Revised DRAFT Report of the iSAS interim Scientific Measurements Panel

The New Otani Kaimana Beach Hotel
Honolulu, Hawaii

December 19, 2001

Summary of iSCIMP Recommendations to iPC
The following recommendation resulting from the December 2001 iSCIMP meeting in Honolulu, HI is forwarded to iPC for comment and approval. The motion was passed unanimously.

iSCIMP Recommendation 01-1-1
iSCIMP recognizes the novel difficulties presented by IODP, particularly with respect to potential commercial spin-offs associated with sampling the deep biosphere. Given the open access and sharing principles of IODP, iSCIMP requests that IWG address those complex issues urgently, possibly through a specialist sub-group. Feedback to iSCIMP on this will help iSCIMP address iPC Motion 1-06 on developing a sample and data distribution policy for IODP. The ownership of samples and sub-samples (often at the molecular level) is probably pertinent.
Passed 13-0-0

Additional Highlights

Action Items
1) iSCIMP members to read the CDC report so as to become familiar with the scientific needs for the non-riser vessel.

2) Kuro Kuroki will give PDF files of the labstack levels on the Chikyu to serve as an appendix for the iSCIMP meeting minutes.

3) iSCIMP members familiarize themselves with current ODP sample policy, so that revisions required for IODP success can be defined at our next meeting.

4) iSCIMP to examine OD21 Database Concept on JAMSTEC website in preparation for comments to be made at next meeting.

interim Scientific Measurements Panel Member List

Jamie Allan	(Co-chair, US, Appalachian State University)
Christian Buecker	(Germany, RWE-DEA)
David Divins	(US, NGDC)
Javier Escartin	(France, CCR)
Eiichi Kikawa	(Co-chair, Japan, JAMSTEC)
Mike Lovell	(UK, Leicester University)
Ellen Martin*	(US, U. of Florida)
Carlos Pirmez	(US, Shell)
Leonardo Sagnotti	(ECOD, INGV)
Doug Schmitt	(Canada, Univ. Alberta)
David Smith	(US, University of Rhode Island)
Saneatsu Saito	(Japan, JAMSTEC)
Ken Takai	(Japan, JAMSTEC)

* alternate for Rick Murray

Liaisons to iSCIMP

Brad Clement	(NSF)
Kaz (Kuro) Kuroki	(JAMSTEC)
Jeff Schuffert	(iSAS Office)
Yasushi Tsuritani	(JAMSTEC)

Guests

Patty Fryer	(SCICOM)
Jimmy Kinoshita	(iPC Co-Chair)
Frank Rack	(JOI)
Peter Schultheiss	(GEOTEK)
Elspeth Urquhart	(JOIDES Office)

Note: Several other SCIMP members also attended parts of the iSCIMP meeting but did not take part; their attendance was not recorded.

Regrets

Yoshiaki Aita	(Japan, Utsunomiya University)
Rick Murray	(US, Boston University)
Urumu Tsunogai	(Japan, Hokkaido University)

A) Introduction
The first meeting of the iSCIMP began at 1:00 PM, Wednesday, December 19 after a one-hour break following the termination of the previous SCIMP meeting. Several of the SCIMP members from the previous SCIMP meeting attended as unofficial guests during parts of the meeting.

B) iSCIMP Mandate
Jeff Schuffert of the iSAS Office began with an account of the iSAS Office staff and their contact information. He followed with an explanation of what the iSAS Office does: it manages the iSAS proposal process, supports iSAS panels and committees, communicates with the international scientific community, and promotes a smooth transition from ODP to IODP. Jeff then gave an outline of the current interim Science Advisory Structure, showing its oversight by the IWG and parallel relationship with the JOIDES structure. The iSAS Office works to maintain a link between the science community and the iSAS panels.

Jeff continued with an explanation of the iSCIMP mandate. It is modified from the JOIDES SCIMP mandate, with a general purpose of advising the IODP community on data and information handling, analytical methods and techniques, laboratory design, portable laboratories and equipment, and borehole experiments and measurements. It will assist iPC in developing recommendations and guidelines for making scientific measurements on all drilling platforms available to IODP, within and around boreholes, and on samples collected by IODP and associated programs. Specific areas of responsibility include databases, publications, and sample curation, computers and laboratory equipment, standards and calibration, and borehole tools and measurements.

