SCIMP APPENDIX
00-3-01

PEC V review

In the Performance Evaluation Committee (PEC) V report, the committee wrote, " The new SCIMP has a number of problems that need to be solved (page 22) ". In particular the report stated:

> "PEC-V observed that with the integration of three service panels (Downhole Measurements, Information Handling, and Shipboard Measurements Panel) into one, the Scientific Measurements Panel (SCIMP), much expertise and engagement cannot be accessed during panel meetings. PEC-V considered whether the possibility of bringing in additional information by setting up ad hoc advisory committees (Guide to ODP, Appendix III, 12.4) would be sufficient. Because of the importance of these issues and the continuous need, we recommend that two subgroups of SCIMP should be established for concerning downhole measurements and information handling. These subgroups should meet just before the SCIMP meets to prepare important relevant issues and foster necessary developments".

NOTE: SCIMP response originally written January, 2000

SCIMP discussed this concern by PEC-V and came to the conclusion, in no uncertain terms, that establishment of subgroups to assist SCIMP is unnecessary. One of the major strengths of SCIMP, perhaps its best feature, is that it deals with issues from a community-wide perspective. Because of the wide variety of expertise sitting on the panel, issues are addressed by looking not only at specific problems but how these problems affect the program as a whole. This type of "big picture" look is often lacking in more detailed committees or panels. In effect, panel members keep each other from becoming too near-sighted.

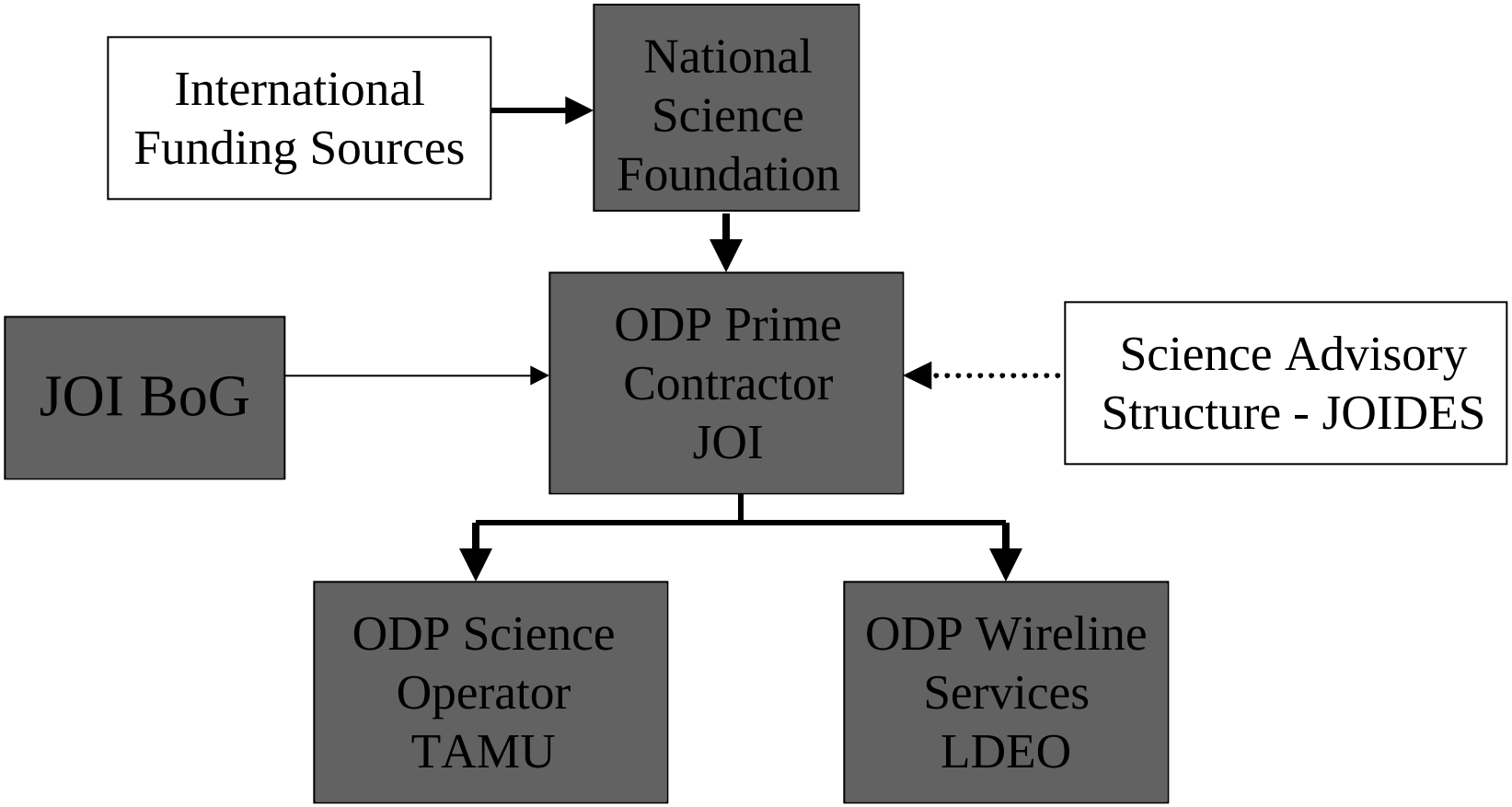
The concern that SCIMP cannot address specific issues on a timely basis is unfounded. SCIMP has several avenues to address specific issues and uses them quite often. First, SCIMP has the ability to invite experts as needed to its meetings in order to provide the panel with information they may find difficult to obtain by themselves. The recent attendance by David Smith (a microbiologist) to our last meeting is an excellent example. Numerous microbiology issues were effectively addressed during this meeting as a result.

A second avenue SCIMP utilizes to stay abreast of the issues under its mandate is through the use of eleven Laboratory Working Groups (LWGs). These LWGs consist of subsets of SCIMP members and ODP-TAMU staff. The LWGs regularly review labs and services and tap into expertise from the science community, industry, technical staff on the ship, and other JOIDES advisory groups to ensure that the needs of any discipline are well served. The recent review of the potential use of GI guns and the recommended review of current U/G operations is a direct result of these LWGs being proactive in their work.

It is the conclusion of SCIMP that the mandates currently addressed by SCIMP are best met by the *entire* SCIMP utilizing the avenues that are currently available to the panel to obtain expert input, when necessary.

SCIMP APPENDIX
00-3-02

ODP Management Structure



JOI Board of Governors (BoG)

Chair: Paul Stoffa; Vice Chair: Neil Opdyke

- **University of California, Santa Cruz - Department of Earth Sciences *new**
- **University of California, San Diego - Scripp's Institution of Oceanography**
- **University of Florida - College of Liberal Arts and Sciences *new**
- **University of Hawaii - School of Ocean and Earth Sciences and Technology**
- **Lamont Doherty Earth Observatory - Columbia University**
- **University of Miami - Rosenstiel School of Marine and Atmospheric Sciences**
- **University of Michigan - College of Literature, Science, and the Arts *new**
- **Oregon State University - College of Oceanic and Atmospheric Sciences**
- **University of Rhode Island - Graduate School of Oceanography**
- **Rutgers, The State University of New Jersey - Institute of Marine and Coastal Sciences *new**
- **Texas A& M University - College of Geosciences and Maritime Studies**
- **University of Texas at Austin - Institute of Geophysics**
- **University of Washington**
- **Woods Hole Oceanographic Institution**

Changes at JOI

2/21/00 Kate Moran resigns as ODP Director

3/2/00 John Farrell designated as Acting Director ODP/JOI

3/7/00 Director ODP/JOI position advertised in *Eos*, etc.

3/9/00 JOI Board of Governors (BoG) meets

1) Management Oversight Com. (MOC) formed

2) ODP/IODP Transition: Dr. John Orcutt

3) JOI President announces 10/1/00 retirement

4) JOI/CORE corporate split proposed

4/6/00 JOI proposal for reorganization submitted to NSF

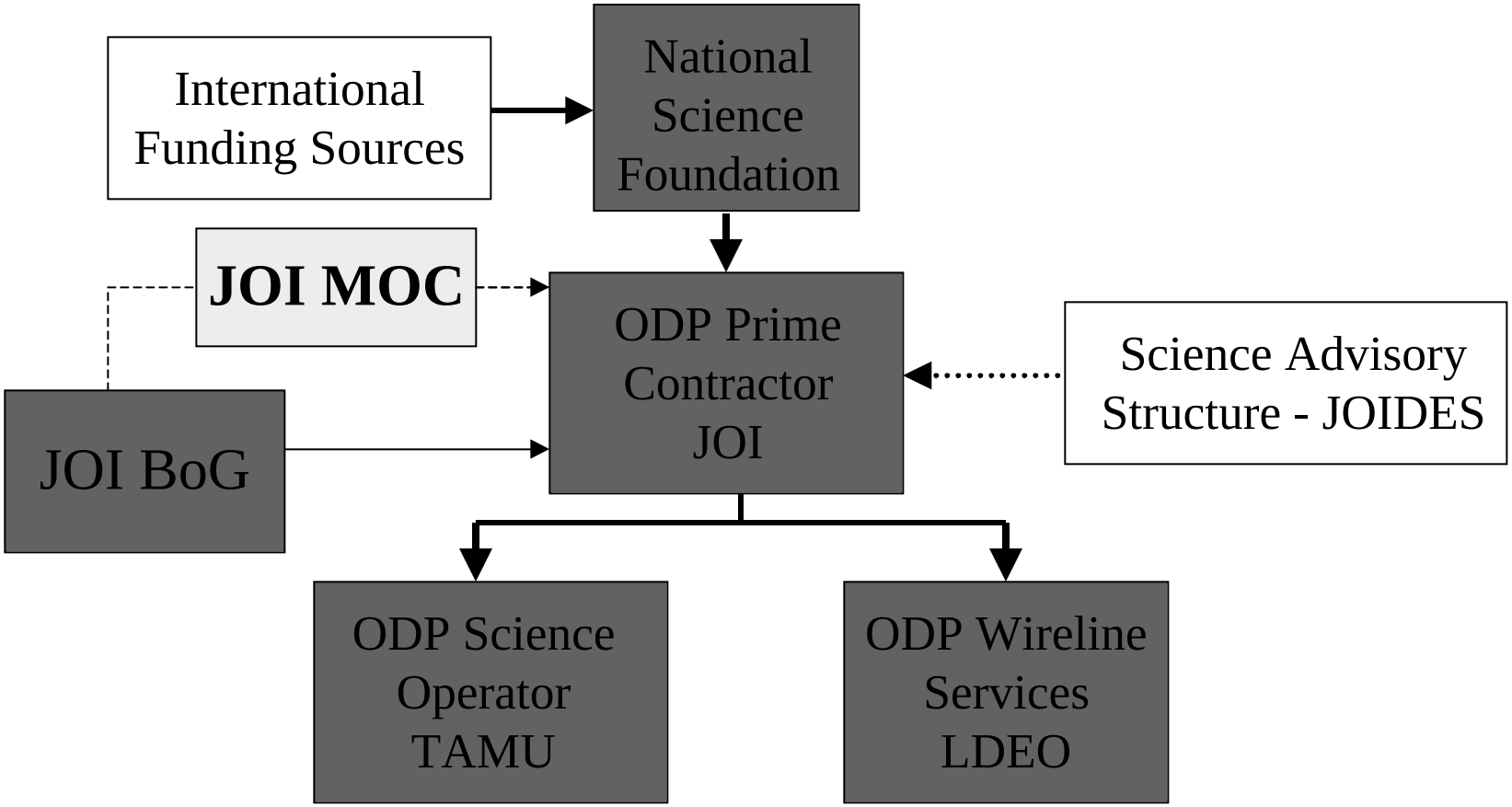
4/23/00 JOI President/ODP Executive Director position advertised in *Washington Post*, *Nature*, *Eos*, etc.

6/28/00 JOI BoG meets (New Chair/Vice Chair elected)

10/1/00 JOI President retires, JOI/CORE split implemented, Dr. John Orcutt designated Interim President of JOI

10/4/00 Dr. Steve Bohlen named President/Executive Director of JOI, start date is 11/27/00.

Modified ODP Management Structure

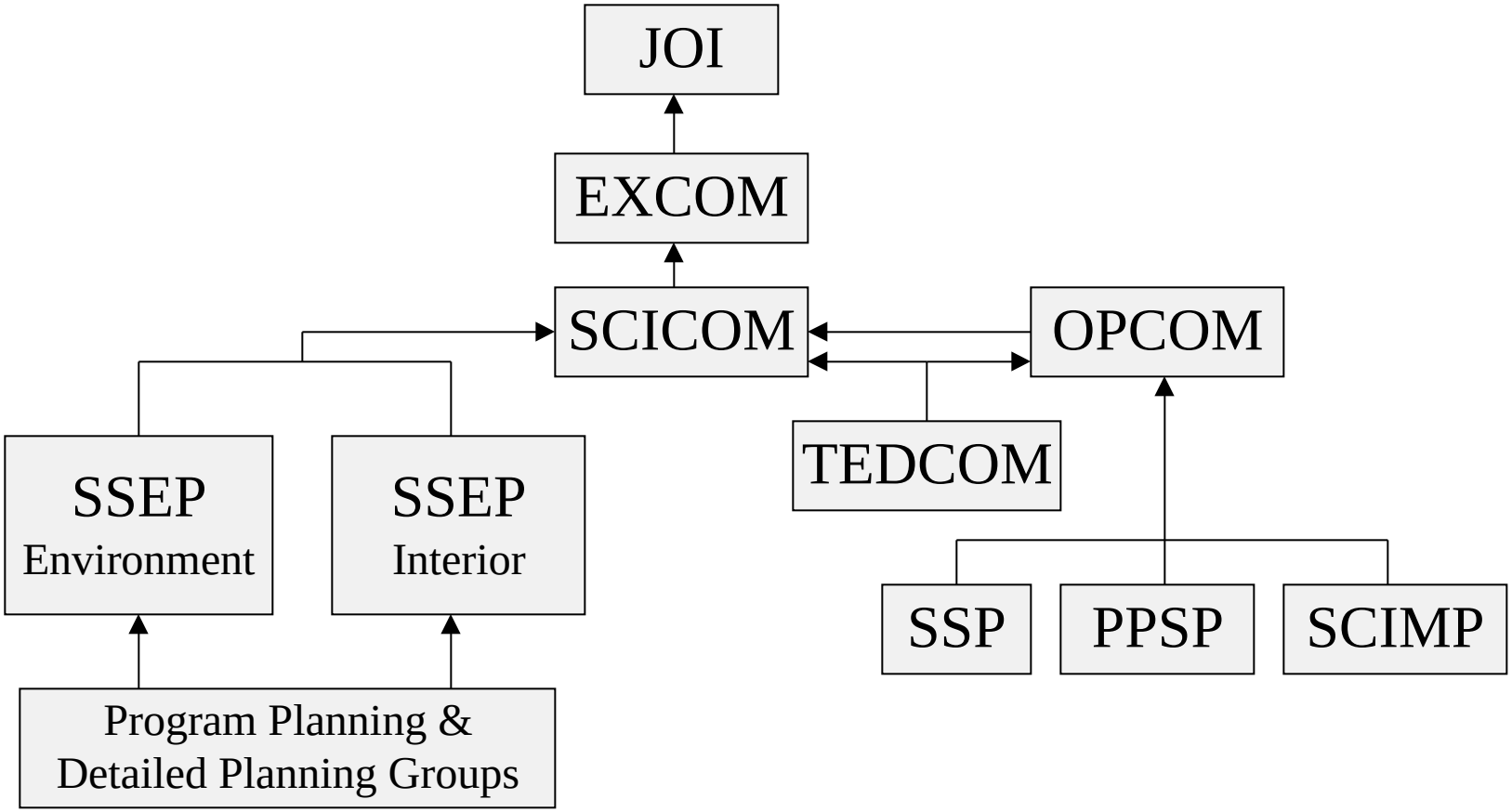


JOI Management Oversight Committee (MOC) Membership:

- **Robert Detrick (WHOI) - Chair**
- **James Gill (UC, Santa Cruz)**
- **Dennis Kent (Rutger's Univ.)**
- **Neil Opdyke (U of Florida)**

The future of the JOI Management Oversight Committee will be evaluated by the JOI BoG at their next meeting.

JOIDES Scientific Advisory Structure



International Membership in the Ocean Drilling Program

Full Members: $3M/year

12 scientists/year sail

Representation on all panels

All products

All technology developments

Associate Members: $0.5M to $2M/year

Scientists/year sail proportional to associate level

Representation on panels reduced proportional to level

Reduced products

International Membership

Full Members ($3M/year)

- **Australia/Canada/Chinese Taipei/ South Korea Consortium for Ocean Drilling**
- **European Science Foundation (ESF) Consortium for Ocean Drilling (Belgium, Denmark, Finland, Iceland, Ireland, Italy, Norway, Portugal, Spain, Sweden, Switzerland, and the Netherlands)**
- **Germany**
- **Japan**
- **United Kingdom**
- **United States of America (funds >60% of the total ODP)**

Associate Members

- **France (Level 3 = $^2/_3$ of full membership)**
- **People's Republic of China (Level 1 = $^1/_6$ of full membership)**

FY01 ODP Program Plan Development

April 3 **Subcontractors submit draft plans to JOI**

May 1 **JOI sends composite draft Plan to subcontractors for review**

May 15 **Subcontractors' comments due at JOI**

May 25 **Draft Plan submitted to NSF and to JOIDES Office**

June 9 **NSF returns comments to JOI**

June 27-28 **EXCOM reviews and approves the Program Plan**

August 15 **JOI submits final Plan to NSF for approval***

*** Due to scheduling changes introduced at the SCICOM/OPCOM meeting, the FY01 program plan was revised at the end of August.**

October 1 **FY01 begins**

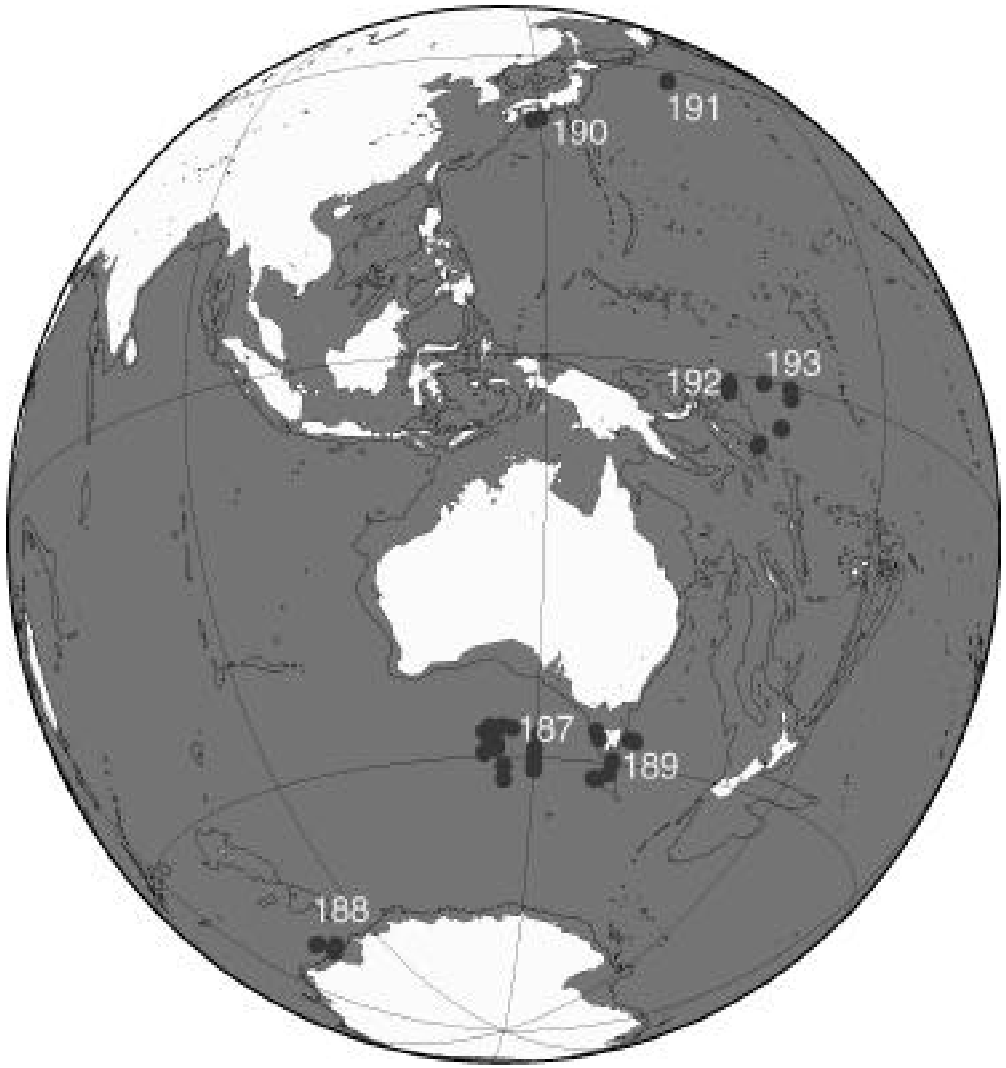
Note: This schedule reflects the development of the FY01 Program Plan. The exact sequence of events may be slightly different for other fiscal years cue to external factors and requirements.

Ship Schedule (FY00 - FY02)

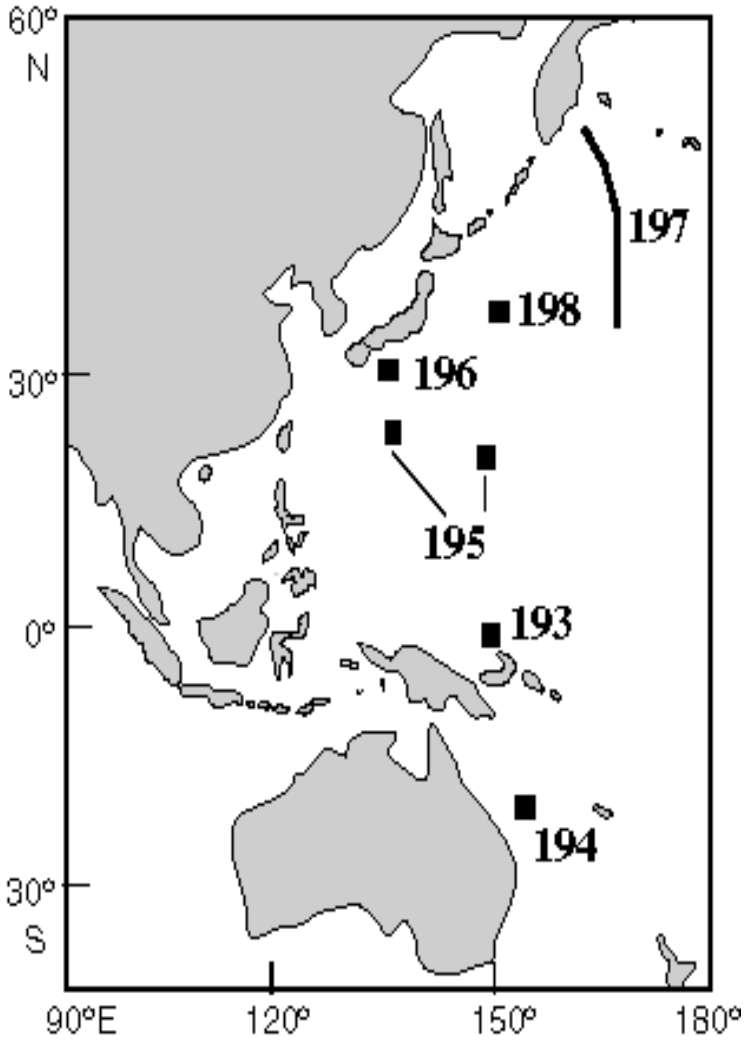
	Leg	Port (Origin)†	Dates –
187	Australia-Antarctic	Fremantle	15 November - 12 January, '00
188	Prydz Bay	Fremantle	12 January - 12 March
189	Southern Gateways	Hobart	12 March - 13 May
	Transit (Townsville-Guam)	Townsville	13-24 May
190	Nankai I	Guam	24 May - 17 July
191	W. Pacific ION/HD Engr.	Yokohama	17 July - 10 September
192	Ontong Java	Guam	10 September - 9 November
193	Manus Basin	Guam	9 November - 6 January, '01
194	Marion Plateau	Townsville	6 January - 5 March
195	Mariana/West Pacific ION	Guam	5 March - 3 May
196	Nankai II *	Keelung	3 May - 2 July
197	Hotspots	Yokohama	2 July - 28 August
198	Shatsky	Yokohama	28 August - 24 October
199	Paleogene	Honolulu	24 October - 17 December
200	H2O	Honolulu	17 December - 7 February, '02
201	Peru	Panama City	7 February - 8 April‡
202	S.E. Paleoceanography	Valparaiso	8 April - 7 June
203	Costa Rica	Panama City	7 June - 6 August
204	Gas Hydrates	San Francisco	6 August - 4 October
205	Eq. Pacific ION	San Francisco	4 October - 9 November

Notes: Port call dates have been included in the dates which are listed. For example, Leg 193 begins on 9 November. The scheduled sailing date is 14 November. Although 5 day port calls are generally scheduled, the ship sails when ready. A mid-leg port call will occur for Leg 196 and may occur for Leg 204. Leg 205 will end in Panama City.

