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Climate Change and Guidelines for Argo Profiling Float Deployment on the High Seas

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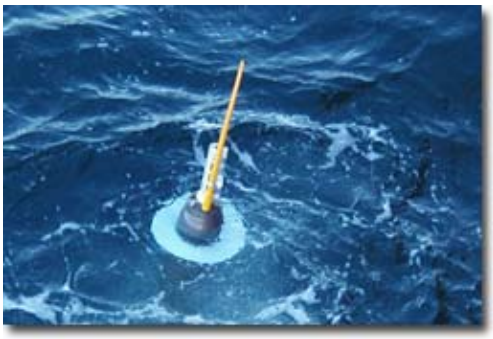
Introduction



States often recognize a need for international legal regulation over new areas of activity. In many circumstances such regulation takes the form of soft-law guidelines or codes of conduct.[1] However, the law of the sea remains affected by an age-old controversy among scientists and diplomats over the dichotomy between "freedom versus regulation." In the conduct of oceanic research activities with new technologies, instruments, and equipment, a fierce resistance to legal regulation of the high seas coexists in an uneasy compromise with a fierce protection of coastal States' sovereign rights to explore and exploit the natural resources of the continental shelf and the Exclusive Economic Zone (EEZ).[2]

The deployment on the high seas by States or international organizations of Argo profiling floats epitomizes this controversy. The Argo Project is an array of 3255 (as of March 23, 2010) active free-floating ocean monitoring devices.[3] Its worldwide scope calls for some form of international legal regulation, because it employs thousands of voluntary observing ships and ships of opportunity, as well as tide gauges, surface drifters, sub-surface drifters, moored buoys, and profiling floats that may drift into national EEZs.[4] Argo floats are deployed to collect a large database of ocean signals related to climate change[5] and provide *in situ* satellite observations of the Earth System as a whole, while protecting life and property, predicting climate variations and severe weather, collecting, storing, and distributing data and information freely to all interested users in near-real time.[6]

In June 2008, the Executive Council of the Intergovernmental Oceanographic Commission of UNESCO (UNESCO/IOC), after extensive debate by members of the IOC Advisory Body of Experts on the Law of the Sea (IOC/ABE-LOS), adopted Guidelines for the legal regulation of Argo Profiling Float Deployments on the High Seas.[7] The Guidelines generated such controversy among IOC/ABE-LOS members that some recommended that

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ORGANIZATIONS OF NOTE

The Argo Project

this body be disbanded. In June 2009, the IOC Assembly confirmed the value, progress, mandate, achievements, and opportunities for future activities by the IOC/ABE-LOS and its key role in soft law implementation of the Guidelines. In June of this year, at its 43rd Session, the IOC Executive Council is scheduled to review IOC/ABE-LOS and to "agree to its future mandate and means of operation," while also receiving updates from the Intergovernmental Coordination Groups for Tsunami Warning and Mitigation Systems for the Pacific Ocean, the Indian Ocean, the North-Eastern Atlantic, the Mediterranean and connected seas, as well as the Caribbean and Adjacent Regions.[8] The outcome of this review will prove critical for the role of the IOC in the implementation of the Guidelines, and it may have a potential impact on integration and the effective legal regulation of the scientific work of these groups. This Insight outlines the relevance of the Guidelines and the role of the Argo Project in monitoring climate change.

I. Argo's Institutional Architecture and International Law Relevance

The Argo float deployment began in 2000 and was completed in 2007.[9] The project emerged in the late 1980s as part of the World Climate Research Program and its two leading components: the World Ocean Circulation Experiment (WOCE)[10] and the Climate Variability and Predictability Project (CLIVAR).[11] It is also a direct heir to WOCE, which concluded in 2002 with the publication of large sets of high quality oceanographic data and an expected steady flow of results still under analysis.

