

CURRICULUM VITAE



1. NAME: D Chandrasekharam
<http://dchandra.geosyndicate.com/index.php>

2. DATE/Place OF BIRTH: 14 March 1948

3. EDUCATIONAL QUALIFICATIONS:

Ph.D 1979 IIT Bombay ; M.Sc 1972 IIT Bombay Applied Geology

4. TEACHING EXPERIENCE (appendix 6): 35 + Years

5. RESEARCH EXPERIENCE: 35 + Years

5 yr. (Senior Scientist) : Centre for Water Resources Development and Management, Calicut, Kerala 1980-85
Management, Calicut, Kerala: 1980-1985

2 yr. (Senior Scientist) Centre for Earth Science Studies, Trivandrum, Kerala 1985-87

21+ yr. (Professor) Department of. Earth Sci., IIT Bombay: 1987-2015

4 + Visiting Professor Department of Civil Engg. IIT Hyderabad 2016-

6. ADMINISTRATIVE EXPERIENCE:) 9 + years

7. THESIS SUPERVISED:

Ph.D: 24; M. Tech: 22; M. Sc: 33

8. PUBLICATIONS: (Appendis 3, 4)

Refereed Journals: 200 + ; Research Reports (Classified): 25; Chapter in Books: 4; Books: 8

9. PRESENT POSITION AND ADDRESS

TUBITAK Fellow: Izmir Institute of Technology, Izmir, Turkey (2021-)
Visiting Professor, Indian Institute of Technology Hyderabad, India (2016-2021)
Adjunct Professor, Univ. Southern Queensland, Australia (2016-2019)
Professor, Department of Earth Sciences IITB (1987-2015)
Adjunct Professor, King Saud University, Saudi Arabia (2013- 2019)
Adjunct Professor, China University of Geosciences, Wuhan, PRC (2010-2012)
Head, Dept Earth Sciences IITB (2000-2003)
Head, Centre of Studies in Resources Engineering, IITB (2002- 2008)
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10. RESEARCH AREAS:

GEOHERMAL ENERGY, GROUNDWATER RESOURCES, ENERGY FROM GRANITES,

11. SPONSORED FUNDED PROJECTS (Appendix 5): Completed: 9

12. MEMBERSHIP IN PROFESSIONAL BODIES:

1.. International Geothermal Association 2. Geothermal Resources Council, U S A, 3. Current Science Association, India, 4. International Association for Hydrogeologists 5.. Life Member- Electron Microscope Society of India.

13: AWARDS AND DISTINCTIONS:

- Senior Associate “Abdus Salam International Centre for Theoretical Physics, Trieste, Italy” 2002 - 2007.
- B. ICTP (International Centre for Theoretical Physics, Trieste) Fellowship under ICTP-CNR Programme 1997.
- TWAS *Visiting Professor* to Sana'a University, Yemen Republic: 1996-2001.
- Board of Directors, **International Geothermal Association**
- Board of Directors, Indian Rare Earths Ltd (Dept. Atomic Energy)
- Board of Directors, Western Coalfields Ltd., Coal India, Ministry of Coal
- Board of Directors, O N G C; Ministry of Petroleum and Natural Gas
- Board of Directors, Mangalore Refineries and Petrochemicals
- Adjunct Professor, China University of Geosciences, Wuhan, China.
- Chairman, Geothermal Energy Resources & Management Committee, Govt. India
- Adjunct Professor, King Saud University, Riyadh, Saudi Arabia.
- Editorial Board: Journal of Climate Science; Geomechanics and Geophysics for Geoenergy and Georesources; Jr. Mineralogical and Petrological Sci., Japan; Journal Water Energy Nexus, Geothermal Energy.
- Distinguished Honorary Member, Association of Independent Directors of India.

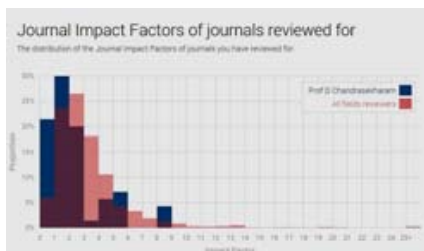
14. SYNERGISTIC ACTIVITIES:

1. Member, Board of Examiners (Ph.D. thesis), Madras University; 2. Member, Board of Examiners, Kerala University; 3. Member, Board of Examiners, Andhra University; 4. Member, Board of Examiners, Mumbai University 5. Member, Board of Examiners, Cochin University; 6. Member, Board of Examiners, Anna University; 7. Member, Project Review Committee (young scientists), DST ; 8. Member, Expert Committee, NRDMS, DST, Govt. India (Natural Resources Data Management System); 9. Member, Natural Resources evaluation Committee, Govt. Madhya Pradesh; 10. Member, Expert Panel, Dept. Sci. Tech., India (2004-2008); 11. Member, Editorial Board: Journal of Advanced Researches on Geology, USA; 12. Expert Member, Ministry of New and Renewable Energy Resources (2015-); 13. Chairperson, Expert Committee, Geothermal Energy Resources, DST, Govt. India.
14. Advisor, Maithri Aquatech Pvt. Ltd.,

15 SCHOLARLY SERVICES

Editorial Board: Water-Energy Nexus; Geomechanics and geophysics for Geo-energy and georesources; Open Environmental Sciences; Journal of Climate Change; Geothermal Energy Science Society and Technology

