

NATIONAL MAPPING OF SCIENCE

**EARTH SCIENCES RESEARCH
IN INDIA**

A Study Based on GeoRef Database

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EARTH SCIENCES RESEARCH IN INDIA-
A STUDY BASED ON GEOREF DATABASE**



REGIONAL RESEARCH LABORATORY

(Council of Scientific & Industrial Research)

BHUBANESWAR – 751 013

FOREWORD

I am happy to forward this report on “Updation of National Mapping of Sciences – Earth Sciences: a Study Based on GeoRef Database” prepared by Dr. J. R. Sahu, Dr. D. B. Ramesh, Dr. D. P. Sandha, Mr. B. K. Dalai, Mr. M. K. Seth and Mr. B. B. Sahoo (Project Assistant) of our Laboratory.

The Department of Scientific & Industrial Research, Govt. of India, New Delhi funded this study under the NISSAT programme of National Mapping of Sciences with our Laboratory.

I hope that the data shown in this report will show some trends of the research efforts of Indian Geologists/Scientists/Scholars in the field of Earth Sciences.


27/12/01

Dr. Vibhuti Narain Misra

Director

Regional Research Laboratory

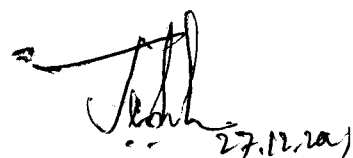
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We express our sincere gratitude to Dr. Abhijit Lahiri, Advisor & Scientist – G, National Information System for Science & Technology (NISSAT), Department of Scientific & Industrial Research (DSIR), Govt. of India, New Delhi for giving this project to our Laboratory and all his advise.

We also express our thanks to Smt. Sridevi Ravindran, and Smt. Kamini Mishra, Scientists of NISSAT for their help in all administrative matters related to this project.

A handwritten signature in black ink, appearing to read 'J. R. Sahu', with the date '27.12.20' written below it.

Dr. J. R. Sahu

Team Leader

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SYNOPSIS

This study has been taken up to quantify and map the research efforts of Indian Geologists, Scientists and Scholars working in the field of Earth Sciences. For this purpose CD-ROM version of the GeoRef database published by the American Geological Institute, USA for the years 1990-1997 and also 1997-2000 August are used. The database has devised its own classification system having 50 category codes to organize the entire literature covered. The GeoRef record comprises as many as 17 fields.

Only records published during the years 1990, 1994 and 1998 were downloaded from the CD-ROM version of GeoRef database. For the years using different combinations of bibliographic fields for downloading the records for the data analysis. There are about 1501 records published by the Indian Scientists are covered in the database during the years 1990, 747 records in 1994 and 879 records in 1998. India ranks 10th in the world based on the publication count during 1990 and 11th in 1994 and 1998 respectively. USA tops the list followed by Canada in 1990 and 1994. However U. K taken the 2nd position in 1998. Almost all the countries recorded a decline in the number of papers produced during 1994 and 1998 in comparison with 1990. There are some slight shifts in percentage share and ranks during 1994 and 1998 from 1990. Percentage shift of total contributions from USA is -1.31 from 1990 to 1998. U.K has some increase in percentage shift i.e. +1.08 and Italy +1.38 from 1990 to 1998.

English tops the list followed by Russian, Chinese, French and German. However, during 1994 Chinese occupied the second position and in 1998 again Russian occupied the second position. More than 75% of the total publications published by the Indian scientists are from India, followed by Netherlands, USA & UK for 1990, 1994 and 1998. All the publications published by the Indian scientists are in English. Only two articles written in Hindi during 1990 and one in Japanese in 1994 and one in French in 1998 are covered.

All the publications published by the Indian scientists during the year 1990, 1994 and 1998 are of Analytic in nature. More than 50% of the Indian Earth Science literature published in Serial publications (journals) and the rest in other type of publications like – conference, documents, abstracts, books, etc.

Hyderabad tops the list followed by Calcutta and Bangalore in 1998. In 1994, Dehradun tops the list followed by Lucknow and New Delhi. During 1990, Calcutta tops the list followed by Dehradun and Hyderabad. Uttar Pradesh tops the list during the years 1998 and 1994 followed by Andhra Pradesh and West Bengal. However, in 1990 West Bengal tops the list followed by Uttar Pradesh and Andhra Pradesh. In 1994, again Uttar Pradesh tops the list followed by West Bengal and Maharashtra.

Almost in all the subject areas, Geological survey of India (GSI), India has contributed its publications except in category codes such as 02D, 05B, 06B, 09, 19 and 25. Wadia Institute of Himalayan Geology, Dehra Dun is the major contributors to some areas such as 06B and 09. NGRI, Hyderabad is the leader in areas like 02C, 20 and 21. ONGC in 29A. NIO, Goa in 07 and 24 and PRL, Ahmedabad in 02D, 05B and 24. Igneous and metamorphic petrology is the major area of research in India as per the publication count for all the three years. GSI (Geological Survey of India) is the major contributor to earth sciences research in India. GSI's contributions at

their different divisions. Geological Survey of India (GSI), India (272) tops the list followed by Wadia Inst. Himalayan Geol., Dehra Dun, India (93) and both together take 30% share of the total publications.

It is interesting to note that 70% of total publications is shared by the first 10 Institutions in India. Banaras Hindu Univ., Varanasi tops the list followed by Andhra Univ., Visakhapatnam, Jadavpur University, Calcutta and Univ. Roorkee, Roorkee during 1990. However, during 1994, Univ. Delhi, Delhi on the top followed by Univ. of Roorkee and BHU. In 1998, Univ. of Roorkee maintained its position followed by BHU and Jadavpur Univ. On the second [position and M. S. Univ. Vadodara has reached to third position. In 1990, Presidency College, Calcutta on the top followed by Deccan College, Poona and M. N. R. Eng. College, Allahabad. However in 1994, St. Xavier College, Bombay on the top followed by Presidency College and Agricultural College, Madurai. In 1998, D. S. College, Aligarh has occupied first position followed by Presidency College, Chennai and Assam Eng. College, Assam.

All the top 10 ranked sources of publications are published from India. Igneous and Metamorphic Petrology is the highly contributed area of research in India during 1990 followed by Applied Geophysics and Economic Geology. During 1994 Igneous and Metamorphic Petrology is the highly contributed area followed by Engineering Geology and Applied Geophysics. During 1998, again Igneous and Metamorphic Petrology is the highly contributed followed by Stratigraphy and Hydrogeology.

The major area of research in earth sciences in the World goes to Stratigraphy followed by Applied Geophysics and Igneous and Metamorphic Petrology. But in 1994, it goes to Environmental Geology followed by Igneous and Metamorphic Petrology and Stratigraphy. However in 1998, the top rank goes to again to Environmental Geology followed by Economic Geology and Stratigraphy.

Project Team

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TABLES: 24

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APPENDICES: 3

NATIONAL MAPPING OF SCIENCE EARTH SCIENCES RESEARCH IN INDIA - A STUDY BASED ON GeoRef DATABASE

This study has been taken up to quantify and map the research efforts of Indian Geologists/Scientists/Scholars in the field of Earth Sciences. For this purpose CD-ROM version of the GeoRef database published by the American Geological Institute, USA for the years 1986-1997 and 1997 to August 2000 are used. The GeoRef database contains over 1.9 million records of North America since 1785 and other areas of the world since 1933. The database has devised its own classification system to organise the literature as per their 50 Category Codes (CC). The GeoRef record comprises as many as 17 fields.

METHODOLOGY

Only records published during the years 1990, 1994 and 1998 were downloaded from the CD-ROM version of GeoRef database using the following combination of bibliographic data fields for the analysis:

- Set 1 PY =1990/1994/1998 and INDIA in AF;
- Set 1 and SO;
- Set 1 and CP;
- Set 1 and CC;
- Set 1 and PY;
- Set 1 and LA;
- Set 1 and PY
- Set 1 and DT;
- Set 1 and PY;
- Set 1 and BL;
- Set 1 and AF and CC

(AF=Author Affiliation; SO=Source; CP=Country of Publication; LA=Language of the Article; PY=Year of Publication; CC=Category Codes; DT=Document Type; BL=Treatment of the work)

There were about 1501 records from India in GeoRef database in 1990 and 747 records in 1994 and 897 records in 1998.

LIMITATIONS OF THE STUDY

In this study, the CD-ROM version of GeoRef database for the years 1990-1997 and 1997 to August 2000 are used. All the publications of Indian scientists published during the years 1990, 1994 and 1998 in India and abroad covered in the database have been downloaded for the purpose of data analysis. Some publications belonging to these years, which are not covered in the GeoRef database by the end of August 2000, are not covered. The decline publication output shown from 1990 to 1994 and 1998 supports that the CD-ROM version of the database is not updated timely and the coverage of publications from world over in the database is also on the decline side with few exceptions.

DATA ANALYSIS

The following indicators have been used for the data analysis by:

- Type of publication,
- Source of the publication,
- Country of publication,
- Institution's name,
- Institution place and state,
- Language of publication,
- Subject classification of publication,
- Year of publication,
- Author field of the publications, etc.

Further, the following indicators have also been studied:

- Indian contribution to world's literature in earth sciences,
- Top priority areas for research in earth sciences in India vs. world,
- Top priority areas for research of other countries in earth sciences,
- Where does Indian publications appear,
- Ranking of top journals/source where Indian papers were published,
- Major Institutions and their Priorities areas of research in earth sciences in India,
- Geographic distribution of publications.

Details of the data analysis were tabulated and presented as follows:

Country-wise distribution of total earth sciences publications

As per the data presented in the Table 1, India ranks 10th in the world based on the publication count during 1990 and 11th in 1994 and 1998 respectively. USA tops the list followed by Canada in 1990 and 1994. However U. K taken the 2nd position in 1998. Almost all the countries recorded a decline in the number of papers produced during 1994 and 1998 in comparison with 1990. (Fig. 1). There are some slight shifts in percentage share and ranks during 1994 and 1998 from 1990 (Tables 2 & 3 and Figs. 2 & 3)).

Table – 1: Country-wise distribution of total earth sciences publications (1990, 1994 & 1998)

Country	1990	%	1994	%	1998	%
World	72286		56813		49933	
USA	22513	31.14	19217	33.83	14893	29.83
Canada	3838	5.31	3029	5.33	2295	4.60
China	3370	4.66	2310	4.07	2332	4.67
Russia	3374	4.67	1743	3.07	2260	4.53
UK	3211	4.44	2723	4.79	2754	5.52
France	2919	4.04	2039	3.59	1856	3.72
Japan	2296	3.18	1849	3.25	1916	3.84
Germany	2214	3.06	1760	3.10	1594	3.19
Australia	1817	2.51	1378	2.43	1505	3.01
India	1501	2.08	747	1.31	879	1.76
Italy	830	1.15	1153	2.03	1264	2.53
Netherlands	574	0.79	477	0.84	591	1.18
Switzerland	444	0.61	369	0.65	420	0.84
Israel	288	0.40	331	0.58	216	0.43
Greece	187	0.26	111	0.20	170	0.34
Malaysia	94	0.13	158	0.28	10	0.02
Korea	56	0.08	126	0.22	136	0.27
Pakistan	38	0.05	21	0.04	21	0.04
Total		68.57		69.60		70.32
Other	22722	31.43	17272	30.40	14821	29.68

Fig. 1: World trend from 1990 to 1998

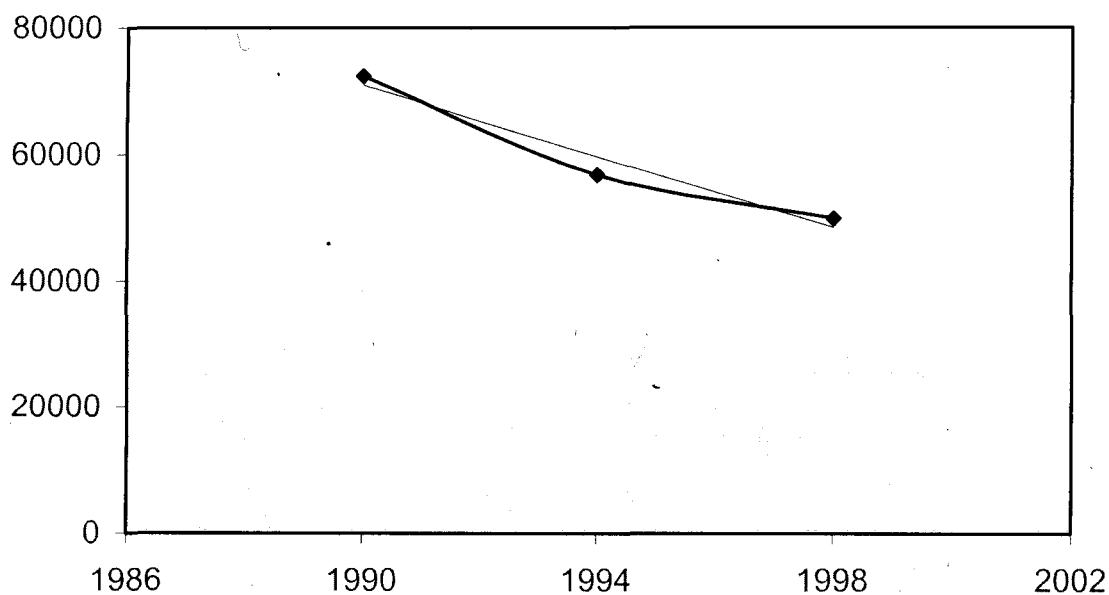


Table – 2: Percentage share and rank of selected countries to World literature in earth sciences (1990, 1994 & 1998)

Country	1990		1994		1998	
	% Share	Rank	% Share	Rank	% Share	Rank
USA	31.14	1	33.83	1	29.83	1
Canada	5.31	2	5.33	2	4.60	4
Russia	4.67	3	3.07	8	4.53	5
China	4.66	4	4.07	4	4.67	3
UK	4.44	5	4.79	3	5.52	2
France	4.04	6	3.59	5	3.72	7
Japan	3.18	7	3.25	6	3.84	6
Germany	3.06	8	3.1	7	3.19	8
Australia	2.51	9	2.43	9	3.01	9
India	2.08	10	1.31	11	1.76	11
Italy	1.15	11	2.03	10	2.53	10
Netherlands	0.79	12	0.84	12	1.18	12

Table 3: Shift in the contributions of selected countries to earth science literature during 1990 and 1998

Country	1990	1998	% Shift
USA	31.14	29.83	-1.31
Canada	5.31	4.60	-0.71
Russia	4.67	4.53	-0.14
China	4.66	4.67	0.01
UK	4.44	5.52	1.08
France	4.04	3.72	-0.32
Japan	3.18	3.84	0.66
Germany	3.06	3.19	0.13
Australia	2.51	3.01	0.50
India	2.08	1.76	-0.32
Italy	1.15	2.53	1.38
Netherlands	0.79	1.18	0.39

From the above Table – 3, it is observed that the percentage shift of total contributions from USA is -1.31 from 1990 to 1998. U.K has some increase in percentage shift i.e. +1.08 and Italy +1.38 from 1990 to 1998.

