

**1. Name & Position:** Dr. Kalachand Sain, Director, Wadia Institute of Himalayan Geology, Dehradun  
Former Head, Seismic Group at CSIR-NGRI, Hyderabad, Hyderabad  
Outstanding Professor at Academy of Scientific & Innovative Research, Ghaziabad

**2. Specialization:** Inversion, Modelling, Processing and Interpretation of Geophysical Data  
Seismic Traveltime & Full Waveform Tomography, Rock Physics  
Artificial Intelligence/Machine Learning, Attribute Characterization

**3. Research Interests:**

- Delineation, Characterization & Appraisal of Marine Gas-hydrates
- Evaluation of Glaciers & Glacial-lakes related Geo-hazards
- Evolution of Sedimentary basins & Geotectonics over Indian Provinces
- Imaging Sub-volcanic sediments (onshore & offshore)
- Seismotectonics of the Himalaya
- Assessment of Geothermal Energy resources



**4. Mailing Address:** Wadia Institute of Himalayan Geology  
33, General Mahadeo Singh Road - 248001  
Tel No. +91 135 2525101; Fax No. +91 135 2625212  
Email: [director@wihg.res.in](mailto:director@wihg.res.in); [kalachandsain7@gmail.com](mailto:kalachandsain7@gmail.com)

**5. Date & Place of Birth:** 05-02-1964, Burdwan (West Bengal)

**6. Educational Qualifications:**

No.	Degree/Certificate	Year	University/Institute	Subjects
i.	B.Sc.(Hons)	1984	Burdwan University, Burdwan	Phys, Chem, Maths
ii.	M.Sc. (Tech)	1988	IIT(ISM), Dhanbad	Applied Geophysics
iii.	Ph.D.	1995	CSIR-NGRI (Osmania Univ.), Hyd.	Controlled Source Seismology
iv.	Post-doctoral	1997	Cambridge University, UK	Marine Seismics
v.	Post-doctoral	1999	Rice University, USA	Traveltime Tomography
vi.	Post-doctoral	2003	Rice University, USA	Waveform Tomography
vii.	Qualified GATE (1989) and CSIR/UGC Joint JRF (1989) Examination			

**7. Academic/Research Experience/Employment:**

No	From	To	Name of Organization	Positions held
i	1988	1989	IIT-Indian School of Mines, Dhanbad	Field Officer
ii	1989	1994	CSIR-National Geophysical Res. Instt. Hyderabad	CSIR JRF & SRF
iii	1994	1998	CSIR-National Geophysical Res. Instt. Hyderabad	Scientist B
iv	1998	2002	CSIR-National Geophysical Res. Instt. Hyderabad	Scientist C
v	2002	2006	CSIR-National Geophysical Res. Instt. Hyderabad	Scientist E1
vi	2006	2010	CSIR-National Geophysical Res. Instt. Hyderabad	Principal Scientist (E11)
vii	2010	2015	CSIR-National Geophysical Res. Instt. Hyderabad	Sr. Principal Scientist (F)
viii	2015	2019	CSIR-National Geophysical Res. Instt. Hyderabad	Chief Scientist (G)
ix	2019	Now	Wadia Institute of Himalayan Geology, Dehradun	Director (Scientist H)
x	2006	2018	University of Hyderabad, Hyderabad	Guest Faculty
xi	2013	2015	Rajasthan Technical University, Kota	Guest Faculty
xii	2010	2019	AcSIR, CSIR-National Geophys. Res. Instt. Hyderabad	Professor
xiii	2019	Now	Academy of Scientific & Innovative Research Ghaziabad	Outstanding Professor

**8. Supervision/Training/Teaching:**

**a. Supervision/Guidance to Ph.D. Students:** 13 awarded; 1 to submit; 6 are pursuing

**b. Training:** Imparted training & mentored for 70 Dissertations of Master students in App. Geophysics

**c. Teaching:**

- Professor at the Academy of Scientific & Innovative Research (2012-2019)
- Outstanding Professor at the Academy of Scientific & Innovative Research (2020- till date)
- Guest Faculty at the University of Hyderabad (2006-2018)
- Guest Lecturer at Al-Habeeb College of Eng. & Tech, Hyderabad (2015-16)
- Guest Faculty at the Rajasthan Technical University at Kota, Rajasthan (2013-2015)
- Explains to the public and school-students about the mysteries of Solid Earth & Ocean