CLIVAR is the first scientific program designed to study climate variability in decade-to-century time scales and to attribute causes to climate change.[12] When the Argo project was launched in May 2001, it was characterized by its focus on El Niño/Southern Oscillation.[13] It was suggested that the impact of a bad El Niño year could cause serious economic damage through flooding to the agricultural sector and coastal communities. Argo was designed to predict the effects caused by the storage of vast amounts of heat in the oceans and explain how this heat is transported by ocean currents, thus providing a better understanding of other basin-scale oceanic phenomena with global impact, such as hurricanes, abundance of fish, coastal circulation and movement of pollutants and industrial waste, and the global absorption of carbon by the oceans. It was anticipated that the results of Argo Program observations would apply to food and water distribution, energy, and coastal security against sea level rises.[14]

The Argo Program is the largest pilot project within the Global Ocean Data Assimilation Experiment (GODAE), itself a component of the Global Ocean Observing System (GOOS).[15] GOOS uses high precision oceanographic altimetry to monitor the oceans and is a joint project of the International Council for Science, the United Nations Environmental Programme, the World Meteorological Organization (WMO), and the IOC of United Nations Educational, Scientific and Cultural Organization (UNESCO). These organizations embraced the Argo project in response to demands voiced at the 2002 World Summit on Sustainable Development (WSSD). The WSSD Implementation Plan is rooted in the 1972 Stockholm Declaration on Human Environment—an instrument that has served as the environmental yardstick over the last thirty years—and calls for a significant increase in the use of both *in situ* observations and satellite-based observations of the Earth

World Ocean Circulation Experiment (WOCE)

Climate Variability and Predictability Project (CLIVAR)

Global Ocean Observing System (GOOS)

World Meteorological Organization (WMO)

Intergovernmental Oceanographic Commission

UNESCO/IOC/LOS

United Nations Educational, Scientific and Cultural Organization (UNESCO)

United Nations Framework Convention on Climate Change Secretariat

system. The latter includes a global ocean observing and information system for oceanic and atmospheric forecasting, for ocean and coastal zone management by coastal nations, and for global environmental change research. The Plan also calls for the provision, in support of sustainable development, of information based on such observations, pursuant to Agenda 21 of the United Nations Conference on Environment and Development.[16]

Argo project activities were also endorsed by the Fourth Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC).[17] The parties to the Convention committed to engage in the collection, processing, and control of data provided by global and systematic meteorological, atmospheric, terrestrial, space-based, and oceanographic observation activities.[18] Argo floats were expected to provide direct support to operational oceanography and meteorology and data to be integrated with space-based measurements of the ocean surface in numerical models for the climate observing system called for by the UNFCCC.[19] The Argo Program therefore is described as one of IOC's major observing system projects in coordination with the WMO through the Joint Technical Commission for Oceanography and Marine Meteorology, particularly in the implementation of GODAE and GOOS.

Since 2007, the Argo Program operates also in the framework of WMO Integrated Global Observing Systems, contributing to the Global Earth Observation System of Systems (GEOSS), which aims to understand and address global environmental and economic challenges, as called for by the Group of G-8 nations at Evian, France, in June 2003. It is part of a ten-year plan for coordinated global observations to be monitored by the Group on Earth Observations, hosted at Geneva by the WMO. Accordingly, the Argo Program is part of a multi-disciplinary and multi-domain global climate observing system.[20]

a. What are Argo Program Floats?

Argo profiling floats are free-floating instruments that measure oceanic temperature and salinity. They are deployed and programmed to descend vertically to a certain depth, then travel horizontally and, at specific intervals, rise to the ocean surface, where they relay via satellite and in real time their position; they then proceed to transfer temperature/salinity profiles and velocity measurements relevant to climatic changes, marine meteorology, geophysical gravity changes in the Earth's crust, and the topography of ocean surfaces. This information is retrieved and stored at a data processing center for dissemination to the operational oceanography community and its final users.[21]

b. How Is Information Disseminated?

