

# Current Comments

Introducing *ISI/GeoSciTech* and the  
*GeoSciTech Citation Index*—the 50 Most-Active  
Research Fronts in 1981 in the Earth Sciences  
Illustrate the Unique Retrieval Capabilities of  
Our New Online and Print Services

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Last year I described ISI's plan to produce a series of new information services that would provide selective, yet comprehensive, coverage of a broad range of disciplines.<sup>1</sup> The first step in that direction was the creation of our online data base called *ISI/BIO-MED*<sup>™</sup>.<sup>2</sup> More recently, I described *ISI/CompuMath*<sup>™</sup>,<sup>3</sup> which was designed to meet information needs of researchers in pure and applied mathematics, computer science, and related fields.

I am particularly pleased to announce yet another disciplinary service covering the literature of the earth sciences and geotechnology. Called *ISI/GeoSciTech*<sup>™</sup>, it covers such fields as petroleum science, geochemistry and geophysics, oceanography, metallurgy, mining, meteorology, and many other disciplines related to the earth's environment.

Like its predecessors, *ISI/GeoSciTech* was created to make it easier for researchers to take advantage of citation indexing and other unique features of ISI services. As a large multidisciplinary index, *Science Citation Index*<sup>®</sup> (*SCI*<sup>®</sup>) is available almost exclusively in the main library at most universities or other large institutions. And although *SCI* covers the earth sciences extensively, most geologists, for instance, use their departmental or personal libraries to meet their

day-to-day information needs. A special trip to the main library for routine bibliographic searches is just not practical. Furthermore, many researchers do not know that the earth scientist is adequately served by *SCI*. To overcome these problems we have included in the *ISI/GeoSciTech* system three basic parts—*Current Contents*<sup>®</sup>/*GeoSciTech* (*CC*<sup>®</sup>/*GeoSciTech*), a printed *GeoSciTech Citation Index*<sup>™</sup>, and *ISI/GeoSciTech* online.

All three components begin with coverage that includes over 350 "core" journals in geosciences and geotechnology. The fields represented in these core journals range from atmospheric sciences to volcanology. Besides covering fields like paleontology, geomagnetism, and geotectonics, *ISI/GeoSciTech* also covers key journals from related fields like astrophysics and planetary science, marine biology, plant science, ecology and ecotoxicity, earthquake engineering, coastal engineering, metal and corrosion science, and even journals in marine policy and ecological law.

In addition to this core coverage, *ISI/GeoSciTech* selectively covers articles relevant to the geosciences from about 6,300 journals in the sciences, social sciences, and even the arts and humanities. Consider, for example, the field of archaeology as it relates to paleontology.

We expect that over 50,000 current articles will be included each year in the *ISI/GeoSciTech* data base. These source articles will contain over 800,000 references to more than 500,000 unique articles and books cited in the current literature.

*CC/GeoSciTech* is the current awareness part of the package, bringing you the contents pages from recent journal issues. I don't think it is necessary for me to belabor the virtues of *CC*. But if you intend to advise colleagues or students about this new edition of *CC*, it is worth noting that in spite of the many new electronic developments in retrieval, *CC* remains as popular as ever as a simple method for covering the core literature. However, *CC/GeoSciTech* is intended as an augmentation of the other basic services. Since it will not initially contain an author address directory, it is important to know that you can order individual articles through *ISI's Original Article Text Service (OATS®)*. Beginning this month, *CC/GeoSciTech* will be issued monthly, and will list about 3,000 articles per issue. It will not contain a subject index since the retrieval function is provided by the online service or the printed indexes.

*GeoSciTech Citation Index* is the second component. Similar in many ways to *ISI's* other citation indexes for the sciences, social sciences, and the arts and humanities, *GeoSciTech Citation Index* is designed to make retrospective searching of the literature in the earth sciences both easy and comprehensive. It includes three sections: a Source Index, a Citation Index, and a Permuterm® Subject Index (PSI).

As Figure 1 shows, the Source Index can be used to determine what a particular author has published. We have improved the Source Index by including the complete list of references cited in each paper. We adopted this feature in

**Figure 1:** Sample entry from the *GeoSciTech™* Source Index. References listed beneath each source paper identify first author, year of publication, journal title, volume, and page number.