## 9. Major Scientific Achievements

- **Established Gas Hydrates Research Center with world-class facilities for processing, modeling and inversion of geophysical data at CSIR-NGRI, Hyderabad;** Delineated, characterized and evaluated gas-hydrates reservoirs in Krishna-Godavari, Mahanadi and Andaman offshore in eastern India through development of new approaches; Gas-hydrates reservoirs were later validated by drilling & coring that show a great promise to energy security of India; Estimated critical parameters (porosity, permeability, pore pressure), pre-requisite for development of geology-specific production technology
- **Provided first scientific perspective on recent ice-mass failure (7th Feb, 2021) leading to flash flood in Chamoli district of Uttarakhand Himalaya;** Identified/demonstrated precursory events upto 3 Hrs. before the main event with a seismological field example in Dhauliganga-Rishiganga catchment, and proposed that real-time monitoring of seismological data along with hydro-meteorological data would be an effective approach for Early Warning System for glaciers and glacial-lakes related hazards
- **Established AI Centre of Excellence (AICEG) for Geosciences and Seismic Interpretation Laboratory (SIL) at WIHG, Dehradun to address challenges of oil industries as a part of institute-industry partnership;** Developed novel approaches, based on machine learning and first of its kind, for automatic interpretation of subsurface geologic features: fault networks, gas plumes, mass transport deposits, intrusive body (dykes, sills, magma ascent), carbonate reefs, magmatic sill and fluid plumbing from a variety of high-resolution 3D surface seismic data off India, New Zealand, Norway and Australia
- **Delineated high-resolution crustal structures of Indian provinces:** Southern Granulite Terrain, Dharwar Craton, Eastern Ghat mobile belts, Narmada-Son Lineament, Kutch Peninsula, Saurashtra Peninsula, Hazara-Kashmir syntaxis, Kangra re-entrant, Bengal basin, Mahanadi delta, upper Assam basin, and Andaman subduction zone from wide-angle seismics, **and shed light on Geotectonics and seismotectonics respectively;** Developed contemporary full waveform tomography of wide-angle seismic data, first time in India, and delineated fine-scale velocity-structures of sub-volcanic sediments in Kerala-Konkan and gas-hydrates bearing sediments in Krishna-Godavari offshore
- **Led Scientific Cruises** (i) off Goa and Cochin in 2007, (ii) in KG and Mahanadi basins in 2010, and (iii) in Andaman subduction zone in 2017 **for studying heat flow, gas-hydrates and seismotectonics respectively;** Participated Indo-Russian Joint Expedition at Lake Baikal in 2005 summer and 2006 winter for understanding attribute characteristics from known gas-hydrate deposits and applying the knowledge gained for the exploration of gas-hydrates **in Indian offshore**
- **Leading a Mission Project** on “Characterization and Assessment of surface and subsurface Processes in Himalaya (CAP-Himalaya) for Geo-hazards, Natural resources & Geodynamics; and Initiated a project for tapping Geothermal Green Energy into Electrical Energy at Tapovan in Uttarakhand Himalaya, and Signed a MoU with a Private Energy Limited

## 10. Awards/Fellowships/Honours/Memorial Lectures:

### a. Awards/Medals/Prizes:

(i) **National Award of Excellence in Geosciences** (2021) by MoES; (ii) **Best Paper Award** (2020) for ONGC Bulletin; (iii) **Sriram Srinivasan Award** (2018) by Association of Exploration Geophysicists; (iv) **Prof. Jagdeo Singh Memorial Best Paper Award** (2018) and **NN Chatterjee Award** (2010) by Geol. Soc. of India; (v) **Distinguished Alumnus Award** (2017) by IIT(ISM); (vi) **Decennial Award** (2016), **Anni Talwani Memorial Prize** (2014) and **Krishnan Medal** (1996) by IGU; (vii) **Best Paper Award** (2012) by International Association of Gondwana Research; (viii) **AP Scientist Award** (2011); (ix); **Best Poster Award** (2007) by Petrotech Int. Conf. & Exp. on Oil & Gas; (x) **National Mineral Award** (2005) by Min. of Mines; (xi) **Best Paper Medal** (2002) by AP Akademy of Sci.; (xii) **Swarnajayanti Project Award** (2001) by DST; (xiii) **Young Scientist Award** (1998) by CSIR.

