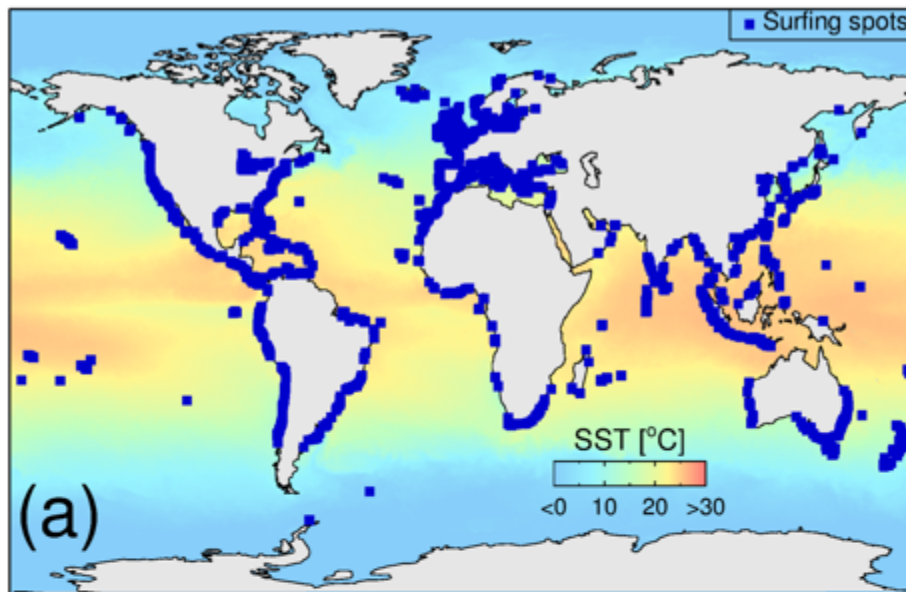


Brewin et al. (2017) *Frontiers in Marine Science*

35 million surfers globally
(*The Economist*, 2012)

3.3 million in the USA
(*Leeworthy and Wiley*, 2001)

1 million in the UK
(*Arkenford* 2016)



Brewin et al. (2015) PLoS One

Brewin et al. (2017) Frontiers in Marine Science

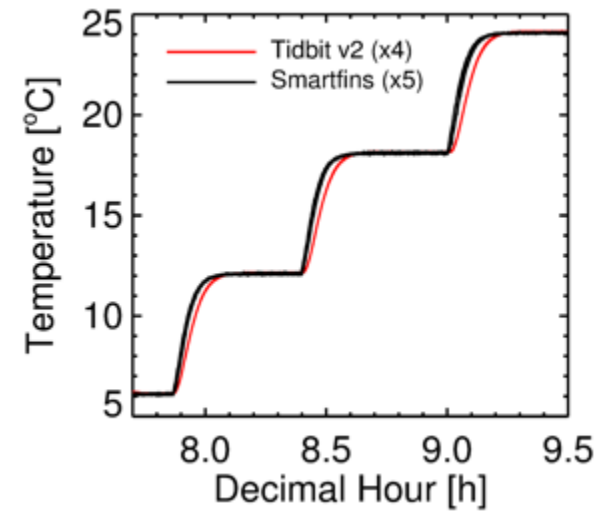
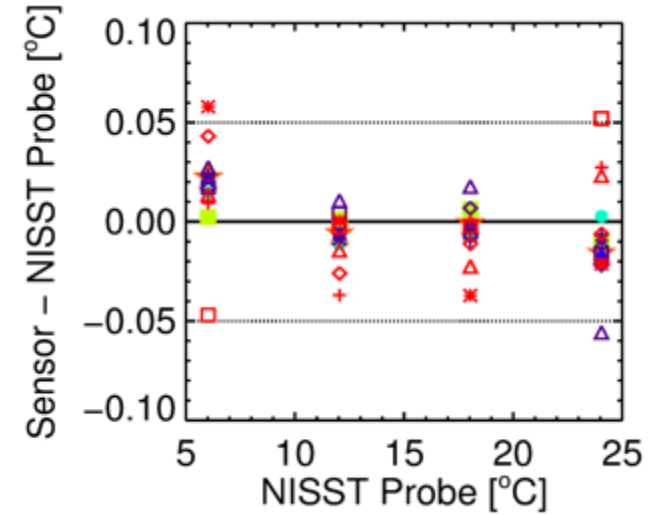
Laboratory



