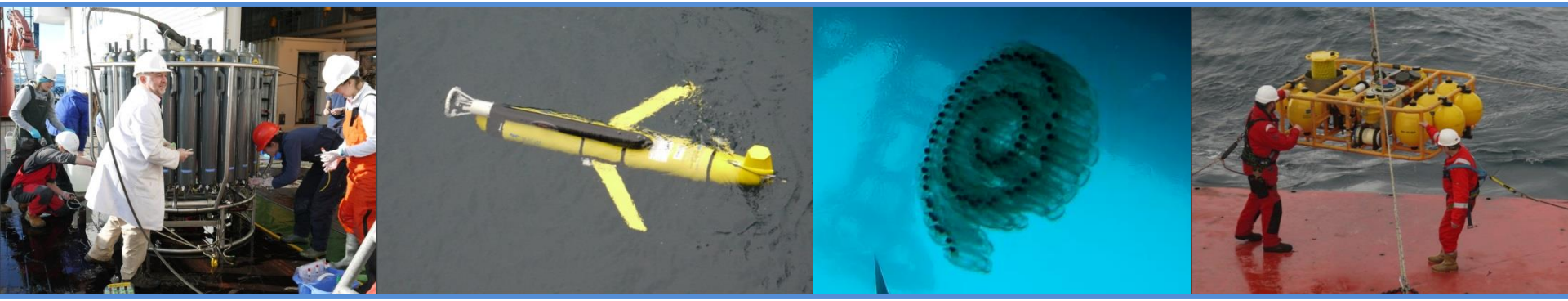

SSB WP1
Function and functioning of a shelf sea

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University of Liverpool and NOC

SHELF SEA BIOGEOCHEMISTRY
www.uk-ssb.org

NERC SCIENCE OF THE ENVIRONMENT

Department for Environment Food & Rural Affairs

Objective 1

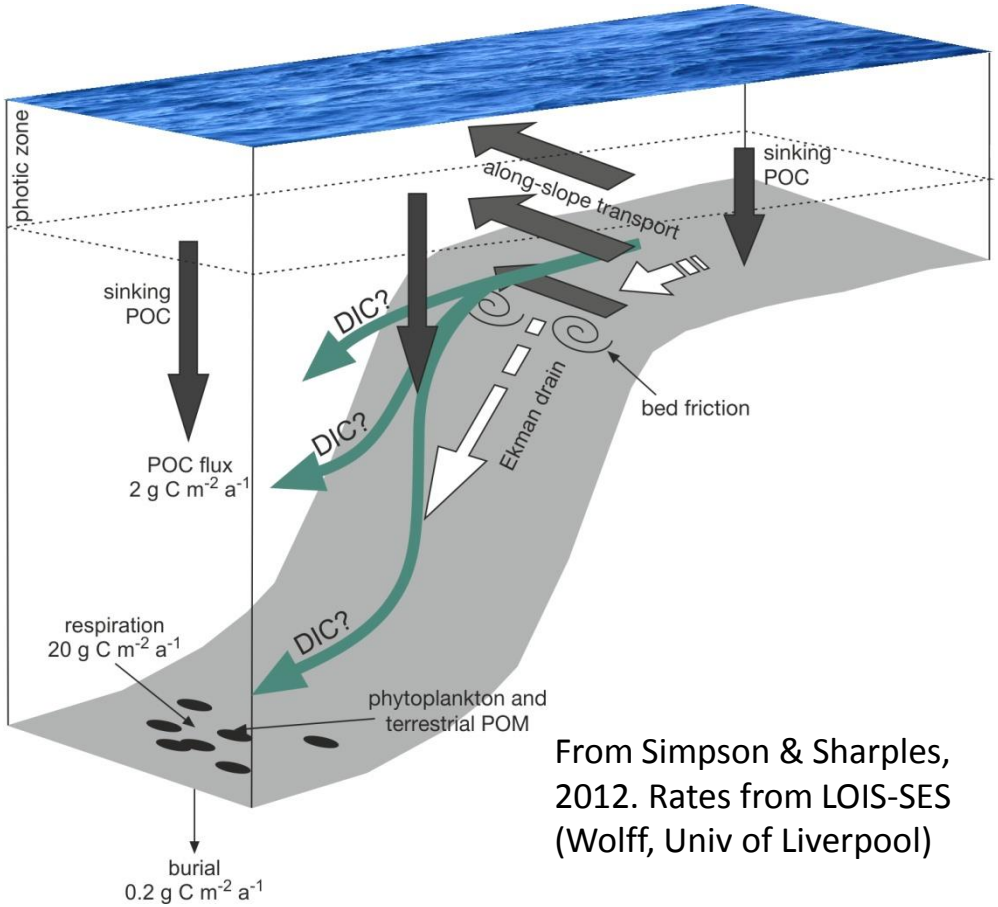
Quantify how much carbon is exported from the NW European shelf.

