

Eleven years of high frequency in situ measurements within a marine monitoring and assessment programme



History of UK eutrophication monitoring (1990-2000)

- Report to OSPAR
- Ship based observations
- Good spatial coverage
- Poor temporal resolution
 - Annual winter nutrient survey
 - Occasional summer survey
- Limited biological data
 - Chlorophyll, oxygen
- Labour intensive (expensive)



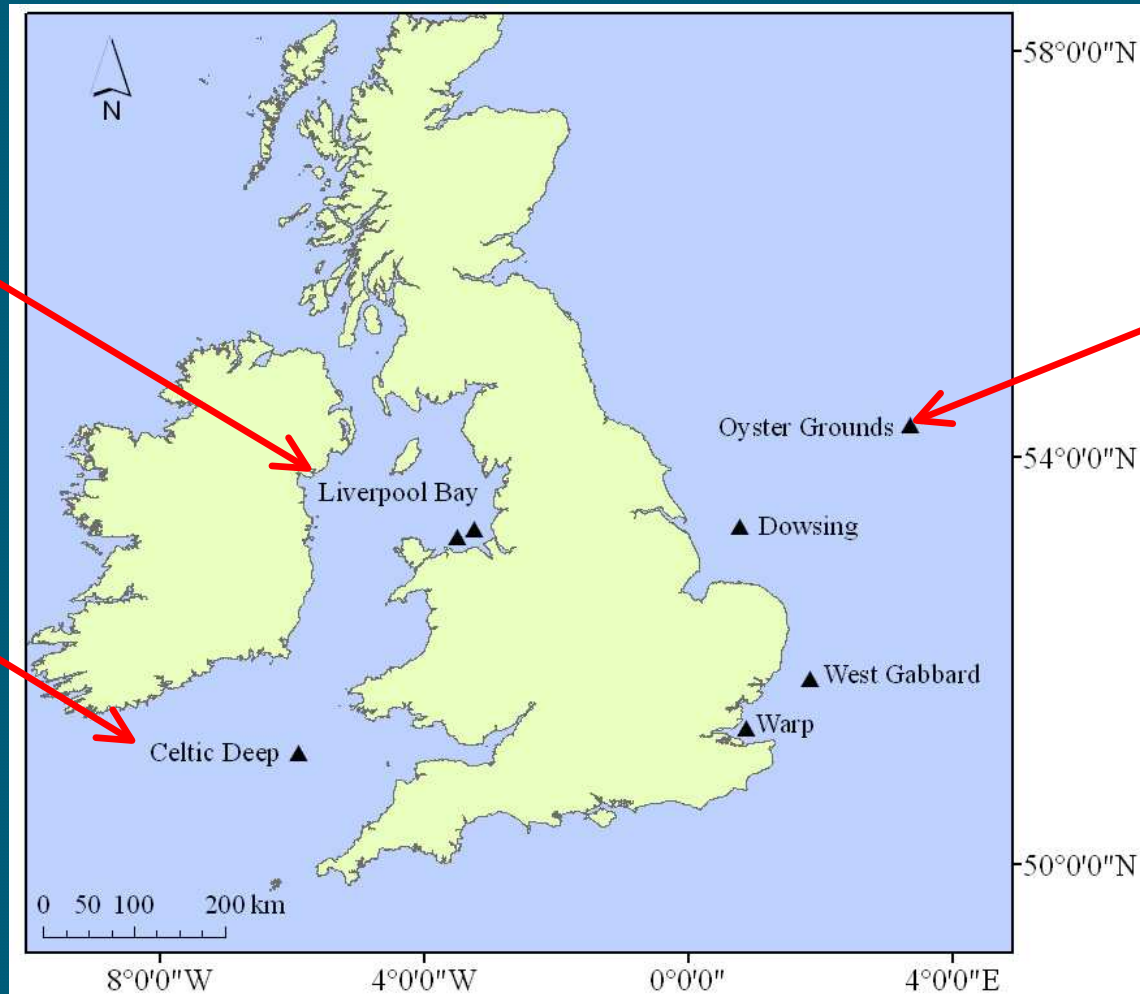
SmartBuoy Locations

7 routine monitoring sites

Cefas/AFBI/
NOCL

Cefas/AFBI

Cefas/DNZ



SmartBuoy deployment history

Location	Start	End
Thames (Warp)	Nov 2000	Ongoing
Outer Thames (Gabbard)	Dec 2000	Ongoing
Dutch Coast (Noordwijk)	Mar 2000	April 2002
Liverpool Bay (x2)	Nov 2002	Ongoing
Oyster Ground	Mar 2006	Ongoing
North Dogger	Feb 2007	Sept 2008
Dowsing	Oct 2008	Ongoing
Celtic Sea	April 2009	Ongoing

