Spokespersons available for interview

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The 12th meeting of the Partnership for Observation of the Global Oceans will be held at the Plaza Hotel, Seoul from 24 to 26 January 2011.

An Ocean under Change.

The Deepwater Horizon oil spill in the Gulf of Mexico (April 2010) has been a stark reminder of the dangers and costs of marine disasters for even the best-prepared of developed nations. Another recent major disaster for nearshore environments was the Indian Ocean tsunami that devastated many coastal zones and communities in December 2004.

In addition to these traumatic, but transient events, the world ocean is subject to continuing, incremental and cumulative change related to increased atmospheric carbon dioxide concentrations, whose effects we are unable to predict in detail. Examples include sea level rise combined with more severe storms, ocean acidification, and the retreat in polar sea ice.

The local sea level rise problem, especially for small islands, can be complicated. Many factors seem to be involved in some of the more dramatic situations. If, as the models say, the storms become stronger under climate change, then the coastal impact of sea level rise is compounded. Having reliable local tide gauge data over decadal time scales is essential because there is often considereable variability in shorter term trend estimates. Sadly, there seem to be cases where national leadership is not well informed about what its own tide gauge data indicate. This is a 'service' need that should be addressed, based on existing observations.

The ocean acidification problem is not yet well explained to society, partly due to a lack of observations in key regions. Oceans are absorbing the excess carbon dioxide in the atmosphere, resulting in a decrease in the average ocean pH. This will have adverse effects on calcifying organisms, and possibly marine ecosystems as a whole, although the extent of these impacts is far from being fully understood. Ocean acidification is poorly monitored at present and a more developed global network of observations is urgently needed.

The observed retreat in summer and winter sea ice over the Arctic, and more recently over parts of Antarctica, have huge implications for primary production, marine food webs, biodiversity, sea level and ocean circulation. We need to know much more about sea ice and air-sea-ice interaction both in the Arctic and Antarctic so that future trends can be better predicted.

Moreover, the coastal fringes of the ocean, where a large fraction of the world’s population lives, are subject to other problems, such as excessive nutrient inputs (eutrophication), oxygen depletion (hypoxia), storms and flooding.

Because we do not know where and when the next disaster will strike, and because experience shows that we do not yet have all the observational background to know how the ocean might respond, our best strategy is to establish, in advance, a suitable world-wide observing network for the ocean. This is what the Partnership for Observation of the Global Oceans (POGO) aims to facilitate, through its own agenda and through leadership of the informal consortium of active bodies in the field known as Oceans United. We can see POGO as the 'Voice of the Oceans', speaking on behalf of Oceans United. In a world undergoing rapid climate change that is driving the ocean (and its ecosystem) into regimes without precedent, we have no firm idea of what lies ahead for the ocean. We would like to be better prepared: that is why we need ocean observations, and why we need POGO.

The Gulf of Mexico oil spill has demonstrated how useful and important regular ocean observations are to disaster response, and at the same time how inadequate current ocean observation systems are, even in highly developed countries such as the United States. The partially-funded ocean observation system already in place in the Gulf of Mexico was admittedly inadequate for the needs of emergency responders, who were forced to depend on non-operational research projects for critical marine observations, ocean circulation models and synthesis products. Coastal radar installations were rapidly repaired and replaced where they had fallen into disuse, and university research laboratories were called upon to coordinate underwater measurement programmes. Clearly, operational oceanography needs secure funding for long-term observations, closely tied to cutting-edge research.

Marine disasters occur in all oceans and on all coasts, respecting no national borders and affecting countries that have only a minute fraction of the national response resources of the United States. International cooperation is desperately needed to build a Global Ocean Observation System (GOOS) that could provide critical data to respond to a wide variety of marine disasters. The Global Earth Observation System of Systems (GEOSS) and its ocean component GOOS, are essential tools providing environmental monitoring data for response to, and mitigation of, the losses from marine disasters. But GOOS has not yet achieved its planned development goals and still lacks a sustainable funding base to provide the long-term observation programme the world needs. In addition, more effort should be invested in the synthesis and prediction components of the observing system, as these are the outputs that are most useful to society. The potential of acoustic methods to monitor ocean processes is under active study. This will broaden the range of techniques available to ocean scientists.

For example, good monsoon predictions depend on high-quality observations of ocean conditions. A fully-functional ocean observing system should be able to give advance warning of severe monsoon rains, such as those that led to the recent major floods in Pakistan (August 2010).

It can be hoped that the recent disasters in the Gulf of Mexico (man-made) and Pakistan (natural) will provide renewed impetus for the development of a monitoring system, in the same way that the Indian Ocean tsunami led to the establishment of an early warning network for earthquakes and related tidal waves. An investment in ocean engineering is required in addition to that in science, to help build these systems. An adequate ocean observing system would not only help to mitigate the disastrous effects of such events, but would also monitor gradual changes, such as Arctic and Antarctic ice retreat, ocean acidification, and decline in fish stocks.

Recent progress under the influence of POGO and Oceans United includes the GEO Biodiversity Network (GEOBON), the Japanese advanced seafloor cabled network for earthquake monitoring (DONET), and a worldwide tsunami monitoring system. GEOBON is starting to coordinate the provision of sustained, cross-cutting, integrated and accessible biodiversity data and information. The need for a Southern Ocean Observing System (SOOS) has been identified and the design document for this integrated, multidisciplinary observing system is now open for comment.

Recently, a scientific instrument with a suite of environmental sensors (including carbon dioxide) has been deployed at Heron Island on the Australian Great Barrier Reef to monitor ocean acidification in this highly sensitive coral reef ecosystem. The carbon dioxide sensors were developed by the US National Oceanic and Atmospheric Administration (NOAA) with the long-term aim of building a global network of carbon dioxide observations in the sea. The Heron Island site is part of a growing network of 23 moorings through the Pacific and Atlantic including coral reef systems.

Another highly significant step has been the establishment, with the support of the Nippon Foundation, of a POGO Centre of Excellence in Ocean Observations. The Centre, which is hosted by the Bermuda Institute of Ocean Sciences, receives ten scholars from developing countries for ten months each year, and teaches them about the theory, methods and interpretation of ocean observations. The programme is now in its third year.