

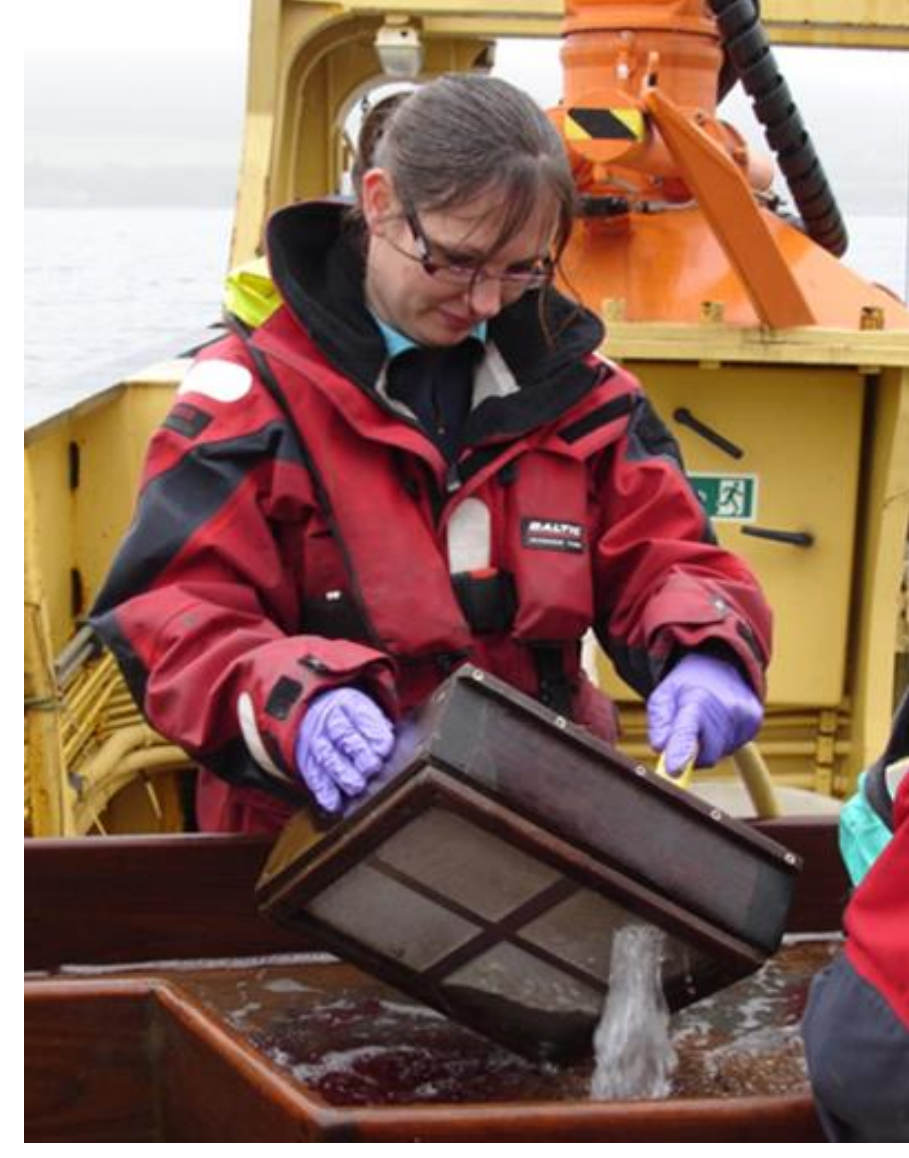


Polychaetes at the Western Channel Observatory

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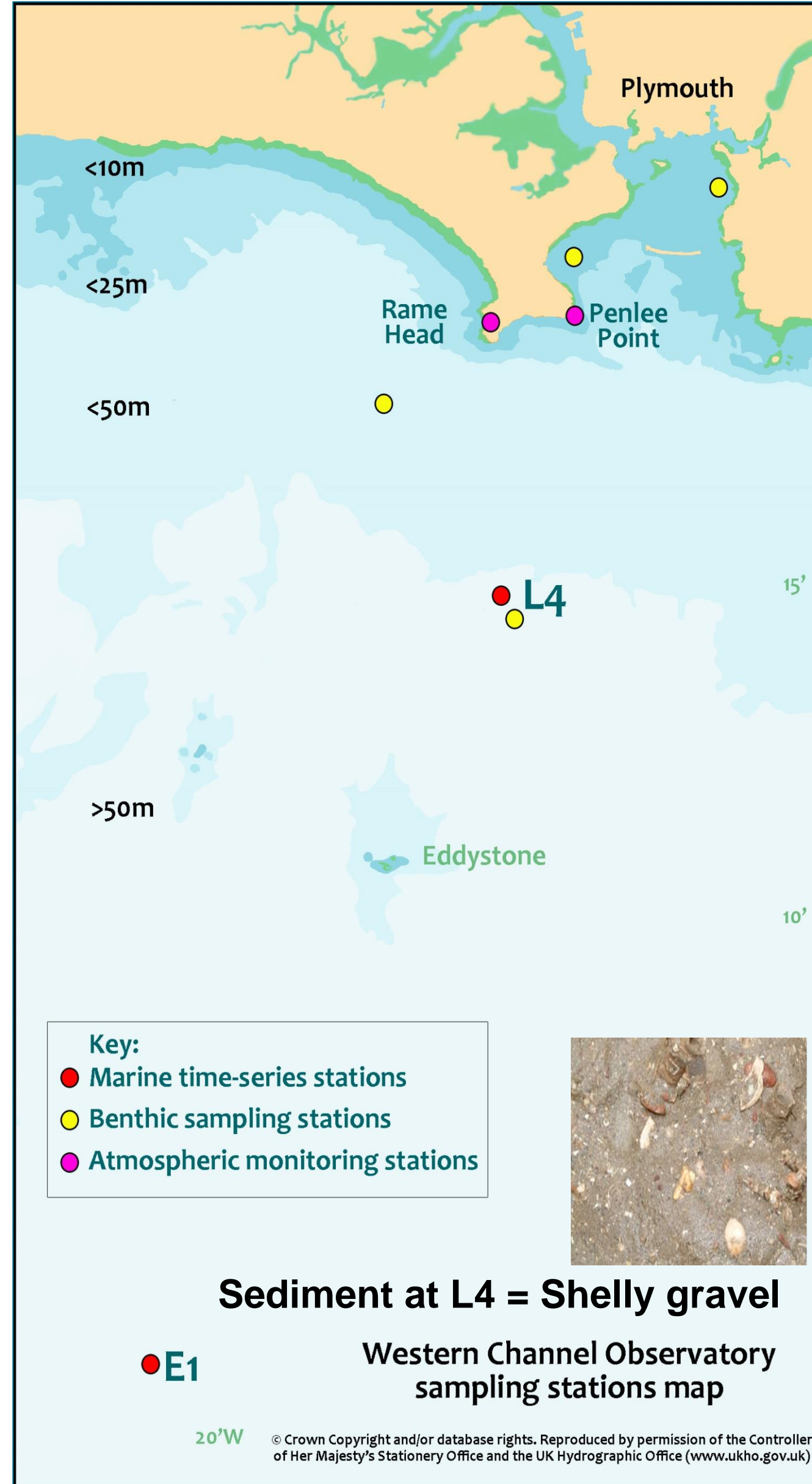