Meetings will usually occur twice per year, with iPC co-chairs approving the agenda for each meeting. Membership will consist of 15-18 members, with their expertise covering information handling and shipboard and borehole measurements. Liaisons to the panel will be from the iPC and iODP Drilling Operators, and to other iSAS panels with iPC approval. Ad-hoc advisory committees may be created, with iPC approval. Alternate iSCIMP members have been identified for the Japanese members; USSAC has been asked to provide alternates for US members, and the Canadian alternate is Earl Davis.

Jeff noted that the mandate allows iSciMP to create *ad hoc* advisory committees, with iPC approval. He then finished his report with an overview of the iSAS proposal review status.

Note that these responsibilities are focused on policy, not specific hardware/software recommendations!

The panel initially expressed concern about the extremely broad scope of its mandate, but then recognized that they should focus during the interim period on developing general policy recommendations rather than specific hardware/software recommendations.

The panel also determined that it should address the following concerns as part of its mandate:

1) Intercalibration issues amongst instrumentation on different platforms
2) Define where measurement techniques need to be improved
3) Refinement of the iSAS and future IODP panel structure, including (but not limited to) the following questions: a) should iSCIMP and iTAP, and their future counterparts in IODP, meet jointly, and b) is a separate data-handling panel needed?

From the discussion, it was clear that the following iSCIMP action item was needed:

Action Item*: iSCIMP members to read the CDC report so as to become familiar with the scientific needs for the non-riser vessel.*

Jeff finished with an overview of where the IODP proposal review status stood.

C) Description of Chikyu On-Board Facilities
Kuro Kuroki started with an overview of previous SCIMP input to the scientific facilities. He then described the different labstack levels with their respective contents. Differences in measurement capabilities between Chikyu and JOIDES Resolution include 3 times the lab space, a magnetically shielded magnetics lab, and a CT scan lab for the core before splitting. Interestingly, the same size scientific party will sail (about 51). Continuous wireline coring with the riser is a design goal, although operations at a site will initially begin with wireline coring and then perhaps move to conventional oilfield coring where the drillstring is retrieved at depth when the drillbit and BHA size becomes small. Core size will remain the same as it is now. The scientific/technical staff will be housed in single rooms, each with a private shower (!). Overall, the panel was most impressed with the facilities that will be available!

Action Item*: Kuro Kuroki will give PDF files of the labstack levels on the Chikyu to serve as an appendix for the iSCIMP meeting minutes.*

D) Overview of current ODP sample policy; with implications for iSCIMP
Frank Rack was invited to give this overview as a guest of iSCIMP to help it get started on its responsibilities regarding setting off sampling policy for the new drilling program. Frank's presentation was outstanding in its thoroughness, and provided the panel with a solid foundation regarding the current ODP sampling policy as well as new challenges for the future program. The overheads for Frank's report have been reproduced verbatim in Appendix 1; there simply was too much content for the panel scribe to keep up.

First, Frank noted that the IODP Principles developed by the IWG are available at www.iodp.org. Important Program Principles include: 1) the results of the program's scientific and engineering activities will be openly available; and 2) the future program is

based upon international cooperation and sharing of financial and intellectual resources. Membership Principles relevant to this panel include: 1) IODP members will have the right to have access to data, samples, scientific and technical results; and 2) IODP members will have the responsibility to actively participate in all aspects of the program, ensure publication and sharing of scientific results, and participate in providing data and proposals for planning of drilling programs.

Within the context of these principles, iSCIMP gives advice on core repositories; sampling; linked ship-shore data handling, management, and collection; and state-of-art oil industry logging capabilities. Publications are not specifically linked to iSCIMP, but are linked to data collection. There is an opportunity for iSCIMP here to think outside the box.

Frank noted that current ODP sampling policy is available on the TAMU website. This policy ensures: sample availability to the scientific party, encourages scientific analyses, preserves core material, and disseminates scientific results. It outlines policies and procedures for dissemination of ODP and DSDP data to research scientists, curators, and educators. It also defines obligations that come from gaining samples. It defines bodies that resolve sampling problems, including the sampling allocation committee, the curatorial advisory committee, and editorial review boards. It defines what is meant by the scientific party, data and sample moratoriums. It also defines sampling operational details (e.g., critical intervals, sample sizes, etc.), and defines what are educational materials and the public display policy.

