

The Fully Electronic IODP Site Survey Data Bank

by Barry W. Eakins, Stephen P. Miller, John Helly, Barry Zelt, and the SSDB Staff

Introduction

The next generation all-digital Site Survey Data Bank (SSDB) opened for service on 15 August 2005 as an online resource for proponents, panel members, and worldwide operations of the Integrated Ocean Drilling Program (IODP). The SSDB functions primarily as a digital home for data objects contributed in support of IODP drilling proposals and expeditions. Overarching goals include easy submission of digital data, support of panelists reviewing data in support of drilling proposals, and providing a secure and accessible archive of information that evolves throughout the lifecycle of proposals and the program. To ensure a close tie between the data, data bank users, and the program, IODP Management International (IODP-MI) provides a dedicated science coordinator to support proponents, members of the

IODP Science Advisory Structure, and the implementing organizations in their site-survey data needs.

The new Web-accessible data bank will have an integrated user management system that provides secure data storage and easy access for uploading and reviewing. The main viewing portal into the data bank enables discovery of all data objects displayed over a basemap of global topography (Fig. 1). Within this Java application, users may search for objects by data type, proposal number, or other user-specified criteria. The data bank currently supports twenty-six data types (see Table 1), and this number may increase as necessary. The IODP currently has 107 active proposals for drilling at sites around the globe, involving nearly 1000 proponents from more than forty countries. Of these proposals, sixty-four currently have digital objects residing within the SSDB.

