

JYOTIRANJAN S. RAY

Director, National Centre for Earth Science Studies

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PERSONAL DATA

Date of Birth: July 16, 1970

Citizenship: Indian

EDUCATION

1998 Doctor of Philosophy (*Geology*)

Physical Research Laboratory, Ahmedabad, India

Title of the Ph. D. Thesis: "*Stable and Radioisotopic constraints on the evolution of Mesozoic Carbonatite-Alkaline complexes of India*"

1992 Master of Technology (*Applied Geology*)

Indian Institute of Technology Roorkee, Roorkee, India.

First Division

Title of the M. Tech. Dissertation: "*Geochemistry of zircons from samples of Banded Gneiss Complex, Rajasthan, India*"

1989 Bachelor of Science (*Geology Honours*)

Ravenshaw College, Utkal University, Orissa, India

First Division with Distinction

EMPLOYMENT

- Director, National Centre for Earth Science Studies, Trivandrum, India, *Since September, 2020 (on deputation from PRL)*
- Senior Professor, Physical Research Laboratory, Ahmedabad, India, *Since January 2020*
- Professor, Physical Research Laboratory, Ahmedabad, India, *2014-2019*
- Associate Professor, Physical Research Laboratory, Ahmedabad, India, *2009-2014*
- Reader, Physical Research Laboratory, Ahmedabad, India *2003-2009*
- Postdoctoral Fellow, School of Ocean and Earth Science and Technology, University of Hawaii, Honolulu, USA, *August 2001-December 2002*
- Postdoctoral Fellow, University of Ottawa, Ottawa, Canada, *June 1999-July 2001*
- Postdoctoral Fellow, Physical Research Laboratory, Ahmedabad, India, *August 1997-May 1999*

AWARDS & RECOGNITIONS

- Recipient of *Shanti Swarup Bhatnagar Prize*, Council of Scientific & Industrial Research, Govt. of India, 2015
- Recipient of *PRL Award 2014*, Physical Research Laboratory, Ahmedabad
- Recipient of *National Geosciences Award 2009*, Ministry of Mines, Govt. of India
- Recipient of *M.S. Krishnan Gold Medal*, Indian Geophysical Union, 2009
- Member, The National Academy of Sciences, India, Allahabad, 2009
- Life Fellow, Geological Society of India, 2008
- Recipient of *BOYSCAST fellowship*, DST, Govt. of India, 2003
- Recipient of *Alexander von Humboldt Research Fellowship*, Germany, 2002
- Recipient of *Young Scientist Medal* of Indian National Science Academy (INSA), 2000
- *Young Associate* of the Indian Academy of Sciences (IAS), Bangalore: 1999-2004

- Recipient of *Best Ph.D. Thesis Award (Gold Medal)*, PRL, Ahmedabad, India, 1998

RESEARCH SUPERVISION

- Successfully supervised 6 PhD students
- Currently supervising 1 SRF
- Supervised more than 8 Postdoctoral Fellows and 25 M.Sc. / B.Tech. interns

PAST PHD STUDENTS

- Dr. Bivin Geo George: 2013-2017: Postdoctoral Fellow at Institute of Geological Sciences, Krakow, Poland
- Dr. Anirban Chatterjee: 2012-2017: Assistant Professor at Presidency University, Kolkata
- Dr.(Ms.) Ikshu Gautam: 2012-2017: Postdoctoral Fellow at Tokyo Institute of Technology, Japan
- Dr. Neeraj Awasthi: 2009-2012: Assistant Professor at Purvanchal University, Jaunpur
- Dr. Alok Kumar: 2008-2011: Assistant Professor at Banaras Hindu University, Varanasi
- Dr. Anil D. Shukla: 2007-2011: Associate Professor at PRL, Ahmedabad

PAST POSTDOCTORAL FELLOWS

- Dr. Souvik Das, PDF, University of Texas, Arlington, USA
- Dr. Shrema Bhattacharya
- Dr. Iftikhar Ahmad, Assistant Professor, Aligarh Muslim University, Aligarh
- Dr. Oinam Kingson, Assistant Professor, Banaras Hindu University, Varanasi