Brewin et al. (2015) PLoS One



<https://smartfin.org/>



Brewin et al. (In Prep)

Evaluating the surfing sensors

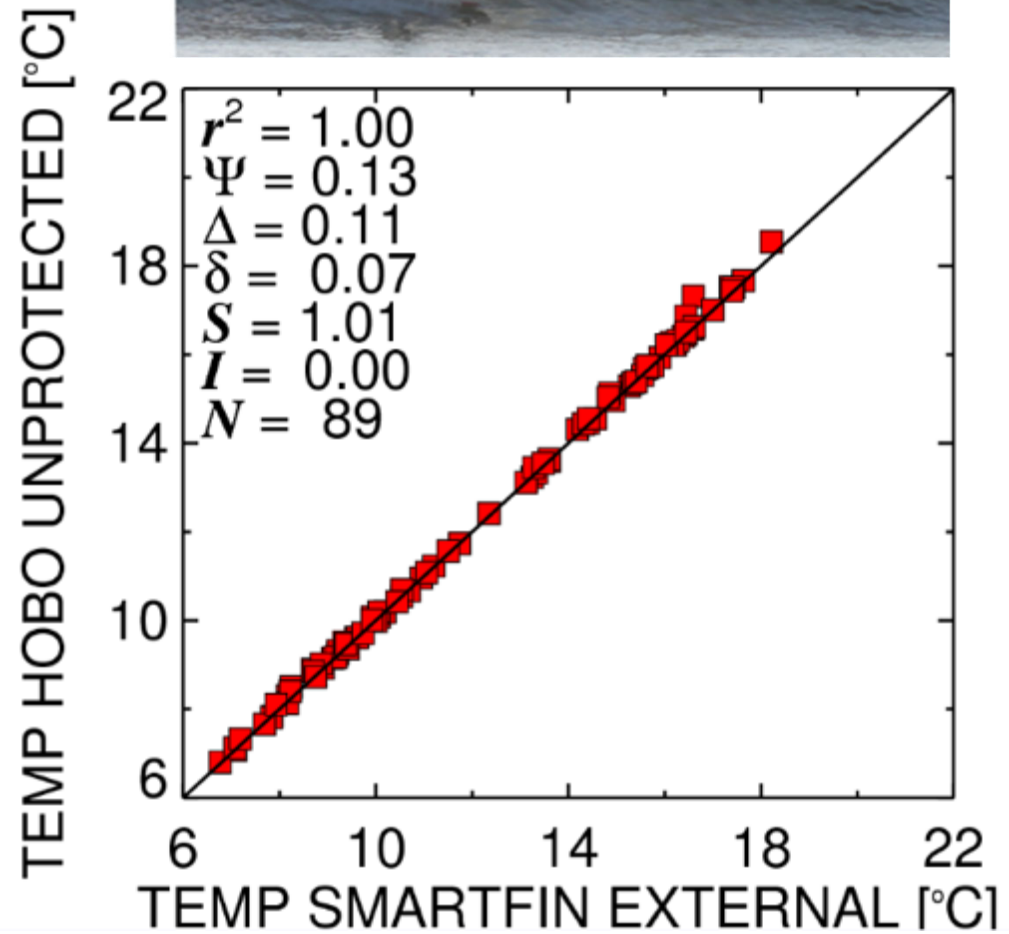


Brewin et al. (2015) PloS One



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Field



Brewin et al. (In Prep)