### b. Fellowships:

(i) **J.C. Bose National Fellowship** (2021) by SERB-DST; (ii) **Fellow of Indian National Science Academy, New Delhi** (2021); (iii) **Fellow of Indian Academy of Sciences, Bangalore** (2021); (iv) **Fellow of National Academy of Sciences, India, Allahabad** (2011); (v) **Fellow of Indian Social Science Academy** (2021); (vi) **Founder Fellow of Telangana State Academy of Sciences** (2016); (vii) **Fellow of Andhra Pradesh Academy of Sciences** (2010); (viii) **Fellow of Geol. Soc. India** (2008); (ix) **Fellow of Indian Geophysical Union** (2002); (x) **Raman Fellow** (2003) by CSIR; (xi) **BOYSCAST Fellow** (1999) by DST; (xii) **National Scholarship** by Min. of Education & Social Welfare, Govt. of India.

**c. Memorial Lectures:**

(i) **Foundation Day Lecture** (2022) at GSI-Dehradun; (ii) **Prof. K.N. Khatri Memorial Lecture** (2021) at IIT-Roorkee; (iii) **National Science Day Lecture** (2020) at CSIR-CBRI, Roorkee; (iv) **Prof. Jagdeo Singh Memorial Lecture** (2019) of IIT(ISM), Dhanbad; (v) **Dr. M.N. Bose Memorial Lecture** (2019) of BSIP, Lucknow; (vi) **CSIR Foundation Day Lecture** (2019) at CSIR-IIP, Dehradun; (vii) **Prem Bahadur Memorial Lecture** (2009) of Indian Geol. Congress.

**d. Recognition/Honours:**

(i) **Corona Warrior** title by UK State Govt. (2020); (ii) **Vice President** of Indian Geophysical Union (2020-2023); (iii) **Congress Director** of Federation of Indian Geosciences Association (2019-2022); (iv) **Alternate Delegate of Asia Pacific Region to AAPG House of Delegates** (2015-2017); (v) **Hon. Secretary** of IGU (2014-2020); (vi) **Treasurer** of Federation of Indian Geosciences Association (2014-2019); (vii) **Vice President** for Soc. of Petroleum Geophysicists, Hyderabad Chapter (2011-2014); (viii) **Thesis Supervisor** at Univ. of Hyderabad (2011 onward), Andhra University (2011 onward) and Osmania University (2007 onward); (ix) **Chief Scientist** for three cruises (2007, 2010 & 2017); (x) **Bureau Member of Int. Lithosphere Program** under IUGG (2007-2015); (xi) **Among 50 Emerging Stars** (2003) by 'The Week' Magazine; (xii) **1<sup>st</sup> Place** in 'Science Writing in Hindi' (2002) by CSIR.

**11. Services****a. Committee Member:**

(i) **Chairperson of Expert Committee of Intensification of Research in High Priority Areas for Earth & Atmospheric Sciences** under SERB-DST; (ii) **Chairman of Program Advisory Committee on Sustainable Habitat domain of IMPRINT** under MHRD-DST Scheme; (iii) **Chairman of Program Advisory Committee of Earth & Atmospheric Sciences** of SERB-DST; (iv) **Chairman of Selection Committee on 'SERB International Research Experience (SIRE)'**; **Member of (v) National Committee on coastal & deep sea mining, renewable offshore energy and R&D of MoES – promotion of Blue Economy** (vi) **Steering Committee of UNFCCC** for adaptation; (vii) **Governing Body & Research Advisory Council** of ESSO-NCESS, Trivandrum; (viii) **Standing Committee on Geosciences** under Space Application Management System, PSA to GoI; (ix) **Mentor Cohort for Academic Framework** at Netaji Subhas Bose University of Excellence, Sikkim (2021-2024); (x) **High Powered Committees** of SERB(DST); (xi) **High Powered Committees** of DST & CSIR; (xii) **Scientific Advisory Committee** (2020-2023) at GB Pant National Instt. of Himalayan Environment, Almora; (xiii) **Research Advisory Committee** (2020-2023) at Himalaya University, Dehradun; (xiv) **National Review Committee – IODP India**; (xv) **NICES-Program Management Council** at National Remote Sensing Center (2019-2022), Hyderabad; (xvi) **Advisory Committee** (2020-2023) for development of Earth Sciences Dept. at Central Univ. of Jammu; (xvii) **Council Member** of Geol. Soc. of India (2019-2022); (xviii) **Board of Studies** for M.Sc. (Tech) in App. Geophys. at IIT-ISM (2006-2008); (xix) Member of preparing 15-years Vision Document for DOD (2000); (xx) Member of preparing 10th, 11th & 12th FYP for CSIR on Hydrocarbons & Gas-hydrates; (xxi) **National Gas Hydrates Program** (2000 – till date); (xxii) **Research Advisory Committee** of DOD (2002-2004).