<b>WOODHOUSE JH</b>			
THE EXCITATION OF LONG PERIOD SEISMIC WAVES BY A SOURCE SPANNING A STRUCTURAL DISCONTINUITY			
<i>GEOPHYSICAL JOURNAL</i> 81(1) 11,29-1131 81			
HARVARD UNIV HOFFMAN LAB DEPT GEOL SCI CAMBRIDGE MA 02138 USA			
BACKUS G	6	GEOPHYS J ROY ASTRON	46 341
GILBERT F	71		22 223
	75	PHILOSOPHICAL MAGAZINE	278 187
<b>WOODWARD SC</b>			
INDUCTION AND REVERSAL OF PULMONARY LIPID HISTIOCYTOSIS IN RATS FOLLOWING ORAL ADMINISTRATION OF ANORECTIC CLOFLOREX AND CHLORPHENTERMINE			
<i>J TOXICOL CLIN PHARMACOL</i> 7(3-4) 509-517 81			
VET ADMIN MED CTR LAB SERVICE SALT LAKE CITY UT 84143 USA			
ENHMAN AP	74	CIRCUITRY	35 657
KACIWS	77	EXPERIMENTAL PATHOL	17 196
	79	TOXICOL APPL PHARM	47 185
KAY JM	89	CROCIALARIA SPECTABILIS	50
LULLMANN H	72	ARZNEIMITTEL FORSCH	22 2986
	72	CHEM REV TOXICOL	4 185
LULLMANN RAUCHER R	73	VIRCHOWS ARCH	B 13 407
LUNA LG	68	MANUAL HISTOLOGICAL	147
MAGNUSON G	72	BETTER PATH	146 79
PARWARI SCH MR	73	RES EXPL MED	161 272
SCHERMER N	67	BLUETIMORPHOLOGIE LABO	11 31
SMITH P	74	PATHETROP	9 273

*Social Sciences Citation Index® (SSCI®)* several years ago. It provides what I call a citation "abstract." Once you have turned to a particular paper in the Source Index, you can see at a glance whose work has been cited, and any one of the cited references can be used as an entry point to the Citation Index section.

The Source Index also includes a subsection called the Corporate Index. This section lists source papers according to the author's institutional affiliation, so you can follow research activity at a particular university or laboratory.

The Citation Index tells you where papers by an author have been cited. A sample from this index appears in Figure 2. The PSI provides a unique approach to key word searching. Figure 3 shows the PSI entry for the word "landsat." All the words that appear in the titles of source papers along with "landsat" are listed along with the authors of each source paper. The PSI allows you to find papers on a specific topic of interest without relying on the subjective judgments of indexers.

To start the service with a significant mass of information, the 1981 annual

**Figure 2:** Sample entry from the *GeoSciTech Citation Index*<sup>TM</sup>.

	VOL	PG	YR
<b>WOODHEAD DS</b>			
73 IAEA P 499			
MCKINLEY IG EST COAST S	13	59	81
<b>WOODHOUSE JH</b>			
74 GEOPHYS J ROY ASTRON 37 461			
MALIN PE PHYS E PLAN	26	261	81
78 GEOPHYS J ROY ASTRON 54 263			
KENNETT BLN GEOPHYS J R	66	633	81
<b>WOODIN SA</b>			
74 ECOL MONOGR 44 171			
WILSON WH J MARINE RE	39	735	81
76 J MARKETING RES 34 25			
CURTIS LA EST COAST S	13	277	81
WILSON WH J MARINE RE	39	735	81
78 ECOLOGY 59 274			
CROKER RA MARINE BIOL	61	79	80
79 AM ZOOLOG 19 1029			
WILSON WH J MARINE RE	39	735	81
<b>WOODING RA</b>			
65 J HYDROLOGY 3 254			
PARLANGE JY J HYDROL N	52	171	81
<b>WOODJONES F</b>			
10 CORALS ATOLLS			
KOJIS BL B MARIN SCI	31	558	81

cumulation will be published this month. These bound volumes will be used to begin most searches. To keep *GeoSciTech Citation Index* as timely as possible, however, we will also publish two interim triannual issues. Each triannual issue covers a four-month period. The buckram bound annual cumulation includes the final four-month period. The first 1982 triannual will also appear this month. The second will appear in October.

