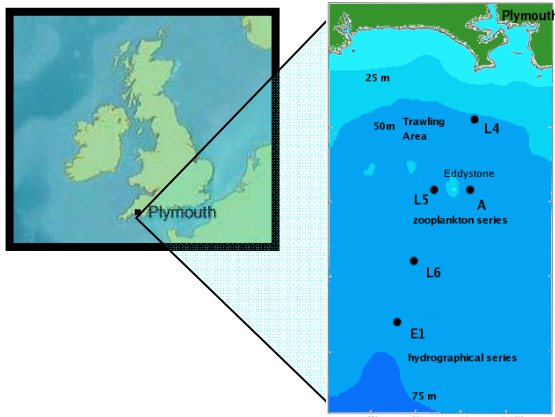


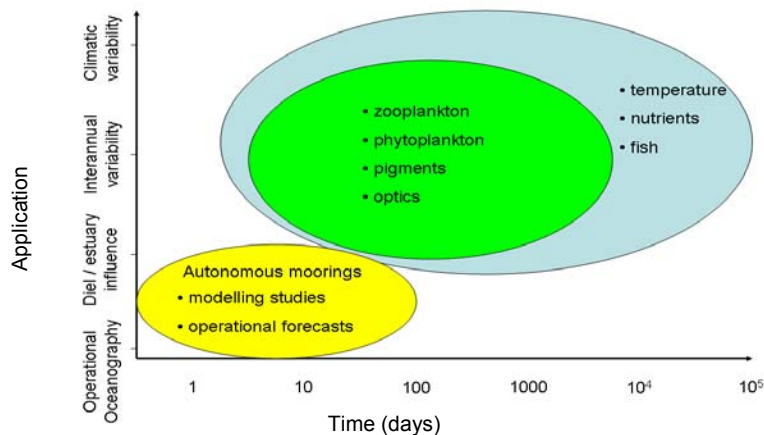
The Western Channel Observatory – a cascade of timescales

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Summary: Observations have been made in the western English Channel (WEC) for over a century. During that period there have been tremendous changes in measurement types and techniques, fuelled in part by technological advances. Each distinct dataset is able to inform the scientist, stakeholder or policy-maker about different aspects of the biological, chemical and physical variability of the WEC.

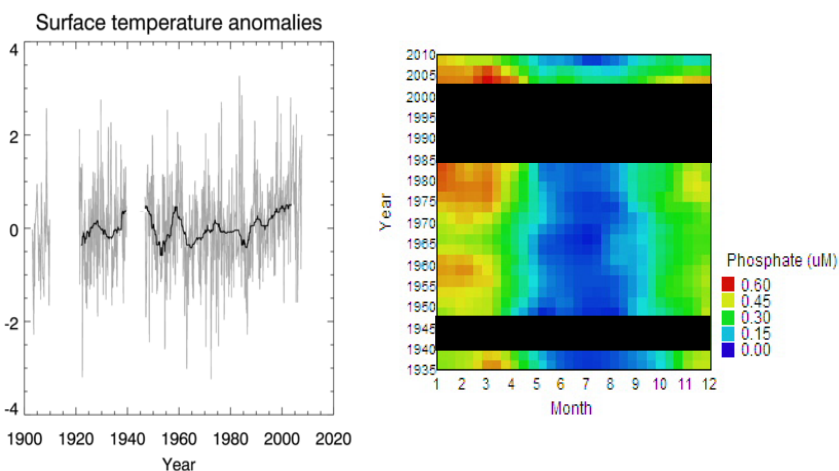


The Western Channel Observatory (WCO) comprises of a number of long-term time-series stations, primarily at L4 (50° 15' N, 4° 13.02' W) and E1 (50° 2.6'N, 4° 22.5'W). The area is a boundary region between open shelf and coastal waters; straddles biogeographical provinces with both boreal / cold temperate and warm temperate organisms being found and; there has been considerable fluctuation of flora and fauna since records began (Southward et al., 2005).



For information on climatic variability, **centennial** scale observations are required, e.g. temperature (1903-); nutrients (1934-); fish (1911-). For **decadal** length-scales the restart of the L4 time-series in 1988 has given insight into the large inter-annual variability in zooplankton (1988-) and phytoplankton (1992-). On a **weekly** basis, the traditional boat sampling is probably sufficient, but for operational oceanography and fine-scale ecosystem model development autonomous moorings with **hourly** sampling schedules are required in the coastal and open shelf regions such as the WCO.