Reviewer: 1) Geothermics; 2) Science of the Total Environment; 3) Environmental Pollution; 4) Groundwater for Sustainable Development; 5) Applied Geochemistry; 6) Geochemical Exploration; 7) Environmental Earth Sciences; 8) Arabian Journal of Geosciences; 9) Water Quality Research; 10) Process safety and Environmental protection; 11) Environmental Geochemistry and Health; 12) Journal of Hydrology; 13) Management of Environmental quality; 14) Geofluids; 15) Water Resources Management; 16) Journal of African Earth Sciences; 17) Advances in Artificial Intelligence; 18) Applied Geophysics; 19) Paleogeography, Paleoclimatology Paleocology; 20) Geothermal Energy; 21) Current Science; 22) Marine Georesources and Geotechnology; 23) Desalination; 24) Renewable and Sustainable Energy Reviews; 25) Hydrogeological Processes; 26) The Geological Society of India; 27) Physics and Chemistry of the Earth; 28) Water Air and Soil Pollution; 29) Geomechanics and geophysics for Geo-energy and Georesources; 30) Geophysical Research Letters; 31) Colloid and Interface Sci.



16. AFFINITIES ABROAD:

*** U S A 1972-1974**

Participated in the Deep Sea Drilling Programme (JOIDES): Investigation on the Ocean floor basalts recovered from Legs 15 and 17 from the Caribbean trench and Central Pacific Basin.

*** United Kingdom 1989**

Presented paper at the 6th Water-Rock Interaction Conference, Malvern, U.K.

*** Japan 1990**

Attended short course on XRD DMAX-1C system, Rigaku, Co., Japan.

*** Italy 1995**

Presented invited paper at the World Geothermal Congress 1995, Florence. Attended short course on "Drafting Geothermal Projects for Funding" at Pisa, Italy.

Invited Lecture: on "Flow stratigraphy mapping of Deccan volcanic flows using field, geochemical, petrographic and paleomagnetic data" at C.N.R. Centro Di Studio per la Minerogenesi e la Geochimica Applicata, Florence, Italy (Host Dr Angelo Minissale).

*** Yemen Republic 1996**

Visited Sana'a under the TWAS Visiting Professorship Programme.

*** Italy 1997**

Worked at the CNR laboratory, Florence, Italy as ICTP-CNR Visiting Fellow.

***Oregon State University, Klamath Falls, USA 1999**

Invited lecture at the "Geothermal days" summer school, Oregon Institute of Technology, Oregon, USA.

*** Manila, Phillipines, 2000**

Invited by the International Business Corporation to deliver a lecture on "Geothermal Energy Resources" in India-opportunities for foreign financial investment (Feb. 28-29).

***Beppu and Morioka, Japan, 2000**

Presented a paper "Geothermal Energy Resources of India, Country update" at the World Geothermal Congress 2000 and Chaired a Session on "Asian Geothermal Energy -Country Update" (May 29-11 June).

***University of Kanazawa, Japan, 2000**

Invited lecture at the Dept. Earth Sciences, Kanazawa University, on "On the evolution Deccan flood basalts".

***Italy, 2000**

Visiting Scientist, CNR Laboratory, Florence, DST-Ministry of Foreign Affairs Bilateral Project.
Invited lecture at ERGA (Italian Energy Council, Pisa) on "Geothermal Energy Resources of India.

*** Karlsruhe, Germany, 2000**

Invited lecture at the Institute of Petrography and Geochemistry, University of Karlsruhe on " evolution of Deccan Volcanics".

***CNR Italy, 2001**

Visiting Professor to CNR Italy under Indo-Italian Fellowship.

*** Bad Urach, Germany, 2001**

Invited to give a lecture on the Hot Dry Rock Geothermal Resources in India.

***Mar del Plata, Argentina, 2002**

Conducted short course on "Geothermal Energy Resources for Developing Countries" (IAH 32nd Congress)

Conducted workshop on "Arsenic Pollution in Groundwater" (IAH 32nd Congress & IAH 32nd Congress).

***Muscat, Oman 2002**

Invited to attend the Interchange 2002 MEA conference of the Schlumberger Oil Field Services to have an over view on the relationship between IITB and OFS.

***CNR Florence Italy 2003**

Visiting Scientist, CNR Laboratory, Florence, DST-Ministry of Foreign Affairs Bilateral Project. Participated in field work to Vulcano, Panarea and Stromboli volcanoes.

***Karlsruhe, Germany 2003**

Collaborative project on Arsenic in groundwater of west Bengal (IITB-DAAD programme).

***Florence, Italy 2004**

Conducted a workshop on “Natural Arsenic in groundwater” during the 32nd International Geological Congress, September 2004. Presented paper at the 32nd International Geological Congress, September 2004.

***Saratoga Springs, USA 2004.**

Presented paper at the 11th Water Rock International Symposium, August 2004.

*** KTH , Stockholm, Sweden, March 2005.**

Invited lecture at the Dept. Land and Water Resources Engineering, Royal Institute of Technology (KTH), Stockholm.

*** Antalya, Turkey, 2005**

Presented Invited paper at the World Geothermal Congress 2005, Antalya.

*** Perth, Australia 2006**

Presented an invited paper at the American Association for petroleum Geologists- International Conference

*** Kunming, China, 2007**

Presented a paper at the 11th Water-Rock International Symposium, July 31- August 9, 2007.

*** San Jose, Costa Rica, 2007**

Conducted a short course on “low enthalpy geothermal resources”, 18th – 30 November 2007.

*** Beijing China, 2008.**

Delivered invited talk on the “Geothermal resources in India: Possibilities for direct use in the Himalayas” at the United Nations Workshop on “Decision Makers on Direct Heating Use of Geothermal Resources in Asia Tianjin, China 11 – 18 May 2008

*** Valencia, Spain, 2008.**

Presented a paper at the 2nd International Arsenic in the Environment Congress, May 21-14, 2008.