The Argo Information Center (AIC) was established in 2001 in Toulouse, France, by the IOC/WMO to coordinate the deployment of Argo floats *in situ* around the globe.[22] To date, there are 3255 Argo profiling floats operational in the world's oceans with the support of forty-six nations, including the European Union.[23] The published data feed ocean models on global climate variability research in decade-to-century time scales. These models

integrate the Argo data with other measurements in the search for causes of climate change and may yield answers on how to predict global effects caused by vast amounts of heat transported through ocean currents.[24]

II. Genesis of the Soft Law Guidelines

Legal lacunae prompted the IOC to establish the IOC/ABE-LOS in 1997. It was tasked with reporting on the legal framework for collecting oceanographic data[25] and developing Guidelines according to the principles adopted in 1999 by the IOC Assembly in Resolution XX-6. The latter provided that a) the Argo Program "shall be fully consistent with United Nations Convention on the Law of the Sea (UNCLOS);" b) "concerned coastal States must be informed in advance through appropriate channels of all deployments of profiling floats which might drift into waters under their jurisdiction, indicating the exact locations of such deployments;" and c) the IOC Executive Secretary would "inform Member States of float locations and how to access float data."[26]

The IOC/ABE-LOS delegates conducted lengthy discussions between 2004 and 2009.[27] Professor Kari Hakapaa (acting coordinator) and Elie Jarmache (Chairman) opened the 2007 meeting in Gabon with the understanding that the Guidelines would consist of simplified procedure not meant to fill gaps, change the rights and obligations of States under UNCLOS, or replace those rights. A majority of Member delegates viewed the deployment of Argo profiling floats as an activity better characterized as Operational Oceanography not governed by the Marine Scientific Research provisions under UNCLOS 1982 Part XIII. After intense debate, delegates agreed to discuss whether a coastal State's consent would be required prior to the deployment of instruments that might drift into its EEZ because of concerns that information concerning valuable natural resources could be the target of deployments. Delegates to the IOC/ABE-LOS then shifted positions, leaning toward stronger regulation and requiring prior consent by coastal States in place of the notification principle embraced in 1999 by the IOC Assembly in Resolution XX-6. As adopted, the Guidelines compromise between these positions by requiring prior notification and allowing coastal States a level of control over the public distribution of sensitive information.

III. The IOC 2008 Guidelines

The IOC Guidelines consist of a short non-binding document that includes a preamble and seven Guidelines.[28]

a. Information Versus Notification (Guidelines 1 to 3)

According to Guideline 1, an IOC Member State must be "informed in advance" through appropriate channels of the deployment on the high seas of any Argo project float that may enter its EEZ. IOC Member States may declare at any time in writing, if they so desire, "that they wish to be notified" of such deployment, and the IOC Executive Secretary will immediately transmit the request to IOC Member States.

Guideline 2 sets up a *general* communication mechanism between the Argo float "Implementer" (deployer), the AIC, and the Argo Focal Point (AFP) in the coastal State. The Implementer is responsible for the deployment and

"transmit[s]" a set of five information parameters through the AIC to the AFP designated by the IOC Member State.[29]

Guideline 3 sets up a *specific* communication mechanism for the Implementer to notify the AFP "reasonably in advance of the expected entry of the float into the EEZ" of the possibility that a float might drift into the EEZ of an IOC Member State that has expressed its desire [to the IOC Executive Secretary] to be notified.

b. Data Policy (Guideline 4)

All data obtained by Argo profiling floats will be made freely available by the Implementer, including data obtained in the EEZs of coastal States. However, coastal States retain the right to restrict the release of data by the Implementer for a limited period of time if the data is "of direct significance for the exploration and exploitation of natural resources, whether living or non-living." This exception to the free availability of data is designed to protect the sovereign rights of the coastal State over the continental shelf and the EEZ.[30] This might amount to an exception to the IOC/WMO Data Policy,[31] according to which "Member States shall provide timely, free and unrestricted access to all data, associated metadata and products generated under the auspices of IOC programs."[32]

IV. Analysis: Operational Oceanography or Marine Scientific Research (MSR)?

Roughly, the U.S. and other leading researching State delegations to IOC/ABE-LOS[33] regard the deployment of Argo profiling floats as Operational Oceanography[34] and its operation an exercise of the freedom of the high seas (which includes navigation and overflight) by the nation or the organization deploying the Argo floats, not subject to regulation.[35] For these states, Guideline 1 undermines the principle of freedom of scientific research and observation on the high seas.[36] Given current practices and personnel constraints, it was argued, a literal application of the UNCLOS Part XIII MSR regime might be impossible because implementers are not staffed to make such notifications to all the coastal States into whose EEZ a float might drift.[37] Even if such notifications were possible, a considerable burden and duplication of effort by the existing bureaucracies might follow because the role of AIC as a multilateral mechanism provided by the international organizations is neglected: it is only tasked to "undertake the notification" after the bilateral communication of Guideline 3 has been implemented.

