

MEMORANDUM of UNDERSTANDING

between

THE NATIONAL SCIENCE FOUNDATION

of

THE UNITED STATES OF AMERICA

and

THE MINISTRY OF EARTH SCIENCES

concerning PARTICIPATION of

INDIA

in

THE INTERNATIONAL OCEAN DISCOVERY PROGRAM

as a member of

the *JOIDES Resolution* CONSORTIUM

The International Ocean Discovery Program (IODP) is a multinational program of scientific research in the oceans which uses drilling and logging to undertake research on earth system processes ranging from changes in the earth's climate to the rifting and drifting of continents. The IODP builds on the scientific results of the Deep-Sea Drilling Project (DSDP) initiated in 1968, the Ocean Drilling Program (ODP), which succeeded the DSDP in 1985, the Integrated Ocean Drilling Program, which began in 2003 and the encouragement that the United Nations Convention on the Law of the Sea has provided to international cooperation in marine scientific research. The IODP seeks to expand the international sharing of intellectual and financial resources, which have been critical to the success of scientific ocean drilling. The IODP scientific program is identified in the IODP Science Plan: *Illuminating Earth's Past, Present, and Future: The International Ocean Discovery Program Science Plan for 2013-2023*, which highlights four main themes, each encompassing a short list of high-priority scientific challenges. These themes are:

Climate and Ocean Change: Reading the Past, Informing the Future: Utilizing strategies that include latitudinal, longitudinal, and depth transects, scientific drilling will recover ocean floor sediment cores to provide records of past environmental and climatic conditions that are essential to understanding earth system processes.

Biosphere Frontiers: Deep Life Biodiversity and Environmental Forcing of Ecosystems: Samples recovered by ocean drilling permit the study of Earth's largest ecosystems, offering insights into the origins and limits of the deep biosphere, evolution of marine microfauna through times of environmental change, and human origins.

Earth Connections: Deep Processes and Their Impact on Earth's Surface Environment: The dynamic processes that create and destroy ocean basins, shift the position of continents, and generate volcanoes and earthquakes extend from Earth's core to its atmosphere, and are fundamental for understanding global change within the context of planetary evolution.

Earth in Motion: Processes and Hazards on Human Times Scales: Many fundamental Earth system processes, including those underlying major geologic hazards, occur at "human" timescales of seconds to years, requiring new sampling, downhole measurement, monitoring, and active experimental approaches.

The *JOIDES Resolution*, provided by the National Science Foundation (NSF) and operated by the U.S. Implementing Organization, is a non-riser vessel available for IODP operations on a global basis. Operational and management oversight of this drilling vessel and ancillary IODP functions is provided by the *JOIDES Resolution* Facility Board, which consists of leading members of the international scientific community and representatives from the NSF, funding agencies contributing to the operations of the vessel, and the U.S. Implementing Organization. Based upon recommendations from its advisory panels, the *JOIDES Resolution* Facility Board approves annual scientific operations for the vessel.

The NSF and the Ministry of Earth Sciences (MoES), hereafter referred to as the Participants, intend to cooperate in IODP activities during the period 1 October 2013 to 30 September 2019, as described in the following sections:

1 - STATUS OF THIS DOCUMENT

This Memorandum and its annexes are not legally binding, do not give rise to obligations or commitments under international law, and should have no effect as legal precedents.

2 - MEMBERSHIP IN THE *JOIDES Resolution* CONSORTIUM

MoES has elected to be a member to the *JOIDES Resolution* Consortium of the IODP and intends to cooperate and participate in the IODP in support of the IODP science program during the period of 1 October 2013 to 30 September 2019.

All cooperative activities described in this Memorandum, including funding arrangements and exchanges of technical information, equipment, and data, are conducted within the limits of available funds and in accordance with the national laws and regulations of each Participant, as well as with international agreements concluded by the nations in which the Participants are established, particularly any intended to prevent, reduce, and control pollution of the marine environment.

The NSF is acting pursuant to the National Science Foundation Act of 1950 as amended, 42 USC1861 *et seq.* This authorization defines the authority of the NSF to enter into this MOU to cooperate in IODP activities.