Fig. 2: Shairing of research publication by different countries

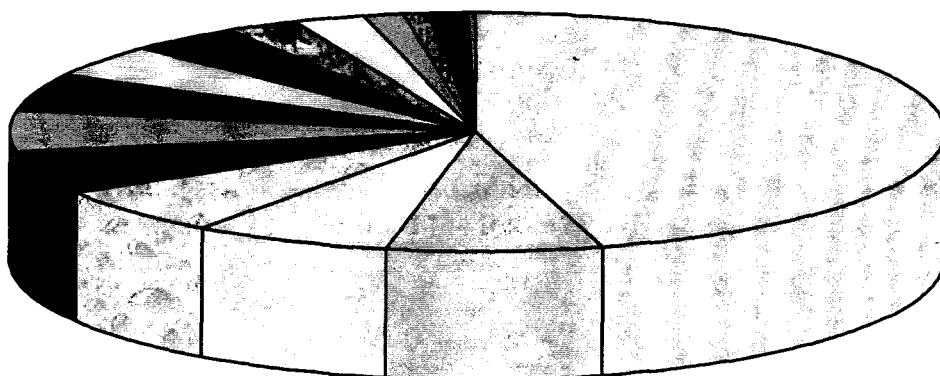
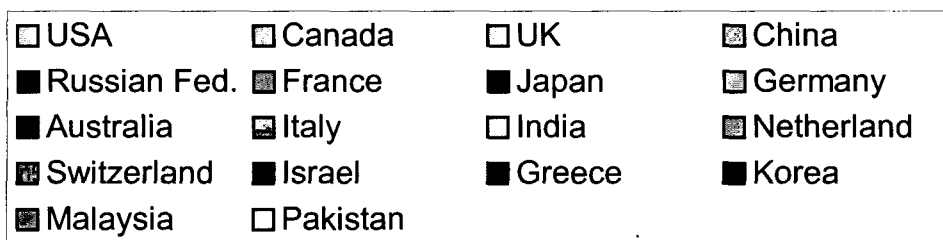
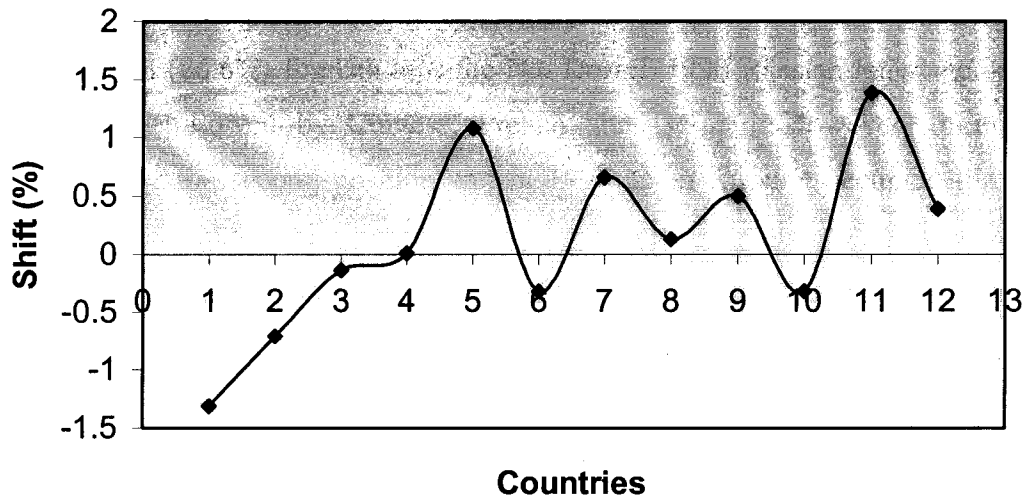


Fig. 3: Shift in research publications of selected countries



1 = USA, 2 = Canada, 3 = Russia, 4 = China, 5 = UK, 6 = France, 7 = Japan, 8 = Germany, 9 = Australia, 10 = India, 11 = Italy, 12 = Netherlands

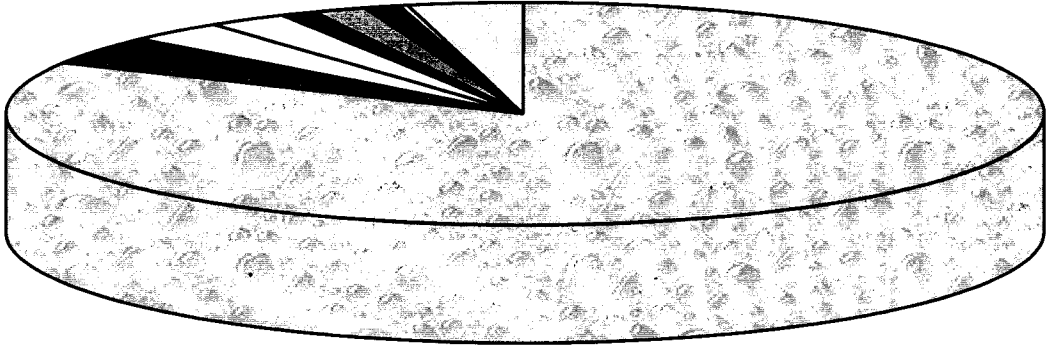
Language-wise distribution of world's earth sciences publications

So far as language of publication is concerned for all the years 1990 (77.5%), 1994 (84.9% and 1998 (86.6%) English tops the list. During 1990 Russian language occupied second position followed by Chinese, French and German. However, during 1994 Chinese occupied the second position and in 1998 again Russian occupied the second position. (Table 4 and Fig. 4)).

Table –4: Language-wise distribution of world's earth sciences publications (1990, 1994 & 1998)

Language	Total No. of Publications		
	1990	1994	1998
English	56028	48243	43289
Russian	5063	1075	1637
Chinese	2530	1261	1521
French	2572	844	870
German	1351	636	103
Japanese	1072	923	888
Spanish	960	870	500
Polish	79	59	157
Hindi	02	00	00
Arabic	01	03	02
Others	4771	2899	966
Total	72286	56813	49933

Fig. 4: Language-wise distribution



Country-wise distribution of Indian publications

More than 75% of the total publications published by the Indian scientists are from India, followed by Netherlands, USA & UK for 1990, 1994 and 1998 (Table - 5).

Table - 5: Country-wise distribution of Indian publications and its percentage (1990, 1994 & 1998)

Country of Publication	1990	%	1994	%	1998	%
India	1117	74.42	370	49.53	549	62.46
Netherlands	122	8.13	73	9.77	63	7.17
United-States	53	3.53	73	9.77	86	9.78
United-Kingdom	44	2.93	39	5.22	52	5.92
Germany	20	1.33	10	1.34	6	0.68
Austria	13	0.87	4	0.54	2	0.23
Switzerland	6	0.40	2	0.27	8	0.91
Greece	6	0.40	0	0.00	0	0.00
Japan	4	0.27	8	1.07	15	1.71
China	4	0.27	0	0.00	1	0.11
Poland	2	0.13	0	0.00	2	0.23
France	2	0.13	3	0.40	2	0.23
Canada	1	0.07	9	1.20	4	0.46
Thailand	1	0.07	0	0.00	2	0.23
Finland	1	0.07	2	0.27	2	0.23
Hungary	1	0.07	3	0.40	1	0.11
Czech-Republic	1	0.07	0	0.00	0	0.00
Iran	1	0.07	0	0.00	0	0.00
Monaco	1	0.07	0	0.00	0	0.00
Pakistan	1	0.07	0	0.00	0	0.00
Slovak-Republic	1	0.07	0	0.00	0	0.00
Sweden	1	0.07	0	0.00	0	0.00
USSR	1	0.07	0	0.00	0	0.00
Hong-Kong	0	0.00	0	0.00	2	0.23
New-Zealand	0	0.00	1	0.13	0	0.00
Norway	0	0.00	1	0.13	0	0.00
Russian-Federation	0	0.00	1	0.13	0	0.00
Malaysia	0	0.00	2	0.27	0	0.00
Spain	0	0.00	2	0.27	0	0.00
Nepal	0	0.00	59	7.90	0	0.00
Other countries	97	6.46	85	11.38	82	9.33
		100.00		100.00		100.00
Total	1501		747		879	

Language-wise distribution of Indian earth science publications

All the publications published by the Indian scientists are in English. Only two articles written in Hindi during 1990 and one in Japanese in 1994 and one in French in 1998 are covered (Table - 6).

Table – 6: Language wise distribution of Indian earth science publications (1990, 1994 & 1998)

Language	Total No. of Publications		
	1998	1994	1990
English	878	742	1499
French	1	0	0
English; French	0	3	0
Japanese	0	1	0
Russian	0	1	0
Hindi	0	0	2
Total	879	747	1501

Classification of Indian earth science publications

All the publication published by the Indian scientists during the year 1990, 1994 and 1998 are of Analytic in nature. (Table - 7).

Table – 7: Classification of Indian earth science publications (1990, 1994 & 1998)

	1998	1994	1990
Analytic	879	747	1501

Type of Indian earth science publications

More than 50% of the Indian Earth Science literature published in Serial publications (journals) and the rest in other type of publications like – conference, documents, abstracts, books, etc. (Tables –8 & 9 and Fig. 5).

Table - 8: Type of Indian earth science publications (1990, 1994 & 1998)

Sl.No.	Description	1998	1994	1990
1	Abstract; Book; Conference-Document	7	5	125
2	Abstract; Report; Conference-Document	1	0	0
3	Abstract; Serial	1	18	369
4	Abstract; Serial; Conference-Document	158	91	189
5	Abstract; Serial; Report; Conference-Document	0	5	0
6	Book	14	14	37
7	Book; Conference-Document	26	6	27
8	Book; Map	0	0	1
9	Serial (Journals)	611	559	630
10	Serial; Conference-Document	58	49	120
11	Serial; Map	1	0	3
12	Serial; Report; Conference-Document	2	0	0
	Total	879	747	1501

Table - 9: Serial Vs Others

Sl.No.		1998	1994	1990
1.	Serial	611	559	630
2.	Others	254	174	834
3.	Book	14	14	37
	Total	879	747	1501

City and State - wise distribution of Indian earth science publications

City-distribution of Indian publications is presented in Table – 10 shows that Hyderabad tops the list followed by Calcutta and Bangalore in 1998. In 1994, Dehradun tops the list followed by Lucknow and New Delhi. During 1990, Calcutta tops the list followed by Dehradun and Hyderabad. (Table – 10).

Table – 10: City-wise (Top 10 cities) contributions to Indian earth science publications (1998, 1994 & 1990)

City	1998	Rank	1994	Rank	1990	Rank
Hyderabad	113	1	43	5	115	3
Calcutta	79	2	52	4	411	1
Bangalore	49	3	22	10	75	4
Dehradun	44	4	93	1	131	2
Lucknow	37	5	57	2	65	5
New Delhi	37	6	54	3	48	6
Ahmedabad	26	7	24	7	18	
Nagpur	25	9	16		34	10
Bhubaneswar	25	8	3		21	
Jaipur	24	10	7		28	
Chennai	22		10		6	
Roorkee	21		23	9	28	
Trivandrum	20		10		12	
Mysore	18		7		13	
Dhanbad	17		18		44	7
Panaji	17		38	6	41	8
Mumbai	17		24	8	35	9
Others	288		246		376	
Total	879		747		1501	

Among the State-wise distribution of all earth sciences publications, Uttar Pradesh tops the list during the years 1998 and 1994 followed by Andhra Pradesh and West Bengal. However, in 1990 West Bengal tops the list followed by Uttar Pradesh and Andhra Pradesh. In 1994, again Uttar Pradesh tops the list followed by West Bengal and Maharashtra. (Table- 11)

Table – 11: State wise (Top 10 states) contributions to Indian earth science publication (1998, 1994 & 1990)

State	1998	Rank	1994	Rank	1990	Rank
Uttar Pradesh	155	1	210	1	285	2
Andhra Pradesh	143	2	59	4	155	3
West Bengal	99	3	86	2	442	1
Karnataka	80	4	44	6	125	4
Maharashtra	59	5	60	3	93	5
Gujarat	49	6	31	8	35	10
Rajasthan	40	7	17		42	8
Tamilnadu	40	7	20	10	9	
Delhi	37	8	54	5	49	7
Bihar	29	9	25	9	61	6
Kerala	29	9	17		20	
Orissa	27	10	5		27	
Goa	17		39	7	41	9
Others	75		81		117	
Total	879		747		1501	

Subject-wise (category code) distribution of Indian earth science publications vs. World

The following Table - 12 presents a comparative figures of publications published by the Indian scientists vs. world in all the 38 subject fields categorised as per the GeoRef database. Fig. 6 presents the Trends of Indian Earth sciences research in different areas.

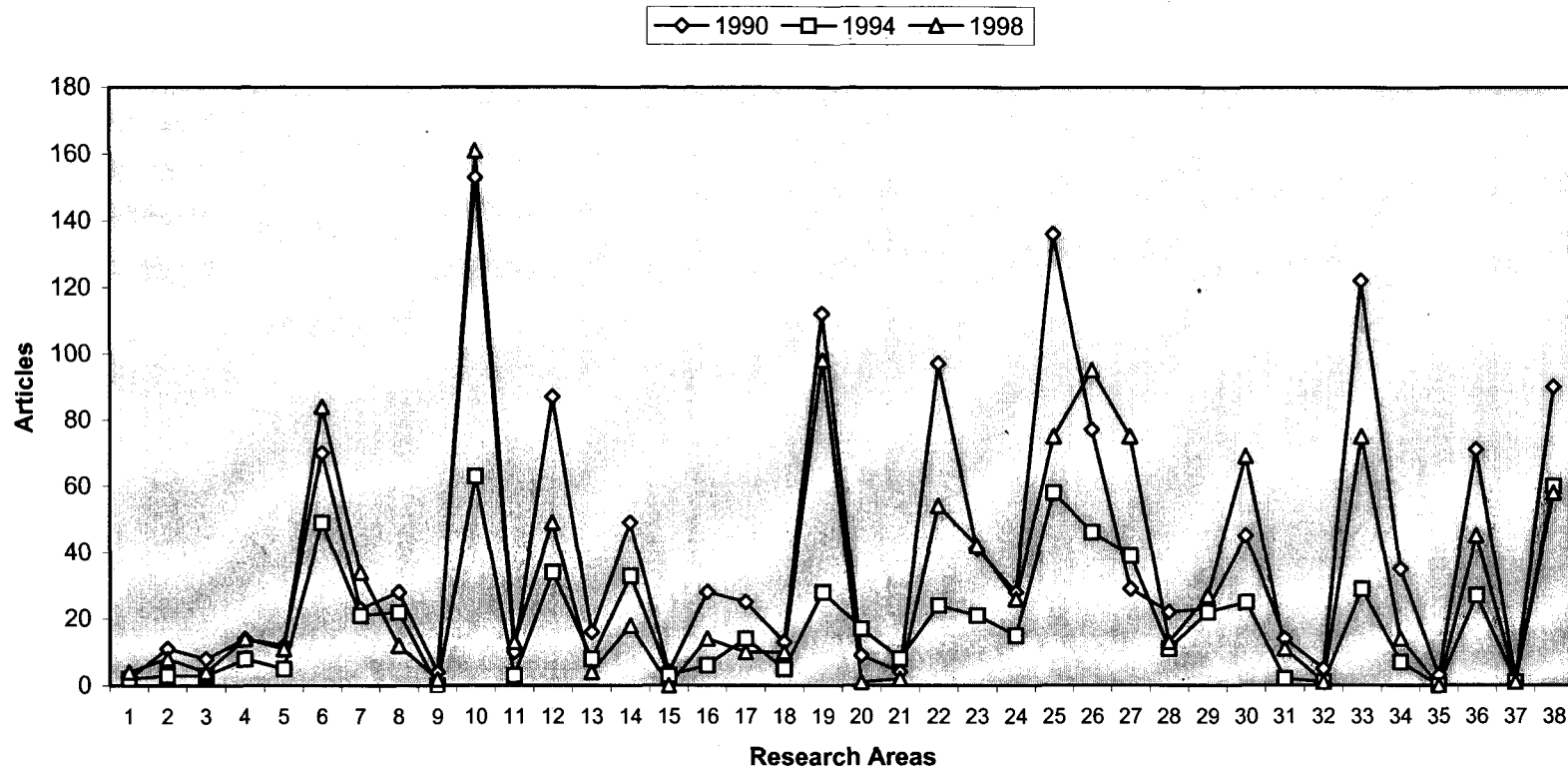
Table – 12: Category code-wise distribution of Indian earth science publications vs. world's (1990, 1994 & 1998)

Sl. No.	Cat. Code	Subject	Total No. of Publications					
			1990		1994		1998	
			India	World	India	World	India	World
1	01A	General-mineralogy	02	343	02	427	04	333
2	01B	Mineralogy-of-silicates	11	822	03	999	08	428
3	01C	Mineralogy-of-non-silicates	08	629	03	688	04	443
4	02A	General-geochemistry	14	1194	08	749	14	1219
5	02B	Hydrochemistry	12	1147	05	921	11	790
6	02C	Geochemistry-of-rocks,-soils	70	3425	49	2488	84	2157
7	02D	Isotope-geochemistry	23	2362	21	1988	34	1775
8	03	Geochronology	28	1829	22	1501	12	1225

9	04	Extraterrestrial-geology	04	1301	00	812	02	1185
10	05A	Igneous-and-metamorphic-pet.	153	5326	63	4697	161	3340
11	05B	Petrology-of-meteorites	10	668	03	458	13	860
12	06A	Sedimentary-petrology	87	3619	34	2609	49	2132
13	06B	Petrology-of-coal	16	359	08	280	04	166
14	07	Oceanography	49	2460	33	1429	18	1438
15	08	General-paleontology	04	400	03	241	00	274
16	09	Paleobotany	28	588	06	263	14	328
17	10	Invertebrate-paleontology	25	1316	14	899	10	1078
18	11	Vertebrate-paleontology	13	1170	05	593	10	722
19	12	Stratigraphy	112	5875	73	4248	98	4007
20	13	Areal-geology	09	571	17	316	01	329
21	15	Miscellaneous	04	941	08	679	02	669
22	16	Structural-geology	97	4940	24	4143	54	3377
23	18	Solid-earth-geophysics	41	3234	21	3026	42	2617
24	19	Seismology	28	2680	15	2319	26	1893
25	20	Applied-geophysics	136	5385	58	3938	75	3976
26	21	Hydrogeology	77	4913	46	3831	95	3582
27	22	Environmental-geology	29	3035	39	5691	75	6800
28	23	Geomorphology	22	1767	11	1194	13	1472
29	24	Quaternary-geology	23	3268	22	3269	27	3235
30	25	Soils	45	1248	25	948	69	1085
31	26A	Economic-geology,-general,	14	936	02	540	11	675
32	26B	Economic-geology,-econ.	05	134	01	52	01	72
33	27A	Economic-geology,-geology	122	4022	29	2221	75	1935
34	28A	Economic-geology,-geology	35	780	07	436	14	484
35	28B	Economic-geology,-econ.	03	66	00	29	00	56
36	29A	Economic-geology,-geology	71	4536	27	3282	45	4250
37	29B	Economic-geology,-econ.	02	109	01	138	01	122
38	30	Engineering-geology	90	4885	60	2795	58	3230

It is observed from the above Table-12 that during 1990, Igneous and Metamorphic Petrology (153 articles) is the highly contributed area of research in India followed by Applied Geophysics (136 articles) and Economic Geology (122 articles). During 1994 Igneous and Metamorphic Petrology (63 articles) is the highly contributed area followed by Engineering Geology (60 articles) and Applied Geophysics (58 articles). During 1998, again Igneous and Metamorphic Petrology (161 articles) is the highly contributed followed by Stratigraphy (98 articles) and Hydrogeology (95 articles).