A number of coastal States, led by the delegations of Peru and Argentina,[38] view Operational Oceanography as a modality of MSR governed by Part XIII of 1982 UNCLOS.[39] In their view, irrespective of the Guidelines, UNCLOS Articles 246, 248, and 249 would compel a State or competent international organization engaged in the deployment of Argo profiling floats on the high seas that might drift into the EEZ of another State to seek prior coastal State authorization "not less than six months in advance of the expected starting date of the marine scientific research project" and to provide the coastal State with extensive information.

Implementing the Guidelines may therefore prove controversial, and the application of MSR Part XIII of 1982 UNCLOS may not solve the uncertainties because MSR or other types of oceanographic research remain undefined. Nor do the Guidelines clarify mechanisms for communication between coastal State organs and the AFP to prevent or to minimize duplication and possible confusion among agencies within States regarding Argo program float deployments. Consequently, a lack of effective scientific cooperation among relevant States could undermine the success of the 1992 UNFCCC commitments to promote the systematic observation of the climate system, Article 4(1)(g) and 4(1)(h).[40] However, States and international organizations are bound under Article 59 of UNCLOS 1982 to negotiate any disagreements regarding the exercise of residual rights in the EEZ not specifically attributed by UNCLOS to any specific State "on the basis of equity and in the light of all the relevant circumstances, taking into account the respective importance of the interests involved to the parties as well as to the international community as a whole."

Conclusion

The IOC Guidelines for the deployment of Argo profiling floats on the High Seas are a step forward in the implementation of UNCLOS through soft law, though they are filled with legal uncertainty. Although the work of the IOC/ABE-LOS has been critical to date, it is unclear whether its mandate will be confirmed by the IOC Executive Council at its 43rd session in June 2010.[41] Ultimately it remains the prerogative of marine scientists and stakeholder States to develop effective practices pursuant to the Guidelines and to fill the lacunae in a manner that places climate change ocean observations in the service of humanity.[42]

About the Authors

Aurora Mateos (Postgraduate Diploma in European Studies, University of Paris I-La Sorbonne; M.phil. in Law, Universidad de Málaga; MSc Universidad Autónoma de Madrid; Bachelor of Law, Universidad de Málaga) is an attorney and former Technical Secretary of the IOC/ABE-LOS (2004-2009). Montserrat Gorina-Ysern (Ph.D. University of New South Wales, 2006; LL.M. Universitat de Barcelona 1984; and Bachelor of Law Universitat Autònoma de Barcelona, 1979) is a consultant and the founder and Director of the Healthy Children-Healthy Oceans Foundation.

Endnotes

[1] Int'l L. Comm'n [ILC], Study Group of the Int' L. Comm'n, *Fragmentation of International Law: Difficulties Arising from the Diversification and Expansion of International Law*, U.N. Doc. A/CN/4/L.682 (Apr. 13, 2006) (*prepared by* Martti Koskenniemi).

[2] The Geneva Convention on the High Seas art. 2, *opened for signature* Apr. 29, 1958, 13 U.S.T. 2312, 450 U.N.T.S. 82 (provides that "[t]he high seas being open to all Nations, no State may validly purport to subject any part of them to its sovereignty. Freedom of the high seas . . . shall be exercised by all States with reasonable regard to the interests of other States

in their exercise of the freedom of the high seas). The Geneva Convention on the Continental Shelf art. 2, *opened for signature* Apr. 29, 1958, 15 U.S.T. 471, 449 U.N.T.S. 311 (provides that "[t]he coastal State exercises over the continental shelf sovereign rights for the purpose of exploring it and exploiting its natural resources"). Both of these articles were codified in the United Nations Convention on the Law of the Sea as Article 87 and Article 77.1, respectively. *See* United Nations Convention on the Law of the Sea [UNCLOS], *opened for signature* Dec. 10, 1982, U.N. Doc. A/CONF.62/122 (1982), *reprinted in* 21 I.L.M.1261 (1982). The U.S. has not acceded to UNCLOS, though it is a world Argo Project leader.