FACILITIES IN-CHARGE (*in PRL*)

- Thermal Ionization Mass Spectrometers (TIMS)
- Laser Ablation High Resolution Inductively Coupled Mass Spectrometer (LA-HR-ICPMS)
- X-Ray Fluorescence (XRF) Laboratory
- Petrological and Stereo microscopes facility
- Clean chemistry laboratory and sample processing facilities

EDITORSHIP AND PEER-REVIEWING

- Guest Editor, Special Issue on *Vindhyan Geology: Status and Perspective*, Journal of Earth System Science, v. 115, No. 1, 2006.
- Associate Editor, *Journal of Earth System Science* 2005-2008
- Reviewer for *Journal of Petrology, Lithos, Mineralogy and Petrology, Precambrian Research, Chemical Geology, Journal of Geology, Journal of Asian Earth Sciences, Current Science, Gondwana Research etc.*
- Editor, *PRL News*, Physical Research Laboratory, Ahmedabad, 2008-2012
- Reviewer of project proposals for MoES, DST, CSIR, and PLANEX & RESPOND programmes of DOS/ISRO.
- Coedited a Book "*The Andaman Islands and Adjoining Offshore: Geology, Tectonics and Paleoclimate*" as a 36th IGC Commemorative Volume and Society of Earth Scientists Series by Springer, 2020. ISBN 978-3-030-39842-2.

CONTRIBUTIONS TO NATIONAL EFFORTS

- Led a multi-institutional DST research programme on the evolution of Barren Island Volcano, 2008-2013
- Member of Indian delegation to Moscow to formulate Indo-Russian collaborative research programme in Earth Sciences, 2010

- Served and currently serving in committees for the NET examination of CSIR, 2008-onwards
- Served as a member of the Quality Control committee of the Ministry of Mines/ Geological Survey of India, 2010
- Involved in designing of syllabus for B.Tech /M.Sc. (Geosciences) for IIST, Trivandrum and University of Hyderabad, 2009-2011
- Member, Technical Committee of MoES for procurement of mass spectrometers at IUAC, 2017-2019
- Lead Author-Coordinator, Proposal for International Ocean Drilling Programme for drilling in the Andaman Subduction Zone, 2018-2019
- Co-opted Member, National PDF Committee, DST-SERB, since October 2018

IMPORTANT ADMINISTRATIVE EXPERIENCE

- Chair, Contract Award Committee, PRL, 2018-2020.
- Registrar, PRL October 2016-October 2017.
- Chair, Geosciences Division of PRL, 2010-2013.
- Member and Chair of Departmental Promotional Review Committees, 2009-2016.
- Co-organized the international conference on Terrestrial Planets: Evolution through Time, at PRL, Ahmedabad, India during January 22-25, 2008.
- Co-organized the international conference on A Scientific Meet in Remembrance of Prof. D. Lal, at PRL, Ahmedabad during February 14-15, 2014

GENERAL RESEARCH INTERESTS

- Theoretical aspects of isotope/elemental distribution in nature
- Origin and evolution of Earth's mantle, continental crust, and oceans
- Physics and chemistry of magma generation and evolution
- Subduction zone processes
- Fluid-rock interaction processes
- Isotope Stratigraphy

CURRENT RESEARCH ACTIVITIES

- Geochemistry of subduction zone magmatism
- Proterozoic Isotope Stratigraphy
- Sediment provenance study using radiogenic isotopes
- Isotopic and geochemical studies in carbonatites-alkaline complexes

RESEARCH EXPERIENCE

- Geochronology: U-Pb zircon, Pb-Pb carbonates, ^{40}Ar - ^{39}Ar , Rb-Sr
- Radiogenic Isotope Geology
- Stable isotope distribution in nature
- Theoretical modeling of isotope and trace element effects

