

RESEARCH PROGRAMME ANNUAL REPORT 2011/12

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| Name of Research Programme | Ocean Surface Boundary Layer |
| Programme Administrator / Manager | Jessica Batchelor |
| Science Coordinator (if applicable) | n/a |
| Programme Management Team Leader or Lead PI for Externally Managed Programmes (if applicable) | Stephen Belcher |
| Date: | 6/6/12 |

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| Indicate the percentage of total programme activities in 2011/12 in each of Science themes of the NERC Strategy | | | |
| Biodiversity | | Natural Hazard | 5 |
| Climate System | 90 | Sustainable Use of Natural Resources | 5 |
| Earth System | | Technologies | |
| Environment, Pollution and Human Health | | | |

1. Scientific Achievements for 2011/12

- a) Paper submitted to Geophysical Research Letters on Langmuir work (Reading/NOC-L).
- b) Paper submitted to JPO on shear spike work (Bangor/ Oxford).
- c) First (successful) testing of the ADCP structure function method on a mooring during cruise 1 (Bangor/ SAMS).
- d) Analysis of methodologies for Stokes drift calculations (NOC-L/ SAMS).
- e) Implemented and testing of mixed layer eddy parameterisation in an idealised case (NOC-S).

Cruise 1 took place in the Clyde sea on the Prince Madog in September 2011. It involved groups from Bangor University, the Scottish Association for Marine Science and the National Oceanography Centre Liverpool. This ambitious cruise was aimed at - (1) Testing instrumentation and methodologies ahead of the main OSMOSIS cruise in September 2012. (2) Making near surface turbulence measurements in a short fetch environment.

We have made substantial science progress on developing the new parameterisation of Langmuir turbulence. The journal Geophysical Research Letters invited us to write a review of the global impacts of Langmuir turbulence on the ocean mixed layer. We have submitted the review and await referees comments.

New understanding has been gained on the process of mixing below the ocean mixed layer. We believe that this process is important in many areas of the ocean, and is related to the shear spiking measured by the Bangor group.

Modelling work at Reading is now focussed on setting up the test bed code for the new OSBL parameterisation scheme that will be developed within the proposal. A meeting of partners involved in modelling was held on Wednesday 31st August 2012.

2. Science activities during 2011/12

Please list major science meetings, workshops, field campaigns, cruises etc

OSMOSIS began on 1st April 2011. We held the science kick off meeting on Wednesday 25th May, which was attended by all partners and some of the collaborators. A second project meeting was held on the 16th January 2012.

A range of other meetings have been held: two including just the modelling groups and two over planning for the cruises.

There has been substantial activity in planning the (i) deployment of the long-term moorings and (ii) the process cruise. All equipment for the long-term moorings has been recovered from previous deployments. The site for the moorings has been selected accounting for the existing PAP site instruments, fishing and local topography. The moorings will be taken out in early September 2012. We have reviewed the use of the gliders: the plan now is to recover them twice for recharging batteries during the deployment, rather than once as identified in the proposal.

The process cruise will be conducted immediately after the deployment of the moorings. Some of the details of the instruments to be used in the process cruise have been changed following experience gained in the Clyde Sea.

3. Knowledge Exchange and User Liaison activities

Nothing so far.

4. International Dimensions

We are in close contact with the project partners identified in the proposal in the US. They have submitted a proposal to NSF to co-fund their contributions.

5. Data Management

This has been considered as part of the planning for the cruises in particular

6. Public Engagement with Research

Nothing so far.

7. Science Coordination

Project management details are given elsewhere. A web site (www.osmosis.ac.uk) has been set up and is now used for project management, and will be developed for external liaison.

A number of proposals have been developed that aim to collaborate with OSMOSIS: 2 to NERC and 1 to NSF in the USA.

8. Problems

We have had some staffing problems. As per the original schedule the PDRA at Reading started on 1st April. However, the member of staff became seriously ill during September 2011 and was in work irregularly until February 2012. He is now back to full health and making good progress again on the project. Although this did delay the project progress, I believe that we are now on track again.

The staff identified for the PDRA positions at Bangor and NOC-S have also moved on. In both cases replacements have now been found with no lasting effect on the project.

9. Plans for 2012/13

1. The deployment of the moorings in September 2012
2. The process cruise in September 2012
3. Further analysis of the Clyde Sea data and begin analysis on the process cruise data
4. Construct the basic parameterisation: this will be in a new structure and in the coming year will include Langmuir turbulence plus convective and stably stratified mixed. This basic scheme will be tested in a 1d test bed created by the Met Office
5. The mixed layer eddy parameterisation will be tested more thoroughly and any scientific problems associated with its implementation will be identified and if possible solved