The third component, the *ISI/GeoSciTech* online data base, allows you to conduct both current awareness and retrospective searches. This data base covers the geosciences literature from 1978 to the present. Beginning this month, it will be available through the ISI Search Network via Telenet, Tymnet, and direct dial.

*ISI/GeoSciTech* online provides a number of access points. You can search the data base by author, institutional affiliations, title words, cited references,

source journals, document type, and language. But you can also search by a new and highly efficient method called "research front specialty searching."<sup>2</sup> This approach to automatic indexing is designed to put a highly focused bibliography in your hands in minutes.

A research front specialty is simply a new way of characterizing an active area of current research. We identify these research fronts through citation clustering.<sup>4</sup> Each research front is associated with a cluster of highly cited core papers. The papers you retrieve in this system are the current articles that cite one or more of the core papers. In the future you will also be able to retrieve a list of core papers for each research

**Figure 3:** Sample entry from the *GeoSciTech*<sup>TM</sup> Permuterm<sup>®</sup> Subject Index.

<b>LANDSAT</b>	
ALBEDO-----	▶ ROBINOVE CJ
ARID-----	
ATCHAFALAYA-----	▶ ROUSE LJ
COMPARISON-----	▶ CHABRIER G
COMPUTATION-----	▶ SHIH SF
CORSICA-----	CHABRIER G
DATA-----	ROUSE LJ
	SHIH SF
DELTA-----	ROUSE LJ
DIFFERENCE-----	ROBINOVE CJ
DOCUMENTAT-----	ROUSE LJ
EXPLORATION-----	▶ MORRISJO DR
FLORIDA-----	SHIH SF
FRAMES-----	CHABRIER G
GROWTH-----	ROUSE LJ
IMAGE-PROC.-----	MORRISJO DR
IMAGES-----	ROBINOVE CJ
IMPROVE-----	SHIH SF
INTERPRETA.-----	MORRISJO DR
LAKE-----	SHIH SF
LAND-----	ROBINOVE CJ
MINERAL-----	MORRISJO DR
MONITORING-----	ROBINOVE CJ
OKEECHOBEE-----	SHIH SF
PROVENCAL-----	CHABRIER G
RIVER-----	ROUSE LJ
SARDINIA-----	CHABRIER G
STRUCTURES-----	
SUBAERIAL-----	ROUSE LJ
TECHNIQUES-----	MORRISJO DR
USE-----	SHIH SF
USING-----	MORRISJO DR
	ROBINOVE CJ
WATER-BUDG.-----	SHIH SF

front. Or, if you prefer, start with a well-known paper in your field to locate the research front to which it has been assigned.

The research fronts are named by a semiautomatic procedure. The titles of all citing papers are sorted by computer to produce a ranked list of key terms or phrases. A scientist examines the list and selects the appropriate words and phrases to create syntactically meaningful names. These usually consist of about five or six significant words. In addition, appropriate cross references are created where necessary.

A numeric as well as alphabetic listing of over 3,500 research front specialties can be found in the *Index to Research Fronts in ISI/GeoSciTech*.<sup>5</sup> The alphabetic index contains an entry for every significant word in the titles chosen for the research fronts. A sample section from the index is shown in Table 1.

To begin your search, you simply choose a research front from the index, and key its number into your terminal. If you were interested in geochemical models of crust evolution, you would probably want to see papers in the research front entitled "Geochemical models of crust and mantle evolution." The number for this specialty is 81-0297. When you enter this number into the ter-

minal, the computer will respond by printing the name of the specialty. In this way, it verifies that you have the correct research front. Then it will tell you how many papers, or "hits," are included in the specialty. This information appears in Figure 4.

Now you know this research front contains 66 papers. If you wish, you can ask the computer to display or print the list of these papers by the command "PRINT." But 66 papers may be too many for your needs, or you may want to see only those papers by a given author, or from certain institutions, and so forth. Thanks to the citation based method, you can also identify the most relevant papers by using the command called "specialty weight."