TEACHING EXPERIENCE

- Graduate level (Ph.D.) courses in *Isotope Geology and Geochemistry*: Taught for 15 years.
- Graduate level courses in *Statistics and Error Analysis*
- Graduate level courses in *Solid Earth Geophysics*

EXPERIMENTAL SKILLS

- Thermal Ionization Mass-Spectrometry (Sr-Nd-Pb) and (U-Th-Pb)

- Gas source Mass-Spectrometry (Stable C-O isotopes, Ar-Ar)
- Major/Minor/Trace element analysis (XRF, INAA and Q-ICPMS)
- Petrography (microscopy, XRD, CL and SEM).

FIELD EXPERIENCE

- Geological field mapping and field studies in all terrains
- Fieldwork and sampling in active volcanic terrains
- 12-days field work in Namibia visiting Neoproterozoic glacial deposits and Etendeka Traps, September-October, 2016
- Speleothem sampling from underground caves
- Participated in two scientific cruises: to the Arabian Sea (sediment-water sampling) in 1993 (25 days) and to the Pacific Ocean (seafloor mapping and dredging of volcanic seamounts) in 2001 (40 days)
- Underground mine mapping

LIST OF PUBLICATIONS

Peer-reviewed Journal Articles

Student first authored publications are marked (*).

1. Ray, J.S., Trace element and isotope evolution during concurrent assimilation, fractional crystallization and liquid immiscibility of a carbonated silicate magma, *Geochimica et Cosmochimica Acta* 62, 3301-3306, 1998.
2. Ray, J.S. and R. Ramesh, Stable carbon and oxygen isotope analysis of natural calcite and dolomite mixtures using selective acid extraction, *Journal of Geological Society of India* 30, 323-332, 1998.
3. Ray, J.S. and R. Ramesh, Evolution of carbonatite complexes of Deccan flood basalt province, India: Stable carbon and oxygen isotopic constraints, *Journal of Geophysical Research (Solid Earth)* 104, 29471-29483, 1999.
4. Ray, J.S., R. Ramesh and K. Pande, Carbon isotopes in Kerguelen-plume derived carbonatites: evidence for recycled inorganic Carbon, *Earth and Planetary Science Letters* 170, 205-214, 1999.
5. Ray, J.S. and K. Pande, Carbonatite-alkaline magmatism associated with continental flood basalts at stratigraphic boundaries: cause for mass extinctions, *Geophysical Research Letters* 26, 1917-1920, 1999.
6. Ray, J.S., and R. Ramesh, A fluid-rock interaction model for carbon and oxygen isotopic variations in altered carbonatites, *Journal of Geological Society of India* 54, 179-186, 1999.
7. Ray, J.S. and R. Ramesh, Rayleigh stable isotopic fractionation from a multicomponent source, *Geochimica et Cosmochimica Acta* 64, 299-306, 2000.
8. Ray, J.S., K. Pande and T.R. Venkatesan, Emplacement of Amba Dongar carbonatite-alkaline complex at Cretaceous/Tertiary boundary: evidence from ^{40}Ar - ^{39}Ar chronology, *Journal of Earth System Science* 109, 39-47, 2000.
9. Ray, J.S., J.R. Trivedi and A.M. Dayal, Strontium isotope systematics of Amba Dongar and Sung Valley carbonatite-alkaline complexes, India: evidence for liquid-immiscibility, and enriched mantle sources, *Journal of Asian Earth Sciences* 18, 585-594, 2000.
10. Ray, J.S., R. Ramesh, K. Pande, J.R. Trivedi, P.N. Shukla and P.P. Patel, Isotope and rare earth analyses of samples from carbonatite-alkaline complexes of Deccan province: implications to magmatic and alteration processes, *Journal of Asian Earth Sciences* 18, 13-30, 2000.