*** Trieste, Italy 2008**

ICS-UNIDO workshop on “Geothermal Energy Resources” Trieste, Italy 10-12 December 2008 (Invited speaker)

*** Krakow, Poland, 2009**

Visiting Professor, Faculty of Geology, A G H University of Science and Technology, Krakow, Poland. Short Course on Low Enthalpy geothermal resources, 15 -27th May 2009.

*** Ethiopia, 2009**

Invited lecture “Low Enthalpy Geothermal Resources for Power Generation: Geo-Powering the rural communities” ICS-UNIDO, Ethiopia, 8-12 June 2009.

*** Trieste, Italy, 2009**

Conducted “School in Geothermics” at the Abdus Salam International Centre for Theoretical Centre, Trieste, Italy” 26th October – 7 November 2009.

*** China, 2009**

Short Course on “Arsenic pollution in groundwater-West Bengal” at the China University of Geosciences, Beijing: 30 November-5th December, 2009

Delivered lectures on “Arsenic and Fluoride pollution in groundwater, India” at the China University of Geosciences, Wuhan: 7th December – 11 December 2009

***Bali, Indonesia 2010**

Chaired Session at the World Geothermal Congress 2010 and presented 3 papers

*** Bochum, Germany 2011**

IGA Board Meeting

*** Monash University 2011**

IITB-Monash Academy sponsored project

*** Bali, Indonesia 2011**

Presented invited paper at the World Renewable Energy Congress 2011.

***Nairobi, Kenya 2012.**

IGA Board meeting. Presented invited paper at " AeGeo-C4: African Geothermal Congress.

*** Abu Dhabi, 2013**

Presented invited talk at the World Future Energy Summit 2013. Attended "*Roundtable*" on geothermal.

*** Dubai, 2013**

Presented a paper at the International Conference on Clean and Green Energy 2013.

*** King Saudi University, Riyadh, Saudi Arabia 2013-**

Adjunct Professor: Research and teaching geothermics

*** Arusha, Tanzania 2014**

African Geothermal Congress C5, Arusha 29 Oct-31 Oct 2014

*** Australia 2015**

World Geothermal Congress 2015, Melbourne

*** New Zealand 2015**

International Geothermal Association Board of Directors' Meeting, Taupo.

*** Wuhan, 2015**

Silk Route Workshop: Invited talk

*** Izmir, Turkey 2016**

Conducted Short course in geothermal energy at Izmir Institute of Technology

***2016 Addis Ababa Board of Directors' meeting, International Geothermal Association**

*** 2018 Jeddah;** Presented a keynote address at the 12th IGC, Saudi Geological Survey on “Evolution of Geothermal systems around the Red Sea: An over view” **Feb 2018.**

17. KNOWLEDGE IN INSTRUMENTATION TECHNIQUES/ SOFTWARE

XRD, AAS, SEM, Reflection and transmission microscopes.

18. ACADEMIC DISTINCTIONS:

IIT Silver Medal (M.Sc); National Scholarship Award (B.Sc. and M.Sc).

DRDO (Defense Research & Development Organization) 2007 Academic Excellence award.

19. RESEARCH AND DEVELOPMENT/ CONSULTATIONS: (Appendix 5)

20. SHORT COURSES/WORKSHOPS

*Organized UNESCO sponsored short course on “Geological Parameters for environmental Protection” Feb 25-2 March 2002 at IIT Bombay, India.

*Conducted a Short Course on “Geothermal Energy Resources in Developing Countries” between 18-20 October 2002 at Mar del Plata, Argentina (32nd IAH Congress) .

* Conducted a workshop on “Natural arsenic in groundwater” between 21-25, October, 2002 at Mar del Plata, Argentina (32nd IAH Congress).

*Conducted workshop on “Natural arsenic in groundwater” between 13-19 August, 2004, at the 32nd International Geological Congress, Florence, Italy.

* Conducted QIP short course for University teacher on “Geothermal energy resources” 27 September 3 October 2004, IITB.

* Conducted short Course on “Low Enthalpy geothermal resources”, 15 -27th May 2009, A G H University of Science and Technology, Krakow, Poland.

* Invited lecture “Low Enthalpy Geothermal Resources for Power Generation: Geo-Powering the rural communities” ICS-UNIDO, Ethiopia, 8-12 June 2009.

* Conducted “School in Geothermics” at the Abdus Salam International Centre for Theoretical Centre, Trieste, Italy” 26th October – 7 November 2009.

* Conducted short Course on “Arsenic pollution in groundwater-West Bengal” at the China University of Geosciences, Beijing & Wuhan; 30 November-5th December, 2009

*Conducted short course in Geothermal Energy Resources at Izmir Institute of Technology, Izmir, Turkey, 2016

Appendix 1

Administrative experience:

Chair, Department of Earth Sciences, 2000 - 2003. Chair, Centre of Studies in Resources Engineering, 2002 -2008.