3 - DURATION OF MEMORANDUM

The IODP implementation period extends from 1 October 2013 until 30 September 2019. During this period, drilling is to be accomplished from the non-riser platform *JOIDES Resolution* if recommended by the Advisory Panels, approved by the *JOIDES Resolution* Facility Board, and if funding and/or other resources are provided by *JOIDES Resolution* Consortium members for *JOIDES Resolution* operations.

Cooperation under this Memorandum may be discontinued at any time by either Participant. The other Participant should receive written notice at least one year in advance.

4 - SCIENTIFIC PLANNING

Scientific planning and direction of the IODP is a function of the two primary Advisory Panels: the Science Evaluation Panel and the Environmental Protection and Safety Panel. The Advisory Panels are composed of scientists and engineers representing the Participants and other IODP members. These panels provide guidance on the scientific planning of the IODP and recommend science and engineering plans based on proposals from the international science community.

The Science Evaluation Panel is composed of representatives from scientific institutions or organizations in the IODP member countries/consortia that have a major interest in the study of the seafloor. The Science Evaluation Panel formulates scientific recommendations to the Platform Provider Facility Boards with respect to IODP planning and operations and is supported by the Environmental Protection and Safety Panel.

The *JOIDES Resolution* Facility Board may change the panel structure at any time in response to changing needs of the Facility.

MoES may elect to be represented on the Advisory Panels, as identified in Annex B.

5 - OPERATIONS PLANNING AND MANAGEMENT OF THE *JOIDES Resolution*

The *JOIDES Resolution* Facility Board develops and manages operations and implementation plans for the *JOIDES Resolution*. The Facility Board receives advice and recommendations on scientific priorities and drilling proposals from the Advisory Panels, requests plans that are responsive to this advice from the U.S. Implementing Organization and recommends approval of Annual Program Plans for the operations of the *JOIDES Resolution* and associated ancillary activities (e.g., publications, core curation, technical development) and the IODP Science Support Office to the NSF. The NSF has responsibility for contractual approval of the annual *JOIDES Resolution* Program Plan and the IODP Science Support Office Program Plan. Significant changes in these Annual Program Plans are to be considered and recommended for approval by the *JOIDES Resolution* Facility Board to the NSF for implementation.

6 – IODP FORUM

The IODP Forum is the custodian of the Science Plan and is a venue for exchanging ideas and views on the scientific progress of the program. The Forum will also provide advice to IODP Facility Boards on Platform Provider activity. IODP Forum membership is open to all countries, consortia, or entities providing funds to any IODP platform operations. Members will include active community scientists and representatives from funding agencies (to any platform), implementing organizations, and program member offices.

As a member of the *JOIDES Resolution* Consortium, MoES may elect to send funding agency and scientific representatives to the IODP Forum, the number of which will be set forth in the IODP Forum Terms of Reference. Each Participant designates its own representatives to the Forum.

7 – PROJECT PROPOSALS AND DATA SHARING FOR *JOIDES Resolution* OPERATIONS

Scientists of India

- a) may make proposals that utilize the *JOIDES Resolution* and other IODP drilling platforms for scientific projects or technical objectives of interest to the scientific community of India. Specific documents related to proposal submission requirements can be obtained at <http://iodp.org/submitting-proposals>;
- b) may have access to all data from geophysical and other site surveys performed in support of the program that are used for drilling planning for the *JOIDES Resolution*; and
- c) may have access to engineering plans, data or other information developed under contracts supported as *JOIDES Resolution* Consortium program costs.

8 - PARTICIPATION ON BOARD THE *JOIDES Resolution* AND ECORD MISSION SPECIFIC PLATFORMS

The U.S. Implementing Organization provides science operations and services on *JOIDES Resolution*, and selects the scientific teams for each cruise or drilling program based on nominations and applications from IODP member program offices. It is understood that opportunities for such participation shall reflect the level of support provided by MoES, as specified in Annex B.

It is recognized that some *JOIDES Resolution* expeditions may be of special scientific interest to scientists from India and increased participation by scientists from India on these expeditions may be appropriate. It is recognized that such increased participation may be offset by reduced participation in other expeditions.

Co-chief scientists for IODP drilling programs implemented by the *JOIDES Resolution* are nominated by the Advisory Panels. In nominating co-chief scientists, the Advisory Panels pay due consideration to primary proponents responsible for drilling proposals and plans. Scientist representing India invited to serve as co-chief scientists will not be counted against participation levels specified in Annex B (this provision may be subject to revision by the *JOIDES Resolution* Facility Board).