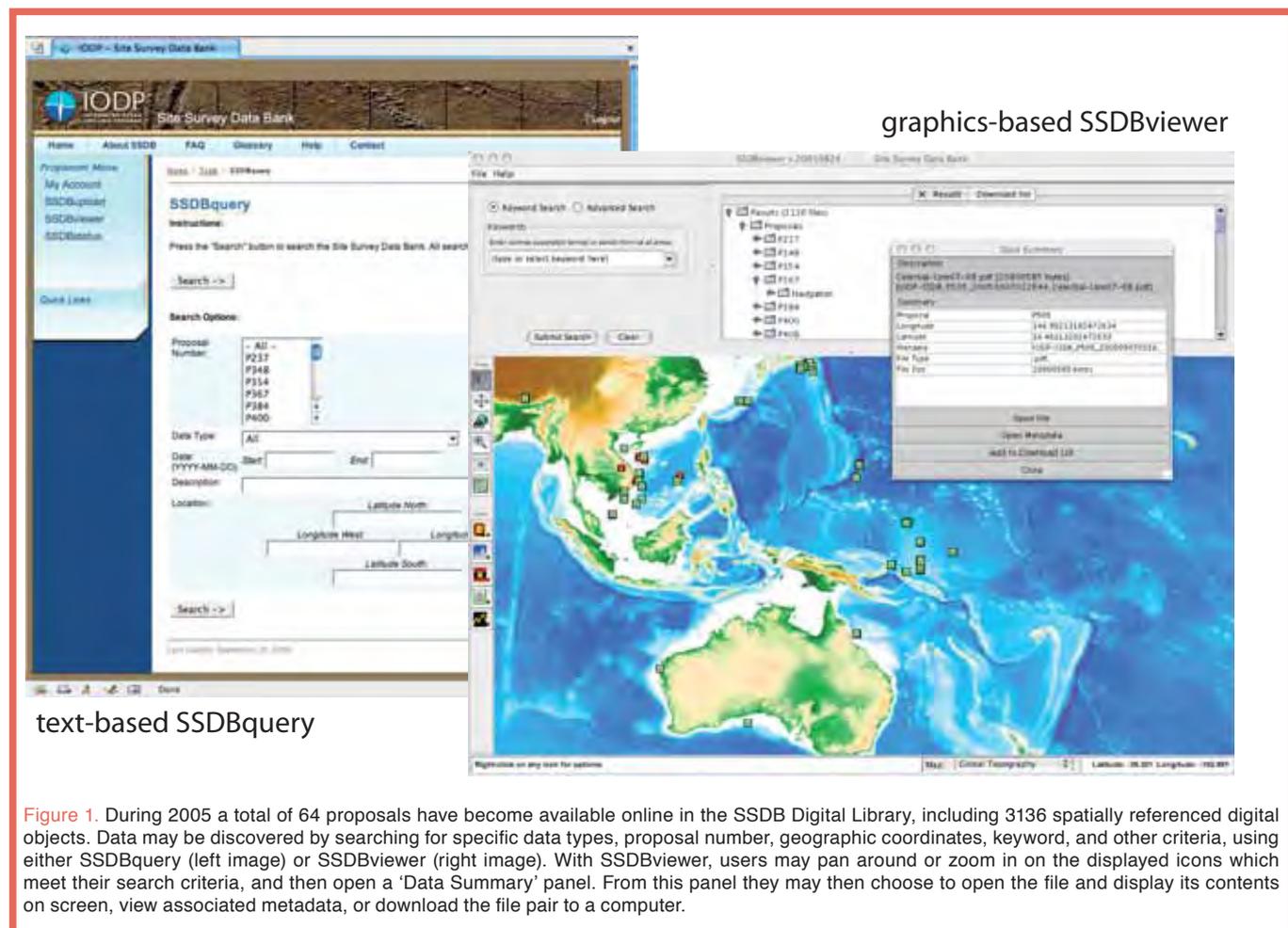
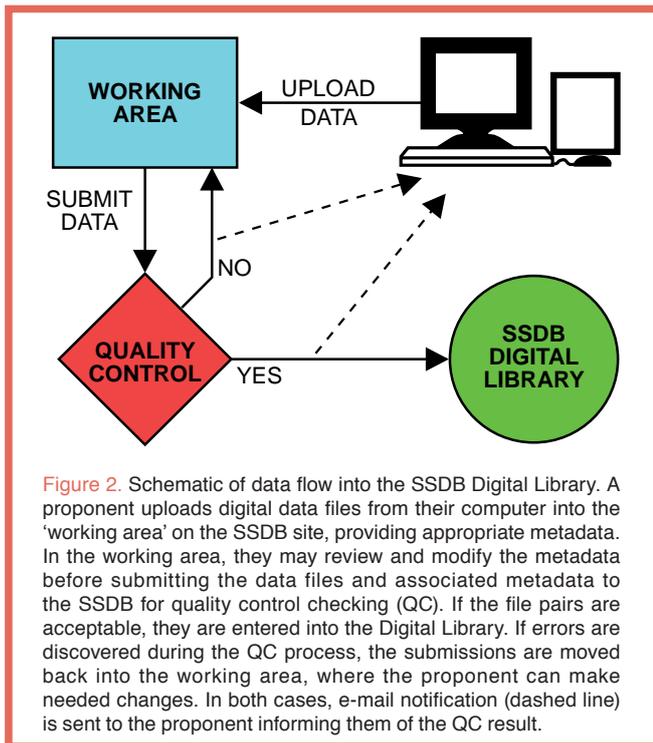


Figure 1. During 2005 a total of 64 proposals have become available online in the SSDB Digital Library, including 3136 spatially referenced digital objects. Data may be discovered by searching for specific data types, proposal number, geographic coordinates, keyword, and other criteria, using either SSDBquery (left image) or SSDBviewer (right image). With SSDBviewer, users may pan around or zoom in on the displayed icons which meet their search criteria, and then open a 'Data Summary' panel. From this panel they may then choose to open the file and display its contents on screen, view associated metadata, or download the file pair to a computer.