Duties of the Chair, Department of Earth Sciences include the following:

1. Recruitment of faculty to the department
2. Recruitment of administrative staff to the department
3. Department's development activities- includes
 - Planning Department's annual budget
 - Preparation of annual scientific / teaching/ technical reports
 - Projected growth plan of the department in terms of manpower, laboratory facilities, academic and research programmes
 - Formulation of new course programmes to meet countries demand
 - Organizing industrial collaborative research activities
 - Promoting faculty-industry relationship through consultancy projects

Duties of Chair, Centre of Studies in Resources Engineering (CSRE) include the following:

CSRE has a faculty/scientist strength of 15 with 23 supporting staff. CSRE's main activities are to conduct research related to natural resources evaluation and management using remote sensing techniques CSRE gets sponsored projects from various National / International (UNDP/NSF) Organizations with funds ranging from 70-100 million rupees / year. Some of the projects executed by the CSRE are :

Water / Mineral Resources Exploration and Management, Soil and agricultural studies, Terrain evaluation and Landuse planning, Natural Hazards and Environmental Monitoring System, Image processing, and GIS

1. Administrative duties related to sponsored projects
2. Planning continuing education / training programmes and short term course in Natural Resources management Scientists/ teachers/ planners/ administrators and panchayat members for district level planning.
3. Formulation of long rang research plans for landslide mitigation and groundwater pollution
4. Identifying thrust areas related to Natural Resources (Mineral, Water)
5. Human resources development of CSRE
6. Development of academic programmes related to Natural Resources
7. Preparation of annual research reports and budget planning

Convener, Indian Space Research Organization (ISRO) –IIT Bombay Space Technology Cell (2002 -2008).

With the launching of several Indian Remote Sensing satellites, there is a growing demand for upgrading the satellite systems and data acquisition system and utilization of data products.

The main function of the convener is to promote strong research programmes between IITB faculty and ISRO through projects funded by ISRO. A major part of the research areas are covered by CSRE.

Appendix 2

TITLE OF THESIS SUPERVISED/SUPERVISING

Ph.D:

1. Geochemistry of thermal springs along the west coast of India, Maharashtra, India (1993; A. Ramanathan)
2. Flow stratigraphy, geochemistry and paleomagnetism of Central Deccan Volcanics and evolution model for Deccan Volcanism (1994; P. Navaneethakrishnan).
3. Evaluation of groundwater resources along northern coastal region of Bombay (1995; Lekha Siraz).
4. Saltwater intrusion studies along the coastal hard rock aquifer, Maharashtra, India (1995; Siraz).
5. Geochemistry, petrogenesis, stratigraphy and structure of Deccan Flood Basalts of the Western Satpura -Tapi region, India (1998; Hetu C Sheth).
6. Geology and Geochemistry of metavolcanics and associated sulphide ores of Kalyadi and Ingaldhal, Karnataka State, South India (1999; Biju Mathew).
7. Saltwater intrusion in coastal areas: The use of SHARP, a Quasi 3D finite difference model to simulate fresh water and saltwater flow in Wadi Surdud, Yemen Republic (2000; Al-Khateeb).
8. Mineralogy and geochemistry of soils associated with different climatic regions of Maharashtra (2000; M. Swaminathan).
9. Fluoride contamination in groundwater, Hungund, Karnataka. (2002: Jalihal, A.A)
10. Fluoride contamination in groundwater, Morel river basin, Rajasthan (2004: Hema C. T).
11. Fluoride contamination in groundwater, Karbi-Anglom, Assam (2007: Saji, S)
12. Geochemistry of Barren Island volcanics and fumaroles, Andaman Sea (2008: A. Alam)
13. Arsenic uptake by crops in relation to soil types, West Bengal (2010 Syed Hilal Farooq).
14. Hydro geochemistry and microbiological evaluation of groundwater in the unconfined urban aquifer system of Douala-Cameroon. (Ms. Gloria Eyong E. Takem, Univ. Buea, Cameroon, TWAS Fellow: 2010).
15. Arsenic content in groundwater of Mizoram, NE India (Thanmbidurai 2015)
16. Geo-Sequestration of carbon dioxide in coal seams (Bala Murali in progress: jointly with Monash Univ. Australia)
17. Assessment of geothermal resources of Bihar, Jharkhand and West Bengal using field and laboratory investigation (Hemant K Singh: 2015)
18. Arsenic contamination in groundwater, Manipur (Chandrasekhar Azad Kashayp, 2015)
19. A numerical study of creation of optimal fracture networks for heat extraction from engineered geothermal reservoirs (Banambar Singh, IITB-Monash Academy, 2015)
20. Hydrochemistry of groundwater in Tigray region, Northern Ethiopia (PDF: Dr. Dessie Nedaw, C V Raman Fellow. 2011-12)
21. Groundwater development in Ellala Catchment, Northern Ethiopia (PDF: Dr Nata Tadesse, CV Raman Fellow: 2012-13)
22. Geochemical evolution of thermal springs along the west coast in relation to the tectonic, lithological and geothermal regime (Trupti G. 2015)
23. Water foot print of Musi river basin, Hyderabad, India (Koteswara Rao 2015 –ongoing)

M.Tech:

1. Ore geochemistry and Cu partitioning between host rock and liquid phase at various salinity levels of a sulphide deposit, Ingaldhal, Karnataka (1992; Haragopal).
2. Geochemistry of sulphide deposit and solubility of silver and associated sulphides in NaCl solutions, Ingaldhal (1993; M.C.Antu).
3. Geothermal energy and its application to small scale industry: a case study: Agnigundala thermal springs, Andhra Pradesh (1995; S.A.Jayaprakash).
4. Groundwater potential zonation in the coastal aquifer of Srivardhan, Raigarh district, Maharashtra- A GIS approach (1998; Lalitendu Dash).
5. Study of recent foraminifera and ambient water chemistry of Kavaratti and Minicoy islands, Lakshadweep, India (1998; Diman Majumdar).
6. Arsenic contamination in groundwater, west Bengal (2000: IITB-DAAD sandwich programme; Juli Karmakar).
7. Study of heavy metals in groundwater, Nashik District, Maharashtra (2000; S.Suchismita).
8. Geoexploration for diamonds in kimberlites from Mainpur area, Raipur, Chhattisgarh State. (2001: K.C.Vinod).
9. Arsenic contamination in groundwater, northern part of West Bengal (2002: DAAD-IITB collaborative programme, Manabesh C).
10. Arsenic uptake by food crops: Noida district, West Bengal (2003: DAAD-IITB Programme, Paramita A).
11. Fluoride contamination in groundwater-Bilwara, Rajasthan (2003; Sengupta, S.)
12. Fluoride contamination of groundwater in and around Kinwat, Nanded district, Maharashtra (2004: M. Sukla)
13. Arsenic contamination in groundwater, Balia district, Uttar Pradesh (2005: Anita Joshi)
14. Arsenic contamination in groundwater and uptake of arsenic by food crops, Malda district, West Bengal. (W. Dhanachandra: 2006 DAAD fellow)
15. Fluoride contamination in and around Anugual district, Orissa. (Jogeshwar Kumbhar, 2007).
16. Petrological study and reconstruction of subsurface lithological sequence of upper Godavari Basin using drill cores (Banambar Singh, 2010)
17. Reconstruction of subsurface lithology of Godavari Basin between Aswaraopet, Draksharamam and Mandipet using drill cores (Deepika Singh, 2010)
18. High heat generating granites of Gugi, Ukkinal (Karnataka) and Rajapur (Maharashtra) and their bearing on the evolution of Rajapur thermal springs (Yadvendra Kumar, 2011)
19. Geochemistry and evolution of thermal springs in Pranhita-Godavari Basin (Bidyut Mohato, 2012)
20. Assessment of U, Th content in granites of Parts of Rajasthan and its bearing on the heat generation and geothermal systems (Gautam Garg, 2012)
21. Arsenic contamination in groundwater of Indravati river basin, Chhattisgarh (Arindam Gosh, 2012)
22. REE concentration in the surface and sub-surface soils, Ambadongar, Gujarat (Kanagaraj, 2015)

M.Sc Dissertations:

1. Geochemistry of surface, subsurface and hot springs, west coast of India, Maharashtra (1988; S.Balasubramaniam).
2. Petrology of Ezhimala igneous complex, Kerala (1988; S.Kannan).
3. Chemical characteristics of thermal springs around Anthoni-Samoni and Anthoni, Madhya Pradesh (1989; Srinivasan).
4. Geochemistry of Tandur volcanics, Andhra Pradesh (1990; Shivakumar).
5. Chemical characteristics of thermal springs of Puttur, Karnataka (1991; R.L.Selvakumar).
6. Geochemistry of Tattapani thermal springs, Madhya Pradesh, India: Field and experimental investigations (1992; M.C.Antu).
7. Hydrogeochemistry of Tuwa and Tulsi Shyam thermal springs, Gujarat (1993).
8. Hydrogeochemistry of Shahada and Chopda thermal springs. (1994; Deepak Das).
9. Geochemistry of Tattapani thermal springs, Orissa (1995).
10. Hydrogeochemistry of coastal aquifers, Bombay island (1996).
11. Hydrogeochemistry of Thana-Belapur coast, Maharashtra (1996).
12. Petrology of basic dikes of Dhule, Deccan Volcanic Province. (1997; Shantanu Kesav).
13. Hydrochemistry of thermal springs, Tapi rift, Jalgaon, Maharashtra (1997; Sheel Ranjan Prasad).
14. Hydrogeochemistry of geothermal springs, northern part of Bombay, Maharashtra, (1998; Julie Karmakar).
15. Comparative petrographic study of xenoliths occurring in alkali olivine basalts from central Bhuj (Kutch), west coast (Murud-Janjhira) and in basalts from Powai (1999; K.C.Vinod).
16. Hydrogeochemistry of thermal springs in Unkeswar, Nanded District, Maharashtra, (1999; Saikat Das).
17. Hydrogeochemical studies of natural waters in and around Powai and Saki Naka, Mumbai, Maharashtra (1999; Smita Chakraborty).
18. Hydrogeochemistry of Rajgir thermal springs, Bihar, India (2000; Manabesh Chawdhury).
19. Hydrogeochemistry of thermal springs in and around Sohana area, Gurgaon District, Haryana. (2001; Basudeb Datta).
20. Hydrochemistry of thermal springs, Manikaran, Himachal Pradesh (2002; Ayaz Alam).
21. Hydrogeochemistry of thermal waters, Surajkund, Bihar (2003; Saumitri Sarkar).
22. Petrology of Godhra granite and hydrochemistry of associated thermal springs, Tuwa, Gujarat (Kaustav Gosh, 2007)
23. Petrography and melt inclusion study on GPB of Igatpuri, Nasik, Maharashtra (S. Mahapatra, 2007)
24. Melt inclusions in picrites from Warangishi, Deccan basalt province (2007).
25. Hydrochemistry of thermal springs, Vajreswari (2008, Sonu Roy)
26. Fluoride contamination in groundwater, Nanded (2008, Atulkumar Anurag).
27. Arsenic and fluoride content in thermal springs of west coast and its bearing on their geochemical evolution (Shasank Nath, 2011)
28. Quality of groundwater in basalt aquifer, North Mumbai (Parthasarathy Choudhury, 2012)
29. Quality of groundwater in basalt aquifer, South Mumbai (Abhijit Ganguly 2012)
30. Quality of groundwater in parts of Dadra Nagar Haveli (Priyanka Paul: 2014)
31. Quality of groundwater in parts of Dadra, Nagar Haveli (Harish 2014).
32. Fluoride contamination in groundwater of Kakalghar, Maharashtra (Chitaranjan Behra, 2015)
33. Geochemistry of Tulsi Shyam thermal springs, Gujarat (Aswathy, T. 2015).