Scientists from India will have participation rights aboard Mission Specific Platforms (MSPs), as specified in Annex B.

9 – ACCESS TO SAMPLES, DATA, AND REPORTS

Scientists from India have access to IODP data and core samples from the all IODP drilling platforms. The procedures and policies for obtaining IODP samples and data are determined by the IODP platform Facility Boards. MoES indicates that it endeavors to ensure that the scientists and institutions from India provide the scientific data resulting from site surveys and laboratory analyses in time for preparation of IODP publications and for inclusion in IODP databases. MoES is expected to provide the *JOIDES Resolution* Facility Board and ECORD Facility Board with copies or digital object identifiers of all publications from scientists from

India that are based on program material. MoES is to receive an appropriate number of copies of all IODP publications and reports.

10 - FINANCIAL SUPPORT

MoES intends to support the *JOIDES Resolution* Consortium with financial contributions, as described in Annexes A and B. Financial contributions to the NSF from all *JOIDES Resolution* Consortium members are commingled to support platform and science operation costs of the *JOIDES Resolution*.

Platform and science operation costs support the basic operation of the vessel and those activities onboard the vessel necessary to the proper conduct of the scientific research program and those shore-based activities required to properly maintain and distribute samples and data, support seagoing activities, and administer and manage the program. Such costs include, for example (1) costs of the drilling and ship's crew, (2) catering services, (3) fuel, vessel supplies and other related consumables, (4) berthage and port call costs, (5) disposal of wastes, (6) crew travel, (7) inspections and insurance, (8) drilling equipment, supplies, and related consumables, (9) engineering or geophysical surveys, and data acquisition and laboratory analyses required for the safety of platform and drilling operations, (10) administration and management costs of the platform operators (11) technical services, (12) computer capability, (13) data storage and distribution, (14) description, archiving, and distribution of data and samples, (15) deployment of a standard suite of logging tools, (16) development of new drilling tools and techniques required by IODP research, (17) program publications, (18) costs of consumables (exclusive of those identified under platform operations costs below), and (19) costs required for administration and management, including the Science Support Office.

Legal and financial responsibility for the non-riser vessel *JOIDES Resolution* resides with the NSF. Legal and financial responsibility, including mobilization and platform operations costs, for other IODP drilling platforms is to reside with the organization(s) or country(ies) which provide such capability to the IODP. Provision of such capability is not considered a contribution in lieu of annual *JOIDES Resolution* Consortium membership contribution.

Support of scientific research and development costs for shore-based analysis and research on IODP samples and data and for non-routine downhole measurements are the responsibility of the Participant and are not supported as program costs.

Activities carried out by the Participants' contractors in direct support of the Participants' individual scientific undertakings are not program costs and are not supported from commingled funds.

11 - SALARIES, TRAVEL, AND EXPENSES

Salaries, travel, and expenses for participants representing India on the *JODIES Resolution* or ECORD MSPs are to be borne by India. Costs of accommodations for

scientists and members of technical parties from India aboard *JOIDES Resolution* and ECORD MSPs are program costs and are the responsibility of the platform operator. The platform operators are to offer scientists from India assistance when going between the airport and the drillship.


12 - CONSULTATION

Meetings of NSF and MoES representatives may be held at any mutually acceptable time upon the request of any Participant to discuss this Memorandum and other matters of mutual interest.

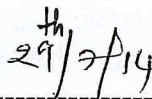
13 – CONCLUDING PROVISIONS

This Memorandum may be modified by written consensus of the Participants.

SIGNED in the English language.

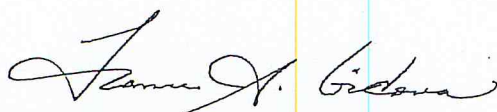


Dr. Shailesh Nayak
Secretary

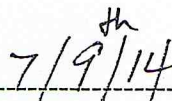


Date

For
THE MINISTRY OF EARTH SCIENCES
GOVERNMENT OF INDIA



Dr. France Córdova
Director



Date

For
THE NATIONAL SCIENCE FOUNDATION
OF THE UNITED STATES OF AMERICA

ANNEX A

ANTICIPATED ANNUAL MEMBER CONTRIBUTIONS TO THE *JOIDES Resolution* CONSORTIUM

A Participant's expected level of participation is recognized to be proportional to the number of "participation units" represented by that Participant's contribution to the *JOIDES Resolution* Consortium.