Fig. 5: Indian earth science research trends



1 = General-mineralogy, 2 = Mineralogy-of-silicates, 3 = Mineralogy-of-non-silicates, 4 = General-geochemistry, 5 = Hydrochemistry, 6 = Geochemistry-of-rocks,-soils, 7 = Isotope-geochemistry, 8 = Geochronology, 9 = Extraterrestrial-geology, 10 = Igneous-and-metamorphic-petr., 11 = Petrology-of-meteorites-and-tekt., 12 = Sedimentary-petrology, 13 = Petrology-of-coal, 14 = Oceanography, 15 = General-paleontology, 16 = Palaeobotany, 17 = Invertebrate-paleontology, 18 = Vertebrate-paleontology, 19 = Stratigraphy, 20 = Areal-geology, 21 = Miscellaneous, 22 = Structural-geology, 23 = Solid-earth-geophysics, 24 = Seismology, 25 = Applied-geophysics, 26 = Hydrogeology, 27 = Environmental-geology, 28 = Geomorphology, 29 = Quaternary-geology, 30 = Soils, 31 = Economic-geology,-general, 32 = Economic-geology,-economics, 33 = Economic-geology,-geology-of, 34 = Economic-geology,-geology-of-, 35 = Economic-geology,-economics, 36 = Economic-geology,-geology-of-, 37 = Economic-geology,-economics, 38 = Engineering-geology

Where as in 1990, the major area of research in earth sciences in the World goes to Stratigraphy (5875 articles) followed by Applied Geophysics (5385 articles) and Igneous and Metamorphic Petrology (5326 articles). But in 1994, it goes to Environmental Geology (5691 articles) followed by Igneous and Metamorphic Petrology (4697 articles) and Stratigraphy (4248 articles). However in 1998, the top rank goes to again to Environmental Geology (6800 articles) followed by Economic Geology (4250 articles) Stratigraphy (4007 articles).

Major subject areas (category code) -wise distribution of Indian earth science publications

Among all the subject areas of research categorised by the GeoRef, Igneous and Metamorphic Petrology (05A) is the major subject area of research followed by Applied geophysics (20), Economic Geology (27A), Stratigraphy (12), Structural Geology (16), Engineering Geology 30) during the years 1990. However, in 1992, Engineering Geology (30) occupies the first position and in 1994 Applied Geophysics occupies the first position (Table - 13)

Table – 13: Major category code – wise distribution and 10 top areas of Indian earth science publications (1998,1994 & 1990)

Sl.No.	Subject code - Subject	Total No. of Papers					
		1998		1994		1990	
		Rank	Papers	Rank	Papers	Rank	Papers
1	05A-Igneous-and-metamorphic-petrology	1	161	1	85	1	177
2	12-Stratigraphy	2	98	2	73	5	120
3	02C-Geochemistry-of-rocks,-soils,-and-sediments	3	84	4	61	10	72
4	27A-Economic-geology,-geology-of-ore-deposits	4	75		34	2	172
5	20-Applied-geophysics	4	75	3	71	4	155
6	22-Environmental-geology	4	75	7	47		36
7	25-Soils	5	69	8	42		46
8	21-Hydrogeology	6	60	4	61	8	82
9	30-Engineering-geology	7	58	3	71	3	171
10	16-Structural-geology	8	54	5	51	6	103
11	06A-Sedimentary-petrology	9	49	6	48	7	91
12	29A-Economic-geology,-geology-of-energy-sources	10	45		30	9	73
13	18-Solid-earth-geophysics		42		25		41
14	02D-Isotope-geochemistry		34		22		24

15	24-Quaternary-geology	27	28	35
16	19-Seismology	26	20	30
17	07-Oceanography	18	36	10 50
18	28A-Economic-geology	14	7	45
19	09-Paleobotany	14	40	9 32
20	02A-General-geochemistry	14	2	15
21	23-Geomorphology	13	16	27
22	05B-Petrology-of-meteorites-and-tektites	13	3	11
23	03-Geochronology	12	27	30
24	26A-Economic-geology,-general,-deposits	11	3	18
25	02B-Hydrochemistry	11	9	13
26	10-Invertebrate-paleontology	10	15	27
27	11-Vertebrate-paleontology	10	9	13
28	01B-Mineralogy-of-silicates	8	7	11
29	06B-Petrology-of-coal	4	11	17
30	01C-Mineralogy-of-non-silicates	4	4	8
31	01A-General-mineralogy	4	2	2
32	15-Miscellaneous	2	8	4
33	04-Extraterrestrial-geology	2	0	4
34	13-Areal-geology	1	2	20
35	26B-Economic-geology,-general,-economics	1	2	5
36	29B-Economic-geology,-economics-of-energy-sources	1	1	5
37	17B-Geophysics-of-minerals-and-rocks	1	0	0
38	27B-Economic-geology,-economics-of-ore-deposits	1	0	0
39	08-General-paleontology	0	8	5
40	17A-General-geophysics	0	1	0
		1201	982	1790

Igneous-and-metamorphic-petrology is on the top rank during all the years 1990, 1994 and 1998. Stratigraphy is on the second rank during 1998 and 1994 and fifth in 1990. Where as Geochemistry-of-rocks, -soils, -and-sediments are on the third position during 1998, fourth in 1994 and 10th in 1990.

It is observed from the above Table-13 that the figure of total number of articles published during the years 1990, 1994 and 1998 as per their classified code is increased due to the reason that some of the articles are classified in more than in classified area.

Table - 14: Subject vs. Author affiliation (1998, 1994 & 1990)

Cat. Code	Year Institution (No. of papers)	Year Institution (No. of papers)	Year Institution (No. of papers)
(CC)	1998	1994	1990
02A	Nil	Nil	GSI (8)
02C	NGRI, Hyderabad (8); GSI (5)	Delhi University, Delhi, (7); GSI (5)	GSI (9)
02D	PRL, Ahmedabad (13)	PRL, Ahmedabad (6)	PRL, Ahmedabad (7)
03	Nil	GSI (12)	GSI (6)
05A	GSI (35); NGRI, Hyderabad (19); Department of Atomic Energy, (9); Mysore Univ., Mysore (10); Osmania Univ., Hyderabad, (6); Wadia Institute of Himalayan Geology, Dehra Dun (7)	GSI (22); Wadia Institute of Himalayan Geology, Dehra Dun (10); Delhi University, Delhi (6); University of Roorkee, Roorkee (5); NGRI, Hyderabad (5)	GSI (51); Wadia Institute of Himalayan Geology, Dehra Dun (24); NGRI, Hyderabad (12); Bangalore University, Bangalore (8); Mysore University, Mysore (8); M. S. University, Vadodara, (5)
05B	PRL, Ahmedabad (9)	Nil	PRL, Ahmedabad (5)
06A	GSI (6)	Wadia Institute of Himalayan Geology, Dehra Dun (8)	Wadia Institute of Himalayan Geology, Dehra Dun (13); GSI (10); Jadavpur University, Calcutta (7); Delhi University, Delhi (5); Utkal University, Bhubaneswar (5)
06B	Nil	Birbal Sahni Institute of Palaeobotany, Lucknow (5)	Nil
07	NIO, Goa (8)	NIO, Dona Paula (10)	NIO, Goa (6)
09	Nil	Birbal Sahni Institute of Palaeobotany, Lucknow (6)	Nil
10	Nil	Nil	GSI (6)
11	GSI (5)	Nil	GSI (6)
12	GSI (20); Birbal Sahni Institute of Palaeobotany, Lucknow (11); ISI, Calcutta (6); KDMIPE, Dehradun	Wadia Institute of Himalayan Geology, Dehra Dun (16); Birbal Sahni Institute of Palaeobotany,	GSI (38); Wadia Institute of Himalayan Geology, Dehra Dun

	(6); NGRI, Hyderabad (5); Wadia Institute of Himalayan Geology, Dehra Dun, (6)	Lucknow (14); Delhi University, Delhi (6); KDMIPE, Dehra Dun, (5)	(13); Birbal Sahni Institute of Palaeobotany, Lucknow (12); ONGC (8); Punjab University, Chandigarh (6)
13	Nil	Nil	GSI (15)
16	GSI (23); NGRI, Hyderabad (5); Wadia Institute of Himalayan Geology, Dehra Dun (5)	Wadia Institute of Himalayan Geology, Dehra Dun (17); University of Roorkee, Roorkee, (8)	GSI (27); Wadia Institute of Himalayan Geology, Dehra Dun (19); Delhi University, Delhi (5); NGRI, Hyderabad (5); University Of Roorkee, Roorkee (5)
18	NGRI, Hyderabad (17); GSI (10); NIO, Goa (5)	NGRI, Hyderabad (7)	NGRI, Hyderabad (10); GSI (7)
19	NGRI, Hyderabad (7)	University of Roorkee, Roorkee (8)	Nil
20	NGRI, Hyderabad (14); GSI (7)	IIT, Kharagpur (7); Andhra University, Visakhapatnam (6); NGRI, Hyderabad (6); ONGC (5)	GSI (64); NGRI, Hyderabad (16); Indian School of Mines, Dhanbad (7); Andhra University, Visakhapatnam (6); NIO, Goa (5)
21	NGRI, Hyderabad (10)		GSI (7); Osmania University, Hyderabad (5)
22	Nil	BHU, Varanasi (6)	GSI (13); Indian School of Mines, Dhanbad, (6)
23	Nil	Nil	GSI (7)
24	PRL, Ahmedabad (7)	NIO, Dona Paula (6); Birbal Sahni Institute of Palaeobotany, Lucknow (5)	GSI (14)
25	National Bureau of Soil Survey and Land Use Planning (ICAR)(12); Jadavpur Univ., Calcutta (5); IARI, New Delhi (7)	National Bureau of Soil Survey and Land Use Planning (ICAR) (9); IARI, New Delhi (5)	Nil
26A	Nil	Nil	GSI (12)
27A	Atomic Minerals Division, Department of Atomic Energy (14); GSI (13); NGRI, Hyderabad (5)	GSI (10); RRL, Bhubaneswar (5)	GSI (82); Atomic Minerals Division, DAE (19); Wadia Institute of Himalayan

			Geology, Dehra Dun, (5)
28A	Nil	Nil	GSI (24); Andhra University, Visakhapatnam (5)
29A	ONGC (19); KDMIPE, Dehra Dun (6); Singareni Collieries Co., Godavarikhan (9); Singareni Collieries Co., Godavarikhan (5)	KDMIPE, Dehra Dun (12); ONGC (6)	GSI (45); KDMIPE, Dehra Dun, (6)
30	IIS, Bangalore (11); IIT, Madras (5);	Central Mining Research Station, Dhanbad (8); University of Roorkee, Roorkee (8); IIS, Bangalore (5)	GSI (91); University of Roorkee, Roorkee (11); Indian School of Mines, Dhanbad (10); IIS, Bangalore (9)

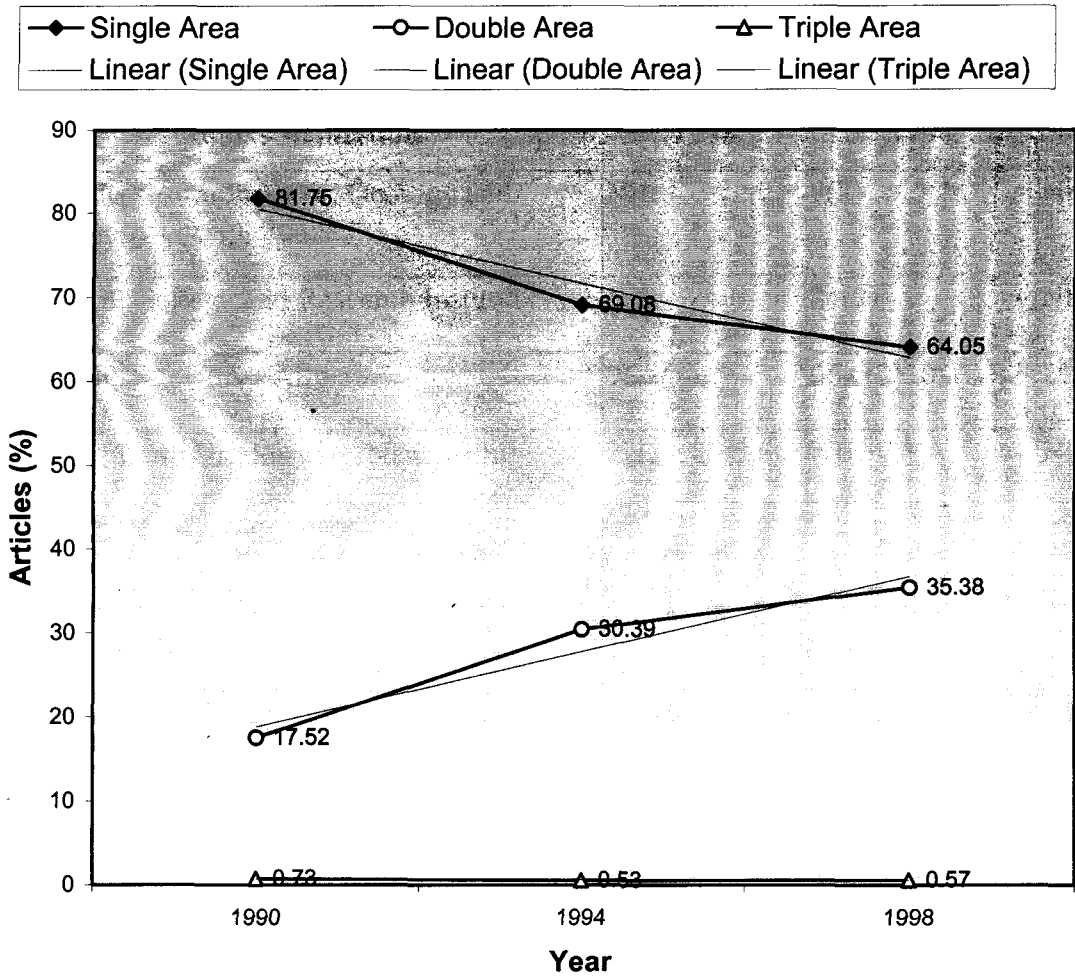
It is observed from Table – 14 that in almost all the subject areas, Geological survey of India (GSI), India has contributed its publications except in category codes such as 02D, 05B, 06B, 09, 19 and 25. Wadia Institute of Himalayan Geology, Dehra Dun is the major contributors to some areas such as 06B and 09. NGRI, Hyderabad is the leader in areas like 02C, 20 and 21. ONGC in 29A. NIO, Goa in 07 and 24 and PRL, Ahmedabad in 02D, 05B and 24.

Table – 15: Multidisciplinary Vs Single Area Research (1998, 1994 & 1990)

Subject	1990	1994		1998
		Percentage		
Single Area	81.75	69.08	64.05	
Double Area	17.52	30.39	35.38	
Triple Area	0.73	0.53	0.57	

During the year 1990, percentage of contributions to single area of research is 81.75, where as in 1994 it has come down to 69.08% and 64.05 in 1998. There is an increase in trend in double and triple areas of research in comparison to year 1990 to 1994 and 1994 as per the above Table – 15 & Fig. 6.

Fig. 6: Single vs. Multidisciplinary research



Institution vs. Category Code-wise distribution of Indian earth science publications as per publications count

It is also observed from Table – 16 that in almost all the subject areas, Geological survey of India (GSI), India has contributed its publications followed by Wadia Institute of

Himalayan Geology, Dehra Dun. NGRI, Hyderabad; NIO, Goa; ISM, Dhanbad; Jadavpur University, Calcutta and BHU, Varanasi.