Books Published

2002

1. **D. Chandrasekharam** and J. Bundschuh 2002. "Geothermal Energy Resources for Developing Countries" AA Balkema Pub., The Netherlands, 412p.

2005

2. J. Bundschuh, P. Bhattacharya and **D. Chandrasekharam** 2005. "Natural Arsenic in Groundwater: Occurrences, Remediation and Management" Taylor & Francis Group Pub., London, ISBN 04 1536 700 X, 339 p

2008

3. **D. Chandrasekharam** and J. Bundschuh 2008. " Low Enthalpy Geothermal Resources for Power generation" Taylor and Francis Pub., U.K. 169 pp.
4. P. Bhattacharya, AL Ramanathan, A.B. Mukherjee, **D. Chandrasekharam**, and A.K. Keshari, 2008. "Groundwater for sustainable development: Problems, Perspectives and Challenges". Taylor and Francis Pub., U.K. 460p

2009

5. AL. Ramanathan, P. Bhattacharya, A.K. Keshri, J. Bundschuh, **D. Chandrasekharam**, and S.K. Singh. 2009. "Assessment of Groundwater Resources and Management" International Publishing House Pvt. Ltd., New Delhi, 518p

2014

6. B. Alpher, J. Bundschuh and **D. Chandrasekharam** 2014. Geothermal Systems and Energy Resources: Turkey and Greece. Taylor and Francis 350p.

2016

7. **D. Chandrasekharam**, A. Lashin,. Al Arifi and Al Bassam A. 2016. Red Sea Geothermal Provinces. CRC Press 221p.

2017

8. J. Bundschuh, J. Piechocki, **D. Chandrasekharam** and G. Chen. 2017. Geothermal, Wind and Solar Energy Applications in Agriculture and Aquaculture. CRC Press 470p.

Appendix 4

IMPORTANT PUBLICATIONS

INTERNATIONAL JOURNALS

1973:

- Bence, A.E., Papike, J. J., **Chandrasekharam, D.** and Cameron, M. 1973. Petrology of basalts from Leg 15, DSDP. EOS Am. Geophy. Union. Trans., 54, 995-998.
- Bence, A.E., Papike, J. J., **Chandrasekharam, D.**, Cameron, M. and Camenisch, S. 1973. Petrology of basalts from Leg 17, DSDP. EOS Am. Geophy. Union. Trans., 54, 998-1001.
- Chandrasekharam, D.** 1973. Petrological variations in the Atlantic, Pacific and Indian Ocean ridge basalts. N. Jb. Min. Mh., 120, pp 69-82.

1974:

- Chandrasekharam, D.** 1974. A re-examination of the Tertiary lavas from Greenland, Iceland and Scottish provinces. N. Jb. Abh., 10, pp 462-467.
- Viswanathan, S. and **Chandrasekharam, D.** 1974. Grain size studies on the plagioclases of the Manor volcanic complex, Maharashtra. N. Jb. Min. Mh., 11, pp 510-516.

1976:

- Subbarao, K. V. and **Chandrasekharam, D.** 1976. Some comments on the origin of the Troodos Ophiolite complex, Cyprus. N. Jb. Min. Mh., 8, pp 379-387.
- Subbarao, K.V. **Chandrasekharam, D.** and Valsangkar, A.B. 1976. Major element, K, Rb, Sr, U analyses, Sr⁸⁷/Sr⁸⁶ ratio, magnetic granulometric analysis and K-Ar ages of the acid volcanic rocks of St. Mary group of islands off west coast, India. IGC, Sydney (Ex-Abstract).

1977:

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1978:

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Geochemistry of groundwater in the unconfined aquifer along the coastal belt of Kozhikode, Kerala. CWRDM Report GW/R 23/83. 32p.

Chemistry of groundwater in a typical laterite midland region of Kerala. CWRDM Report GW/R 8/83. 105p.

Chemical characteristics of rain over Kozhikode, Kerala. CWRDM Report GW/R 71/83. 5p.

Atmospheric CO₂ and the chemistry of groundwater. CWRDM Report GW/R 59/83. 10p.

1984:

Laterite -water interaction studies: Project Report CWRDM Report GW/R 95/84. 197p.

1986:

Location of sites for digging dug wells under WREP in Chirayinkil Taluk, Trivandrum. CWRDM Report GW/R 154/86. 10p.

1987:

Geochemistry of groundwater in laterites with special application to pollution control. Project Report. CWRDM Report GW/R 170/87. 200p.