[3] *See* Argo Home Page, *Current Status of Argo*, http://www.argo.ucsd.edu /About_Argo.html; *see also* ARGONAUTICS, Sept. 2009, *available at* http://argo.jcommops.org/FTPRoot/Argo/Doc/Argo_Newsletter_11.pdf. In the 2007 sessions of the IOC/ABE-LOS at Gabon, delegates defined float as "an autonomous instrument used for collection of oceanographic data, which, when deployed descends to a programmable depth where it remains until, at programmed intervals, it rises to the ocean surface where its position is determined using satellite technologies and . . . any oceanographic data collected are transmitted via satellite to a data processing center for dissemination to users." *See* IOC/ABE-LOS VII/3, ¶ 39 (2007).

[4] *Proceedings from GEOSS Workshop XXVII - Understanding the Integrated Ocean Observation System, Including Sub-surface Sensors* (May 10, 2009), *available at* http://www.ieee.org/organizations/pubs/newsletters/oes/html/fall09/GEOSS-Workshop.html. *See also Report to the UNFCCC Regarding Sweden's Participation in Global Climate Observing Systems (GCOS) and on Systematic Observation in Sweden* (2005) (on file with Sweden's focal point to GOCS, Erik Lilja) [hereinafter Swedish Report].

[5] Argo Home Page, *Global Change Analysis*, http://www.argo.ucsd.edu /global_change_analysis.html.

[6] *See* IOC Advisory Body of Experts on the Law of the Sea [IOC/ABE-LOS], 7th Sess. (Mar. 19-23, 2007), at 5, *available at* http://ioc3.unesco.org/abelos /index.php?option=com_docman&task=doc_download&gid=254.

[7] *See* IOC/EC-XLI/3, Annex II (July 29, 2008). 41st Sess. of the Executive Council adopted resolution EC-XLI.4: "Guidelines for the implementation of Resolution XX-6 of the IOC Assembly regarding the deployment of Profiling floats in the High Seas within the framework of the Argo Program", *available at* http://unesdoc.unesco.org/ulis/cgi-bin/ulis.pl?database=ged&mode=e& sc1=1&sc2=1&by=3&look=ioc&req=2&no=179861.

[8] *See* IOC-XXV/3 prov. – Annex II, (Apr. 7, 2010), 25th Sess. of the IOC Assembly adopted Resolution XXV-1, *Ninth Meeting of the IOC Advisory Body of Experts on the Law of the Sea*, IOC/ABE-LOS IX.

[9] The Argo Program name is a clever allusion to the mythological ship used by Jason and the Argonauts in search for the Golden Fleece (Argo is counterpart to the "Jason" satellite) and "Argos the giant, who was blessed with 100 eyes to see in all directions, with only a handful asleep at any one

time." *See Earth Monitoring: Observing the Ocean from Within*, NATURE NEWS, Dec. 5, 2007, *available at* http://www.nature.com/news/2007/071205/full/450780a.html.

[10] *See* World Ocean Circulation Experiment Global Data Resource, http://woce.nodc.noaa.gov/wdiu/.

[11] *See* Climate Variability and Predictability, http://www.clivar.org.

[12] The Secretary-General, *Report of the Secretary-General on Oceans and the Law of the Sea*, at 478-83, U.N. Doc.A/56/58 (Mar. 9, 2001) [hereinafter Secretary-General Report I]; and The Secretary-General, *Report of the Secretary-General on Oceans and the Law of the Sea*, at 527-28, U.N. Doc.A/57/57 (Mar. 7, 2002) [hereinafter Secretary-General Report II], *available at* http://www.un.org/Depts/los/general_assembly/general_assembly_reports.htm.

[13] Previously studied under the Tropical Oceans/Global Atmosphere Program (TOGA).

[14] *See* Presentation to the Joint Technical Commission on Oceanography and Marine Meteorology, *Launching the Argo Armada*, www-eng.lbl.gov/~dw/projects/misc/argo.pps.

[15] *See* Swedish Report, *supra* note 4.