Carlos Pirmez raised the point that we should look at drilling and coring itself as a sampling of the earth- i.e., this is a larger policy issue. He also raised issues of commercial sampling. Eiichi Kikawa stated that Japan and NSF are discussing whether sample policy should be in the Memorandum of Understanding. It is not decided yet. We should wait until the MOU is defined before taking major action.

Action Item*: iSCIMP members familiarize themselves with current ODP sample policy, so that revisions required for IODP success can be defined at our next meeting.*

E) Intellectual property rights for Microbiology

Ken Takai presented a provocative proposal for creation of an iSCIMP working group to define IODP policy with respect to microbiological investigation. His memo is reproduced verbatim for reference in Appendix 2.

His proposal, which would attribute sample ownership to the country operating the ship and the country owning the waters where the sample originated from, generated much discussion regarding the need to preserve an intellectually open program. IODP may need to define clearly avenues for commercial applications while preserving scientific integrity and open access policy to data and samples. It is important that scientific stewardship of the samples be preserved; "ownership" of IODP cored samples and life from these samples

is a vexing issue. One larger issue identified from Ken's proposal is that snipping out pieces of DNA with specific characteristics from IODP-derived organisms may be used to modify existing organisms to create essentially new life. Who owns the rights to these new life forms? Panel believed that it is poorly equipped to deal with these issues but recognizes their importance, giving rise to the following recommendation:

iSCIMP Recommendation 01-1-1
iSCIMP recognizes the novel difficulties presented by IODP, particularly with respect to potential commercial spin-offs associated with sampling the deep biosphere. Given the open access and sharing principles of IODP, iSCIMP requests that IWG address those complex issues urgently, possibly through a specialist sub-group. Feedback to iSCIMP on this will help iSCIMP address iPC Motion 1-06 on developing a sample and data distribution policy for IODP. The ownership of samples and sub-samples (often at the molecular level) is probably pertinent.
Passed 13-0-0

F) OD21 Database Concept
Sanny Saito provide the iSCIMP with an overview of the OD21 Database concept, a key aspect of which is compatibility with the current JANUS system by using the same data structure. This database will have a real time data browsing system, and a user-friendly data input/edit system for core description. Also, it features an advanced digital archiving system, and will operate in a fast LAN environment onboard.

New functions of this database will include:
1) a composite log viewer and graphical composite display, where core images and logging data can be shown, description interface and archive interface functions
2) a multi-scale core editor, operable at any scale

Sanny showed graphics illustrating the shipboard system configuration and matching shore system with distribution of the shipboard data by website. Post-cruise data will be included within the system. He also showed the database developmental schedule, which should be ready by the 2004 Chikyu shakedown cruise. International feedback regarding the concept is needed for optimal development, preferably through iSCIMP at our next meeting. Overall, the concept is very impressive. Some questions were raised regarding archive aspects of the database program, such as availability of proper metadata and associated ASCII archives of the data, which could be addressed at our next meeting.

***Action Item**: iSCIMP to examine OD21 Database Concept on JAMSTEC website in preparation for comments to be made at next meeting.*

A discussion of the iSCIMP Lab Working Areas and potential Panel membership was deferred to next meeting.

G) Next Meeting
Panel agreed to meet jointly again with the SCIMP in College Station in the May-July timeframe.

The first meeting of the iSCIMP adjourned at 6:00 PM, Wednesday, December 19.

APPENDIX 1

IODP INITIAL SCIENCE PLAN

IPSC & IWG MEETING MINUTES

www.iodp.org

CDC REPORT (U.S. – Provided)
IODP PRINCIPLES (IWG)

1. Principles on Drilling Platforms
2. Program Principles
3. Membership Principles
4. Implementation Principles
   - iSAS
5. Management Principles

IODP PROGRAM PRINCIPLES

1.) The IODP is a scientific research program. The results of the program's scientific and engineering activities will be openly available.

2.) The IODP is based on international cooperation and sharing of financial and intellectual resources.