Evaluating the surfing sensors

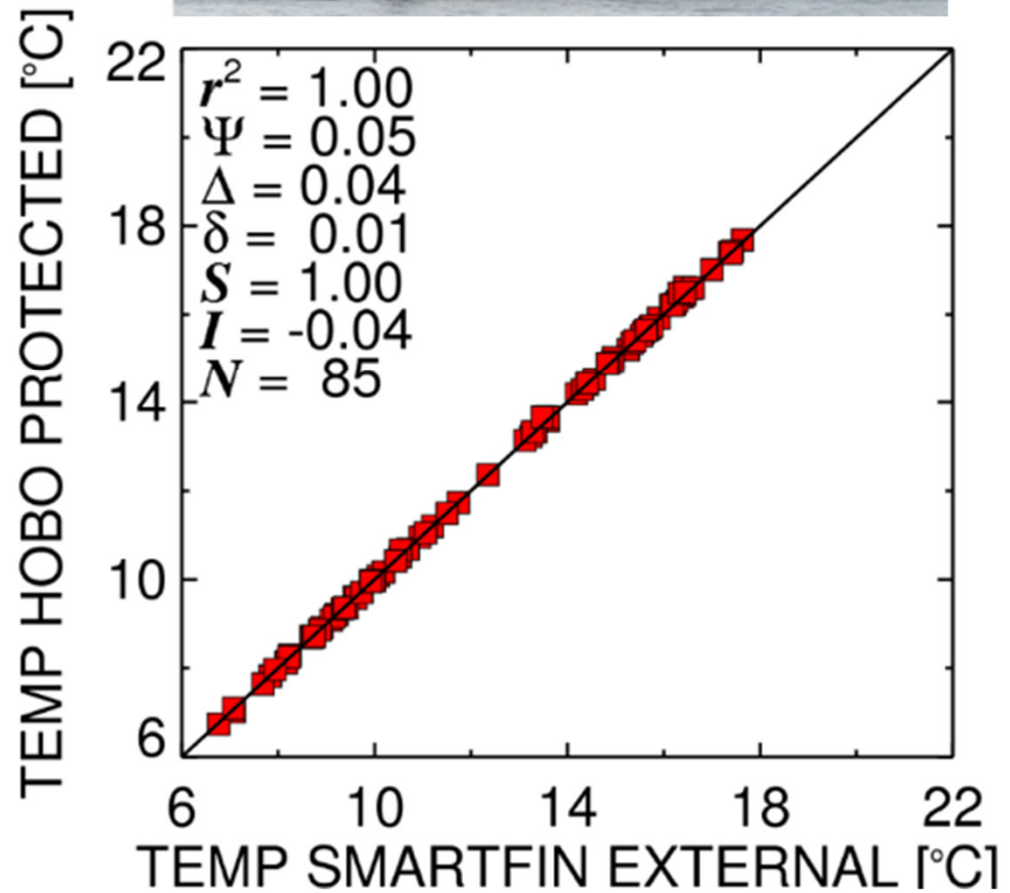


Brewin et al. (2015) PloS One



<https://smartfin.org/>

Field

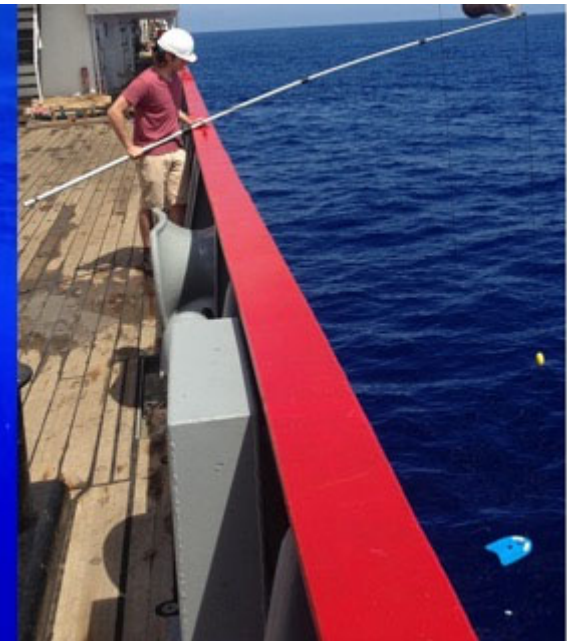
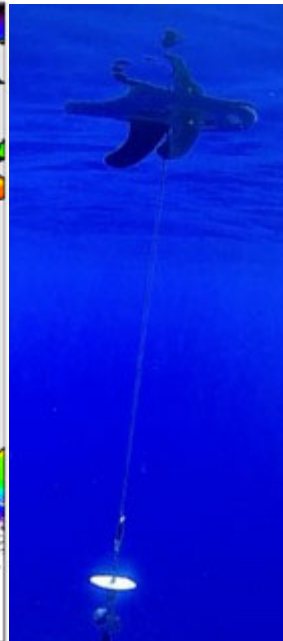
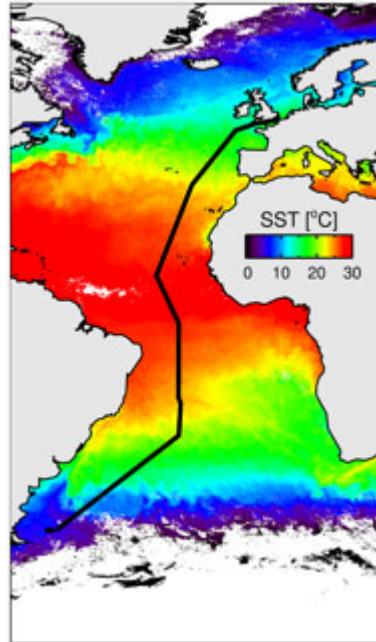