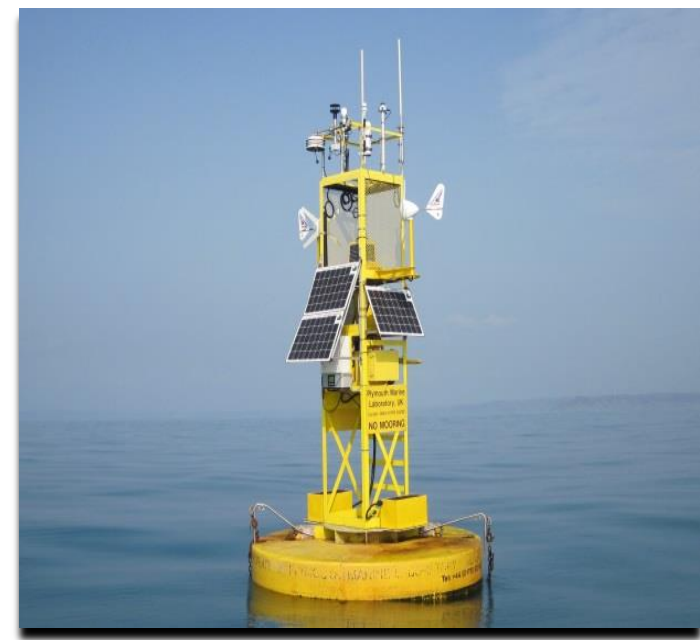
Here we present a flavour of the work conducted at Plymouth Marine Laboratory as part of the Western Channel Observatory (WCO). The aim is to:

