Report on POGO Biology Initiative

Institutional Contacts

Eight institutions responded to the query regarding biological observations, and the following people have been named the institutional contacts for the POGO Biology Initiative:

CSIRO (Australia)	Tony Koslow	Tony.Koslow@csiro.au
LDEO (USA)	John Marra	marra@lamont.ldgo.columbia.edu
BIO (Canada)	Glen Harrison	HarrisonG@dfo-mpo.gc.ca
IMR (Norway)	Francisco Rey	pancho@IMR.no
SOC (UK)	David J. Hydes	djh@soc.soton.ac.uk
PML (UK)	Carol Robinson	carol.robinson@pml.ac.uk
WHOI (USA)	Larry Madin	lmadin@whoi.edu
SIO (USA)	Greg Mitchell	gmitchell@ucsd.edu;

The group discussed how the POGO Biology Initiative might proceed, and made suggestions on possible actions. They are listed below.

1. **Advertise available data and new techniques:** Greg Mitchell has offered access to all the data that are collected through the CALCOFI Programme. POGO should provide links to CLCOFI and other sources of data on phytoplankton and primary production through the POGO web site. The web site can also be used to provide access to reports on new and emerging operational techniques for measuring phytoplankton and primary production.

2. **Promote New and Emerging Techniques for Measuring Phytoplankton Pigments or Primary Productivity:** David Hydes has offered to contribute to this topic. Again, the simplest way to do this would be for POGO to promote new and emerging techniques and related developments through the POGO web site. The idea would be for short write-ups about the new technologies to be posted on the POGO web site, with appropriate pointers to the scientists who are behind the initiatives.

3. **Organise a workshop on Molecular Oceanography:** One of the recommendations of the POGO biology workshop was to promote the use of molecular techniques in biological oceanography. To take this recommendation forward, it would be useful to have a workshop with presentations from leading researchers who have been using molecular techniques in biological oceanography. Their contributions would be organised into a text book on Molecular Oceanography. The workshop would be followed by a training programme on the theme of the workshop. Dr. Osvaldo Ulloa has agreed to help with this initiative. John Marra has suggested that it might be useful to organise a session or two at an ocean or aquatic sciences meeting prior to the workshop.

4. **Organise a Workshop on Chlorophyll-a as a Geophysical Variable:** Of all the biological variables that are likely to become "operational", the most likely candidate is chlorophyll. Yet, unlike physical variables, we have no primary or secondary standards for calibration of this variable. We have many techniques and methods for measuring this variable, ranging from the chemical to the optical. The scale of measurements range from the single cell using flow cytometry, to the basin scale using satellites. But we have no operational definition of chlorophyll concentration, and inter-comparison of results from various methods remains problematical. There are ambiguities also on what is measured by the various techniques. The workshop would invite a small number of experts to address these issues; make recommendations on primary standard and secondary standards for chlorophyll-a estimation; recommend an operational definition for chlorophyll-a; and suggest methods of inter-comparison and interpretation of results from different types of sensors and instruments. Alternate suggestion from John Marra: organise workshop on ocean colour as a geophysical variable, rather than on chlorophyll-a.

5. **Promote new technologies for observation of large phytoplankton and zooplankton:** There are now quite a range of promising acoustic and optical technologies, such as ADCPs, ship's sounders, multi-frequency acoustic systems; video plankton recorders, optical counting/sizing instruments, and flow cytometry. SCOR has a working group on New Technologies for Observing Marine Life sponsored by Census of Marine Life. To enhance this effort, POGO, perhaps in conjunction with the Census for Marine Life, can explore ways of developing one or more pilot observational programs to evaluate relative costs and benefits of some of the most promising technologies.

6. **Accelerate generation of end-user products:** Adopt a strategy for marine biology that accelerates end-user products. The obvious model is the focusing of biology on improving human health. In the case of marine biology, the customer is environmental prediction in the broadest sense, including fisheries, epidemiology and toxic algal blooms, as well as pollution. It would be easier to attract more funding for marine biology and biological oceanography if POGO were to adopt a strategy for linking it to such applications. In the language of economics that means increasing the focus of customer pull, and not relying merely on science/technology push. This suggestion came from John Woods.