Table – 16: Author affiliation vs classification code (1998, 1994 & 1990)

Author's Affiliation	1998	1994	1990
Agharkar Research Institute, Geology and Palaeontology Group, Poona,	NIL	9(2)	NIL
Agricultural College and Research Institute, Madurai	NIL	21(2)	NIL
Aligarh Muslim Univ., Aligarh,	06A(2);	06A(2), 05(A);	21(2);25(2); 02C(2);05A(2)
All Soil & Land Use Survey, New Delhi,	22(2); 20(2)	NIL	NIL
Andhra University, Visakhapatnam,	02C(2); 05A(3);21(2); 22(3)	22(3); 21(4);20(6); 07(2)	05A(2);28A(5); 27A(3);21(2); 07(2);16(3); 20(6); 02B(2);
Anna University, Madras,	21(2)	22	NIL
Annamalai University, Annamalai,	05A(2);27A (2);02B(2)	21	24; 03
Atomic Minerals Division, Department of Atomic Energy,	22(2);26A(3); 02D(3); 27A(14); 03(4);05A(9); 02A(2);	05A(2); 02C(2); 20(3);	27A(19);20(3); 05A(2)
Banaras Hindu University, Varanasi,	12(2);05A(7); 02C(2);	22(6); 02B(2) ; 05A(4);20(2); 12(3);06B(2);	05A(4);12(4); 02D(2);21(3); 27A(3);22(4) ;06A(2);25(2);
Bangalore University, Bangalore,	05A(4); 27A (2)	NIL	27A(3);05A(8); 21(3)
Bhabha Atomic Research Center, Mumbai,	06A(2); 02C(2)	07(2); 02D(2);22(2)	22(2)
Bidhan Chandra Krishi Viswa Vidyalaya, Mohanpur,	NIL	25(3)	NIL
Birbal Sahni Institute of Palaeobotany, Lucknow,	12(11); 06B(2);9(6)	9(24);09(6); 12(14);24(5); 06B(5)	9(17);12(12); 29A(2);09(3)
CCS Haryana Agricultural University, Haryana,	02C(4); 25(4);22;21	25(2);02C	NIL

Cent. Earth Sci. Stud., Trivandrum,	NIL	NIL	05A(4)
Cent. Fuel Res. Institute of, Dhandbad,	NIL	NIL	06B(2)
Cent. Rice Res. Institute of, Cuttack,	NIL	NIL	21(2)
Central Arid Nilone Research Institute, Jodhpur,	24(2)	21(2)	02C; 07;25;23
Central Building Research Institute, Roorkee,	30	30(2)	NIL
Central Ground Water Board	21; 02B	23; 20	21(2)
Central Mining Research Station, Dhanbad	30(3)	30(8);26A(2)	NIL
Central Mining Research Station, Nagpur	NIL	30(3)	NIL
Central Soil and Materials Research Station, New Delhi,	30	30(3)	NIL
Central Soil and Water Conservation Research and Training Institute, Dehra Dun	21	21(2)	NIL
Central Soil Salinity Research Institute, Anand,	NIL	21(3)	NIL
Central Soil Salinity Research Institute, Karnal,	25(4)	21(2)	NIL
Central Water and Power Research Station, Poona,	30(2)	NIL	NIL
Centre for Earth Science Studies, Trivandrum,	05A(3);27A(3);18(3);02C(4)	05A(2);28A(2)	NIL
Cochin University of Science & Technology, Cochin,	19(2)	02C(2)	NIL
Consultant, Gurgaon	NIL	29A(2)	NIL
D. S. College, Aligarh,	06A(2); 12(2)	12; 06A	24; 11
Delhi University, Delhi,	21(2);12(2)	22(3);02C(7);20(2),16(4), 05A(6),12(6);06A(4)	16(5);05A(4);02D(2);06A(5);27A(2)
Department of Mines and Geology, Mysore,	05A(3)	NIL	30;15;12
Economic Geology Division-2, IND,	NIL	NIL	27A(3)
G. B. Pant University of Agriculture and Technology, Pantnagar,	NIL	25(2)	NIL

Geological Survey of India	06A(6); 05A (35);12(20); 19(3); 27A(13); 25(2);02C(5); 28A(3);24(3); 16(23);11(5); 18(10);20(7); 02A (2);22(2); 26A(3);09(2)	02C(5); 05A(22);03(7); 02D(2),03(5); 30(3);12(6); 11(2);9(2);7; 27A(10);24(2); 23(4); 20(4);	12(38);13(16); 16(27);18(7) 03(6);02D(2); 05A(51);02C(9) 06A(10);27A(8) 20(64);10(6); 11(6);19(3); 02A(8);07(3); 23(7);28A(8); 02B; 24(14);22(13); 28B;21(7); 02C(2); 29A(45);28A(1) 30(10);9(2); 30(81);26A(12) 01C(3); 15;7(2);3(4); 05B(3);06B(3); 19;7(2);
Gulbarga University, Karnataka,	27A	21; 20	27A(3);3(2)
Guru Nanak Dev University, Amritsar,	02B	19	02C(2);02D(2);
Haryana Agricultural University, Hisar,	25(2)	21(2)	25(2)
Himachal Pradesh Krishi Vishwavidyalaya,Palampur	NIL	25(2)	NIL
Indian Agricultural Research Institute, New Delhi,	25(7);02C(4); 22(2)	25(5);21(2);;	25(3);02C(2); 21(2)
Indian Institute of Geomagnetism, Mumbai,	18(3)	20(2)	20(3);19(2)
Indian Institute of Science, Bangalore,	02C(2);30(11)	30(5);21(2)	21(2);30(9)
Indian Institute of Soil Science, Bhopal,	25(3); 02C(3)	NIL	NIL
Indian Institute of Technology, Kharagpur,	20(3);30(4); 01C(2); 27A(3); 05A(3);16(2); 06A(2);	20(5);10(2); 20(2);	10(2);16(4); 30(2);05A(3);
Indian Institute of Technology, New Delhi	30(2)	22(2);30(2)	30(3)
Indian Institute of Technology, Kanpur	30(4)	30(3)	05A(2)
Indian Institute of Technology, Madras,	30(5)	21(2);30(2)	NIL

Indian Institute of Technology, Mumbai	16(4);30(2); 05A(3); 27A(2)	05A(2);30(4); 22(3)	27A(3);30(3); 20(2)
Indian School of Mines, Dhanbad,	12;02D;29A; 21;27A;22;30; 25;20;19;16	06B;02C;29A; 17A;30;22;15	02C(2);06A(2) 18(3);16(2); 20(7);21(2);22 30(10);05A(2); A(4)
Indian Space Research Organisation, Bangalore,	21(2); 20(2)	NIL	NIL
Indian Space research organisation, Ahmedabad,	NIL	20(2)	NIL
Indian Statistical Institute, Calcutta,	16(3);05A(2);1 2(6);11(2)	12(2);16(3)	NIL
Indira Gandhi Nahar Board, Jaipur,	22(2)	NIL	NIL
J.N.V. University, Jodhpur,	05B(2);12(2)	NIL	NIL
Jadavpur University, Calcutta,	12(2);25(5); 02D(2); 05A(3); 27A(3);16(2)	27A(2);06A(2); 16(2);05A(2); 10(2)	06A(7);16(3); 27A(2);01C(2); 05A(2);02C(2)
Jammu University, Jammu,	05A(2)	NIL	NIL
Jawaharlal Nehru University, New Delhi,	02B(2); 05A(2)	18(2)	21(2);
K. D. Malaviya Institute of Petroleum Exploration, Dehra Dun,	12(6);29A(6); 06A(2)	29A (12), 12(5), 06A(2); 20(2);02C(4); 02D(2)	12(4);06A(2); 29A(6);20(2);
Karnatak University, Dharwad,	27A(2)	27A(2)	21(3);23(2);10
Lucknow University, Lucknow,	12(3);02D(2); 16(2)	NIL	06A(2);30(2); 16(3)
M. S. University of Baroda, Vadodara,	21(2);24(3);06 A(3);12(2)	NIL	25(2);05A(4)
M.N.R. Eng. Coll., Allahabad,	NIL	NIL	05A(2);30(2)
Maharshi Dayanand University, Rohtak,	NIL	16(2)	18(2)
Mysore University, Mysore,	05A(10); 02C(2); 27A (2);28A(2); 16(2)	05A(3)	05A(8);02C(2)
Nagarjuna Univ., Nagarjunanagar,	NIL	NIL	05A(2)
Nagpur University, Nagpur	NIL	05A,(2)	NIL
National Bureau of Soil Survey and Land Use Planning (ICAR),	22(3);24(3); 25(12);02C(2)	25(9); 02C(2)	25(3)

National Geophysical Research Institute, Hyderabad,	02C(8); 05A(19); 02D (4);19(7); 18(17); 21(10);22(2); 12(5);16(5); 24(2); 27A(5); 20(14);	02D(2); 06A(4), 18(7);20(6); 21(2);03(3); 05A(5);16; 02C(3);19(2);	19(4);12(4); 21(4);30(3); 05A(12);02C(3); 20(16);18(10); 16(5);27A(4);3(2)
National Institute of Hydrology, Roorkee,	22(2);21(2)	NIL	NIL
National Institute of Oceanography, Goa	07(8);7(3); 18 (5);20(4)	02C(3); 07(8) ;7(7);10(2); 24(6);07(2); 20(3);02D(2); 18(4)	02C(3); 07(6);02B(2); 7(14);10(2); 06A(2);18(2); 20(5);
National Mineral Development Corporation, Hyderabad,	28A(2)	NIL	NIL
National Remote Sensing Agency, Hyderabad	21(2); 20(4)	NIL	NIL
Oil and Natural Gas Commission	29A(19); 20(3);06A(4); 12(2)	29A(6);20(5); 12(2)	02C(2);12(8); 29A(4)
Oil India, IND	NIL	29A(2)	NIL
Orissa University of Agriculture and Technology, Bhubaneswar	NIL	NIL	25(2)
Osmania University, Hyderabad,	05A(6);20(2)	20(2)	21(3);20(6);21(2); 05A(6);
Physical Research Laboratory, Ahmedabad,	02D(13);24 (6);03(3); 05B(9)	02D(6); 07(2), 3(6);24(3);02B; 07;02C(2);12(2); 22;03(3);05A; 05B	02D(7);24(3); 05B(5);06A(2)
Presidency College, Calcutta,	06A(2)	NIL	06A(4); 05A (2);16(2)
Presidency College, Chennai,	05A(3)	NIL	NIL
Punjab Agricultural University,Ludhiana,	25(4); 02C(3)	NIL	NIL
Punjab Remote Sensing Centre, Ludhiana,	21(3)	NIL	NIL
Punjab University, Chandigarh,	NIL	22(2),12(2); 11(2)	16(2);12(6)
Rajendra Agricultural University, Samastipur,	NIL	25(3)	25(2); 02C(2)

Regional Research Laboratory, Bhubaneswar,	27A(3); 02C(3); 28A(2)	27A(5)	27A(3);01C(2)
RITES, New Delhi,	30(2)	NIL	NIL
S.G.S. Institute of Technol. and Sci., Indore,	NIL	NIL	20(2)
Singareni Collieries Co., Godavarikhan,	29A(9);30(5)	NIL	NIL
St. Xavier's College, Bombay	NIL	05A(2); 02C(3)	NIL
Tamil Nadu Agricultural University, Coimbatore,	25(3);02C(2)	NIL	NIL
Udai Pratap (Autonomous College), Varanasi	NIL	22(2)	NIL
University of Agricultural Sciences, Bangalore	NIL	25(2)	NIL
University of Calcutta, Calcutta,	12(2);16(2); 05A(3)	06A(2);05A(2)	02C(2); 21(2)
University of Jammu, Jammu,	NIL	11(2)	NIL
University of Kerala, Kariavattom,	05A(2)	NIL	NIL
University of Lucknow, Lucknow		12(2)	NIL
University of Madras, Chennai,	12(2);05A(3)	NIL	NIL
University of Pune,Poona,	05A(3)	01B(2), 05A(2)	NIL
University of Rajasthan, Jaipur,	12(2);02C(2)	NIL	NIL
University of Roorkee, Roorkee,	19(2);20(3);30 (3);19(2)	16(8),05A(6), 30(4), 20(2), 19(8), 30(4);02C(2); 21(3)	16(5);05A(2); 30(11);22(2); 21(3)
Utkal University, Bhubaneswar,	02C(2)	NIL	06A(5)
Vikram Univ., Sch. Stud. Geol., Ujjain,	NIL	NIL	06B(2)
Wadia Institute of Himalayan Geology, Dehra Dun,	12(6);16(5); 18(3);02C(3); 05A(7); 06A(2);19(3); 23(2)	16(17); 05A(10); 12(16));11(2); 18(4);06A(8); 08(2);01B(3); 02C(2);02D(2); 27A(2);19(3); 23(3);24(3)	7(2);12(13); 13(3);16(19); 18(2);;02A(2); 02C(4);05A(24); 06A(13);18(3); 19(4);27A(5)

Data on major institutions Vs. major subject areas of research as per publication count put together for the 1990, 1994 and 1998 has been provided in Table – 17

**Table – 17: Major institutions vs. major subject areas of research (> or = 5 areas)
during 1990, 1994 and 1998**

Author's Affiliation	1998	1994	1990
Andhra University, Visakhapatnam,	02C(2); 05A(3);21(2); 22(3)	22(3); 21(4);20(6); 07(2)	05A(2);28A(5); 27A(3);21(2); 07(2);16(3); 20(6); 02B(2);
Atomic Minerals Division, Department of Atomic Energy,	22(2);26A(3); 02D(3); 27A(14); 03(4);05A(9); 02A(2);	05A(2); 02C(2); 20(3);	27A(19);20(3); 05A(2)
Banaras Hindu University, Varanasi,	12(2);05A(7); 02C(2);	22(6); 02B(2) ; 05A(4);20(2); 12(3);06B(2);	05A(4);12(4); 02D(2);21(3); 27A(3);22(4); 06A(2);25(2);
Birbal Sahni Institute of Palaeobotany, Lucknow,	12(11); 06B(2);9(6)	9(24);09(6); 12(14);24(5); 06B(5)	9(17);12(12); 29A(2);09(3)
Delhi University, Delhi,	21(2);12(2)	22(3); 02C(7);20(2), 16(4), 05A(6), 12(6);06A(4)	16(5);05A(4); 02D(2);06A(5); 27A(2)
Geological Survey of India	06A(6); 05A (35); 12(20); 19(3); 27A(13); 25(2);02C(5); 28A(3);24(3); 16(23);11(5); 18(10);20(7); 02A(2);22(2); 26A(3);09(2)	02C(5); 05A(22);03(7); 02D(2),03(5); 30(3);12(6); 11(2);9(2);7; 27A(10);24(2); 23(4); 20(4);	12(38);13(16); 16(27);18(7) 03(6);02D(2); 05A(51);02C(9); 06A(10);27A(82); 20(64);10(6); 11(6);19(3); 02A(8);07(3); 23(7);28A(8); 02B; 24(14);22(13); 28B;21(7); 02C(2); 29A(45);28A(16); 30(10);9(2); 30(81);26A(12); 01C(3); 15;7(2);3(4); 05B(3);06B(3); 19;7(2);

Indian Institute of Technology, Kharagpur,	20(3);30(4); 01C(2); 27A(3); 05A(3);16(2); 06A(2);	20(5);10(2); 20(2);	10(2);16(4); 30(2);05A(3);
Indian Institute of Technology, Mumbai	16(4);30(2); 05A(3); 27A(2)	05A(2);30(4); 22(3)	27A(3);30(3); 20(2)
Indian School of Mines, Dhanbad,	12;02D;29A; 21;27A;22;30; 25;20;19;16	06B;02C;29A; 17A;30;22;15	02C(2);06A(2); 18(3);16(2); 20(7);21(2);22(6); 30(10);05A(2); 27A(4)
Jadavpur University, Calcutta,	12(2);25(5); 02D(2); 05A(3); 27A(3);16(2)	27A(2);06A(2);1 6(2);05A(2); 10(2)	06A(7);16(3); 27A(2);01C(2); 05A(2);02C(2)
K. D. Malaviya Institute of Petroleum Exploration, Dehra Dun,	12(6);29A(6); 06A(2)	29A (12), 12(5), 06A(2); 20(2);02C(4); 02D(2)	12(4);06A(2); 29A(6);20(2);
National Geophysical Research Institute, Hyderabad,	02C(8); 05A(19); 02D (4);19(7); 18(17); 21(10);22(2); 12(5);16(5); 24(2); 27A(5); 20(14);	02D(2); 06A(4), 18(7);20(6); 21(2);03(3); 05A(5);16; 02C(3);19(2);	19(4);12(4); 21(4);30(3); 05A(12);02C(3); 20(16);18(10); 16(5);27A(4);3(2)
National Institute of Oceanography, Goa	07(8);7(3); 18 (5);20(4)	02C(3); 07(8) ;7(7);10(2); 24(6);07(2); 20(3);02D(2); 18(4)	02C(3); 07(6);02B(2); 7(14);10(2); 06A(2);18(2); 20(5);
Oil and Natural Gas Commission	29A(19); 20(3);06A(4); 12(2)	29A(6);20(5);12 (2)	02C(2);12(8); 29A(4)
Physical Research Laboratory, Ahmedabad,	02D(13); 24 (6);03(3); 05B(9)	02D(6); 07(2), 3(6);24(3);02B; 07;02C(2);12(2); 22;03(3);05A; 05B	02D(7);24(3); 05B(5);06A(2)
University of Roorkee, Roorkee,	19(2);20(3); 30(3);19(2)	16(8),05A(6), 30(4), 20(2), 19(8)	16(5);05A(2); 30(11);22(2);

		19(8), 30(4);02C(2); 21(3)	21(3)
Wadia Institute of Himalayan Geology, Dehra Dun,	12(6);16(5); 18(3);02C(3); 05A(7); 06A(2);19(3); 23(2)	16(17); 05A(10); 12(16));11(2); 18(4);06A(8); 08(2);01B(3); 02C(2);02D(2); 27A(2);19(3); 23(3);24(3)	7(2);12(13); 13(3);16(19); 18(2);;02A(2); 02C(4);05A(24); 06A(13);18(3); 19(4);27A(5)

Ranking of major major subject areas of research as per the publication count during the years 1998, 1994 and 1990 is presented in the Table 18

Table– 18: Major major subject areas of research as per the publication count during the years 1998, 1994 and 1990

1998 (Rank)	1994 (Rank)	1990 (Rank)	Description
58 (6)	71 (3)	171 (3)	30-Engineering-geology
75 (5)	71 (3)	155 (4)	20-Applied-geophysics
75 (4)	34 (5)	172 (2)	27A-Economic-geology,-geology-of-ore-deposits
84 (3)	61 (4)	72 (6)	02C-Geochemistry-of-rocks,-soils,-and-sediments
98 (2)	73 (2)	120 (5)	12-Stratigraphy
161 (1)	85 (1)	177 (1)	05A- Igneous-and-metamorphic-petrology

It is found that Igneous and metamorphic petrology is the major area of research in India as per the publication count for all the three years. There is slight shifts in the ranking in other areas during these years.