What is the annual air-sea CO_2 flux over the entire NW European shelf?

How much of the shelf water is exchanged with the adjacent ocean, and what are the water elemental properties?

Does the exported water reach depths below the winter mixed layer?

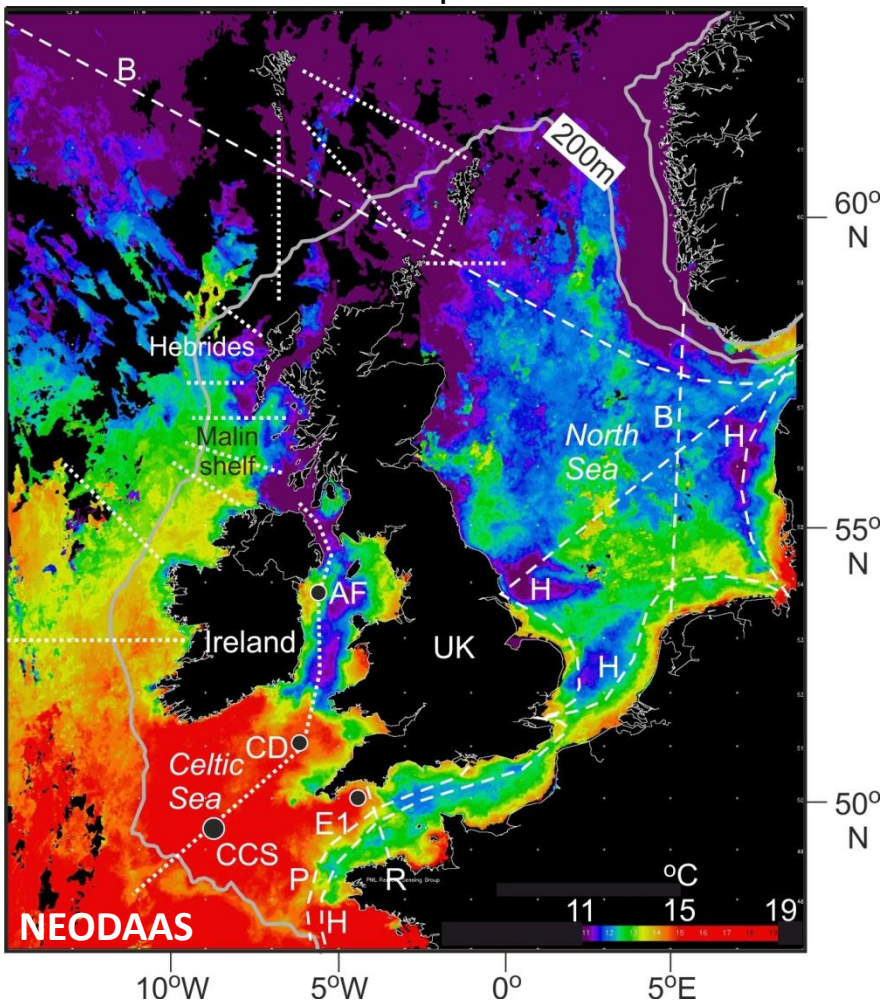
Do shelf sediments play a role in carbon export (link to WP2)?