Website: www.cefas.co.uk/monitoring

Cefas

SmartBuoy Configuration



Max. weight ca. 500kg

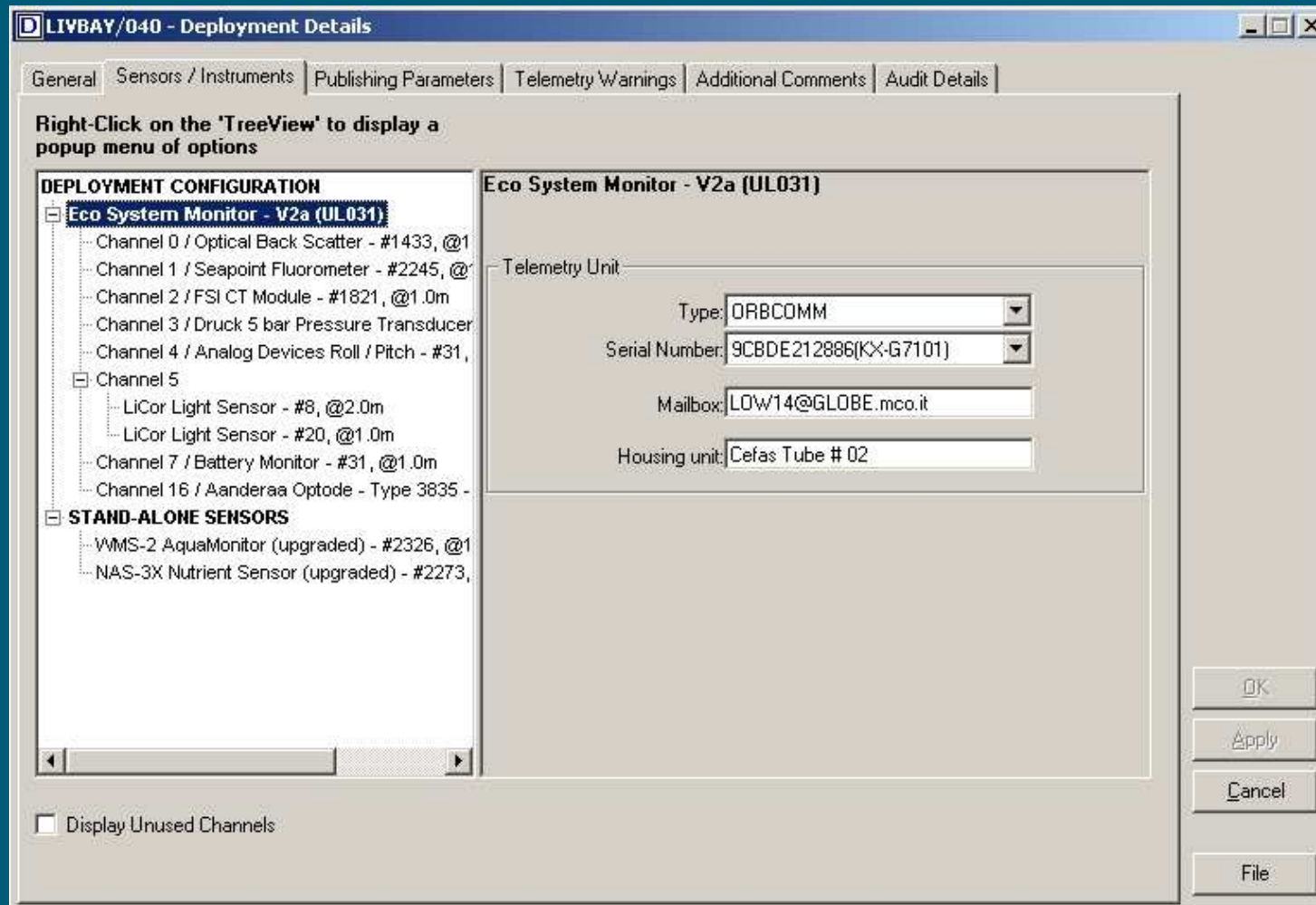
Variable	Sample frequency
Salinity	1Hz in 2 x 10 min burst/hr Data acquisition and control via ESM-2
Temperature	
Chlorophyll fluorescence	
Turbidity	
PAR irradiance	
Dissolved oxygen	
TOxN (total oxidisable nitrogen)	
Dissolved silicate	Up to daily
Phytoplankton counts and composition	Every 4 days