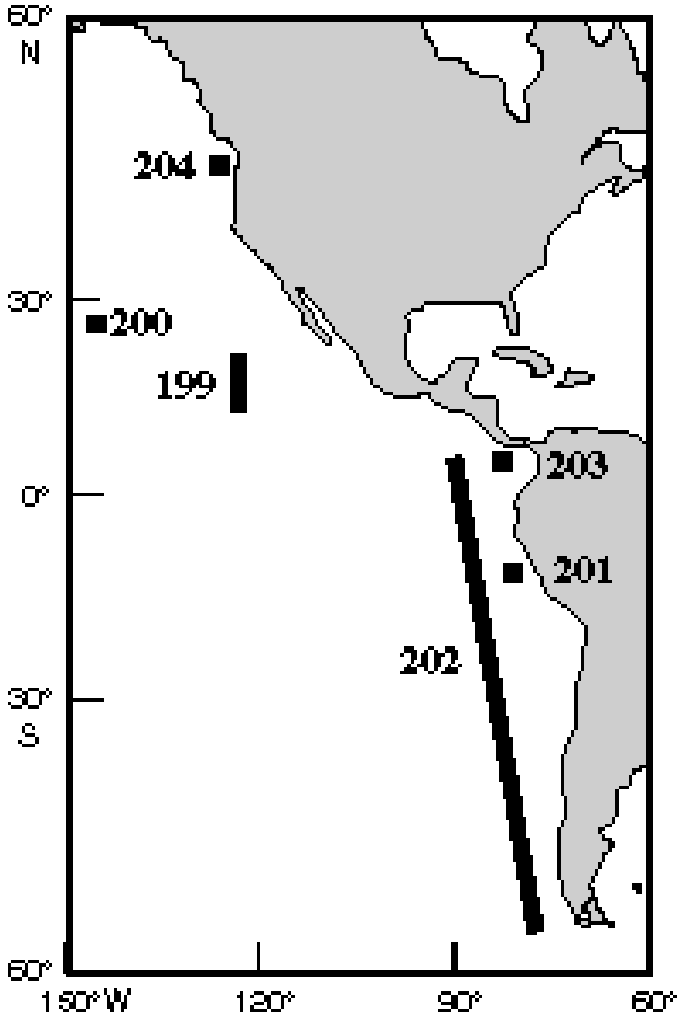
ODP Fiscal Year 2000 Schedule



ODP Fiscal Year 2001 Schedule



ODP Fiscal Year 2002 Schedule



ODP Long Range Plan Initiatives - Status

• Deep Biosphere

- **Microbiology Lab upgrades and downhole contamination studies for QA/QC.**
- **Dedicated leg scheduled for microbiological studies - Peru (Leg 201).**

• Gas Hydrates

- **Development of APC Methane Tool w/ MBARI (ongoing).**
- **Test of HYACE tool on Leg 194; upgrades to Pressure Core Sampler are planned.**
- **Reschedule Oregon Margin/Hydrate Ridge cruise for better weather window (Leg 204 August 6 to October 4, 2002).**

• Alternate Platforms

- **Arctic Detailed Planning Group (DPG) formed.**
- **Shallow water continental margin drilling (NSF and JOI/USSSP-sponsored workshop "MARGINS: Source to Sink", held in Lake Tahoe, CA on Sept. 11-15, 2000).**
- **Coral reef drilling (NSF and JOI/USSSP-sponsored workshop on "Submerged Coral Drilling", held in St. Petersburg, FL on Sept. 23-25, 2000).**

ODP FY00 - FY02 Schedule

Routine Legs

- 194 Marion Plateau
- 195 Mariana/W.P. ION
- 197 Hotspots
- 198 Shatsky Rise
- 199 Paleogene
- 200 Hawaii-2 Observatory (H2O)

Microbiology-focus

- 193 Manus Basin
- 196 Nankai II
- 201 Peru Microbiology
- 202 SE Paleoceanography
- 203 Costa Rica
- 204 Gas Hydrates

History of DSDP/ODP Gas Hydrate Research

- 1970 First BSR Drilled, DSDP Leg 11 Blake Ridge
- 1979 First Hydrate Recovered, DSDP Leg 67 Guatemala
- 1980 First Use PCS, DSDP Leg 76 Blake Ridge
- 1982 1.5 m Massive Hydrate, DSDP Leg 84 Guatemala
- 1983 Microbes & Hydrates, DSDP Leg 96 Gulf of Mexico
- 1986 Hydrates in Lower Slope Seds, ODP Leg 112 Peru
- 1989 Hydrates in Sea of Japan, ODP Leg 127
- 1990 Hydrates in Nankai Trough, ODP Leg 131
- 1992 Drilled through BSR, ODP Leg 146 Cascadia
- 1995 Dedicated Hydrate Cruise, ODP Leg 164 Blake Ridge

ODP Gas Hydrate Technology

- **Advanced Piston Corer**
- **Shipboard Laboratory Facilities**
- **In Situ Temperature Probes**
- **Pressure Core Sampler**
- **HYACE Tool (cooperative development with European researchers - field testing on Leg 194)**
- **Methane-APC Tool (cooperative development with MBARI - piston instrumented with pressure, temperature, and conductivity sensors)**

Post-2003
Scientific Ocean Drilling
Town Meeting
Fall AGU Meeting
San Francisco, CA
Marriott Hotel, Golden Gate A
Saturday, December 16, 2000 @5:30-7:30

The Ocean Drilling Program ends in 2003. Planning is well underway for a new, post-2003 program and your input is essential. This meeting is an open forum to learn the latest news about current planning efforts and to share your views on the future. All are welcome. Refreshments will be served.

IPSC/IODP Web Sites

URL: **http://www.iodp.org/** (IODP general web address)
URL: **http://www.iodp.org/ipsc** (IPSC general web address)
URL: **http://www.iodp.org/ipsc/default.html** (general information)

IODP Science Plan (V. 5): **http://www.iodp.org/pdf/IODP_ISP.pdf**
Text only: **http://www.iodp.org/ipsc/isp_v2.2/ISP_V2_2_text.pdf**
Figures (lr): **http://www.iodp.org/ipsc/isp_v2.2/ISP_V2_2_figs.pdf**
Figures (hr): **http://www.iodp.org/ipsc/isp_v2.2/ISP_V2_2_figs_hr.pdf**
HTML format: **http://www.iodp.org/ipsc/isp_v2.2/default.htm**

Please send comments to: **ipsc@umich.edu (Best if sent by Jan. 4, 2001)**

Conceptual Design Committee (CDC) Report:
PDF format: **http://www.joi-odp.org/USSSP/cdc/cdcreportfinal.pdf**
HTML format: **http://www.joi-odp.org/USSSP/cdc.default.html**

Please send comments to: **ipsc@umich.edu (Best if sent by Jan. 4, 2001)**

SCIMP APPENDIX
00-3-03

Science Operator's Report to the JOIDES Scientific Measurements Panel

Casa Munras

Monterey, California

December 12 - 14, 2000

Science Operator's report to SCIMP, December 2000

EXECUTIVE SUMMARY

Action on recommendations from January 2000 SCIMP meeting

Many recommendations and action items from the June 2000 SCIMP meeting have resulted in action by ODP/TAMU. This includes support of the SCIMP recommended seismic/downhole/core data integration working group, investigation of an asset management software/database, and a breakdown of email costs to and from the JOIDES Resolution. In addition the previously proposed policy change to compensate sea-going only employees during shore-based training came into effect in July 2000. Unfortunately, some other recommendations and action items, although desirable, could not be targeted because of budget problems created by the high price of fuel for the ship. Especially funds to purchase a digital imaging system, which has been a high priority for several years, are currently not available.

Operations Schedule

A revised operations schedule was released on 24 August, 2000 and updated on 10 October, 2000. The major changes to the previous schedule are the addition of Legs 202 through 205 and the addition of a CORK site to Leg 195. In addition two legs, Shatsky Rise (Leg 198), and Peru Biosphere (Leg 301) were inserted into the existing schedule.

Leg Reports

Leg 190 (Nankai 1)

Six sites along two transects across the Nankai Trough accretionary prism were successfully drilled during Leg 190, satisfying all leg objectives. Two reference sites at the seaward ends of the Muroto Transect (Site 1173) and the Ashizuri Transect (Site 1177) delineate the stratigraphic framework of the accreting subducting Shikoku Basin sedimentary section. A thick section of Miocene turbidites and smectite-rich mudstones is present within the subducting section at the Ashizuri site. The turbidites and mudstones are absent in the correlative section at the Muroto site, probably contributing to the difference in prism wedge taper between the two transects, while possibly controlling the seismic character of this active plate boundary.

Leg 191 (West Pacific ION Project/Hammer Drill Engineering)

The seismic observatory was successfully installed at Site 1179 and left ready for activation by a future remotely operated vehicle cruise. The hammer drill tests were less successful owing to a streak of bad luck. The hammer drill was tested on a seamount near Guam (Sites 1180 and 1181), but the lithology was unsuitable (soft volcanic ash) and a typhoon forced evacuation of the area. Finally, an abbreviated HRRS test was accomplished at a site atop a basaltic volcano in the Mariana Trough (Site 1182).

Leg 192 (Ontong Java Plateau)

ODP Leg 192 recovered igneous basement and sediment cores in five widely separated sites in previously unsampled areas across the Ontong Java plateau. Primary objectives of the leg were to determine (1) the age and duration of emplacement of the plateau, (2) the compositional range of magmatism, and (3) the environment and style of eruption. Acoustic basement at the four sites on the main or high plateau consists of pillow and/or massive basalt flows with rare, thin sedimentary interbeds. Biostratigraphic evidence indicates that basement ages at Sites 1183, 1186, and 1187 are Aptian. At Site 1185, two groups of basalt are present; the lower group is Aptian, whereas the age of the upper group is estimated only loosely as latest Cenomanian to Albian. Together with data for DSDP Site 289 and ODP Site 807, it now appears that the great bulk of the high plateau formed in a single episode in the early Aptian. Later volcanic events, including the ~90 Ma event recorded at Leg 130 Site 803 and in the eastern Solomon Islands, appear to have been volumetrically minor on the high plateau and largely confined to its margins. One of these late-stage events is recorded in our fifth site, Site 1184, on the plateau's eastern lobe or salient, where we cored 338 m of a middle Eocene basaltic volcaniclastic sequence.

Science Services Update

- Microbiology Lab has been moved to the F-Deck on Leg 191.
- Status of Microbiology Lab issues.
- In the light of the current financial situation an RFQs for a less expensive digital imaging system was issued early December and responses expected early January before the SCICOM/OPCOM meeting.
- New Tech Note for ICP analysis on the web.
- Investigation of asset management software/database
- Curational statistics and activities summarized

Information Services Update

- JANUS application projects status summarized.
- Data migration status summarized.
- JANUS database mirror site request by the University Bremen discussed

Drilling Services Update

- **Rig Instrumentation System (RIS):** Instrumented load pins completed during Leg 192 portcall, RIS set up to calculate weight on bit (WOB) from the load pin measurement. A WOB filter is being developed and scheduled for Leg 195.
- **APC Temperature Tool and WSTP**: Blue Mountain Instruments (BMI) was selected to provide repair and calibrations services for the APC temperature tool and WSTP data logger, because.Adara Systems discontinued support of these instruments.
- **APC Methane Tool**: Two design review meetings with MBARI conducted, where the mechanical packaging concept for the MBARI acquisition electronics and the sensors was approved and the sensors for the APC piston selected. MBARI placed orders for six of each thermistor probe, pressure transducer, and conductivity sensor.
- **Downhole Measurement Technology:** Fugro's Piezoprobe pore pressure tool and Hydraulic Fracture Tool (HFT) were evaluated for deployment in ODP bottom hole assemblies (BHA). Fugro and ODP engineers concluded that both tools could be adapted to APC/XCB BHA without compromising the coring operation.
- **Davis/Villinger Temperature Probe (DVTP):** Adoption of the Davis/Villinger Temperature Probe (DVTP) as an operational ODP tool. Two new DVTP's are being procured.
- **Memory Drilling Sensor Sub:** DSS will provide data to improve the understanding of the dynamic forces at work downhole and to quantify the impact of heave and surface inputs (torque, weight, rpm, and flow rate) on coring performance. Demonstration test run on Leg 188. Scheduling of this tool delayed.
- **Active Heave Compensator (AHC) operational review:** New load pins installed for Leg 192. Beta version of Weight on Bit filter developed during Leg 191, scheduled to be implemented during the Leg 195 portcall. AHC hydraulic umbilical replaced during the Leg 191 portcall.
- **Advanced Diamond Core Barrel (ADCB)** successful in land tests during June and October, 2000. Ready to be deployed on Leg 193.
- **Hard Rock Re-entry System (HRRS) Project**: Limited testing conducted on Leg 191. Many of the objectives could not be completed.

Publication Services Update

- Review of acceptance of new-format *Proceedings* publications
- IR through v. 186 and SR through v. 174A published
- Leg related citations lists compiled since January 1999, contains 317 citations (appended)
- ODP *Proceedings* distribution
- Sample distribution, data distribution and publications policy revision planned for February 2001.
- Web page development and web site statistics

ACTION ON RECOMMENDATIONS AND ACTION ITEMS FROM JUNE 2000 SCIMP MEETING

SCIMP RECOMMENDATION 00-2-1: SCIMP recommends that a temporary Working Group be established to advise SciMP on the minimum capabilities needed for a routine seismic/downhole/core data integration program aboard the *JOIDES Resolution*.

Adam Klaus attended the workshop at LDEO on 30-31 Oct, 2000, to provide input to the temporary working group.

SCIMP Recommendation 00-2-2: SCIMP recommends that JOI direct ODP-TAMU to reallocate current fiscal year funds to move forward immediately with the purchase of a single-track, moving sensor GEOTEK line-scan digital imaging system.

The digital imaging system issue is currently being re-examined. The digital imaging working group has had several conversations with three potential vendors regarding the need for a less expensive system. This can probably be achieved by purchasing an off-the-shelf system that will not be custom modified to suit ODP's needs. During the week of 27 November, a review meeting atttended by SCIMP chair Tom Janecek and Frank Rack was held at ODP-TAMU and a request will go out to vendors for bids on such digital imaging systems December 5. The bids are due on Januar 5 so that a selection of an imaging system will have taken place before the SCICOM/OPCOM meeting at the end of January at which funds may be reprioritized. Since there will be no funds available before the SCICOM meeting, the bidding and selection procedure will not delay the purchase of a digital imaging system.

A digital camera for color close-up photography will be considered as long as a core digital imaging system is not installed on the JR. The digital close-up pictures would not substitute for regular shipboard photography, but they should be extremely useful for preparing figures for the scientific reports and for scientists' post-cruise research.

SCIMP Recommendation 00-2-3: SCIMP recommends that all investigators who produce data using leg-specific, non-ODP scientific analytical equipment and instrumentation on board *the JOIDES Resolution* follow all standard ODP data policies and data moratoriums. In all cases these data should be made freely available in the same way that other shipboard data are distributed.

This recommendation is in accordance with the sprit of data acquisition on the JOIDES Resolution and will be supported and enforced by ODP-TAMU personnel.

SCIMP Recommendation 00-2-4: SCIMP recommends that the ODP-IODP transition plan address the issue of long-term use of ODP drilled boreholes, with particular emphasis on the distribution and archiving of data collected from these legacy holes.

Requires no ODP-TAMU response.

SCIMP Recommendation 00-2-5: To establish a protocol for the consistent linking of metadata with digital single frame images (e.g., thin sections, scanned core photographs) SCIMP recommends that ODP-TAMU purchase and implement the use of an asset management software/database (e.g. Extensis Porfolio or Cumulus Canto). The database generated should interface with JANUS, have SQL compatibility and be able to export data in a long-term archive format.

Jay Miller has tested the digital image handling software that SCIMP recommended to investigate in terms of handling digital images. Jay's detailed report is provided in the Science Services update section.

Summary
Pros
** Great for shipboard scientist use (provided it is archived properly)*
** Relatively inexpensive ($200 for each single user-$2500 for server version which allows easier administration and $200 for each additional client over 5)*

Cons
** Does not guarantee proper archiving*
** Does not provide required original file security*
** Does not guarantee proper storage of metadata*
** Does not provide for ease of transport off the ship*
** Requires heavy administration to even potentially overcome the above cons*

This type of software provides some of the user friendly (shipboard only) features ODP needs, but is not transportable, does not ease the administration tasks (in fact they will probably increase), and does not provide the security ODP requires.

Update on action items

ACTION ITEM: ODP-TAMU personnel to keep SCIMP Chemistry LWG members updated on ICP-ES operations.

DONE: Rick Murray has been kept informed about the ICP operations. After Rick rotates off SciMP, his successor will receive this information.

ACTION ITEM: Determine if JANUS uploader programs for the Magnetic Susceptibility data from the Archive MST and the Discrete Bartington loop are on JANUS modifications task list.

The uploader program for the magnetic susceptibility data from the Archive MST is on the JANUS task list, however, with relatively low priority. Datamodel and uploader are very similar to the existing MST susceptibility measurements. Currently the susceptibility data occasionally generated with the Archive MST are stored and archived in separate files outside of JANUS.

The archiving of discrete susceptibility data generated on the Bartington loop is considered very low priority and is not on the JANUS modification task list. Discrete susceptibility data are rarely produced. If they are generated they are usually collected to monitor magnetic mineralogy changes during thermal demagnetizations or other rockmagnetic experiments.

ACTION ITEM: SCIMP and ODP-TAMU computer lab working teams develop a plan to upgrade Macintosh operating systems.

The Mac OS X has not been released other than in beta form. It will probably not come out before next summer. The ODP-TAMU computer specialists have done testing on the beta version recently and discovered some incompatibilities with the current configuration. There are no plans to upgrade to OS X any time soon, especially since there is no firm release date for it.

ACTION ITEM: Query shipboard microbiologists to determine computational needs in Microbiology Lab.

The following four stations essential for the microbiology lab require a dedicated computer:
1) Digital Imaging System for the Microscope
2) Total Organic Carbon (TOC)
3) GC/ECD HP Chemstation
4) Hydrogen GC

ACTION ITEM: SCIMP Physical Property LWG members to pursue the steps (and costs) required for development of a BGO/full spectrum natural gamma system for IODP.

Requires no ODP-TAMU response.

***ACTION ITEM**: ODP-TAMU to supply SCIMP with breakdown of email costs to and from the JOIDES Resolution.*

Ship/Shore communication costs are tracked by the ODP-TAMU administration. The COMSAT bills are charged to six accounts of which four accounts were combined for the purposes of this report into one ODP phone/fax account. It is not possible to track or distinguish sent versus received messages with this accounting system. The breakdown of the ship/shore communication accounts for FY'00 is:

ODP phone/fax accounts:	$12,221.27
ODP email accounts*:	$36,633.55
TSF/LDEO/Schlumberger:	$30,422.72
Total communication:	$79,277.54

*contains ODP business (estimated at about 5%) and personal email

The Transocean/Sedco/Forex (TSF)/LDEO/Schlumberger account is a rebilling account which includes business and personal email accounts (their policy regarding subsidized email is identical to ODP-TAMU's), phone, and fax charges. The ODP email account charges ($36,633.55) is the amount of money spend by ODP on business-related email and on free email for scientists and technicians. ODP-TAMU collected in other FY's about $1,000 to $2,000 per leg for personal email from scientists and technicians.

The requested breakdown of received versus sent messages and ODP business versus personal accounts is not easy to obtain. The cc:mail system in use before Leg 187 could only track sent email bytes, and any incoming mail was not accounted for. Not even the amount of the total received bytes can be easily generated today because ODP-TAMU was billed by Sedco and not directly by COMSAT. Although spreadsheets with the shipboard email charges were not routinely kept and archived after a leg, we were able to find three email bills from Legs 181, 184, and 185. Email charges for these legs broken down into different user groups are shown in Table 1 below. User groups are ODP business accounts (operations, curation, lab officer, staff scientist, and computer support), ODP staff accounts, Transocean-Sedco-Forex (TSF), LDEO, and Schlumberger accounts (fully billed to TSF, LDEO, and Schlumberger at no cost to ODP-TAMU), and scientist accounts.

After the installation of a new email system (Groupwise) during Leg 187, no system for email charges was in place through Leg 191. Leg 192 which ended November 9, 2000, was the first leg with the new billing policy in place (200 kb free, then charges for sent and received messages at $0.000033/byte), which limits the detailed email statistics requested by SCIMP at the moment to Leg 192. A breakdown of the Leg 192 email charges is shown below in Table 2**. Email traffic between ODP-shore and ODP-ship accounts is not included in these numbers**, because there are no charges for ODP internal emails. The system only tracks email sent over the internet. Once the November COMSAT bill comes in, we will be able to calculate that number for Leg 192. Estimates from Leg 193 show that less than 5% of the total email bytes account for ODP intern traffic. New high speed transmissions and better COMSAT rates have dropped the rates from $0.004/byte before July 2000 to currently $0.000033/byte.

The email expenses for the ODP personal accounts for four months from June through November, 1999 (excluding September and October because of drydock) totals $16,065 with the old email policy in place (100 Kb free, then charges for sent messages). During the following four months (December 1999 through March 2000), without an accounting system in place, the total personal email cost was $21,846, an increase of 36% over the previous period.

Table 1. Email usage during Legs 181, 184, and 185 (cc:mail, one-way billing)

	bytes sent	% sent	Paid	% paid
Leg 181				
Total bytes	13181588	100.00	$2,489.72	100.00
Average per account	148108		$27.97	
ODP business	2495237	18.93	$689.30	27.69
Avg ODP business	311905		$86.16	
ODP staff	2080729	15.79	$192.04	7.71
Avg ODP staff	86697		$8.00	
TSF, LDEO, Schlum	2833861	21.50	$346.80	13.93
Avg TSF, LDEO, Schlum	94462		$11.56	
Scientists	5771761	43.79	$1,261.58	50.67
Avg Scientists	213769		$46.73	
Leg 184				
Total bytes 184	14975052	100.00	$2,862.00	100.00
Average per account	161022		$30.77	
ODP business	2562060	17.11	$747.00	26.10
Avg ODP business	366009		$106.71	
ODP staff	2481468	16.57	$299.00	10.45
Avg ODP staff	118165		$14.24	
TSF, LDEO, Schlum	4502532	30.07	$654.00	22.85
Avg TSF, LDEO, Schlum	125070		$18.17	
Scientists	5428992	36.25	$1,162.00	40.60
Avg Scientists	187207		$40.07	
Leg 185				
Total bytes 185	15320985	100.00	$2,973.00	100.00
Average per account	156337		$30.00	
ODP business	2777595	18.13	$798.00	26.84
Avg ODP business	308622		$89.00	
ODP staff	3418800	22.31	$534.35	17.97
Avg ODP staff	122100		$19.00	
TSF, LDEO, Schlum	3650035	23.82	$466.00	15.67
Avg TSF, LDEO, Schlum	104287		$13.00	
Scientists	5474555	35.73	$1,175.00	39.52
Avg Scientists	210560		$45.00	

Table 2. Email usage during Leg 192 (Groupwise, two-way billing)

	Bytes received	% received	bytes sent	% sent	total bytes	% total	paid	% paid
Total bytes 192	24755964	100.00	20151228	100.00	44907192	100.00	$908	100.00
Average per account	193590		203492		325414		$6.58	
ODP business	170080	0.69	1429920	7.10	1600000	3.56	$52.80	5.82
Avg ODP business	24297		204274		200000		$6.60	
ODP staff	5939456	23.99	4279588	21.24	10219044	22.76	$193.45	21.31
Avg ODP staff	148486.4		213979.4		255476.1		$4.61	
TSF, LDEO, Schlumberger	10326916	41.71	8136776	40.38	18463692	41.12	$336.29	37.04
Avg TSF, LDEO, Schlumberger	178050		173123		302683		$5.51	
Scientists	8319512	33.61	6304944	31.29	14624456	32.57	$325.27	35.83
Avg Scientists	286880		252198		504292		$11.22	

ACTION ITEM: ODP-TAMU to supply estimated completion date for laboratory "cookbooks".