Brewin et al. (In Prep)

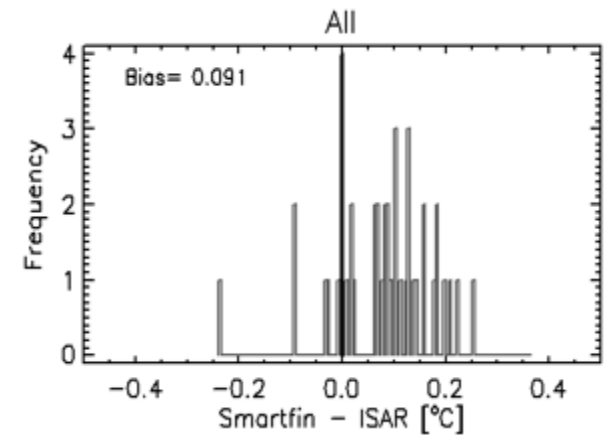
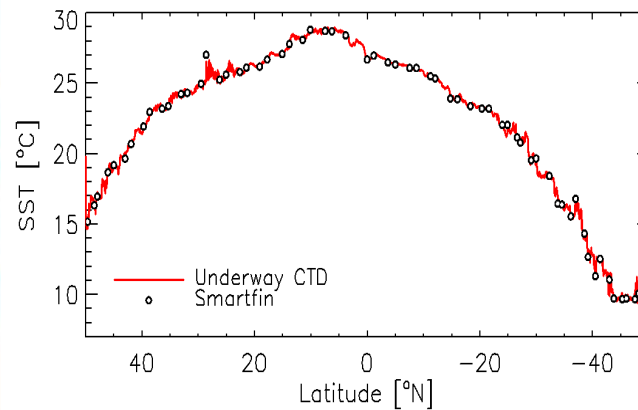
Field