**b. Membership of Professional Scientific Bodies:**

(i) Active Member of **AAPG** (2012 -); (ii) Active Member of **SEG** (2015 onward); (iii) Member of **Asia Oceania Geosci. Soc.** (2003 -); (iv) Member of **AGU** (2001-2004; 2013 -); (v) Life member of Indian Geophys. Union (1996), (vi) **Indian Sci. Cong. Ass.** (1997); (vii) **Indian Geological Congress** (2009).

**c. Editorial Board:**

(i) Subject (Applied Geology, Environment) Editor **Indian Jour. of Pure & App. Physics** (2022-2025); (ii) **Patron of Jour. of Himalayan Geology** (2019 onward); (iii) **Jour. Geol. Soc. India** (2011 onward); (iv) **Int. Jour. Earth Sci. & Eng.** (2008 onward); (v) Open Access **Jour. of Geophys. & Remote Sensing** (2013 onward); (vi) **Executive Editor** of Jour. of Indian Geophys. Union (2014 - 2016); (vii) **Episodes** (2007 - 2011); (viii) **Geohorizons** (2007 - 2011); (ix) Open Access **Int. Jour. of Geosci. Res.** (2013 -); (x) **1<sup>st</sup>** (2011) and **2<sup>nd</sup>** (2021) Editions of **Encyclopaedia of Solid Earth Geophysics**, Springer

**d. Volume Editor:**

(i) **3 Edited volumes** (2011, 2014, 2019) on Gas-hydrates, **Marine & Petroleum Geology**, Elsevier; (ii) **2 Authored volumes** on (a) Evaluation of Gas-hydrates (2012) and (b) Attenuation characteristics of Gas-hydrates (2017), both by **Lambert Academic Publishing**, (iii) **1 Authored volume** on 'Seismic Meta-Attributes' (2022), **John Wiley & Sons**, in press; (iv) **1 Authored volume** on 'Seismic

Tomography' (2022), MoU signed with **AGU**, in prep; (v) **1 Edited volume** on Emerging Energy Resources in India (2022), **Springer & Geol. Soc. of India**, in press.

**e. International/National Seminars/Workshop:**

(i) **Organized the 42<sup>nd</sup> Annual Convention** of Ass. of Expl. Geophysicists (AEG) at WIHG during Dec. 2-3, 2021; (ii) **Conducted a workshop on Artificial Intelligence** for Geosciences using 3D Seismic Data on Dec 1, 2021 at the 42<sup>nd</sup> AEG; (iii) **Organized the 5<sup>th</sup>** (July 22-23, 2021), **4<sup>th</sup>** (June 23-24, 2020) **and 3<sup>rd</sup>** (June 6-8, 2019) **National Geo-Research Scholars Webinar** at WIHG; (iv) **Organized the 2<sup>nd</sup>** (October 13-16, 2019 at CSIR-NGRI) **and 1<sup>st</sup>** (November 8-10, 2016 at IIT-ISM) **Triennial Congress of Federation of Indian Geosciences Association (FIGA)**; (v) **Convened the 56<sup>th</sup>** (October 13-16, 2019 at CSIR-NGRI), **55<sup>th</sup>** (December 5-7, 2018 at RNTU, Bhopal), **54<sup>th</sup>** (December 3-7, 2017 at CSIR-NGRI), **53<sup>rd</sup>** (November 8-10, 2016 at IIT-ISM), **52<sup>nd</sup>** (November 3-5, 2015 at NCPOR), **and 51<sup>st</sup>** (November 19-21, 2014 at Kurukshetra University) **Annual Convention of Indian Geophysical Union**; (vi) **Convened & Organized 9th International Methane Hydrates R&D Workshop** in Hyderabad during November 9-12, 2014; (vii) **Co-Convened International Workshop on Exploration & Exploitation of Shale Gas** in Hyderabad during December 19-20, 2012; (viii) **Organized a National Seminar on Gas Hydrates** at NIOT, Chennai during February 4-5, 2007; (ix) **Organized/convened 21 sessions in International/national Seminars/Conferences**; (x) **Chaired 35 sessions**; (xi) **Delivered invited talks 49 offline & 29 online**; (xii) **Attended 72 conferences**; (xiii) **Taught Courses on 'Seismic Tomography'** (2015) **at International Conference & Exposition of SPG-India, 2015 and 'Seismic Modeling'** (2017) **at International Conference & Exposition of SPG-India.**