Physical Properties: Spring 2001
Paleomagnetism: Spring 2001
Organic Chemistry: Spring 2001
IW Chemistry: Will require update as a result of change from AA to ICP analysis
ICP Chemistry: Published and on the web (September 15, 2000)
UW Geophysics: No action, guide available, protocol changes quickly
Paleontology: No action, user manual for the PAL application and the microscopes exist; inventory is available on the web; processing methods and preferences depend on the scientist.
Shipboard Scientists Handbook: Summer 2001
Core Description: No action, core description manual still up-to-date, AppleCore manuals exist.
Downhole Tools: No action
Microbiology: No action, wait to hire technicians and establish procedures

Update on previous recommendation

SCIMP Recommendation 00-1-2: SCIMP recommends that ODP-TAMU provide the necessary shore-based training for all ASPP employees in a manner that appropriately compensates them for their time.

A proposed policy change to compensate ASPP employees for shore-based training or special projects at the same rate as sea pay, i.e., 80% above the base salary for the additional time came into effect July 18, 2000. Details about the policy can be found on the ODP website at

http://www-odp.tamu.edu/admin/humres.html

OPERATIONS SCHEDULE

LEG	PORT OF ORIGIN†	DATES*	TOTAL DAYS (port/sea)	DAYS AT SEA (transit/on site)	TAMU CONTACT	LDEO CONTACT
FY01						
193 Manus Basin	Guam	9 November 2000- 6 January 2001	58 (5/53)	9/44	J. Miller	G. Iturrino
194 Marion Plateau	**Townsville**	**6 January - 5 March 2001**	**58 (5/53)**	**13/40**	**P. Blum**	**H. Delius**
195 West Pacific Ion	Guam	5 March -3 May 2001	59 (5/54)	8/46	C. Richter	S. Barr
196 Nankai II*	**Keelung**	**3 May - 2 July 2001**	**60 (5/55)**	**9/46**	**A. Klaus**	**S. Saito**
197 Hotspots	Yokohama	2 July - 28 August 2001	57 (5/52)	17/35	G. Acton	F. Einaudi
198 Shatsky	**Yokohama**	**28 August - 24 October 2001**	**57 (5/52)**	**17/35**	**M. Malone**	**TBN**
**********						
FY02						
199 Paleogene	**Honolulu**	**24 October - 17 December 2001**	**54 (5/49)**	**13/36**	**C. Escutia**	**P. Fothergill**
200 H2O	San Francisco	17 December - 7 February 2002	38 (5/53)	18/15	P. Wallace	Y. Sun
201 Peru	**Panama City**	**7 February - 8 April 2002**	**60 (5/55)**	**20/35**	**J. Miller**	**TBN**
202 SE Paleocean	Valparaiso	8 April - 7 June 2002	60 (5/55)	20/35	P. Blum	U. Ninnemann
203 Costa Rica	**Panama City**	**7 June - 6 August 2002**	**60 (5/55)**	**12/43**	**A. Klaus**	**TBN**
204 Gas Hydrates*	San Francisco	6 August - 4 October 2002	59 (5/54)	6/48	C. Richter	D. Goldberg
**********						
FY03						
205 Eq. Pac. ION	**San Francisco**	**4 October - 9 November**	**36 (5/31)**	**15/16**	**G. Acton**	**TBN**

† Although 5 day port calls are generally scheduled, the ship sails when ready. Port call dates are included in total days, e.g., Leg 197 begins on 2 July with 5 port call days, so the ship will sail on 7 July. *Mid-leg port call will occur for Leg 196 and may occur for Leg 204.

Co-Chief Status

Leg	Co-chiefs
193	R. Binns, F. Barriga
194	F. Anselmetti, A. Isern
195	M. Shinohara, M. Salisbury
196	K. Becker (CORK), H. Mikada (both), J.C. Moore (LWD)
197	J. Tarduno, R. Duncan
198	T. Bralower, TBN
199	M. Lyle, P. Wilson
200	R. Stephen, J. Kasahara
201	S. D'Hondt, TBN
202	A. Mix, R. Tiedemann
203	TBN
204	A. Trehu, G. Bohrmann
205	TBN

Leg Reports

Summary of Leg Operations: Legs 190, 191, 192

	Leg 190 Nankai 23 May - 16 Jul '00 Guam – Yokohoma	**Leg 191** W. Pac. ION 16 Jul - 8 Sep '00 Yokohoma – Guam	**Leg 192** Ontong Java 8 Sep – 9 Nov '00 Guam – Guam
Transit/Onsite (day)	6.8 / 44.7	17.6 / 30.7	13.2 / 41.8
Sites	6	4	5
Holes	8	18	6
Water Depth (m)	1754 – 4856	970 - 5577	1673 - 3910
Deepest Penetr. (m)	1120	475	1211
Cored Interval (m)	3896	509	1764
Tot. Recov. (m,%)	2625 (67.4%)	363 (71.3%)	898 (50.9%)
APC Recov. (m,%)	685 (95.2%)	296 (102.5%)	0
XCB Recov. (m,%)	913 (85.1%)	17 (63.1%)	0
RCB Recov. (m,%)	1026 (57.2%)	50 (26.0%)	898 (50.9%)

Leg 190 (Nankai 1)

- 13-24 May 2000: Portcall in Townsville for crew change & to load consumables. Transit to Guam & board Leg 190 science party.
- 6 Sites (8 holes) in 1754 -- 4856 m WD
- APC 685 m (67%), XCB 913 m (85%), RCB 1026 m (57%)
- Cored 3896 m / Recovered 2625 m
- Deepest penetration: 1120 m through decollement
- Drill-In-Casing: 11-3/4 in. casing to 142.2 m

Six sites along two transects across the Nankai Trough accretionary prism were successfully drilled during Leg 190, satisfying all leg objectives. Two reference sites at the seaward ends of the Muroto Transect (Site 1173) and the Ashizuri Transect (Site 1177) delineate the stratigraphic framework of the accreting subducting Shikoku Basin sedimentary section. A thick section of Miocene turbidites and smectite-rich mudstones is present within the subducting section at the Ashizuri site. The turbidites and mudstones are absent in the correlative section at the Muroto site, probably contributing to the difference in prism wedge taper between the two transects, while possibly controlling the seismic character of this active plate boundary.

The décollement in both transects is localized along a stratigraphic unit (~5.9—7 Ma) within the lower Shikoku Basin. This horizon is correlative across both transects through its magnetic susceptibility.

The broad low-chloride zone in the lower Shikoku Basin unit, first identified at Site 808, progressively decreases across the Muroto Transect. This landward-freshening trend is due to both enhanced diagenetic reaction and fluid flow.

Our ideas of the tectonic evolution of the Muroto Transect have been dramatically changed. Accretion of a Miocene and Pliocene turbidite package forms the large thrust slice zone (LTSZ). This event is associated with a shift from a transverse sediment transport system that delivered coarse material from the arc to the trench to an axial transport system that delivers sediment down the trench axis from the east. Growth of the prism from the LTSZ to the toe of the slope (40 km) took place rapidly within the past 2 m.y.

Leg 191 (West Pacific ION Project/Hammer Drill Engineering)

- ION Site 1179 in 5566 m WD
- Cored 4 holes: APC 296 m (71%), XCB 17 m (63%), RCB 50 m (26%)
- Reentry Cone with 64 m 16 in., 393 m 10-3/4 in., drilled to 475 m
- Installed broadband seismometer in 3rd Int'l Ocean Network long-term borehole geophysical observatory
- Jamstec ROV "Kaiko" scheduled to connect to undersea cable in Fall 2000
- Deepest penetration 475 m
- Lost 4 days in a typhoon & medivac. Drawworks brake band cracked late in leg–new band expedited to ship for HD tests.

Engineering Test:

- Limited 4 day test of Hard Rock Reentry System (HRRS)
- Hammer operated flawlessly without damage or equipment failure
- Successfully tested Hammer Drill w/ 2 underreamer bits
- Minimized surface vibrations w/ downhole pulsation-dampner sub & improved standpipe support in the derrick.
- Bare rock spud in lava flows w/ rop 2.7 to 9 m/hr in sea states of 2.5 to 4-m with AHC.

Results

Leg 191 had two main goals: (1) to drill and case a borehole at a site in the northwest Pacific Ocean between Japan and Shatsky Rise and install therein a seismic observatory and (2) to test the drilling and casing emplacement capabilities of the hard rock reentry system (HRRS or "hammer drill") on a basaltic outcrop atop Shatsky Rise. There were also numerous ancillary scientific goals to be addressed using cores and logs obtained from Leg 191 sites. The seismic observatory was successfully installed at Site 1179 and left ready for activation by a future remotely operated vehicle cruise. The hammer drill tests were less successful owing to a streak of bad luck. Early in the leg, 4 days were lost when the JOIDES Resolution had to leave Site 1179 because of a typhoon. A medical emergency cost another 3 days and forced the ship to leave the Shatsky Rise area and return to Japan. In addition, a broken part on the drawworks made it impossible to return to Shatsky Rise for the HRRS test. In an effort to salvage the HRRS program, the hammer drill was tested on a seamount near Guam (Sites 1180 and 1181), but the lithology was unsuitable (soft volcanic ash) and another typhoon forced evacuation of the area. Finally, an abbreviated HRRS test was accomplished at a site atop a basaltic volcano in the Mariana Trough (Site 1182).

Despite the operational difficulties, an excellent set of cores was obtained from Site 1179,which is located on lithosphere of Anomaly M8 age (129 Ma). A 377-m-thick sedimentary column was cored in addition to 98 m of basaltic basement (total depth = 475 meters belowseafloor). The sedimentary column can be divided into four lithologic units. Unit I consists of223.5 m of clay- and radiolarian-bearing diatom ooze of late Miocene to late Pleistocene age. Ashbeds are common in this unit, recording volcanic activity from the western Pacific island arcs. UnitII is a clay-rich, diatom-bearing radiolarian ooze of late Miocene age with a thickness of 22.5 m.Unit III contains barren, brown pelagic clay in a 37.5-m-thick layer. Unit IV yielded poor recoverywith only chert and porcellanite fragments from an unknown sedimentary matrix within 93.7 mabove basement. The upper sedimentary section produced a well-defined magnetic reversalpattern, which shows that sedimentation was low (1.5 m/m.y.) during the mid-Miocene andincreased 300-fold (to 40-43 m/m.y.) in the Pliocene and Pleistocene. Biostratigraphy in Units Iand II was based mainly on siliceous microfossils and palynomorphs because calcareousmicrofossils were rare to absent. Sedimentation rates derived from biostratigraphy are in goodagreement with those calculated from magnetostratigraphy. The brown pelagic clay of Unit III isbarren, and few fossils were recovered from Unit IV; however, radiolarians observed in porcellanite samples indicate an Early Cretaceous age. The physical properties of the uppersedimentary section are unusual because porosities are extremely high (often >80%) and bulkdensities actually decrease downhole for the first 150 m. These characteristics probably result froman increasing downward abundance of diatom tests, which have low grain densities and containlarge amounts of pore space. The 98-m igneous section consists of aphyric ocean ridge basaltsdivided into 48 units based on lithologic differences and cooling boundaries. The section consistsof massive flows and pillows with small amounts of interunit sediments and volcanic breccia. Thebasalts are unusually fresh for Early Cretaceous igneous rock, and alteration is restricted to low-grade zeolite facies at temperatures less than ~10°-30°C.

Leg 192 (Ontong Java Plateau)

- Set 2 Free Fall Funnels & 1 Reentry Cone.
- Cored 5 sites in 1673 - 3910 m WD
- 1 of 4 primary sites was not drilled because ODP could not get permission from Solomon Islands.
- Drilled 2383 m sediment
- RCB cored 907 m sediment (41.5% recovery) & 856 m basement (60.8% recovery). Total Recovery 50.9%. penetration of 65 to 338 m.
- One BHA was lost when the drilling jars failed.
- Very calm seas throughout leg; returned to Guam 1.4 days early to begin repairs on heave compensator cylin

Results

With a surface area of 1.6×10^6 km^2 and a volume of 4-5×10^7 km^3, the Ontong Java Plateau is the world's largest volcanic oceanic plateau, and may represent the largest magmatic event on Earth in the last 200 m.y. ODP Leg 192 recovered igneous basement and sediment cores in five widely separated sites in previously unsampled areas across the plateau. Primary objectives of the leg were to determine (1) the age and duration of emplacement of the plateau, (2) the compositional range of magmatism, and (3) the environment and style of eruption.

Acoustic basement at the four sites on the main or high plateau consists of pillow and/or massive basalt flows with rare, thin sedimentary interbeds. Biostratigraphic evidence indicates that basement ages at Sites 1183, 1186, and 1187 are Aptian. At Site 1185, two groups of basalt are present; the lower group is Aptian, whereas the age of the upper group is estimated only loosely as latest Cenomanian to Albian. Together with data for DSDP Site 289 and ODP Site 807, it now appears that the great bulk of the high plateau formed in a single episode in the early Aptian. Later volcanic events, including the ~90 Ma event recorded at Leg 130 Site 803 and in the eastern Solomon Islands, appear to have been volumetrically minor on the high plateau and largely confined to its margins. One of these late-stage events is recorded in our fifth site, Site 1184, on the plateau's eastern lobe or salient, where we cored 338 m of a middle Eocene basaltic volcaniclastic sequence.

The basalt at Sites 1183 and 1186, and that making up the lower group of lava flows at Site 1185, are closely similar in composition, and belong to the remarkably homogeneous Kwaimbaita magma type found at Leg 130 Site 807 and in the eastern Solomons. Thus, much of the high plateau's upper crust appears to consist of Kwaimbaita-type basalt. The Eocene volcaniclastic rocks of Site 1184 also have a Kwaimbaita-like bulk composition. No flows of Singgalo-type basalt, which overlies Kwaimbaita-type lavas at Site 807 and on the island of Malaita, were encountered. An exciting discovery of Leg 192 was that basement at Site 1187 and the upper group of flows at Site 1185 are composed of a high-MgO (8-10 wt%), incompatible-element-poor (e.g., TiO_2 = 0.72-0.77 wt%; Zr = 36-43 ppm) type of basalt not found previously on the plateau. These rocks appear to represent very high total fractions of partial melting of their mantle source, and their presence in >100-m-thick lava piles at two sites 146 km apart suggests that such basalt is voluminous on the eastern edge of the high plateau.

Emplacement of lavas at all four high-plateau sites was entirely submarine. The shallowest estimated Aptian water depth for basement is several hundred meters, at Site 1183 on the broad dome of the plateau. Together with previous evidence, our results indicate that most of the Ontong Java Plateau formed well below sea level. The only evidence that a portion of the high plateau was ever at shallow depth is in two thin intervals of Aptian vitric tuff above basement at Site 1183, and possibly a vitric tuff just above basement at DSDP Site 289. The largely submarine emplacement of the plateau probably accounts for its apparently limited paleoenvironmental effects. Evidence for at least local Aptian "dead zones", however, is provided by ferruginous claystone layers above basement at Sites 1183 and 1187.

SCIENCE SERVICES UPDATE

Microbiology: the next step

After several legs with a substantial microbiology component (Legs 185, 187, 190, 191) we are now ready to take the next step in integrating deep biosphere studies into ODP. Following is a list if issues (not necessarily in priority order) which need to be addressed. Some of these can be dealt with in-house, some will require guidance from SciMP.

Reality check - 1: There is clearly a wide range of understanding and expectations in the microbiology community regarding what can be accomplished on an ODP leg. Some individuals are satisfied to collect and preserve clean samples for future study; some require immediate shipboard analysis for ephemeral properties, and some have visions of complex lab projects conducted while still at sea. A "basic" program, which defines what can reasonably be done while at sea within the context of the multidisciplinary activities of ODP, needs to be established and communicated to potential seagoing participants.

Basic supplies: During the past fiscal year we spent significantly more than budgeted on supplies for microbiology. Hopefully, this was a "start-up" problem resulting from lack of experience both at ODP/TAMU and among participating microbiologists. Following from the establishment of a basic observation/sampling program, we need to establish a basic "shopping list" of supplies which participants can reasonably expect to be available on board JR. This needs to be closely coordinated with the needs of chemistry so that where ever possible common supplies can be used. This simplifies inventory and is more cost-effective. Once the basic supply list is established, we need to make it clear to participants that if they require anything different, or beyond what we usually supply, then special arrangements must be made well ahead of the leg and they may have to provide their own supplies/equipment. Any special arrangements need to be coordinated with ODP/TAMU so that shipping, and safe storage and handling can be properly accommodated.

Technical support: Clearly microbiology, like every other discipline represented on board JR, needs technical support. We are presently planning to add to our technical support team an MLS whose duties will include microbiology support. In addition, we plan to cross train the chemistry and X-ray technicians in microbiology-related tasks so that we will have a team of 3 or 4 people with appropriate skills whose duties can be adjusted according to the needs of the specific leg. This may not be ideal, but it is the best that can be done with the present budgetary and berthing constraints.

Space: The location of microbiology adjacent to chemistry seems to be sufficient and functional, however we still have significant "fine-tuning " to do. Also, the microbiologists need to understand that space is not an infinitely flexible commodity. The more instruments are installed on the ship, the more crowded the labs will be. We cannot continue to squeeze other disciplines to make more space available for microbiology. Also, we should be alert for apparent duplication of instruments/measurements between microbiology and, say, chemistry.

Reality check - 2: the flip side of getting the microbiology community on board with regard to what is reasonable and feasible is getting the earth science community to appreciate what microbiology has to offer the non-biologists. This is a two-way educational process which will take time.

Sampling issues: On relatively high recovery legs the sampling needs of microbiology can be easily accommodated. However, on low recovery legs, or at sites which sample critical geologic intervals, or where the microbiologists need to do shipboard incubation studies or lipid analyses, which require large samples, sampling needs can be problematic. We need to establish protocols for handling these situations.

Sampling tools: On Leg 190 John Parkes' lab provided an elaborate sampling instrument. This worked well but required large amounts of nitrogen gas. On Leg 191, the need for uncontaminated samples was met in a much simpler, though possibly less rigorous, manner. We need to establish standard sampling

procedures which assure the microbiologists of clean samples, and at the same time are routine and easily supported by our core lab technicians.

Contamination testing: This will likely become a routine process. The procedure is now established and validated, but is short of routine. We need to make some improvements in the hardware to streamline the process, and develop "cookbooks" and procedures so that it becomes "transparent" to the shipboard scientists, i.e. it becomes a technician responsibility.

Radio isotope studies: Microbiologists have advocated eventually conducting radio isotope studies aboard JR. It is important to recognize that engaging in such studies has implications beyond satisfying the concerns of colleagues, finding a suitable location on the ship and using proper procedures, e.g. there are insurance issues ($12-18,000 per leg), port call issues, responsibility issues (if a visiting scientist does not follow procedure and contaminates the ship, who is pays for clean up and how do we enforce payment?), etc.

Digital imaging archiving software test

Jay Miller has tested the digital image handling software that SCIMP recommended to investigate in terms of handling digital images.

Jay read the webpages associated with one product (Cumulus) and purchased a single license copy of Portfolio by Extensis (they are both virtually the same, but you can import Cumulus catalogs into Extensis, Jay could not tell from the Cumulus webpages if it worked the other way). This is digital image cataloging software and offers some great utility for viewing and searching digital image catalogs, provided the proper metadata is associated with each file. This type of software provides part of the system we need for a digital image database, but there are critical shortfalls that make it problematic for the shipboard environment.

Here is the process as it works at this time and might work using this software:

1) User captures an image.
This is pretty straightforward with our current system. The data capture tools we use provide this function.

2) User saves image.
Here is where we run into challenges. File must be saved with a unique filename, with a minimal but critical amount of metadata (sample #, thin section #, illumination, filters, magnification, and description are the absolute minimum), and to a safe location where the original cannot be compromised. The way we are overcoming this right now is asking scientists to fill out an excel spreadsheet each time they save an image and they save the image to a temporary location. At least daily someone has to check to make sure that this has been done, that all metadata is present, transfer the files to a secure location, and create working file duplicates for shipboard use and easy transport at the end of the cruise. It is easy to make error(s) in this process. Typographic errors are common, copy and paste induced errors are common for metadata, and simply forgetting to fill in the spreadsheet happens regularly.

Because of the 8.3 naming convention that most systems still require to guarantee cross platform compatibility we cannot use sample IDs for filenames. Even if we could, it is common to have multiple images from the same thin section, and we would need some way to distinguish these. In practice, the only thing that has worked thus far has been a naming convention like XXXPMYYY.tif (where XXX is leg number, PM indicates photomicrograph, and YYY is a cumulative number starting with 001). This means there is no direct, easy to recognize link between the datafile and what it contains. We could use Extensis type software, and ask everyone to enter sample #, thin section #, illumination, filters, and magnification into the keyword file, and the description into the description file. For each file, however, this requires opening three windows and typing in these by hand. In the "Administrator" mode, it is possible to create a set of demand fields to queue users as to required information, and even create easy to chose from lists of

metadata (which still require double-click & drag & select for each datatype), but it is not possible to force users to fill in these fields (or even select the proper windows) before the file is saved.

This has a high potential for errors and omissions. Even the spreadsheet is somewhat preferable to this. You can see all the cells on a single data entry screen, you can copy and paste between cells, and it is easier to pick out errors or missing metadata. Although checking the spreadsheet daily is a real chore, Jay's experience working with this software indicates that administering a database using only this software without error proof data entry protocols these packages offer little if any improvement over what we do now for data archiving, and in fact make it more challenging and time consuming.

If we try to use this software, then we will need to have a posted protocol that goes like this (assuming we have both MAC and PC versions of the software).

1) Open the existing catalog as View-List.
2) Save the digital image file from the PCs attached the cameras to the digital image server with a filename of the next consecutive number based on the list.
3) Add item to catalogue
4) Open Item properties/fields window and add metadata
5) Open Item properties/general window and add description
6) Save additions to database

So far, even with the relatively simple spreadsheet we have used, Jay has not been able to get shipboard personnel to use it consistently. They save one image file after another, lose track, and then any number of problems crop up. This will not change under the above scenario. At least under our current system these files are only saved to a temporary location. The biggest problem is security and the integrity of the original files. Ultimately what we need is some type of system where a file cannot be saved unless the associated metadata is entered and is correct to the best of our ability to keep it so. We can predefine lists of metadata for illumination, filters, magnification and this helps a bit, but frankly of these only magnification is critical. We need some way to link and verify sample numbers to thin section number (via Janus output?) which is a common area of errors. We also need to have the control that the file cannot be saved without the description completed. While there are several categories of participation with this software from read only to full administration, in order for a user to be able to perform the tasks listed above, they also have the ability to accidentally delete or rename the originals from the catalog. Since this catalog is the only link between the image number and its metadata, the potential for lost data is huge. It is also problematic with everyone having access to the original files which is required if all users have the ability to save originals to the server.

3) Using the files.
Either of these software packages would potentially make part of this step easier if we were licensed shipwide, had a dedicated server for digital image files, and had strict control over how files got into the database (naming and metadata convention). The catalogs do not access all the files directly, but work with thumbnails created when the database is saved. The software maintains a hard link to the original files, but keeps the thumbnails and metadata separate for rapid searching. To view, copy, or edit the original, the link to the storage facility must be maintained. We could potentially use this software to create a second catalog of enhanced images, if we could convince folks to enter the additional metadata on how the image was processed to reach the end result. What this does not provide for, however, is carry off access at the end of the cruise. Under our current system, the working files are .jpg files that can easily be copied and burned to a CD. While the thumbnail files are great, if our scientists do not have the proper software at home, these files are useless.

Bottom line is, for a single user with a consistent naming and filing convention this is pretty decent software. For a multiuser environment with constantly changing and unfamiliar users who do not have access to the software postcruise, it is no better (actually worse) for the administrator and users than our existing system, and probably much more difficult to enforce. For shipboard users, the thumbnail catalogs are a real plus, but metadata entry is more of a task than entering into a spreadsheet, and we all know how

well that goes over (see AppleCORE). Free access to the original files also puts us in jeopardy, but there is no way around this if we use this type of software.

Finally, just sending this software out to the ship only addresses part of the problem. The only way to utilize all the benefits of this software would be to have someone responsible as digital image database administrator. The files could all be saved to a temporary location, then the administrator would have to check all the files for consistency and accuracy, correct any errors, migrate the images and the catalog file to a secure location, copy the corrected catalog back to the user volume, and reestablish the links from the catalog software to the secure originals. These tasks could potentially take a few hours per day on a heavy use leg. These tasks cannot be assigned to the Staff Scientist. Jay has been spending at least a couple of hours per day (that takes away from other duties or more often just increases the workload) with the current administration method. This is a new task with the advent of digital photomicroscopy and requires allocation of new resources to make it work.

Curation

Curatorial Statistics

See attached figures/tables for FY00 activity.