11. Ray, J.S. and K. Pande, ^{40}Ar - ^{39}Ar age of carbonatite-alkaline magmatism in Sung Valley, Meghalaya, India, *Journal of Earth System Science* 110, 185-190, 2001.
12. Shukla, P.N., Bhandari, N., Das, A., Shukla, A.D. and Ray, J.S., High Iridium concentration of alkaline rocks of Deccan and implications to K/T boundary, *Journal of Earth System Science* 110, 103-110, 2001.
13. Ray, J.S., M.W. Martin, S. Bowring and J. Veizer, U-Pb geochronology and Sr isotope stratigraphy of the Vindhyan Supergroup, India, *Geology* 30, 131-134, 2002.
14. Sheth, H.C. and Ray, J.S., Rb/Sr- $^{87}\text{Sr}/^{86}\text{Sr}$ variations in Bombay Trachytes and Rhyolites (Deccan Traps): Rb-Sr isochrones, or AFC process, *International Geology Review* 44, 624-638, 2002.
15. Ray, J.S., J. Veizer, and W.J. Davis, C, O, Sr and Pb isotope systematics of carbonate sequences of the Vindhyan Supergroup, India: age, correlations and implications for global events, *Precambrian Research* 121, 103-140, 2003.
16. Ray, J.S., K. Pande, and S.K. Pattanayak, Evolution of Amba Dongar carbonatite complex: Constraints from ^{40}Ar - ^{39}Ar chronologies of the Inner Basalt and an alkaline plug, *International Geology Review* 45, 857-862, 2003.
17. Ray, J.S., and J. Veizer, Reply to Comments by S. Kumar on C, O, Sr and Pb isotope systematics of carbonate sequences of the Vindhyan Supergroup, India: age, correlations and implications for global events, *Precambrian Research* 129, 189-190, 2004.
18. Ray, J.S., and J. Veizer, Reply to comments by Chakrobarty P.P., and Sarkar, A. on C, O, Sr and Pb isotope systematics of carbonate sequences of the Vindhyan Supergroup, India: age, correlations and implications for global events, *Precambrian Research* 129, 195-196, 2004.
19. Ray, J.S., and P.N. Shukla, Trace element geochemistry of Amba Dongar carbonatite complex, India: Evidence for fractional crystallization and silicate-carbonate melt immiscibility, *Journal of Earth System Science* 113, 1-13, 2004.
20. Ray, J.S., S.K. Pattanayak and Kanchan Pande, Rapid emplacement of the Kerguelen plume-related Sylhet Traps, eastern India: Evidence from ^{40}Ar - ^{39}Ar geochronology, *Geophysical Research Letters* 32, L10303, 2005.
21. Ray, J.S., Age of Vindhyan Supergroup: A review of recent findings, *Journal of Earth System Science* 115, 149-160, 2006.
22. Ray, J.S. and R. Ramesh, Stable carbon and oxygen isotopic compositions of Indian carbonatites, *International Geology Review* 48, 17-45, 2006.
23. *Ray, R., Shukla, A.D., Sheth H.C., Ray, J.S., and others, Highly heterogeneous Precambrian basement under the central Deccan Traps, India: Direct evidence from xenoliths in dykes, *Gondwana Research* 13, 375-385, 2008.
24. Ray, J.S., Carbon Isotopic Variations in Fluid-deposited Graphite: Evidence for multicomponent Rayleigh isotopic fractionation, *International Geology Review* 51, 45-57, 2009.
25. Sheth, H.C., Ray, J.S., and others, Geology and geochemistry of Pachmarhi dykes and sills, Satpura Gondwana Basin, central India: problems of dyke-sill flow correlations in the Deccan Traps, *Contributions to Mineralogy and Petrology* 158, 357-380, 2009.
26. Sheth, H.C., Ray, J.S., Bhutani, R, Kumar, A., and Smitha, R.S., Volcanology and eruptive styles of Barren Island: an active mafic stratovolcano in the Andaman Sea, NE Indian Ocean, *Bulletin of Volcanology* 71, 1021-1039, 2009.
27. Ray, J.S., Radiogenic isotopic ratio variations in carbonatites and associated alkaline silicate rocks: Role of crustal assimilation, *Journal of Petrology* 50, 1935-1954, 2009.
28. Ray, J.S., Shukla, A.D., and Dewangan, L.K., Carbon and oxygen isotopic compositions of Newania dolomite carbonatites, Rajasthan, India: implication for source of carbonatites, *Mineralogy and Petrology* 98, 269-282, 2010.