Serving the Needs of Proponents

New users must complete an online registration form when first visiting the SSDB Web site (<http://ssdb.iodp.org>). An IODP-MI science coordinator will subsequently authorize an account and grant appropriate access. Once authorized, proponents may begin the process of submitting digital data objects over the Web using an upload tool that guides them through the submission process. This includes selecting an appropriate proposal number and data type, entering data-specific supporting information (metadata), selecting digital files to upload from the proponent's computer, reviewing of the entered metadata, and uploading to a temporary working area.

All data files submitted to the SSDB must meet specific requirements before acceptance into the Digital Library, the online SSDB data resource. These include geographic coordinates for georeferencing and visual display, and supporting metadata describing the object and its importance, allowing discovery using the viewer and query tools. Objects may be given a 'point' coordinate such as logging data from prior drilling sites, beginning and ending 'line' coordinates such as seismic lines, or a 'bounding box' suitable for maps. Data objects may be associated with one or more proposed drilling sites and may be flagged as proprietary, ensuring access only by authorized panelists, reviewers and members of the IODP implementing organizations.

Proponents also may use a status tool to manage their submissions once the data objects have been uploaded to the working area. Following submittal, the data objects and associated metadata pass through quality control (QC) performed by SSDB staff to ensure that georeferencing is

appropriate, that metadata are satisfactory, and that the data file can be viewed with the necessary viewer before entering the Digital Library. The status tool can be used to track progress through the QC process, though proponents will also receive e-mail alerts stating success or failure of the QC check. Figure 2 conceptualizes this process. In addition, the viewer and query tools can be used to discover other data objects in a region of interest.

Serving the Needs of Panelists

The SSDB serves the needs of panel members and reviewers in evaluating proposals, which is why it is so critical for proponents to supply the requested metadata when uploading data. The digital data bank's most significant role in this regard is its search capability, using either the graphically driven viewer tool or the text-based query tool (Fig. 1). These tools permit discovery of data objects related to specific proposals, through user-specified search criteria, with the aim of finding the data most relevant to answering a panelist's questions. These criteria include searching by data type, site name, special keywords, or date of submission to the SSDB—to find, for example, all proposal-related data submitted since the last panel meeting. Users may view data objects either directly over the Web or after downloading to their computer. By having the digital data bank as an online resource, panelists can review proposal data prior to gathering for panel meetings as well as for browsing the data bank during review sessions.

One important aspect of the online digital SSDB is its ability to display seismic profiling data (SEG-Y format) over the Internet (Fig. 3). The advantage of a Web-driven visual

Table 1. Data types supported within the SSDB

Backscatter
Bathymetry
Documents
Electromagnetics
Environmental Conditions
Fluid Flux
Geology
Gravity
Heatflow
Location Maps
Logging
Magnetics
Navigation
Permits
Sample Data
Seafloor Photography
Seismic Data:
Single-channel Reflection
Multi-channel Reflection
3-D Reflection
Sub-bottom Profiler
Refraction
Velocity Models
Ocean Bottom Seismometer
Seismicity
Visualization
Water Column