The GCR received 9468 m of core from Legs 187-192, and had post cruise sampling activity for Leg 189, plus additional post cruise sampling from Leg 184. The BCR has maintained a relatively high level of activity because of interest in recent legs such as 175, 177 and 178, and 188. The ECR decreased in sampling activity in FY00, although part of its sampling total includes hundreds of large u-channel samples, which are becoming more commonplace. The WCR maintained a similar amount of activity as the previous year, although the overall number (1927) still remains low. Requests for non-destructive scanning of cores (e.g., MST, scanning XRF) are becoming more common for the BCR, ECR, and GCR.

The number of visitors at each repository reflects the large amount of sampling activity at the BCR. The ECR had a moderate number of visitors, and the GCR's number of sampling visitors reflects the fact that the GCR staff took a considerable number of samples for Legs 184 and 189 without scientists from those legs coming to visit. The WCR had only a few sampling visitors. However, the WCR has had more time to arrange and accommodate visits of educational groups. The GCR's high number of educational visitors is a result of two initiatives: one was a group of Texas middle school science teachers who came for a week-long science/technology intensive related to the Ocean Drilling Distance Learning Project, and the second was TAMU Dept. Geology & Geophysics Historical Geology students who are now regularly doing a lab exercise each semester which involves describing and interpreting ODP sediment cores.

The number of days to complete post moratorium requests shows that 50% of requests were filled within 2 weeks of the date of request, and 75% are filled within one month. The long tail on the curve is the result of several situations: (a) requests for large amounts of samples which the investigators took themselves, sometimes over several widely spaced visits to the repositories, (b) a museum request where the cores were requested more than a year before the museum’s exhibit hall was ready to receive the cores, (c) requests that were dependant upon an investigator scheduling a visit to sample themselves, (d) requests for several thousand samples, where the repository staff took and shipped subsets of the samples over a long period, because of short staffing.

Permanent Archive Sampling

Nine permanent archive sampling requests were received during FY00, of which 7 were approved. The 9 requests were from 11 investigators. Total number of samples taken for these in FY00 was 141, of which 99 were <2cc.

Museum Displays/Conference Displays

One new Museum loan was filled in Spring, 2000, when two cores were sent to the North Carolina State Museum of Natural Sciences. The cores represent basaltic basement and early post rifting sediment from the North Atlantic. Another Museum Loan is pending with the Indiana State Museum.

Two core replicas (of K/T Boundary and Cariaco Basin cores) were on display at the Dec. 1999 AGU meeting (FY00). Two boxes of sulfide core sections from Legs 139 and 169 were sent to Toronto for display during the annual Prospectors and Developers Association Convention.

Reprint Collection/Bibliography DB

The Curatorial Bibliographic Database is now current with all published ODP SR volume publications and with all received journal reprints entered into it. We are currently still re-establishing links (>50 % have been done) between publications and sample requests that were entered into the old S1032 database. When the old records were migrated into Oracle, these links were not transferred.

ODP Requests: 8860
ODP Requests/parts: 11080
Publications: 5262
Publications linked to one or more sample requests/parts: 2753
Requests linked to one or more publications: 2798
ODP SR volume publications: 2530

FY00 Curatorial Activity

BCR	Oct./Nov	Dec./Jan.	Feb/Mar	Apr/May	June/July	Aug./Sept.	Total FY00
Archives viewed/scanned	321	6	2	14	312	224	879
Samples Issued	3905	1866	3405	4978	6675	3371	24200
Number of Requests	22	17	21	17	38	15	130
Visitors							
Sampling Visit	25	12	4	5	20	6	72
Tour/PR Visit	6	11	5	1	52	3	78
Education Visit	0	0	0	0	0	0	0
Personnel							

ECR	Oct./Nov	Dec./Jan.	Feb/Mar	Apr/May	June/July	Aug./Sept.	Total FY00
Archives viewed/scanned	1	23	160	150	20	509	863
Samples Issued	1582	1717	1186	469	1988	177	7119
Number of Requests	22	14	13	9	22	6	86
Visitors							
Sampling Visit	6	2	6	4	12	2	32
Tour/PR Visit	0	9	5	0	19	0	33
Education Visit	0	0	10	1	0	50	61
Personnel			Gar Esmay sailed on Leg 189			Gar Esmay sailed on Leg 192	

GCR	Oct./Nov	Dec./Jan.	Feb./Mar.	Apr./May.	June/July	Aug./Sept.	Total FY00
Archives viewed/scanned	0	0	0	127	19	0	146
Samples Issued	6672	16320	4999	5137	3421	1177	37726
Number of Requests	27	51	33	25	24	22	182
Visitors							
Sampling Visit	11	12	2	6	3	5	39
Tour/PR Visit	0	0	45	8	11	8	72
Education Visit	0	0	22	241	21	0	284
Personnel		Bruce Horan sailed on Leg 187					

WCR	Oct./Nov	Dec./Jan.	Feb/Mar	Apr/May	June/July	Aug./Sept.	Total FY00
Archives viewed/scanned	0	0	0	0	0	0	0
Samples Issued	458	209	254	463	304	239	1927
Number of Requests	11	5	13	10	5	9	53
Visitors							
Sampling Visit	7	0	3	0	1	3	14
Tour/PR Visit	0	5	1	0	0	0	6
Education Visit	46	0	75	8	0	21	150
Personnel							

Total Repositories	Oct./Nov	Dec./Jan.	Feb/Mar	Apr/May	June/July	Aug./Sept.	Total FY00
Archives viewed/scanned	322	29	162	291	351	733	1888
Samples Issued	12617	20112	9844	11047	12388	4964	70972

Number of Requests	82	87	80	61	89	52	451
Visitors							
Sampling Visit	49	26	15	15	36	16	157
Tour/PR Visit	6	25	56	9	82	11	189
Education Visit	46	0	107	250	21	71	495
Personnel							

Ship Sampling	Leg 187	Leg 188	Leg 189	Leg 190	Leg 191	Leg 192	Total
Number of Requests	18	31	33	28	19	29	158
Samples Issued	1276	11021	29647	18410	2511	3246	66111

Total FY00	BCR	ECR	GCR	WCR	Ship	Grand Total
Number of Requests*	130	86	182	53	158	609
Samples Issued	24200	7119	37726	1927	66111	137083
Sampling Visitors	72	32	39	14		157
PR Visitors	78	33	72	6		189
Education Visitors	0	61	284	150		495

*some requests were sampled, and thus reported on, over more than one bimonthly reporting period. Also some requests were filled by more than one repository, and were reported in the activity of each repository. Actual total # of requests for FY00 is 585.

INFORMATION SERVICES UPDATE

Personnel

Ken Emery retired. His position was filled by Phil Gates. The new Information Services contact to SCIMP is the manager of Information Services, David Becker.

JANUS Applications Status

The bulk content of these tables may be found on the Web at:
http://janusaxp.tamu.edu/predef_queries/general/whiteboard_janus.shtml

Work in Progress

ID	Task Name	Phase	Area	Target Leg
12	Fix AppleCORE uploader	DevTest	Core Desc.	194
20	Fix Slider entry and bugs	Development	Core Desc.	194
1	Integrate hard-rock ICP data	Development	Chemistry	TBD
40	Deploy, test PC version of Coulometer	Development	Chemistry	194
16	Implement JRS (Java) on ship	DevTest	Curation	196
21	WCMST control data	DevTest	Phys. Props.	TBD
34	NGR data transfer	Development	Phys. Props.	194
35	WCMST threshold warnings	Assigned	Phys. Props.	TBD
38	MAD control measurements	UserTest	Phys. Props.	192
10	Implement bar codes	Development	All	TBD
14	Age-depth control points	UserTest	All	194
	Generic Editor	Analysis	All	196

Tasks Completed

ID	Task Name	Phase	Area	Target Leg
13	Fix Applecore batch export of core id's	Closed	Core Desc.	190
30	Applecore software bugs/upgrades	Closed	Core Desc.	On-going
26	Reformat gas element table	Closed	Chemistry	189
27	Reformat gas element graphs	Closed	Chemistry	189
31	Ensure IW upload on PC	Closed	Chemistry	190
32	Ensure CARB upload on PC	Closed	Chemistry	190
48	Correct GAS upload	Closed	Chemistry	190
28	Section breaks in Net query	Closed	Pmag	190
29	Create Net query for Zplot	Closed	Pmag	190
11	Upgrade "PWS"	Closed	Phys. Props.	191
19	Automated CR	Closed	Phys. Props.	
41	Implement updated MAD	Closed	Phys. Props.	192
33	Fix/create splice reports	Closed	All	188
	Generic Uploader	Closed	All	188
	BOL/EOL Synchronizer	Closed	All	188

Tasks Pending

ID	Task Name	Phase	Area
9	Downhole temperature collection	Open	Downhole
17	Downhole temperature in database	Open	Downhole
36	Implement alternate demag. Measurement types	Open	Pmag
15	TC user interface	Open	Phys. Props.
22	Implement PWS4	Open	Phys. Props.
37	TC data model	Open	Phys. Props.
18	Splice as query parameters	Open	All
39	Better integrate Splicer	Open	All

About these Task Lists

These tables show tasks assigned to the ODP applications development team of the Information Services Group. ODP staff members may acquire more task detail by clicking on a 'Task Name' link.
Progress on these development efforts is reflected in one of two ways-- via milestones or via a percentage completion flag. The 'Phase' column reflects the last milestone achieved. For tasks where work completed may readily be expressed quantitatively, a status is still assigned, but the percent complete is used to show progress.
The accepted milestones in ODP applications development efforts are:

- **Assignment**. A responsible person has been assigned to complete a task.
- **Analysis**. The problem is being studied. A written analysis and set of specifications is being generated.
- **Development**. A solution system is being prototyped. Initial system and process implementation happens during this phase.
- **Development Testing** (DevTest). An initial prototype system is available for demonstration purposes. Alpha testing.
- **User Testing** (UserTest). The system is sufficiently stable to deploy on end-user's stations. Beta testing. System scrutinized for completeness, correctness, and usability from an end-user perspective.
- **Deployment**. Initial deployment of product into production environment with the approval of the end-users affected and associated Lab Working Team.
- **Documentation**. User and technical documentation is being finalized for the deployed product.
- **Production**. The system is in continued production use. Applicable staff are being trained on the usage of the system.
- **Acceptance**. Verify with the applicable staff and lab working teams that the system is performing acceptably.
- **Closed**. The current development effort is complete. Additional issues and requests will be logged and handled as a new task.

History

The original task list came out of extensive discussions and review internal to ODP. To better advise internal and external personnel of continuing changes, the task list has been moved to a database accessible via the Internet. At present only this task list overview is publicly provided. Detailed sub-task and action items recorded are available only for in-house reference.

.

Lab Working Teams Legend

Abbreviation	Descriptions
ADMIN	Administrative ODP Functions
BIO	Microbiology
Core Desc.	Core Description
Chemistry	Chemistry Fluids & Solids (AllRF/ICP/AllRD)
COMP	Computers/Communications
Curation	Curation and Sampling
DA	Depth and Age
Downhole	Downhole Measurements
DOPS	Drilling Operations
PAL	Micropaleontology
Pmag	Paleomagnetics
Phys. Props.	Physical Properties
UND	Underway Geophysics
All	Cross-Lab Miscellaneous Issues

Data Migration

The projects to migrate old ODP data (Legs 101-170) to the Janus database have been progressing very well. Two data migration projects are active at this time, (A) MST and Color Reflectance data migration, and (B) Physical Properties and Paleomag data migration.

(A) 95% of the MST and Color Reflectance data migration has been completed. We are currently working to migrate the remaining 5% MST data, checking all the migrated data, consolidating the raw files, merging the data migration code, and completing the project report. We expect to complete this migration project by August 2001.

(B) The migration of physical properties data started in December 1999. It includes Moisture & Density (formerly known as Index Properties), Thermal conductivity, PWS, Shear Strength and Paleomag. We expect to complete this project by December 2001.

Please see the attached Excel file for details of the status of these two data migration projects.

Status of data migration

Start Date: September 1998 Current: **October 2000** Target Completion Date: August 2001

Leg / Data	170	169	168	167	166	165	164	163	162	161	160	159	158	157	156	155	154	153	152	151	150	149	148	147	146	145
GRAPE	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	o	x	x	x
P-Wave	x	x	x	x	x	x	x	o	x	x	x	x	x	x	x	x	x	o	x	x	x	x	o	x	x	x
MagSus	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	o	x	x	x
NGR	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	o				1				
Color Reflectance	x	x	x	o	x	x	x	o	o	x	x	x	o	x	x	o	x	2								

Leg / Data	144	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129	128	127	126	125	124	123	122	121	120	119
GRAPE	x	x	o	x	o	x	x		x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x
P-Wave	x	x	o	x	o	x	x		x	x	x	x		x	x					x	x	x	x	x	x	x
MagSus	x	x	o	x	o	x	x	x	x	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
NGR																										
Color Reflectance																										

Leg / Data	118	117	116	115	114	113	112	111	110	109	108	107	106	105	104	103	102	101
GRAPE	o	x	x	x	x	x	x	x	x	O	x	x	o	x	x	x	o	x
P-Wave	o	x			x	x	x	o	x	O	x	o	o	o	o	o	o	o
MagSus	x	x	x	x	x	o		x	x	O	o	x	x	x	x	o	o	o
NGR																		1
Color Reflectance																		2

Legend:

- x Migration to Janus database completed
- o Data not acquired by ODP
- 1 NGR acquisition started Leg 150
- 2 Reflectance acquisition started Leg 154

Magsus Leg 101-132 in S1032

Completed = 197 = 93 %

Remaining = 14

Oct.2, 2000

Janus database Mirror Sites

In May 2000 Martin Cepek of the University of Bremen requested help in establishing a Janus database Mirror site at the University of Bremen. Setting up a Janus database mirror site will require a significant amout of work both for us and for the host institution. We have sent him some start up information, but have not sent any data as yet. We need advice from SCIMP at 2 levels:

(A) Is this an official request approved by the JOIDES panel structure? Should we move forward in fulfilling this request or not?

(B) The proprietary and sensitive nature of some data stored in the JANUS database require that those data are not transferred to mirror sites. In order for the relational character of the database to be viable and allow web queries to work at the remote locations, additional time and effort will be necessary to prepare the database export files that will be used to build mirror site databases.

There are three types of data that comprise the proprietary and sensitive data.

Scientist name, and contact information. Scientist name and contact information will not be released, as it is published ODP policy that personal information will not be distributed to any outside parties.

Sample Request - scientist's proposed research. The sensitive nature of the proposed research is time dependent and should become part of the public database after the publication goal date has been reached.

Leg-specific scientific data within the one year moratorium period. These leg data are released to the public at one year after the end of the cruise.

These considerations will impose a penalty in terms of personnel time and effort. Instead of just dumping the whole Janus database to an export file, each table must be culled for data that should not be made public. Some scripts that have already been written can be modified to accomplish this task, and a few more scripts will need to be written. To finish these scripts and create a mirror site database will take approximately two dedicated months of an FTE. Doing this work will negatively affect our on-going efforts towards data migration.

We need SCIMP advice on which of the above proprietary and/or sensitive data must be protected, and at what priority should we do this additional work to set up a JANUS database mirror site?

DRILLING SERVICES UPDATE

Rig Instrumentation System (RIS)

The purpose of the Rig Instrumentation System (RIS) is to improve the quality and quantity of core recovery by virtue of improved decision making with the aid of RIS data. The system was installed during dry dock and displays and records data from the various rig sensors, measurement while drilling (MWD) transmissions, ODP/TAMU measurement systems, and third-party systems.

RIS is operating to specification, and its documentation is complete. Hardware is being acquired to allow the driller's RIS screen to be broadcast over the ship's TV network.

The instrumented load pins are installed and functioning properly. The installation was completed during the Leg 192 port call, and RIS was set up to calculate weight on bit (WOB) from the load pin measurement. A meeting was held with M/D Totco to discuss the instrumented load pin reliability problem. A newly installed load pin failed within hours of installation during Leg 190. M/D Totco agreed to supply ODP with the diagnostic procedures to trouble shoot and repair the load pins onboard the ship and to sell spare electronic modules to support the repair effort.

The addition of an Active Heave Compensator (AHC) has increased the need for a stable hook load measurement. The dynamic effect of AHC operation renders the hook load signal from the crown-mounted load cell unreliable. A WOB filter is being developed that can electronically filter the dynamics of the top-drive and AHC. A beta version of the WOB filter software was developed during Leg 191. Implementation of the filter and the addition of a WOB digital meter output will occur during the Leg 195 port call.

The driller's instrumentation panel is being reconfigured to improve the driller's view of the data. The primary change consists of moving the AHC display to the front. The new panels and additional hardware were shipped to the Leg 193 port call for installation during the transit to Townsville at the end of the leg. The WOB meter will be added to the console when the digital filtering scheme is implemented during the Leg 195 port call.

RIS received and recorded real-time transmissions from an MWD tool during Leg 188. An RS422 cable was run between the RIS master computer in the server room to the Schlumberger Anadrill unit in the LDEO Downhole lab. Two-way communication was established using Well Site Information Transfer Standard (WITS) protocol. The WITS link between the RIS and Anadrill data acquisition systems was used while drilling two MWD/logging while drilling (LWD) holes. RIS received the Anadrill rig sensor data (time stamp, hook load, bit position, standpipe pressure, rate of penetration [ROP]) as well as the sensor data from MWD transmissions (WOB, torque on bit [TOB]) at a 2-second data rate. RIS sent Anadrill the ship's motion data (heave, roll, and pitch) at a 2-second data rate. This was the first time that MWD was used in an ODP borehole, and the first time real-time downhole data was displayed alongside real-time surface data in the driller's cabin.

APC Temperature Tool and WSTP

The purpose of this project is to find alternative support for the APC Temperature tool and WSTP electronics since the original supplier, Adara Systems, discontinued support.

Blue Mountain Instruments (BMI) was selected to provide repair and calibrations services for the APC temperature tool and WSTP data logger. BMI is also compiling all software source code and drawing files (i.e., compiling a technology transfer package) held by Adara Systems, which they will deliver to ODP. A portion of these files has been received.

Six thermistors for the WSTP were purchased and sent to the ship. Instead of purchasing a low temperature and a high temperature thermistor, a single thermistor was bought, which can operate over the full WSTP temperature range by using two calibration coefficients.

APC Methane Tool

The purpose of the project is to monitor the effects of gas loss in cores from the time the core is cut until it reaches the deck. This is done by recording temperature, pressure, and conductivity in the headspace at the top of the core with sensors mounted in the APC piston head. In situ concentrations of methane can then be calculated from the data.

The APC Methane tool is being developed in concert with Charlie Paull and Bill Ussler of Monterey Bay Aquarium Research Institute (MBARI). The sensor development is being done at MBARI, whereas the electronics and packaging is being done at ODP/TAMU.

The ODP/TAMU APC Methane tool development schedule was delayed due to Derryl Schroeder and Mike Friedrich's involvement with commissioning the Rig Instrumentation System and Active Heave Compensator. Because of this delay, the ODP/TAMU engineering group is repackaging the MBARI acquisition electronics, instead of using the ODP DAS (in development) into the APC piston. Prototype testing is targeted for Leg 195 and operational deployment is targeted for Leg 199.

A design review meeting with MBARI was conducted on 29 August, where the mechanical packaging concept for the MBARI acquisition electronics and the sensors was approved. Six modified MBARI acquisition electronics were ordered by ODP. Another design review meeting with MBARI was held on 25 October, where the sensors for the APC piston were selected. MBARI placed orders for six of each thermistor probe, pressure transducer, and conductivity sensor.

Downhole Measurement Technology

The purpose of this project is to provide centralized support for ODP/TAMU downhole measurement tools, as well as develop and acquire new measurement tools for improved science. A major part of this effort is to create a commonality in data acquisition and support software for all downhole measurement tools. This will be applied to current operational tools, third party tools and future tools. A service center has been set up to provide centralized documentation control, inventory control, technical support, and orderly implementation of upgrades and changes. Initially, the five tools being included in this project are the APC Temperature tool, the WSTP, the DVTP, the APC Methane tool and the Memory Drilling Sensor Sub.

Fugro's Piezoprobe pore pressure tool and Hydraulic Fracture Tool (HFT) were evaluated for deployment in ODP bottom hole assemblies (BHA). Fugro and ODP engineers concluded that both tools could be adapted to APC/XCB BHA without compromising the coring operation.

An adjunct to the downhole measurement tools is the Rig Instrumentation System. Rig Instrumentation deals primarily with data acquisition from surface measurements that provide information about downhole conditions. This system will become more coupled to downhole measurements with the deployment of the Drilling Sensor Sub.

Davis/Villinger Temperature Probe (DVTP)

The purpose of this project is to adopt the Davis/Villinger Temperature Probe (DVTP) as an operational ODP tool.

All of the existing DVTP documentation is collected and centralized in DSD's library. Ninety percent of the mechanical and electrical drawings are integrated into ODP's drawing system. The overall assembly and the electrical assembly drawings are 75% complete.

ODP is working with Earl Davis of Pacific Geosciences Center, Canada to help integrate the pore pressure measurement into the DVTP tool. The prototype tool was deployed on Leg 190 and run 12 times. The pressure data response curve appeared to be credible on all but the last two runs, which was attributed to bottom-water infiltration. The final report is pending. The tool was shipped back to College Station at the end of Leg 190 for inspection and refurbishment. It experienced significant corrosion in the pressure transducer region. Modifications will be made to alleviate this problem as well as address some assembly difficulties. The next leg deployment of the DVTP-P will be determined by science requirements.

A beta version of DVTP Comm, which is a LabView based communication and data reduction program, is on the ship and operational. This program takes the user through all steps of setup, run, and data recovery for the DVTP. A final version of DVTP Comm will be installed at the Leg 194 port call. APC Temperature and WSTP will be included in an expanded, comprehensive version of this software.

Two new DVTP's are being procured. The data loggers for the new tools allow for upgrading so that they can handle the addition of the pore pressure measurement. This will provide for the DVTP stock to have two standard DVTP's and two DVTP's with pore pressure.

Memory Drilling Sensor Sub

The purpose of this project is to operate a Memory Drilling Sensor Sub (DSS) near the bit. The DSS will provide data to improve the understanding of the dynamic forces at work downhole and to quantify the impact of heave and surface inputs (torque, weight, rpm, and flow rate) on coring performance. The DSS will be a short 8-1/4 in OD collar with a 4-1/8 in through-bore to allow for core retrieval. It will be positioned in the BHA on top of the outer core barrel.

A demonstration test of a commercial sensor sub was run using an Anadrill measurement while drilling (MWD) system on Leg 188. The Anadrill MWD tool had weight-on-bit and torque-on-bit sensors. The test successfully demonstrated the practical application of the DSS, especially when data is transmitted in real time.

The procurement of DSS is divided into two parts, (1) downhole electronics and (2) sensor/sensor body. The downhole electronics have been sourced. The sensor/sensor body will be sourced after competitive bidding among engineering/sensor companies. The sensor/sensor body development will be in two phases. Phase I consists of the preliminary design where the fabrication methodology is determined and manufacturing specifications are produced. The deliverables of Phase I will be a detailed design layout, load and stress analysis, material specifications, expected sensor accuracy, testing and calibration requirements, and an estimate of time and cost to complete Phase II. The companies will bid on Phase I work and one will be selected. Phase II will build on the Phase I engineering work and produce the first article for testing. Phase II work will be competitively bid using the Phase I document as the starting point.

Scheduling of this tool was delayed because of the ODP/TAMU project manager's involvement with commissioning the rig instrumentation system.

Active Heave Compensator (AHC) operational review

The AHC was designed and installed to minimize the absolute motion of the drillpipe relative to the seafloor over the full range of sea-states and compensator stroke.

The AHC equipment has far exceeded the contract Statement of Work (SOW). The SOW required 90% average efficiency at 4-ft/sec vertical ship velocity. There has never been less than 92% efficiency reported and several occurrences of 96-98% efficiency with 4.3-ft/sec vertical ship velocity. The system is capable of 5-ft/sec vertical ship velocity.

The AHC controls the absolute drill string motion to within 4-in. relative to the seabed. This has been demonstrated even with 12-ft to 14-ft of absolute ship motion (approximately 20-ft seas). The best efficiency documented for the Passive Heave Compensator (PHC) is 80%, which would correlate to 2.4-2.8 ft of absolute drill string motion.

Weight Indicator Readings & AHC Weight on bit bias force

The inertial effects of the travelling block have historically imparted a dynamic force into the crown-mounted load cell, which is exhibited by needle bounce on the Martin Decker weight indicator. The inertial effects of the travelling block responding to the ship's motion has been measured as creating a 5,000-10,000 lb. variation in WOB on the Martin Decker gauge.

With the addition of the AHC, the AHC dynamic forces required to maintain the 4-in. absolute drill string motion are superimposed at approximately 50 hertz on the Martin Decker (MD) Weight Indicator. As a result the MD needle bounces around, to the point of being unreadable by the Driller.

