REPORT OF THE HARD ROCK WORKING GROUP
JOIDES SCIENTIFIC MEASUREMENTS PANEL

May 9-10, 2002
Held at the Ocean Drilling Program
Texas A&M University,
College Station, Texas

Members Present

James Allan (Chair and SCIMP Co-Chair)	Appalachian State University
Jeff Alt	University of Michigan
Shoji Arai	Kanazawa University
Sherman Bloomer (SCICOM member)	Oregon State University
Georges Ceuleneer	CNRS
Henry Dick	Woods Hole Oceanographic Institution
Jay Miller	Texas A&M University
James Natland	University of Miami
Paul Robinson	Dalhousie University

Regrets:

Peter Herzig (SCICOM Member)	University of Freiberg
Chris Macleod (SCICOM Member)	University of Wales

Guests:

John Beck	Ocean Drilling Program, Texas A&M University
David Becker	Ocean Drilling Program, Texas A&M University
Kevin Gregor	Ocean Drilling Program, Texas A&M University
Ann Klaus	Ocean Drilling Program, Texas A&M University
Nancy Luedke	Ocean Drilling Program, Texas A&M University
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Introduction

The Hard Rock Working Group arose from discussions within the June, 2001 JOIDES SCIMP regarding the need to create a new means of more effectively describing hard rock core. The acquisition of the GEOTEK line scan camera onboard the JOIDES Resolution offers unparalleled opportunities to modernize and streamline the means with which hard rocks are described. Current descriptive methods use an antiquated system that requires the core to be hand drawn, with descriptions based on artificial coring and curational intervals and not linked to visual core representations. SCIMP quickly recognized at the June, 2001 meeting that it did not have the internal expertise required for making effective recommendations for overhauling hard rock core description, and decided that additional expertise and experience was needed for making effective suggestions for core descriptive program and database design. The following SCIMP motion was adopted from this meeting:

SCIMP Motion 01-1
SCIMP recommends to SCICOM that a workshop be convened to define the characteristics and requirements of a hard rock core description methodology. The implementation of the GEOTEK line scan camera provides a digital image that may serve as the foundation of a core's description. The workshop should look forward to the IODP.

During discussion of this motion in August, 2001, SCICOM believed that a more effective tack would be for SCIMP to initially seek advice from experienced members of the hard rock drilling community by forming a short-lived Hard Rock Working Group, allowing the effective expertise of the SCIMP to be expanded greatly. In essence, this group would represent "hired guns" that would examine critical issues of hard rock description in IODP, and make recommendations to SCIMP regarding developmental needs required to take full advantage of digital image acquisition.

SCICOM Consensus 01-02-04:
In response to SCIMP Recommendation 01-1-4, SCICOM approves a small SCIMP working group to define the characteristics and requirements of a hard rock description methodology. This working group should have approximately 6 members representing volcanic, magmatic, metamorphic, and structural expertise, should be organized no later than the next SCIMP meeting, and should meet once at ODP-TAMU. The SCIMP co-chairs should be prepared to report on the working group findings at the next SCICOM meeting.

Subsequent discussions with the SCICOM Chair emphasized the need to have a larger working group to ensure expertise depth regarding the descriptive needs of complex igneous, metamorphic, and sulfide core, all with potential structural overprints. Additionally, it was made clear that the group should take advantage of work done during JANUS planning, namely "picking up where JANUS left off." It was also made clear that the Report of the Hard Rock Working Group, if accepted by SCIMP and SCICOM, will be forwarded to the iODP planning structure for further endorsement. It was further understood that endorsement by iSCIMP and iPC could lead to attempts for funds for a larger community workshop, if deemed necessary.

The report written below is compiled from the Hard Rock Working Group meeting held at the Ocean Drilling Program, Texas A&M University on May 9-10, 2002. Within the group present at the meeting, there was 57 DSDP and ODP legs of experience, with additional expertise provided by other members who were not able to attend but have nonetheless participated in the advice given here. All recommendations represent consensus agreement, as no formal voting took place. The wording of all recommendations was reviewed in final form and agreed upon by all present before the meeting ended.

Hard Rock Working Group Recommendations

Recommendation #1:
Real-time digital line scan images need to be the foundation for core description and sampling in IODP.

Rationale:
As shown by work done by the JANUS core description working groups and by the OD21 database concept, real-time digital images of the core most easily serve as a foundation for the description of igneous and metamorphic rock core that typically contain complex, hard to draw features.