IODP MEMBERSHIP PRINCIPLES

4.) Members will have the right to: (1) participate in all drilling cruises, (2) be represented on all planning & advisory panels, (3) be represented on IWG or its successor, (4) have access to data, samples, scientific and technical results,…

5.) Members will have the responsibility to: (1) actively participate in all aspects of the IODP, (2) ensure publication and sharing of scientific results, (3) participate in providing data and proposals for planning of drilling programs, (4) etc.

CONFLICT OF INTEREST STATEMENT FOR iSAS

Panels are charged with recording in their minutes any information on potential conflict of interest and moves they have made to avoid such. They are also charged with clearly

defining their decision making and recommendation procedures and to have these reviewed by iPC.

IPSC – 8 MEETING 11/27-28/2000

"The IODP SAS will have final responsibility for approving policies for publication and dissemination of scientific data and results of analyses, and the IODP management office will have the final responsibility for enforcing them."

IPSC MINUTES – APPENDIX 2 11/27-28/2000
"IODP OVERARCHING PROGRAMS"

SUBCONTRACTED IODP SERVICE FUNCTIONS

CORE RESPONSIBILITY – Core Curation, Storage, Processing, and Sampling
- Oversee operations
- Ensure uniformity of archiving & sampling procedures consistent with IODP policies
- Fulfill sample requests in a timely manner consistent with IODP policy.

DATABASE DEVELOPMENT/INFORMATION SERVICES
- Create linked ship and shore data collection, maintenance, and handling processes, including databases.
- Software development; maintain software licenses.

DOWNHOLE LOGGING AND TOOLS
- Provide state-of-the-art "oil industry" logging capabilities and specialty logs customized to the needs of IODP scientists.
- Provide downhole logging operations, as well as log data processing, distribution, and database services for IODP.

PUBLICATIONS
- Assemble, edit, and produce a coherent and continuing series of scientific and data publications that report the results of scientific ocean drilling for all IODP drilling components.

Recommended source of scientific advice and guidance for each of these activities:
iSCIMP

ODP SAMPLING POLICY

OBJECTIVES:

- Ensure availability of samples & data to scientific party.
- Encourage scientific analyses over a wide range of scientific disciplines by providing samples to the scientific community.
- Preserve core material as an archive for future description & observations, for nondestructive analyses, and for sampling.
- Disseminate scientific results from postcruise research.

1.) Outlines the policy & procedures for distributing ODP & DSDP samples and data to research scientists, curators, & educators.
2.) Defines obligations that sample and data recipients incur.

· Samples	Responsibilities
· Data	- Program/stakeholders
· Publications	- Requestor/participant
· Moratorium	

ERB – Editorial Review Board

SAC – Sample Allocation Committee
CAB – Curatorial Advisory Committee

TERMS AND DEFINITIONS

- SCIENTIFIC PARTY – all scientist who sail on a leg, as well as any shorebased scientists…
- MORATORIUM – 1 year from start of a leg.
- UNIQUE AND NON-UNIQUE INTERVALS
- COMPOSITE SPLICE
- ARCHIVE AND WORKING HALVES
- PERMANENT ARCHIVE
- TEMPORARY ARCHIVE
- CRITICAL INTERVALS
- NON DESTRUCTIVE ANALYSES

* LEG-SPECIFIC SAMPLING GUIDELINES
* SAMPLE REQUEST FORM
* TYPICAL SAMPLE VOLUMES
→ EDUCATIONAL MATERIAL
→ PUBLIC DISPLAY

INTELLECTUAL PROPERTY RIGHTS

UNEP - United Nations Environment Prog.
CBD – Convention on Biological Diversity (1992)
WTO – World Trade Organization
WIPO – World Intellectual Property Organization
OECD – Organization for Economic Co-operation and Development
BIONET – Biodiversity Action Network
TRIPS – Trade-Related Intellectual Property Rights

- Access to genetic resources.
- Benefit sharing regarding the utilization of genetic resources.

1.) Prior informed consent
    - Country of origin involvement
2.) Mutually agreed-upon terms
    - Model agreements & guidelines

3.) Fair and equitable
    - Code of conduct

Proposed measures on access and benefit-sharing should demonstrate:

- Simplicity
- Clarity
- Flexibility
- Workable system

· Document carefully the source and origin of materials accessed and the terms under which they were acquired.