AHC WOB Bias Force

Because of the AHC dynamic forces Maritime Hydraulics (MH) added an algorithm to the operational software to obtain a usable AHC WOB. The algorithm performs a simple average of the AHC hydraulic forces over a 30-second period. The output of this function is the so-called AHC WOB Bias Force, which is updated each second, but exhibits a lag since it is the average over the previous 30-seconds. This is the best approach until the filtered WOB circuit can be implemented.

The Driller creates a quasi-WOB with the AHC by stroking-out (bleeding-off) the PHC while the AHC is in the landing mode. The AHC is designed to minimize the absolute motion of the drill string with the PHC set at a mid-point. When the PHC stokes out the AHC applies a force to lift the drill string back to its set mid-point. This is seen on the AHC driller console as a minus force (bias) or AHC WOB Bias Force. When the Driller does set the drill string down on the seabed, he maintains the AHC WOB Bias Force at zero value with the brake, thereby establishing a WOB equal to the bias force.

If there are motions at the bit that are much slower than the 30-second period the real time conditions at the bit will be averaged and not considered in the calculation by the MH algorithm, which is displayed as the AHC WOB Bias Force.

Weight on Bit Filter

The Active Heave Compensator (AHC) has elevated the need for a reliable and stable hook load measurement.

With the addition of AHC and its rapid (20 msec) response the hook load signal from the crown-mounted load cell has become unusable. The driller is unable to effectively control the weight on bit due to excessive gauge needle bounce. The AHC Project Manager sailed on Leg 191 to develop a WOB filter, which can electronically filter the dynamics of the ship and derrick travelling equipment. Sensors were installed on the top-drive and the derrick (travelling block equivalent accelerations) to measure the dynamic forces, and a computer program was written to record, analyze and model the dynamic forces. A beta version of the WOB filter software was developed during Leg 191.

The WOB filter will be implemented during Leg 195 port call. The installation includes permanently mounting a sensor module on the top drive and a sensor module on the drill floor. Both modules consist

of acceleration sensors and a controller. A radio transmitter in the top drive module will send acceleration data to the drill floor module, which will process the data and send the filtered data to the two new digital gauges in the console and to Rig Instrumentation System for recording.

Driller's Console
The implementation of the WOB filter is being carried out in conjunction with the installation of instrumented load pins on the hook and reconfiguration of the Driller's console for improved visibility by the Driller of the AHC driller console. The load pins were installed for Leg 192 to provide a more stable WOB measurement. Because the load pins are mounted at the hook the dynamic effects of the travelling block are reduced compared to the reading from the hydraulic load gauge in the crown (water table).

The WOB filter can be applied to either the instrumented load pin signal or the hydraulic load cell signal. The new Driller console will feature the AHC display in front of the driller for easier viewing and operation. Space has been provided for installing two digitally driven gauges to display filtered hook load and filtered WOB. The console panel will be installed during Leg 194 port call.

AHC Hydraulic Umbilical
Dynamic interference between the new AHC service loops and the existing PHC and top drive service loops caused significant wear within the AHC bundles at several places during Legs 188 through 190, to the extent that the AHC service loop was replaced at the Leg 191 port call. The spare service loops were reconfigured by the ODP Project Engineer to reduce the causes for wear. The worn bundle was considered to be unsalvageable and discarded at the Leg 191 port call. The hydraulic umbilical was inspected during Leg 193 and found to be without any similar wear problems.

Advanced Diamond Core Barrel (ADCB)

The scientific goal of the ADCB was to improve core recovery in fractured hard rock.

The ADCB Project goal was to adapt existing mining technology's thin kerf concept and to utilize "off the shelf" hardware where possible. The resulting thinner kerf bits would cut less rock and in turn reduce the amount of potential disturbance that the formation sees while coring. The ADCB Project will provide ODP with a "PQ" mining style, thin-kerf diamond coring system.

A second land test of the ADCB in early June 2000 allowed all the new components to be tested as a system. The new hardware included the positive indicator latch, shock sub, circulation sub, and split steel liners with the PQ-3 style bits. Forty core runs were made over a 3.5-day test period with an overall core recovery of 86%. All of the hardware operated successfully. Information obtained from this second field test will be incorporated into the Draft ADCB Operations Manual.

The new positive indicator latch worked perfectly every time it was deployed. The compression spring in the latch was operated over the full range of settings to ensure that there were no downside effects from higher-pressure settings. Two miss latches were observed. These were caused by core left in the bottom of the hole and had nothing to do with the performance of the latch.

The Shock sub was operated behind the core barrel during more than half the core runs. We realize that land drilling probably would not demonstrate any significant difference in core recovery whether the sub was in the string or not. Operating with the sub was done to ensure that it could withstand the rigors of actual drilling without any detrimental effect to the coring operations.

Poor hole conditions caused the circulation sub to be tested near the surface only. The circulation sub ports opened as designed when the drill string pressure reached the cracking pressure on both tests. The cracking pressure of the circulation sub was set at the lowest pressure of 850-900 psi. The circulation sub was removed from the drill string after initial tests confirmed it worked as tested in the laboratory.

The split steel liners were run with the PQ-3 bits during the last eight runs and showed improved recovery over runs without the liners with the same PQ-3 bits. Based on the observations, it was recommended that the ADCB be operated in the PQ version with the split steel liners unless friable or granular material was being cored.

The mid-body inner barrel stabilizer could not be used during the land tests. We learned that a retainer ring was needed behind the inner barrel stabilizer to prevent the stabilizer from pulling out of its cavity during inner barrel retrieval. On two occasions, the stabilizer was lifted out of its cavity and rotated inside the outer core. This prevented the inner barrel from landing correctly. For the remainder of the test program, the inner barrel stabilizer was not used and no detrimental effects were noticed.

The new float valve design was not evaluated during this test. The float valve interfered with the initial make-up of the core barrel when the lower stabilizer did not screw onto the core bit. The ADCB Project Manger learned that the float valve was designed by the vendor for a standard 5-1/2" F.H. connection and not the modified 5-1/2" F.H. connection which is 1 in longer. A new float valve design will be made and tested on the next deployment of the ADCB.

The ADCB Project Manager assisted the Japan Drilling Company (JDC)/JAMSTEC in a controlled laboratory testing program of the Japanese Small Diameter Rotary Core Barrel (SD-RCB) which is very similar to the ADCB system. This testing program occurred in late September at Terratek's facility in Salt Lake City, Utah. ODP provided the majority of the ADCB hardware to the JDC for this test program. Several tests were performed both under atmospheric and pressure conditions. JDC was very encouraged by the results of the ADCB (SD-RCB) over several of the other coring systems being evaluated. The ODP provided ADCB equipment was shipped directly from Salt Lake City to Guam for the Leg 193.

Based on the testing results, the ADCB Project Manager purchased seven PQ size impregnated bits for testing on Leg 193. These impregnated bits are designed to cut soft, medium and hard formations. The ADCB will be used extensively on Leg 193, if the rate of penetration, core recovery, and bit life meet or exceed the existing RCB system. Other parameters that will effect the ADCB success are the sea states, the operation of the Active Heave Compensator and the ability to maintain a constant Weight-on-Bit.

The ADCB will also be tested on Leg 194 with the PQ-3 style bit. This new bit is a Polycrystalline Diamond Compact (PDC) design that is similar to a JDC bit tested in Salt Lake City. This bit is expected to have higher penetration rates and be more suitable to the formations on Leg 194.

Draft copies of the Phase II Field Report and the ADCB Operations Manual were circulated for comments and review within the department. The Phase II Field Report should be completed in October 2000. The ADCB Operations Manual will be updated during Legs 193/194 and be ready for final review by February of 2001.

As a part of the development vision in the ODP Long Range Plan, the next phase of the ADCB is the development of a retractable bit. This ADCB retractable bit (Retractabit) development phase is dependent upon future funding for this technology. This project has been described as innovative work that could rewrite the chapter on offshore coring tools.

The Retractabit program is a natural continuation of the ADCB development program. Successful development and demonstration of the retractable bit will open new doors for science coring for year to come.

Hard Rock Re-entry System (HRRS) Project

The scientific goal of the HRRS has been the development of a cased reentry system for unstable surface formations of fractured hard rock and pillow basalt. The objective has been to develop a system that would allow the emplacement of a reentry funnel and surface casing on the seafloor where conventional casing,

hard rock guide bases and standard re-entry cones can not be used. The HRRS project goal has been the development of downhole fluid hammer drilling technology with a nested drill-in-casing system.

Land testing of the HRRS prototype bit designs was completed in February 2000. A report was completed in May 2000 that discusses the three land tests on the bits and hardware. The report has been classified as confidential due to confidentiality agreements with the vendors.

To support the sea trails on Leg 191, ODP purchased eight bits based on four different bit types. These bits are a combination of new and refurbished prototype bits. These bits have been developed and improved over the last two years to be more robust than the bits tested on Leg 179. The bits have been redesigned for an improved bare rock spud.

ODP purchased additional support equipment for the Leg 191 sea trials, including bit breakers, stabilizers, hammer components, and various subs. SDS completed machining, inspection and bench testing of the bits and support equipment in June 2000. The HRRS Project Manager witnessed the final assembly of the bits in Australia. The hammer bits, fluid hammers, and ancillary equipment were shipped to Yokohama for Leg 191.

ODP purchased a pulsation sub from Houston Engineers in Houston, Texas. The pulsation sub was completed in June 2000. The ODP Project Manager witnessed the final assembly and testing of the pulsation sub at the Houston Engineers facility.

The HRRS equipment and hardware were ready for Leg 191 sea trials during the last 12.5 days. Unfortunately, the HRRS testing was postponed to the last seven days due to severe weather delays to avoid approaching typhoons, one emergency medical evacuation, and downtime/transit for drawworks repair parts. With limited time, both the original and alternate HRRS sites at Shatsky Rise were canceled. Two new sites (ROTA-1 and Mariana Back Arc) were selected that were closer to Guam.

Three potential drill sites were identified from a 3.5 kHz seismic survey at ROTA-1. These sites were abandoned after 20 hours because the seismic reflection of a hard bottom turned out to be a soft ash-covered seamount and not hard rock. The soft materials allowed the hammer to penetrate up to nine meters under its own weight without rotation and with a pump jet force of only 100-200 gallons per minute. The soft material would close around the HRRS tools and cause a loss of circulation. The fluid hammer never encountered sufficient hard rock to operate properly in any of the six test holes at ROTA-1.

A second site, Marina Back Arc, was hastily selected with limited information. The 3.5kHz seismic survey data indicated that volcanic lava flows were present at the seafloor. The vibration-isolation television camera confirmed the seafloor hardness during two jet-in tests (without rotation) to a maximum penetration of two meters. After removing the VIT camera, two holes were spud with the dual cam underreamer bit to 5 meters and 3.5 meters with penetration rates of 3.2 and 4.7 meters per hour. The drill string was round tripped to change from the dual cam underreamer bit to the flat-faced underreamer bit. Three holes were spud with the flat-faced underreamer bit to 4.5 meters, 7 meters, and 5 meters with penetration rates varying from 2.7 to 9 meters per hour.

Both sites used less than five days to test the HRRS bit designs. There was insufficient time remaining in the last two days to complete the next step in the HRRS testing program. This step required deploying an umderreamer type bit with the 13-3/8" drill-in casing. The remaining time was insufficient to make up and test the HRRS running tool hardware, space out the casing, perform the drill-in operational test, and retrieve the HRRS tools back on board the drillship.

At the conclusion of Leg 191, many of the test objectives for the HRRS project were not completed. The HRRS is currently available for use on Leg 193 for bare rock spuds in hard volcanic rocks to drill in a short string of casing. The HRRS equipment was stored in Guam and will be loaded on the drillship for Leg 193.

The future of the HRRS Project is dependent upon the level of funding that is available through the end of the program. Future use of the HRRS technology, casing equipment, bits, and hammer rental could be included in the DSD operating expenses under specific leg costs. At this time, no funding is planned for the HRRS project for the remainder of the ODP Program.

As a part of the vision of the ODP Short Range Plan, the HRRS Project could deploy of a smaller fluid hammer that could offers several new opportunities to increase operational efficiency. The smaller fluid hammer could be used for hole opening operations, drilling instrumented sections such as for ION holes, and assisting in setting conventional casing through deep unstable formations which are susceptible to bridging.

It is also envisioned in the ODP Long Range Plan that a nested casing system would be developed upon the successful demonstration of this technology through Legs 191 and 193. The nested system would allow a smaller second casing to be run independently or nested inside the first casing string.

PUBLICATION SERVICES UPDATE

Volume Production

From July through November 2000, the following ODP *Proceedings* volumes were produced and distributed:

Initial Reports
Booklet/CD-ROM: 185 (Sep 2000), 186 (Aug 2000)
Web (PDF and HTML): 185* (19 Sep 2000), 186* (28 Jul 2000)

Scientific Results
Booklet/CD-ROM: 167 (Jul 2000), 168/169S (Aug 2000), 169 (Oct 2000)
Web (PDF and HTML)†: 167 (31 Jul 2000), 168 (4 Aug 2000), 169S (8 Aug 2000), 169 (15 Apr 2000), 170 (30 Jun 2000), 171A (2 Aug 2000), 171B (4 Jul 2000), 172 (1 Sep 2000), 173 (3 Oct 2000), 174A (29 Sep 2000)

From December 2000 through June 2001, the following ODP *Proceedings* volumes are expected to be produced and distributed:

Initial Reports
Booklet/CD-ROM: 187 (Jan 2001), 188 (Mar 2001), 189 (Jun 2001)
Web (PDF and HTML): 187* (Mar 2000), 188* (May 2001)

Scientific Results
Booklet/CD-ROM: 170 (Feb 2001), 171A (Dec 2000), 171B (Feb 2001), 172 (Apr 2001), 173 (June 2001)
Web (PDF and HTML): 174B (first paper Dec 2000), 175 (first paper anticipated 2001), 176 and beyond: chapters will be published on Web after manuscripts have been accepted and processed for publication.

Update on the New-Format *Proceedings* Publications

It has been 18 months since the first new-format *Initial Reports* (IR) volume was published and eight months since the first *Scientific Results* (SR) paper was published on the Web for Leg 169. The overwhelming feedback we have received about the new publication formats has been positive, although it is clear that some authors will always prefer printed books to electronic publications, especially those who want to compare data from two or more volumes simultaneously.

The consensus among ODP community scientists is that given the constraints of the ODP Publications mandate and current technology, they are pleased with the cross-media publication formats we have produced. Authors are recognizing that electronic publication formats allow the utilization of publication features unavailable in printed books (e.g., unlimited color figures, video clips, high-resolution color plates, and large data sets). In addition, having the volumes available in cross-media electronic formats has given users much greater flexibility in how they can use the volume material (e.g., copying text, data or figures; searching text; linking to other resources) and transportation and storage of volumes is no longer a problem. The move to electronic publications has also enabled ODP to increase the distribution of the *Proceedings* throughout the world, as online volumes provide readers with 24-hour access to the materials from anywhere in the world where there are Internet services.

To date, three SR volumes are complete on the Web (169, 170, 171A), and the associated booklet/CD-ROM products are being produced or distributed. As of 20 November 2000, 41 papers have been

---

* PDF and/or ASCII versions of all materials published on the volume CD-ROM become available initially on the Web; HTML versions of chapters become available as soon as the material is formatted

† Dates represent the date the first paper in the volume was published on the Web.

published on the Web for SR volumes 169 through 174A. On average, papers were published 44 months postcruise, or four months before the booklet/CD-ROM was distributed. For the last four volumes in production (171B through 174A), the first papers for each volume were published between 38 and 41 months postcruise, or 7 to 10 months before the distribution date for the booklet/CD-ROM.

ODP *Proceedings* Web Site User Statistics

There are now 26 IR volumes and 28 SR volumes on the Web. Between November 1999 and October 2000, an average of 31 unique users have accessed each IR volume every month (see Table 1). The actual number of unique users per volume per month ranges between 8 (IR 174AXS, November1999) and 112 (IR 185, October 2000). Overall site access per volume has increased by 60% between November 1999 and October 2000. In November 1999, an average of 12 unique users accessed each IR volume; in October 2000 the average number of unique users increased to 41 per IR volume.

Table 1. *Initial Reports* Volumes Web Site User Statistics*

Volume	Nov 99	Dec 99	Jan 00	Feb 00	Mar 00	Apr 00	May 00	Jun 00	Jul 00	Aug 00	Sep 00	Oct 00	Web Publication Date
166	32	41	34	27	44	44	57	44	34	36	44	52	1 Oct 1997
167	27	20	37	37	36	29	52	38	25	41	45	41	13 Feb 1998
168	23	19	33	22	26	19	23	32	20	32	35	29	23 Feb 1998
169	39	33	37	41	39	29	33	27	21	24	35	35	17 Apr 1998
169S	14	19	25	32	18	16	17	24	20	23	23	26	10 Apr 1998
170	20	25	27	25	21	23	33	37	28	29	28	34	24 Apr 1998
171A	22	18	23	23	20	16	20	29	25	26	31	32	26 June 1998
171B	31	20	31	31	31	24	1	30	24	31	1	26	26 June 1998
172	18	19	36	29	26	26	25	25	23	36	43	37	31 July 1998
173	22	19	29	16	18	22	25	31	23	23	31	33	4 Sept 1998
174A	36	14	21	22	17	25	24	28	28	27	36	31	31 Dec 1998
174B	17	20	16	16	12	13	18	20	17	16	26	22	31 Dec 1998
174AX	20	11	25	16	12	14	19	22	17	17	28	32	31 Dec 1998
174AXS**	8	21	32	27	18	17	18	17	121	3	22	27	28 Dec 1998
175	22	27	29	28	35	25	21	27	26	42	40	50	9 Feb 1999
176**	25	20	18	13	19	25	18	27	26	26	30	33	30 June 1999
177**	50	26	33	40	30	24	49	57	52	31	39	46	28 May 1999
178**	29	31	37	39	37	26	38	39	53	52	39	51	31 Aug 1999
179**	36	44	37	36	18	30	27	25	30	19	29	34	23 July 1999
180**				38	63	44	46	30	31	29	43	39	4 Feb 2000
181**							42	33	39	36	28	33	12 May 2000
182**							42	38	28	20	32	57	26 May 2000
183**								45	40	23	61	44	9 June 2000
184**								42	63	40	60	46	12 June 2000
185**											50	112	19 September 2000
186**									34	57	86	73	28 July 2000

* = numbers indicate hits to the entry page of each volume. = volumes are only in PDF format. ** = volumes posted initially in PDF format and subsequently in HTML format.

Between November 1999 and October 2000, an average of 63 unique users have accessed each SR volume every month (see Table 2). The actual number of unique users per volume per month ranges between 15 (SR 159T, December 1999) and 160 (SR 160, October 2000). Total access to SR volumes increased by 54% between November 1999 and October 2000. However, the average number of unique users per volume decreased during this time because ODP began to publish papers individually beginning with SR 169, and as a result the newer volumes contained fewer chapters because they were not complete (in November 1999, an average of 93 unique users accessed each SR volume; in October 2000 the average number of unique users decreased to 61 per SR volume). Also, some of the first volumes published in the new format contained relatively few chapters (see Table 3).

Table 2. ***Scientific Results*** **Volumes Web Site User Statistics***

Volume	Nov 99	Dec 99	Jan 00	Feb 00	Mar 00	Apr 00	May 00	Jun 00	Jul 00	Aug 00	Sep 00	Oct 00	Web Publication Date
150X	58	42	63	61	63	57	53	58	40	62	60	64	7 Aug 1998
152	98	65	75	87	76	64	78	65	47	58	84	102	8 July 1998
154	93	65	82	78	78	80	116	67	46	58	72	78	1 Oct 1997
155	86	72	101	80	103	66	73	87	53	69	70	100	15 May 1998
156	59	46	64	55	70	53	49	59	46	55	74	64	21 Aug 1998
157	98	70	80	79	75	64	62	60	46	45	52	80	14 Aug 1998
158	66	65	68	65	77	52	71	56	43	50	56	66	15 May 1998
159	96	73	82	65	62	46	70	64	44	53	74	79	31 Dec 1998
159T	30	15	26	19	22	20	33	35	21	25	36	38	31 Dec 1998
160	144	124	118	131	145	97	122	113	94	99	133	163	9 Nov 1998
161	86	88	88	98	80	68	79	79	65	58	81	89	19 Mar 1999
162**	50	44	47	46	58	37	45	37	25	36	49	34	20 Aug 1999
163**	62	38	68	63	60	51	50	40	29	21	34	36	19 Sept 1999
164							70	87	48	59	43	48	19 May 2000
165							34	57	55	34	45	50	26 May 2000
166							43	90	60	35	47	44	29 May 2000
167									31	55	68	54	31 July 2000
168										54	71	43	4 August 2000
169						25	62	77	71	61	77	41	15 April 2000
169S										50	46	34	8 August 2000
170								30	41	52	75	64	20 June 2000
171A										49	37	46	2 August 2000
171B									53	72	55	39	4 July 2000
172											84	40	1 September 2000
173												34	2 October 2000
174A											10	48	29 September 2000

Notes: * = numbers indicate hits to the entry page of each volume. = volumes are only in PDF format. ** = volumes posted initially in PDF format and subsequently in HTML format. = volume will be published chapter by chapter in the order of acceptance in both PDF and HTML formats; date indicates when first paper was published.

Leg-related Citations

During Legs 160 through 175, authors were permitted to fulfill their ODP publication obligation by either *submitting* a manuscript to a peer-reviewed journal that is published in English, or a paper or data report to the *Scientific Results* (SR) volume. Beginning with Leg 176, authors are required to *publish* a paper in a journal or book, or a paper or data report in the SR volume. In addition, authors from Legs 160 and beyond are supposed to provide ODP/TAMU with copies of all citations from papers published in books or journals during the first 48 months postcruise. ODP/TAMU posts these citations on the Publications Web site (<http://www-odp.tamu.edu/publications/, click on "Citation List").

The Publication Services Department began collecting leg-related citations in January 1999. The citation lists now include 317 citations, of which 224 are submitted, in review, in press, or published papers and 65 are conference abstracts. Of the 224 papers, 99 have abstracts reproduced on the ODP/TAMU web site. (ODP requests abstract reprint permission from all publishers.) The numbers of citations listed per leg depend on whether authors notify ODP once their papers have been accepted for publication; whereas the availability of abstracts depends on whether publishers permit their reproduction.

We know the leg citation lists are incomplete despite our efforts and those of the Staff Scientists to remind scientific party members of their obligation to submit citations to ODP after their papers have been published. Publication Services has cross-checked the citations they have received with the reprints received by Curation. It has also sent reminders to Co-chiefs and correspondence authors to remind them to submit this important information. The success of the leg-related citation lists is dependent upon authors remembering to fulfill their final obligation requirement and submit all published citations and a reprint of each publication to ODP. Though it does appear that our records are more incomplete for earlier legs than more recent legs, we believe this process does not work well and a comprehensive citations list will be very difficult to maintain for some legs.

Table 3 reflects the number of ODP-related papers that are projected, submitted, or published in the *Scientific Results* volume, and the number of papers that are projected, submitted, or published in books or journals. The data on books and journals are based on the information members of the scientific parties from each leg have submitted to ODP. (There is no guarantee the counts are complete.)