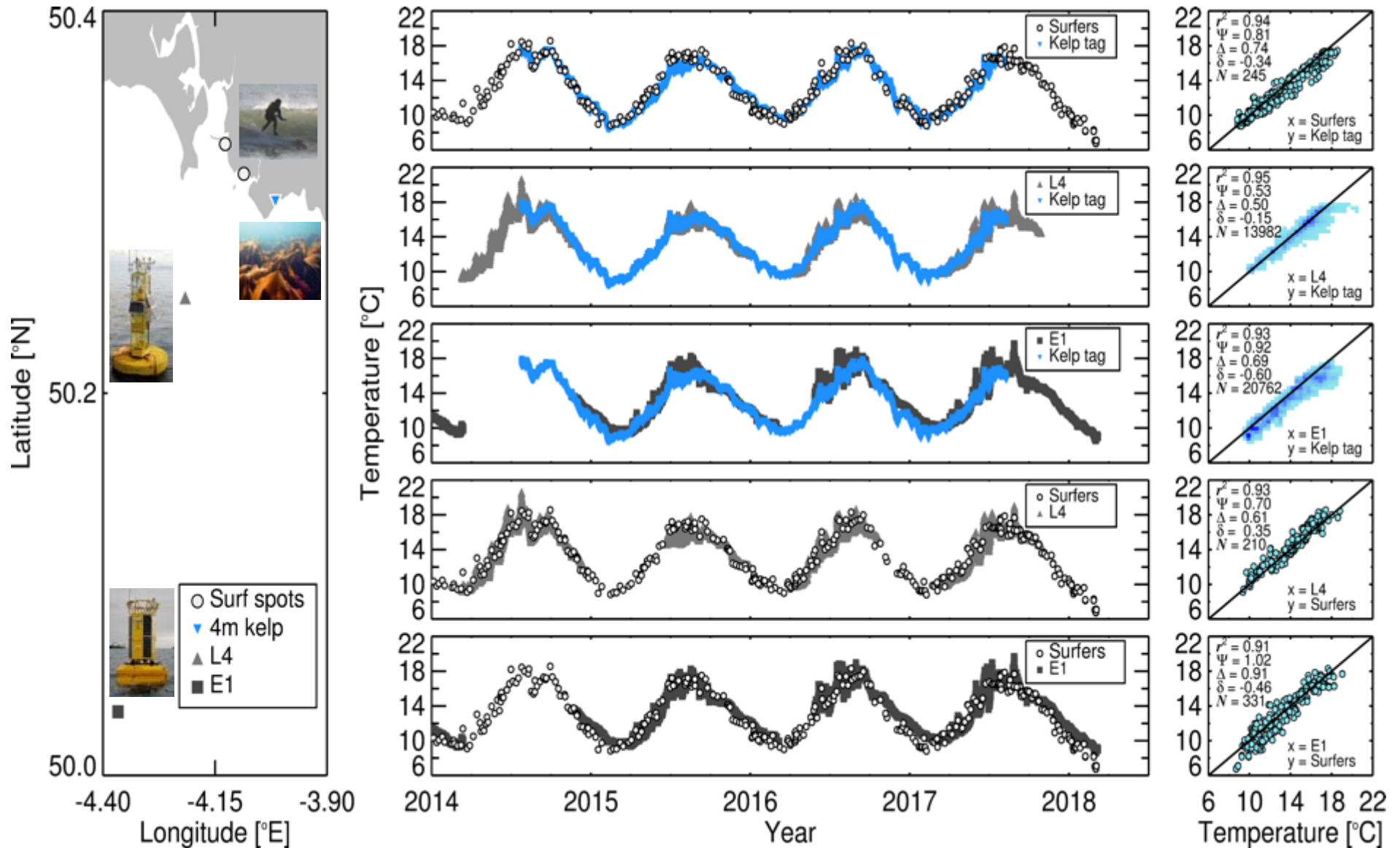
Donlon et al. (2018) JAOT



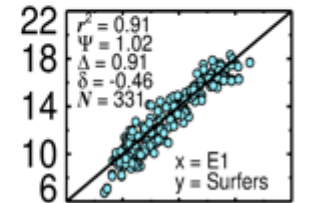
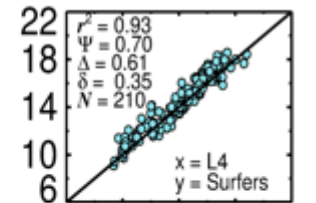
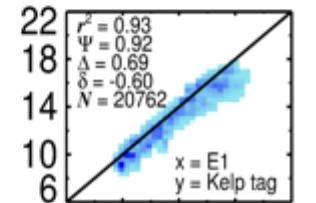