[16] Sponsors Group for the Global Observing Systems, 9th Mtg. G3OS (2004), *available at* http://www.fao.org/gtos/meetGXOS.html. *See also* Joint IOC-WMO Circular Letter, JCOMM No. 002 (Feb. 7, 2000), *available at* www.jodc.go.jp/info/ioc_doc/Annual/123069eo.pdf.

[17] United Nations Framework Convention on Climate Change, *opened for signature* May 9, 1992, *reprinted in* 21 I.L.M. 849 (1992). The Fourth Session of the UNFCCC, Conference of the Parties (COP4), Buenos Aires, Argentina, 1998, *available at* http://unfccc.int/cop4/.

[18] UNFCCC art. 4(1)(g) ("Promote and *cooperate in scientific, technological, technical, socio-economic and other research, systematic observation and development of data archives* related to the climate system and intended to further the understanding and to reduce or eliminate the remaining uncertainties regarding the causes, effects, magnitude and timing of climate change and the economic and social consequences of various response strategies.") (emphasis added).

[19] Intergovernmental Oceanographic Comm'n [IOC] of UNESCO, Annual Report, SC-2001/CONF.216/CLD.14 (2000), *available at* www.jodc.go.jp/info/ioc_doc/Annual/123069eo.pdf.

[20] *See* Swedish Report, *supra* note 4.

[21] IOC Advisory Body of Experts on the Law of the Sea 7th Sess. Report, *supra* note 6.

[22] Personal communication with Mr. Mathieu Belbeoch, Argo Coordinator

(Dec. 2008), *infra* note 39.

[23] *See* Argo Homepage, *How Argo Floats*, http://www.argo.ucsd.edu/How_Argo_Floats.html. States involved are Argentina, Australia, Brazil, Canada, Chile, China, Cook Islands, Costa Rica, Denmark, Ecuador, European Union, Fiji, France, Gabon, Germany, Greece, Iceland, India, Indonesia, Ireland, Japan, Kenya, Kiribati, Korea (Republic of), Marshall Islands, Mauritius, Mexico, Micronesia (Federate States of), Mozambique, Netherlands, New Caledonia, New Zealand, Niue, Norway, Papua New Guinea, Poland, Russian Federation, Samoa, Solomon Islands, South Africa, Spain, Tokelau, Tonga, Tuvalu, United Kingdom, United States of America, and Vanuatu. See Joint WMO IOC Technical Commission for Oceanography and Marine Meteorology, *at* http://wo.jcommops.org/cgi-bin/WebObjects/Argo.woa/wa/default.

[24] The Secretary-General Report I, *supra* note 12, at 478-84; and Secretary-General Report II, *supra* note 12, at 527-28.

[25] With special emphasis on the legal regime for the deployment of Argo floats on the high seas in the event that they might drift into the EEZ of a nation, whether or not involved in the program.

[26] *Id*. Res. EC-XLI.4, Annex to the IOC/EC-XLI/3 (July 29, 2008).

[27] Reports of these meetings are available at http://ioc3.unesco.org/abelos/index.php?option=com_content&task=view&id=18&Itemid=32.

[28] IOC Res. EC-XLI.4, *Guidelines for the Implementation of Resolution XX-6 of the IOC Assembly Regarding the Deployment of Profiling Floats on the High Seas in the Framework of the Argo Program* (June 30, 2008), *in* Intergovernmental Oceanographic Comm'n of UNESCO Adopted Resolution, IOC/EC-XLI/3 prov. – Annex II, at 7, *available at* http://www.unescobkk.org/fileadmin/user_upload/westpac/documents/WESTPAC_VII/Adopted_Res.pdf.

[29] The information includes type and number of floats to be deployed; dates and geo-coordinates of locations where floats are to be deployed in the high seas; contact information of the Implementer; parameters and variables to be collected by sensors; and other information that the Implementer might consider of interest.

[30] UNCLOS arts. 56.1 (a), 56.2 [for the EEZ], 76.1, 76.3,6,8, 9 and 78.2 in the Continental Shelf; and art. 249.2 regarding the duty to comply with certain conditions, specifically prior to publication of research results.

[31] IOC Res. XXII-6 on the IOC Oceanographic Data Exchange Policy (June 24 - July 4, 2003), *available at* http://www.scor-int.org/IOCDataPolicy.pdf.

[32] *Id*. cl. 1.