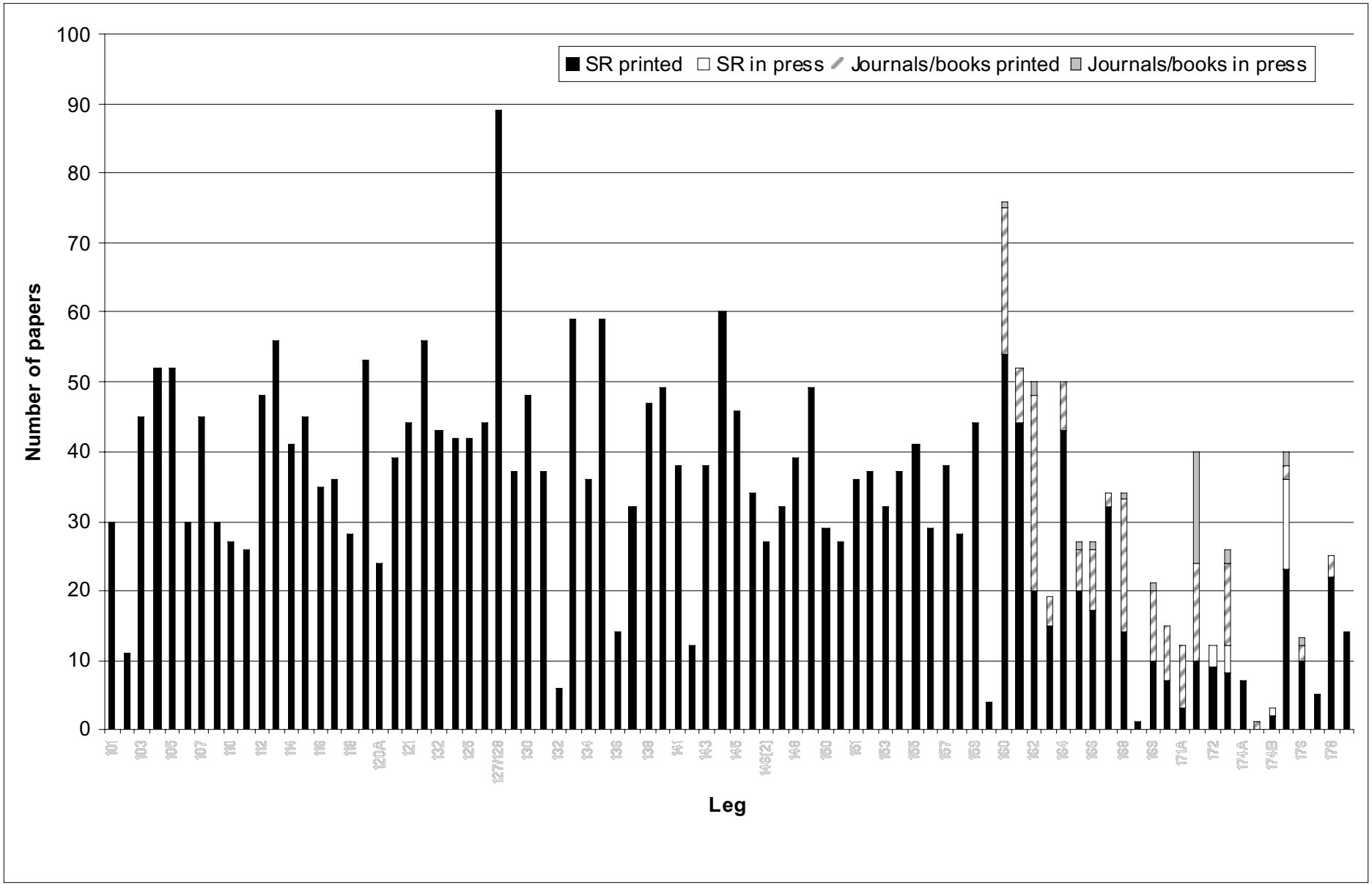
Figure 1 shows the total number of published or in press papers that ODP has been notified of per leg. For Legs 101 through 159, only *Scientific Results* papers were tracked. Beginning with Leg 160, papers published in journals and books were also tracked. All legs through 169 have passed the 4-years postcruise mark. Legs 170 through 179 have passed the 28-month postcruise mark when all SR and book or journal submissions are due (170 deadline = April 1999; 179 deadline = October 2000).

Table 3. Number of ODP-related papers projected, submitted, and published in SR volumes and in books or journals.

	SR Volume			Journal or Book		
Leg	Projected*	Submitted	Published	Projected*	Submitted	Published
160	62	54	54	0	2	21
161	47	46	44	6	6	8
162	24	23	20	32	10	28
163	22	16	15	4	5	4
164	35	41	43	18	5	7
165	26	24	20	2	11	6
166	28	18	17	7	9	9
167	40	33	32	11	8	8
168	17	13	14	47	9	19
169S	0	1	1	28	7	0
169	14	10	10	29	7	10
170	6	7	6	15	11	8
171A	1	3	3	16	10	9
171B	15	9	6	43	28	14
172	8	11	4	36	11	1
173	8	12	2	19	10	12
174A	8	6	2	17	13	8
174AX						1
174B	1	1	11 Dec 00	5	2	
175	14	24	12 Feb 01	24	11	2
176	17	11	9 Apr 01	20	7	2
177	7	4	11 June 01	34/10	26	
178	8	25	6 Aug 01	17/27	11	3
179	15	2	8 Oct 01	8	3	
180	15	11 Dec 00	10 Dec 01	23/2	11 Dec 00	2
181	21	12 Feb 01	11 Feb 02	23/2	12 Feb 01	
182	13	9 Apr 01	8 Apr 02	37	9 Apr 01	3
183	15	11 June 01	10 June 02	18/19	11 June 01	1

Notes: Data updated in November 2000. * = count from table of contents prepared at second postcruise meeting. = published and submitted counts reflect the number of papers authors have notified the ODP Publications Coordinator about. = second number indicates papers proposed without a specific venue. = no information. Dates reflect upcoming deadlines when submissions are due.

Figure 1. Number of published and in press papers on record per leg.



ODP Proceedings Distribution

The Department has sold DSDP and ODP volumes for a cumulative revenue of $11,825 between June 2000 and October 2000. This revenue supports a portion of the cost budgeted for the printing and distribution of new volumes.

The Department has continued to distribute free sets of volumes to academic institutions that do not already have accessible sets of DSDP and ODP volumes (institutions pay shipping costs). Between June 2000 and November 2000, 3 institutions (Broward Community College, USA; University of Miami RSMAS, USA; Appalachian State University, USA) were sent 321 ODP and 165 DSDP volumes. Total value for the books in these shipments equals $13,455.50.

Panel-Related Issues and SCIMP Recommendations

Sample Distribution, Data Distribution, and Publications Policy Revision
In February 2001, the Sample Distribution, Data Distribution, and Publications Policy will be revised with the following changes.

1) reference to policy guidelines for Legs 160 through 174 will be removed from Section 4.4.b. and Appendixes A and B.
2) specific wording for acknowledging the Ocean Drilling Program in all publications that result from the data collected from ODP samples will be added to Section 4.4.b.i.

AGI Database (Rec. 99-2-1)
On 20 December 1999, the American Geological Institute (AGI) delivered a CD-ROM to ODP/TAMU containing a compiled database of citations to papers published on DSDP/ODP-related research. The database (drawn from the full American Geological Institute GeoRef database) contains over16,000 citations related to research tied to the Ocean Drilling Program and the Deep Sea Drilling Project since 1969. The Publication Services Department has prepared the second portion of a review of the data, which primarily focuses on ODP *Proceedings* and DSDP *Initial Reports* citations (see Publications Appendix.)

In September 2000, staff from the JOI office and ODP Publication Services Department met with AGI staff to develop a plan for updating the DSDP/ODP citations database. In November, the following message was distributed to all leg participants and drilling community members.

> 10 November 2000
>
> Dear ODP Scientist:
> The Ocean Drilling Program (ODP) is creating a bibliographic database of citations related to the ODP and to the Deep Sea Drilling Project (DSDP). This electronic citations database will catalog more than thirty years of scientific ocean drilling and will be made available in 2001 for research, education, and other purposes.
>
> We have created a preliminary database based on a key-word search of GeoRef, the bibliographic database produced by the American Geological Institute (AGI). Although GeoRef is comprehensive, some DSDP- or ODP-related citations may have been missed, possibly because of key word associations. Consequently, we are asking you, the international community of scientists involved in scientific ocean drilling, for your help in making the database as complete as possible.
>
> Please review our preliminary database for any overlooked publications. We are keen to capture publications outside of the ODP *Proceedings* or the DSDP *Initial Reports* volumes, which are already in the master database. Citations contributed by the scientific community will be reviewed by

AGI. Citations that are not already in GeoRef will be added, and all submitted citations will be included in the revised DSDP/ODP database.

To participate, go to: http://janusaxp.tamu.edu/predef_queries/general/citation.shtml. Review the preliminary database and complete the online form for any DSDP- or ODP-related citation that has been overlooked. All submissions must be received by 31 December 2000.

Thank you for your assistance.

Ocean Drilling Program

Web Development

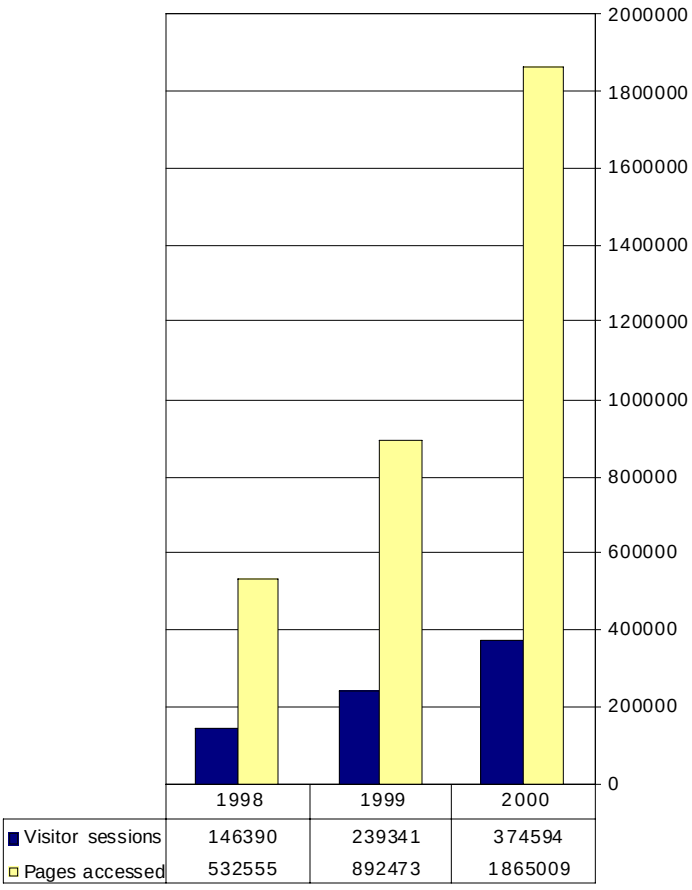
ODP/TAMU Web Site User Statistics

The number of site visitors (defined as single computers accessing the site) to the ODP/TAMU Web site increased 157% from fiscal year 1998 to fiscal year 2000 (see Figure 2). The total number of pages, or files, accessed at the ODP/TAMU Web site during this three-year period has increased 250% (see Figure 2). Figure 3 shows the breakdown by month of total site visitors during this period.

Overall, the number of unique-computer sessions to the ODP/TAMU Web site pages that are listed below increased 74% between November 1999 and October 2000 (see Table 4). The largest increase was seen at the *JOIDES Resolution* page (170%), followed by increases of 41% and 37% at the Publication Services main page and ODP/TAMU main site page, respectively.

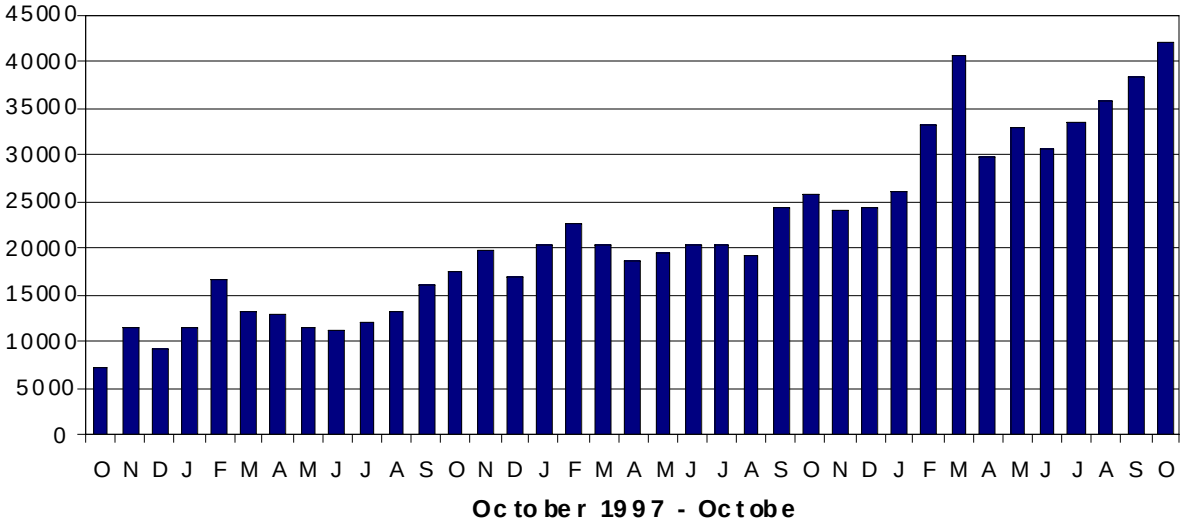
The German mirror site went online in June 2000. User site statistics are listed in Table 5. User statistics are not available yet for the mirror sites in Australia and the United Kingdom.

Figure 2. ODP/TAMU Web Statistics by Fiscal Year



Note: Visitor session = a single computer accessing the Web site; page = a single HTML file.

Figure 3. ODP/TAMU Web Site Visitors



Note: Visitor = a single computer accessing the Web site.

Table 4. ODP/TAMU Main Entry Points*

	Nov 99	Dec 99	Jan 00	Feb 00	Mar 00	Apr 00	May 00	Jun 00	Jul 00	Aug 00	Sep 00	Oct 00
ODP/TAMU site www-odp.tamu.edu	24,069	24,309	26,021	33,162	40,643	29,790	32,920	30,623	33,370	35,744	38,229	41,962
ODP/TAMU main page	5,622	4,651	5,900	6,492	6,649	5,271	5,749	4,656	4,782	5,016	5,860	7,713
Publication Services main page**	1,211	973	1,166	1,311	1,380	1,133	1,344	1,153	1,266	1,351	1,406	1,540
Cruise Information	908	749	1,146	1,476	1,380	976	1,148	967	1,005	986	1,370	1,279
Database main page	1,182	1,023	982	1,086	1,180	1,068	1,049	921	1,037	1,111	1,022	1,166
Operations Schedule	640	558	826	711	764	598	756	573	566	699	830	831
Drilling Services main page	755	591	727	825	896	701	832	552	562	604	801	830
JOIDES Resolution	297	282	NA	749	862	680	783	603	698	754	806	803
Search	763	625	791	862	932	738	823	668	644	597	731	902
Science & Curation main page	563	433	567	584	609	484	567	452	457	486	533	589
ODP & DSDP Site Maps	423	348	481	414	417	329	413	351	408	386	473	472
Cruise Participation	311	277	NA	314	388	296	362	305	328	349	339	360
Janus queries (janusaxp.tamu.edu)	948	866	982	1,186	1,180	891	746	804	925	1104	726	867

Notes: * = numbers represent unique-computer sessions that originate outside ODP/TAMU; each session may result in multiple page views and/or database requests; mirror sites are not included. = Janus sessions are in addition to those given for the ODP/TAMU site. ** = see Update on the New-Format *Proceedings* Publications section for statistics on unique-computer sessions for each volume. NA = not available.

Table 5. Mirror Sites Web User Statistics

	Nov 99	Dec 99	Jan 00	Feb 00	Mar 00	Apr 00	May 00	Jun 00	Jul 00	Aug 00	Sep 00	Oct 00
German mirror site* (odp.pangaea.de)									178	350	1049	1656

Note: * = German mirror site went online in June 2000. No user statistic data available from mirror sites in Australia and United Kingdom.

Appendix. Part II—ODP and DSDP Citations Report: Citations from Deep Sea Drilling Project and Ocean Drilling Program Research, 1969–1999

In Part I of this report (issued in the Spring 2000 panel report), the bulk of the summary focused on the "nonproceedings" citations in the database. "Non-proceedings" citations are defined as citations from all publications other than the publications produced and published directly by DSDP or ODP (*ODP Proceedings* and *DSDP Initial Reports* series publications, and ODP Scientific Prospectus, Preliminary Report, and Technical Note publications; but not the *JOIDES Journal*).

Most of the initial analysis reported in Part I was based on the citation records in the database that contained author affiliation data. Author affiliation data includes the institution and country of contributing authors. Approximately 1800 citations in the database, or ~11%, do not have "author affiliation" data; 97% of these records are "nonproceedings" citations. (AGI did not begin recording author affiliation information until 1975, so this information is absent from many records. Affiliation is also absent from some records simply because there are many publication venues that do not require an author to supply such information. In addition, some authorships, such as "Shipboard Scientific Party," cannot be given author affiliations because the "author" is a group of individuals from a variety of countries.)

Part II of the database analysis is focused on all citations in the database, including those without author affiliation data. It also includes data on "program proceedings" citations (see definition of "nonproceedings citations above).

FigureA1 shows the number of citations in serial publications vs. the number of "program proceedings" citations per year, from 1969 through 1999. (Note: "Proceedings" citations only include citations to the printed books, not the citations to CD-ROM materials from 1999.) Table A1 shows a complete listing of the "nonproceedings" serial publication sources listed in the DSDP/ODP database and the number of citations per year, per publication (this includes all database records [those with and without affiliations]).

Figure A1. "Nonproceedings" serial citations vs. "program proceedings" citations, 1969–1999.

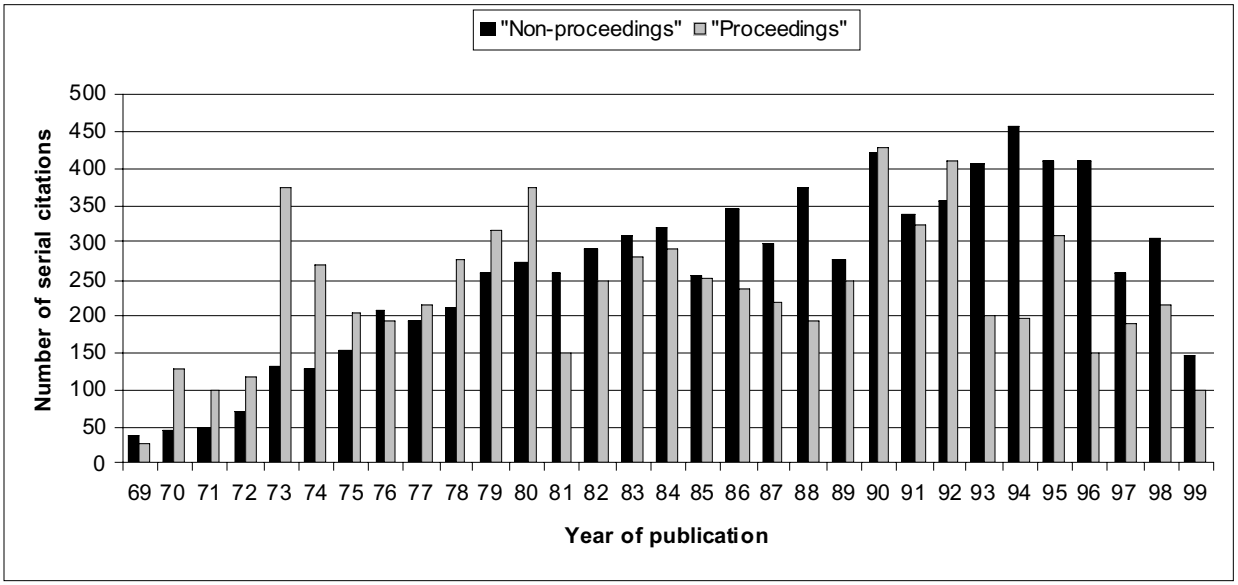


Table A1. All nonproceedings publication sources listed in the DSDP/ODP database and the number of citations per year for each publication.

Journal title	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	Tota
AAAS Publ (Am Assoc Adv Sci)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3
AAPG Bulletin	1	3	2	2	8	2	2	5	2	7	26	10	14	11	10	7	14	14	15	17	2	56	18	8	2	3	1	2	4	10	3	281
AAPG Explorer	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3
AAPG Memoir	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	6	◦	1	◦	◦	◦	◦	1	◦	39	2	◦	◦	◦	◦	◦	◦	◦	50
AAPG Studies in Geology	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	1	4	◦	◦	◦	4	2	3	◦	◦	1	◦	1	◦	◦	◦	◦	17
Abhandlunger der Geologischen Bundesanstalt	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3
Abs - Geol Soc Australia	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	6	◦	2	◦	◦	◦	1	◦	16	3	◦	◦	29
Abs - Intl Conf Geochron, Cosmochron, Isotope Geology	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
Abs - Intl Conf on Natural Glasses	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Abs - Intl Palynological Conf	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	4	◦	◦	2	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	6
Abs - Intl Symp on Observation of the Cont Crust through Drilling	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Abs - Nordic Geol Winter Meeting	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3	◦	3
Abs - Palaeontological Assoc Aston, Ann Conf	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Abs - SEPM Midyear Meeting	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	4	◦	19	9	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	33
Abs - Soc Exploration Geophysicists Intl Mtg	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Abs Gen Mtg Intl Mineral Assoc	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	1
Abs papers - Pacific Sci Congr	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	6	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	6
Abs papers Submitted to the Lunar and Planetary Science Conf	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	1	4	1	1	3	◦	5	◦	◦	3	◦	◦	◦	19
Abs paps - Am Chem Soc, Natl Mtg	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Abs paps - Regional Congr Geol, Mineral and Energy Resources of Southeast Asia (GEOSEA)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Abs/of Reports - Intl Cong Org Geochem	◦	◦	1	◦	◦	2	◦	◦	5	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	8
Abs/prog GSA	11	2	7	12	12	32	21	22	22	19	22	32	33	40	49	26	27	14	39	18	34	29	34	24	50	49	37	45	27	29	◦	818
Abs/Prog/Excursion Guide - Intl Workshop on Agglut Foraminifera	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
ACS Symp Sers (Am Chem Soc)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
Acta Botanica Neerlandica	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Acta Geol Acad Sci Hung Magyar Tudomanyos Akad Foeldtani Koezloenye	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Acta Micropalaeontologica Sinica Weiti Gushengwu Xuebao	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	1
Acta Mineralogica-Petrographica (Szedge)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Acta Palaeontologica Polonica	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Acta Universitatis Carolinae. Geologica	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Actas Cong Latinoamericano Geol	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	1
Advs Underwater Tech, Ocean Sci & Offshore Engineering	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
AGI Reprint Series	◦	◦	◦	◦	◦	◦	1	1	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3
AGSO J Austral Geol & Geophys	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	1
AGSO Research Newsletter	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	1
Ameghiniana	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
American Journal of Botany	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1

Journal title	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	Tota
American Journal of Science	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	1	1	◦	◦	◦	◦	◦	1	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	1	6
American Mineralogist	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
American Scientist	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Anais da Academia Brasileira de Ciencias	◦	◦	◦	◦	◦	◦	◦	3	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	4
Anais do Congresso Latino-Americano de Paleontologia	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Ann Conv & Seminar Expl Geophys	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Ann des Mines et de la Geologie	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Ann Geologiques Pays Helleniques. Hors serie.	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	3	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	4
Ann Mtg - Israel Geological Soc	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	2
Ann Mtg [Ext] Abs - AAPG/SEPM	◦	◦	◦	◦	◦	◦	3	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	7	12	9	6	19	7	9	◦	72
Ann Res Conf. Gulf Coast Sect. SEPM Prog & Abs	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	11	◦	◦	8	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	20
Ann Rev Earth & Planetary Sci	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Ann Rpt Director, Geophys Lab, Carnegie Inst	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Ann Rpt Inst Geosi, Univ Tsukuba	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	1
Annales - Soc Geologique du Nord	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	1	◦	◦	1	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	4
Annales de l'Institut Oceanographique (Monaco)	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Annales Geophysicae	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	6	◦	6
Annales Geophysicae, Ser B: Terrestrial & Planetary Physics	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Annales Societatis Geologorum Poloniae	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	1
Annales Societatis Scientiarum Faroensis, Suppl	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
Annals of the S. African Museum	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Antarctic J of the United States	◦	◦	◦	1	1	◦	◦	6	◦	◦	1	5	2	1	◦	4	1	◦	2	2	1	2	1	◦	◦	◦	◦	◦	◦	◦	◦	30
Antarctic Research Series	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	4	◦	◦	◦	1	◦	◦	6
APEA J (Aus Petro Explor Assoc)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Applied Geochemistry	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	1
Archiwum Mineralogiczne	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Arctic and Alpine Research	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	1
ASTM Spec Tech Pub (AM Soc Test & Materials Spec Tech Pub)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Ateneo Parmense. Sezione 2: Acta Naturalia	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Atlantic Geology	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	1	1	◦	◦	◦	3
Atti della Accademia Nazionale dei Lincei. Rendiconti Lincei. Scienze Fisiche e Naturali	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	1
AusIMM Bull & Procs (Aus Inst Mining & Metallurgy)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
Australian J Earth Sciences	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	1	◦	◦	2
Bacillaria	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
Beitraege zur Meerestechnik	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Berichte - Rpts, Geol-Palaeon Inst und Museum, Christian-Albrechts-Universitaet Kiel	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
Berichte der Deutschen Mineralogischen Gesellschaft	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Berichte des Inst fuer Geophysik der Ruhr-Univ, Bochum	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2