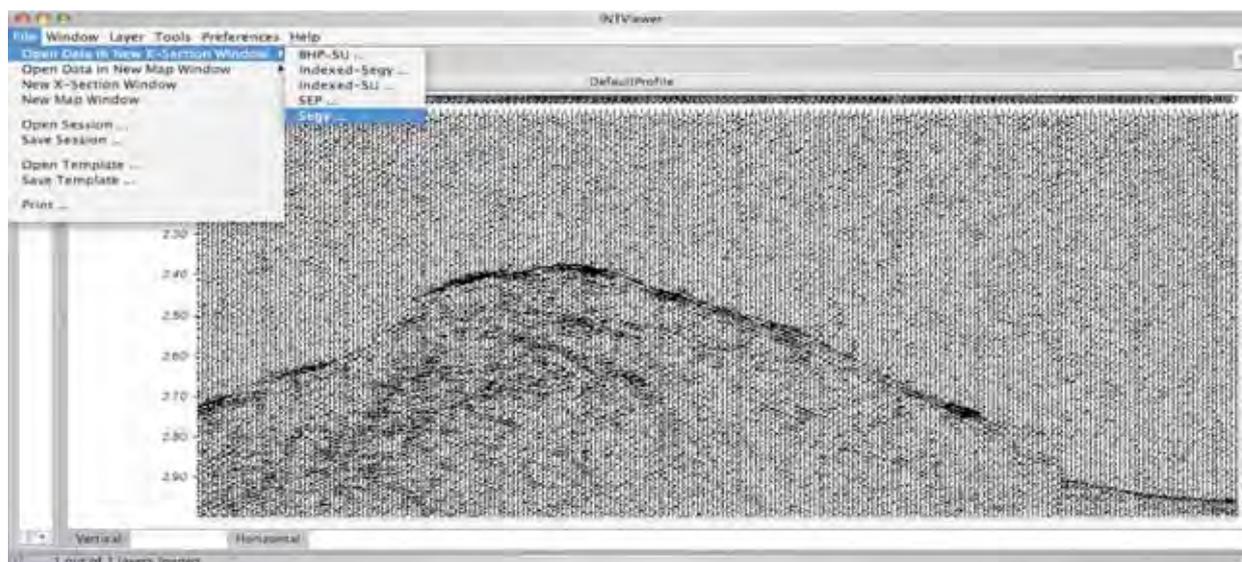


Figure 3. The SSDB utilizes the Java application INTViewer for displaying digital seismic profiles (SEG-Y format) which reside within the Digital Library. Data are displayed as an image onto the user's computer screen, permitting evaluation of the data, as well as printing. INTViewer has several ways of displaying the seismic traces (deflection, positive color fill, etc.), and gain can be applied to enhance weaker signals. It can also display specific sections of a SEG-Y file, for example, by limiting the traces and time range displayed.

display, rather than file download, is that issues of connection speed and local storage space are largely circumvented, though users may still download the SEG-Y data if desired.

The Future ...

Now that the SSDB has entered the Internet Age, what does the future hold? Certainly, there will be continuing improvements, including 3-D seismic capabilities, expanding search criteria, and improved administrative tools. The capabilities now also exist for integrating with other online data resources, which will allow discovery of potentially relevant data that reside outside the SSDB. For example, the information architecture of the SSDB is derived from the SIOExplorer Project, which has placed 647 Scripps Institution of Oceanography (SIO) cruises online (<http://SIOExplorer.ucsd.edu>), including 323 multibeam cruises. This effort is currently being extended in collaboration with the Woods Hole Oceanographic Institution (WHOI) to include WHOI cruises, *Alvin* dives, and ROV (remotely operated vehicle) operations. In the future, IODP proponents should be able to conduct joint searches over the holdings of the SIO and the WHOI, as well as the SSDB, as they prepare site-survey data contributions. The IODP Site Survey Panel is also developing online guides to help proponents determine what data types are necessary for their proposal to be approved. Data held within the SSDB have already been used in support of at-sea drilling operations, a function that will expand dramatically when IODP Phase II drilling operations start in 2007.

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Authors

Barry W. Eakins, Stephen P. Miller, Geologic Data Center, Scripps Institution of Oceanography, University of California–San Diego, 9500 Gilman Drive, La Jolla, Calif. 92093-0220, U.S.A., e-mail: spmiller@ucsd.edu

John Helly, San Diego Super Computer Center, University of California – San Diego, 9500 Gilman Drive, La Jolla, Calif. 92093-0505, U.S.A.

Barry Zelt, Integrated Ocean Drilling Program–Management International, CRIS Building, Room 05-101, Hokkaido University, N21 W10 Kita-ku, Sapporo 001-0021, Japan.

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Related Web Links

- <http://ssdb.iodp.org>
- <http://www.iodp.org>
- <http://www.int.com>
- <http://SIOExplorer.ucsd.edu>