**f. External Research Fund received & Project Handled:**

(i) **INR 15 Lakhs from SERB-DST** under JC Bose National Fellowship every year (2021-2025); (ii) **INR 4886 Lakhs from MoES** for investigation of gas-hydrates (2007 - 2017) (**Project Leader**); (iii) **INR 60 Lakhs from OIDB** for quantification on gas-hydrates (2007 - 2012) (**Project Leader**); (iv) **INR 36 Lakhs** under **Swarnajayanti Project from DST** for delineation & assessment of gas-hydrates (2002 - 2006) (**Project Leader**); (v) **INR 25 Lakhs by MoES** for understanding petroleum system of gas hydrates in KG basin (2014-2017) (**Project Leader**); (vi) **Procured INR 8500 Lakhs** worth ocean bottom & multi-channel seismic data from ONGC-Mumbai in Kerala-Konkan offshore for the investigation of sub-volcanic sediments (2015-2018) (**Project Leader**); (vii) **PL** of MLP Project on "Gas Hydrates & Conventional Hydrocarbons"; (vii) **Nodal Officer** of GENIAS, and **PL** of SHORE & GEOSCAPE - important projects under the 12th Five Year Scientific Program of CSIR.

**g. Institutional Committee Member at CSIR-NGRI (before Lien):**

(i) **Chairman**, Students' Academic Committee (2016-2018); (ii) **Chairman**, House Allotment Committee (2013-2018); (iii) **Chairman**, Purchase Committee - upto 25 Lakhs (2013-2018); (iv) **Member**, Honorarium Distribution Committee (2011-2018); (v) **Member**, 'Standing Committee' to share ECF earned (2012-2018); (vi) **Member**, 'E-classroom Committee' to monitor work-progress (2012-2014); (vii) **Member**, Collegium for Assessment of Scientists (2011-2018); (viii) **Member**, Selection Committee for PA/PF/SRF/RA/PS (2011-2018); (ix) **Member**, Compassionate Appointments Committee (2012-2018); (x) **Chairman**, OB Committee (2011-2014); (xi) **Member**, Medical Committee (2007-2010)

**12. Countries Visited**

UK, USA, Germany, Canada, Russia, Italy, Armenia, Thailand, Taiwan, South Korea, Norway, Austria, Singapore, France, Malaysia, New Zealand, Japan, Australia, China, Czech Republic & South Africa.