Organiation-wise distribution of all the Indian earth science publications

Organiation-wise list of distribution of all the Indian Earth Sciences publications published during the year 1990, 1994 and 1998 are provided in the Appendix – 1.

GSI (Geological Survey of India) is the major contributor to earth sciences research in India. GSI's contributions at their different divisiions is as follows (Table 19):

**Table – 19: Major Divisions of GIS as per their publications
(1998, 1994 & 1990)**

Sl.No	Author Affiliation	1998	1994	1990
1	Geol Surv. India, Samchi, Bhutan	0	0	12
2	Geological Survey of India, Ahmedabad,	0	0	2
3	Geological Survey of India, Andaman Division, IND	0	0	2
4	Geological Survey of India, Bangalore,	0	8	23
5	Geological Survey of India, Bhopal	0	2	0
6	Geological Survey of India, Cochin	0	0	2
7	Geological Survey of India, Itanagar,	0	0	1
8	Geological Survey of India, Jabalpur	0	2	0
9	Geological Survey of India, Jammu,	0	1	8
10	Geological Survey of India, Jayanagar	0	0	1
11	Geological Survey of India, Poona	0	0	1
12	Geological Survey of India, Ranchi	0	0	4
13	Geological Survey of India, Trivandrum	0	1	1
14	Geological Survey of India, NILawar Mines, Rajasthan,	0	0	1
15	Geological Survey of India, A.M.S.E. Wing, IND	1	0	0
16	Geological Survey of India, Agaratala	1	1	0
17	Geological Survey of India, Kangra	1	0	0
18	Geological Survey of India, Mangalore	1	0	4
19	Geological Survey of India, Patna	1	0	1
20	Geological Survey of India, Raipur	1	0	1
21	Geological Survey of India, Seminary Hills	1	0	0
22	Geological Survey of India, Dehradun	1	0	4
23	Geological Survey of India, Chandigarh	2	0	5
24	Geological Survey of India, Gandhinagar	2	0	0
25	Geological Survey of India, Marine Wing, Visakhapatnam	2	1	4
26	Geological Survey of India, Nagpur	2	0	23
27	Geological Survey of India, Nagpur	3	1	0
28	Geological Survey of India, Chennai	3	2	2
28	Geological Survey of India, Shillong	5	1	2
30	Geological Survey of India, Antarctic Division, Faridabad	4	1	2
31	Geological Survey of India, Bhubaneswar	5	0	4
32	Geological Survey of India, Lucknow	7	3	11
33	Geological Survey of India, Hyderabad	9	3	10
34	Geological Society of India, Bangalore	10	0	5
35	Geological Survey of India, , Jaipur,	15	3	24
36	Geological Survey of India, Calcutta	38	33	347
	Total	115	63	507
	Percentage	13	9	34

Top Institutions per their publications count

Geological Survey of India (GSI), India (272) tops the list followed by Wadia Inst. Himalayan Geol., Dehra Dun, India (93) and both together take 30% share of the total publications as is seen from Table-20 below. It is interesting to note that 70% of total publications is shared by the first 10 Institutions in India during the year 1990. But in 1992, National Geophysical Research Institute, Hyderabad contributed nearly 5 % of total publications and occupied second position after GSI. During 1994, National Institute Oceanography, Dona Paula, Goa occupied second position by contributing 22 publications. Both these Institutions are national laboratories under the Council of Scientific & Industrial Research (CSIR).

Table-20: Ranking of top institutions as per their publications count (1998, 1994 & 1990) (> or =10 in all the years together)

Author Affiliation	1998	1994	1990
Aligarh Muslim University, Aligarh	6	5	13
Andhra University, Visakhapatnam	10	15	26
Atomic Minerals Division, Begumpet, Hyderabad	9	7	17
Banaras Hindu University, Varanasi	15	18	27
Bangalore University, Bangalore	8	0	20
Birbal Sahni Institute of Paleobotany, Lucknow	20	47	35
Central Mining Research Institute, Dhanbad	5	12	3
Centre for Earth Science Studies, Trivandrum	13	6	0
Cochin University of Science, Cochin	7	5	2
Geological Society of India, Bangalore	10	0	5
Geological Survey of India, Jaipur,	15	3	24
Geological Survey of India, Bangalore,	0	8	23
Geological Survey of India, Calcutta	38	33	359
Geological Survey of India, Lucknow	7	3	11
Geological Survey of India, Nagpur	2		23
Geological Survey of India, Hyderabad	9	3	10
Indian Agricultural Research Institute, New Delhi	10	8	6
Indian Institute of Science, Bangalore	13	10	14
Indian Institute of Technology, Kanpur	8	6	3
Indian Institute of Technology, Powai	4	14	12
Indian Institute of Technology, Kharagpur	13	14	20

Indian Institute of Technology, Madras	6	4	1
Indian Institute of Technology, New Delhi	3	5	4
Indian School of Mines, Dhanbad	8	6	39
Indian Statistical Institute, Calcutta	11	7	3
Jawaharlal Nehru University, New Delhi	5	4	9
K. D. Malaviya Institute of Petroleum Exploration, ONGC, Dehra Dun	3	9	10
Karnatak University, Dharwad	3	3	15
Kumaun University, Department of Geology, Nainital	3	1	7
Lucknow University, Lucknow	3	2	11
M.S. University, Vadodara	11	1	13
National Bureau of Soil Survey and Land Use Planning, Nagpur	10	4	3
National Geophysical Research Institute, Hyderabad	72	26	58
National Institute of Oceanography, GOA	17	35	39
Oil and National Gas Commission, Dehra Dun	10	18	12
Osmania University, Hyderabad	8	3	22
Physical Research Laboratory, Ahmedabad	23	19	13
Regional Research Laboratory, Bhubaneswar	9	2	6
Singareni Collieries Company, Yellandu	8	0	1
University Jammu, Jammu	5	6	8
University of Calcutta, Calcutta	10	8	6
University of Delhi, New Delhi	7	22	15
University of Kerala, Trivandrum	3	2	3
University of Lucknow, Lucknow	7	3	3
University of Madras, Madras	6	1	3
University of Mysore, Mysore	15	6	11
University of Poona, Poona	4	7	5
University of Roorkee, Roorkee	16	19	25
Utkal University, Bhubaneswar	7	0	7
Wadia Institute of Himalayan Geology, Dehra Dun	26	59	92
Others	338	248	404
	879	747	1501

Ranking of top institutions as per their publications count (> or = 10) during 1998, 1994 & 1990 is presented in Table- 21. During 1998, NGRI, Hyderabad ranked one followed by GSI, Calcutta and Wadia Institute of Himalayan Geology, Dehra Dun. In 1994, Wadia Institute of Himalayan Geology, Dehra Dun is on the top followed by Birbal Sahni Institute of Paleobotany, Lucknow and NIO, Goa. However in 1990, Geological Survey

of India, Calcutta was on the top rank followed by Wadia Institute of Himalayan Geology, Dehran Dun and NGRI, Hyderabad.

Table-21: Ranking of top institutions as per their publications count (> or = 10) during 1998, 1994 & 1990

Author Affiliation	1998 (Rank)	1994 (Rank)	1990 (Rank)
Andhra University, Visakhapatnam	10	15	26
Banaras Hindu University, Varanasi	15	18	27
Birbal Sahni Institute of Paleobotany, Lucknow	20	47(2)	35
Geological Survey of India, Calcutta	38(2)	33	347(1)
Indian Institute of Science, Bangalore	13	10	14
Indian Institute of Technology, Kharagpur	13	14	20
Indian School of Mines, Dhanbad	10	10	39
National Geophysical Research Institute, Hyderabad	72(1)	26	58(3)
National Institute of Oceanography, Goa	17	35(3)	39
Oil and National Gas Commission, Dehra Dun	10	18	12
Physical Research Laboratory, Ahmedabad	23	19	13
University of Delhi, New Delhi	10	22	15
University of Mysore, Mysore	15	10	11
University of Roorkee, Roorkee	16	19	25
Wadia Institute of Himalayan Geology, Dehran Dun	26(3)	59(1)	92(2)

Top Universities as per their publications count

As per the publications count (Table-22), Banaras Hindu Univ., Varanasi tops the list followed by Andhra Univ., Visakhapatnam, Jadavpur University, Calcutta and Univ. Roorkee, Roorkee during 1990. However, during 1994, Univ. Delhi, Delhi on the top followed by Univ. of Roorkee and BHU. In 1998, Univ. of Roorkee maintained its position followed by BHU and Jadavpur Univ. On the second position and M. S. Univ., Vadodara has reached to third position.

Table – 22: Major Universities as per their publications (1998, 1994 & 1990)

Author Affiliation	1998(Rank)	1994(Rank)	1990(Rank)
University of Roorkee, Roorkee	16(1)	19(2)	25(3)
Banaras Hindu University, Varanasi	15(2)	18(3)	27(1)
Jadavpur University, Calcutta	15(2)	11(5)	22(4)
University of Mysore, Mysore	15(2)	6(8)	11(9)
M.S. University, Vadodara	11(3)	1	13(8)
Andhra University, Visakhapatnam	10(4)	15(4)	26(2)
University of Calcutta, Calcutta	10(4)	8(6)	6
Bangalore University, Bangalore	8(5)	0	20(5)
Osmania University, Hyderabad	8(5)	3	22(4)
Annamalai University, Annamalainagar	7(6)	1	1
Cochin University of Science, Cochin	7(6)	5(9)	2
University of Delhi, New Delhi	7(6)	22(1)	15(6)
University of Lucknow, Lucknow	7(6)	3	3
Utkal University, Bhubaneswar	7(6)	0	7
Aligarh Muslim University, Aligarh	6(7)	5(9)	13(8)
University of Madras, Madras	6(7)	1	3
J. N. V. University, Jodhpur	5(8)	1	0
Jawaharlal Nehru University, New Delhi	5(8)	4	9(10)
University Jammu, Jammu	5(8)	6(8)	8
University Rajasthan, Jaipur	5(8)	3	1
Tamil University, Thanjavur	4(9)	2	1
University of Poona, Poona	4(9)	7(7)	5
Karnatak University, Dharwad	3(10)	3	15(6)
Kumaun University, Nainital	3(10)	1	7
Lucknow University, Lucknow	3(10)	2	11(9)
Tamil Nadu Agricultural University, Coimbatore	3(10)	0	0
University of Kerala, Trivandrum	3(10)	2	3
Anna University, Madras	2	1	0
Assam Agricultural University, Jorhat	2	1	1
Bharathidasan University, Tiruchirapalli	2	2	0
Haryana Agricultural University, Hisar	2	2	3
Mohanlal Sukhadia University, Udaipur	2	0	0
Panjab University, Chandigarh	2	8(6)	14(7)
Rajasthan Agricultural University, Bikaner	2	0	0
University College, Trivandrum	2	0	0
University of Allahabad, Allahabad	2	0	2
A.P. Agricultural University, Hyderabad	1	0	0
Barkatullah University, Bhopal	1	0	0

B.C. Krishi Viswa Vidyalaya, Mohanpur	1	4(10)	0
Birsa Agricultural University, Ranchi	1	0	0
Burdwan University, Burdwan	1	0	1
D.D. College, Keonjhar	1	0	0
Dr. H. S. G. University, Sagar	1	0	2
G. B. Pant Univ. of Agr. and Tech., Pantnagar	1	2	2
Gauhati University, Guwahati	1	1	1
Gujarat University, Ahmedabad	1	0	0
Gulbarga University, Karnataka	1	1	6
Guru Nanak Dev University, Amritsar	1	1	7
J. Nehru Technical University, Hyderabad	1	0	0
Kakatiya University, Warangal	1	0	0
Kalyani University, Kalyani	1	0	1
Kurukshetra University, Kurukshetra	1	3	2
Kuvempu University, Shimoga	1	0	0
Maharshi Dayanand University, Rohtak	1	2	4
Pt. Ravishankar Shukla University, Raipur	1	2	0
S.V. University, Tirupati	1		3
Shivaji University, Solapur	1	1	3
Sri Krishnadevaraya University, Anantapur	1	0	0
Sri Venkateswara University, Tirupati	1	0	0
Allahabad University, Allahabad	0	1	0
Berhampur University, Berhampur	0	0	2
Dep. Mines and Geol., Mysore,	0	0	1
Dibrugarh University, Dibrugarh	0	0	1
Dr. Y.S. Parmar Univ. of Hort. & Forestr., Solan	0	1	0
Goa University,	0	2	2
H.P. Krishi Vishva Vidyalaya., Palampur,	0	2	2
J. N. Agric. University, Indore	0	0	1
Jamia Millia Islamia, New Delhi	0	1	0
J.N. Technological Univ., Hyderabad	0	1	1
Kanpur University, Kanpur	0	1	1
M. L. Sukhadia University, Udaipur	0	0	2
Mahatma Phule Agricultural University, Rahuri	0	1	0
Mangalore University, Mangalore	0	4	4
Nagarjuna University, Nagarjunanagar	0	0	3
Nagpur University, Nagpur	0	2	2
Nainital University, Nainital	0	0	1
North Bengal University, Darjeeling	0	0	1
North. East. Hill University, Kohima	0	1	1
Patna University, Patna	0	0	1
Punjabi University, Dep. Phys., Patiala	0	0	1
Rajendra Agricultural University, Samastipur	0	3	3

Ranchi University, Ranchi	0	0	1
Sambalpur University, Sambalpur	0	1	1
Shen-e-Kashmir Univ. Agric. Sci. Technol., Jammu	0	0	1
Shivaji University, Kolhapur	0	0	1
Shivaji University, Vidyanagar	0	0	1
Sukhadia University, Dep. Geol., Udaipur	0	0	2
University Coll. Agric., Calcutta	0	0	1
University Department of Geology, Nagpur	0	0	1
University Jodhpur, Jodhpur	0	0	5
University of Agricultural Sciences, Bangalore	0	2	0
University of Agricultural Sciences, Dharwad	0	1	1
University Of Science And Technology, Cochin	0	0	1
University Sagar, Sagar	0	0	2
Vikram University, Ujjain	0	0	9(10)
University Bombay, Bombay	0	0	1
Total	239	204	386

College-wise distribution of publications

An analysis of the publications published from the colleges as presented in Table 23. In 1990, Presidency College, Calcutta on the top followed by Deccan College, Poona and M. N. R. Eng. College, Allahabad. However in 1994, St. Xavier College, Bombay on the top followed by Presidency College and Agriculturaql College, Madurai. In 1998, D. S. College, Aligarh has occupied first position followed by Presidency College, Chennai and Assam Eng. College, Assam.

Table-23: College wise distribution of publications (1998, 1994 & 1990)

Author Afiliation	1998	Rank	1994	Rank	1990	Rank
D. S. College, Aligarh	4	1	1	5	1	
Presidency College, Chennai	3	2	0		0	
Assam Engineering College, Assam	2	3	0		0	
College of Agriculture, Gwalior	2	4	0		0	
D. B. S. (PG) College, Dehra Dun	2	5	0		1	
Fergusson College, Department of Geology, Pune	2	6	0		0	
Presidency College, Calcutta	2	7	2	2	8	1
University College, Trivandrum	2	8	0		0	

A. S. Post-Graduate College, Bulandshahar	1	9	0	0		
Agricultural College Farm, Bapatla	1	10	0	0		
Agricultural Research Institute, Rajendranagar	1	11	0	0		
Arts & Science College, Durg	1	12	0	0		
Bharati Vidyapeeth's College of Engineering, IND	1	13	0	0		
D.D. College, Keonjhar	1	14	0	0		
Deccan College, Postgraduate and Research Institute, Poona	1	15	1	6	5	2
Regional Engineering College, Warangal	1		0		3	4
J. K. College, Purulia	1		0		1	
MNR Engineering College, Allahabad	1		0		1	
G. S. Science College, Department of Geology, Belgaum	1		0		0	
JNN College of Engineering, Faculty of Civil Engineering, Shimoga	1		0		0	
M.M. Arts and Science College, Sirsi	1		0		0	
Malaviya Regional Engineering College, Jaipur	1		0		0	
Malnad Collège of Engineering, Hassan	1		0		0	
Walchad College of Arts and Science, Solapur	1		0		0	
Govt. Maharaja Autonomous College, Chhatarpur	1		0		0	
Government Arts and Science College, Durg	1		0		0	
Government Engineering College, Department of Civil Engineering, Trivandrum	1		0		0	
Government Science College, Department of Geology, Jabalpur	1		0		0	
M. N. R. Eng. Coll., Dep. Appl. Mech., Allahabad	0		0		4	3
St. Xavier's College Bombay, Amar Singh Coll., Dep. Geol., Srinagar, Kashmir	0		3	1	2	
Coll. Agric., All India Coord. Res. Proj. Manage. Salt Af S, Indore	0		0		2	
Naval Physical and Oceanographic Laboratory, Thrikkakara	0		1	15	1	
Bharatiya Mahavidyalaya, Amravati	0		0		1	
Durgapur Gov. Coll., Dep. Geol., Durgapur,	0		0		1	

J.D. Coll., Dep. Geol., Calcutta	0	0	1	
K. J. Somaiya College Sci. Commerce, Bombay	0	0	1	
P. G. Coll. Sci., Saifabad, Hyderabad	0	0	1	
Post-Graduate College of Science (OU), Department of Mathematics, Hyderabad	0	0	1	
TDB Coll., Dep. Geol., Raniganj	0	0	1	
University Coll. Agric., Calcutta	0	0	1	
Vaish Coll., Vaish	0	0	1	
Visvesvaraya Regional College of Engineering, Nagpur	0	0	1	
Yuvaraja's Coll., Dep. Geol., Mysore	0	0	1	
Gov. Model Sci. Coll., Dep. Geol., Raipur	0	0	1	
Govt. Arts Coll., Dep. Geol., Salem	0	0	1	
Agricultural College and Research Institute, Madurai	0	2	3	0
Udai Pratap (Autonomous) College, Varanasi	0	2	4	0
Bengal Engineering College, Howrah	0	1	7	0
College of Engineering, Poona	0	1	8	0
Day and Post-Graduate College, Hisar	0	1	9	0
Government Engineering College, Farmugudi, Goa	0	1	10	0
M.M.M. Engineering College, Gorakhpur	0	1	12	0
Madras Christian College, Madras	0	1	13	0
National College, Department of Mathematics, IND	0	1	14	0
Ninilam College, Department of Botany, Hyderabad	0	1		0
Rajasthan College of Agriculture, Udaipur	0	1		0
Regional Engineering College, Calicut	0	1		0
S.J. College of Engineering,, Mysore	0	1		0
Govt Degree College, Kathua	0	1	11	
University Bombay, Bombay		0		1
Total	39	24	45	

Distribution of all Indian earth science publications as per source

Source - wise list of distribution of all the Indian Earth Sciences publications published during the year 1990, 1992, 1994 are provided in the *Appendix – 3*.