Recommendation #2
We will continue to need color film to represent the archive image of the core, but color film cannot supplant the digital line scan image for core description and sampling purposes. When the dynamic range of CCD cameras equals that of film, the film may be replaced by the CCD digital image, depending on archival requirements.

Rationale:
Experience with the current Geotek line scanner underlines the fact that the relatively limited dynamic range of current line scanner technology does not allow for effective color calibration. The Group acknowledges that this will likely change in the future.

Recommendation #3
To ensure accurate color rendition of the core, a dedicated core image laboratory should be an integral part of the ship and core flow design.

Rationale:
Color accuracy for archival digital images requires that all components in the imaging chain be continuously calibrated for color balance. Sufficient space is also needed for proper illumination geometry and to provide effective implementation of track-mounted digital line scanners.

Recommendation #4
A fundamental part of any core description package should be the real-time annotation of the core image for descriptive and sampling documentation purposes. Annotation should be within a multi-layer environment, with an X-Y, GIS-like coordinate system linked to a relational database.

Rationale:
This need for real-time annotation was recognized during JANUS planning as a fundamental need for effective description of complex core. In this manner, areas and features of description and sampling are directly noted and linked spatially to descriptive text in the database. The GIS framework allows for layers of information to be linked to a single geographic point in the core.

Recommendation #5
Line scan images should be made of both the archive and working halves. These images will serve as the foundation for description of the archive half and sampling of the working half. Annotations of these images, preserved in the database, will directly show what feature was described or what area and volume was directly sampled. Sampling annotation of the working half should continue after the cruise.

Rationale:
Even though every attempt is made to split key features of the core so that they are represented in both the archive and working halves, in practice this is simply not possible. As a result, a permanent visual record needs to be made of both core halves. The line scan image of the working half would function as an effective template for providing visual record of sampled core areas and features, easily showing what is available for future sampling.

Recommendation #6
Whole-core digital imaging of the unsplit core should be available for routine use as is needed by Leg science. These images should be available for display and annotation in the core description software.

Rationale:
When shipboard parties decide to split the core so as to split features as best as possible between an archive and a working half, the core splitting is already an interpretive process. Often it is the most stunning, easy to see structures that are split, so other fundamental features may be missed, and the manner in which the core is split influences how it may be described. The Group considered examples of whole-core digital imaging from Leg 176, showing correlation of features and magnetic susceptibility data with the unwrapped whole-round image. Concern was expressed as to whether these images could be efficiently incorporated within the core description software package, although this would be desirable.

Recommendation #7
There is a fundamental need to accurately place in three-dimensional location all coherent core pieces as the core is being described. Critical towards this requirement is the development of bit, bottom hole assembly (BHA), and rig instrumentation, including measuring resistivity, weight on bit (WOB), and torque on bit (TOB) at the drillbit. We also foresee the need, in particular, of directly monitoring core recovery, and encourage further development and deployment of the Sonic Core Monitor.

Rationale:
These engineering developments are necessary for scientific parties to make rational decisions about where to place core in spatial context where recovery is less than 100%. These measurements would effectively complement core-log integration procedures.

Recommendation #8
Routine processing of the core should include determining depth-shifted core location and orientation using all available coring, logging, and descriptive data. The core description software package should include the ability to display all related data for this effort.

Recommendation #9
Despite the need to accurately render in space all coherent core pieces, all core measurement and description should be fundamentally linked to curated depth rather than to an interpreted, adjusted depth.

Rationale for Recommendations 8 and 9:
Any spatial shifting of core represents an interpretive process. The foundation of the core description database should be made on raw data, which is represented by the curated depth of individual core pieces.

Recommendation #10
Continuous quantitative and semi-quantitative descriptions of specific core features, as currently collected downcore in spreadsheet format, are integral to core description and must be incorporated into the database for core-log integration and analysis.

Recommendation #11
Integrated textual descriptions of core should be based on mappable unit boundaries, not on artificial sectional or core boundaries based upon intervals of coring.

Recommendation #12
We recommend that common spreadsheet fields be defined that may be incorporated into a relational database. We further recommend that common, basic templates be defined for igneous, metamorphic, structural, volcanoclastic, and sulfide lithology. Any descriptive system should allow addition of other critical fields so as to allow leg or project-specific descriptive logs to be created.