[33] *See* Intergovernmental Oceanographic Commission of UNESCO [UNESCO/IOC], 8th Mtg. of the IOC Advisory Body of Experts on the Law of the Sea [IOC/ABE-LOS VIII], IOC/ABE-LOS VIII/3 (June, 3 2008), *available at* http://www.ioc-unesco.org/hab/components/com_oe

/oe.php?task=download&id=3906&version=1.0&lang=1&format=1 [hereinafter IOC Experts Meeting].

[34] Defined as “the routine collection of ocean observations in all maritime zones . . . used for monitoring and forecasting . . . [for] near real time transmission . . . and availability to the public.” *See* J. Ashley Roach, PowerPoint Presentation at the Rhodes Academy (July 2007), *available at* http://www.authorstream.com/Presentation/Peppar-9552-Roach-Internal-Waters-TS-Innocent-Passage-INTERNAL-WATERS-TERRITORIAL-SEA-INNOCENT-PASSAGE-roach-internal-waters-ts-and-innocent-passage-ppt-powerpoint; *See also* J. Ashley. Roach, *Defining Scientific Research: Marine Data Collection*, *in* LAW, SCIENCE & OCEAN MANAGEMENT 541 (Myron H. Nordquist et al., eds., 2007).

[35] *See* Katharina Bork et al., *The Legal Regulation of Floats and Gliders-In quest of a New Regime?* 39 OCEAN DEV. & INT'L L. 298 (2008). *See also* UNCLOS Part V (“Exclusive Economic Zone”); Part VI (“Continental Shelf”); Part VII (“High Seas”); Part XII (“Protection and Preservation of the Marine Environment”); and Part XV (“Settlement of Disputes”); and UNCLOS art. 87.2 (Part VII).

[36] *See* IOC 7th Sess. of IOC Advisory Body of Experts on the Law of the Sea (IOC/ABE-LOS) (May 10, 2007), IOC/ABE-LOS VII/3, *available at* http://ioc3.unesco.org/abelos/index.php?option=com_docman&task=doc_download&gid=254.

[37] Bork et al., *supra* note 35 (as also objected by the U.S., one of the main implementers of Argo, at IOC/ABE-LOS VIII/3). According to Matthew Belbeoch, the Argo Information Center Deployment plans involving Argo Program floats are registered and confirmed with the AIC. When the draft plan and its updates – i.e. based on Argo array status, ship routes, etc. – is final, it is “notified” to the AFP through the AIC, in other words, the deployer/implementer provides confirmation of deployment. The AIC then provides every Argo Program float with a tracking registration number to identify the float (the WMO identifier) by several criteria such as manufacturer and telecommunications in use. Floats share the nationality of the purchasing institution, which may be an oceanographic or a meteorological center; and are linked to a responsible person, for example a national or sub-national program manager or a principal investigator. The Argo program technical coordinator ensures compliance by each Argo Program float deployer with the rules outlined above and monitors the accuracy of identifying information regarding each float before placing it on the Argo Data System for real-time relay. The Argo Program float community receives monthly reports in addition to the information available at its website. All the relevant information about deployment is sent to all Argo National Focal Points via email, and all data is distributed through the Argo identifier.

[38] *See* IOC Experts Meeting, *supra* note 36.

[39] *See* UNCLOS arts. 239-265. Article 258 provides that “the deployment and use of any type of scientific research installations or equipment in any area of the marine environment shall be subject to the same conditions as . .

. marine scientific research in such areas.”

[40] Under the 1992 UNFCCC, the “climate system” refers to the “totality of the atmosphere, hydrosphere, biosphere and geo-sphere and their interactions.” UNFCCC art. 1(3).

[41] The 43rd Session of the IOC Executive Council will take place from 8-16 June 2010 (“IOC and Law of the Sea” is scheduled under point 4.4 of the provisional agenda (IOC/EC XLIII/1 Prov)). More information is *available at* http://www.ioc-unesco.org/index.php?option=com_oe&task=eventCalendar&headGroupID=All&Itemid=31.

[42] MONTSERRAT GORINA-YSERN, AN INTERNATIONAL REGIME FOR MARINE SCIENTIFIC RESEARCH (2004).