29. Sheth, H.C., Ray, J.S., Bhutani, R., Kumar, A., Awasthi, N., The latest (2008-09) eruption of Barren Island volcano, and some thoughts on its hazards, logistics and geotourism aspects, *Current Science* 98, 1-7, 2010.
30. *Awasthi, N., Ray, J.S., Laskar, A.H., Kumar, A., Sudhakar, M., Bhutani, R., Sheth, H.C., and Yadava, M.G., Major ash eruptions of Barren Island Volcano (Andaman Sea) during the past 72 kyr: clues from a sediment core record, *Bulletin of Volcanology* 72, 1131-1136, 2010.
31. Sheth, H.C., Ray, J.S., Kumar, A., Bhutani, R., and Awasthi, N., Toothpaste lava from the Barren Island volcano (Andaman Sea), *Journal of Volcanology and Geothermal Research* 202, 73-82, 2011.
32. Ray, J.S., Mahoney, J.J., Duncan, R., Ray, J., Wessel, P., and Naar, D., Chronology and geochemistry of lavas from the Nazca Ridge and Easter Seamount Chain: an ~30 Myr hotspot record, *Journal of Petrology* 53, 1417-1448, 2012.
33. Ray, J.S., Pande, K., and Awasthi, N., A minimum age for the active Barren Island Volcano, Andaman Sea, *Current Science* 104, 934-939, 2013.
34. Ray, J.S., Kumar, A., Sudheer, A.K., Deshpande, R.D., Rao, D.K., Patil, D.J., Awasthi, N., Bhutani, R., Bhushan, R., and Dayal, A.M., Origin of gases and water in mud volcanoes of Andaman accretionary prism: implications for fluid migration in forearcs, *Chemical Geology* 347, 102-113, 2013.
35. *Awasthi, N., Ray, J.S., Laskar, A.H., and Yadava, M.G., Chronology of major terrace forming events in the Andaman Islands during the last 40 kyr, *Journal of the Geological Society of India* 82, 59-66, 2013.
36. Ray, J.S., Pande, K., Bhutani, R., Shukla, A.D., Rai, V.K., Kumar, A., Awasthi, N., Smitha, R.S., and Panda, D.K., Age and geochemistry of Newania dolomite carbonatites, India: implications for the source of primary carbonatite magma, *Contributions to Mineralogy & Petrology* 166, 1613-1632, 2013.
37. *Awasthi, N., Ray, J.S., A.K. Singh, S.T. Band, and V.K. Rai, Provenance of the Late Quaternary sediments in the Andaman Sea: Implications for monsoon variability and ocean circulation, *Geochemistry Geophysics Geosystems* 15, 3890-3906, doi:10.1002/2014GC005462, 2014.
38. *Awasthi, N., Ray, J.S., and Pande, K., Origin of the Mile Tilek Tuff, South Andaman: evidences from ^{40}Ar - ^{39}Ar chronology and geochemistry, *Current Science* 108, 205-210, 2015.
39. Ray, J.S., Pande, K., and Bhutani, R., $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology of subaerial lava flows of Barren Island volcano and the deep crust beneath the Andaman Island Arc, Burma Microplate, *Bulletin of Volcanology* 77: 57, DOI 10.1007/s00445-015-0944-9, 2015.
40. *Chatterjee, A., and Ray, J.S., Provenance of the mid-Holocene sediments in the Great Rann of Kachchh, India: Implications for the fluvial landscape of the Harappan Civilization, *Quaternary International* 443, 177-187, 2017.
41. *Gautam, I., Ray, J.S., Bhutani, R., Balakrishnan, S., and Dash, J., Role of fractionation correction in accurate determination of $^{142}\text{Nd}/^{144}\text{Nd}$ by TIMS: a case study of 1.48Ga alkaline rocks from Khariar, India, *Chemical Geology*, <http://dx.doi.org/10.1016/j.chemgeo.2017.06.036>, 2017.
42. *Chatterjee, A., and Ray, J.S., Geochemistry of Harappan Potteries from Kalibangan and sediments in the Ghaggar River: Clues for a Dying River, *Geoscience Frontiers* doi: 10.1016/j.gsf.2017.07.006, 2017.
43. *George, B.G., and Ray, J.S., Provenance of sediments in the Marwar Supergroup, Rajasthan, India: implications for basin evolution and Neoproterozoic global events, *Journal of Asian Earth Sciences* 147, 254-270, 2017.