Rationale for Recommendations 10, 11, and 12:
The Group felt that a key aspect of effective core description is to describe quantitatively and semi-quantitatively the variation in rock stratigraphy, properties and composition, rather than focus on distinct descriptions on core sections that are recorded as independent observations. Our discussion resulted in a model most useful for description of igneous and metamorphic rock recovered in a drilling program of one or more legs dedicated to crustal drilling. Staffing of at least several petrologists with igneous, metamorphic, and structural specialization is implicit in our core description system design, with members of these specialties required for proper documentation of all aspects of the core. An analog might be the dedicated paleoceanography program describing the high-resolution stratigraphy of sediment obtained by advanced hydraulic piston coring. Obviously, during legs with limited objectives in the ocean crust, and only one or two petrologists, the core description protocols will be different, and probably more limited. Our general model thus is to allow scientific parties to develop core descriptions emphasizing those aspects of the rocks having particular relevance to their own general scientific objectives. We do not propose an all encompassing template to be used by everyone, but one with flexible attributes, and components or modules that can be selected and modified as necessary. We thus propose using a basic descriptive template keyed to at least one form of digital image of the core, but with options to use additional images as they are deemed useful, and as core flow and staffing allow. The computer environments that now exist also mean that we can also incorporate digitized shipboard laboratory measurements obtained using the multi-sensor track or other instruments. Both images and these laboratory measurements plotted versus depth thus can be brought up on monitors simultaneously and used as a basis for, or components of, the core descriptions. These should be incorporated to the extent that they are useful and consistent with the physical limitations of the core lab and the personnel available to describe the core.

Effectively, this means that there cannot be a single defined database template to serve the needs of all hard rock legs. Instead, we envision spreadsheet templates containing defined fields common to all legs, with an additional 8-10 fields that should be leg-specific and user-definable.

Recommendation #13
A digital image library of rock features such as textures should be incorporated into the database or descriptive program. An additional descriptive cookbook for hard rock needs to be developed.

Rationale:
Planning for JANUS core description recommended pull-down menus for input of the myriad textural terms used in rock description. While choosing not to follow this exact model, we nonetheless see the wisdom in providing user-friendly visual examples of textures used in hard-rock description. A descriptive cookbook is thought to be a more effective, simpler way of ensuring quality hard rock description rather than complex, pull-down menus for filling in descriptive terms.

Recommendation #14
Any core description package has to include the full description of thin sections, noting that it represents discontinuous data.

Recommendation #15
We endorse the OD21 concept of linking core close-up and photomicrograph images with annotation of the core digital images.

Background Presentations and Discussion

JANUS Background

Jamie Allan started the meeting off with an overview of previous JANUS planning efforts regarding hard rock description. Three planning meetings for hard rock description took place in 1994-1996, although no report was produced and planning stopped when it become clear that no funds were available for implementation of recommendations. Nonetheless, these discussions recognized a basic underlying need for digital scanning of the core with real-time availability of core image for annotation, description, and data entry. Detailed needs for an accompanying core description program were defined, with the data model having numerous libraries and toolboxes. Sulfides and volcanoclastics were not really addressed within the data model.

As a stopgap, there was a recommendation for adapting the sediment description program Applecore; this was never implemented because of numerous challenges. Applecore never had spreadsheet functions, and had many windows that needed to be opened for rock description. The adaptation of the program to hard rock description was not effective because it was set up to describe core on 9.5 m length versus 1.5 m section lengths. The design structure of the program was also not conducive to hard rock description, being too simple. The costs of revamping the program were deemed too high, and instead ODP kept the old format of hard rock forms with hand-written notes and no link between spreadsheet data and core descriptions.

Overview of Geotek digital line scanner

Jay Miller followed with an overview of the current Geotek digital line scanner currently on the JOIDES Resolution. He emphasized that the current core description system is mature but lacks linkages with associated data types. The images taken are broken up into interval packages and do not represent a continuous record. JANUS planning originally produced a core description application that was far too expensive for available funds. Other JANUS applications work well, with data easily accessible. Sailing of programmers has allowed effective evolvement of JANUS data interfaces. The challenge is to do the same with hard rock description data. Henry Dick made the point that a spreadsheet file is numerical data that represents continuous records like magnetic susceptibility data.