Cefas

SmartBuoy Data Management System – 1

Sensor and deployment configuration



SmartBuoy Data Management System – 2

QA Level 2 (manual QA by expert user)

Manual QA Analysis - to level 2 (for SmartBuoy)

Deployment: Liverpool Bay Coastal Observatory - 033
Liverpool Bay Coastal Observatory - 034
Liverpool Bay Coastal Observatory - 035
Liverpool Bay Coastal Observatory - 036
Liverpool Bay Coastal Observatory - 037
Liverpool Bay Coastal Observatory - 038
+ Liverpool Bay Coastal Observatory Site 2
- Lowestoft Lab Test Site

Sensor: Aanderaa Optode - Type 3835 - #127

There are a total of 2016 bursts
Select number of Records to be viewed at one time:-
 All Records
 100 500 1000
 2000

Highest QA level: 4

Burst	Date	Oxygen concentration	Oxygen percent saturation	Temperature
773	07-Oct-2006 12:30:00	7.7646	96.0006	15.7856
774	07-Oct-2006 13:00:00	7.8197	96.615	15.769
775	07-Oct-2006 13:30:00	7.8415	96.8458	15.7643
776	07-Oct-2006 14:00:00	7.8563	97.0231	15.7639
777	07-Oct-2006 14:30:00	7.8142	95.2461	15.2997
778	07-Oct-2006 15:00:00	7.8292	95.7116	15.4068

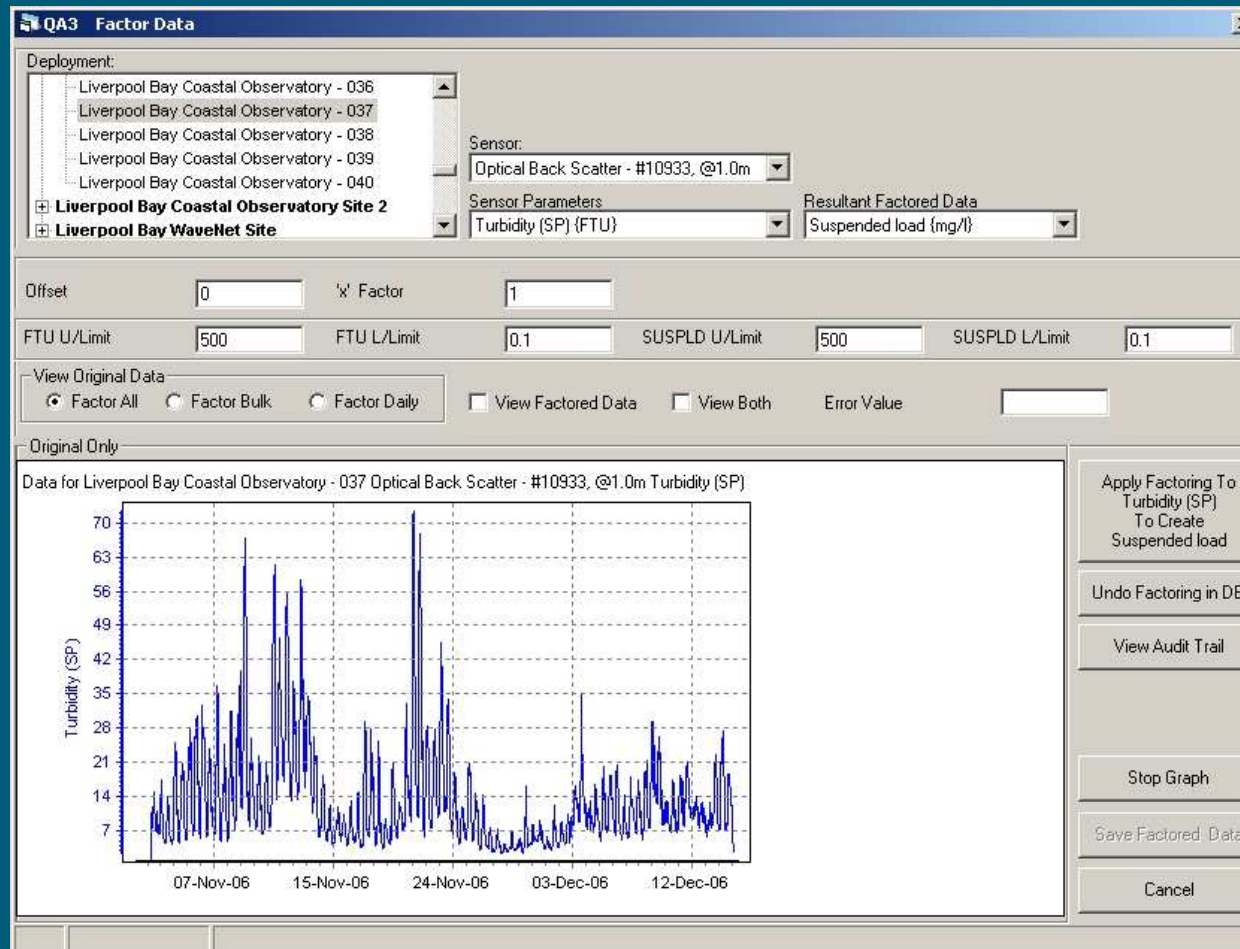
Liverpool Bay Coastal Observatory - 036
Aanderaa Optode - Type 3835 - #127, @1.0m