From Simpson & Sharples, 2012. Rates from LOIS-SES (Wolff, Univ of Liverpool)

Approach (Objective 1)

Summer sea surface temperature



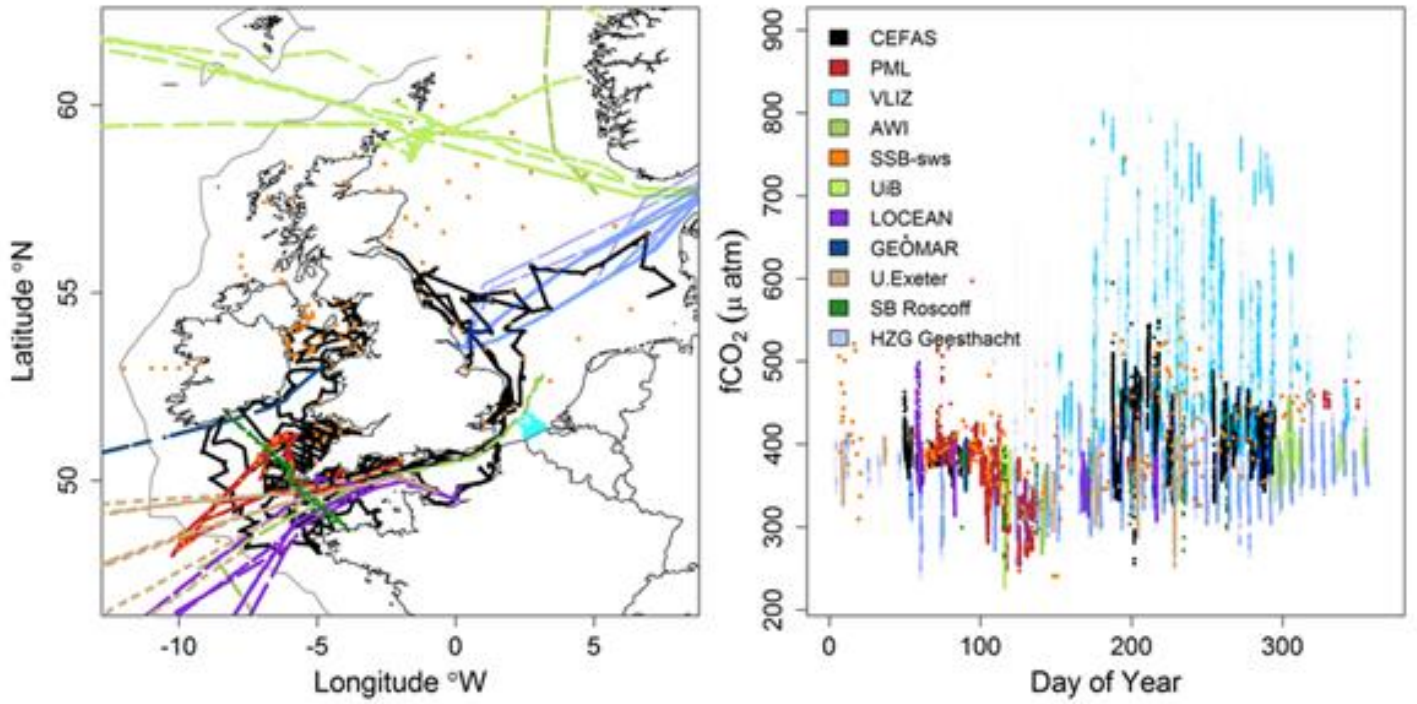
~~12~~ 18 months of nutrient and carbonate chemistry sampling

Daily surface sampling, key transects, moorings (Marine Scotland, CEFAS, AFBI, Irish Marine Institute). Collaboration with 5 groups running ferry box routes (Roscoff, HZG, Universities of Bergen, Vigo, Las Palmas)

Earth-Observation and statistical techniques to interpolate across patchy data fields.

Utilise existing databases on riverine and atmospheric inputs.

Successes (Objective 1)

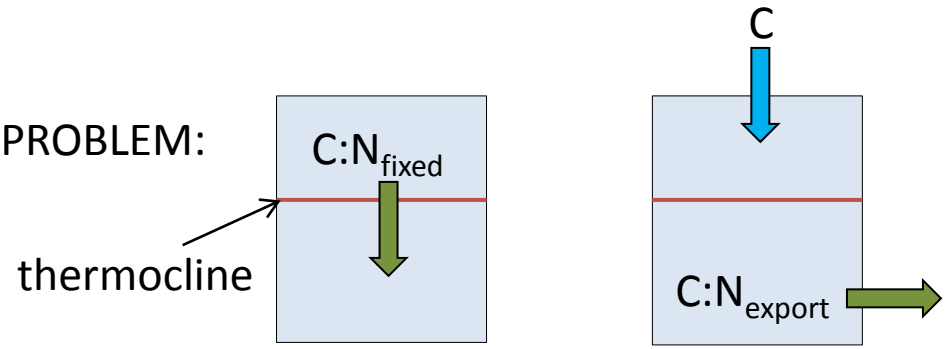


Details from:
Sue Hartman (1130 today)
Vas Kitidis (synthesis, 1620 today)