In Figure 5, we've conducted a specialty weight search. Responding to the command, "EXPAND SPWT=81-0297#," the computer ranks the papers according to the number of core documents they cite. As you can see, 30 papers cite one core document, 13 papers cite two, seven cite three, three cite four, eight cite five, and two papers cite six core documents. After all the papers have been ranked, the computer announces that there are "NO MORE HITS," and awaits further instructions. In this example, by entering the

**Table 1:** Sample section from the *Index to Research Fronts in ISI/GeoSciTech*™.

#### **DRAINAGE**

effects of internal DRAINAGE and WEATHERING on SOIL .....	81-0813
DRAINAGE BASIN MORPHOMETRY .....	81-3431
contributions of NUTRIENTS to TILE DRAINAGE .....	81-0457
TOPOLOGICAL ASYMMETRY of DRAINAGE NETWORKS .....	81-3385

#### **DRIFT**

DRIFT PATTERNS of STREAM INVERTEBRATES .....	81-0762
MANTLE CONVECTION MODELS and CONTINENTAL DRIFT .....	81-3038
PALEOMAGNETISM and CONTINENTAL DRIFT .....	81-1140
effects of PARTICLE DRIFT and the SOLAR-CYCLE on COSMIC-RAYS .....	81-2011

#### **DRILLING**

LOW-TEMPERATURE alteration of BASALTS in the DEEP-SEA DRILLING PROJECT .....	81-0232
--	---------

**Figure 4:** *ISI/GeoSciTech*™ online search. Computer response to user's initial command to locate SP=81-0297.

```
*SP=81-0297
GEOCHEMICAL MODELS OF CRUST AND
MANTLE EVOLUTION
SET 1: 66 HITS
```

**Figure 5:** *ISI/GeoSciTech*™ online search by specialty weight.

```
*EXPAND SPWT=81-0297H
TYPE: SPWT
```

```
1 (30)                81-0297-01
2 (13)                81-0297-02
3 (7)                 81-0297-03
4 (3)                 81-0297-04
5 (8)                 81-0297-05
6 (2)                 81-0297-06
```

```
NO MORE HITS
ACTION/GROUP 6
SET 1: 2 HITS
```

```
*PRINT 1
```

```
AN GS0042340
TI ISOTOPE AND TRACE-ELEMENT
  MODELS OF CRUSTAL EVOLUTION
LA ENGLISH
DT ARTICLE
AU ONIONS RK; HAMILTON PJ
CS DEPT EARTH SCI, DOWNING ST,
  CAMBRIDGE CB2 3EQ, ENGLAND
SO PHILOSOPHICAL TRANSACTIONS OF
  THE ROYAL SOCIETY OF LONDON - A
  301(1461):473-487
```

```
YR 81
RF 41
ONLQ980
SP 81-0129; 81-0297; 81-2627; 81-1275; 81-1486
```

```
AN GS0014102
TI GEOCHEMICAL STUDIES ON OCEANIC
  BASALTS FROM THE INDIAN-OCEAN
LA ENGLISH
DT ARTICLE
AU SUBBARAO KV; REDDY VV
CS INDIAN INST TECHNOL, BOMBAY 400076,
  INDIA
SO TECTONOPHYSICS 75(1-2):69-89
YR 81
RF 53
ONLP321
SP 81-2453; 81-2856; 81-1383; 81-1001; 81-0297
```

"PRINT" command, we've asked to see bibliographic information on the two most relevant papers, the papers in group six. Each of these papers cites six core documents in the cluster. Incidentally, in the future, you will be able to execute a "CORE" command that will also list the core papers for each specialty.

You can see from Figure 5 that *ISI/GeoSciTech* provides all the bibliographic information necessary to retrieve the article from your library. You are given the full title; the author's name and institutional affiliation; the document type and language; the journal title, volume, page numbers, and year of publication; even the number of references the article contains. We also include the article's accession number, so you can relocate the full entry at a later date simply by using that number. You are also given the *OATS* number that identifies the journal issue if you want to order the article from ISI. In the last line of each entry, we list the numbers of other research fronts in which each paper appears. By entering these numbers into your terminal, you can widen your search and explore other specialties that might be relevant to your interests.

When displaying bibliographic information of articles in the *ISI/GeoSciTech* data base, you actually have a choice of formats. We've used Format 1 in Figure 5. If you wanted to see more information on the articles, such as the references they cite, you would select one of the other formats. Several formats present less information by excluding institutional affiliations, document type, language, and so forth. Figure 6 presents a more compact, unlabeled format. Thus, the *ISI/GeoSciTech* user can request the bibliographic information most suited to his or her needs.