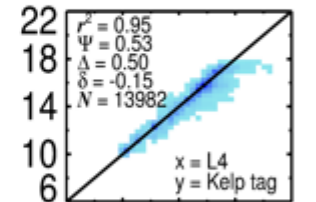
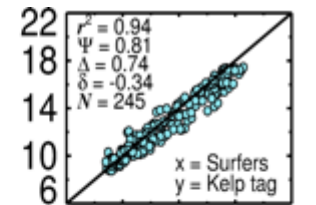
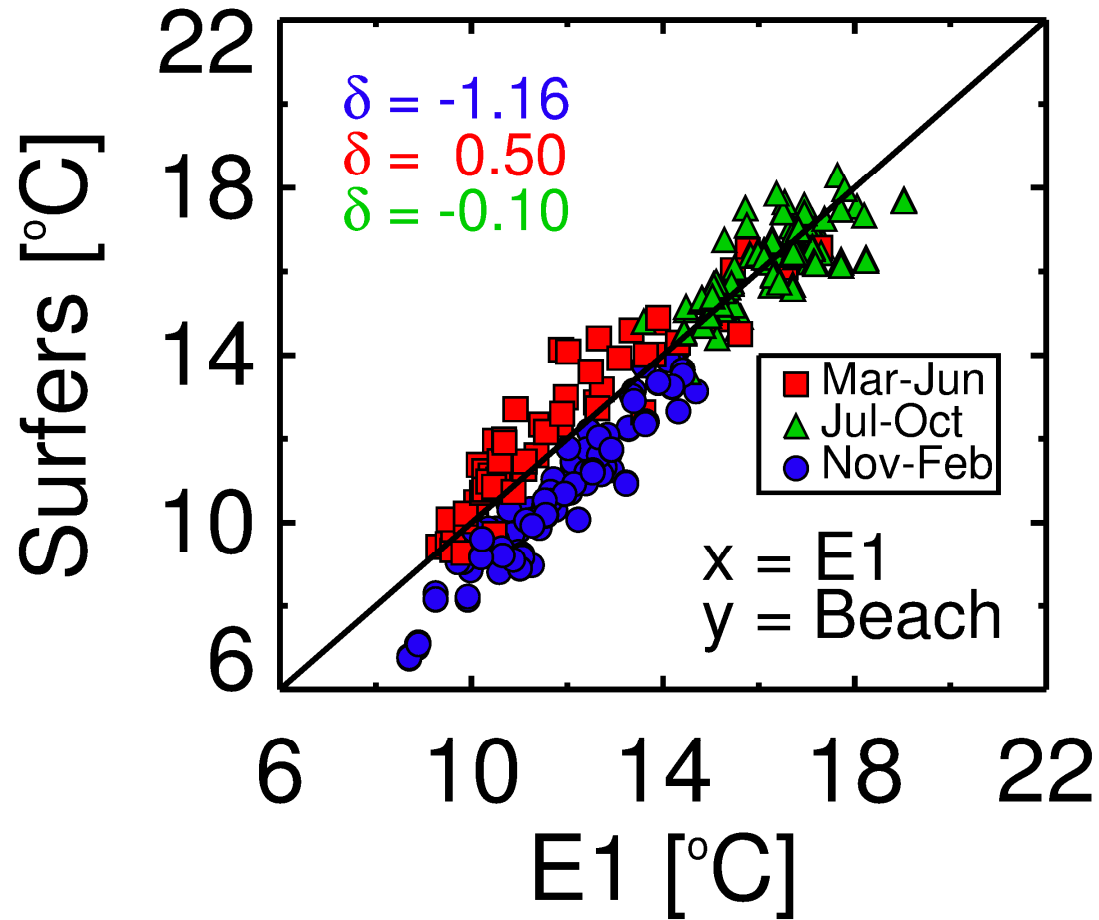
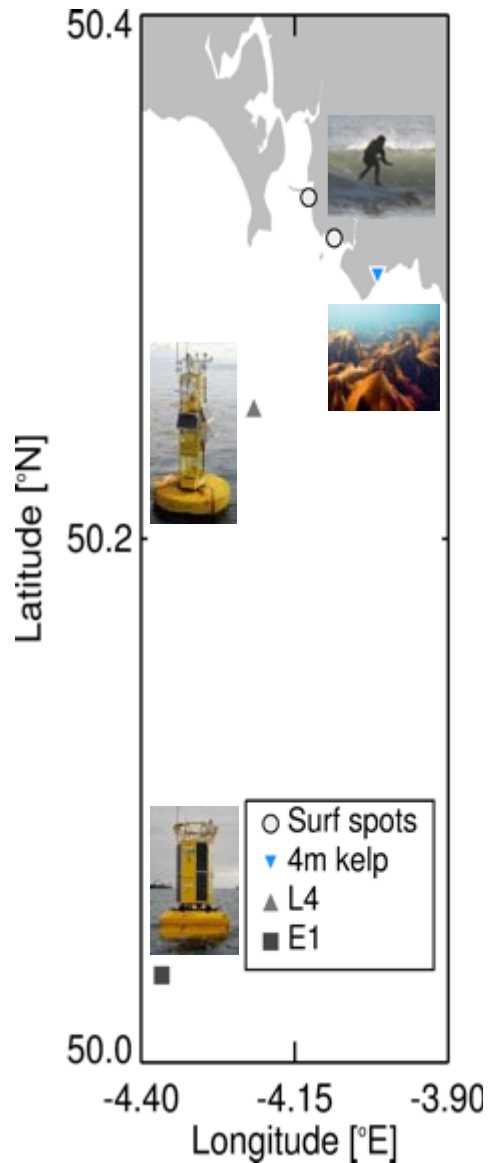
<https://smartfin.org/>