- Integrate long term biological and environmental data
- Provide an insight into the specific relationships between the key benthic functional groups existing in polychaetes found at station L4
- To consider the natural temporal changes occurring in the marine environment
- Use a whole suite of additional parameters to identify the specific drivers of benthic-pelagic coupling and carbon and nutrient cycling



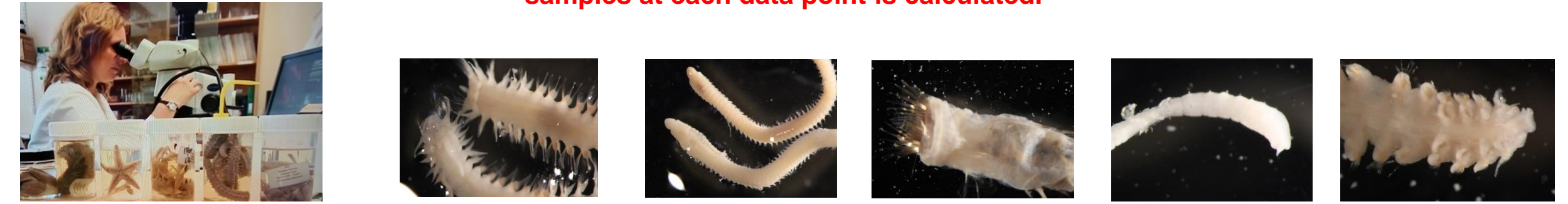
The Western Channel Observatory (WCO)

- An unprecedented comprehensive oceanographic ecological time series with a heritage of over 100 years
- A unique multidisciplinary survey encompassing a whole ecosystem approach
- Integrates a whole suite of chemical, microbial and pelagic parameters
- Aims to disentangle the complex maze of interrelationships influencing population dynamics
- Validates ecosystem models (ERSEM) and ocean forecasting
- Utilised in underpinning national and international policy (ICES, MCCIP)