· Provide mechanism for tracking of sources and origins of materials.

· Timing involved in obtaining prior informed consent, including that related to any change in use

MOSAICC – Micro-Organisms Sustainable Use and Access Regulation International Code of Conduct

- Existing guidelines regarding access and benefit sharing.

- Application for access to competent national authority

- Prior informed consent linked to the requirement of mutually agreed-upon terms

- Mutually agreed-upon terms will cover the types, timing, distribution, and mechanisms of benefits to be shared. These will vary depending on what is regarded as fair and equitable in light of the circumstances.
    - Monetary benefits
    - Non-monetary benefits

SYSTEM OF PRIOR INFORMED CONSENT

Purpose of minimum standards is to ensure predictability and participation of stakeholders;

Legal Framework & Review Mechanism
- National
- International

Competent National Authorities
- National focal point
- Implement system
- Provide basic information

And, to provide the needed degree of flexibility and to respect states' different legal systems.

GOALS:

1.) Equally-levelled playing field
2.) Distinction between research activities and commercial (for-profit) activities.

GENETIC RESOURCES

REPONSIBILITIES OF MAIN STAKEHOLDERS

1.) Decision of a user leading to access to genetic resources and receipt of consent to obtain such resources. Access is defined as:

"Admission for the collection, obtaining, or other acquisition of genetic resources."

2.) Process of scientific research and development.
- Collection or other acquisition of genetic resources.

3.) Dealing with the findings of scientific research and development.
Includes mechanism for dealing with questions regarding the commercialization and other utilization of genetic resources or derived products.

APPENDIX 2

What we have to discuss for the microbiological investigation in the IODP operation

(Takai's Personal Memo)

1. Retrieval of samples for microbioligical investigation.

Since the discovery of viable microbial populations in terrestrial and oceanic subsurface environments, there has been increasing interest in the structure and function of microbial communities in subsurface environments. Recent progress in subsurface microbiology using conventional cultivation and isolation techniques has established that subsurface microorganisms are physiologically and phylogenetically diverse and may significantly impact subsurface geochemical processes. Some subsurface microorganisms have novel metabolic properties and have potential use for industrial processes, bioremediation, or other biotechnological applications. In addition, calculation suggests that the terrestrial and oceanic subsurface biosphere is one of the largest reservoirs of biomass on Earth. In terms of basic science and industrial application, the subseafloor microorganisms are of great interest and will be prosperous subject for the future science not only for basic and applied microbiologist but also multidisciplinary earth scientists.

The core samples obtained from IODP expedition, which is aiming for microbiological investigation or not, are important resources for potentially valuable microorganisms, their genes and products. In the present ODP operation, half-cut of the core is preserved while its preservation does not meet the demands of microbiologist for the subsequent research. Hence, microbiological and biotechnological exploration to the previously retrieved ODP samples is about impossible. In the IODP operation, this must be considered. Of course in the microbiological expedition such as ODP leg #201 and even in the non-microbiological expeditions, certain amounts of the samples should be retrieved from the cores with permission of the chief scientists and on-board scientists stuffs and be preserved for the future microbiological investigation in public core repository centers under the good conditions. These centers will manage the preserved samples and be responsible for distribution of the samples for the subsequent research after the peer-reviewing and permission of the chief scientist and their behalfs. This system will induce the broader and deeper investigation and will finally strengthen the IODP significance.

2. Microorganisms ownership

This is very difficult matter. I like to separate it into two case; one is the case of basic science and the other is the case of patent. The patent policy tentatively proposed is described in another form.

If the scientific party on board or co-workers on shore find a new microorganism from the core obtained from the IODP operation, who has the ownership of the microorganisms? Yes, the persons who isolated and characterized it have. If the microorganism is a new

species, or sometime a new genus, new family and new order, the researchers will submit a paper for describing the interesting microorganism. In the global microbiology society, describing new taxa (naming the microorganism) is required for the authors to deposit the microorganism in at least two public culture collections in two different countries. The deposited microorganism is no longer belonging to the persons who found it and is open to any of the microbiologists.

If the researchers do not describe the microorganism, they do not need to deposit it in the public culture collections and still have the ownership of the microorganism. It depends on the researchers. Hence, IODP will admit this general rule globally accepted by microbiologists. However, in case that the microbiologists who are not members of the initial scientific party or the coworkers take a microorganisms from the preserved core samples as described above, the work might be recognized as collaboration between the persons who isolated it and preserved the core samples, the microbiological source. Then, the ownership of the microorganism depends on their choice.

3. International treaty for bio-diversity

USA does not ratify this international treaty. I do not figure out the treaty in detail but any other countries joining the IODP ratify it. So, we need to make a rule according to this treaty. For example, if American microbiologists find a very powerful oil-producing microorganism from the Nankai Trough within Japanese exclusive economic zone, the benefit resulting from the microorganism should be reciprocated to Japan. Of course, the scientific results are not regulated by treaty. Anyway, we are not lawyer and need help from the specialists and lawyers.

4. Establishment of the working group for discussing above-mentioned subjects

Finally, I propose to establish a international working group to talk about the IODP policy with respect to the microbiological investigation. This working group will prepare the initial policy with any expected cases that microbiological investigation meet in the future IODP operation. The group will include a variety of microbiologists, earth scientist, lawyers with bio-diversity treaty and patents. I recommend Dr. Kaoru Tsujii, JAMSTEC, as one of the chair of the working group. He is a physical chemist but has wide scope for the chemistry and microbiology and a background for managing with industrial research and development. The countries joining the IODP will recommend several members for the working group and more specifically discuss and prepare the recommendations.

Patent Application Policy on Microbiological Study in IODP
(Tentative Proposal)

1. Background of the Policy

Deep-biosphere, particularly deep-subsurface microbiology, is one of the main research targets in IODP. Microbiological studies can be readily utilized in industrial

applications. Deep-subsurface microbiology is a very new research field, and possesses high possibility to find out a lot of useful microorganisms. We shall be able to provide a completely novel source of microbes for wide fields of industries. These new microorganisms will contribute to develop a new biotechnology through production of novel useful enzymes and/or bioactive substances, CO_2 fixation, biodegradation of hardly-decomposable-chemicals, bioremediation and so on. These new technologies are, of course, to be patented.

No patent application policy exists in the ODP system, since the deep-biosphere is out of main scientific targets in the ODP. As mentioned above, however, we need the patent application policy in the IODP system. This is a tentative proposal for the policy. We should discuss about the contents of the policy, and brush up them.

2. Possible inventions in the studies of deep-subsurface microbiology

Followings are possible inventions to be patented in the field of deep-subsurface microbiology.

1) New microorganisms

Microorganism itself can be patented, if it is new species and/or new strain, and produces something useful. This patent is the most basic one. Nobody can use this microbe for any profitable business. Sometimes an agreement is requested even for academic use.

2) New materials produced by microorganisms

Even if a microorganism itself is known one, a novel material produced by the microbe can be patented. This compound should how at least one useful property in any industrial fields.

3) Composites and/or formulations containing the new materials

Any products of composites and/or formulations containing the above new compounds can be patented.

4) Production methods of the new materials.

Even if both of the microorganism and the material produced by it are known, any new production methods of the material can be patented. Any new conditions to improve the production yield can be also patented.

3. Property of the right

This is the most important chapter of the policy. The contents of this chapter should be discussed fully by all related members.

1) Ownership of the core samples

The core samples taken by riser drilling in Chikyu belong to JAMSTEC, Japan, and the samples taken by non-riser drilling in JOIDES Resolution or a successive drilling vessel belong to NSF, USA.

The core samples taken in a territorial sea of a country belong to both JAMSTEC and the government of the country when drilled by Chikyu, and belong to both NSF and the government of the country when drilled by JOIDES Resolution or a successive drilling vessel.

2) Ownership of the microorganisms

See Takai's personal memo.

3) Property of the patent right

Any inventions made by using the drilling core samples must be co-applied as patent(s) by both of the inventor(s) and the owner(s) of the core sample. The patent right is shared by the inventor(s) and the core owner(s). The percentage of the property of the right depends on the contribution of each inventor and owner, and should be decided by their discussions. When the inventor(s) transfers the right to any organization, the patent right is, of course, shared by the organization and the core owner(s).