Journal title	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	Tota
Berichte Sonderforschungsbereich 313 "Veraenderungen der Umwelt: der Noerdliche Nordatlantik"	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	3
Berliner Geowissen. Abhandlungen, Reihe A: Geol & Palaeontol	.	.	.	.	.	.	.	.	.	.	.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7
Bild der Wissenschaft	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	2
BIO Review	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Biogeograph. & Palynol. Resumes Commun, Assoc des Palynols Langue Francaise, Symp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	2
Biosystems	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1
BMR J Australian Geol & Geophys	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
BMR Research Newsletter	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	2	.	.	.	.	.	.	.	.	.	3
BMR, Yrbook Bureau of Mineral Resources, Geology & Geophysics	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Bochumer Geologischeund Geotechnicshe Arbeiten	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	.	4
Boletim de Minas	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Boletin de Geologia Publicacion Especial	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Boletin Geologico y Minero	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Boletin Informativo - Asociacion Venezolana de Geologia, Mineria y Petroleo	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4
Boletin Sociedad Geol Mexicana	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Boll Soc Geologica Italiana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1
Boll Soc Paleontologica Italiana	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	1	.	.	.	2	.	.	.	.	.	.	.	4
Buletin Persatuan Geologi Malaysia (Bull Geol Soc Malaysia)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1
Bull - Australia, Bur Miner Resour, Geol & Geophys	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Bull - Australian Soc Explor Geophysicists	.	.	.	.	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Bull - Corpus Christi Geol Soc	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Bull - Dry Valley Drill Proj (DVDP)	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Bull - Houston Geol Soc	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3
Bull - New Mex Bureau Mines & Mineral Resources	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	4
Bull Bur Recherches Geol & Mins	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Bull Canadian Petroleum Geology	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Bull de l'Inst de Geologie du Bassin d'Aquitaine	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	2
Bull de Mineralogie	.	.	1	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Bull des Centres de Recherches Explor-Prod Elf-Aquit. Memoire.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Bull des Centres de Recherches Explor-Prod Elf-Aquitaine	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	3
Bull du Groupe Francais des Argiles	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Bull du Mus Natl d'Histoire Nat. Sect C: Sci de la Terre: Paleontol, Geol, Mineral.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Bull Earthquake Res Inst Tokyo (Daigaku Jishin Kenkyusho Iho)	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Bull Marine Geol Inst Indonesia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1
Bull Natl Sci Museum Ser. C: Geol and Paleontol	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Bull Ocean Res Inst, Univ Tokyo	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Bull S. Carolina Acad of Sciences	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2

Bull Seismological Soc America	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	3
Bull Soc Geologique de France [Huitieme Ser.]	0	0	0	0	1	1	2	5	2	10	5	8	0	6	0	3	5	1	6	2	1	2	1	0	1	0	1	0	0	1	0	64
Bulls Am Paleontology	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Journal title	**69**	**70**	**71**	**72**	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**86**	**87**	**88**	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**Tota**
Byulleten' Moskovskogo Obshchestva Ispytateley Prirody, Otdel Geologicheskiy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	1	0	0	0	0	0	0	0	0	4
California Geology	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Campus Museum Contributions	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Canadian J Earth Sci - J Canadien des Sciences de la Terre	0	0	0	0	0	0	0	0	22	0	2	0	0	0	0	1	1	0	3	0	1	1	1	1	3	0	1	0	0	0	0	37
Carbonates and Evaporites	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	2
Chem Congr of N. Am. Abs paps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3
Chemical Geology	0	0	0	0	0	0	0	1	2	2	0	2	3	5	1	1	1	2	1	7	0	3	1	2	2	3	3	2	1	4	6	55
Chemical Geology; Isotope Geoscience Section	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	3
Chemie der Erde	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	6
Chigaku Zasshi (J of Geography)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	2	1	0	1	0	3	0	0	1	2	0	3	0	0	17
Chikyu Kagaku (Earch Science)	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4
Chikyukagaku (Tokyo) (Geochem)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	2
Chishitsu Chosajo Geppo (Bull - Japan, Geological Survey)	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	5
Chishitsu News	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2
Chishitsugaku Ronshu (Mems Geol Soc Japan)	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	6
Chishitsugaku Zasshi (J Geol Soc Japan)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2	0	1	0	0	0	0	0	0	0	1	1	4	0	0	11
Ciencias da Terra	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Circum-Pacific Council for Energy & Mineral Resources, Earth Sci Ser	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6	0	0	1	0	0	0	0	0	0	0	0	0	8
Clay Minerals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2
Clays and Clay Minerals	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	1	0	0	0	0	2	1	2	0	0	0	9
Climate Dynamics	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	2
Climatic Change	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Coll Colloques et Seminaires - Inst Francais du Petrole	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Coll Reprints - U S Natl Oceanic and Atmos Admin, Atlantic Oceanogr and Meteorolog Labs	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Coll Reprints - Woods Hole Oceanogr Inst	0	0	6	2	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23
Colloque Intl sur l'Exploitation des Oceans	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Colloques Internationaux du Centre National de la Recherche Scientifique	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Comments on Earth Science; Geophysics	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Compt Rendus Hebd des Seances de l'Acad des Scis, Serie D: Sci Natur [C.R.'Acad Sci., Ser 3]	0	0	0	1	1	0	0	0	0	1	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
Compte Rendu - Congres Intl Stratig & Geologie du Carbonifere (Intl Congress on Carboniferous Stratigraphy and Geology)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Compte Rendu Sommaire des Seances de la Soc Geol de France	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Comptes-Rendus Seances de l'Acad Sci, Ser 2: Mecanique-Physique, Chimie, Sci de l'Univers, Sci de la Terre (several vol title changes)	0	0	0	0	0	0	0	0	0	0	0	0	2	3	3	5	3	8	2	2	11	6	4	1	2	0	5	3	1	2	2	65
Computers and Geosciences	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
Conf Clay Mineralogy & Petrology	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Congr of Intl Union for Quat Res	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	12

Continental Dynamics	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	1
Contrib - Hawaii Inst of Geophysics	°	°	°	°	1	5	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	6
Contrib - U C, San Diego, Scripps Inst of Oceanog	°	1	°	°	3	12	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	16
Journal title	**69**	**70**	**71**	**72**	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**86**	**87**	**88**	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**Tota**
Contribs Mineralogy and Petrology	°	°	°	°	°	°	1	°	4	1	1	3	2	1	°	1	°	°	°	°	1	°	°	1	°	1	3	1	°	1	2	24
Contribs Ser - Am Assoc Strat Palynologists (AASP)	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Contribs to Sedimentology	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Cretaceous Research	°	°	°	°	°	°	°	°	°	°	°	°	1	°	1	°	1	°	°	1	°	°	1	°	1	°	°	°	°	2	1	9
Cruise Report - Geol Surv Japan	°	°	°	°	°	°	°	°	°	°	2	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	3
Cruise Rpt - Inst Oceanograph Sci	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	1	°	°	°	°	°	°	°	°	°	2
CSPG Reservoir (Canadian Soc Petroleum Geologists)	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	1	°	°	°	°	°	°	°	°	2
Current Activities Forum Prog/abs (Geol Surv Canada)	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	1
Daiyonki-Kenkyu (Quaternary Res)	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	3	°	°	4
Deep-Sea Research	°	°	°	°	°	°	°	°	2	°	1	°	°	1	°	1	°	1	°	°	1	°	°	1	°	°	°	°	°	°	°	8
Deltio tes Ellenikes Geologikes Etaireias (Bull Geol Soc of Greece)	°	°	°	°	3	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	4
Der Aufschluss	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Developments in Geotectonics	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	2
Devs in Palaeontol & Stratigraphy	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	2	°	°	°	°	°	°	°	°	°	°	°	2
Dicengxue Zazhi (Journal of Stratigraphy)	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Die Geowissenschaften (Weinheim, Zeitschrift)	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	2	°	°	°	2	°	°	°	°	°	°	5
Diqiu Kezue Kihan TAO, Terrestrial, Atmospheric & Oceanic Sciences	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	1
Dixue Qianyuan (Earth Science Frontiers)	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	1	°	2
Dizhen Gongcheng yu Gongchen Zhendong (Earthquake Engineering & Engineering Vibration)	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	1
Dizhi Keji Qingbao (Geological Sci & Technology Info)	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	1	°	°	°	°	°	°	°	°	°	2
Dizhi Kexue Scientia Geol Sinica	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Documents - B.R.G.M.	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	1	°	°	°	°	°	°	°	°	°	°	2
Documents des Laboratoires de Geologie, Lyon	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	1
Documents des Laboratoires de Geologie, Lyon, Hors Serie	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Doklady Akademii Nauk SSSR	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	2
DSIR Bulletin	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	3	°	°	°	°	°	°	°	°	°	°	°	°	°	3
Earth & Planetary Sci Letters	°	°	°	°	2	1	3	5	8	5	9	4	3	2	5	1	°	6	11	5	5	4	10	18	14	12	12	13	12	13	7	190
Earth Evolution Sciences	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Earth in Space	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	1
Earth Surface Processes and Landforms	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	1
Earth, Planets and Space	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	1	2
Earth-Science Reviews	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Eclogae Geolgicae Helvetiae	°	°	°	°	°	°	°	°	°	°	°	1	1	1	°	2	1	°	°	°	°	°	1	°	°	°	°	°	°	°	°	7
Economic Geology & the Bull of the Soc of Economic Geologists	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	1
Economic Geology Res Unit News	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	1
Endeavour, New Series	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	1
EOS	2	°	2	4	40	15	26	36	44	51	22	34	37	42	62	49	37	50	29	83	15	111	19	61	121	159	91	113	45	11	4	1415

Episodes	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	5
Estudios Geologicos (Madrid)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
European Geophys Soc, mtg abs	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Evolutionary Monographs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Journal title	**69**	**70**	**71**	**72**	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**86**	**87**	**88**	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**Tota**
Exploration Geophysics	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Explorer (Clevelalnd)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Ext abs - Intl Symp Water-Rock Interaction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Facies	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
Field Trip Guidebk - Pac Section SEPM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Fisica de la Tierra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Forschung (Boppard)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Fortschritte der Mineral, Beiheft	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Fossils	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	4
Fossils and Strata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Frontiers in Sedimentary Geology	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	4
Geobios	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	3
Geochemical Journal	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	1	0	1	1	0	0	0	6
Geochemistry International	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	9
Geochim et Cosmochim Acta	0	1	0	0	1	0	2	2	2	0	1	3	3	4	2	3	4	5	3	4	2	2	4	5	4	3	4	3	2	5	3	77
Geodynamics Series	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	7
Geografia Fisica e Dinamica Quaternaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
GeoJournal	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Geokhimiya	0	0	0	0	0	0	0	0	1	0	1	2	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	7
Geol Greenland Survey Bulletin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Geol Jahrbuch. Reihe A: Allgem Regionale Geol BR Deutschland und Nachbargebiete, Tektonik, Stratigraphiek Palaeontologie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	3
Geol Jahrbuch. Reihe B: Regionale Geologie Auslalnd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Geol Jahrbuch. Reihe D: Mineral, Petrogr, Geochem, Lagerstaettenkunde	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Geol Soc New Zealand Misc Publ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	2	0	0	1	0	0	1	0	0	0	0	0	8
Geol Soc Special Publ (London)	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	6	0	15	4	3	1	7	2	8	7	0	0	8	2	41	2	111
Geolog (Geol Assoc Canada)	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Geologi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	2
Geologia Tecnica	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Geologica Balcanica	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Geologica Ultraiectina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Geological Journal, Spec Issue	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Geological Magazine	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	1	0	5
Geologicky Pruzkum	0	1	0	0	0	0	0	0	1	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Geologie en Mijnbouw	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Geologie Mediterraneenne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Geologische Rundschau	0	0	0	0	0	0	0	0	0	2	0	0	2	0	1	0	0	4	0	0	17	0	1	0	1	1	1	0	0	1	0	31
Geology (Boulder)	0	0	0	0	2	6	3	0	1	1	2	1	1	2	3	4	5	3	1	8	5	4	8	11	9	11	9	20	15	8	13	156
Geology Today	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	2
Geo-Marine Letters	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	1	0	1	5	1	1	1	1	0	1	2	0	0	0	20
GEOMAR-Report	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Geomorphology	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2
Geophys J Royal Astron Soc	0	0	0	0	0	0	0	1	2	2	0	2	1	2	4	1	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	20

Geophysical Journal International	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	2	1	1	°	3	3	2	3	15
Geophysical Monograph	°	°	°	°	°	°	°	4	°	°	°	1	°	°	°	°	3	°	1	°	1	°	°	°	6	°	17	2	2	°	°	37
Geophysical Research Letters	°	°	°	°	°	°	°	°	°	1	°	°	1	°	°	°	2	1	2	1	1	8	1	10	1	3	9	12	1	3	4	61
Geophysical Surveys	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Journal title	**69**	**70**	**71**	**72**	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**86**	**87**	**88**	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**Tota**
Geophysical Transactions (Geofizikai Kozlemenyek Geofizicheskiy Byulletin')	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	1
Geophysics	°	6	°	°	°	°	°	°	°	°	°	°	°	1	°	1	1	°	1	°	°	1	°	°	°	°	°	°	1	°	°	12
Geophytology	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	1
GeoResearch Forum	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	1
Geos (Ottawa)	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	1	°	°	°	°	°	°	°	3
Geoscience and Man	°	°	°	2	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	2
Geoscience Canada	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	1	°	°	1	1	°	°	°	°	°	°	3	°	°	7
Geoscience Journal	°	°	°	°	°	°	°	°	°	°	°	1	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	2
GeoTech	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	1
Geotectonics	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Geothermal Energy	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Geotimes	11	12	8	11	9	5	11	7	7	7	5	3	7	10	7	4	4	8	9	9	6	5	2	5	4	4	4	1	°	2	2	189
Giornale de Geologia	°	°	°	°	°	1	°	°	°	°	1	°	2	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	1	°	6
Global & Planetary Change	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	1	1	°	1	°	4
Global Giogeochemical Cycles	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	1
Gondwana Geological Magazine	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	1
Grondboor en Hamer	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Grzybowski Foundation Spec Publ	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	2	°	°	3
GSA Bull	°	°	°	°	5	1	3	5	3	3	3	4	2	6	5	°	3	2	1	2	1	2	°	3	°	3	3	°	2	2	3	67
GSA Today	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	2	1	2	°	2	°	°	°	°	7
Haeyang Yon'gu (Ocean Research)	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	1
Haiyand Dizhi yu Disiji Dizhi (Marine Geology & Quat Geology)	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	1	°	°	°	°	°	°	2
Hanguk Kukchi Yongu (Korean J Polar Research)	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	1
Hauptversammlung der Deutschen Geologischen Gesellschaft	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	3	°	°	°	3
Heidelberger Geowissenschaftliche Abhandlungen	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	3	°	°	°	°	1	°	°	°	°	°	°	°	4
HIG (Hawaii Inst Geophysics)	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Historical Biology	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	2	1	°	°	°	°	°	°	°	°	°	°	3
Hydrobiologia	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	2	°	°	°	°	°	°	2
IAGA Bulletin (Intl Assoc Geomagnestim & Aeronomy)	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	3	°	°	°	°	°	°	°	°	°	°	3
INA Newsletter	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	4	°	3	°	°	1	°	°	°	1	°	°	°	°	°	10
Indian Colloq Micropalaeo & Strat	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	1
Indian J of Marine Sciences	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	2	°	°	4
Indian J of Petroleum Geology	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	1
Indian Journal of Earth Sciences	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Indian Journal of Geology	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	1	1	°	1	°	°	°	°	°	°	°	°	4
Indian Minerals	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Inst Geol & Nuclear Scis Contrib	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	1
Interagency Airborne Geosci Wkshp	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	1
Intl Assoc Sedmintols Reg Mtg.	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	2	1	°	°	°	°	°	°	°	°	°	°	°	3

Intl Congr Sedimentology (Congres Intl de Sedimentologie)	◦	◦	◦	◦	◦	◦	3	◦	◦	9	◦	◦	◦	20	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	32
Intl Geological Congr, Abs (Congres Geolog Intl, Resumes)	◦	◦	◦	◦	◦	◦	◦	10	◦	◦	◦	27	◦	◦	◦	◦	◦	◦	◦	◦	◦	18	◦	◦	54	◦	◦	◦	◦	◦	◦	◦	109
Intl Geology Review	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	1	◦	◦	1	◦	◦	◦	1	2	1	◦	◦	◦	◦	◦	◦	◦	◦	7
Intl J of Coal Geology	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	1
Journal title	**69**	**70**	**71**	**72**	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**86**	**87**	**88**	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**Tota**
Intl J Radiation Apps & Instrumenta, Part E, Nclu Geophys	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Intl Sedimentological Congr (Proc)	◦	◦	◦	◦	◦	◦	2	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	9	◦	◦	◦	◦	◦	◦	◦	◦	◦	11
Intl Sedimentological Congr Abs	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	5	◦	◦	◦	◦	◦	5
Intl Series of Monographs on Earth Sciences	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Intl Symp Antarctic Earth Sciences	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3	◦	◦	◦	◦	◦	1	◦	◦	4
Intl Symp Borehole Geophys Minls, Geotech, & Groundwater Apps	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Intl Symp on Ostracoda	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3	◦	◦	3	◦	◦	◦	◦	◦	◦	6
Intl Union Geodesy and Geophys	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Intl Union Geodesy and Geophys, Gen Assemb	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	◦	◦	◦	◦	◦	◦	6	◦	◦	◦	◦	◦	◦	◦	21	◦	◦	◦	◦	29
Intl Union Geological Sciences	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
Inzhenemaya Geologiya	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
IPOD-Japan Basic Data Ser. Ocean Res Inst, Univ of Tokyo	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Isotope Geoscience	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Isreal J of Earth-Sciences	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	◦	◦	◦	2
Izvestiya Adademii Nauk SSSR. Ser Geologicheskaya	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	4	◦	◦	◦	◦	◦	◦	2	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	7
Izvestiya Vysshikh Uchebnykh Zavedeniy. Geologiya i Razvedka	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	4	1	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	6
J Acoustical Society of America	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3
J African Earth Sciences	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	1	◦	◦	◦	3	◦	◦	1	◦	◦	◦	1	◦	◦	4	1	12
J Colorado-Wyoming Acad Sci	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
J Czech Geol Soc (Casopis Ceske Geolgicke Spolecnosti)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	1
J Faculty of Marine Sci & Tech, Tokai University	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	2	3
J Faculty of Sci, Univ Tokyo, Sec 2: Geol, Miner, Geogr, Geophys	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
J Foraminiferal Research	◦	◦	◦	◦	1	2	1	◦	◦	3	◦	1	1	1	◦	1	3	2	1	1	1	◦	3	2	1	3	1	2	2	1	1	35
J Geodynamics	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	3
J Geol Soc Australia	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
J Geol Soc India	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	1	1	1	◦	1	◦	◦	◦	◦	1	3	1	◦	2	◦	1	2	◦	15
J Geol Soc London	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3	1	1	◦	1	◦	◦	1	1	◦	1	2	1	4	1	2	1	◦	20
J Geol Soc Philippines	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	1
J Geological Education	◦	◦	◦	◦	◦	◦	◦	1	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
J Geology	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	1	1	◦	1	1	◦	◦	◦	1	◦	1	◦	1	◦	1	◦	◦	9
J Geomag & Geoelectricity	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	2	◦	◦	◦	◦	◦	3	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	6
J Geophysical Research	◦	◦	◦	◦	1	1	3	19	4	1	3	4	11	4	6	1	4	5	5	3	4	24	5	5	10	12	9	10	5	14	10	183
J Geoscience Education	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	1
J Geotechnical Engineering	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
J Intl Assoc for Mathematic Geol	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
J Micropalaeontology	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	3	◦	1	◦	4	◦	◦	◦	◦	2	◦	◦	2	◦	13

Journal title	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	Tota
J Mining College, Akita Univ, Ser A.: Mining Geology	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	2
J Mississippi Acad of Sciences	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	2
J Nannoplankton Research	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	13	◦	4	4	1	24
J Nepal Geological Society	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	1
J Non-Crystalline Solids	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
J Palaeontological Soc of India	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	1	2	◦	◦	◦	◦	◦	◦	◦	◦	◦	4
J Paleontology	◦	◦	◦	◦	1	◦	1	2	3	1	2	1	1	4	1	2	1	◦	◦	2	1	◦	1	◦	2	1	1	3	◦	◦	◦	31
J Petroleum Geology	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	1
J Petroleum Technology	1	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	2	1	1	1	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	8
J Petrology	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	1	4
J Physics of the Earth	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
J Quaternary Science	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	1
J Royal Soc New Zealand	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3
J Sci Hiroshima Univ, Ser C: Geology & Mineralogy	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	1
J Sedimentary Petrology	◦	◦	◦	◦	2	2	◦	2	4	2	2	1	1	1	2	◦	1	◦	1	1	1	◦	2	◦	1	◦	◦	◦	◦	◦	◦	26
J Sedimentary Research	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	1	3	2	4	3	14
J Southeast Asian Earth Scis	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	1
J Structural Geology	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	1	2	1	◦	◦	2	◦	7
J Tennessee Academay of Sci	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	1
J Vertebrate Paleontology	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	1	◦	◦	◦	◦	3
J Volcanology & Geothermal Res	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	1	1	◦	◦	◦	◦	◦	1	◦	1	◦	◦	◦	◦	2	◦	1	◦	◦	1	10
Jahresbericht - Deutsche Forschungsgemeinscaft, Band 2, Programme un Projekte	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
Jahresbericht - Kemforschungsanlage Juelich GmbH	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Jahrestagung der Deutschen Geophysikalischen Gesellschaft e.V.	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
JOI/USSAC Newsletter	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	1	◦	◦	2	◦	◦	◦	5
JOIDES Journal	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	4	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	4	8	7	◦	◦	5	◦	31
Journal of Geophysics Zeitschrift fuer Geophysik	◦	◦	◦	◦	◦	1	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3
Kasan Bull Volcanolog Soc Japan	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	1	◦	◦	5	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	7
Kompleksnyy Issledovaniya Prirody Okeana	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
KTB Report	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
La Recherche	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	3
La Vie des Sciences	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	2
Le Courrier du C.N.R.S.	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Lethaia	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	1	◦	◦	◦	◦	◦	2	◦	◦	5
Lithology & Mineral Resources	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	2	2	5	2	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	14
Lithos	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	1	1	5
Litologiya i Poleznyye Iskopayemyye	◦	◦	◦	◦	◦	◦	2	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
LPI Contribution	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	3	◦	◦	◦	◦	2	◦	3	1	◦	1	◦	◦	9	◦	◦	◦	◦	◦	20
Lund Publications in Geology	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	1
Magyar Allami Foldtani Intezet Evkonyve (Annals Hungarian Geol Inst)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Marine & Petroleum Geology	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	2	2	◦	◦	1	◦	1	◦	2	◦	◦	2	◦	1	◦	13
Marine Chemistry	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	1	◦	◦	◦	◦	◦	2	◦	◦	1	◦	◦	5
Marine Geology	◦	◦	2	◦	3	◦	1	2	4	9	5	18	3	5	1	6	1	7	4	3	6	1	13	7	6	6	7	8	6	9	20	163

Marine Geophysical Researches	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	4	1	1	0	0	2	0	0	1	0	0	12
Marine Georesources & Geotechn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	1	1	0	0	5
Marine Geothechnology	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3
Marine Micropaleontology	0	0	0	0	0	0	0	2	1	4	5	3	3	2	8	1	2	5	2	1	3	2	3	15	9	9	8	13	9	9	7	126
Marine Science (Plenum)	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Maritime Sediments	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Mathematical Geology	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2
Maurice Ewing Series	0	0	0	0	0	0	0	0	1	0	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47
Journal title	**69**	**70**	**71**	**72**	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**86**	**87**	**88**	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**Tota**
Meddelanden fran Stockholms Univ Inst for Geologi och Geokemi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Mem - Canadian Soc Petroleum Geologists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	2
Mem - Congreso Latinoamericano de Paleontologia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Mem - Geol Soc India	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
Mem - GSA	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	9	11	0	1	0	0	0	1	2	0	0	0	0	0	0	25
Mem - Miami Geological Society	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Mem della Soc Geol Italiana	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	7	0	0	0	0	0	0	0	0	11
Mem Geol de l'Univ de Dijon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Mem Hors Serie - Soc Geol France	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Mem Natl Inst Polar Res. Spec Iss.	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Mem Soc Geol France [varies]	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	1	0	0	0	7
Memoires du B.R.G.M. (Bur. Recherches Geol et Minieres)	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Mems des Sciences de la Terre	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Messinian Seminar (Seminario sobre el Messinense)	0	0	0	0	0	0	0	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Meteor-Forschungsergebnisse. Reihe C: Geologie und Geophysik	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Meteoritics	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	3	0	0	0	0	1	0	0	0	0	0	6
Meteoritics & Planetary Science	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	4
Meteorologiya i Gidrologiya	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Micropaleontology	0	0	0	0	0	0	1	2	3	2	3	3	3	5	2	7	0	2	2	1	3	2	2	5	4	2	1	3	2	3	0	63
Micropaleontology Spec Publ	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Mineral Resources Bulletin	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Mineral Resources Devel Series	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3
Mineralia Slovaca	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Mineralogical Magazine	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	7	0	1	0	0	0	12
Mitteil aus dem Geol Inst Eidgenoessischen Technischen Hochschule und der Univ Zuerich, Neue Folge	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Mitteil aus dem Geologisch-Palaeontologischen Inst der Univ Hamburg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	9
Mitteilungen - Deutsche Forschungn	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Modern Geology	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3
Mosaic (Washington)	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Moscow Univ Geology Bulletin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Mus Argentina Ciencias Natur "Bernardino Rivadavia" - Inst Nacional Investig Ciencias Natur, Rev, Geol	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Nachrichten - Deutsche Geologische Gesellschaft	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0	13

