

## **The role of benthic observatories in an integrated Ocean Observing System**

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“The lack of extensive, more-or-less continuous time-series measurements in the oceans is probably one of the most serious impediments to understanding of long-term trends and cyclic changes in the oceans and in global climate...” (US National Science Foundation (2001), p151). This statement encapsulates the new challenge in ocean observation currently under discussion in an international context.

Over the past two decades, satellite remote sensing, instrumented fixed point moorings, and the recent developments in AUV technology have pointed the way to temporal and spatial analysis of mesoscale oceanic variability that has stretched our powers of understanding. However, much of this information relates to the surface, or at best, the upper 1000 m of the water column. At greater depths, the benthic realm remains opaque to our instruments, and our understanding. Recent developments in lander technology, ROVs and use of discarded submarine cables, is starting to offer a new way of approaching sea floor observatories. Major new initiatives (e.g., Neptune in the USA and Canada), point to huge aspiration and investment in networked arrays of benthic observatories. In Europe, EsoNET will start to drive new integration of existing observations, whilst EU FP6 programmes, such as COBO (Coastal Benthic Observatories) will stretch the technological envelope for long term experimental and manipulative systems on the sea bed.

Recently, the north American effort is being coordinated under the ORION (Ocean Research Interactive Observatory Networks) banner, not only to emphasise the technology and science, but the lock-step integration of cyber networks (e-science technology) and public outreach into the multi-million dollar programme. In Europe, we have excellent technology, and well identified science objectives, but only aspirations for the wider benefits from marine observatories.

This presentation will review the current state-of-the art in benthic observatories, from Neptune and ORION, through to European and national examples, including our own work on benthic lander technology at SAMS. However, the main conclusion will be the call to integrate and develop the case and rationale for a national benthic observing system to link to the excellent upper water column and remote sensing services provided to ocean observation by UK marine scientists.