Since many users still rely on printed indexes for a variety of information

Figure 6: Compact print format for papers in *ISI/GeoSciTech*™ online data base.

ISI ACCESSION GS0014102  
SUBBARAO KV; REDDY VV  
GEOCHEMICAL STUDIES ON OCEANIC BASALTS FROM THE INDIAN-OCEAN  
(ENGLISH/ARTICLE)  
TECTONOPHYSICS 75(1-2):69-89 1981 53 REFERENCES  
INDIAN INST TECHNOL,BOMBAY 400076, INDIA  
ISI OATS ORDER #LP321  
EXPLORE SPECIALTY 81-2453; 81-2856; 81-1383; 81-1001; 81-0297

ISI ACCESSION GS0042340  
ONIONS RK; HAMILTON PJ  
ISOTOPE AND TRACE-ELEMENT MODELS OF CRUSTAL EVOLUTION  
(ENGLISH/ARTICLE)  
PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY OF LONDON SERIES  
A-MATHEMATICAL AND PHYSICAL SCIENCES 301(1461):473-487 1981 41 REFERENCES  
DEPT EARTH SCI,DOWNING ST,CAMBRIDGE CB2 3EQ, ENGLAND  
ISI OATS ORDER #LQ980  
EXPLORE SPECIALTY 81-0129; 81-0297; 81-2627; 81-1275; 81-1486

needs, we are developing a fourth component of *ISI/GeoSciTech*. This is the printed version of the *ISI/GeoSciTech* online file, to cover 1976 to 1980. This five-year cumulation will be available in December 1983.

There are two subscription policies for *ISI/GeoSciTech*—one for the combined print and online versions, and another for the online version alone. Both subscription prices reflect the costs inherent in creating the *ISI/GeoSciTech* data base. The print/online subscription is \$1,250 per year. Print subscribers receive the two triannual issues as well as the 1982 hardcover annual *GeoSciTech Citation Index*. Additional copies of the Index are available to print subscribers at half price. New print subscribers will also receive 12 monthly issues of *CC/GeoSciTech* free of charge. Additional copies of *CC/GeoSciTech* are available to subscribers for \$125 per year. In addition, print subscribers can use *ISI/GeoSciTech* online for \$50 per hour. To non-print subscribers, the *ISI/GeoSciTech* online data base is available at a rate of \$150 per hour. Communications costs are not included in these prices.

The printed version of the 1976-1980 *GeoSciTech Citation Index* cumulation

will be sold separately and will be published in December 1983. It can be purchased for \$4,000 until December 31, 1982. After that date, the five-year cumulation will cost \$5,000. This allows you time to plan and order at the pre-publication price. The 1981 annual Index will be sold as a back issue for \$1,250.

For large organizations providing selective dissemination of information (SDI) services, the *ISI/GeoSciTech* data base, including cluster data, will be available on magnetic tape. Current-year tapes will cost \$8,000 each and back-year tapes will cost \$4,000 each.

For more information on these services, you can write Gerald Francis, Manager of Product Development, ISI, 3501 Market Street, University City Science Center, Philadelphia, Pennsylvania 19104, USA. Or you can call toll-free in the US at (800) 523-1850, ext. 1389. Readers abroad can contact the offices listed at the beginning of each issue of *CC*.

Since this is the first time we have reported in a significant fashion on any aspect of the earth sciences, I want to illustrate the value and power of clustering. So in Table 2, I have listed the 50