Ranking of top publications where Indian earth science publications published

Below mentioned Table-24 provides ranking of top publications where Indian scientists in the field of Earth Sciences have published their research findings. It is found that all the top 10 publications are published from India.

Table – 24: Ranking of top Publication Source as per publications count (> or = 10) during 1998, 1994 & 1990

Journal	Total No. of Publications					
	1998	Rank	1994	Rank	1990	Rank
Journal of the Geological Society of India	147	1	118	1	106	4
Indian Mineralogist	113	2	0		0	
Journal of the Indian Society of Soil Science	66	3	35	3	30	9
Indian Minerals	32	4	20	5	36	6
Journal of African Earth Sciences A	29	5	0		0	
Special Publication Series Geological Survey of India	25	6	0		36	7
Indian Journal of Geology	16	7	20	6	14	
Indian Journal of Marine Sciences	13	8	3		15	
Journal of the Palaeontological Society of India	11	10	10	14	20	
Geoscience Journal	11	12	16	8	13	
The Palaeobotanist	11	14	25	4	12	
Indian Geotechnical Journal	11	13	19	7	11	
Photonirvachak (Dehra Dun)	10	17	5		10	
Meteoritics and Planetary Science	10	15	0			
Memoir Geological Society of India	8		0		25	12
Proceedings of the Indian Academy of Sciences: Earth and Planetary Sciences	8		9		22	
Indian Journal of Petroleum Geology	7		13	11	0	
Marine Geology	2		9		10	
Abstracts Geological Society of Australia	1		0		11	
Records of the Geological Survey of India	0		14	10	367	1
Bulletin of the Indian Society of Earthquake Technology	0		1		17	
Developments in Precambrian Geology vix	0		0		16	
Exploration and Research for Atomic Minerals	0		0		16	
Bulletin of the Oil and Natural Gas Commission	0		0		11	
Gerlands Beitrage nilur Geophysik	0		0		10	
Journal of Nepal Geological Society Special issue	0		55	2	0	
Journal of Himalayan Geology	0		14	9	0	
Geophytology	0		5		15	

Findings of the Study

1. There were about 1501 records from India in GeoRef database in 1990 and 747 records in 1994 and 897 records in 1998.
2. India ranks 10th in the world based on the publication count during 1990 and 11th in 1994 and 1998 respectively. USA tops the list followed by Canada in 1990 and 1994. However U. K taken the 2nd position in 1998. Almost all the countries recorded a decline in the number of papers produced during 1994 and 1998 in comparison with 1990. There are some slight shifts in percentage share and ranks during 1994 and 1998 from 1990.
3. Percentage shift of total contributions from USA is -1.31 from 1990 to 1998. U.K has some increase in percentage shift i.e +1.08 and Italy +1.38 from 1990 to 1998.
4. English tops the list followed by Russian, Chinese, French and German. However, during 1994 Chinese occupied the second position and in 1998 again Russian occupied the second position.
5. More than 75% of the total publications published by the Indian scientists are from India, followed by Netherlands, USA & UK for 1990, 1994 and 1998.
6. All the publications published by the Indian scientists are in English. Only two articles written in Hindi during 1990 and one in Japanese in 1994 and one in French in 1998 are covered.
7. All the publications published by the Indian scientists during the year 1990, 1994 and 1998 are of Analytic in nature.
8. More than 50% of the Indian Earth Science literature published in Serial publications (journals) and the rest in other type of publications like – conference, documents, abstracts, books, etc.
9. Hyderabad tops the list followed by Calcutta and Bangalore in 1998. In 1994, Dehradun tops the list followed by Lucknow and New Delhi. During 1990, Calcutta tops the list followed by Dehradun and Hyderabad.
10. Uttar Pradesh tops the list during the years 1998 and 1994 followed by Andhra Pradesh and West Bengal. However, in 1990 West Bengal tops the list followed by Uttar Pradesh and Andhra Pradesh. In 1994, again Uttar Pradesh tops the list followed by West Bengal and Maharashtra.

11. Igneous and Metamorphic Petrology (05A) is the major subject area of research followed by Applied geophysics (20), Economic Geology (27A), Stratigraphy (12), Structural Geology (16), Engineering Geology (30) during the years 1990. However, in 1992, Engineering Geology (30) occupies the first position and in 1994 Applied Geophysics occupies the first position.
12. Igneous-and-metamorphic-petrology is on the top rank during all the years 1990, 1994 and 1998. Stratigraphy is on the second rank during 1998 and 1994 and fifth in 1990. Where as Geochemistry-of-rocks,-soils,-and-sediments is on the third position during 1998, fourth in 1994 and 10th in 1990.
13. Almost in all the subject areas, Geological survey of India (GSI), India has contributed its publications except in category codes such as 02D, 05B, 06B, 09, 19 and 25. Wadia Institute of Himalayan Geology, Dehra Dun is the major contributors to some areas such as 06B and 09. NGRI, Hyderabad is the leader in areas like 02C, 20 and 21. ONGC in 29A. NIO, Goa in 07 and 24 and PRL, Ahmedabad in 02D, 05B and 24.
14. Igneous and metamorphic petrology is the major area of research in India as per the publication count for all the three years. There is slight shifts in the ranking in other areas during these years.
15. GSI (Geological Survey of India) is the major contributor to earth sciences research in India. GSI's contributions at their different divisions.
16. Geological Survey of India (GSI), India (272) tops the list followed by Wadia Inst. Himalayan Geol., Dehra Dun, India (93) and both together take 30% share of the total publications as is seen from Table-12 below. It is interesting to note that 70% of total publications is shared by the first 10 Institutions in India during the year 1990. But in 1992, National Geophysical Research Institute, Hyderabad contributed nearly 5 % of total publications and occupied second position after GSI. During 1994, National Institute Oceanography, Dona Paula, Goa occupied second position by contributing 22 publications. Both these Institutions are national laboratories under the Council of Scientific & Industrial Research (CSIR).
17. Banaras Hindu Univ., Varanasi tops the list followed by Andhra Univ., Visakhapatnam, Jadavpur University, Calcutta and Univ. Roorkee, Roorkee

during 1990. However, during 1994, Univ. Delhi, Delhi on the top followed by Univ. of Roorkee and BHU. In 1998, Univ. of Roorkee maintained its position followed by BHU and Jadavpur Univ. On the second [position and M. S. Univ. Vadodara has reached to third position. In 1990, Presidency College, Calcutta on the top followed by Deccan College, Poona and M. N. R. Eng. College, Allahabad. However in 1994, St. Xavier College, Bombay on the top followed by Presidency College and Agricultura College, Madurai. In 1998, D. S. College, Aligarh has occupied first position followed by Presidency College, Chennai and Assam Eng. College, Assam.

18. All the top 10 ranked sources of publications are published from India.
19. Igneous and Metamorphic Petrology (153 articles) is the highly contributed area of research in India during 1990 followed by Applied Geophysics (136 articles) and Economic Geology (122 articles). During 1994 Igneous and Metamorphic Petrology (63 articles) is the highly contributed area followed by Engineering Geology (60 articles) and Applied Geophysics (58 articles). During 1998, again Igneous and Metamorphic Petrology (161 articles) is the highly contributed followed by Stratigraphy (98 articles) and Hydrogeology (95 articles).
20. Where as in 1990, the major area of research in earth sciences in the World goes to Stratigraphy (5875 articles) followed by Applied Geophysics (5385 articles) and Igneous and Metamorphic Petrology (5326 articles). But in 1994, it goes to Environmental Geology (5691 articles) followed by Igneous and Metamorphic Petrology (4697 articles) and Stratigraphy (4248 articles). However in 1998, the top rank goes to again to Environmental Geology (6800 articles) followed by Economic Geology (4250 articles) Stratigraphy (4007 articles).

Appendix - 1
Organisation – wise distribution of all earth science publications
(1998, 1994 & 1990)

Author Affiliation	1998	1994	1990
Agharkar Research Institute, Poona	2	3	0
Agricultural College and Research Institute, Madurai	0	2	0
Agricultural College Farm, Bapatla	1	0	0
Agricultural Research Institute, Rajendranagar	1	0	0
Aligarh Muslim University, Aligarh	6	5	13
All India Soil & Land Use Survey, IARI campus, Pusa, New Delhi	2	1	1
Allahabad University, Allahabad	0	1	0
Amar Singh Coll., Dep. Geol., Srinagar, Kashmir	0	0	2
Andhra Pradesh Agricultural University, Hyderabad	1	0	0
Andhra Pradesh, State Groundwater Department, Hyderabad	0	1	0
Andhra University, Visakhapatnam	10	15	26
Anna University, Madras	2	1	0
Annamalai University, Annamalainagar	7	1	1
Anthropol. Surv. India, N.W. Reg., Dehra Dun	0	0	2
Arts & Science College, Durg	1	0	0
Assam Agricultural University, Jorhat	2	1	1
Assam Engineering College, Assam	2	0	0
Atomic Minerals Division, Shillong	1	0	1
Atomic Minerals Division (DAE), IND	2	0	2
Atomic Minerals Division, Bangalore	5	1	4
Atomic Minerals Division, Begumpet, Hyderabad	9	7	17
Atomic Minerals Division, Department of Atomic Energy, Baroda	1	0	1
Atomic Minerals Division, Department of Atomic Energy, Jaipur	0	0	1
Atomic Minerals Division, Jamshedpur	1	0	0
Atomic Minerals Division, Nagpur	0	1	1
Banaras Hindu University, Varanasi	15	18	27
Bangalore University, Bangalore	8	0	20
Barkatullah University, Bhopal	1	0	0
Bengal Engineering College, Howrah	0	1	0
Berhampur University, Dep. Mar. Sci., Berhampur	0	0	2
Bhabha Atomic Research Centre, Hyderabad	2	0	0
Bhabha Atomic Research Centre, Mumbai	4	3	3
Bharat Gold Mines, Karnataka	0	0	1
Bharathidasan University, Tiruchirapalli	2	2	0
Bharati Vidyapeeth's College of Engineering, IND	1	0	0

Bharatiya Mahavidyalaya, Amravati	0	0	1
Bidhan Chandra Krishi Viswa Vidyalaya, Mohanpur	1	4	0
Bihar Council of Science & Technology, Patna	1	1	0
Bihar Remote Sensing Appl. Cent., Patna	0	0	1
Birbal Sahni Institute of Paleobotany, Lucknow	20	47	35
Birsa Agricultural University, Ranchi	1	0	0
Border Roads Organisation, Dhanbad	1	0	0
Burdwan University, Burdwan	1	0	1
C&P Div., E.R., Calcutta	0	0	1
C-190, Sarita Vihar, New Delhi	0	1	0
Cachan Proj., Assam	0	0	1
Calcutta Port Trust, Calcutta	0	0	1
CBIT, Hyderabad	0	0	1
CCS Haryana Agricultural University, Haryana	4	2	0
Cent. Earth Sci. Stud., Trivandrum,	0	0	8
Cent. Fuel Res. Inst., Coal Surv. Lab., Raniganj	0	0	1
Cent. Fuel Res. Inst., Dhanbad,	0	0	2
Cent. Fuel Res. Inst., Nagpur,	0	0	1
Cent. Ground Water Board, Hyderabad,	0	0	1
Cent. Ground Water Board, IND	0	0	1
Cent. Ground Water Board, Kasal Subernarekha, Jamshedpur,	0	0	1
Cent. Ground Water Board, Lucknow,	0	0	1
Cent. Petrol. Lab., Calcutta,	0	0	1
Cent. Rice Res. Inst., Cuttack,	0	0	3
Center for Study of Man and Environment, Calcutta	0	1	0
Central Agricultural Research Institute, Port Blair, Andamans	1	0	0
Central Arid NILone Research Institute, Jodhpur	3	4	3
Central Board of Irrigation and Power, New Delhi	0	1	0
Central Building Research Institute, Roorkee	1	3	0
Central Glass & Ceramic Research Institute, Calcutta	0	1	1
Central Ground Water Board, Chandigarh	0	1	0
Central Ground Water Board, Patna	1	0	0
Central Institute of Freshwater Aquaculture, Bhubaneswar	1	0	0
Central Mine Planning and Design Institute, Bihar	0	1	2
Central Mining Research Institute, Dhanbad	5	12	3
Central Mining Research Station Unit, Nagpur	0	3	0
Central Salt and Marine Chemicals Research Institute, Bhavnagar	1	1	
Central Soil and Materials Research Station, New Delhi	1	3	0
Central Soil and Water Conservation Research and Training Institute, Dehra Dun	1	4	0

Central Soil Salinity Research Institute, Anand	1	3	
Central Soil Salinity Research Institute, Karnal, Haryana	3	4	1
Central Soil Salinity Research Institute, Canning Town	1	0	0
Central Water and Power Research Station, Pune	2	1	2
Central Water Commission, New Delhi	2	0	0
Centre for Earth Science Studies, Trivandrum	13	6	0
C-MMACS, Bangalore	0	1	0
Coal India, Calcutta,	0	0	1
Cochin University of Science, Cochin	7	5	2
Coll. Agric., All India Coord. Res. Proj. Manage.			
Salt Af S, Indore	0	0	2
College of Agriculture, Gwalior	2	0	0
College of Engineering, Poona	0	1	0
Consultant, Bhubaneswar	2	0	0
Consultant, Gurgaon	0	2	0
CSMRS, Rock Mechanics Division, New Delhi	0	1	0
D. B. S. (PG) College, Dehra Dun	2	0	1
D. S. College, Aligarh	4	1	1
D.D. College, Keonjhar	1	0	0
Day and Post-Graduate College, Hisar	0	1	0
Dayalbagh Educational Institute, Dayalbagh	1	0	0
Deccan College, Postgraduate and Research Institute, Poona	1	1	5
Defence Laboratory, Jodhpur	1	0	1
Defence Terrain Research Laboratory, Delhi	0	1	0
Dep. Geol. and Mines, Assam,	0	0	1
Dep. Mines and Geol., Bangalore	0	0	2
Dep. Mines and Geol., Mysore,	0	0	1
Dep. Sci. and Technol., New Delhi,	0	0	1
Department of Agricultural Chemistry and Soil Science, Akola	1	0	0
Department of Mining Engineering, VRCE, Nagpur	0	1	0
Department of Studies in Geology, Manasagangotri, Mysore	3	0	0
Dibrugarh University, Appl. Geol. Dep., Dibrugarh	0	0	1
Dr. Ambedkar Institute of Technology, Department of Geology, Bangalore	1	0	0
Dr. H. S. G. University, Centre of Advanced Study in Geology, Sagar	1	0	2
Dr. Y.S. Parmar University of Horticulture and Forestry, Department of Soil Science, Solan, Himachal Pradesh	0	1	0
Durgapur Gov. Coll., Dep. Geol., Durgapur,	0	0	1
E-3 Vishnukamal Apt., Nagpur		1	
Economic Geology Division-2, IND	0	0	5