Jay gave the background to acquisition of the Geotek system, based on a SCIMP recommendation. It has been out since Leg 198, and scientific parties are enamored of it. Image file size is about 45 Mbytes per core. It processes four sections at a time, sitting on an x-y frame, and contains a moving linescan camera and light source. It has 100 pixels per cm resolution, simple calibration and white balance, captures neutral gray standard and core label in each image, and requires about 5 min per section to image on a platform running Windows 2000 OS (20 min of unattended operation per core). The Geotek system offers automated data acquisition and archiving, rapid web-based access to .tiff or .bmp files, and uses MR.Sid proprietary software to view and compress and uncompress files (lossless compression system with 40-1 compression; it produces 1 mbyte files). Files are archived offline (not in JANUS), with remote access from home offices same as well as on the ship (moratorium protected). There is a TAMU contract with Geotek to enhance the system, using a hand-held scanner to shoot file names and so avoid hand entry. The system now produces .TIFF files and archives those instead of .bmp (bit mapped) files. A new software package allows users to bring up images, zoom in, and concatenate sections to produce whole core images by stitching them together. As well, RGB values of the image are available to be plotted graphically.

Advantages of the Geotek line scan system include the simple, rapid generation of digital image files, excellent image resolution, and its use as a substitute for color close-up photography. Whole-core color images are available minutes after the core is scanned, and have been used by scientific parties as a reference almost immediately. As a means of preserving accurate color images of the core, ODP is nonetheless maintaining a color photo archive through the end of ODP.

There are several potential improvements to the system. Currently, it requires download to a local hard drive to view or edit. There is insufficient dynamic range of the line-scan CCD to avoid problems of calibration of core with varying image brightness- calibration to see details of dark core cause washouts of bright areas, and calibration for bright core causes dark areas of core to lack detail. Regarding accurate color archiving of the core, core after core, these calibration problems appear insurmountable with the current CCD dynamic range. There are also some MR.Sid idiosyncrasies; the system is not yet "idiot proof," important when scientists operate the core scanner.

Georges Ceuleneer mentioned a possible way out of the dynamic range problem by taking two scans- one at a standard calibration, another with dynamic or optimized static calibration, and then recalibrate through processing.

After examining MR.Sid images available on the web, the Group was very impressed by the core details and color. Questioning and discussion with those familiar with the system noted that setting the proper level of dynamic range was critical for preserving effective core appearance. Currently, there is a need for recording of metadata regarding the processing of digital images to enhance contrast, etc.- figure captions need to note processing. A point was also made that wet and dry protocols for imaging need to be set up.

Measurement While Coring Overview
Kevin Gregor gave an overview of engineering development of measurement while coring tools. Measurement while coring (MWC) allows for continual monitoring of formation, hole and tool conditions without a break in the coring process, and for modification of drillstring control to address identified problems. MWC also potentially allows for monitoring of core recovery, aiding in placing core within a 3-D framework when recovery is less than 100%. Mudpulse telemetry is used to transmit signals from an instrumented bottom hole assembly (BHA) through the water column in the drillstring.

Current and past developments have included measuring formation resistivity at the bit (RAB), both during drilling and coring, and development of the Sonic Core Monitor (SCM), designed to record actual recovery of core. SCM development has been stopped since 1996, as blindspots occur either at the first two meters, or at 2-4 meters, depending on the transducer used. The SCM needs a new transducer and further development to overcome these blind spots. The Group noted that if drillers are monitoring when core enters the core barrel, scientific parties could use this information to determine where true core piece placement should be.

The MWC BHA assembly consists of a drilling sensor sub between the RCB BHA and a telemetry tool. ODP engineering staff are seeking funding for instrumentation packages that would monitor weight on bit (WOB), torque on bit (TOB), drillstring RPM, bit displacement (rate of penetration), borehole temperature, and borehole pressure. Values taken from the MWC BHA would be far more accurate at inferring downhole conditions than is currently done from those measured by the rig instrumentation system at the rig floor. ODP Drilling Services will deploy a drilling sensor sub as a memory (not telemetry) tool on Leg 206, but needs $185K to finish drilling sensor sub construction (they are currently seeking outside funding for this to ensure deployment).

The RAB hardware sits 2 m behind the bit. A preliminary design will be evaluated on Leg 204, and it will be a memory system. Modifications of existing core barrels will be needed, and the system will be kluged together using the motor-driven core barrel (MDCB), as the normal rotary core barrel (RCB) tools are too large. The Group was interested in the possibility that the RAB could be used on Leg 209.

Digital Versus Analogue Image Issues
Ann Klaus started off with a definition of what an actual archive represents: a place in which public records or historical documents are preserved. She further defined what it means to preserve: to keep safe from harm and decomposition for future use. She went over how the format for data publication had changed, noting that our electronic publishing system is really a hybrid, as it has to be able to print the published documents. During development of electronic publication ODP/TAMU learned that ODP needs to better link the Initial Results volume and the database- the actual line between the two is blurred. If one assumes that publications in IODP are moving to an all-electronic format, then there is a need to figure out efficient links between the IODP database and publications. We should not design them as separate entities, as the use of links connects them. Nevertheless, there is a need to freeze rock descriptions coming off ship within a database for it to be considered part of publication with a date- this date of frozen data acquisition is an essential part of JANUS, and important to define.