Brewin et al. (In Prep)



Brewin et al. (2017) *Estuar. Coast. Shelf Sci.*
 Brewin et al. (2018) *Remote Sensing*

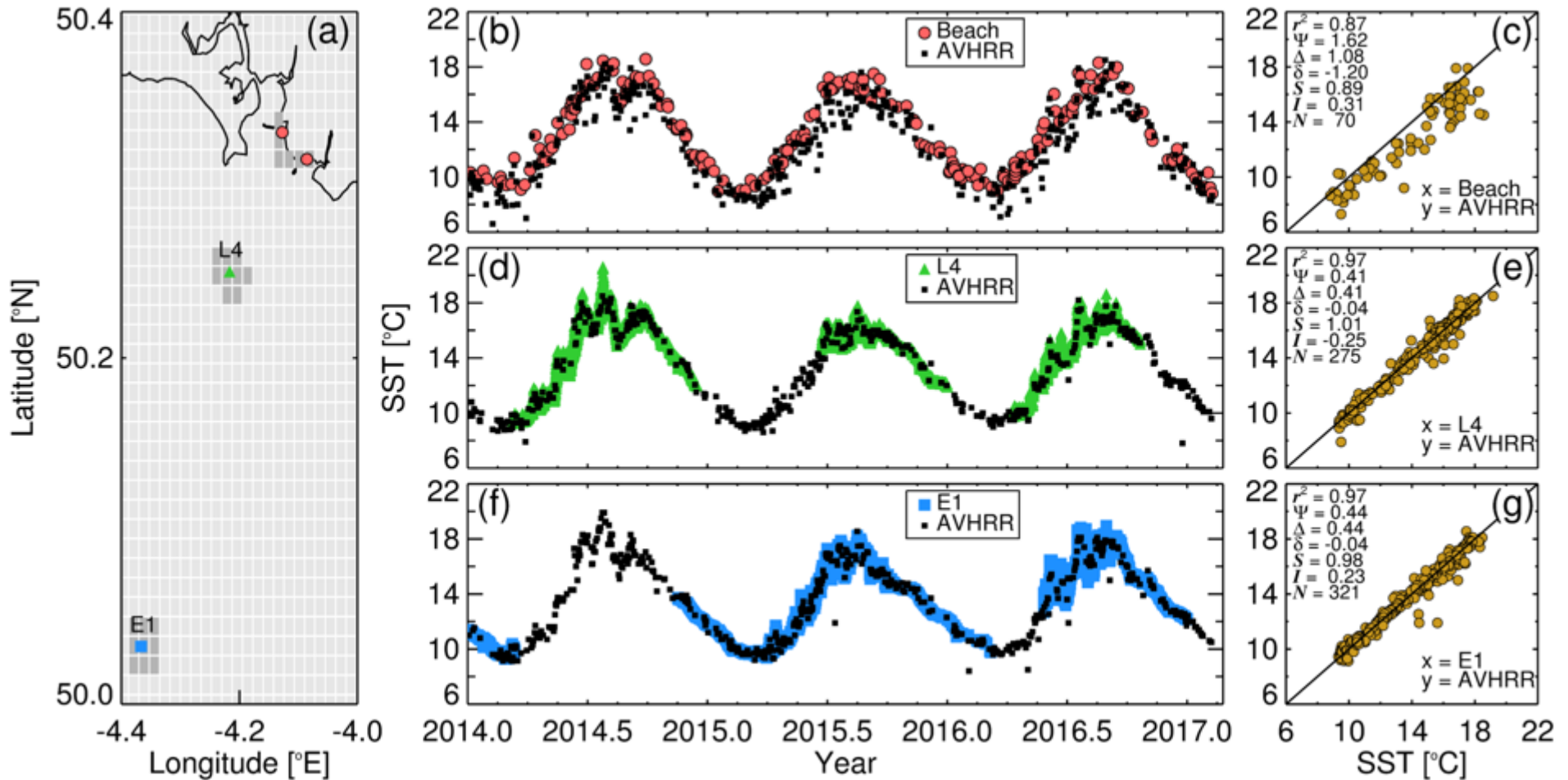


Temperature [°C]

Brewin et al. (2017) *Estuar. Coast. Shelf Sci.*
 Brewin et al. (2018) *Remote Sensing*



LOWER SPATIAL HIGH TEMPORAL RESOLUTION SATELLITE (AVHRR)



Brewin et al. (2017) *Estuar. Coast. Shelf Sci.*
 Brewin et al. (2018) *Remote Sensing*



Surfers: The Secret Weapon in Monitoring Coastline Health

Collecting sea-surface temperature data while hanging ten.

takepart

NEWS ENVIRONMENT FOOD CULTURE WORLD BUSINESS TAKE ACTION

Oceanographer Aims to Turn Millions of Surfers Into Marine Scientists



ONE MINUTE INTERVIEW

Surfers on a mission

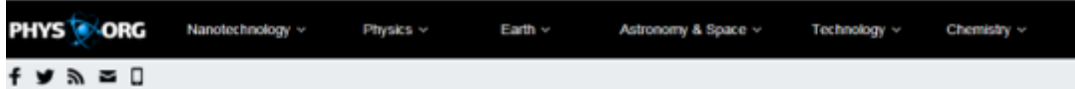
It is tricky to get coastal data, so **Bob Brewin** wants to recruit a volunteer surfer armada to help

Why use surfers? Why not attach sensors to boats?
The techniques are easily transferable to other recreational watercraft. The focus on surfers is really to get observations of the near-shore environment. It is difficult to get a small dinghy into 3-4 foot (0.9-1.2 metres) of surf!