Legend:
 Oxygen concentration (mg/l)
 Oxygen percent saturation (%)
 Temperature (°C)


0%

Actions ...
Enable Rejection Reasons
Enable Zoom/Scroll
Stop Graph
Save
Close

SmartBuoy Data Management System – 3 QA Level 3 (applying field calibrations)



Web access to data

 **Cefas**

[Home](#) [Site map](#) You are in: [Data](#) ▶ [Marine monitoring](#) ▶ [SmartBuoy Basic Map](#)

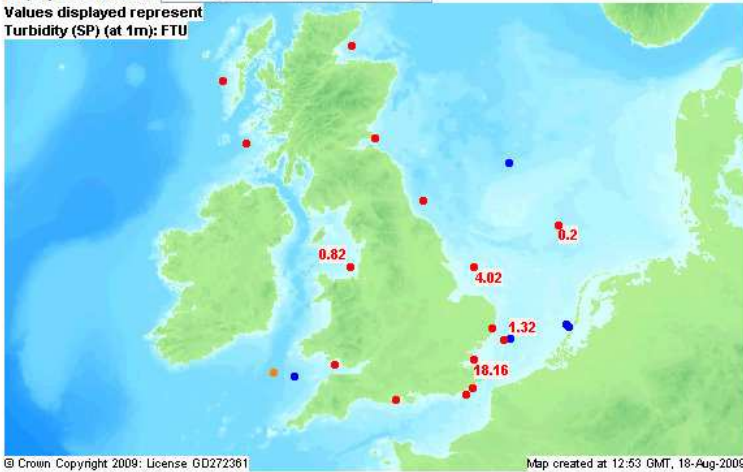
Marine monitoring
▶ [Data policy](#)

Marine monitoring

SmartBuoy Basic Map

Hover the mouse-pointer over a buoy location to view the latest data from that buoy

Display the value for:
Values displayed represent
Turbidity (SP) (at 1m): FTU



© Crown Copyright 2009: License GD272361 Map created at 12:53 GMT, 18-Aug-2009

Acknowledgements

- Active buoy (outline only represents data >8 hours old).
- Inactive buoy (no data for >26 hours).
- Future location.
- Inactive location.

[More Info](#)