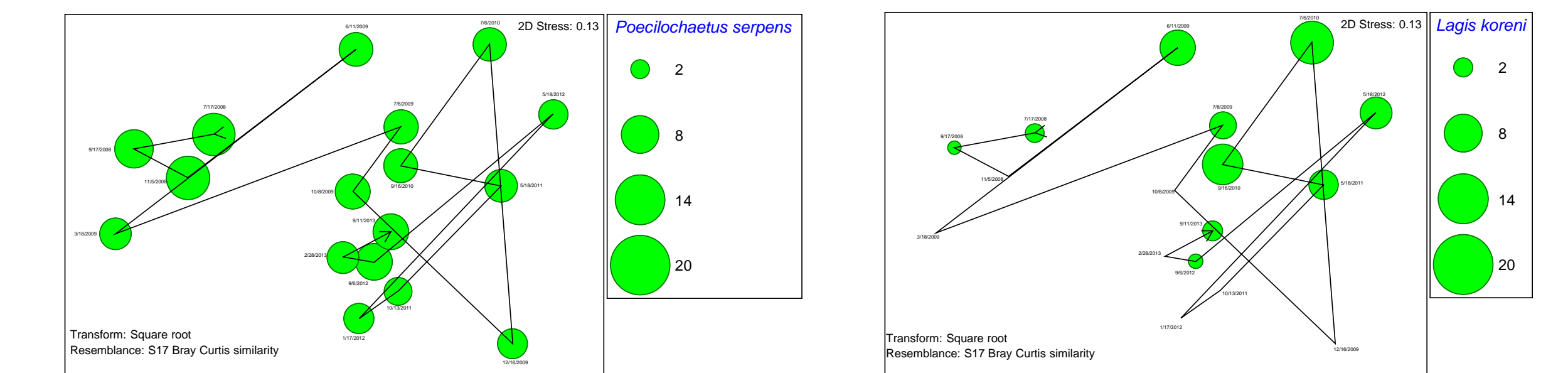


Dominant Polychaetes found at L4

Polychaete abundance accounts for just over 50% of the total macrofauna and 20% of the biomass found at L4. Using the PRIMER-E function SIMPER, the species responsible and their % contribution in causing similarity between samples at each data point is calculated.