Appendix 5

LIST OF SPONSORED FUNDED PROJECTS COMPLETED

- * Sustainable exploitation of groundwater and cost-effective removal of arsenic from arsenic contaminated aquifers in China and India (Collaborative project between **India and China; 2009-2012. Completed**)
- * Crustal configuration and active tectonics of the Andaman arc-sea region based on analysis of geophysical data (**DST, 2008-2012. Completed**)
- * Groundwater arsenic in the alluvial aquifers of Ganges-Brahmaputra Flood Plains of India (**Indo-Sweden bilateral project- 2007-2012 Completed**).
- * Mapping the source regions of active Barren Island Volcano and structural configuration of the Andaman subduction zone in the NE Indian Ocean. (**National Integrated DST project: National Coordinator- 2007-2011**)
- * Geothermal Energy Resources of India (**Bilateral project between India and Italy: Sponsored by the Dept. Science and Tech., Govt. India and Ministry of Foreign affairs, Italy. -1996-2002**).
- * Geothermal Energy Resources of Gujarat. (**Collaborative project between India and Italy: Sponsored by the Gujarat Energy Development Agency. 2001**)
- * Flow stratigraphy of Northern Deccan Volcanic province based on field, geochemical, petrographic and paleomagnetic investigations. (**1997: Sponsored by Dept. Sci. Tech., Govt. India**).
- * Flow stratigraphy of Central Deccan Volcanic province based on field, geochemical, petrographic and paleomagnetic investigations. (**1994: Sponsored by Dept. Sci. Tech., Govt. India**).
- * Laterite-Water interaction Experimental investigation:- Evaluation of groundwater quality in laterite aquifers. (**1987: Sponsored by Sci. Tech. Govt. Kerala**).
- * Geochemistry of Laterites with application to pollution control. (**1985: Sponsored by Sci. Tech., Govt. Kerala**).

Appendix 6

RESEARCH AND DEVELOPMENT/CONSULTANCY PROJECTS

1. Chemical methods to upgrade the quality of kaolinite for paper industry (Patent pending).
2. Zircon Opacifiers: Chemical methods to upgrade zircon sand (whitening) for paint industry (Patent pending)
3. Chemical methods to remove iron from talc (Patent pending)
4. Investigation on the causes of failure of "Gas Pipeline concrete" (International consultation project.).
5. Investigation on the causes of failure of concrete: rehabilitation project- Killari earthquake (Govt. Maharashtra:).
6. Investigation on the causes of failure of concrete - Inter. Airport (International Airport Authority).
7. Investigation on the causes of failure of concrete - Oberoi Towers.
8. Assessment of concrete - mass housing project, Powai.
9. Investigation on the causes of failure of concrete - Chowa Chandan building, Bombay..
10. Testing of sand used for the construction of "Hot-Rolled Coil Project" (M/s Essar Gujarat Co. Ltd.).
11. Petrographic analyses and evaluation of physical and chemical properties of drill cores- Mulshi Dam Project (M/s Unicorn and Co.).
12. Chemical assessment of ceramic tiles (M/s Nitco Tiles Co.).
13. Evaluation of Sodium absorption capacity, chemical and physical properties of soils - Fly-over project, Thane creek, Bombay (M/s Land and coast P. Ltd.).
14. Evaluation of "Kota" slabs using chemical and physical parameters..
15. Estimation of asbestos fibres in water pipes and l/b ratio of the fibres and its relation to strength properties (M/s Govt. Maharashtra Water Supply Board.).
16. Alkali - silica reactivity of basalt aggregate (M/s Govt. Maharashtra.).
17. Cement content and grade of cement used in civil construction works (Bombay Municipal Corp.).
18. Groundwater quality assessment of bore well samples, Bombay island (M/s Sandeep Housing society, Bombay.).
19. Location of groundwater potential zones for deep bore wells based on landsat images at Waghu and Kalamb, Pune district, Maharashtra. (M/s Groundwater Exploration Service, Maharashtra.).
20. Groundwater quality assessment of coastal dug wells (two), Bombay island (M/s groundwater Exploration Service, Maharashtra.).
21. Assessment of mica a for paint industry (M/s Ashok Dalmia Ltd., Bombay.).
22. Estimate of cement content in concrete (M/s Do-Well Oil Plants Pvt. Ltd., Bombay.).
23. Assessment of grade of limestone for railway platform construction (M/s City Industrial Develop. Corp, Maharashtra.).
24. Petrographic evaluation of basalt aggregate for industrial construction purpose (M/s L and T, Madras.).
25. Environmental impact of gas pipeline from Dhabol to Goa. (M/s Enron Com.Ltd.)
26. Rock-water and liquid petroleum gas interaction (M/s RITES India Ltd.,).
27. Assessment of Kota limestone (M/s International Airports Authority of India)
28. Petrographic evaluation of aggregate for Pune-Mumbai high way construction (M/s Prakash Engineering and construction Co.)
29. Alkali-silica reactivity of aggregate (Ms Dhar Consultnts)

30. Estimation of thickness of paint over concrete using petrographic technique (Ms Dhar Consultants)
31. Investigation of colour variation and black streaks in sandstones (L and T, Mumbai).
32. Investigation on landslides, Mumbra-Highway by pass (Mumbai, PWD).
33. Assessment of Industrial Pollution in groundwater, Sangamner district, Maharashtra (Govt. Maharashtra).
34. Assessment of physical and petrographic characteristics of basalt core samples- Bhandup- Malad water project (Mumbai Municipal Corp).
35. Development of cracks in Italian Marble tiles (Central Bank of India, Bombay).
36. Chemical composition of failed concrete slabs (CIDCO, Bombay).
37. Assessment of water quality for ceramic industry (HR Johson India Ltd., Mumbai).
38. XRD analysis of soap samples (Godrej India Ltd., Mumbai).
39. Chemical composition of admixtures and concrete (Gammon India Ltd., Mumbai).
40. Chemical composition of red clay (Niranjana mines, Karnataka).
41. Evaluation of physical properties of basalt cores (Hindustan Construction Com., Mumbai).
42. Quality evaluation of ceramic tiles

TEACHING PROFILE

Courses offered:

The courses offered at M.Sc., M.Tech. and Ph.D. levels are: Igneous petrology; hydrogeochemistry; geothermics; global tectonics; mineralogy and crystal optics; marine mineral resources.