44. Ray, D., Shukla, A.D., and Ray, J.S., Early 2017 activity of the Barren Island Volcano: facts versus hype, *Current Science* 113, 1657-1659, 2017.
45. *George, B.G.; Ray, J.S., Shukla, A.D., Awasthi, N., Chatterjee, A., and Laskar, A.H, Stratigraphy and geochemistry of the Balwan Limestone, Vindhyan Supergroup, India: Evidence for Bitter Spring $\delta^{13}\text{C}$ anomaly, *Precambrian Research* 313, 18-30, 2018.
46. *George, B.G., Ray, J.S., and Kumar, S., Geochemistry of carbonate formations of the Chattisgarh Supergroup, central India: implications for Mesoproterozoic global events, *Canadian Journal of Earth Sciences* 56, 335-346, 2019.
47. *Shukla, A.D., George, B.G., and Ray, J.S., Evolution of the Proterozoic Vindhyan Basin, Rajasthan, India: Insights from geochemical provenance of siliciclastic sediments, *International Geology Review* doi 10.1080/00206814.2019.1594412, 2019.
48. Patil Pillai, S., George, B.G., Ray, J.S., and Kale, V., Comments on Paper: “Depositional history and provenance of cratonic Purana basins in southern India: A multipronged geochronology approach to the Proterozoic Kaladgi and Bhima basins” by Joy et al., 2018, *Geological Journal* doi10.1002/gj.3589, 2019.
49. Ray, J.S., and Parthasarathy, G., Recent Advancement in Studies of Deccan Trap and Its Basement; Carbonatites and Kimberlites - An Indian Perspective in Last Five Years, *Proceeding of Indian National Science Academy* DOI: 10.16943/ptinsa/2018/49552, 2019.
50. *Chatterjee, A., Ray, J.S., Shukla, A.D., and Pande, K., On the existence of a perennial river in the Harappan heartland, *Scientific Reports* 9:17221, doi.org/10.1038/s41598-019-53489-4, 2019.
51. *Awasthi, N., and Ray, J.S., The Palaeogene record of Himalayan erosion in the Andaman Basin, *Journal of Earth System Science* 129:15, doi.org/10.1007/s12040-019-1266-7, 2020.
52. *George, B.G., and Ray, J.S., Depositional history of the Mesoproterozoic Chhattisgarh Basin, central India: insights from geochemical provenance of siliciclastic sediments, *International Geology Review* doi.org/10.1080/00206814.2020.1712557, 2020.
53. Awasthi, N., and Ray, J.S., Tracking Indian monsoon variability from changes in sediment provenance, *Current Science* 119: 291-306.
54. *Chaudhuri, A., Chatterjee, A., Banerjee, S., and Ray, J.S., Tracing multiple sources of sediments using trace element and Nd isotope geochemistry: provenance of the Mesozoic succession in the Kutch Basin, western India, *Geological Magazine* doi.org/10.1017/S0016756820000539, 2020.