The Group was receptive to Ann's ideas, noting that descriptive hard rock logs such as for veins or rock alteration fit within this environment; we need to have the flexibility within the IODP database to create and preserve these logs.

Ann then discussed metadata needs for digital core image manipulation. Color management is essential and there is a need to develop protocols and standards. She then showed on web-based ODP Leg publications how core images are linked to close-ups, giving examples from Leg 193.

John Beck then discussed archive issues regarding digital images of core. Digital archives are much more expensive to acquire and maintain than hard copy analogue archives. Hybrid systems, such as what ODP currently uses, are likely the most viable for the future program. From other studies and experiences, there is a need to do cost-benefit analyses; usually, maintenance costs of digital archives are very high and will likely be justified only for images that will be used.

Migration of media, files, and metadata, which need to be done at regular intervals, is very expensive. Maintaining digital image files on-line, and the infrastructure to do so, is also costly. Studies show that 50-100% of the initial acquisition investment is spent for file maintenance over the first 10 years of archiving, with further network infrastructure and staff costs five times that of the initial acquisition costs. The end result is that the cost for a digital archive image is much higher than for an analogue archive image, which has comparatively modest archival costs.

John then discussed how ODP has 4" X 5" film of every DSDP and ODP core, with DSDP cores from Legs 1-60 reshot for consistency. As ODP personnel have time, they are producing digital images on a drum scanner of each DSDP and ODP 4" X 5" core film photo. The digital aspect of these drum-scanned images allows for accurate rendition of core color: one can use the known RGB characteristics of the gray-scale calibration on each core image for correction to true color. As a result, the best of two worlds is married: ODP is able to maintain the dynamic range of the analog color film, but is able to digitally correct the drum-scanned images for inconsistency in color caused by variations in color processing.

John followed with an overview of the relative dynamic ranges of differing image technology. Drum scanners have the highest dynamic range, even higher than the 4" X 5" film used as the current primary archive of the core appearance. Therefore, drum scans of the current archive yield no loss in resolution. John also emphasized that the dynamic ranges in CCD images and color prints are well below that of color film. He reiterated the dynamic range issues of currently available CCD's and this compromises the ability to have accurate color calibration. The current line scan system requires an opening up of aperture to image darker core, with a loss of color accuracy. A proper color management system is needed, calibrated every day, with calibration and profiling of monitors and scanners used for imaging. There is a need to have an understanding of the color working space for each piece of imaging equipment in the imaging chain to move to a true digital archive core image. He was impressed that CCD technology is moving rapidly, but emphasized that we should not move to a digital archive until the CCD dynamic range equals that of color film.

Overview of GIS in Relation to Core Description

Dave Becker gave an overview of how Geographic Information System (GIS) technology might be applicable to core description. He started out by stating that 3-D GIS is not really developed to the point where it would be useful to us, being used primarily only in medical science, but that 2-D GIS is more practically viable. GIS brings together a 2-D spatial framework and data, such as might occur in a relational database like JANUS.

JANUS data types include Core log, Leg, Site, Physical Properties, Chemistry, Magnetic, Paleontology, and Environmental (e.g. ADARA temperatures). There are 450 related Oracle data tables in JANUS; queries into JANUS are complicated with nearly 40 applications used to collect data, upload data into database, retrieve data, and produce predefined printed and web reports.

GIS provides a way to organize core data as well as to display it. Adding GIS to JANUS could link queries of data to certain features of certain sites. Uses of GIS in IODP might include core sections collected over multiple holes and sites (e.g. could produce a block diagram or 3-D map that could be a potential stratigraphic correlation technique).

A core section GIS template would represent linear measurements in two directions related to the length of section, depth measurement, and drill hole size. In other words, the split surface of the curated core could have a 2-D, X-Y geographic framework assigned to it. This would set up a GIS database linked to the JANUS database. The GIS database could use key words to link features to the JANUS data as well. This X-Y template would then serve as a foundation for adding multiple layers of data related to unique X-Y points; these multiple "Z" direction items, each with an unique identifier to each x-y coordinate, could include images, text, and spreadsheet entries that can be linked together.