Thesis Supervision

As a part of the course curriculum, M.Sc. and M.Tech., students have to work on a project, submit a thesis and defend it before a panel of external examiners. Grades are assigned to the project. The project has a field as well as laboratory components. The results of the projects are presented at conferences and/or published in journals. The choice of selecting a project rests with the students. I supervise thesis related to groundwater, igneous petrology, water-rock interaction and geothermal energy resources. M.Tech. projects are assigned keeping in mind the needs of various industries in this country. List of thesis supervised are listed in appendix 2 above.

Course evaluation Scheme

The courses offered to the students are evaluated each semester by the students "under course evaluation" scheme. This is done mainly to get feed-back from the students regarding the course content, level of teaching, suggestions to improve the course content and methods of teaching. Based on the data, thus collected over a period of 3 to 4 years, the course structure is improved and new concepts are introduced. This scheme is followed for M.Sc. and M.Tech programmes. My over all rating is above 90%.

Ph.D. Programme

As a part of partial fulfillment of the programme, the students submit a thesis and defend it before a panel of external examiners. I supervised thesis related to groundwater resources and geothermal resources evaluation and igneous petrology. List of Ph.D. thesis supervised are listed in appendix 2.

Education Technology Programme

Under this programme, course modules are prepared on videotapes for the benefit of students registering under "self-study" programme. Some of the topics which are in demand by the students have been prepared by me and are listed below:

1. Determination of optical properties of minerals using 3 axes universal stage (45 minutes).
2. Saltwater intrusion in coastal aquifers: mechanism of intrusion and case histories from coastal laterite aquifer of Kerala (60 minutes).
3. Geochemical evolution of thermal springs, estimation of reservoir temperature using geochemical thermometers and geothermal energy assessment (90 minutes).

New Course

There is a growing interest among the students to get in-depth knowledge in hydrogeochemistry and low temperature reactions between rocks and meteoric water. I formulated syllabi for two course (GS 530: Hydrogeochemistry; GS 630: Geothermics) along with my colleagues. These two courses are being offered to 2nd M.Sc and M.Tech. graduates.

Low temperature experimental lab

To support the theory course, I have developed an experimental lab to conduct low temperature reactions at atmospheric pressure between rocks and water. A couple of my students have completed their thesis work using this facility and the data has been published.

Administrative responsibilities (details in Appendix 1)

Appointed as the Chair, Department of Earth Sciences, between 2000-2003. Duties includes administrative responsibilities, research and developmental activities of the department; development of interaction between the department and the industries and govt. agencies; development of staff and faculty structure of the department and curriculum development; infra structural development of the department.

Departmental Post Graduate Committee (DPGC) and Under graduate committee (DUGC) review various academic programmes and makes necessary changes in course content, keeping in view the recent developments in the field of earth sciences. The curricula are revised once in three years. Department Chair is the Convener of DPGC and DUGC..

Faculty Advisor

It is mandatory for each faculty member to be faculty advisor for M.Sc., M.Tech. and Ph.D students. The duty of the faculty advisor is to guide the students in choosing appropriate courses, assess course load, help academically weak students to cope-up with load etc.

I was a faculty advisor for 5 years for M.Sc., M.Tech. and at present faculty advisor for Ph.D students.

Class room seminars

Over the past several years I realized that the students are not cultivating the habit of reading and understanding publications appearing in various journals. In order to overcome this problem, I assign a seminar topic relevant to the course (which needs extensive reference work) to students and hold discussions on the topic in the class and assign marks. I have been successful in this programme and these seminars are being appreciated by the students as well.

Undergraduate geology programme

We offer first degree geology course to engineering graduates with an aim to strengthen the skills of those who will be involved in civil construction projects (buildings, dams, tunnels etc.). I offer this course depending on the teaching and research loads.

In summary, ~60% of my time is allotted to teaching, academic and administrative work and rest ~40% is devoted to research. This scheme is generally followed by all the faculty members of this Institute.

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13. Ramanathan, A. and **Chandrasekharam, D.** Geochemistry of Rajapur and Puttur thermal springs, west coast of India. *J. Geo. Soc. India*, 49, pp 559-565.
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15. **Chandrasekharam, D.** and Prasad, S. R. Geothermal system in Tapi rift basin, Northern Deccan Province, India. *9th Water - Rock Interaction (Eds) G.B. Arehart and J.R. Hulston, A.A. Balkema, Pub. Co., The Netherlands*, pp 667-670.
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17. **Chandrasekharam, D.** and Sheth, H. C. 1997. Significance of flow stratigraphy in deciphering erosional history of flood basalt province. *IV International Conf. Geomorphology, Bologna, Italy (Abstract)*, 110.
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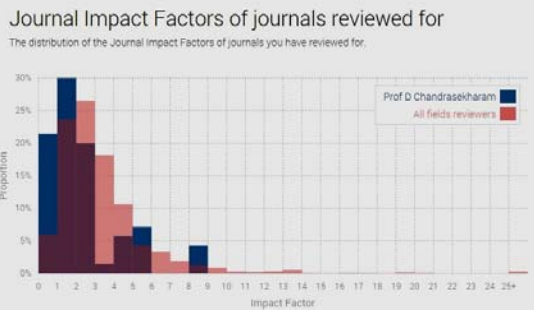
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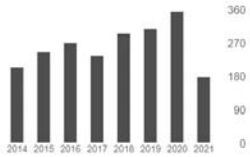
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