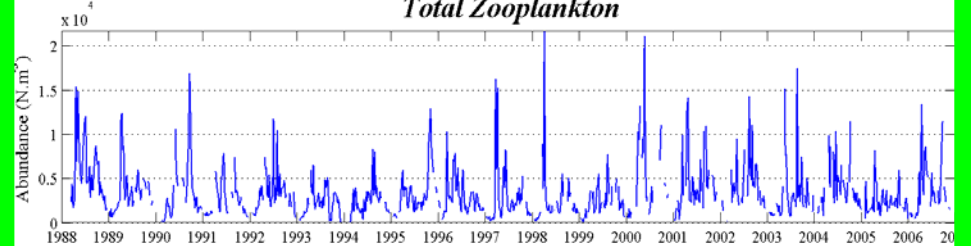
Centennial



Surface temperature at E1 shows a warming of around 0.8 °C over the past 20 years and winter phosphate (E1) shows decadal variability. The effects of climate change and fishing on fish stocks are beginning to be disentangled.

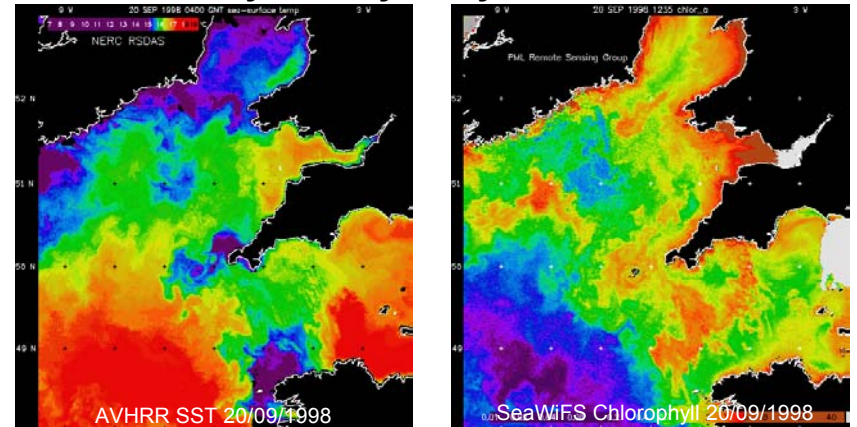
References:
Eloire et al. (2010). J. Plank. Res., 32, 657 – 679
Southward et al. (2005). J. Mar. Biol. Ass. UK, 42, 275-375
Widdicombe et al. (2010). J. Plank. Res., 32, 643 - 655

Decadal

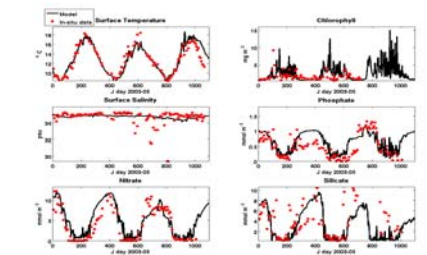
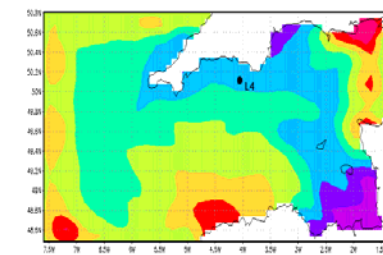


Both the L4 phytoplankton and zooplankton datasets indicate large inter-annual variability but there is a detectable decrease in biomass over the past 20 years (Eloire et al., 2010; Widdicombe et al., 2010)

Annual, monthly, weekly, daily

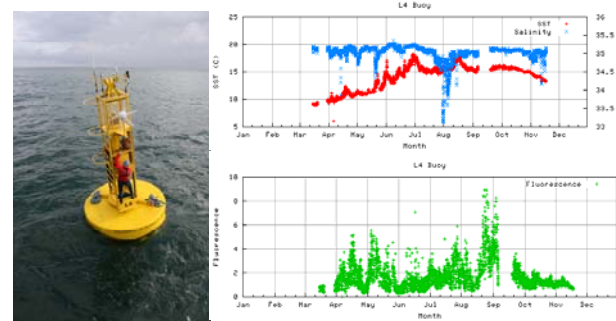


Interannual and decadal variability can also be detected from space. PML hosts the NERC Earth Observation Data Acquisition and Analysis Service (NEODAAS) with archives of 30 years sea-surface temperature and 10 years Ocean Colour. The daily coverage at 1 km resolution allows the wider spatio-temporal context of the WCO to be quantified.



PML has internationally recognised expertise in ecosystem modelling: a 7 km model, now run operationally by the UK Met Office, and 1 km model have been developed. Close links exist between in situ and remote sensing observations to models for testing, validation and parameterisation.

Hourly, daily, weekly



A complete season of buoy data has shown a clear connection between the Tamar estuary, coast and open shelf. The hourly sampling schedule (100 x previous) allows a contribution to operational oceanography (UK Met Office). The short duration blooms, correlated with freshwater intrusions, are consistent with the 1 km WCO model.