Objective 2

Determine how the carbon export is sustained.

THE PROBLEM:



If C:N$_{fixed}$ = C:N$_{export}$ then shelf nutrient pools will be diminished

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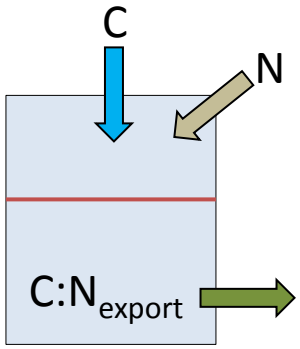
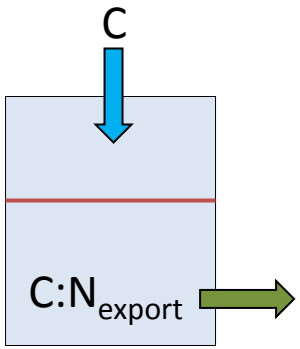
SOLUTION 1:



If C:N is fixed, then we need a supply of nutrients from elsewhere

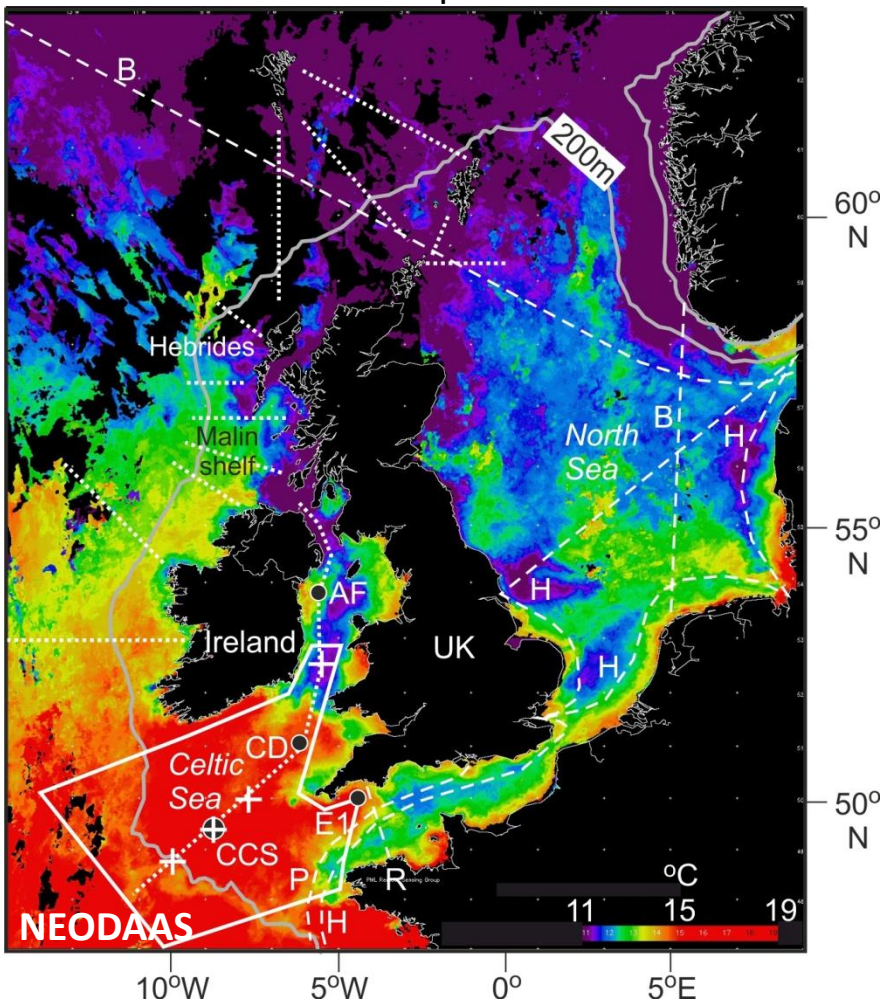
SOLUTION 2:



C:N$_{fixed}$ < C:N$_{export}$ due to different rates of elemental cycling on shelf (water column and sediments)

Approach (Objective 2)

Summer sea surface temperature



3 process cruises + data from WP2 cruises

Key physics-biogeochemistry process stations and moorings, whole-shelf transects, backed up with gliders and Earth Observation.