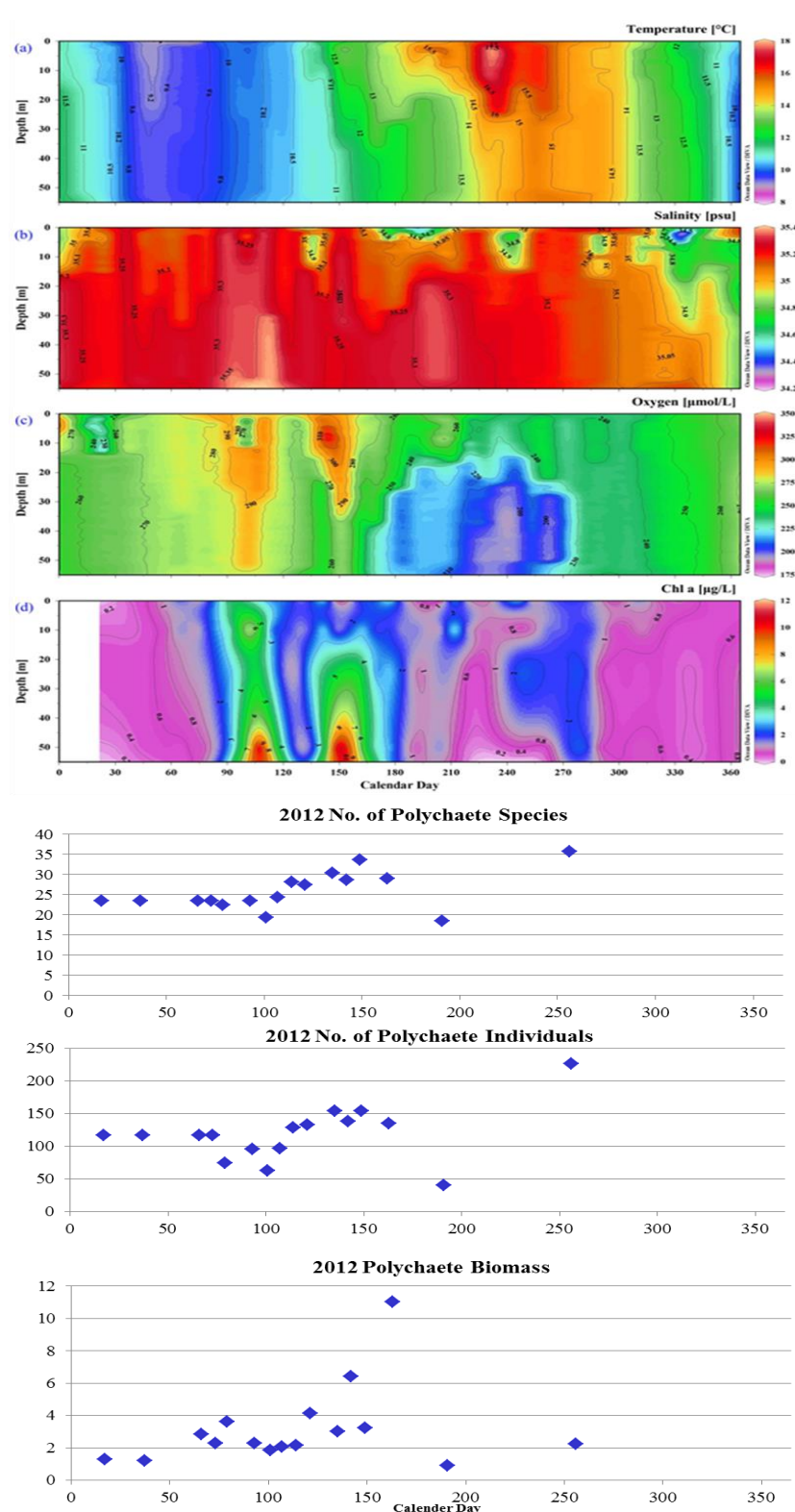


	<i>Poecilochaetus serpens</i>	<i>Lumbrineris cingulata</i>	<i>Lagis koreni</i>	<i>Peresiella clymenoides</i>	<i>Spiophanes kroyeri</i>
Similarity	33	9.5	3.66	2.27	2.07
Presence as % of total no. individuals	23	14	4.8	3.99	3.03
% spread across samples	98	99	42	94	80



- Community composition changes during winter 2009
- Never returns back to its original state.
- Bubble plots demonstrate *Poecilochaetus* homogeneity
- Contrasting heterogeneous seasonality patterns in *Lagis*.
- Further in depth analysis is required to assess what caused this shift in community composition.
- Linkages between plankton data and environmental pelagic conditions can be investigated to provide information on benthic-pelagic coupling and carbon and nutrient cycling.

L4 Measurements 2012

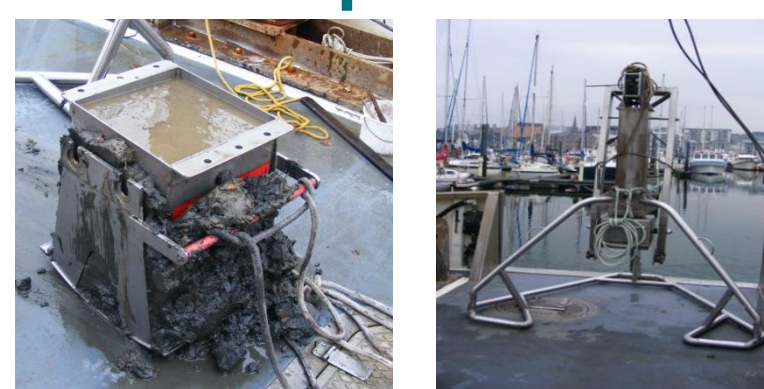


- Extended bloom, with double the average phytoplankton biomass
- Weekly benthic sampling co-ordinated to capture bloom effects
- Polychaete diversity and biomass peaks with phytoplankton¹
- Interactions observed differ between functional groups (e.g. Amphipods driven by temperature²)