**13. National and International Collaboration:**

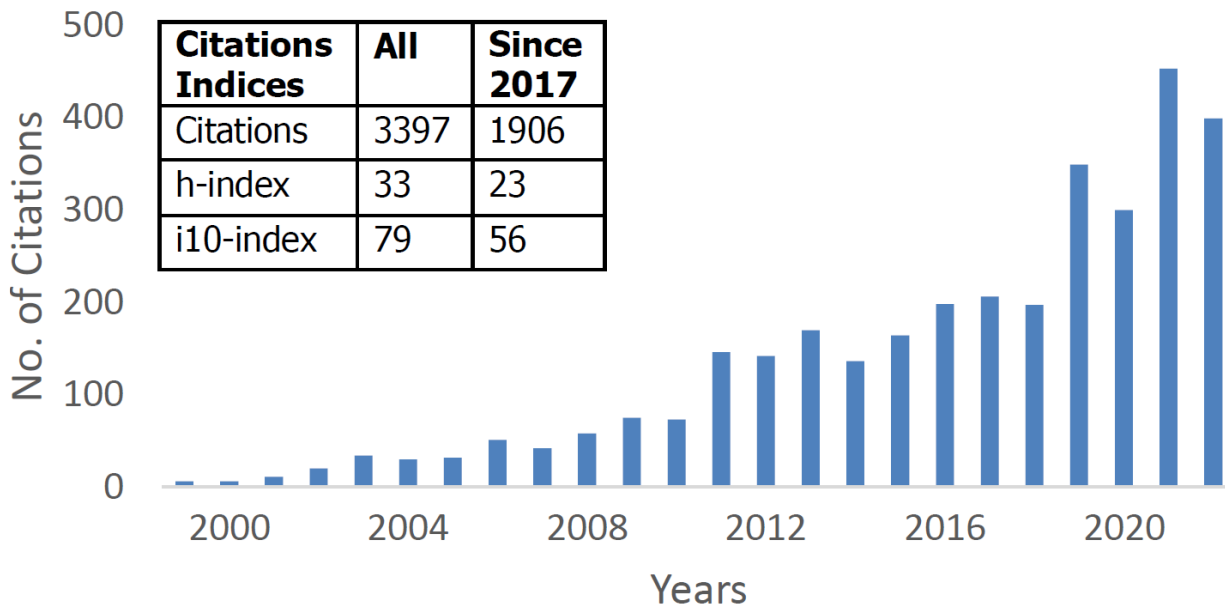
(i) Indo-UK (2018 -): Dr. K. Sain & Prof. Tiago M. Alves, Cardiff University, UK; (ii) CSIR-NGRI & ONGC Joint Study (2014-2018): Dr. K. Sain & Mr. N. Chandrasekhar, ONGC, Mumbai; (iii) Indo-China (2011-2013): Dr. K. Sain & Dr. Xiujuan Wang, Chinese Academy of Sciences, China; (iv) Indo-Italian (2009): Dr. K. Sain & Dr. Umberta Tinivella, OGS, Italy; (v) Indo-US (2007): Dr. K. Sain & Dr. Richard Coffin, Naval Research Laboratory, USA; (vi) Indo-Russia (2005-2006): Dr. K. Sain & Dr. G.A. Cherkashov, IGMRO at St. Petersburg, Russia; (vii) Indo-US (1999): Dr. K. Sain & Dr. Colin A. Zelt at Rice University, Houston, USA; (viii) Indo-US (2003): Dr. K. Sain & Dr. Colin A. Zelt at Rice University, Houston, USA; (ix) Indo-Canada (2003): Dr. K. Sain & Dr. Gerhard A. Pratt at Queen's University at Kingston, Ontario, Canada; (x) Indo-US (2001): Drs. P.R. Reddy and K. Sain & Dr. Walter D. Mooney at USGS at Menlo Park, USA; (xi) Indo-UK (1998): Dr. K. Sain & Dr. Satish C. Singh at Cambridge University, UK