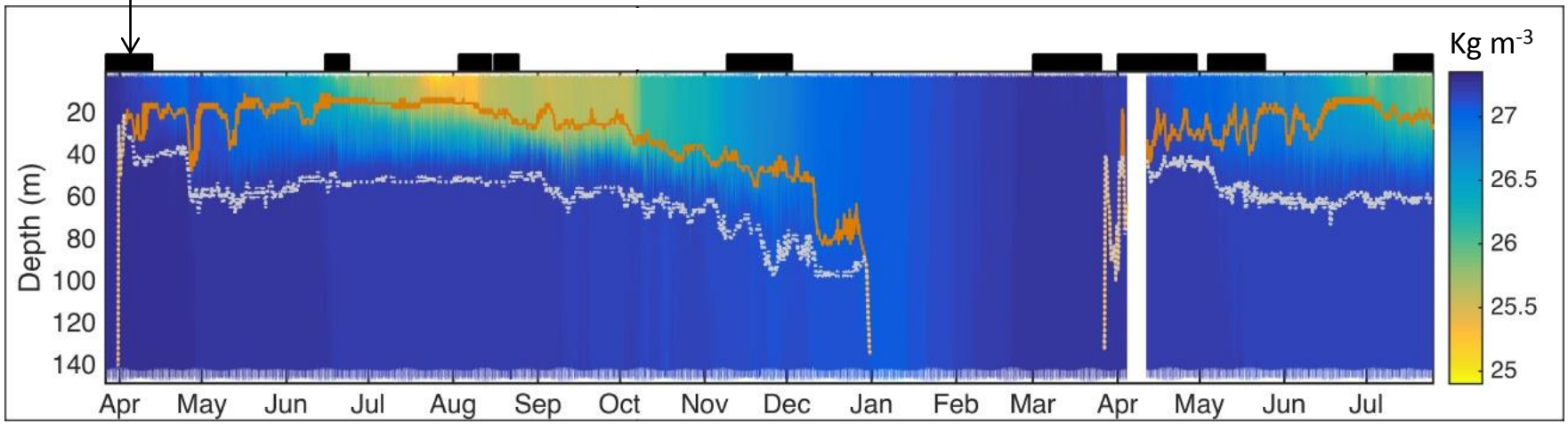
Cruises timed at key stages of the seasonal cycle.

Collaborative effort: elemental cycling quantified both in water column, and in sediments.

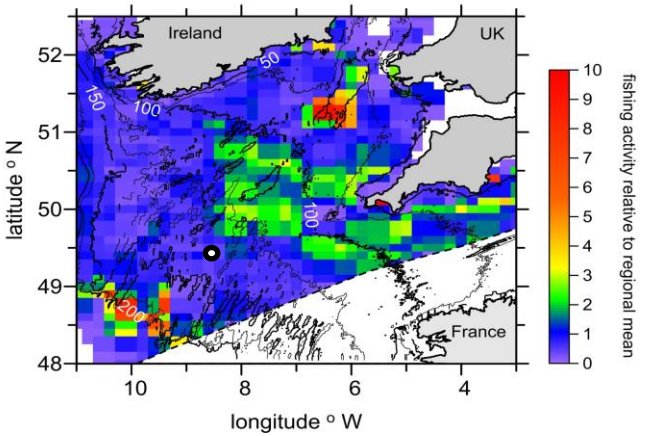
Celtic Sea: A generic temperate shelf region with well-constrained physics.