What monitoring equipment do you use?
We have been attaching a small temperature logger at the midpoint of a surfer's leash and putting a GPS device in a small waterproof wetsuit bag for the surfer to wear.

You went surfing 85 times wearing this kit last year. What did you find?
We compared the temperature data collected by the kit with a very accurate buoy array.

PROFILE
Bob Brewin is a satellite oceanographer at



Home » Earth » Environment » July 9, 2015

Scientists plan to use surfers to monitor the coastal environment

July 9, 2015



Surfers enlisted to help monitor ocean

Dr BOB BREWIN
Lead scientist and keen surfer



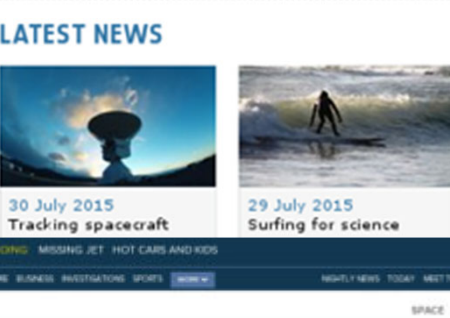
RESEARCHERS WANT TO ENGAGE AN ARMADA OF SURFER SCIENTISTS



July 13th 2015 | Place an advert | Buy a photo | Local Projects | Live us |

Surfers wired up to study the waves

By Western Morning News | Posted July 12, 2015



Surfing for Science: Sport Could Help Keep Tabs on Ocean Temperatures

Scientists put a 'smartfin' on my surfboard. Is it the next wave in ocean monitoring?



Thank-you for listening
For further information or interest please
contact me at

robr@pml.ac.uk