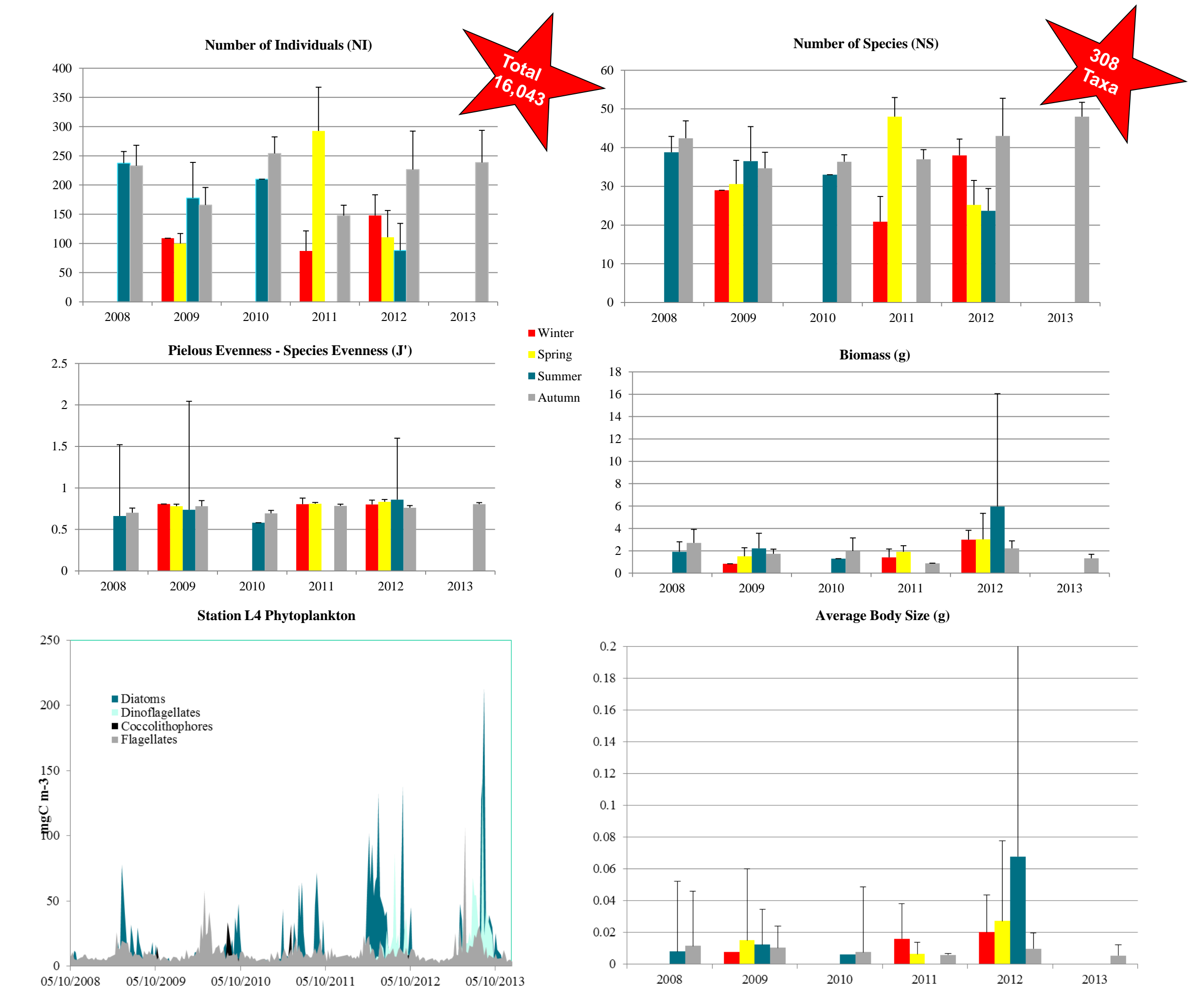
¹Zhang et al (2015)
²Navarro-Baranco et al (in prep)

The Benthic Survey

- Collection of macrofauna, meiofauna and bacteria initiated 2008
- Bimonthly sampling at L4 – (41 time points 2008 – 2016)
- 4 sampling sites in total chosen for their contrasting depths, sediments and levels of exposure
- 4 x 1m² Box Core replicates taken at each time point
- 182 Macrofauna samples (54 done)
- 123 Trawls