Successes (Objective 2)

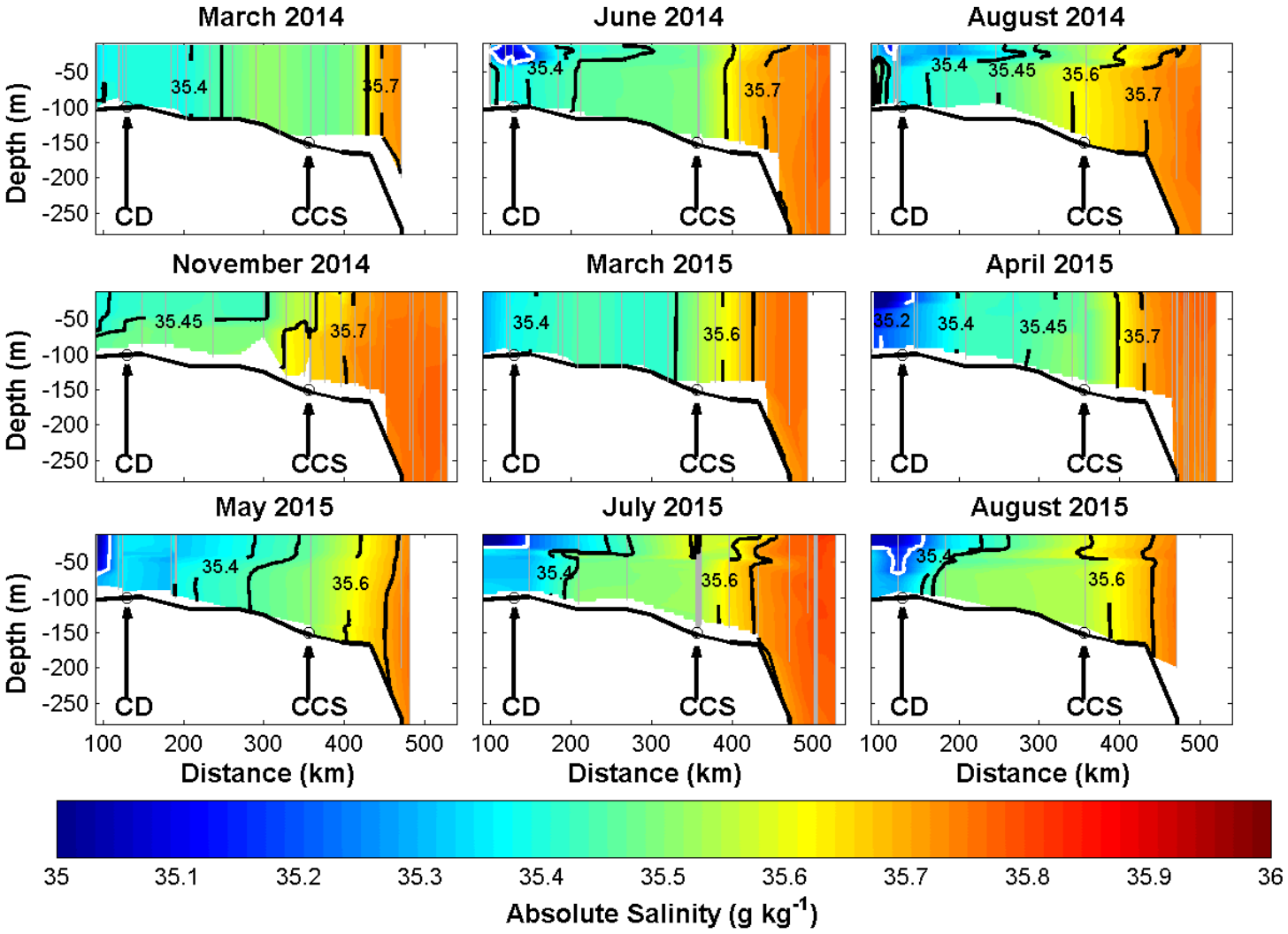
WP1 and WP2
process cruises



17 months of mooring data:
Water column profiles of T, S, density, u, v
Surface chl, nitrate, PAR
Meteorology



Successes (Objective 2)



Eugenio Ruiz, Uni. Liverpool

Rest of session

Reports from different modules.

Status of key data sets and important results.

A synthesis (so far) – where we are (or think we are) going next.

Watch out for:
Special Issue of *Progress in Oceanography*