**14. Publications at a glance – 294 Peer-reviewed articles – 197**

**SCI papers – 158; Non-SCI Papers/Reports/Books/Book- Chapters – 136; Papers submitted – 16**

- (i) Science (IF=47.73) – 1
- (ii) Gondwana Research (IF=6.05) – 1
- (iii) Earth & Planetary Science Letter (IF=5.26) – 1
- (iv) Precambrian Research (IF=5.09) – 1
- (v) Jour. of Natural Gas Sci. & Eng. (IF=4.97) – 8
- (vi) Geological Society of America (IF=4.5) – 1
- (vii) Scientific Reports (IF=4.38) – 3
- (viii) Jour. of Petrol. Sci & Engg. (IF=4.35) – 2
- (ix) Mar. & Petrol. Geology (IF=4.35) – 15
- (x) Basin Research (IF=4.31) – 1
- (xi) Geothermics (IF=4.28) – 1
- (xii) Jour. of Geophys. Research (SE) (IF=3.85) – 2
- (xiii) Marine Geology (IF=3.55) – 2
- (xiv) Jour. of Asian Earth Sciences (IF=3.45) – 3
- (xv) Tectonophysics (IF=3.93) – 1
- (xvi) Geo-mech-phys-energy resources(IF=3.7) – 15
- (xvii) Royal Soc. of Chem. Adv. (IF=3.25) – 1
- (xviii) Geophysical Jour. International (IF=2.93) – 12
- (xix) Marine Geophys. Researches (IF=2.69) – 10
- (xx) Mar. Georesources & Geotech. (IF=2.67) – 1
- (xxi) Episodes (IF=2.49) – 2
- (xxii) Jour. of Geodynamics (IF=2.35) – 2
- (xxiii) Pure & Applied Geophysics (IF=2.34) – 5
- (xxiv) Jour. of Applied Geophysics (IF=2.12) – 5
- (xxv) Petrol. Expl. and Development (IF=2.07) – 1
- (xxvi) Environmental Geotechnics (IF=1.93) – 1
- (xxvii) Jour. of Seismic Exploration (IF=1.83) – 2
- (xxviii) Arabian Journal of Geosciences (IF=1.83) – 3
- (xxix) Geophysics (IF=1.80) – 3
- (xxx) Advances in Geosciences (IF=1.70) – 1
- (xxxi) Jour. of Acoustic Soc. of America (IF=1.57) – 1
- (xxxii) Jour. of Geol. Soc. of India (IF=1.46) – 29
- (xxxiii) Jour. of Earth System Sciences (IF=1.37) – 3
- (xxxiv) Himalayan Geology (IF=1.29) – 4
- (xxxv) Carbonates & Evaporites (IF=1.30) – 1
- (xxxvi) Current Science (IF=1.10) – 16
- (xxxvii) Exploration Geophysics (IF=0.94) – 3
- (xxxviii) Chinese Journal of Geophysics (IF=0.85) – 1
- (xxxix) Interpretation (IF=0.61) – 1
- (xl) Geosystems and Geoenvironment – 1
- (xli) Proceedings of INSA (IF=0.57) – 5
- (xlii) Indian Jour. of Geo-Marine Sci. (IF=0.49) – 1
- (xliii) Int. Jour. of Earth Sci. & Engg. – 2
- (xliv) Results in Geophysical Sciences – 1
- (xlv) Memoir Geol. Soc. of India – 3
- (xlvi) Jour. of Indian Geophys. Union – 7
- (xlvii) Jour. of Earth Sci. & Engineering – 1
- (xlviii) Encyclopedia of Solid Earth Geophys. – 4 Ch
- (xlix) Encyclopedia of Natural Hazard – 1 Ch
- (l) Geological Soc. of America, Sp. Paper – 1 Ch
- (li) Earth's Magnetic Interior, Springer Book – 1 Ch
- (lii) Earth' System Processes and Disaster Management, Springer Book – 1 Ch
- (liii) Basics of Computational Geophysics – 2 Ch



(Source: <http://scholar.google.co.in/citations?hl=en&user=9nhStVcAAAAJ>)

## 15. Full List of Publications:

### (a) SCI Papers

- 1) T. Gogoi, S. Sahu, R. Chatterjee & **K. Sain**, 2022. Fracture identification and porosity estimation of subsurface reservoirs in parts of Upper Assam Basin, NE India, *Petrol. Expl. and Development*, accepted.
- 2) P. C. Kumar & **K. Sain**, 2022. Seismic Texture of Tertiary successions: insights from Tipam and Barail Formations in the Upper Assam Basin, NE India, accepted.
- 3) Madhab Biswas & **K. Sain**, 2022. Mechanism of fault terminations with field examples, *Jour. Geol. Soc. of India*, accepted.
- 4) V. Pandey & **K. Sain**, 2022. Amplitude variation with angle analysis of bottom-simulating reflector in fractured filled gas hydrates reservoirs in KG basin, India, *Jour. Geol. Soc. of India*, accepted.
- 5) **K. Sain**, 2022. Need for development of AI-based Integrated Warning System (IWS) for Mitigation of Glaciers/Glacial-lakes related hazards with special reference to UK Himalaya, in press.
- 6) N. Damodara & **K. Sain**, 2022. Acoustic full waveform tomography of realistic 2D synthetic seismic elastic data, *Current Science*, 122(12), 1407-1414.
- 7) **K. Sain** & M. Mehta, 2022. Atalakodi route of Hemkund Sahib: A potential area of snow avalanche, *Jour. Geol. Soc. of India*, 98: 863-864.
- 8) S.K. Tiwari, **K. Sain** & J.S. Yadav, 2022. Assessment of geothermal renewable energy with reference to Tapovan geothermal fields, northwest Garhwal Himalaya, India, *Jour. Geol. Soc. of India*, 98: 765-770.
- 9) P. C. Kumar, