

**Draft Minutes
Lithosphere Panel
Spring 1994
Bergen Norway**

Dates: March 28 to 30, 1994

Chair: Sherman Bloomer

Host: Yngve Kristoffersen

1. Attendees:

Panel Members: Andy Fisher
Kathy Gillis
Anne Sheehan
Doug Wilson
Rob Zierenberg
Shoji Arai
Yngve Kristoffersen
Roland Rihm (alternate for Peter Herzig)
Pam Kempton
John Ludden
Dave Caress
Mike Coffin
Matilde Cannat

Liaisons and Guests: Jay Miller (ODP-TAMU)
Catherine Mevel (PCOM)

Absent: Replacement for John Bender

2. March 28, 1994

The meeting was called to order by Sherm Bloomer. The Chair welcomed new members (Shoji Arai), alternates (Roland Rihm), and newly-reappointed member Rob Zierenberg and Yngve Kristoffersen provided some details on meeting logistics. After a fruitless call for a minutes-taker we proceeded with liaison and meeting reports (Dave Caress and Anne Sheehan volunteer the use of their notes in reconstructing minutes!)

A. Liaison reports:

PCOM

C. Mevel

The FY 95 schedule, as set at the December meeting, was reviewed. It was noted that there remained a question about the dry-dock in Capetown, and hence about the schedule. **(The Panel noted that they understood the schedule was only to be reconsidered if problems arose which ruled out Capetown as a viable location for the dry-dock; the Panel also reiterated its support for the Vema transverse ridge as an appropriate site for the DCS test).** The scheduling process and the status of NARM after legs 149 and 152 were briefly reviewed. Mevel reviewed the discussions of staffing and the use of the ROCKY program, and the status of the DCS test (now apparently delayed while the operator finds a new vendor to provide a land test facility). The budget priorities for FY 94 (engineering review and logging while drilling at Barbados) and for FY 95 (computers and software, DCS, upgrade of downhole measurements facilities on ship, special shallow-water site survey). The last item led to some discussion about what constituted a reasonable expectation for PI funded site survey (a recommendation to PCOM follows this section).

Finally, the discussion of the long-range plan and white papers was reviewed, and a brief note made of the status of deep drilling initiatives and the computer RFP.

DRILLOPTS*S. Bloomer*

Bloomer briefly reviewed the intent of the DRILLOPTS meeting and its results this year. It was pointed out the Sedimented Ridges II was deemed ready to drill, but was simply too far from the area of operations to consider. The transit issue to 735B was also noted briefly (and it was pointed out that large transits were involved in both the 735B and NAAG proposals).

PANCHM*S. Bloomer*

Bloomer reviewed results of the PANCH meeting not already covered in the PCOM report, including the statement about DCS, the support for the collection of structural geology data, the endorsement of the review criteria, and the suggestion to PCOM that a science writer be hired to help turn the white paper into a document more appropriate for general circulation.

SGPP*R. Zierenberg*

The SGPP meeting was hosted in College Station (March 7-9) by Laura Stokking, ODP staff scientist, in order to facilitate communication with the ODP engineers regarding development of tools of interest to SGPP, particularly the PCS and VPC. Scheduled drilling of gas hydrates on Leg 164 would greatly benefit from improvements in the PCS that should make the tool more reliable. Discussions with both the ODP engineers and TEDCOM indicated that relatively minor changes to the current PCS system should improve the ability of the tool to recover core. Desired changes to the gas handling manifold for sampling the PCS and the need for a proposal to redesign, test, and calibrate the manifold were discussed. The proposed PPCS will only be useful for very soft lithologies, generally the upper few tens of meters of sediment, and would not be an appropriate tool for sampling gas hydrates, therefore SGPP is no longer supporting development of this tool as a high priority. Keith Kvenvolden presented an overview of importance and occurrence of gas hydrates and Miriam Kastner presented results from Leg 146 that are relevant to the formation of gas hydrates. The desirability of a tool for in situ pore water sampling was discussed at length. Proposals are being prepared for redesign of the WSTP tool as a stand alone in situ pore fluid sampling tool. These efforts will be coordinated with ongoing redesign of the tool for better pore pressure and temperature measurements. The VPC remains a high priority to the panel, but the present tool has been deemed unlikely to be reliable following analysis by Failure Analyses engineers. The British Geological Survey (BGS) requested permission to borrow the tool from ODP for an informal at sea test. PCOM has recommended the BGS test and instructed TAMU not to proceed with any new efforts to obtain a working VPC until the results of the BGS's informal test of the tool are available.

Miriam Kastner updated the panel on plans for Leg 156 drilling on Barbados Ridge. The leg will be quite "engineering intensive" and has a very ambitious schedule. A change from previous plans is the inclusion of 4-5 days of logging while drilling, which will be done under contract. Redesigned corks will be used that should allow re-entry of the holes by submersible. New sensor strings for the corks are being designed by French scientist and one string will hopefully be available for installation on the leg. Dr. Kastner is also developing two different in situ chemical samplers to be installed on the string, but they may have to be installed after drilling by submersible.

New and revised proposal were reviewed prior to the global ranking which

follows:

Rank	Proposal	Score (max = 11)
1	348	Mid-Atlantic Neogene Transect-N.J. Margin 9.39
2	400	Costa Rica accretionary wedge 8.43
3	412	Bahamas sea level transect 8.07
4	386	California Margin 7.21
5	SR II	Sedimented Ridges II 7.00
6	434	Cariaco Trench Quaternary climate 5.93
7	354	Benguela Current 5.79

8	440	Juan de Fuca-Flank flux	4.64
9	355	Peru gas hydrate	3.38
10	435	Mariana-Crustal fluxes	3.29
11	435	Nicaragua-Crustal fluxes	3.07
12	424	Cork 395A	

The panel also expressed its support for less than a leg science and in particular supports the proposal to cork 395A and to APC the Cariaco Trench. Some panel members expressed the opinion that some proposals of high importance to SGPP were not ranked because they required DCS for successful completion. Others on the panel voiced concern over the high cost of the DCS and its economic impact on the program.

SGPP continued the task of rewriting its white paper. The new white paper will be reorganized under three main themes: 1. Sea level and facies architecture, 2. Fluid flow and geochemical fluxes, and 3. Base of the Biosphere.

The fall meeting will be held in Fukuoka, Japan.

TEDCOM

R. Zierenberg

Report on TEDCOM meeting, March 7-8, College Station, Texas

TEDCOM confirms that the slimline riser concept for the JOIDES Resolution is technically feasible; they do not feel that the 4 km riser proposed for the Japanese drillship is feasible using today's technology. Land tests for the DCS have been delayed because of expiration of the Partech contract for using their test rig. As there is more time now before Leg 165, TEDCOM does not want the new land tests to be rushed. TEDCOM recommends the tests not be run until all other preparatory tests have been completed successfully. This means putting them back to about Sept. 1994 at the earliest. TEDCOM is still in favor of presetting HRBs on VEMA prior to Leg 165, perhaps after Leg 158.

OHP

J. Tarduno

OHP Spring 1994 meeting overlapped with the LITHP meeting in Bergen. OHP's Fall 1994 meeting will be held on Sept. 27-29 in Australia. The principal issue of joint LITHP-OHP interest is the potential Caribbean drilling. The LITHP liaison (J. Tarduno) met with the OHP representative to the Caribbean drilling planning meeting (M. Leckie) and discussed their respective panel interests to be met in a potential drilling program.

TECP

M. Cannat

TECP met March 10 to 13 in Kona, Hawaii. Time was mostly devoted to reviews and ranking of new and revised proposals. TECP ranked highly the West Woodlark basin (447), Costa Rica accretionary prism (400), Taiwan arc collision (450), and Iberian margin (non volcanic NARM Add3) proposals. This ranking closely reflects TECP's Phase Implementation Plan for 1996-1998, as described in the last revised version of TECP's White Paper:

- 1 leg to clean up NARM non volcanic drilling in Iberia;
- 2 legs to drill, characterize and instrument a detachment on a rifted margin; and
- 1 leg to conduct a mass balance experiment in a convergent margin.

TECP drafted a number of resolutions and recommendations regarding the recording of structural data on board the Joides Resolution: that positions for scientists to sail explicitly as structural geologists be considered for each leg; that a standardized set of required structural descriptions of the cores be devised; that these descriptions be published in the legs initial results volumes; that structural descriptions gathered during past legs be officially archived at TAMU. This last recommendation involves putting these data into an archivable format, and TECP recommended that some working time by TAMU scientific staff be devoted to this task. TECP also specifically asked that the structural data acquired during leg 153 be published in the Initial Results volume

for this leg. A sub-group of TECP (Sue Agar, Yves Lagabrielle, Steve Hurst, Roland von Huene and Kevin Brown) was formed to put together the list of standardized structural observations to be required for all legs (with Peter Clift at TAMU), and to be involved in any relevant software development (at TAMU, and with the contractants of the Computer Upgrade RFP). TECP will also perform tests of new structural softwares as they are being developed. Finally, the panel nominated Jian Lin (Woods Hole) as the new liaison to LITHP.

Full TECP rankings were:

- | | |
|----------------------------|--------------------------------|
| 1. Woodlark Basin | 11. Southern Australia margin |
| 2. Costa Rica Margin | 12. Japan downhole observatory |
| 3. Taiwan arc collision | 13. Lau-Taupo arc drilling |
| 4. Non-volcanic NARM | 14. Newfoundland Basin |
| 5. Mariana back-arc | 15. Galicia S reflector |
| 6. North Australia margin | 16. Peru subduction |
| 7. Volcanic NARM | 17. Tonga forearc |
| 8. Cayman Trough | 18. Cascadia |
| 9. Nankai | 19. W. Pacific seismic network |
| 10. Ocean crust reflectors | |

B. Planning/contact reports:

EXCOM/STA-JAMSTEC S. Bloomer

The presentations at the joint EXCOM/STA-JAMSTEC meeting in February were reviewed. The paper presented on behalf of LITHP had already been distributed to the panel: Bloomer synopsized the presentations of the thematic panel chairs, of Charles Sparks (on slimline risers,) of the representatives from each partner nation, and of the representatives from STA-JAMSTEC. The Panel was particularly interested in the riser discussion, and the differences that appeared to exist between the goals of the thematic panels and the capabilities of the new Japanese vessel. It was noted that there is a meeting planned between representatives of JOI and STA-JAMSTEC this coming summer in Washington. Jay Miller gave a very brief review of the ideas that have been discussed for a mid-life refit of the Resolution.

MARGINS S. Bloomer

Bloomer briefly reviewed what the MARGINS initiative was, and the status of the three different meetings that went into its preparation had been. It is likely that the initiative will lead to an increased focus on convergent margin processes in part of the U.S. science community.

COMPOST R. Zierenberg

The COMPOST report had been distributed before the panel meeting, for information, so that panel members would be aware of the type of discussions that were underway in the U.S. It was noted that the report had been presented at the AGU meeting in December.

Caribbean Workshop J. Tarduno

Caribbean Drilling Planning Meeting (Univ. Puerto Rico, Mayaguez, Feb. 25-26) At its last meeting LITHP voiced its support for a drilling leg in the Caribbean that addressed high priority LITHP (LIP) objectives but also could address K-T boundary problems. Last Fall OHP representatives met with proponents and gave guidance for the planning of a Caribbean leg. To coordinate these efforts Lew Abrams sponsored a Caribbean drilling planning meeting in Puerto Rico. OHP was represented by Mark Leckie while LITHP was represented by John Tarduno. TECP was unable to identify a representative to attend the meeting. Proponents present included: Steve Hondt, Steve Carey, Nick Donnelly, Robert Duncan, Alain Mauffret, John Diebold, Eric Rosencrantz, Paul Mann, and Andre Droxler.

On the first day of the meeting proponents gave talks on their proposals to an open session. On the second day proponents and panel representatives met in a closed session. During the closed planning meeting the panel representatives first reviewed for the proponents the revisions required by each panel. Panel members stressed that such revisions would be necessary to make these proposals competitive in future rankings. Panel representatives stressed the need to have the proposed sites tied to existing seismic data and the need for this data to reach the data bank. Dan Quoidbach reviewed the specific needs of the Site Survey Panel. The needs of the two panels differed. OHP was mainly concerned with composing a drilling program incorporating several different objectives. The proponents moved two of the previously proposed sites to old Leg 15 locations due to the lack of new site survey data. The Leg 15 sites were spot-cored and substantial information could be gained by their reoccupation. LITHP asked proponents to produce a separate document outlining a leg addressing LIP objectives. The need for a separate document was in no way meant to discourage interaction between the two larger proponent groups. Instead, it purely addressed a practical matter. Having components of several highly ranked programs to be drilled, OHP had previously expressed the need for greater LITHP support for Caribbean drilling. To be competitive in their ranking, LITHP needed a separate proposal directed toward its stated objectives. In addition, the proponents needed to summarize the available radiometric and geochemical data from the on-land sections and tie it to the drilling. During the meeting the proponents responded to these comments well and promised a revised drilling plan available for discussion at the Spring LITHP meeting in Bergen.

[The Panel, thanked John for his efforts in making the Caribbean Drilling Workshop a success, and noted the contribution of Lew Abrams in organizing and funding the meeting.]

Geodynamics Committee

J. Tarduno

The U.S. Geodynamics Committee had asked that a representative of IITHP attend their winter meeting before AGU in San Francisco to answer questions about the draft copy of our white paper. John Tarduno represented LITHP.

Computer upgrade

J. Miller/A. Fisher

The Chair had asked Andy Fisher and Jay Miller to give the panel a review of the computer RFP. Andy went over the history and background of the computer system aboard the Resolution and talked about some of the goals of the upgrade. Jay reviewed the current status of the RFP and what he knew of the general outline of the proposals that had been submitted. He also listed the existing software modules in use aboard the ship and the types of data they are intended to archive. There was a long discussion about what was needed in the upgrade and how the panel might help evaluate software as it was developed.

Review of recent legs:

Leg 152/NARM project
Leg 153/MARK

S. Bloomer
M. Cannat

Sherm Bloomer had prepared a short review of the NARM-Volcanic program for the PCOM meeting in December. He presented that review and briefly described the results from Leg 152, borrowing liberally from Hans-Christian Larsen's presentation to PCOM in December.

Matilde Cannat, co-chief of Leg 153, gave a review of the principal results of drilling in the MARK area. She reviewed the technical problems in drilling and in placing the guidebase. The ultramafic section had substantial heterogeneity and the gabbros were distinct from those recovered at Hess but similar to rocks from 735B. The gabbros were characterized by abrupt grain size changes and common mylonite zones. The results were not what were expected, but provided tremendously important information about the lateral heterogeneity of the lower oceanic crust (see the panel's statement and recommendation about offset-section drilling).

There was a brief discussion of upcoming InterRIDGE and ION meetings and LITHP representation at those meetings, of planning for upcoming legs of LITHP interest (VICAP, TAG, Return to 735B, and Vema/DCS), and of panel members' contacts with national and international working groups. Bloomer will contact Bill Luth about getting information on the activities of the Continental Drilling Program and Anne Sheehan will serve as a liaison to ION. LITHP will invite a member of ION to give us a briefing at our next meeting on their plans and concerns. The chair will send a letter to InterRIDGE and the various national RIDGE groups soliciting proposals for scientific ocean drilling on or near ridge crests.

Recommendation 1: LITHP has asked a three-person subcommittee (Ludden, Zierenberg, Rihm) to prepare a list of likely drilling areas within the Red Sea by July 1.

LITHP recommends to PCOM that they direct ODP-TAMU to submit that list to Thomas Cocks at the U.S. Department of State so that he can explore the possibility of getting clearance to drill in those areas.

Explanatory notes: John Ludden had asked Tim Francis what the clearance situation in the Red Sea was, and he in turn had talked to Thomas Cocks in the U.S. Department of State. It was Cocks's suggestion that the process of clearance be initiated by using a "stow" list of sites (see attached correspondence, Appendix 1).

Recommendation 2: LITHP recommends to PCOM that they endorse an international meeting to assemble and synthesize the available geological and geophysical data in the Red Sea, as a prelude to the submission of one or more new Red Sea drilling proposals.

Explanatory notes: LITHP believes that an endorsement from PCOM will aid some of the national and international groups working in the Red Sea in securing funds to support the type of meeting described in the recommendation. Note that no commingled funds are needed nor requested for this meeting.

Recommendation 3: LITHP recommends to PCOM that they form a 6-8 person (about 2 per thematic area) person advisory committee to provide specific input to the vendor designated to develop software modules for the new computer system and that funds be allocated for that group to meet with software developers as necessary. Members of the group should all have sailed aboard the Resolution and have had some experience with database use or management.

Explanatory notes: Shipboard experience of the user community from recent hardrock legs (e.g. 118, 147, 153) has highlighted the inadequacy of the computer system for current and future data handling needs. It is the opinion of this panel that effective design of some modules of the data handling system (e.g. ROCKY, HRTHIN) will require, at the earliest stages of the design process, extensive communication between the scientists collecting these data and software engineers who will design the system. Identification of the types of data and information that should be recorded can only be accurately done by the scientific community. Furthermore, an effective system must allow extraction and utilization of the data in addition to data archiving. Therefore, LITHP encourages the formation of a multidisciplinary working group who could advise the software engineers in these and other equally important aspects of the system. This panel is interested in coordinating that effort and is willing to identify scientists who 1) have experience with the types of data that are required, 2) who have extensive experience with the current procedures on the drillship, 3) and who are knowledgeable in basic data management systems. We would also be willing to facilitate testing of the software as it is designed by distributing working versions to appropriate scientists, including co-chiefs or scientists scheduled for legs where the software will be used so that 1) major problems can be identified before the software is used at sea, 2) training of the shipboard party will be more efficient, and 3) shipboard experience will be gained as early in the design stage as possible, allowing fine-tuning of programs to meet the needs of the community. We further suggest that PCOM request the other thematic panels adapt similar roles so that IHP will have the guidance of the end users of the system during redesign of the shipboard data handling system. The computer upgrade will

have a tremendous financial impact on the program and LITHP is concerned that the benefits of this investment may not be available until near the end of the program. We further would hope that a very modest amount of the total cost of the system be available to assist those scientists volunteering to help this effort attend meetings with the software engineers paid to design the computer upgrade.

Recommendation 4: LITHP recommends to PCOM that they reconsider their decision to fund site-surveys for shallow water drillsites from operational funds. As we move into more complex drilling experiments, site survey requirements for a variety of programs are becoming more complex. Surveys which include, for example, mapping potential sites for hard-rock guidebases, placing transponders, siting experiments around hydrothermal fields, or doing small-scale photo surveys are proving important to some LITHP sites and such surveys are moving farther from what can be viewed as stand-alone science. We recognize a fiscal gradation in this site-survey problem, from doing a few extra camera tows, as at the Vema transverse ridge, to doing a shallow-water seismic survey, as would be required at the New Jersey margin transect. We are concerned about the problems a precedent for supporting site-survey work from the operational budget may lead to, given the inevitable pressures it will place on an already strained operational budget.

Recommendation 5: The Lithosphere Panel is excited about the new insights into lower crustal and shallow mantle processes that were gained by the off-set drilling programs of Legs 147 and 153. Drilling relatively long holes as originally planned proved not to be feasible given the structural complexities of active terrains. However, by drilling a sequence of shallow holes at one site, the nature and geometry of lithological contacts and the scale of lateral heterogeneity in the oceanic lithosphere were characterized for the first time.

Nonetheless, the panel's highest priority remains the recovery of long sections (>300 m) of lower crustal rocks, in Phase 1 (1993-98) from the principal layers of the upper lithosphere and in Phase 2 (1998-2003) through the transitions between those layers. We recognize that our difficulty in obtaining such sections from some of our offset-section locales requires that we examine whether that difficulty stems from solvable technological problems or from more fundamental geologic conditions. To aid us in that evaluation, **LITHP recommends to PCOM that a small group be convened at College Station to review the science operations at 735B, Hess Deep and MARK. That group should include the co-chiefs of those legs or their designees, the staff scientists and operations superintendents (as possible) and the chairs of LITHP and TECP. We recommend that such a meeting be convened as soon as possible.**

Recommendation 6: LITHP recommends to PCOM that they take appropriate action to see that the the digital BHTV is tested at the earliest possible opportunity.

Explanatory notes: The measurement of in-situ borehole stresses remains a capability critical to a number of LITHP's thematic objectives. We understand that the BHTV is the most appropriate tool to accomplish those measurements. The rebuilt BHTV was to be tested during Leg 153, but no hole of sufficient depth to allow that test was made during the leg. LITHP would like to see sufficient financial support (which we understand to be minimal) and direction given to allow a test of the rebuilt digital BHTV as the earliest possible time so that we can determine if the BHTV can meet our needs for reliable borehole stress measurements or if we need to investigate alternate technologies.

3. March 29--Proposal Reviews

The meeting convened at 0830 and the entire day was devoted to reviews of new or revised proposals and letters of intent. Each proposal was assigned review criteria in categories A-F (from the new review form); letters of intent were simply reviewed.

The reviews and comments for proponents follow:

Review Form: Spring Lithosphere Panel
Proposal Number: none (see Appendix 2)

Short Title: Caribbean Basalt Province

Proponents: Donnelly et al.

Criteria Categorization:

A	B1	B2	C	D	E	F
A1	B1.1	B2.1	C1	D1	E6.E7	F2

Comments:

LITHP would like to compliment the proponents of all the proposals for responding fully to previous panel comments and concerns. The revised LITHP proposal of Abrams, Careyø, Donnelly, Duncan, Mauffret, Sigurdsson and Sinton from the Caribbean drilling planning meeting in Puerto Rico replaces the previous active proposals addressing LITHP objectives (combining basement drilling objectives from #411, #415rev and #384rev3). Therefore, LITHP has decided to review (and rank) this proposal. LITHP appreciates the efforts of the proponents of the original Sigurdsson et al. proposal in constructing a revised 2-leg scenario. If OHP and LITHP both rank Caribbean drilling highly, such an effort to combine the legs is natural. However, since basement drilling is contingent on a high ranking by LITHP, review and ranking of this combined proposal by LITHP is viewed as premature. However, LITHP is concerned with the classification of Site C as an alternate site in the Sigurdsson et al. potential 2-leg scenario. This site appears crucial to the age transect approach and its exclusion would need substantial justification: the 4-site scenario outlined in the Donnelly et al. 1-leg hard-rock proposal is preferred. The major objectives of the Mauffret and Leroy proposal have been incorporated in the LITHP-focused Caribbean proposal. A few clarifications are needed in the description and justification of the sites, particularly Site A1. Questions were raised as to whether a position of the site to the south (the other side of the fault) might reach below B'' more easily. Complete site summary forms are needed. Some panel members requested a complete reference list. The proponents should make revisions to this proposal and submit it to the JOI office by July 1. LITHP would also ask the proponents (or the JOI office) to remove their previous proposals from the system. Total basement penetration will ultimately depend on time. The proponents should prepare themselves for less penetration at all sites. While seeking at least 150 m at each site (less than 100 m may not be meaningful for paleomagnetic measurements) some priorities should be considered between the 4 sites for deeper penetration. Previously, LITHP has voiced its support for drilling in the Caribbean region addressing K-T boundary questions. In a LITHP Caribbean leg, such problems could be studied in recovered K-T boundary sequences. Therefore, LITHP views its support of a leg of Caribbean drilling as outlined in this proposal. (in addition to a leg with primarily OHP objectives) as the best way to support K-T boundary drilling while still acting within its mandate.

Proposals **384-Rev3** (Pacific-Atlantic Connection), **408-Add2** (Caribbean Transects), **415-Add2** (Caribbean Ocean History), and **436** (Campeche Bank) were not reviewed as they were superseded by the above reviewed proposal or (in the case of 436) were not within the mandate of the panel. Proponents of 384-Rev3, 408-Add2, and 436 are referred to the comments contained in the review of the above proposal.

Review Form: Spring Lithosphere Panel

Proposal Number: LOI 23

Short Title: Kerguelan

Proponents: Coffin et al.

Criteria Categorization:

A	B1	B2	C	D	E	F
---	----	----	---	---	---	---

no category ranks were given for letters-of-intent

Comments:

The proposal discussed in this letter of intent meets one of our high priority objectives for drilling prior to 1998. The proponents need to include a specific discussion of deep vs. transect drilling. Panel members discussed a potential 2-phase scheme. Phase 1 would be devoted to a transect, while phase 2 would drill a deep hole (>250 m penetration). To meet LITHP goals, however, one deep hole should be included. A 15 site program is probably unrealistic, especially considering possible difficult working conditions and long transit times. Perhaps the proponents could start with considering a transect at 1/2 the spacing suggested in the letter of intent. The proponents should realize that LITHP would like to devote 1-2 legs toward drilling one of the giant oceanic plateaus. Therefore the proponents should include in their proposal a frank discussion of the pros and cons of drilling the other candidate, Ontong Java Plateau. Such a

discussion should include a comparison of the sediment thickness of each plateau as that might influence the selection of the appropriate plateau for study.

Review Form: Spring Lithosphere Panel

Proposal Number: LOI 25

Short Title: Shatsky Rise

Proponents: Sager et al.

Criteria Categorization:

A B1 B2 C D E F

no category ranks were given for letters-of-intent

Comments:

LITHP places high priority on furthering our understanding of large igneous provinces (LIPs), especially on elucidating their timing, emplacement histories, and crustal petrologies/geochemistries. The Shatsky Rise appears to offer opportunities to address such problems. Its advantages include a moderate size and a relatively well explained tectonic setting as age-progressive magmatism along a triple junction.

LITHP will be interested to learn the outcome of the upcoming site survey, now scheduled for mid-1994. In considering whether or not to submit an ODP proposal to drill the Shatsky Rise, however, the proponents should address several major concerns of the panel. 1) Are dredge samples available from the Shatsky Rise, and if so, what light do they shed on its emplacement history? It appears that many dredge targets are available on the Rise, and these should be exploited, the samples analyzed, and the results interpreted before drilling would proceed. 2) Shatsky Rise is noted for its chert horizons, and previous drilling has experienced severe technical/operational problems as a result. Without the diamond coring system (DCS), given the probabilities that bit life will be significantly reduced and that much of the sedimentary section will not be recovered, what LIP objectives are realistically addressed by drilling Shatsky Rise? If such questions still remain after the site survey, it is unlikely that LITHP would rank a proposal to drill Shatsky Rise to address LIP problems highly.

Review Form: Spring Lithosphere Panel

Proposal Number: LOI 29

Short Title: Hawaiian hotspot

Proponents: Mahoney and Spencer

Criteria Categorization:

A B1 B2 C D E F

no category ranks were given for letters-of-intent

Comments:

The Hawaiian-Emperor seamount chain is the best-expressed example of hotspot volcanism on Earth. Its chemical and isotopic evolution through time is an interesting scientific problem.

LITHP, however, has serious doubts as to the usefulness of drilling in addressing problems of hotspot evolution. Given the accessibility of the seamounts to the dredge, all of the proposed drilling targets should be dredged (if not already so), the samples analyzed, and the results interpreted before any drilling could be justified. Historically, drilling seamounts has produced a mixed bag of results, with many yielding only alkaline basalts which the proponents want to avoid.

In summary, given the low feasibility of recovering the types of rocks necessary for the proposed study, the admitted complexity in an individual seamount's petrology and geochemistry, and the amount of time necessary to drill a seamount chain, it is unlikely that LITHP would ever rank a drilling proposal addressing the chemical and isotopic evolution of a hotspot as a high priority.

Review Form: Spring Lithosphere Panel

Proposal Number: 380-Rev4

Short Title: VICAP-MAP

Proponents: Schminke et al.

This proposal was not reviewed as it has already been scheduled.

Review Form: Spring Lithosphere Panel

Proposal Number: 439

Short Title: Marquesas Mass Balance

Proponents: McNutt et al.

Criteria Categorization:

A	B1	B2	C	D	E	F
A3	B1.2	B2.1	C3	D2	OK	F4

Comments:

Recently LITHP has been charged with identifying specific problems it would like to see addressed by 1998. These priorities are summarized in the recent LITHP white paper. The mass balances at hotspots has been identified in these priorities and LITHP is currently supporting one such program (VICAP, ODP Leg 157). LITHP would like to see the results from the VICAP drilling before making a decision on further support for this type of drilling.

However, at this time the prospects for future support of this proposal are not high. There may be technical problems (hole stability) with such a deep hole in the volcanoclastic sequence. The accuracy of dating, which was not discussed, will likely be a serious problem. Unlike the VICAP program, where many dated events are available (prior to drilling), the dating here may have much more uncertainty. Separating the sedimentary volcanoclastic evolution from large scale slumping may be difficult in a meaningful way in a single hole. The Panel is not clear about the focus of the proposal. The main thrust of this version appears to be testing the seismic stratigraphic model, and should be of more interest to TECP and SGPP. The evolution of oceanic islands is of interest to LITHP, but that theme needs to be better developed and the rationale for doing such an experiment in the Marquesas better established.

Review Form: Spring Lithosphere Panel

Proposal Number: 448

Short Title: Ontong-Java

Proponents: Kroenke et al.

Criteria Categorization:

A	B1	B2	C	D	E	F
A1	B1.2	B2.1	C2	D1	OK	F2

Comments:

LITHP places high priority on furthering our understanding of large igneous provinces (LIPs), especially on elucidating their timing, emplacement histories, and crustal petrologies/geochemistries. The giant Ontong Java Plateau offers clear opportunities to address such problems, and is one of two LIPs identified by LITHP as high priority targets to be drilled before 1998. The proposal, however, must be significantly revised before it will be ranked by LITHP.

LITHP strongly encourages submission of a revised proposal for drilling the Ontong Java Plateau which addresses major LIP themes outlined in the LITHP White Paper. In the revised proposal, the proponents should address several concerns of the panel. 1) Only 3 or 4 of the proposed sites directly address the age of the plateau; given the two sets of dates for the feature, why not focus more on investigating the age of the main plateau? Furthermore, are there any structural discontinuities or other explanations for the two sets of dates? 2) Two of the eight sites appear to be strong targets for the dredge, which should precede drilling. Has the plateau been dredged, and if so, where and what are the results? 3) The eastern salient of the plateau appears to extend to 172°E. Why is only one site, at 164°E, proposed for the entire eastern portion? 4) Is Site 807 the best possible site for deep (~1000 m basement penetration)? If so, why; if not, what are potentially superior sites? 5) Dipping reflectors do not necessarily mean lateral accretion of crust at a

spreading center - it appears that large volcanoes can produce dipping reflectors. See Schaming & Rotstein, GSA Bull., 1990). 6) Realistic time estimates for drilling should be provided, as should coherent 1 or 2 leg scenarios. 7) Only those seismic data which are of high enough quality for basement drilling should be included in Figure 17. For each proposed site, the proposal should include a seismic section, and sediment isopach and structure contour maps.

Review Form: Spring Lithosphere Panel

Proposal Number: LOI 24

Short Title: Cascadia II

Proponents: Carson et al.

Criteria Categorization:

A **B1** **B2** **C** **D** **E** **F**

no category ranks were given for letters-of-intent

Comments:

This moderately-detailed letter shows the intent of the authors to submit a full proposal for a second leg of drilling on the Cascadia margin. A LOI was submitted at this time because creation of a full proposal must await additional consideration of Leg 146 results, in particular the interpretation of shipboard packer and post-cruise CORKed-hole testing. Because this is an LOI it does not include specific sites.

New interpretations of seismic data collected within and around the area of proposed drilling on the Oregon margin suggest that left-lateral strike-slip faulting may play a significant role in margin deformation and fluid expulsion. LOI 24 proponents suggest that the influence of this faulting can be investigated during a second leg of drilling, in addition to addressing some remaining primary goals of the original program. These topics include the nature and magnitude of fault and background permeability; roles of pore pressure in fluid and tectonic processes; chemical, biological, and physical meaning of the BSR; relationship between faulting and fabric, fluids, and diagenesis; and the timing of flow.

Specific drilling goals include refurbishment of existing CORKs; emplacement of additional seals; drilling of holes in an area of fluid flow without a BSR, a reference site in the Cascadia Basin, and along frontal thrust and strike-slip faults. These goals are vaguely consistent with LITHP interests in fluid and chemical transport processes at active margins (related primarily to crustal recycling and access to continental and mantle sources), but the goals of the proposed program are generally too shallow to be a high priority for LITHP. This proposal falls squarely within the mandates of SGPP and TECP.

Review Form: Spring Lithosphere Panel

Proposal Number: LOI 30

Short Title: Erosion, mass balance and fluid flux

Proponents: vonHuene

Criteria Categorization:

A **B1** **B2** **C** **D** **E** **F**

no category ranks were given for letters-of-intent

Comments:

LITHP has a strong interest in mass balance experiments in subduction zones, particularly in experiments that attempt to address the contribution of subducted components to arc volcanism. The extensive seismic imaging on the Peru margin, and the especially the thorough data evaluation undertaken by the proponents, make the Peru margin one of the best places in the world to attempt to balance the input of material into a subduction zone. Unfortunately, the Peru margin is not a good site to examine the effects of material transport into a subduction zone on the composition of the subduction related volcanism. Because of this, the Peru margin is unlikely to ever become highly rated by LITHP as the best location for a subduction zone/arc volcanism mass balance experiment. Although the present procedure for scheduling drill legs might appear to favor proposal that focus on the objectives of individual thematic panels, LITHP remains committed to the concept that best drilling targets are those that are inherently multidisciplinary in nature and which are of interest to a broad spectrum of the earth science community. We therefore do not encourage the strategy of splitting a well conceived drilling program into separate proposals aimed at isolating drilling objectives such that they would only appeal to the interests of a single thematic panel.

Review Form: Spring Lithosphere Panel
Proposal Number: 330-Add4
Short Title: Mediterranean Ridges

Proponents: Robertson et al.

This proposal was not reviewed as the leg is already scheduled.

Review Form: Spring Lithosphere Panel
Proposal Number: 355-Rev3
Short Title: Formation of Gas hydrate

Proponents: von Huene et al.

Criteria Categorization:

A	B1	B2	C	D	E	F
----------	-----------	-----------	----------	----------	----------	----------

see LOI 30

Comments: duplicate of comments on LOI 30, which was a different set of objectives for essentially the same drill sites:

LITHP has a strong interest in mass balance experiments in subduction zones, particularly in experiments that attempt to address the contribution of subducted components to arc volcanism. The extensive seismic imaging on the Peru margin, and the especially the thorough data evaluation undertaken by the proponents, make the Peru margin one of the best places in the world to attempt to balance the input of material into a subduction zone. Unfortunately, the Peru margin is not a good site to examine the effects of material transport into a subduction zone on the composition of the subduction related volcanism. Because of this, the Peru margin is unlikely to ever become highly rated by LITHP as the best location for a subduction zone/arc volcanism mass balance experiment. Although the present procedure for scheduling drill legs might appear to favor proposal that focus on the objectives of individual thematic panels, LITHP remains committed to the concept that best drilling targets are those that are inherently multidisciplinary in nature and which are of interest to a broad spectrum of the earth science community. We therefore do not encourage the strategy of splitting a well conceived drilling program into separate proposals aimed at isolating drilling objectives such that they would only appeal to the interests of a single thematic panel.

Review Form: Spring Lithosphere Panel
Proposal Number: 400-Add2
Short Title: Mass balance at the Costa Rica margin

Proponents: Silver et al.

Criteria Categorization:

A	B1	B2	C	D	E	F
A1	B1.1	B2.1	Novel	D1	E5	F2

Comments:

The proposal objectives are well-formulated and LITHP considers the location appropriate to meet these objectives. Only portions of the proposal by itself are relevant to LITHP thematic objectives, but is of high priority as part of a package of similar proposals. It is highly probable that the scientific objective of mass balance across the Costa Rica Margin can be achieved and LITHP is very interested in seeing this done as the first stage of a study of the variation of sediment signal in arc volcanism under similar accretionary conditions. Proposal 435Rev (Nicaragua Mass Balance) should, in the second stage, serve as the complementary high-sediment-signal endmember (assume that the results of drilling at Costa Rica show that this kind of mass balance experiment can be successfully done). LITHP regards 400Rev in [principal as complete and ready for drilling, but would appreciate seeing a balance cross-section and a review of the results of the heat-flow and ALVIN diving. LITHP recommends to the proponents that they keep close contact with the proponents of 435-Rev to ensure the maximum compatibility of drilling concepts and resulting mass estimates from both programs.

Review Form: Spring Lithosphere Panel

Proposal Number: 435-Rev
Short Title: Nicaragua crustal fluxes

Proponents: Plank et al.

Criteria Categorization:

A	B1	B2	C	D	E	F
A1	B1.1	B2.1	Novel	D1	E3.E5	F2

Comments:

The panel appreciates the proponents' efforts to clarify 435 and to answer our questions from the fall meeting. The link between this proposal and 400-Costa Rica is now clear, and the two programs form a coherent strategy for a mass balance experiment on this margin. However, it is clear that the Nicaragua transect is a few years from being ready to drill, in terms of its site-survey needs, and our commitment to this proposal will depend heavily on whether or not the drilling along the Costa Rica transect demonstrates that this kind of mass-balance experiment can be completed with the drillship. We encourage the proponents to begin the site survey process, which should yield a great deal of interesting science in itself, to complete the geochemical characterization of the volcanoes onshore of the Costa Rica transect as needed, and to wait and see what the results of the Costa Rica drilling are.

Review Form: Spring Lithosphere Panel

Proposal Number: 435-Rev2
Short Title: Mariana-Izu Crustal Fluxes

Proponents: Plank et al.

Criteria Categorization:

A	B1	B2	C	D	E	F
A1	B1.1	B2.1 (ques)	C2	D1 (7km at BON8A) may be difficult	other	F2

Comments:

Again, the panel appreciates the quick and clear response of the proponents to our questions. There were a number of questions raised about this proposal--some of these may exist because of pieces lost in splitting the two proposals (we see only the current version at each meeting) and may be things that weren't clear at last review. These questions include:

What exactly is the inventory of available material now--there are a lot of holes in the western Pacific, and if 801C is good enough why are other holes in the region not sufficient. Specifically, what is exactly is missing in the available database that the proposed drilling will supplement? What can't you do with what you have?

Why is the crustal characterization from Site 585 not good enough? What kind of mass balance can you attempt along these margins with what you do know?

Is there material available that will give you some constraint on the enriched volcanoclastic material actually going down the Marianas? It is clear that some constraint on those compositions is needed as well on the "normal" ocean crust in the area.

Along what transect will these mass balances be done--Iwo Jima or Agrigan? Is there adequate chemistry on the islands in the Izu-Volcano arc?

The panel believes 801C made an important contribution to our understanding of crustal evolution and supports deepening or redrilling the site.

Review Form: Spring Lithosphere Panel

Proposal Number: 445
Short Title: Nankai Trough

Proponents: Moore et al.

Criteria Categorization:

A **B1** **B2** **C** **D** **E** **F**
A5

Comments:

This proposal aims at a deeper insight into deformation processes and fluid behaviors within an accretionary prism of the Nankai Trough, at the northern end of the Philippine Sea plate. The mode of formation, deformation and dewatering of accretionary prism is fundamental to understanding of the evolution of island arc or active continental margin as well as of global material recycling. The Nankai Trough is unique, i.e., enriched in sandy terrigenous sediments, making a good contrast to the Barbados prism, which is enriched with pelagic sediments. Several sites (three legs) were took by DSDP and ODP around the Nankai Trough: Leg 131 was especially successful to drill through the accretionary complex to the subducting slab (basalt). Combined with those data, the present proposal is planning to have a three-dimensional view of various characteristics of the prism. Proposed drilling sites are arranged on two transects, eastern and western ones. According to the restored cross-sections the brittle deformation (e.g., thrusting) is prominent in the Protothrust Zone in the eastern part of the prism. In the western part the ductile deformation (e.g., thickening of sediments) is more predominant in the same zone. Main drilling objectives are to detect the nature of the Protothrust Zone (deformation, dewatering and diagenesis), the nature of the decollement zone and the nature of fluid flow within the Nankai prism. Physical and mechanical properties of the sediments and their relationships with the fluid flow are also planned to be investigated. Particularly interesting are long-term in situ measurements of permeability, fluid pressure and chemistry on sealed boreholes by submersible.

The results of the proposed drilling may contribute greatly to understanding of the accreting and solidifying processes of sediments and the global circulation of fluids and other materials. The theme is rather interdisciplinary, concerned with diagenesis of sediments, tectonics, geochemistry and circulation of fluid and fluid-rock interaction within accretionary prisms, and is not concerned to the Lithosphere Panel but much more to those of Tectonics Panel and/or Sedimentary and Geochemical Processes Panel.

Review Form: Spring Lithosphere Panel

Proposal Number: 450
Short Title: Taiwan Arc-Continent Collision

Proponents: Lundberg et al.

Criteria Categorization:

A **B1** **B2** **C** **D** **E** **F**
A5

Comments:

The target of this proposal is an analysis of collision processes between arc and continent. The target area is Taiwan-Luzon volcanic arc, where the Luzon arc is colliding against the Asian continent along the Manila trench. Because the collision is oblique and propagating southward by 84 km/my various stages of arc-continent collision can be observed from Central Range of Taiwan (collision initiated mid-Pliocene) to the Luzon arc where the forearc basin has not been closed. With the progress of collision backthrusts were formed on the frontal margin of the arc, along the North Luzon Trough (= initiation of flip of subduction polarity).

The proposed drillings aim at investigating tectonic and sedimentary processes during early phases of the collision. Kinematics and structural geometry of the collisional closure of a forearc basin is one of the main objectives. Deformation and fluid-rock interactions within the rear of the accretionary prism and sedimentological processes related with collisional unroofing are also included in the main objectives. All of the proposed drilling sites are, therefore, set near or along the Southern Longitudinal Trough (tilted and deformed former fore-arc basin) and the North Luzon Trough (northward closing present forearc basin). The scientific objectives of this proposal are interesting but are beyond the main mandate of the Lithosphere Panel. They may be concerned with the Tectonics Panel and partly with the Sedimentary and Geochemical Processes Panel.

Review Form: Spring Lithosphere Panel

Proposal Number: LOI 21
Short Title: Basins of the SW Pacific

Proponents: Ewart et al.

Criteria Categorization:

A B1 B2 C D E F

no category ranks were given for letters-of-intent

Comments:

LITHP considers the topic of mantle isotopic domains a potential priority topic, as indicated by our high-ranking of proposal 426 at the Australian-Antarctic Discordance. However, before the type of project outlined in this LOI can be given further support, better documentation of the evidence for various mantle domains in the basins needs to be presented (presumably requiring Sr, Nd, and Pb isotopic analyses on existing samples). There are numerous interesting tectonic and petrologic questions in this region, but the plan needs to be more specifically focused on clearer questions before this LOI would warrant a full proposal.

Review Form: Spring Lithosphere Panel

Proposal Number: 437

Short Title: Lau-Havre-Taupo Rift

Proponents: Parson et al.

Criteria Categorization:

A	B1	B2	C	D	E	F
A4	B1.3	B2.2	C3	D1?	?	F3

Comments:

LITHP is certainly interested in initiation of arc rifting as a potential high priority topic. Several aspects of the objectives in this proposal will have to be clarified, or the experiment redesigned, before the proposal can be supported. For example, why are the Leg 135 results not adequate to answer many of the structural questions? Will single sites at a given latitude, spread over such a tremendous area, be adequate to determine age and structural relationships? The panel felt that at least three sites in E-W transects would be needed. How many questions can be answered from existing seismic data? Overall, the proposal would benefit from a less ambitious geographic scope and a more focused strategy.

Review Form: Spring Lithosphere Panel

Proposal Number: 442

Short Title: Rift initiation in Marianas

Proponents: Stern et al.

Criteria Categorization:

A	B1	B2	C	D	E	F
A1	B1.2clarification	B2.1	C1 (C3 hydrothermal)	D1	magnetics	F3

Comments:

This proposal is highly relevant to LITHP's top thematic objectives. However, it needs substantial revision, as 1) the geological and geophysical data used to infer northward propagation of the north Mariana backarc rift is insufficiently detailed and not convincing (as an example, the magnetic coverage referred to in the proposal concerns a region to the south of the area of proposed drilling, and in any case does not provide clear evidence for rift propagation); and 2) discussions of available data on the arc's geochemistry, of the possible causes of observed geochemical variations, and of the geochemical models to be tested in the proposed backarc drill sites, are either too short or altogether lacking. The proposed location is appropriate, and the potential of sites A, B, C and E for providing important constraints on back arc basins evolution is good. The necessity for drilling site D is less apparent, due to the poor justification presented for the rift propagation hypothesis. The scientific feasibility is good, and all the proposed sites can be drilled with on hand and tested technology. Need for additional site survey (submersible and side-scan sonar) is identified by proponents, and is being proposed. If proponents wish to stress the hydrothermal objectives briefly stated for sites A, B, C and E, LITHP suggests they include prospection for hydrothermal vents or deposits in their objectives for this site survey cruise. The proposal is presently of relatively low priority to LITHP, but will undoubtedly become high priority if the above mentioned revisions are achieved.

Review Form: Spring Lithosphere Panel**Proposal Number:** 447**Short Title:** Continental extension**Proponents:** Taylor et al.**Criteria Categorization:**

A	B1	B2	C	D	E	F
A3	B1.2	B2.1	C2	D2	E5	F4

Comments:

Portions of this proposal are relevant to LITHP's objectives (A3). LITHP is interested in the possibility offered of testing the role of low angle detachments in the formation of rifted margins. However, it will not play the leading role in supporting this proposal, as it is primarily relevant to TECP's objectives. The proposal would be improved if P, T path history of on land detachments studied in the Woodlark region was discussed, and if the rationale for bare-rock drilling of Moresby seamount was better explained. Specifically, what structural, petrological and metamorphic (P, T paths) characteristics are anticipated in the core if the detachment hypothesis is correct? In the same line of thought, it appears that drilling results at site ACE 1 will be critical for the continuation of the leg: if high and medium grade metamorphics similar to that of on land core complexes are recovered there, the core complex interpretation of Moresby Seamount presumably won't hold any longer. What would then be the proponents strategy for the continuation of the leg? The location chosen is appropriate, the Woodlark basin being, as stated by the proponents an ideal example of rift propagation within continental basement, with little sediment and no salt deposits. Submersible studies in the drilling area, and specifically on the Moresby Seamount, would help putting drilling data into a wider geological perspective, and may actually make bare-rock drilling at this site less critical. This could help, as drill time estimates are not provided by the proponents, but are likely to be over one leg in the present form of the proposal, given the long basement penetration proposed at each site and the time consuming instrumentation program at site ACE 2. Technical feasibility of site ACE 2 instrumentation plan presumably needs to be assessed. Proposal is fairly complete, but could benefit from a balanced cross-section along the line of proposed sites. Finally, proposal is of relatively low priority for LITHP, and unlikely to become higher priority.

Review Form: Spring Lithosphere Panel**Proposal Number:** 453**Short Title:** Bransfield Strait**Proponents:** Fisk et al.**Criteria Categorization:**

A	B1	B2	C	D	E	F
A3	B1.1	B2.1	C2	D1	E5	F3

Comments:**Thematic relevance (A3)**

Marginal basin development is an important priority of Lithosphere panel. This region is interesting in that it is possible to drill a section from the rifted margin towards the basement. It is not clear that this basin has reached "maturity" as the objective of this proposal is, in part, to test if the OCT has been reached. Lith panel would place a higher priority if the axial region were not ambiguous in nature.

Scientific Merit

(B1 Well formulated) The panel would like to see justification that the marginal basin has passed to OCT and hole BSA-2 does therefore penetrate Back-arc oceanic crust"

Location (appropriate)**Scientific feasibility (C2)**

The hydrothermal aspects of this proposal are not developed as a cruise is planned for this summer. Complementing the basement-tectonics objectives of this proposal with studies of sediment-based hydrothermal deposits would significantly enhance the justification for drilling in this area.

Preliminary Technical feasibility (D1) May require Ice-boat support and limited weather-window.

Proposal completeness
 "Balanced" cross-sections based on the seismic data

Recommended action (F3)
 Hydrothermal aspects, following 1994 cruise, more detail on the OCT could significantly enhance prospects of drilling in the Bransfield Strait.

Review Form: Spring Lithosphere Panel

Proposal Number: LOI 21
Short Title: Crustal creation in Western Pacific

Proponents: Arculus

Criteria Categorization:

A **B1** **B2** **C** **D** **E** **F**

no category ranks were given for letters-of-intent

Comments:

LITHP finds the questions interesting but does not expect them to become a top priority. The proponent may want to consider approaching the proponents of Proposal 442 (Stern et al. Mariana Trough) and proponents of 446 (Bloomer and MacLeod, Tonga forearc) which encompass in one way or another, some of the objectives in this letter of intent. The Philippine Sea objectives have some important tectonic and petrologic implications, and are not being addressed by any other group. The proponent may wish to contact Suyehiro et al. (proponents of 431, Western Pacific Seismic network) who are advocating a hole in the West Philippine Basin. A combined proposal emphasizing tectonic and seismic objectives might address high priority objectives of this and other panels.

Review Form: Spring Lithosphere Panel

Proposal Number: 421-REV
Short Title: Alkali-Acid Rocks of the Volcano Trench

Proponents:

Criteria Categorization:

A **B1** **B2** **C** **D** **E** **F**

A5

Comments:

The panel believes that the central premise of this proposal is flawed. We find that the description of rock types is completely consistent with current interpretations of plate tectonics. In this view, the Pacific plate includes a large seamount province, with various alkalic volcanic rocks and sediments; that portion of the Pacific plate is being subducted (underthrust) below an Eocene arc complex which includes basalts, boninites, their more silicic derivatives, and their plutonic counterparts. Unless the proponents can make a convincing case otherwise, we do not believe that drilling in this area will become a high priority of the panel. The proponents may wish to contact the proponents of another forearc drilling proposal (#446 Chris MacLeod, IOS, United Kingdom and Sherm Bloomer, Boston University, USA for the Tonga forearc) to see if any of his objectives overlaps with theirs.

Review Form: Spring Lithosphere Panel

Proposal Number: 446
Short Title: Tonga Forearc

Proponents: MacLeod and Bloomer

Criteria Categorization:

A **B1** **B2** **C** **D** **E** **F**
 A1 B1.2 B2.1 C2 D1 E4,E6,E8 F2

Comments:

This proposal clearly addresses themes highly relevant to this panel as identified in the LITHP White Paper. However, the proposal fails to clearly connect intended for drilling with achievement of the stated objectives. The proposal also needs a much clearer statement of the geologic context for the area in general, and for the proposed drill sites in particular. Significantly more site survey data are needed. A recognition of this deficiency appears in the proposal, but we would particularly stress the need for MCS data (or at least a clarification of the quality of the data that currently exist), better bathymetry and photographic data at each site. Although the proponents say that submersible data would not be helpful, we think this should be reconsidered, particularly for the area of the gabbro site, given the results of drilling such rocks in active tectonic environments during Legs 147 and 153.

With respect to testing the ophiolite model, there was concern expressed that 200m of basement penetration would be inadequate to establish similarities or differences between ophiolite and mid-ocean ridge alteration, and between forearc crustal sections and ophiolites inferred to be suprasubduction zone in origin.

It is also suggested that the proponents consider at least one relatively deep hole. For example, if more depleted rocks are recovered at TF2, then it might be useful to drill deeper in the TF3 site to determine whether equally depleted rocks are recovered at depth. (Also note that the total depth of penetration has been incorrectly calculated on the Site Summary forms for sites TF2 - TF5).

Finally, given the extent of overlap in objectives and site locations in this proposal and #451 (Tappin et al), it is recommended that these two groups discuss rationalization of objectives and sites for the Tonga area

Review Form: Spring Lithosphere Panel**Proposal Number:** 451**Short Title:** Tonga Ridge**Proponents:** Tappin et al.**Criteria Categorization:**

A	B1	B2	C	D	E	F
A2	B1.2	B2.1	C1	D1	E8	F3

Comments:

Although this proposal is relevant to thematic objectives of this panel, it was felt that arrowly focussed to ever rank highly. Nevertheless, the objectives are clearly defined and have significant scientific merit. These objectives also overlap significantly with objectives and site locations for forearc drilling in proposal #446 (Macleod and Bloomer). We, therefore, recommend that these two groups discuss rationalization of objectives and drill sites to come up with a single leg of drilling in the Tonga area.

The panel also had the following questions/comments about the existing proposal:

- (1) How do you propose to date the sequence stratigraphy within the volcanoclastic sediments?
- (2) Most of the drilling is sited in the Tonga trough (i.e. between the Tofua and Tonga arcs). How can you determine the arc from which any given volcanoclastic layer is derived or whether a horizon represents a recent eruption or the erosional product of an older volcano? This could be particularly important since the volcanics from Tonga and Tofua could be different compositions and of different age. Also it is well known that pumice fragments float for some distance away from the site of eruption before settling. They would, thus, not represent the local volcanic activity. Can these aspects be resolved or avoided and if not, would they compromise the test you are making of the Tonga evolutionary model?
- (3) Can the objectives be met by drilling less sediment and more basement?

Review Form: Spring Lithosphere Panel**Proposal Number:** LOI 17**Short Title:** Internal Anatomy of Volcanoes**Proponents:** Binns and Scott**Criteria Categorization:**

A B1 B2 C D E F

no category ranks were given for letters-of-intent

Comments:

Characterizing active felsic volcanic-hosted hydrothermal systems is a high priority of LITH P. In order to determine if Pual Ridge is an appropriate site to investigate this type of volcanogenic massive sulfide deposit, however, will require significant additional site survey data. Moreover, if it is determined that Pual Ridge is an appropriate location for drilling, a significant effort will be required to establish a monitoring program. We refer the proponents to the site survey programs for TAG and Sedimented Ridges I for guidance.

note: comment included in LITHP's global proposal rankings: LITHP is excited to see LOI 17, the Internal Anatomy of Volcanoes, as it may offer a chance to examine the origin of felsic volcanic hosted massive sulfide deposits, one of the Panel's highest priority objectives for the next phase of the program. However, there is not yet enough site-specific information to determine if the Woodlark and Manus Basin sites are indeed appropriate analogs for such deposits nor to evaluate specific sites. In that light, LITHP believes that it is premature to rank this LOI, but we encourage the proponents to pursue additional site survey data, as this is the most promising area we have seen to address one of our upcoming priorities.

Review Form: Spring Lithosphere Panel

Proposal Number: LOI 19
Short Title: Hydrothermalism in the Red Sea

Proponents: Sichler et al.

Criteria Categorization:

A B1 B2 C D E F

no category ranks were given for letters-of-intent

Comments:

Investigating hydrothermal processes at an incipient rift is a high priority of LITH P. In order to be of interest to LITH P, it is necessary that the proponents link their proposed goals with a drilling strategy that specifically addresses hydrothermal processes in the Red Sea, rather than as an add-on to the Bonatti proposal.

NOTE--comment included in LITHP's global rankings: LITHP still believes that drilling in the Red Sea could address some of our high priority questions about processes of ocean basin development and the origin of massive sulfide deposits. Our ranking of Red Sea drilling last year (#5, Spring 1993) appears to have generated a number of discussions among various groups (see Recommendations to PCOM #1 and #2) which we believe will generate site-specific Red Sea proposals by our next Spring meeting, if the prospects of clearance in the Red Sea appear good. We believe that it is better to wait for those proposals rather than ranking another non-specific Red Sea placeholder-proposal.

Review Form: Spring Lithosphere Panel

Proposal Number: 440
Short Title: Circulation on eastern Juan de Fuca

Proponents: Davis et al.

Criteria Categorization:

A B1 B2 C D E F
A1 B1.1 B2.1 C1 D1 F1

Comments:

LITHP is quite excited about the prospect of drilling the flanks of the Juan de Fuca ridge. The panel compliments the authors for the conception and design of an elegant experiment and especially for the thorough, but concise presentation of these ideas in the proposals. LITHP finds no deficiencies in the proposal or in the supporting evidence and hopes

that this leg can be scheduled for drilling as soon as possible. Deepening of one of these holes through the extrusives is highly supported by this panel.

Review Form: Spring Lithosphere Panel

Proposal Number: 420
Short Title: Evolution of Ocean Crust

Proponents: Fisher et al.

Criteria Categorization:

A	B1	B2	C	D	E	F
----------	-----------	-----------	----------	----------	----------	----------

no category rankings--simply a letter of information

Comments:

LITHP continues to strongly support the crustal evolution experiment presented in proposal 420. The panel recognizes that the support necessary for accomplishing the survey work that will allow the proponents to select and characterize the drill sites will be difficult, if not impossible, to obtain in the time remaining before the end of the drilling program. Never the less, the panel is concerned that moving the experiment to the Costa Rica Rift may compromise the success of the experiment. In particular, the ability to conduct the experiment along a single flow line and access to sufficiently old oceanic crust would be lost. The panel members, and we assume the proponents, are still uncertain of the range in age or thickness of sediment cover necessary to seal the advection of fluids from oceanic crust, and hope to see an expanded discussion of this in a revised proposal. The panel would also ask the proponents to consider the potential of the Russian-USGS MCS line recently published in JGR as a possible first step in providing the necessary data to begin to evaluate drill sites. The panel has ranked highly proposal 440 for investigating low temperature hydrothermal circulation on the flank of the Juan de Fuca ridge. The goals of proposal 440 have some overlap with proposal 420. The panel did not feel that 440 was a reasonable substitute for 420, in part because the rapid sediment burial of the Juan de Fuca ridge results in sealing of the oceanic crust at an anomalously young age, and therefore within a higher heat flow regime than is typical for the evolution of oceanic crust.

Review Form: Spring Lithosphere Panel

Proposal Number: 438
Short Title: Reflecting Interfaces

Proponents: Mutter et al.

Criteria Categorization:

A	B1	B2	C	D	E	F
A1	B1.1	B2.2?	C4	D1/D2 at edge		F4

Comments:

Oceanic crust is remarkably similar worldwide based on refraction studies, but there are consistent differences between conceptual models of slow- and fast-spreading crust based on reflection studies. This proposal is intended to address a question that is fundamental to our understanding of crustal accretion: why is crust formed at slow-spreading ridges seismic reflection 'rich,' while crust produced at faster-spreading ridges is seismic reflection 'poor?' There are two end-member models that might explain the differences in seismic (and so physical, chemical, constructional, tectonic?) structure.

- **STRUCTURAL MODEL:** Differences in crustal reflectivity reflect differences in crustal deformation. Magmatism builds similar crust at fast and slow ridges, but brittle and diffuse deformation of slow crust results in formation of sharp and diffuse reflectivity, respectively. Slow-spreading crust is more mechanically active than fast spreading crust.

- **MAGMATIC MODEL:** Reflections indicate layering in the crust. This layering is present in all crust but is not apparent in fast crust because the layers are too thin, i.e., below the tuning thickness of the seismic energy.

There are several three problems with this proposal:

1) The target is at the very limit of the capabilities of J. Resolution, and in fact could be beyond the reach of the bit if the present velocity analyses are incorrect. In addition, the proposal requires penetration and casing of a very thick sedimentary section. This is not impossible, but it is somewhat risky. [On the other hand, coring and logging in old basement tends to be relatively easy and provide good results.]

2) The proposed drilling target is not particularly striking but appears to be rather subtle. This may reflect the poor quality of the reproduction in the proposal book, but the target reflector is, in any case, not nearly so apparent as many other (unfortunately deeper) reflectors. Is this really the best place to test the models, or is this simply a convenient place that has some of the desired characteristics? We suspect the latter.

3) Experience in ODP (and Kola, KTB, etc.) suggests that reflectors in crystalline rocks, much like youth, are fleeting. There would be time for drilling only one deep hole on the proposed program. Is it worth pinning all hopes on the penetration and identification of this single reflector?

4) There are a few DSDP and ODP holes that penetrated through the upper few hundred meters of oceanic crust? Do data from these holes tell us anything about the nature of reflectors in the crust? At least for 504B, the layer 2/3 reflector seems to be caused by a fairly subtle change in properties.

5) This proposal might be of greater interest to this panel if the objectives could be linked to other themes and objectives of interest. This might require choosing a different location (i.e., one in which more than one hole could be drilled in a leg through a thinner sediment layer, where there are other features of interest, etc.)

6) LITHP is unconvinced that the different models can be resolved with a single hole. Even if the proposed program is 100% successful, will we know that this result is a rule rather than an exception. Experience in lower crustal sections suggest significant heterogeneity in structure and composition; perhaps there are many different causes of reflectors in different places within the same piece of crust.

7) Is there some better way to define the nature of the reflectors using 3-D data sets or other forms of geophysics? LITHP found the figures shown in the proposal to be unconvincing, particularly the Line 700 that shows the proposed site.

8) LITHP members were aware of another seismic data set that may be of interest, an MCS line from the Argo Abyssal Plain with numerous intercrustal reflectors, presently in the hands of Phil Simmons and colleagues in Australia (?).

In summary, LITHP thinks that the objectives of this proposal are of primary importance to this panel. It was with great reluctance that we classified the proposal F4 (low priority and unlikely to be high priority) but we felt that the proponents were unlikely to be able to convince us that this site was worth drilling as presented. If the proposal could be sited elsewhere, below a thinner sediment layer, where other objectives could be achieved at the same time, the proponents could find greater support from LITHP.

Review Form: Spring Lithosphere Panel

Proposal Number: 443
Short Title: Oceanic faults

Proponents: Alt and Becker

Criteria Categorization:

A	B1	B2	C	D	E	F
A1	B1.2	B2.2	C3	??	E8	F4

Comments:

LITHP recognizes that continued drilling in holes 504B and 896A would address issues of crustal structure and heterogeneity which are of high priority to the panel. However, given the number of other programs of high interest now being considered by LITHP, the panel is unconvinced that the probable scientific returns from the proposed drilling are sufficient to justify the rededication of resources to these holes. The panel considers it unlikely that this proposal will be ranked highly in the foreseeable future, but is certainly willing to consider revised proposals which make a stronger case for another 504B leg. In addition, the panel encourages the proponents to update the proposal for coring hole 504B.

Review Form: Spring Lithosphere Panel

Proposal Number: LOI 28
Short Title: Japan Trench Observatory

Proponents: Kanazawa et al.

Criteria Categorization:

A **B1** **B2** **C** **D** **E** **F**

no category ranks were given for letters-of-intent

Comments:

LITHP recognizes that the establishment of seafloor seismic stations as proposed by ION will address high priorities of this panel and that the role of ODP in facilitating such stations should be championed by this panel. However, it is unlikely that LITHP will rank highly a proposal to drill holes solely for the purpose of establishing borehole seismic stations until it is firmly established that borehole installations are superior to seafloor installations. LITHP strongly encourages the proponents to explore ways to link borehole seismic station proposals with other scientific justifications for the drilling; the panel thinks this is the most likely means by which these stations may be established in the near future.

LITHP questions the need for two borehole stations. The panel sees no reason why boreholes are required for seafloor geodetic benchmarks; installations anchored in the sediment should be adequate for this purpose.

Review Form: Spring Lithosphere Panel

Proposal Number: **431-Add**
Short Title: **W. Pacific Seismic network**

Proponents: **Suyehiro et al.**

Criteria Categorization:

A	B1	B2	C	D	E	F
A1	B1.2	B2.1	C3	D3		F3

Comments:

LITHP recognizes that the establishment of seafloor seismic stations as proposed by ION will address high priorities of this panel and that the role of ODP in facilitating such stations should be championed by this panel. However, it is unlikely that LITHP will rank highly a proposal to drill holes solely for the purpose of establishing borehole seismic stations until it is firmly established that borehole installations are superior to seafloor installations. LITHP strongly encourages the proponents to explore ways to link borehole seismic station proposals with other scientific justifications for the drilling; the panel thinks this is the most likely means by which these stations may be established in the near future.

LITHP recognizes that the proponents have addressed several of the panel's concerns with the initial proposal. In particular, LITHP is satisfied that a seafloor installation for site WP-1 is justified despite the presence of the nearby island. The panel reiterates that a basement penetration of at least 100 m is desirable.

Review Form: Spring Lithosphere Panel

Proposal Number: **LOI 15**
Short Title: **Paleozoic Basement**

Proponents: **Fracassi**

Criteria Categorization:

A	B1	B2	C	D	E	F
----------	-----------	-----------	----------	----------	----------	----------

no category ranks were given for letters-of-intent

Comments:

LITHP feels that this proposal lacks focus and the depth of the holes proposed is not within the technical capabilities of the JOIDES Resolution. In its present form the proposal has little to no chance of being ranked highly or becoming a high priority. Motivation for drilling has not been adequately demonstrated. Improved bathymetry, seismic, dredging

studies all should be done first. The proponents need to formulate site specific objectives and demonstrate feasibility of achieving scientific goals.

Review Form: Spring Lithosphere Panel
Proposal Number: LOI 31
Short Title: Lower Plate margin in Australian Bight

Proponents: Stagg and Wilcox

Criteria Categorization:

A	B1	B2	C	D	E	F
----------	-----------	-----------	----------	----------	----------	----------

no category ranks were given for letters-of-intent

Comments: not of high priority

The nature of the transition between continental and oceanic crust is of interest to LITHP. The crust considered to have been generated at slow spreading rate in the Australian Bight needs to be better characterized by seismic methods, particularly in view of the apparent discrepancy in age between magnetic anomaly identification and correlation of regional seismic reflectors. At this stage of continental margin drilling, however, LITHP feels it is highly desirable to be able to access conjugate margins in order to test models of rifting.

Review Form: Spring Lithosphere Panel
Proposal Number: NARM-ADD3
Short Title: LEG 149-PART 2

Proponents: Reston et al.

Criteria Categorization:

A	B1	B2	C	D	E	F
A4	B1.3	B2.2?	C3	D1		F4

Comments:

The proposal aims at narrowing the uncertainties on the nature of the continent-ocean crustal transition still remaining after Leg 149 drilling. LITHP maintains an interest in sampling the oldest oceanic crust at Site IAP-3C seaward of the peridotite ridge, but considers other aspects of the proposal low priority. The Panel is not convinced by the case made for returning to this margin, based on the available results from Leg 149. We suggest that the results of 149 need to be in hand and digested before a compelling plan can be made for a second leg; the results to date call into question the strategy of drilling basement highs along the margin.

Review Form: Spring Lithosphere Panel
Proposal Number: 386-Add2
Short Title: California margin Drilling

Proponents: Lyle et al.

Criteria Categorization:

A	B1	B2	C	D	E	F
A3	B1.1	B2.1	C1	D1		F4

Comments:

This proposal is of some secondary interest to LITHP. LITHP applauds the proponents for their positive response to the LITHP Fall94 comments (suggestion to extend drilling into basement until destruction of the XCB cutting shoe). The major items in this proposal of interest to LITHP are the holes drilled to basement, particularly those that sample Franciscan basement and those on the Gorda Plate.

New or revised proposals or letters-of-intent not listed above were not reviewed, as they were not considered within the mandate of LITHP.

The Panel then briefly reviewed other active proposals, and then reviewed the list of 64 proposals, letters-of-intent, or areas of interest which are within our mandate. The panel went through that list of 64 plans numerically and made an initial decision about whether or not to rank the plan. 40 proposals, letters, or concepts were selected for further consideration. Those were then listed by theme (LIP, mass balance, forearc/arc, backarc, mantle dynamics, ocean ridge, hydrothermal) and a second review was made of the list. 17 proposals were selected for ranking.

The meeting adjourned at 2030 (after a grueling day with no coffee breaks) to ponder the list.

4. March 30, 1994

The meeting convened at 0830.

A. Future Meeting Dates: October 3-4-5, 1994 in Canada, either in Montreal or Victoria, hosted by John Ludden

B. Current Liaisons for 1994 from LITHP to:

TECP	Doug Wilson/Kathy Gillis
SGPP	Rob Zierenberg
OHP	John Tarduno
DMP	Mike Coffin/Andy Fisher
TEDCOM	Yngve Kristoffersen

To ease the burden on liaisons, and to insure we always have a contact with other panels, we've appointed two liaisons to some panels. Since there is no need for two liaisons at an individual panel meeting (one from a panel and one to it) we will try to coordinate schedules with the other panels so that every panel is represented but that we minimize the extra meetings that people have to attend.

C Membership Activity Nominated to replacement John Bender:

1. Pat Castillo
2. Dave Christie
3. Peter Michael

(Pat Castillo has been contacted and indicated that he is willing to serve)

Matilde Cannat is rotating off the panel for France

Pamela Kempton is rotating off the panel for the United Kingdom

D. Thanks and kudos.

The panel thanks Matilde Cannat and Pamela Kempton for their service to the Lithosphere Panel. They have provided many hours of thoughtful advice and comment and have been wonderful company as well!

The panel offered a resounding (and well-fed) thank you to Yngve Kristoffersen (and his family and colleagues) for hosting an excellent meeting and for providing hospitality above and beyond the call of duty. It was formally agreed that future hosts will not be held to the same impossible standards!

E. Global Rankings:

The 17 proposals selected the previous evening were listed and reviewed; and their drillability and locations were noted. After this discussion 16 proposals were included in the final list; it was decided that our support for the global seismic network would be shown better by a statement separate from the rankings.

Panel members assigned 16 points to their highest proposal, 1 to their lowest. Proponents of proposals, or members with stated conflicts-of-interest, could not vote for the proposals on which they were involved--those panel members assigned votes from 16 to 1 plus the number of proposals they could not vote for.

Total number of voting members: 15 (1 short-no replacement yet for John Bender)

Global Rankings:

Rank	Proposal Number	Title	Score	SD	# voting	Ready?
1	xxx	Caribbean Workshop (LITHP) ¹	14.13	1.81	15	yes*
2	xxx	Giant LIP ²	12.21	2.55	14	no
3	SR-DPG	Sedimented Ridges II	11.93	3.67	14	yes*
3	440	Juan de Fuca off-axis	11.93	3.08	14	yes*
5	426	Antarctic Discordance	10.73	3.53	15	no
6	400	Costa Rica mass balance	10.00	4.19	15	yes*
7	NARM-DPG	NARM Volc. II-Voring ⁶	9.67	4.37	15	no
8		Tonga arc/forearc ⁵	9.64	3.41	14	no
9	420	Evol. of oceanic crust ⁴	9.38	4.21	13	no
10	435-Rev2	Mar-Izu mass balance (801C) ³	7.27	4.53	15	yes
11	442	Mariana Trough	6.64	3.18	14	no
12	435	Nicaragua mass balance	6.13	3.85	15	no
13	425	15o20'N, MAR-offset drilling	5.86	3.44	14	no
14	376	Vema frac. zone-offset drilling ⁷	5.67	2.69	15	no
15	447	Woodlark Basin	4.87	4.36	15	yes?
16	453	Bransfield Strait	4.40	2.26	15	no

*within the area of operations for the next fiscal year

¹ Caribbean Workshop Leg is that for 1 leg of drilling combining elements of basement drilling from proposals 384R3, 415R, and 411 as presented by Donnelly, Abrams, Sigurdsson, Carey, Duncan, Sinton, and Mauffret. LITHP sees this as one-half of a 2-leg program (the other portion being that emphasizing principally OHP objectives). The two legs are complementary and should be planned in tandem. However, the four principal sites outlined in the ranked proposal are all required for a proper characterization of the basement of the basin (see Appendix 2).

² Kerguelan or Ontong-Java as outlined in LOI 23 and proposal 448.

³ Includes a return to 801C as part of a convergent margin mass balance experiment.

⁴ An experiment as outlined in the original 420 proposal for two sets of paired sites along a flow line--the siting of those experiments needs to be carefully considered after recent communications suggesting that the experiment might be moved to the Costa Rica Rift.

⁵ a one-leg program combining proposals 446 and 451

6. a transect across the Voring margin as outlined in the original NARM-DPG

7. The Vema ranking is for the leg of offset-section drilling of lower crust as outlined in proposal 376R2

Notes on programs of interest:

LITHP is excited to see LOI 17, the Internal Anatomy of Volcanoes, as it may offer a chance to examine the origin of felsic volcanic hosted massive sulfide deposits, one of the Panel's highest priority objectives for the next phase of the program. However, there is not yet enough site-specific information to determine if the Woodlark and Manus Basin sites are indeed appropriate analogs for such deposits nor to evaluate specific sites. In that light, LITHP believes that it is premature to rank this LOI, but we encourage the proponents to pursue additional site survey data, as this is the most promising area we have seen to address one of our upcoming priorities.

LITHP still believes that drilling in the Red Sea could address some of our high priority questions about processes of ocean basin development and the origin of massive sulfide deposits. Our ranking of Red Sea drilling last year (#5, Spring 1993) appears to have generated a number of discussions among various groups (see Recommendations to PCOM #1 and #2) which we believe will generate site-specific Red Sea proposals by our next Spring meeting, if the prospects of clearance in the Red Sea appear good. We believe that it is better to wait for those proposals rather than ranking another non-specific Red Sea placeholder-proposal.

LITHP is firmly convinced that the establishment of seafloor seismic stations as proposed by ION is essential for addressing some high priorities of this panel and that the role of ODP in facilitating such stations should be championed by this panel. However, it is unlikely that LITHP will rank highly a proposal to drill holes solely for the purpose of establishing borehole seismic stations until it is firmly established that borehole installations are superior to seafloor installations. LITHP strongly encourages the proponents to explore ways to link borehole seismic station proposals with other scientific justifications for the drilling; the panel thinks this is the most likely means by which these stations may be established in the near future. We will try to facilitate communication with ION to insure that the panel is kept aware of developments in seafloor and borehole seismometers.

LITHP still strongly endorses the proposal to CORK hole 395A (proposal 424) which would require 3-4 days of ship time. This is clearly important science, but because it constitutes less-than-a-leg there is no way to consider it on a footing with proposals for full legs of drilling. LITHP would welcome any guidance from PCOM about dealing with less-than-a leg proposals, after PCOM's discussion of the issue at their April meeting.

The Panel reviewed the rankings and confirmed that they reflected our stated long-term priorities and our recognition that we needed a review of our difficulties with drilling at Hess Deep and MARK.

(late Wednesday morning session, Rob Zierenberg assumed the chair for the remainder of the meeting, as Sherm Bloomer needed to catch an early plane)

Zierenberg promptly called a coffee break

F. Final White Paper Revisions

White paper discussions led to rewording of some areas and discussion of the two sections added toward the end of the document. There are also problems in the large table that need to be addressed. Discussion of both the white paper and the continuation of the program beyond 2003 focused on the establishing the societal relevance of the program. It was felt that an expansion of the section on metallogenesis was warranted, especially as many of the partners have emphasized this aspect in obtaining funding for the program. This increased emphasis on metallogenesis in the LITHP white paper should not be interpreted as an attempt to move thematic

responsibility for this area from SGPP to LITHP. Former thematic division of high temperature hydrothermal processes as a LITHP objective and lower temperature hydrothermal process and metallogenesis in general as an area under the SGPP mandate remain. However, concern was expressed that SGPP alone would not supply the support necessary to see that legs with metallogenesis objectives get on the drill schedule. LITHP hopes to continue to work with SGPP to see that the best proposals addressing metallogenic themes of interest to both panels continue to make it onto the drilling schedule. After making several changes in the wording of the White Paper the panel accepted this version as the final draft. The changes will be incorporated into the document and a final version will be presented to PCOM for approval at their August meeting.

G. Beyond 2003: Science in the 21st Century

In order to evaluate the direction the lithospheric component of a renewed drilling program should take, the panel reflected first on the history of scientific oceanic drilling. DSDP was instrumental in revolutionizing the understanding of earth science processes by testing and confirming the basic tenets of the new plate tectonic paradigm. New understandings of the history of the earth, the causes and locations of earthquakes and volcanoes, and distribution and genesis of energy and mineral resources were direct results of this research. ODP continued this effort by both substantiating many of the details of the plate tectonic model and by identifying areas where rigid plate interactions are not capable of explaining geologic phenomenon, for example LIPs, interplate seismicity, vertical tectonics, and the formation and evolution of continental crust. Our concept for a program beyond ODP has as its ultimate objective the construction of a unified global model of earth systems that includes the lithosphere, biosphere and atmosphere. In pursuing this goal many of the objectives would overlap or be extensions of those previously identified in various long range planning documents and white papers. However, we envision an evolution of the program from one that uses the drill ship primarily as a means for examining past records of earth processes to a program that increasingly uses the drill ship as mechanism for active experimentation in pursuit of a new understanding of an integrated model of the Earth.

LITHP identified three areas where such unified models would be particularly important. These are:

- (1) Mantle dynamics and the implications for sea level change, climate change, erosion rates, volcanism and volcanic hazards, and basin evolution and consequences for energy resources.
- (2) Mass and energy fluxes including flux of heat and fluids in the crust, flux of material into the mantle at subduction zones and out to the crust and atmosphere at volcanic arcs, and flux of material and heat from deep to shallow mantle, as exemplified by models of mantle plumes that can result in large volume igneous intrusive and extrusive activity. The consequences of mass and energy flux overlap with those listed above (e.g. climate change, energy and mineral resources, composition of the oceans, origin of life, stress in the lithosphere).
- (3) Active experimentation of earth systems. We included here not only the concept of using the drill ship as a tool, but also include other approaches such as setting up and monitoring long term observatories. Examples include monitoring seismic activity, volcanic and tectonic hazards, and fluid circulation by using instrumented bore holes and new technology such as CORKs and acoustic data links. Implicit in this approach is increased interactions with other research consortia including ION, InterRIDGE, MARGINS, Deep Continental Studies, etc. The ultimate goal of this approach will be to gain sufficient understanding of earth system processes so that we can move beyond explaining our observations and begin to predict the consequences of those observations.

The meeting was adjourned about noon (I assume!)