One could extend JANUS to include core description attribute tables. These tables might include: base maps (section image or core images representing concatenated sections images), point attribute tables, line attribute tables, polygon attribute tables, and annotation tables. The system could be automated, through thresholding of images, and generation of an electronic template of core outline (image analysis), useful for area calculations.

Group discussion followed about the use of digitizing pads versus annotating the digitized image with automatic digitizing of drawn points, lines, or shapes (polygons). In particular, discussion centered on whether such devices as Palm Pilots, linked by infrared communication or other means to large display systems, could be used to annotate digital images of core in such a GIS environment.

Use of Spreadsheets in Core Description

Henry Dick gave an overview both of the use of spreadsheets in aiding hard rock core description, and how hard rock parties have worked most efficiently in describing complex core. He emphasized how important it is to recognize how scientists work most effectively both individually and together. He and others gave numerous examples of how breaking the leg scientific party up into two different shifts introduced nearly insurmountable problems in consistency of core description and effective cross-shift teamwork.

The goals of a hard rock description system are:
1) High quality observations
2) High quantity observations
3) Efficient data collection
4) Flexible architecture
5) Accessible architecture and data

Henry discussed the Leg 118 experience, noting that rock types were not easily described using IUGS terminology. In particular, some rock types represent disequilibrium assemblages, not easily described using fixed terminology adopted by international committee and based upon idealized rock types. In general, the Leg 118 rocks proved very difficult to describe, as they had both complex igneous assemblages and a complex metamorphic overprint.

Henry then noted that the idea of continuous monitoring of changes in rock composition is analogous to semi-continuous to continuous measurements of rock properties by analytical machines, such as the multi-sensor track or the pass-through magnetometer. A system of mapping such changes in rock composition can be most effectively done by setting up teams of scientists responsible for mapping specific sets of rock characteristics: e.g., igneous, structure, and metamorphic teams, sometimes with one or two individuals responsible for specific features such as metamorphic vein or vesicle frequency and character. In hard-rock specific legs, disciplinary teams of 4-5 individuals have worked well. This system removes personal stakes, and forces work by consensus. It also rewards individuals by giving ownership over the aspect of data they systematically collect.

With igneous-intensive legs with larger hard rock parties, there must be flexibility in the database structure to accommodate numerous and new data types that may be leg or multi-leg project specific. Spreadsheet entries provide the most effective means of recording semi-continuous or continuous changes in rock composition and character. Henry pointed out that one can quantify effectively what is currently isolated descriptive or qualitative information, such as noting the degree of plastic deformation on 1 to 5 scale calibrated by images of each scale in the IR volume. The database needs to be flexible enough to add leg-specific fields- as a consequence, one won't be able to search the same fields across all legs. There may be able to have common fields for all legs, but must be able to add unique fields to accommodate needs of differing hard rock legs.

Henry reiterated the importance of retaining the curated rock depth as an absolute reference. Value is added from calculating "integrated depths" from external data, including logging, measurements while coring, or other data using provided toolbox. Database enhancements could include the ability to calculate running averages (binning tool), and pinpoint depth tielines with the ability for differential core expansion. In addition, one must make a distinction between penetrative features and those that aren't. Core images will show such distinctions more readily than generalized logs.

Finally, a key aspect of a hard rock core description package is that one needs to be able to integrate any data sets in real time with the core. So, data input tools and query tools all need to be keyed to a core image.

Overview of OD21
Jamie Allan gave an overview of the OD21 Database concept, presenting again overheads shown to the iSCIMP last December. The OD21 would be compatible with the current JANUS system, using the same data structure. The database will have a real time data browsing system, and a user-friendly data input/edit system for core description. It features an advanced digital archiving system, and will operate in a fast LAN environment onboard. The database also includes a composite log viewer and graphical composite display, where core images and logging data can be shown; description interface and archive interface functions; and a multi-scale core editor, operable at any scale. It is not clear whether the system will have significant core image annotation features, thought to be very important by the Group. A number of members thought that having a visual dictionary for textural terms that would be very similar to a paleontology taxon dictionary could significantly enhance the hard rock portion of such a database.

Geotek Imaging Tools
Dave Becker gave an overview of the Geotek Imaging Tools available with the line scanner. Through these tools, it has been possible add RGB values to the JANUS database. The width of the imaged window and the core area averaged to produce the RGB values are set by the leg co-chiefs. These tools can calculate RGB values on the fly for specified areas. The tools use the MR.Sid compressions system, and can make JPEG files from expanded files and stitch them together. The tools can stitch together all data types- JPEG to MR.Sid to TIFF, and can create companion metadata files to TIFF files (.XML file).