Peer-reviewed Book Chapters

1. Sheth, H.C., Ray, J.S., Senthilkumar, P., Duraiswami, R.A., Chatterjee, R.N., and Gurav, T., Recycling of flow-top breccia crusts into molten interiors of flood basalt lava flows: Field and geochemical evidence from the Deccan Traps, in *Topics in Igneous Petrology* (Eds: J. Ray et al.), Springer- Berlin, Chapter 8, 61-180, 2011.
2. Ray, J.S., The Andaman Archipelago, in *Geomorphological Landscapes of India* (Ed. V. Kale), Springer-Berlin, 203-209, 2014.
3. Bhattacharya, S., Pande, K., Kumar, A., Kingson, O., and Ray, J.S., Timing of formation and obduction of the Andaman Ophiolite, in *The Andaman Islands and Adjoining Offshore: Geology, Tectonics and Paleoclimate*, Chapter-2, ISBN 978-3-030-39842-2.
4. Awasthi, N., George, B.G., and Ray, J.S., Tracing the sources and depositional pathways for the Oligocene sediments in the Andaman Forearc, in *The Andaman Islands and Adjoining Offshore: Geology, Tectonics and Paleoclimate*, Chapter-6, ISBN 978-3-030-39842-2.

Publications in Conference Proceedings

1. Ray, J.S., and Ramesh, R, Stable carbon and oxygen isotopes in hydrothermally altered carbonatites, Ambadongar, Gujarat, *Proceedings of 7th National Symposium on Mass Spectrometry*, 1996.
2. Ray, J.S., and Trivedi, J.R., Sr isotope systematics of Amba Dongar alkaline rocks: evidence for liquid immiscibility and wall-rock assimilation, *Proceedings of 7th National Symposium on Mass Spectrometry*, 1996.
3. Ray, J.S., and Pande K., An early alkaline magmatism at Amba Dongar, Deccan province: evidence from ⁴⁰Ar-³⁹Ar chronology, *Proceedings of 7th National Symposium on Mass Spectrometry*, 1996.
4. Pande K. and Ray, J.S., ⁴⁰Ar-³⁹Ar ages of the Sylhet Traps: evidence for coeval Rajmahal Sylhet volcanism, *Proceedings of 8th ISMAS Symposium on Mass Spectrometry*, v. 2, 1999.
5. Ray, J.S., ⁸⁷Sr/⁸⁶Sr and ¹⁴³Nd/¹⁴⁴Nd variations in carbonatites and associated silicate rocks, *Proceedings of 11th ISMAS workshop on Mass Spectrometry*, 2004.

Other Publications

1. The Barren Island: India's only active volcano, Popular Article, *PRL News* 23, 12-14, September 2008.
2. Principles of Radiometric Dating by K. Gopalan, Book Review, *Current Science* 114, 397-398, 2018.
3. Rengaswamy Ramesh (1956-2018), Obituary, *Current Science* 114, 2199-2200, 2018.
4. Ray, J.S., Barren Island: the only active volcano of India, *Rama Devi Women's University Bulletin of Science*, vol-II, 17-23, 2018.

INVITED TALKS/LECTURES

1. Evolution of the Indian sub-continental mantle: the story from carbonatites: 15th mid-year meeting of Indian Academy of Sciences, Indian Institute of Sciences, Bangalore, July 2-3, 2004.
2. Tracing atmospheric particles through Carbon and Lead isotopes: Workshop on Environmental health impacts from exposures to metals organized by World Health Organization at Shimla, June 1-3, 2005.
3. Origin and Evolution of Indian Carbonatites: Precambrian High of Geological Survey of Canada, May 26, 2006.
4. Understanding the Early Earth: at PRL Diamond Jubilee Alumni Meet, Ahmedabad, November 10, 2006.
5. Understanding the Earth and its evolution: Tata Consultancy Services, Gandhinagar, November 16, 2006.
6. Exploring the Earth using isotopes: Community Science Centre, Ahmedabad, November 25, 2006.
7. Easter Seamount Chain: Evolution of a 30-million-year hotspot trail: Center for Earth Sciences, Indian Institute of Sciences, April 15, 2008.
8. Understanding the Earth's mantle using isotopes: Indian Institute of Space Science and Technology, Trivandrum, October 29, 2008
9. Fundamentals of radiogenic isotope geology: DST sponsored Training Programme on Radiogenic isotopes and their applications, Department of Earth Sciences, Pondicherry University, Pondicherry, December 15-21, 2008. (4 – lectures)
10. Mud Volcanoes: Geodynamic and Climatic Implications: Pandit Deendayal University Petroleum University, Gandhinagar, March 18, 2009