The annual contribution of one participation unit for the period 1 October 2013 to 30 September 2019 is estimated to be \$3.0 million (U.S. dollars), but this figure is subject to increase or decrease based on operating experience and projected operating costs. Identification of the annual contribution level for particular years during this period will be done by the NSF.

It is recognized that for each participation unit, the Participant may elect to have

- a) four (4) representatives on the Scientific Evaluation Panel, i.e., two (2) on the Science Sub-Group and two (2) on the Site Survey Sub-Group,
- b) two (2) representatives on the Environmental Protection and Safety Panel, and
- c) two (2) representatives per expedition or equivalent for each *JOIDES Resolution* expedition identified as an IODP cost.

Additional participants on an expedition may be acceptable, but it is expected that these may be offset by reduced participation in other expeditions.

The Participant, as a member of the *JOIDES Resolution* Consortium, will have one (1) representative on the *JOIDES Resolution* Facility Board.

ANNEX B

1) ANTICIPATED FINANCIAL CONTRIBUTION BY THE MINISTRY OF EARTH SCIENCES OF INDIA TO THE *JOIDES Resolution* CONSORTIUM FOR THE INTERNATIONAL OCEAN DISCOVERY PROGRAM

During the period 1 October 2013 to 30 September 2019, MoES, subject to its budget processes and within the limits of available funds, plans to support the *JOIDES Resolution* Consortium as follows:

1 October 2013 - 30 September 2014	(U.S. Fiscal Year 2014) = US \$1,000,000
1 October 2014 - 30 September 2015	(U.S. Fiscal Year 2015) = US \$1,000,000
1 October 2015 - 30 September 2016	(U.S. Fiscal Year 2016) = US \$1,000,000
1 October 2016 - 30 September 2017	(U.S. Fiscal Year 2017) = US \$1,000,000
1 October 2017 - 30 September 2018	(U.S. Fiscal Year 2018) = US \$1,000,000
1 October 2018 - 30 September 2019	(U.S. Fiscal Year 2019) = US \$1,000,000

TOTAL US \$6,000,000

In accordance with 42 U.S.C.A. § 1870, the NSF will accept this unrestricted donation and intends to use it for the purposes outlined in this Memorandum.

MoES yearly contributions shall be paid prior to the start of the U.S. Fiscal Year (October 1), unless a different date is agreed upon by both Participants prior to the start of the U.S. Fiscal Year (October 1).

MoES reserves the right to vary its annual contribution. Any decrease in contribution will be subject to fair and reasonable notice. It is expected that any change in contribution rate identified above will result in a proportional increase or decrease in participation rights on the *JOIDES Resolution* and the Advisory Panels.

2) PARTICIPATION OF INDIAN SCIENTISTS TO *JOIDES Resolution* EXPEDITIONS AND ADVISORY PANELS

As a *JOIDES Resolution* Consortium member at contribution level shown above in this Annex (the equivalent of 0.33 participation units, as defined in Annex A), MoES shall have the right to

- a) send one (1) scientist on four (4) *JOIDES Resolution* expeditions per year, assuming six (6) expeditions per year are implemented. If less than six (6) *JOIDES Resolution* expeditions are implemented each year, then participation will be adjusted proportionally;
- b) have one (1) voting representative on the Science Evaluation Panel Science Sub-Group;
- c) have either one (1) voting representative on the Environmental Protection and Safety Panel or one (1) voting representative on the Science Evaluation Panel Site-Survey Sub-Group; and

- d) have one (1) member on the *JOIDES Resolution* Facility Board and at least one (1) representative on the IODP Forum.

MoES may send additional representatives as observers to all Advisory Panel, *JOIDES Resolution* Facility Board, and IODP Forum meetings and is invited to send participants to all IODP workshops.

As a *JOIDES Resolution* Consortium member, MoES may send one (1) scientist to participate on each MSP expedition. Additional participation on MSP expeditions by scientists from India can be further negotiated directly by MoES with ECORD.