Engineers India, Gurgaon	1	0	0
Enron Oil & Gas India, IND	1	0	0
Fergusson College, Department of Geology, Pune	2	0	0
Forest Research Institute, Forest Soils and Land Reclamation Division, Dehra Dun	0	1	2
French Institute, Pondicherry	0	1	1
G. B. Pant Institute of Himalayan Environment and Development, Sikkim	1	0	0
G. B. Pant University of Agriculture and Technology, Pantnagar	1	2	2
G. S. Science College, Department of Geology, Belgaum	1	0	0
Gauhati University, Guwahati	1	1	1
Geod. & Res. Branch, Dehra Dun,	0	0	1
Geol Surv. India, Samchi, Bhutan	0	0	12
Geological Society of India, Bangalore	10	0	5
Geological Survey of India, Nagpur	3	1	0
Geological Survey of India, , Jaipur,	15	3	24
Geological Survey of India, A.M.S.E. Wing, India	1	0	0
Geological Survey of India, Agaratala	1	1	0
Geological Survey of India, Ahmedabad,	0	0	2
Geological Survey of India, Andaman Division, India	0	0	2
Geological Survey of India, Antarctic Division, Faridabad	4	1	2
Geological Survey of India, Bangalore,	0	8	23
Geological Survey of India, Bhopal	0	2	
Geological Survey of India, Bhubaneswar	5	0	4
Geological Survey of India, Calcutta	35	19	125
Geological Survey of India, Chandigarh	2	0	5
Geological Survey of India, Chennai	3	2	2
Geological Survey of India, Cochin	0	0	2
Geological Survey of India, Gandhinagar	2	0	0
Geological Survey of India, IND	3	14	222
Geological Survey of India, Itanagar,	0	0	1
Geological Survey of India, Jabalpur	0	2	
Geological Survey of India, Jammu,	0	1	8
Geological Survey of India, Jayanagar	0	0	1
Geological Survey of India, Kangra	1		
Geological Survey of India, Lucknow	7	3	11
Geological Survey of India, Mangalore	1	0	4
Geological Survey of India, Marine Wing, Visakhapatnam	2	1	4
Geological Survey of India, Nagpur	2	0	23
Geological Survey of India, Patna	1	0	1
Geological Survey of India, Poona	0	0	1

Geological Survey of India, Raipur	1	0	1
Geological Survey of India, Ranchi	0	0	4
Geological Survey of India, Seminary Hills	1	0	0
Geological Survey of India, Shillong	5	1	2
Geological Survey of India, Trivandrum	0	1	1
Geological Survey of India, Nilawar Mines, Rajasthan,	0	0	1
Geological Survey of India, Hyderabad	9	3	10
Geological Survey of India, Dehradun	1	0	4
Geoscience Laboratory, Oil and Natural Gas Commission, Jodhpur	0	1	0
GMS Powerpacks Pvt., Pune	1		
Goa University,	0	2	2
Golden Valley Institute of Engineering, Department of Mining Engineering, IND	1	0	0
Gondwana Geological Society, Nagpur	1	0	0
Gov. Model Sci. Coll., Dep. Geol., Raipur	0	0	1
Government Arts and Science College, Durg	1		
Government Engineering College, Farmugudi, Goa	0	1	0
Government Engineering College, Department of Civil Engineering, Trivandrum	1	0	0
Government Institute of Science, Aurangabad	1	1	0
Government Science College, Department of Geology, Jabalpur	1	0	0
Govt Degree College, Kathua	0	1	0
Govt. Arts Coll., Dep. Geol., Salem	0	0	1
Govt. Maharaja Autonomous College, Chhatarpur	1	0	0
Ground Water Department, Jodhpur	1	0	0
Ground Water Dev. Corp., Junagadh			1
Groundwater Institute, Poona	0	1	0
GSPUA and T, Department of Civil Engineering, Pantnagar	1	0	0
Gujarat University, Ahmedabad	1	0	0
Gujarat Water Supply and Sewage Board, Public Health Engineering Laboratory, Vadodara	1	0	0
Gulbarga University, Karnataka	1	1	6
Guru Nanak Dev University, Department of Physics, Amritsar	1	1	7
H.P. Krishi Vishva Vidyalaya., Palampur,	0	0	2
Haryana Agricultural University, Department of Soil Science, Hisar	2	2	3
Haryana State Minor Irrigation and Tubewells Corporation, Karnal	1	0	0
Himachal Pradesh Krishi Vishwavidyalaya, Himachal Pradesh	0	2	0

Hind. Lever Res. Cent., Bombay	0	0	1
Hindustan Copper, Masaboni Min., ICC, Calcutta	0	0	1
Hindustan Copper, Rajasthan	0	0	1
Hindustan NILinc, Udaipur	1	1	0
Hutti Gold Mines Co., Kalyadi Copper Unit, Arsikere	0	0	2
I & CAD Dev., Water Manage. Cell, Hyderabad	0	0	1
ICAR Res. Complex, Lembuchera	0	0	1
III J Block, Bangalore	0	1	0
Impact Environs, Hyderabad	1	0	0
Ind Space Res. Organ., ., Bangalore,	0	0	2
Ind. Toxicol. Res. Cent., Lucknow	0	0	1
India Meteorological Department, New Delhi	1	0	0
India Meteorological Department, Poona	0	1	0
India National Bureau of Soil Survey and Land Use Planning, Nagpur	0	1	0
Indian Agricultural Research Institute, New Delhi	10	8	6
Indian Assoc. Cult. Sci., Solid State Phys. Dep., Calcutta,	0	0	1
Indian Bureau of Mines, Nagpur	4	0	0
Indian Bureau of Mines, Bangalore	1	0	3
Indian Bureau of Mines, Dhanbad	1	0	0
Indian Bureau of Mines, IND	1	0	0
Indian Inst. Chem. Technol., Hyerabad	0	0	1
Indian Inst. Mechan. Continua, Calcutta	0	0	1
Indian Inst. Sugarcane Res., Lucknow	0	0	1
Indian Institute of Geomagnetism, Colaba	1	0	0
Indian Institute of Geomagnetism, Mumbai	2	2	4
Indian Institute of Remote Sensing, Dehra Dun	1	1	2
Indian Institute of Science, Bangalore	13	10	14
Indian Institute of Soil Science, Bhopal	3	1	0
Indian Institute of Technology, Kanpur	8	6	3
Indian Institute of Technology, Powai	4	14	12
Indian Institute of Technology, Kharagpur	13	14	20
Indian Institute of Technology, Madras	6	4	1
Indian Institute of Technology, New Delhi	3	5	4
Indian National Science Academy, New Delhi	0	1	1
Indian School of Mines, Dhanbad	8	6	39
Indian Space Research Organisation Headquarters, Bangalore	2	0	0
Indian Statistical Institute, Calcutta	11	7	3
Indira Gandhi Nahar Board, Jaipur	2	0	0
Indira Gandhi Natl. Open University, New Delhi	0	0	1
Industrial Toxicology Research Centre,, Lucknow	0	1	0
Inst. Deciduous For., Jabalpur	0	0	1

Inst. Sci., Nuclear Chemistry Div., Bombay	0	0	1
Institut Francais de Pondichery, Pondicherry	1	0	0
Institute for Social and Economic Change, Bangalore	0	1	0
Institute of Pesticide Formulation Technology, Udyog Vihar	0	1	0
International Commission on Stratigraphy (ICS), India	0	1	0
Irrig. Res. Inst., Roorkee	0	0	1
ISRO, Regional Remote Sensing Service Centre Department of Space, Nagpur	1	0	0
J and K Gov., Dir. Geol. and Min., Srinagar,	0	0	1
J. K. College, Purulia	1	0	1
J. N. Agric. University, Indore	0	0	1
J. N. V. University, Jodhpur	5	1	0
J. Nehru Technical University, Hyderabad	1	0	0
J.D. Coll., Dep. Geol., Calcutta	0	0	1
Jadavpur University, Calcutta	15	11	22
Jalpaiguri Government Engineering College, Jalpaiguri, West Bengal	0	1	0
Jamia Millia Islamia, New Delhi	0	1	0
Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore	2	0	0
Jawaharlal Nehru Technological University, Hyderabad	0	1	1
Jawaharlal Nehru University, New Delhi	5	4	9
JNN College of Engineering, Faculty of Civil Engineering, Shimoga	1	0	0
K. D. Malaviya Institute of Petroleum Exploration, ONGC, Dehra Dun	3	9	10
K. J. Somaiya College Sci. Commerce, Bombay	0	0	1
K.R.E.C., Applied Mechanics Department, Surathkal	0	1	1
Kakatiya University, Department of Geology, Warangal	1	0	0
Kalyani University, Kalyani	1	0	1
Kanpur University, Kanpur	0	1	1
Karnatak University, Dharwad	3	3	15
Karnataka Power Corporation, Ganeshgudi	0	0	1
Karnataka Regional Engineering College, Mangalore	0	1	0
Konkan Krishi Vidyapeeth, Dapoli	0	1	0
Konoike Constr. Co., Tech. Res. Inst., Konohana,	0	0	1
Kumaun University, Department of Geology, Nainital	3	1	7
Kurukshetra University, Kurukshetra	1	3	2
Kuvempu University, Department of Applied Geology, Shimoga	1	0	0
L.B. Colony, Sandur	1	0	0
L.D. Coll. Eng., Ahmedabad	0	0	1
Lucknow University, Lucknow	3	2	11

M. L. Sukhadia University, Dep. Geol., Udaipur	0	0	2
M. N. R. Eng. Coll., Dep. Appl. Mech., Allahabad	0	0	4
M.A.C.S. Res. Inst., Dep. Geol. and Palaeont., Poona	0	0	1
M.M. Arts and Science College, Sirsi	1	0	0
M.M.M. Engineering College, Civil Engineering Department, Gorakhpur	0	1	0
M.S. University, Vadodara	11	1	13
Madras Christian College, Palaeophytology Laboratory, Madras	0	1	0
Maharashtra Eng. Res. Inst., Nashik	0	0	1
Maharshi Dayanand University, Department of Mathematics, Rohtak	1	2	4
Mahatma Phule Agricultural University,, Rahuri	0	1	0
Makhalia Bakrahat, West Bengal	1	0	0
Malaviya Regional Engineering College, Jaipur	1	0	0
Malnad College of Engineering,Hassan	1	0	0
Mangalore University, Mangalore	0	4	4
Manoharbai Patel Institute of Engineering and Technology, Gondia	1	0	0
Meteorol. Off., Poona	0	0	2
Meteorological Office, New Delhi	1	0	1
Mineral Exploration Corporation, Nagpur	0	0	1
Mineral Exploration Corporation, Ranchi	1	0	0
Minist. Petrol. and Nat. Gas, New Delhi	0	0	1
Ministry of Rural Areas and Employment, New Delhi	1	0	0
MNR Engineering College, Allahabad	1	0	1
Mohanlal Sukhadia University, Udaipur	2	0	0
Nagarjuna University, Nagarjunanagar	0	0	3
Nagpur University, Nagpur	0	2	2
Nainital University, Nainital	0	0	1
National Bank for Agriculture and Rural Development, Mumbai	1	0	0
National Botanical Research Institute, Lucknow	0	0	2
National Bureau of Soil Survey and Land Use Planning Bangalore	5	0	0
National Bureau of Soil Survey and Land Use Planning , Calcutta	1	0	1
National Bureau of Soil Survey and Land Use Planning, Nagpur	10	4	3
National Bureau of Soil Survey and Land Use Planning, Udaipur	1	2	0
National Center for Compositional Characterisation of Materials, Hyderabad	1	0	0
National College, Department of Mathematics, India	0	1	0
National Environmental Engineering Research	1	0	0

Institute, Nagpur			
National Geophysical Research Institute, Delhi	1	0	0
National Geophysical Research Institute, Hyderabad	72	26	58
National Hydroelectric Power Corporation, New Delhi	0	0	2
National Institute of Hydrology, Roorkee	4	1	2
National Institute of Oceanography, Goa	17	35	39
National Institute of Rock Mechanics, Kolar Gold Fields	1	1	0
National Metallurgical Laboratory, India	1	0	0
National Mineral Development Corporation, Hyderabad	2	0	0
National Physical Laboratory, New Delhi	1	0	1
National Remote Sensing Agency, Hyderabad	1	0	0
National Remote Sensing Agency, Hyderabad	4	0	1
National Research Centre for Soybean, Indore	1	0	0
National Thermal Power Corporation, Noida	1	1	0
Natl. Alum. Co., Orissa	0	0	1
Natl. Bur. Soil Surv. and Land Use Plann., Reg. Cent., Jorhat,	0	0	1
Natl. Coll., Dep. Geol., Tiruchy	0	0	1
Naval Physical and Oceanographic Laboratory, Thrikkakara	0	1	1
NBSS, Nagpur	0	0	1
Ninilam College, Department of Botany, Hyderabad	0	1	0
North Bengal University, Darjeeling	0	0	1
North Eastern Institute of Science and Technology, Nirjuli	2	0	0
North. East. Hill University, Kohima	0	1	1
North-Eastern Hill University, Pachhunga			
University College, Department of Geology, Ainilawl	1	0	0
Nucl. Res. Lab., New Delhi	0	0	1
Nuclear Power Corporation, Mumbai	1	0	0
O.N.G.C., Calcutta	1	1	1
Office of Collector, Indore	0	1	0
Oil & Nat. Gas Comm., Bombay	0	2	3
Oil & Nat. Gas Comm., Sibsagar,	0	0	1
Oil & Natural Gas Commission, Rajahmundry	1	0	0
Oil & Natural Gas Corporation, Baroda	4	0	2
Oil & Natural Gas Corporation, IND	8	0	3
Oil and Nat. Gas Comm., Nanilira	0	0	1
Oil and National Gas Commission, Dehra Dun	10	18	12
Oil and Natural Gas Commission, Silchar	1	0	1
Oil and Natural Gas Corporation, Madras	2	0	0
Oil and Natural Gas Corporation, Jorhat	1	0	0
Oil and Natural Gas, Mehsana	0	1	0
Oil India, Assam	0	1	0

Oil India, Duliajan	1	0	1
Oil India, IND	2	1	0
Oil India, Jodhpur	0	1	0
ONGC, IRS, Ahmedabad	1	0	0
ONGC, Nagpur	1	0	0
Operations Karnataka and Goa, IND	0	1	0
Orissa University Agric. and Technol., Bhubaneswar	0	1	3
Osmania University, Hyderabad	8	3	22
P. G. Coll. Sci., Saifabad, Hyderabad	0	0	1
P. G. V. Mahavidyalaya, Gwalior	0	0	1
P. K. Roy Memorial College, Department of Geology, Dhanbad	1	0	0
P. O. Donimalai Township 583118, Karnataka	0	0	1
Panattuparbil, Kerala	1	0	0
Panjab University, Chandigarh	2	8	14
Patna University, Cent. Water Resour. Stud., Patna	0	0	1
Pestic. Dev. Programme India, IND	0	0	1
Pet. Recovery Inst., IND	0	0	1
PG Centre, Bihar	0	1	0
Physical Research Laboratory, Ahmedabad	23	19	13
Post-Graduate College of Science (OU), Department of Mathematics, Hyderabad	0	0	1
Potash Res. Inst. India, Gurgaon	0	0	1
Presidency College, Chennai	3	0	0
Presidency College, Calcutta	2	2	8
PRIWQM Laboratory, Panchayat Raj Engineering Department, Hyderabad	1	0	0
Pt. Ravishankar Shukla University, Raipur	1	2	0
Punjab Agricultural University, Ludhiana	4	2	2
Punjab Remote Sensing Centre, Ludhiana	5	0	0
Punjab State Council. Sci. & Technol., Chandigarh	0	0	1
Punjabi University, Dep. Phys., Patiala	0	0	1
R.C.E.R., Dep. At. Energy, Nagarbhavi	0	0	1
R.M.K. Engineering College, Kavaraipettai	1	0	0
Rajasthan Agricultural University, Bikaner	2	0	0
Rajasthan College of Agriculture, Udaipur	0	1	0
Rajasthan State Mines and Miner., Udaipur, Rajasthan	0	0	1
Rajendra Agricultural University, Samastipur	0	3	3
Ramgarh, Calcutta	0	0	1
Ranchi University, Ranchi	0	0	1
Regional Engineering College, Calicut	0	1	0
Regional Engineering College, Warangal	1	0	3
Regional Institute of Technology, Jamshedpur	0	1	0
Regional Research Laboratory (CSIR), Assam	1	0	0