11. Radiogenic isotopic ratio variations in carbonatites and associated silicate rocks: 47th Annual Convention of Indian Geophysical Union, Dehradun, October 05, 2009.
12. Third Rock from the Sun - the story of the Earth: Workshop on Earth and Space Sciences at Indian Institute of Space Science and Technology, Trivandrum, November 18, 2009.
13. The story of the Earth: Workshop on Earth and Planetary Sciences, Sardar Patel University, Vidhyanagar, June 15, 2012.
14. Learning from volcanoes: the story of Barren Island: Indian Institute of Space Science and Technology, Trivandrum, August 09, 2012.
15. Mud Volcanism in Andaman Subduction Zone: From Mantle to the Moon – An international scientific meet in remembrance of Prof. Devendra Lal, PRL, February 15, 2014.
16. Learning from subduction zone: the story of Andamans: PRL Award acceptance talks, August 11, 2014.
17. Oxygenation of Earth's atmosphere-ocean system: UK-India Frontiers of Science Meeting, October 9-13, 2014.
18. Interior of Terrestrial Planets: Planex Workshop at PRL, Ahmedabad, January 2015.
19. Provenance of sediments in the Andaman Accretionary Prism: implications for Paleogene drainage in South Asia: National Conference on Paleogene of the Indian Subcontinent, Lucknow, April 23-24, 2015.
20. Learning from volcanoes: story of India's only active volcano, DST-INSPIRE Talk at NIIST, Berhampur, Odisha, January 27, 2016.
21. Learning from volcanoes: story of India's only active volcano, Convergence 2016, Department of Earth Sciences, IISER Kolkata, March 06, 2016.
22. Third Rock from the Sun - story of the Earth: DST-INSPIRE Talk at KIIT, Bhubaneswar, Odisha, March 11, 2016.
23. Learning from volcanoes: story of India's only active volcano: DST-INSPIRE Talk at KIIT, Bhubaneswar, Odisha, November 17, 2016.
24. The Proterozoic Earth: a geochemical insight from the rocks of India: 6th Dr. BS Venkatachala Memorial Lecture, Birbal Sahni Institute of Paleosciences, Lucknow, January 02, 2017.
25. Quaternary Volcanism in India: the tale of two Andaman Volcanoes: Colloquium at Tata Institute of Fundamental Research, Mumbai, April 12, 2017.
26. Cretaceous Magmatism in North-Eastern India: 83rd Annual Meeting of Indian Academy of Sciences at NEHU, Shillong, November 04, 2017.
27. Geochemical evolution of Amba Dongar carbonatite, complex: International Seminar on Carbonatites-Alkaline Rocks and Associated Economic Mineral Deposits, Vadodara, December 8, 2017.
28. Bitter Springs $\delta^{13}\text{C}$ anomaly in the Vindhyan Supergroup, Rajasthan, India: National Seminar on Dynamics of surface and subsurface geological processes, Pondicherry, February 9, 2018.
29. Third Rock from the Sun: DST-INSPIRE talk at National Institute of Science and Technology, Berhampur, March 24, 2018.
30. Geochemical evolution of the Andaman Back Arc: A window to the Indian Ocean Mantle: IODP India proposal development meeting at NCAOR, Goa, September 17, 2018.
31. Learning from volcanoes: the story of Barren Island, ISRO STP Meeting PRL, February 06, 2019.
32. Unravelling the mysteries in Vindhyan Geology: GSI in the e-Training titled "Course on sedimentary mapping techniques in Vindhyan", October 17, 2020.