**Table 2:** 50 most-active research fronts in *ISI/GeoSciTech*™ (1978-1981).

<b>Number of citing papers</b>	<b>Cluster number</b>	<b>Name of research front</b>
569	81-0451	Energetic particles in Jupiter's magnetosphere
564	81-0170	Electrodynamics of the thermosphere and ionosphere
527	81-0084	Isotopic anomalies in meteorites and the formation of the solar-system
482	81-0073	Mantle-derived xenoliths and the nature of the upper-mantle
420	81-0282	Mesoscale mass and heat fluxes and cumulus convection in GATE
373	81-0021	Alfven-wave instabilities in the solar wind
373	81-0096	Ion chemistry of the thermosphere and ionosphere
365	81-0294	Atmospheres and electromagnetic spectra of Saturn, Uranus, Neptune and their satellites
362	81-0208	Ions upstream and backstream from the earth's bow shock and solar wind
338	81-0803	Electrostatic shocks and auroral particle acceleration
316	81-0218	Plasma waves in Jupiter's magnetosphere
307	81-0233	Eulerian-mean circulation and Lagrangian-mean flow during sudden warming of the stratosphere
291	81-0469	Formation of emission-lines of Seyfert galaxies, quasars, and QSOs
277	81-0129	Neodymium and strontium isotope systematics, igneous petrogenesis and crustal evolution
277	81-0087	Petrogenesis of igneous and metamorphic rocks
272	81-0262	Outer atmospheres of cool stars
269	81-0525	Properties of energetic particles in inter-planetary space
264	81-0080	Mantle deformation and rheology
261	81-0171	Mutagenic activity of various air-pollutants and water-pollutants
257	81-0067	Relation of ionospheric electric fields to field-aligned-currents and auroras
249	81-0142	Effects of wind-driven shelf-waves and coastal trapped waves on coastal circulation
245	81-0179	Trace elements in carbonaceous chondrites and other chondrites
242	81-0521	Gas abundances in planetary nebulae
235	81-0749	Energy-balance global climate models
229	81-0572	Models of two-dimensional turbulence
228	81-0002	Equatorial F-region plasma bubbles
223	81-0499	Isostasy and flexure of the ocean lithosphere
222	81-0049	Identification of inter-stellar material
219	81-1383	Geochemical variations in oceanic-crust basalts and implications on mantle heterogeneity
208	81-2028	Geochemistry, petrology, and tectonic setting of volcanic complexes and metavolcanic complexes
207	81-1469	Effects of competition and predation on infauna abundances in inter-tidal-zones
207	81-1557	Crystal structures of metals, alloys and silicate minerals
207	81-0115	Paleomagnetism, paleopoles and plate-tectonics
206	81-1394	Ozone depletion by halogenated hydrocarbons and nitrous oxide
204	81-0195	Information on the geology and climate of Mars provided by the Viking mission
203	81-0764	Marine-sediment traps and fecal-pellet flux
203	81-0777	Models of formation and characteristics of pyroclastic deposits
201	81-0126	Geomagnetic field reversals and the earth as a non-linear astrophysical dynamo
200	81-0221	Interstitial water chemistry and fluxes across the deep-sea sediment-water interface
197	81-0740	Kinetics of phase separation by spinodal-decomposition in binary mixtures
196	81-0291	Relation of field-aligned-currents to the inter-planetary magnetic-field and ionospheric currents
192	81-0482	Plasma instabilities due to the equatorial electrojet
190	81-2496	Partitioning of rare earth elements in igneous rocks
188	81-0120	Grazing rates and feeding responses of copepods
182	81-0635	Properties of ocean internal-waves
181	81-0380	Abundance of elements in globular-cluster red-giants
177	81-2942	Periodicity and chaos in turbulent convection

most-active research fronts represented in the *Index to Research Fronts in ISI/GeoSciTech*. If you want the complete index of 3,500 research fronts you can order a copy for \$50. However, it is provided to subscribers at \$25 per copy. As we have done in mathematics and other fields, we also intend to follow up this essay with analyses of the most-cited journals as well as the most-cited authors in the earth sciences.

As with *ISI/CompuMath*, the earth sciences research fronts have been identified by processing four years of data. In our *ISI/BIOMED* system, we use only one year of core data. Clearly, the rate of publication affects the "timing" of this classification procedure, and varies from field to field. In the earth sciences and mathematics, we will probably want

to create a new set of clusters every year. Certain fast-moving topics in computer science may also require this. On the other hand, pure mathematics may not need to be changed every year.

The examples in Table 2 should illustrate very well our claim that the system provides a new dimension in literature classification. By a process similar to the one that I have described for our new *ISI Atlas of Science: Biochemistry and Molecular Biology*,<sup>6</sup> we can and will in the future create a series of minireviews for an encyclopedic *Atlas of the Earth Sciences*.

\* \* \* \* \*

*My thanks to Joseph Pickett for his help in the preparation of this essay.*

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