

6. Increasing scientific knowledge, and developing research capacity and transfer of marine technology.

The Argo Program (<http://www.argo.ucsd.edu>), through its global array of nearly 4000 uniformly distributed profiling floats measuring ocean temperature and salinity from the sea surface to 2000 m, has revolutionized oceanography, including basic research, assessment of the climate state of the ocean, secondary and tertiary education, and ocean reanalysis and forecasting.

a) Status and trends

The Argo array, consisting of a profiling float every 3-degrees of latitude and longitude, and collecting a profile every 10 days, was completed in 2007 and has been sustained for 10 years. The high value of Argo is widely recognized (e.g. by the Intergovernmental Oceanographic Commission of UNESCO and by the WCRP's CLIVAR project) and its systematic observations of the physical state of the oceans should be sustained.

b) Challenges and opportunities

Opportunities: Technical advances in profiling floats are allowing Argo to overcome its sampling limitations that have included marginal seas, high latitude ice-covered regions, and the deep ocean below 2000 m. New models of Argo and Deep Argo floats are extending the coverage toward a truly global array. At the same time, new sensors for biogeochemical (BGC) variables make it possible to add multi-disciplinary observations to the Argo Program. The major new initiatives in Argo are Deep Argo (0-6000 m sampling) and BGC Argo.

Challenges: (i) Most national partner Argo Programs are supported out of research funding, for finite periods and without inflationary increases. More robust funding models are needed. (ii) Access to the global oceans for deployment and drift of Argo floats is an essential requirement for sustaining a global array. Present international governance arrangements are not adequate for enabling global coverage including EEZs.

c) Existing partnerships

- • Are many existing partnerships covering the theme of the dialogue?
- Are there identified gaps in coverage?
- Who are the main actors involved in existing partnerships?

Argo National Programs and the number of their presently operational Argo floats include

ARGENTINA (3), AUSTRALIA (387), BRAZIL (6), BULGARIA (1), CANADA (73), CHINA (122), ECUADOR (1), EUROPEAN UNION (51), FINLAND (5), FRANCE (324), GERMANY (148), GREECE (5), INDIA (129), IRELAND (10), ITALY (73), JAPAN (162), KENYA (1), MAURITIUS (1), MEXICO (2), NETHERLANDS (18), NEW ZEALAND (7),

NORWAY (10), PERU (3), POLAND (4), REPUBLIC OF KOREA (63), SPAIN (8), UK (136), USA (2239). Further increases in the number of partner National Programs are sought.

- Do we know how well existing partnerships are performing?
- What have been success factors? What are the main challenges identified with existing partnerships?
- Have successful partnerships on the theme been narrowly focused in scope, or more holistic, encompassing several related areas?

The Argo Steering Team (AST) guides and coordinates the implementation of the Argo Program, including issues of spatial coverage and float and sensor technical performance. The AST's subcommittee the Argo Data Management Team (ADMT) is responsible for evolution and maintenance of the Argo Data System. A second subcommittee, the Biogeochemical Argo Steering Team is responsible for integration of new BGC sensors into the Argo Program. Other operational aspects of Argo, including IOC-mandated notifications of Argo float deployment are managed through the WMO/IOC JCOMMOPS Argo Information Center.

d) Possible areas for new partnerships

Given challenges, opportunities and gaps, how could new partnerships help with implementation?

- What actors would need to be involved for new partnerships to succeed?
- What would be critical success factors?

On the applications side, many *ad hoc* partnerships exist for basic research using Argo data as well as for assessment of ocean/climate variability and change, education applications, and ocean reanalysis and forecasting. Some of these have more formal expression such as through the WCRP CLIVAR Project, the Global Ocean Data Assimilation Experiment – Ocean View, and the Intergovernmental Panel on Climate Change.

e) Guiding questions for the dialogue