Journal title	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	Tota
Nanhai Dizhi Yanjiu (Geological Research of South China Sea)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	1
NASA Conference Publication	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
NATO ASI Series. Ser C: Math & Physical Sciences	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	7	3	◦	◦	◦	◦	◦	◦	◦	◦	◦	10
NATO Conf Ser. IV. Marine Sci	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	4	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	5
Nature	◦	1	◦	◦	3	1	10	5	4	8	6	9	8	15	16	5	14	9	11	5	11	6	2	2	9	6	4	7	8	9	2	196
Nature und Museum	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Nature; Physical Science (London)	◦	◦	◦	1	3	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	4
Naturen	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	1
Naturwissenschaften	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Naturwissenschaftliche Rundschau	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	3
NERC News (Natural Environmental Res Council, UK)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	1	◦	◦	◦	◦	◦	◦	◦	2
Neues Jahrbuch fuer Geologie und Palaeontologie. Abhandlungen	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	1
Neues Jahrbuch fuer Geologie und Palaeontologie. Monatshefte	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	1
Neues Jahrbuch fuer Mineralogie. Abhandlungen	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
New Zealand Geophysical Soc Symp, Abs	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	1
New Zealand J of Geol & Geophys	◦	◦	◦	◦	◦	◦	1	◦	1	1	◦	◦	1	1	◦	◦	1	◦	◦	1	◦	1	1	1	◦	◦	◦	2	◦	◦	◦	12
New Zealand Soil Bur Sci Report	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
Newslet - Geol Soc N. Zealand	◦	1	◦	2	1	1	1	◦	◦	◦	◦	1	◦	◦	1	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	1	◦	1	◦	11
Newslet - New Concepts in Global Tectonics	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	◦	2
Newslet Spec Grp Tectonics & Struct Geol, Geol Soc Australia Inc	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Newsletters on Stratigraphy	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	1	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	4
Nippon Kaiyo Gakkai-Shi (J of the Oceanographical Soc of Japan)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Norelco Reporter	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Nova Acta Leopoldina	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Nuclear Instruments & Methods in Phys Res, Sect B: Beam Interacts w/ Materials and Atoms	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
Nuclear Tracks & Radiation Measurements	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Occasional Rept - Univ Waikato, Dept Earth Sci (New Zealand)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	1
Ocean Industry	2	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3
Ocean Research	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Ocean Science and Engineering	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
Oceanologica Acta	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	3	2	13	1	2	1	◦	◦	◦	◦	1	1	2	◦	1	◦	◦	◦	◦	◦	◦	28
Oceanology	◦	◦	◦	◦	1	◦	◦	2	3	1	1	2	◦	1	◦	◦	◦	◦	◦	1	3	◦	1	1	◦	◦	1	◦	2	3	2	25
Oceans	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
Oceans (New York)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	9	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	10
Oceanus (Woods Hole)	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	1	◦	◦	1	3	◦	◦	1	1	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	9
Offshore (Conroe)	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	3
Ofioliti	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	2	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	4
Ohio Journal of Science	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Oil and Gas (Sydney)	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Oil and Gas Journal	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	1	◦	◦	2	◦	◦	1	◦	◦	◦	◦	1	1	◦	◦	◦	◦	9

Journal title	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	Tota
Open File Report - State of Oregon, Dept Geol Mineral Industries	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Open-File Rpt - Geol Surv Canada	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Organic Geochemistry	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	2	9	◦	8	◦	4	1	1	◦	3	◦	3	4	3	2	1	◦	42
Origins of Life & Evol of Bioshpere	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Pacific Rim Congress	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Pacific Science	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Pacrofi	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Palaeocology of Africa & of the Surrounding Islands [& Antarctica]	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	1	◦	◦	3	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	6
Palaeogeogr, climatol, ecology	◦	◦	◦	◦	◦	◦	◦	◦	1	1	2	◦	3	4	4	6	2	4	1	2	1	1	3	7	2	14	5	2	6	6	5	82
Palaeontologia Electronica	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	1	2
Palaeontological Research	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	1
Palaeontologische Zeitschrift	◦	◦	◦	◦	◦	◦	1	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
Palaeontology	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	1	◦	◦	◦	◦	2
Palaios	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	1	◦	1	1	1	3	2	1	◦	1	◦	◦	12
Paleobiology	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	2	1	◦	◦	◦	◦	◦	◦	1	◦	◦	1	1	4	◦	1	◦	12
PaleoBios	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	4	◦	3	◦	◦	1	◦	◦	◦	8
Paleoceanography	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	6	2	3	6	12	6	6	8	6	8	◦	6	7	7	83
Paleontological Journal	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Paleopelagos	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	1	◦	◦	◦	◦	◦	2
Palynology	◦	◦	◦	◦	◦	◦	◦	◦	2	3	◦	◦	◦	1	3	2	1	4	◦	14	◦	2	2	2	◦	◦	◦	7	◦	2	◦	45
Paper - Geol Surv Canada	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	1	◦	3	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	6
Peoc - SPE/IADC Drilling Conf (Soc Petroleum Engineers)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	1
Petros	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Philos Trans Roy Soc London Ser. A: Math and Physical Sciences	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	15	◦	2	◦	1	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	19
Phys of the Earth & Planet Interiors	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	3	◦	1	◦	◦	2	◦	◦	2	◦	◦	◦	1	◦	◦	2	◦	2	14
Physics & Chemistry of the Earth	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	6	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	7
Physics of the Solid Earth [Izvestiya, Physics of Solid Earth]	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	2	1	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	6
Polar Geoscience	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	1
Polar Record	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
Polar Research	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Prelim Rpt - Ocean Res Inst, Univ Tokyo	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	52	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	52
Preprints - Offshore Tech Conf	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
Principaux Resultats Scientifiques - Bur de Recherches Geol & Mins	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3
Priroda	1	◦	◦	◦	◦	◦	◦	◦	◦	2	2	◦	◦	◦	◦	3	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	10
Proc - Geoscience Info Soc	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Proc - Intl Clay Conference	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Proc - Intl Conf on Port and Ocean Engineering under Arctic Conditions	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Proc - N. Am Paleontologic Conv	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	◦	◦	2	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	4
Proc - Offshore Technology Conf	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	2	◦	◦	1	2	1	1	1	1	1	1	2	1	1	◦	◦	1	◦	2	1	◦	20
Proc - Planktonic Confr	◦	◦	6	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	6
Proc - Soc Potroleum Engineers of AIME. California Regional Mtg	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1

Journal title	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	Tota
Proc - World Petroleum Congr (Actes et Documents - Congres Mondial du Petrole)	◦	◦	1	◦	◦	◦	2	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3
Proc Seminar on Petroliferous Basins of India	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	1
Proc Biological Soc Wash (DC)	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Proc Conf Civil Engineering in the Oceans	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Proc Congr - Reg Commit on Mediter Neogene Strat, Intl Union of Geol Sciences	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Proc Indian Acad Sci: Earth & Planetary Sciences	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	1	◦	1	◦	◦	◦	3
Proc Intl CODATA Conf	◦	◦	◦	◦	◦	◦	◦	◦	3	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3
Proc Intl Conf Basement Tectonics	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
Proc Intl Congr of Speleology	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	1
Proc Intl Diatom Symposium	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
Proc Intl Mtg Organic Geochem	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	9	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	9
Proc Intl Symp on Ostracods	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Proc Intl Symp on Shallow Tethys	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	1
Proc Intl Symp Water-Rock Interact	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3	◦	◦	◦	◦	◦	◦	◦	4
Proc Koninklijke Nederlandse Akademie van Wetenschap., Ser B: Palaeo, Geol, Phys, Chem, [Anthro]	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3
Proc Lunar & Planetary Sci Conf	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	2
Proc Natil Sci Council, Rep China, Part A: Physical Sci & Engineering	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Proc Nebraska Acad Sciences & Affiliated Societies	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	1	◦	2
Proc NIPR Symp on Antarctic Geosci (Natl Inst Polar Res) Tokyo	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
Proc of the Ussher Society	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	1	2	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	4
Proc Pacific Science Congr	◦	◦	2	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
Proc Royal Soc Edinburgh. Sect. B: Biological Sciences	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Proc Session of the Committee Co-ordination of Joint Prospecting for Mineral Resources in Asian Offshore Areas (CCOP)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Proc Symp on Geol of Bahamas	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Proc Intl Geological Congress [Rept Session]	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3	19	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	2	◦	◦	25
Proc N. Am Rock Mech Symp	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	1
Proces-Verbaux - Intl Assoc Physical Sci of the Ocean	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3
Procs Ann Res Conf, Gulf Coast Sect, SEPM Foundation	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Prog Rpt - Natl Sci Foundation	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	4	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	4
Prog/Abs - Am Assoc Strat Palynologists (AASP)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	4	13	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	18
Prog/Abs - Am Quat Assoc Conf	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	3
Prog/Abs - Ann Clay Minerals Conf	◦	◦	◦	◦	◦	◦	◦	2	◦	◦	◦	1	◦	◦	◦	1	◦	◦	◦	2	1	◦	2	◦	◦	◦	◦	◦	◦	◦	◦	9
Prog/Abs - Geol Assoc Canada; Mineral Assoc of Canada; Canadian Geophys Union, Joint Ann Mtg (GAC/MAC/CGU)	◦	◦	◦	◦	◦	◦	◦	22	◦	◦	◦	◦	◦	◦	1	1	8	10	2	21	3	16	7	2	◦	10	14	◦	◦	◦	◦	117
Prog/Abs; Biennial Pan-Am Conf on Res on Fluid Inclusions	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	1
Progress in Oceanography	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	1

Przeglad Geologiczny	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	◦	◦	◦	◦	◦	◦	2
Pubblicazione - Milan, Universita, Instituto di Geologia e Paleontologia	◦	◦	◦	9	1	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	11
Publ - Earth Sciences Centre	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	1	◦	2
Publ - Soc Geologique du Nord	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Publ Occasionnelle - Centre Intl Pour la Formation et les Echanges Geologiques	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Pubs Centre Natl pour l'Exploit des Oceans. Ser. Rapports Scientifiques et Techniques	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Pubs Series - Australasian Inst Mining and Metallurgy	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	1	◦	◦	◦	2
Quarterly of the Colorado School of Mines	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Quaternary International	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	1	◦	◦	◦	2

Journal title	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	Tota
Quaternary Newsletter	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	4
Quaternary Research (New York)	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	1	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	1	◦	◦	2	7
Quaternary Science Reviews	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	1	4	◦	1	1	◦	◦	1	4	◦	13
Radiocarbon	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	1	◦	3
Rapport - Groenlands Geologiske Undersoengelse (Rpt - Geological Survey of Greenland)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	1	◦	◦	◦	2
Rapports et Proc Verbaux des Reunions - Comm Intl pour l'Explor Scientif de la Mer Mediterranee	◦	◦	◦	◦	4	◦	◦	◦	4	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	10
Rapports et Proc-Verbaux des Reunions - Counseil Intl pour l'Exploration de la Mer	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Recent Researches in Geology	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
Record - New Zealand Geol Surv	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Records Geol Surv New S. Wales	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Report on the Conf on Scientific Ocean Drilling (COSOD)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Rept - Dept Mines & Energy (Halifax)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Rept NZGS (New Zealand Geol Surv)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Rept: AGSO Bulletin	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	1
Rept: Circum-Pacific Map Series	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	1
Rept: Curr Res - Geol Surv Canada	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	1
Rept: SAND (Sandia Natl Lab, NM)	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3
Repts Faculty Sci, Shizuoka Univ	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	1	2
Res Repts - Natl Geogr Society	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2
Reunion Ann des Sci de al Terre	◦	◦	◦	◦	1	4	◦	3	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	◦	◦	2	◦	3	◦	◦	◦	3	◦	◦	◦	18
Rev de Geologie Dynamique et de Geographie Physique	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	3
Rev l'Inst Francais du Petrole [& Ann des Combustibles Liquides]	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	1	◦	◦	2	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	5
Rev Palaeobotany & Palynology	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	1	◦	◦	1	2	◦	1	1	◦	1	9
Reviews of Geophysics	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	1	◦	◦	◦	◦	◦	◦	◦	1	1	◦	4
Revista Brasileira de Geociencias	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Revista Espanola de Micropaleo	◦	◦	◦	1	◦	1	◦	1	1	1	◦	2	◦	◦	◦	1	1	1	2	◦	2	1	◦	1	1	1	2	1	◦	◦	◦	21
Revista Espanola de Paleo	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	2
Revista Geologica de Chile	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	4	◦	◦	◦	◦	◦	◦	◦	4
Revista Soc Geologica de Espana	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	1
Revs Geophys and Space Physics	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	1	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	2

Revue de Micropaleontologie	°	°	1	°	°	°	°	1	1	°	°	°	1	1	°	1	°	°	°	1	°	°	2	°	°	°	°	°	°	°	°	9
Revue de Paleobiologie	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	2
Rivista Italiana di Paleontologia e Stratigrafia	°	°	°	2	2	3	2	°	1	°	2	1	°	1	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	1	°	16
Rock Magnetism & Paleogeophys	°	°	°	°	°	°	1	°	°	°	2	°	°	°	1	1	°	°	1	1	°	1	4	2	°	°	°	°	°	°	°	14
Rock Mechs & Rock Engineering	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	1
Russian Geology and Geophysics	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	1
S. African Journal of Science	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	1
S. Pacific Marine Geological Notes	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	1
Schriften Naturwissenschaftlichen Vereins fuer Schleswig-Holstein	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Schweizerische Mineral Petrograph Mitteil Bull Suisse de Mineral et Petrographie	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Sci of the Total Environment	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Sci Rpts Kanazawa University	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	1
Sci Rpts Niigata Univ, Ser E, (Geol)	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	1
Journal title	**69**	**70**	**71**	**72**	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**86**	**87**	**88**	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**Tota**
Sci Rpts Tohoku Univ. Ser 2: Geol Tohoku Daigaku Rika Hokoku. Dai 2: Shu Chishitsugaku	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	2	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	3
Science	1	4	1	1	3	1	3	2	1	3	3	2	4	3	2	4	2	2	2	°	°	2	2	1	3	1	4	7	°	5	3	72
Science J. (London)	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Science News (Washington)	°	°	°	°	°	°	4	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	5
Science, Progres, Decouverte	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Sciences de la Terre	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Sciences Geologique (Bulletin)	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Scientific Drilling	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	4	3	°	°	1	2	°	°	°	°	10
Scripps Inst of Oceanography	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Scripta Geologica	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	1
Sea Frontiers/Sea Secrets	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Sea Technology	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	2
Sedimentary Basins of the World	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	2	°	°	°	°	°	°	2
Sedimentary Geology	°	°	°	°	°	°	°	°	°	°	3	°	°	°	°	1	°	7	°	1	°	1	°	1	2	2	1	1	3	2	2	27
Sedimentology	°	°	°	1	°	°	1	1	1	°	2	°	1	°	3	°	°	1	°	°	°	°	1	°	1	°	2	°	°	1	°	16
SEG Abs (Soc Explor Geophys)	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	2	°	°	°	°	°	°	°	°	°	°	°	°	2
Seismological Research Letters	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	1
Sekiyu Gijutsu Kyokaishi (J Japanese Assoc Petroleum Tech)	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	2	1	°	2	°	1	°	°	1	°	°	°	°	8
SEPM Reprint Series	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
SEPM Short Course	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	3	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	3
Shigen Chishitsu (J Soc Resource Geology)	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	1	°	°	°	°	2
Shiyou Yu Tianranqi Dizhi (Oil & Gas Geology)	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	1
Short Course Notes - Geol Assoc Canada	°	°	°	°	°	°	°	°	°	°	°	°	°	2	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	2
Show and Tell Messinian Seminar	°	°	°	°	°	°	°	8	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	8
Skrifter - Norsk Polarinstitutt	°	°	°	°	°	°	°	°	°	°	2	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	2
Slovensky Kras	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Soil Mechs & Foundation Engineer.	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	1
Sonderforschungsbereich 313 "Sedimentation im Europaeischen Nordmeer"	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	°	°	1	°	°	°	°	°	°	°	°	°	°	2
Southeast Asia Pet. Explor. Soc.	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1
Sovetskaya Geologiya	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1	1	°	°	°	°	°	°	°	°	2
Soviet Antarctic Expedition, Inf Bull	°	°	°	°	°	°	1	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	1

Spec Paper - Geol Soc America	.	.	.	.	.	.	.	.	.	.	.	.	1	5	.	.	.	.	.	2	.	2	.	1	.	.	1	6	.	.	4	22
Spec Publ - Geochemical Society	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	1
Spec Publ - Geol Soc Australia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	1
Spec Publ - Soc Econ Paleon Mineralogists (SEPM) [Soc Sedimentary Geol] [3 titles]	.	.	.	.	.	1	.	.	.	.	.	.	26	.	.	.	1	.	.	.	.	.	2	.	.	.	6	.	1	2	.	39
Spec Publ - The Paleontologic Soc	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	.	.	5
Spec Publ European Assoc Petroleum Geoscientists	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	2
Spec Publ of the Intl Assoc of Sedimentologists	.	.	.	.	.	6	.	.	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.	2	2	.	.	.	.	.	12
Spec Publs - Cushman Foundation for Foraminiferal Research	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	1	1	.	.	.	.	.	.	.	.	.	.	4
Spec Rpt - Geotherm Resources Council	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Stanford U. Publs. Geological Sci.	.	.	.	.	.	.	.	.	.	9	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	10
Stero-Atlas of Ostracod Shells	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	1	.	.	.	4
Stockholm Contribs in Geology	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	4
Strata. Actes du Lab de Geol Sed et Paleontol de l'Univ Paul-Savatier, Toulouse, Ser 1: Communications	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1
Journal title	**69**	**70**	**71**	**72**	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**86**	**87**	**88**	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**Tota**
Stratigrafiya, Geologicheskaya Korrelyatsiya	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	1
Studi Geologici Camerti. Vol Spec	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	2
Studia Geologica Salmanticensia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	2
Studies in Geology (Knoxville)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1
Surveys in Geophysics	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Syllogeus - Natl Mus Natural Sci	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Systematic Zoology	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Tech Bull - U.N., Econ & Social Commiss. Asia & Pacific (ESCAP), Committ. Co-ordination of Joint Prospecting for Mineral Resources in S. Pacific Offshore Areas.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Tech Prog/Abs Papers - European Assoc Exploration Geophysicists	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	2
Tech Rpt - Interagency Ecological Study Program for the Sacramento-San Joaquin Estuary	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	1
Tech Rpt - Marine Geosci Unit, Joint Geol Surv/Univ Cape Town	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Tech Rpt - Woods Hole Oceanographic Institution	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	.	.	.	.	.	.	.	.	2
Tech Rpt ISEI, Series A (Inst Study Earth's Interior, Okayama Univ)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	1	.	.	.	.	.	.	.	.	3
Tectonics	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1	.	1	1	.	.	.	.	.	.	4
Tectonophysics	.	.	.	.	1	.	.	.	.	1	2	.	.	.	2	4	1	1	2	1	.	.	2	2	1	2	2	3	3	4	.	34
Terra Abstracts	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	29	.	18	.	3	.	.	.	.	50
Terra Antartica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	2	.	3
Terra Cognita	.	.	.	.	.	.	.	.	.	.	.	.	8	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	9
Terra Nostra (Bonn)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	14	.	.	.	.	14
Terra Nova. The European J of Geosciences	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	2	1	.	.	.	1	.	6
Tertiary Research	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1
Thalassografika	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
The Canadian Mineralogist	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	1	.	.	.	.	.	.	.	3
The Edinburgh Geologist	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	2
The J Alabama Academy of Sci	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	1	.	.	.	.	2	.	.	.	.	4
The J Geol Soc Jamaica	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	1

The Log Analyst	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6	0	0	0	0	0	0	0	0	7
The Palaeobotanist	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
The Paleontological Soc Papers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
The Sciences (New York)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Tikhookeanskaya Geologiya (Pacific Geology)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Trans - Gulf Coast Assoc Geological Societies	0	0	0	0	1	0	1	0	0	1	1	0	0	0	0	0	2	1	1	2	0	0	1	0	0	0	0	0	0	0	0	11
Trans (Doklady) USSR Acad Sciences: Earth Sci Sections	0	0	0	0	0	1	0	0	0	2	1	0	0	0	0	0	0	4	0	0	1	0	0	0	0	1	1	0	0	0	0	11
Trans Caribbean Geological Conf Memorias - Conf Geologica del Caribe	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	6
Trans CIBCASIO (mtg)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Trans CWLS Formation Evaluation Symp (Canadian Well Log Soc)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Trans Latin Am Geologiacl Conf	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Trans R Soc Edinburgh: Earth Sci	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
Trans SPWLA Ann Logging Symp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	1	0	0	0	0	1	0	0	1	0	0	7
Trans/Proc Palaeontol Soc of Japan; New Series	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	2	0	0	0	0	6
Travaux du CRM Jean Cuvillier	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Travaux et Docs de Geographie Tropicale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Journal title	**69**	**70**	**71**	**72**	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**86**	**87**	**88**	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**Tota**
Travaux et Docs de l'ORSTOM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Trudy - Geol Inst, Akad Nauk SSSR	0	0	0	0	0	0	0	0	0	0	0	0	0	1	16	8	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	35
Trudy - Naucno-Issledovatel'skij Inst Geologii Arktiki	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Trudy - Vsesoyuznyy Ordena Lenina Nauchno-Issledovatel'skiy Geologicheskiy Institut im A. P. Karpinskogo, Novaya Seriya	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Trudy Inst Geologii I Geofiziki (Novosibirsk)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Trudy Inst Okeanologiy im. P.P. Shirshova	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Tulane Studies Geology and Paleontology	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Tulsa Geological Soc Digest	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Umschau in Wissenschaft und Technik	0	1	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
USGS Bulletin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	3
USGS Circular Report	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	11	0	0	0	0	0	14
USGS Digital Data Series	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
USGS Open File Report	0	0	0	0	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0	1	0	2	3	8	2	11	1	2	0	0	1	36
USGS Prof Paper	3	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Utrecht Micropaleo Bulls	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Verhandlungen der Naturfor-schenden Gesellschaft in Basel	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Vestnik Akademii Nauk SSSR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Vestnik Moskovskogo Univ, Ser 5: Geografiya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Voporsy Mikropaleontologii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Warta Geologi (Newsl Geol Soc Malaysia)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3
WAT on Earth (Univ Waterloo)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Water Resources Research	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Water Spectrum	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
World and Regional Geology	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4
World Data Center A for Marine Geology & Geophysics, Rept MGG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	16
World Oil	0	2	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Xiandai Dizhi (Geoscience)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	2

Yanjiu Baogao - Guoli Tawan Daxue Lixueyuan Haiyang Yanjiusuo Acta Oceanographica Taiwanica	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Yanshi Zuebao Acta Petrologica Sinica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Year Book - Carnegie Inst of Wash	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	4
Yearbook - Lamont-Doherty Geol Observatory Columbia Univ	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Zeitschrift der Deutschen Geologischen Gesellschaft	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
Zeitschrift fuer Angewandte Geologie	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Zeitschrift fuer Geol Wissenschaft	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Zeitschrift fuer Gletscherkunde und Glazialgeologie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Zentralblatt fuer Geol & Palaeo, Teil I: Allglemeine, Angewandte, Regionale und Historishe Geologie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Zhizn' Zemli	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Zhongguo Diqiu Huaxue Xuebao (Chinese Journal of Geochemistry)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Zitteliana	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3
Totals	**37**	**44**	**49**	**71**	**133**	**127**	**153**	**208**	**191**	**210**	**258**	**272**	**260**	**293**	**308**	**318**	**254**	**343**	**297**	**377**	**275**	**422**	**338**	**356**	**406**	**456**	**410**	**410**	**256**	**305**	**146**	**7983**	