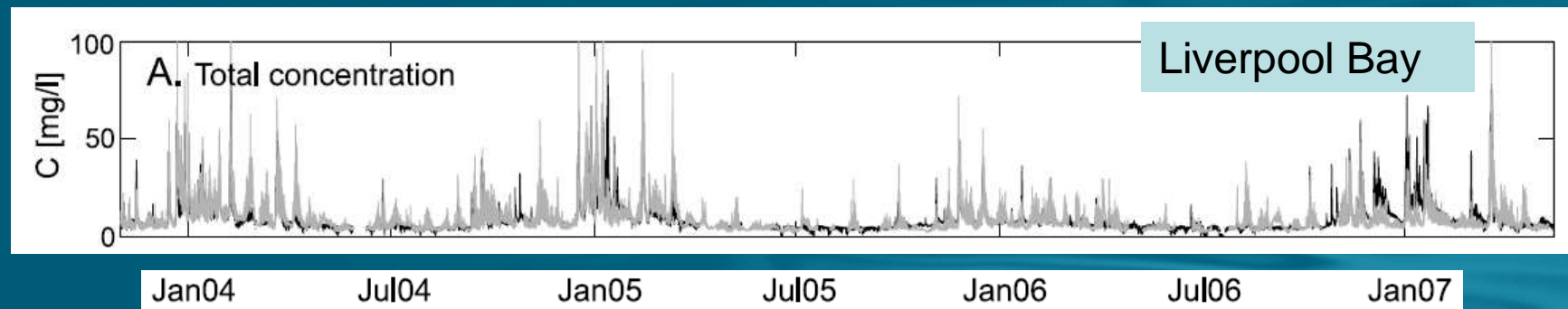
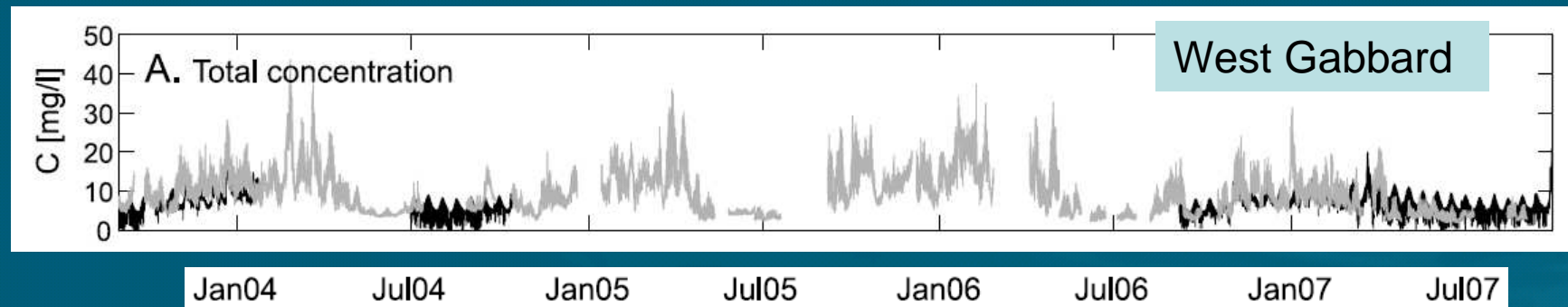
Centre for Environment, Fisheries & Aquaculture Science (Cefas)
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Website: www.cefas.co.uk/monitoring

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Model validation – suspended particulate matter