Polychaete Abundance, Diversity and Biomass



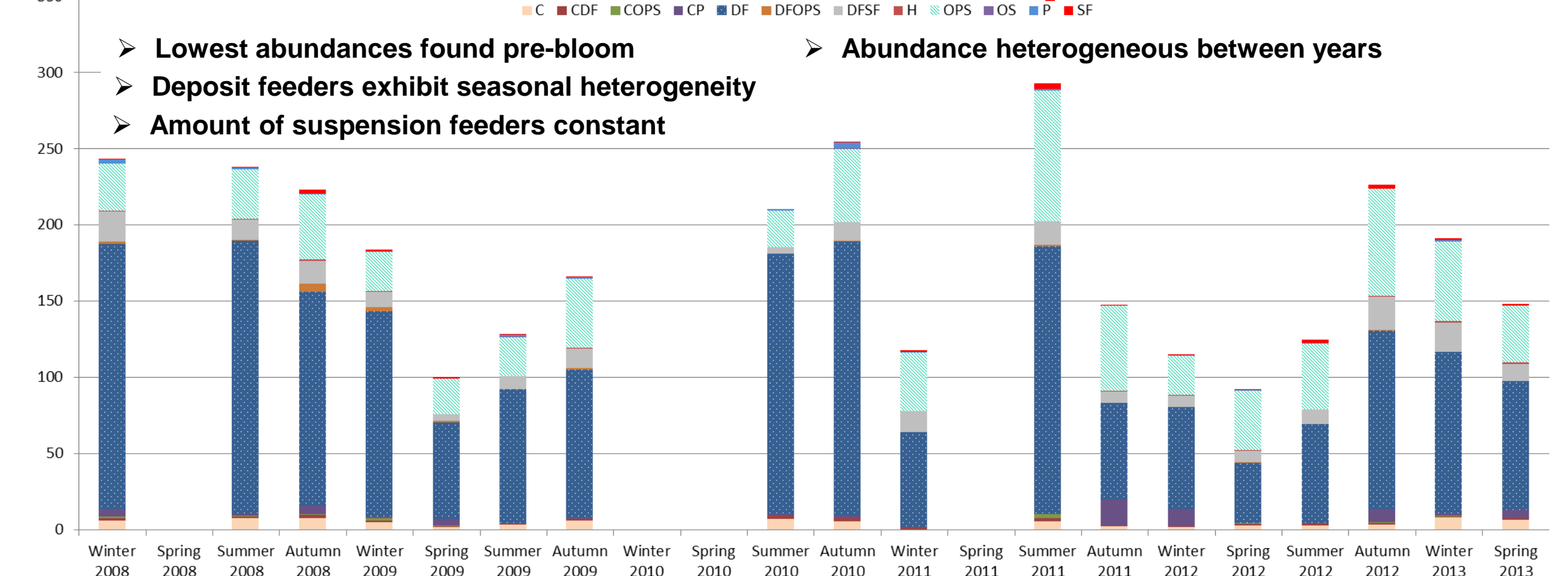
Summary

- Polychaetes exhibit high diversity and abundance. Much inter-annual variability exists. There are strong annual and seasonal patterns observed between species and functional groups
- As the time series ages, an elevated tangible sense of the natural seasonal and annual variability can be realised along with increased durability of the data
- Valuable in encapsulating sporadic events as they occur (e.g. Storms/ bloom anomalies)

- Establishment of a “normal” baseline = more accurate assessment of the impact of anthropogenic changes
- PML operates a cross lab multi-disciplinary approach. Work completed as part of WCO offers invaluable support to other NERC funded projects (e.g. SSB, MERP)



Seasonality Patterns Observed Across Functional Groups



From volunteers to undergraduate through to PhD, the Benthic Survey has formed the basis of many student projects.

Please be in touch if you are interested in becoming involved with working with the Western Channel Observatory!