Regional Research Laboratory, Bhopal	0	1	0
Regional Research Laboratory, Bhubaneswar	9	2	6
Regional Research Laboratory, Jorhat	0	1	2
Regional Research Laboratory, Trivandrum	1	1	0
Reliance Petroleum, Bombay	1	0	0
Remote Sensing Applications Center, Lucknow	0	1	0
Research Centre of Central Marine Fisheries			
Research Institute, Bolar	1	0	0
Reva Enviro Systems, Nagpur	1	0	0
RHEP, NEEPCO, IND	0	1	0
RITES, New Delhi	2	0	0
River Res. Stn., Guwahati	0	0	1
S. N. Bose National Centre for Basic Sciences, Calcutta	0	1	0
S.C.O.98-100, Sector 17-C, Chandigarh	0	1	
S.G.S. Inst. Technol. and Appl. Sci., Indore	0	0	3
S.J. College of Engineering, Department of Computer Science and Engineering, Mysore	0	1	0
S.K.N. College of Agriculture, Jobner	1	0	0
S.V. University, Tirupati	1	0	3
Saha Institute of Nuclear Physics, Calcutta	1	1	0
Sai Krupa Street Number 19, Secunderabad	1	0	0
Sambalpur University, Sambalpur	0	1	1
Sandur Manganese & Iron Ores, Karnataka	1	0	0
Sant Longowal Institute of Engineering and Technology, Department of Physics, Longowal	1	1	0
Sardar Sarovar Narmada Nigam, Gandhimagar	0	1	0
Sch. Mar. Sci., Mar. Geol. Div., Cochin	0	1	1
Shen-e-Kashmir University Agric. Sci. Technol., Jammu	0	1	1
Shivaji University, Kolhapur	0	1	1
Shivaji University, Solapur	1	1	3
Shivaji University, Vidyanagar	0	1	1
Shree Vivekananda Research and Training Institute, Mandvi	1	1	0
Shri G.S. Inst. Technol. and Sci., Remote Sensing Cell, Indore	0	1	1
Shri Warana Coll., Dep NILool., Kolhapur	0	1	1
Singareni Collieries Co., Godavarikhan	1	1	0
Singareni Collieries Company, Yellandu	8	0	1
Soil and Water Conservation, IND	0	1	0
Soil Surveying and Land Use Planning Centre, Sabour, Bhagalpur	1	0	0
Space Applications Centre, Ahmedabad	0	2	0
Space Applications Centro (ISRO), Ahmedabad	1	3	2
Sreebagh, Ammankoil Road, Kochi	1	0	0
Sri Krishnadevaraya University, Department	1	0	0

of Geography, Anantapur			
Sri Venkateswara University, Department of Geology, Tirupati	1	0	0
St. Xavier's College Bombay,	0	3	2
STA Fellow, National Institute of Hydrology, New Delhi	0	1	0
Sukhadia University, Dep. Geol., Udaipur	0	0	2
Tamil Nadu Agricultural University, Department of Soil Science and Agricultural Chemistry, Coimbatore	3	0	0
Tamil University, Thanjavur	4	2	1
Tata Coll.,Chaibasa	0	0	2
Tata Inst. Fundam. Res., Bombay	0	0	5
Tata Iron and Steel Company, IND	2	0	0
Tata Steel, IND	2	0	1
TDB Coll., Dep. Geol.; Raniganj	0	1	1
Tubewells & Lift Irrigation, Bhopal	0	1	0
Tungabhadra Project (CADA), Geol. Wing, Munirabad	0	0	1
Udai Pratap (Autonomous) College, Varanasi	0	2	0
University Bombay, Bombay	0	1	1
University Coll. Agric., Calcutta	0	0	1
University College, Trivandrum	2	1	0
University Department of Geology, Nagpur	0	1	1
University Jammu, Jammu	5	6	8
University Jodhpur, Jodhpur	0	1	5
University of Agricultural Sciences, Bangalore	0	2	0
University of Agricultural Sciences, Dharwad	0	1	1
University of Allahabad,Allahabad	2	1	2
University of Calcutta, Calcutta	10	8	6
University of Delhi, New Delhi	7	22	15
University of Kerala, Trivandrum	3	2	3
University of Lucknow, Lucknow	7	3	3
University of Madras, Madras	6	1	3
University of Mysore,Mysore	15	6	11
University of Poona, Poona	4	7	5
University of Roorkee, Roorkee	16	19	25
University Of Science And Technology, Cochin	0	1	1
University Rajasthan, Jaipur	5	3	1
University Sagar,Sagar	0	1	2
Utkal University, Bhubaneswar	7	1	7
V. O. Chidambaram College, IND	0	1	0
V.R.C.E., Nagpur	0	0	1
Vaish Coll., Vaish	0	1	1
Vikram University, Ujjain	0	1	9
Visvesvaraya Regional College of Engineering, Nagpur	0	1	1
Wadia Institute of Himalayan Geology, Dehran Dun	26	59	92

Walchad College of Arts and Science, Solapur	1	1	1
Water and Land Management Institute, Anand, Gujarat	1	1	1
Water and Land Management Institute, Aurangabad	1	1	1
Water Management Project, Regional Research Station, Chiplima	0	1	1
Water Technology Centre for Eastern Region (ICAR), Bhubaneswar	1	1	1
Yuvaraja's Coll., Dep. Geol., Mysore	0	1	1
	877	747	1501

Appendix – 2

City-wise distribution of Indian earth science publications & top 10 ranks (1998, 1994 & 1990)

City	1998	Rank	1994	Rank	1990	Rank
Hyderabad	113	1	43	5	115	3
Calcutta	79	2	52	4	411	1
Bangalore	49	3	22	10	75	4
Dehradun	44	4	93	1	131	2
Lucknow	37	5	57	2	65	5
New Delhi	37	6	54	3	48	6
Ahmedabad	26	7	24	7	18	
Nagpur	25	9	16		34	10
Bhubaneswar	25	8	3		21	
Jaipur	24	10	7		28	
Chennai	22		10		6	
Roorkee	21		23	9	28	
Trivandrum	20		10		12	
Mysore	18		7		13	
Dhanbad	17		18		44	7
Panaji	17		38	6	41	8
Mumbai	17		24	8	35	9
Vadodara	17		1		16	
Varanasi	15		20		27	
Kharagpur	13		14		20	
Visakhapatnam	12		16		30	
Pune	12		15		16	
Aligarh	10		6		14	
Jodhpur	10		7		9	
Ludhiana	9		2		2	
Kanpur	8		7		4	
Yellaru	8		0		1	
Cochin	7		5		6	
Annamalainagar	7		1		1	
Hissar	6		5		3	
Jamshedpur	6		1		2	
other	5		15		0	
Jammu	5		7		17	
Chandigarh	4		11		20	
Guwahati	4		2		5	
Jorhat	4		2		3	
Shilong	4		1		3	
Farjdabad	4		1		2	

Karnal	4	4	1
Tanjavur	4	2	1
Bhopal	4	5	0
Dharwad	3	6	16
Nainital	3	1	8
Allahabad	3	1	7
Patna	3	3	5
Udaipur	3	3	5
Coimbatore	3	0	0
Ranchi	2	0	5
Visakhapatnam	2	1	4
Solapur	2	1	3
Tirupati	2	0	3
Warangal	2	0	3
Pantnagar	2	2	2
Raipur	2	2	2
Gwalior	2	0	1
Anand	2	3	0
Tiruchirapalli	2	2	0
Gandhinagar	2	1	0
Bikaner	2	0	0
Durg	2	0	0
Nirjuli	2	0	0
Shimoga	2	0	0
Mangalore	1	5	8
Amritsar	1	1	7
Indore	1	1	7
Gulbarga	1	1	6
Rohtak	1	2	4
Sagar	1	0	4
Kurukshetra	1	3	2
Port Blair	1	0	2
Gurgaon	1	2	1
Jabalpur	1	2	1
Pondichery	1	1	1
Burdwan	1	0	1
Kalyani	1	0	1
Purulia	1	0	1
Silchar	1	0	1
Mohanpur	1	4	0
Aurangabad	1	2	0
Agartala	1	1	0
Kolar	1	1	0
Naida	1	1	0

Ainilawl	1	0	0
Akola	1	0	0
Anantapur	1	0	0
Baptala	1	0	0
Belgaum	1	0	0
Bhagalpur	1	0	0
Bolar	1	0	0
Bulandsahr	1	0	0
Colaba	1	0	0
Dayalbagh	1	0	0
Godavarikhan	1	0	0
Gondia	1	0	0
Hassan	1	0	0
Kavaraipetti	1	0	0
Keonjhar	1	0	0
Kochi	1	0	0
Longwal	1	0	0
Mandvi	1	0	0
Panattuparmbil	1	0	0
Rajahmundry	1	0	0
Rajendranagar	1	0	0
Sandur	1	0	0
Sikkim	1	0	0
Sirsi	1	0	0
Bhavnagar	1	1	0
Chhatrapur	1	0	0
Jobner	1	0	0
Kangra	1	0	0
Ujjain	0	0	9
Samastipur	0	3	3
Cuttack	0	0	3
Nagarjunanagar	0	0	3
Srinagar	0	0	3
Arsikere	0	0	2
Berhampur	0	0	2
Chaibasa	0	0	2
Kolhapur	0	0	2
Palampur	0	0	2
Raniganj	0	0	2
Kohima	0	1	1
Sambalpur	0	1	1
Surathkal	0	1	1
Trikkakara	0	1	1
Amaravati	0	0	1

Darjeeling	0	0	1
Dibrugarh	0	0	1
Durgapur	0	0	1
Ganeshgudi	0	0	1
Itanagar	0	0	1
Jayanagar	0	0	1
Konohana	0	0	1
Munirabad	0	0	1
Nagarbhavi	0	0	1
Nashik	0	0	1
Nanilira	0	0	1
Patiala	1	0	1
Salem	0	0	1
Sibsagar	0	0	1
Trichy	0	0	1
Vaish	0	0	1
Vidyanagar	0	0	1
Madurai	0	2	0
Palampur	0	2	0
Calicut	0	1	0
Chipilima	0	1	0
Dapolui	0	1	0
Farmugudi	0	1	0
Gorakhpur	0	1	0
Howrah	0	1	0
Jalpaiguri	0	1	0
Lakshmipuram	0	1	0
Meshana	0	1	0
Nauni	0	1	0
Rahuri	0	1	0
Udyog Vihar	0	1	0
Kathua	0	1	0
Junagarh	0	0	1
Other	10	18	6
Total	879	747	1501

Appendix – 3

Distribution of all Indian Earth Science Publications as per Source (1998,1994 & 1998)

Journal	ISSN NO.	1998	1994	1990
Journal of the Geological Society of India	0016-7622	147	118	106
Indian Mineralogist	0019-5928	113	0	0
Journal of the Indian Society of Soil Science	0019-638X	66	35	30
Indian Minerals	0019-5936	32	20	36
Journal of African Earth Sciences A	0899-5362	29	0	0
Special Publication Series Geological Survey of India	0254-0436	25	0	36
Indian Journal of Geology	0970-1354	16	20	14
Indian Journal of Marine Sciences	0379-5136	13	3	15
Journal of the Palaeontological Society of India	0552-9360	11	10	20
Geoscience Journal	0252-1970	11	16	13
The Palaeobotanist	0031-0174	11	25	12
Indian Geotechnical Journal	0046-8983	11	19	11
Photonirvachak (Dehra Dun)	0255-660X	10	5	10
Meteoritics and Planetary Science	1086-9379	10	0	
Journal of Mines Metals and Fuels	0022-2755	9	5	9
Gondwana Geological Maganiline	0970-261X	9	0	6
Memoir Geological Society of India	0435-4001	8	0	25
Proceedings of the Indian Academy of Sciences: Earth and Planetary Sciences	0253-4126	8	9	22
Pure and Applied Geophysics	0033-4553	8	2	6
International Journal of Mineral Processing	0301-7516	8	0	0
Indian Journal of Petroleum Geology	0971-2542	7	13	0
Others Serial		7	8	0

Geophysics	0016-8033	6	3	3
Talanta (Oxford)	0039-9140	6	0	1
Journal of Applied Geophysics	0926-9851	6	2	0
Others		5	3	123
Clay Research	0255-7193	5	4	6
Geochimica et Cosmochimica Acta	0016-7037	5	2	1
Gondwana Research International Geoscience Journal	1342-937X	5	0	0
Journal of Structural Geology	0191-8141	5	2	0
Journal of Applied Hydrology	0971-670X	4	6	7
Tectonophysics	0040-1951	4	3	6
Computers and Geosciences	0098-3004	4	8	5
AAPG Bulletin	0149-1423	4	3	2
Environmental Geology	0177-5146	4	6	0
Journal of Asian Earth Sciences	1367-9120	4	0	0
Journal of Geotechnical and Geoenvironmental Engineering	1090-0241	4	0	0
Tunnelling and Underground Space Technology	0886-7798	4	0	0
Precambrian Research	0301-9268	3	5	4
Mineralogical Maganiline	0026-461X	3	2	3
Geoderma	0016-7061	3	1	2
Journal of Geodynamics	0264-3707	3	0	2
Engineering Geology	0013-7952	3	3	1
Journal of Radioanalytical and Nuclear Chemistry	0236-5731	3	2	1
Journal of Petrology	0022-3530	3	1	1
Bulletin of the Seismological Society of America	0037-1106	3	0	1
Marine Georesources and Geotechnology	1064-119X	3	4	0
Hydrological Sciences Journal = Journal des Sciences Hydrologiques	0262-6667	3	3	0
Journal of Hydraulic Engineering	0733-9429	3	3	0
Applied Clay Science	0169-1317	3	2	0
Geotechnical and Geological Engineering	0960-3182	3	2	0

Water Resources Management	0920-4741	3	1	0
International Geology Review	0020-6814	3	0	0
The Proceedings of Green: the Internl Symposium on Geotechnics Related to the Environment		3	0	0
Water and Energy International	0972-057X	3	0	0
Geophysical Journal International	0956-540X	3	3	0
Marine Geology	0025-3227	2	9	10
Sedimentary Geology	0037-0738	2	3	3
Proceedings of the Indian National Science Academy Part A: Physical Sciences	0370-0046	2	1	3
Acta Geophysica Polonica	0001-5725	2	0	2
Geotechnique	0016-8505	2	0	2
Nature (London)	0028-0836	2	0	2
Earth and Planetary Science Letters	0012-821X	2	7	1
Geophysical Research Letters	0094-8276	2	4	1
Abstracts of Papers Submitted to the Lunar and Planetary Science Conference		2	0	1
Journal of Coastal Research	0749-0208	2	0	1
Water Resources Journal	0377-8053	2	0	1
Canadian Geotechnical Journal = Revue Canadienne de Geotechnique	0008-3674	2	1	0
Ganko = Journal of Mineralogy Petrology and Economic Geology	0914-9783	2	1	0
Quaternary Research (New York)	0033-5894	2	1	0
Applied Radiation and Isotopes	0969-8043	2	0	0
Carbonates and Evaporites	0891-2556	2	0	0
Earth Planets and Space	1343-8832	2	0	0
Earthquake Engineering and Structural Dynamics	0098-8847	2	0	0
Environmental Geochemistry and Health	0269-4042	2	0	0
Geocarto International	1010-6049	2	0	0

Palynology	0191-6122	2	0	0
Proceedings of the Institution of Civil Engineers Geotechnical Engineering	1353-2618	2	0	0
Proceedings of the Symposium on the Application of Geophys. to Environmental and Engineering Problems (SAGEEP)		2	0	0
Proceedings Series International Atomic Energy Agency = Collection Comptes Rendus Agence Internationale de l'Energie Atomique	0074-1884	2	0	0
Quaternary International	1040-6182	2	0	0
Special Paper Geological Survey of Finland	0782-8535	2	0	0
Special Publication Association of Engg. Geologists		2	0	0
XRay Spectrometry	0049-8246	2	0	0
Abstracts Geological Society of Australia	0729-011X	1	0	11
Journal of Hydrology	0022-1694	1	5	9
Review of Palaeobotany and Palynology	0034-6667	1	1	7
Chemical Geology	0009-2541	1	4	3
Terra Nova	0954-4879	1	4	3
Marine Chemistry	0304-4203	1	5	2
Water Air and Soil Pollution	0049-6979	1	1	2
Atomic Spectroscopy	0195-5373	1	0	2
Geological Journal	0072-1050	1	0	2
Geological Society Special Publications	0305-8719	1	0	2
Clays and Clay Minerals	0009-8604	1	2	1
Hydrological Processes	0885-6087	1	2	1
Micropaleontology	0026-2803	1	2	1
Soils and Foundations	0038-0806	1	2	1
Marine Geodesy	0149-0419	1	1	1

Abstracts with Programs Geological Society of America	0016-7592	1	0	1
European Journal of Mineralogy	0935-1221	1	0	1
ITC Journal = Bulletin de l'ITC	0303-2434	1	0	1
Journal of Geology	0022-1376	1	0	1
Mineralium Deposita	0026-4598	1	0	1
The Log Analyst	0024-581X	1	0	1
Water Resources Research	0043-1397	1	2	0
Acta Geodaetica et Geophysica Hungarica	1217-8977	1	1	0
Advances in Water Resources	0309-1708	1	1	0
Geobios	0016-6995	1	1	0
Geochemical Journal	0016-7002	1	1	0
Journal of Geochemical Exploration	0375-6742	1	1	0
Palaeogeography Palaeoclimatology Palaeoecology	0031-0182	1	1	0
Radiocarbon	0033-8222	1	1	0
American Mineralogist	0003-004X	1	0	0
Annales Geophysicae () Suppl	0992-7689	1	0	0
Annual Meeting Expanded Abstracts American Association of Petroleum Geologists	0094-0038	1	0	0
Canadian Journal of Earth Sciences = Revue Canadienne des Sciences de la Terre	0008-4077	1	0	0
Cogeoenvironment News		1	0	0
Comptes Rendus de l'Academie des Sciences Serie II Sciences de la Terre et des Planetes	1251-8050	1	0	0
Environmental and Engineering Geoscience	1078-7275	1	0	0
Hydroinformatics Proceedings of the International Conf. on Hydroinformatics		1	0	0
Hydrology and Earth System Sciences	1027-5606	1	0	0
Individual Studies by Participants at the International Institute of Seismology and Earthquake	0074-6606	1	0	0

Engineering				
International Assn.of Geodesy Symposia		1	0	0
International Conf. on Ground Control in Mining		1	0	0
International Journal of Sediment Research	1013-7866	1	0	0
Journal of Arid Environments	0140-1963	1	0	0
Journal of Gemmology	1355-4565	1	0	0
Journal of Geophysical Research B Solid Earth and Planets	0885-3401	1	0	0
Journal of Geophysical Research E Planets		1	0	0
Journal of Hydraulic Research = Journal de Recherches Hydrauliques	0022-1686	1	0	0
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