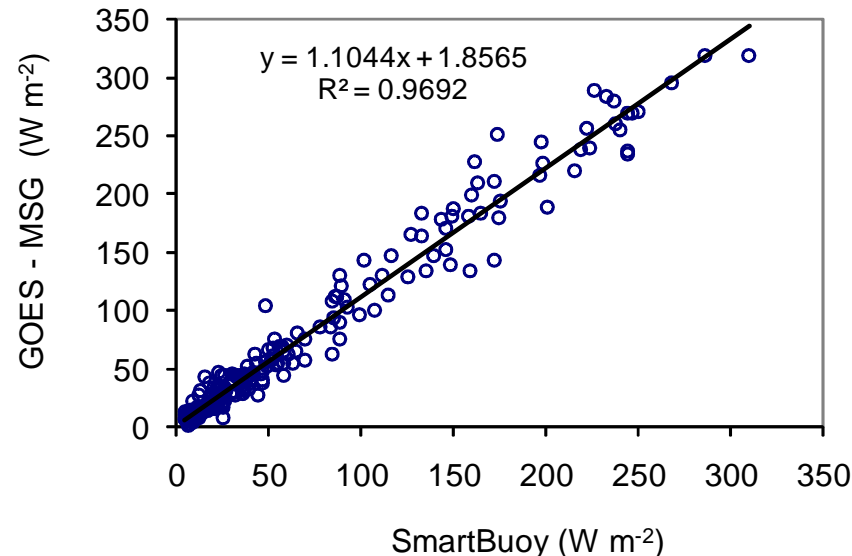
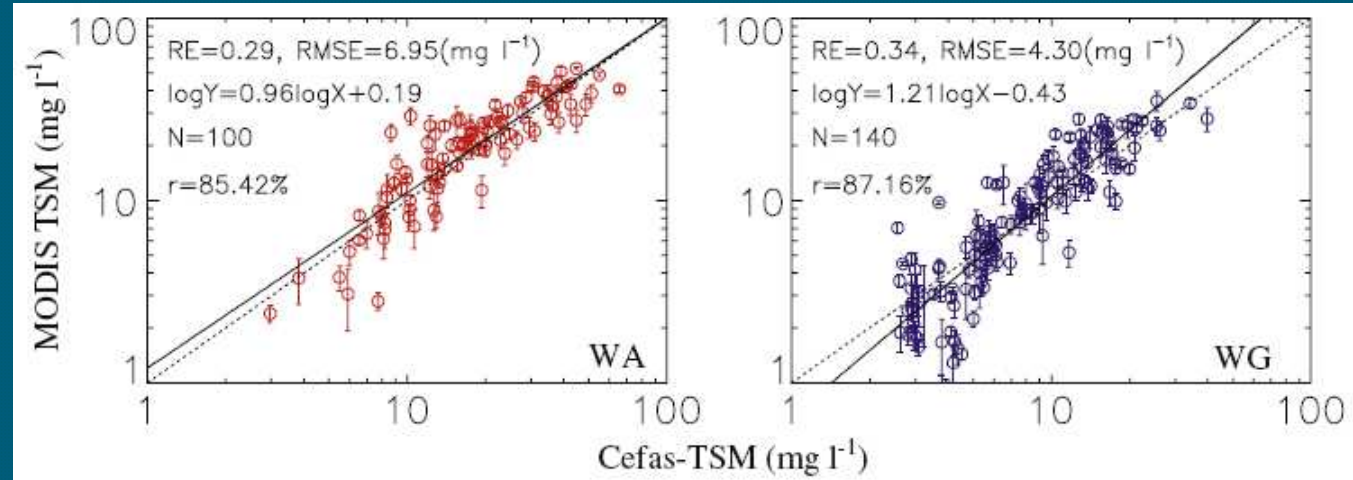


- SPM controls underwater light climate in coastal locations
- Timing of spring bloom

Validation of remote sensing products

Validation of MODIS TSM algorithms

Nechad et al. (2011)

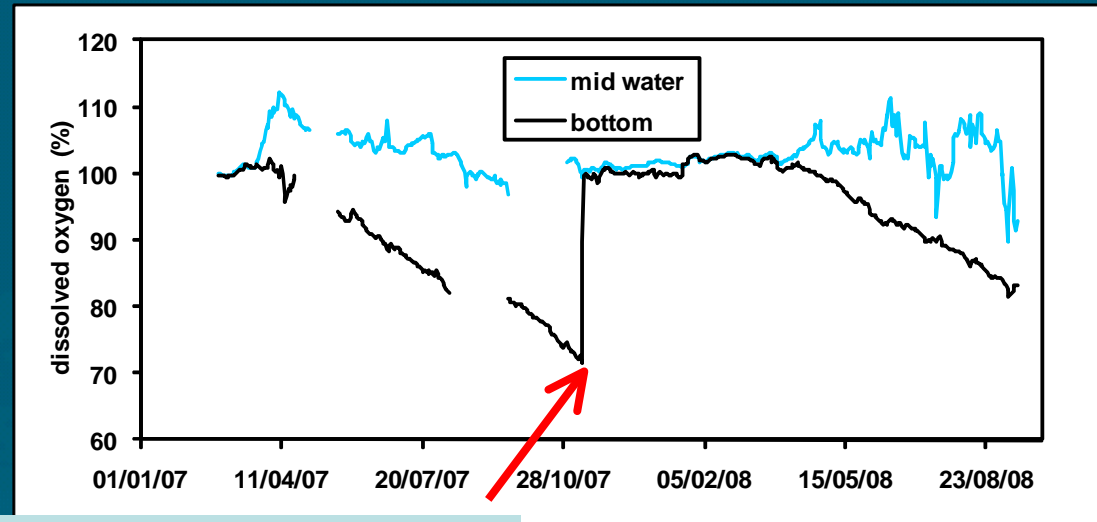


Estimates of daily global solar irradiance from SmartBuoy versus estimates from GOES – MSG satellites

Capuzzo et al. (accepted)

North Dogger - Oxygen depletion

- Bottom water isolated after stratification
- Very little increase in bottom temperature
- Decreasing oxygen concentration until autumn mixing



Tidal surge Nov 2007

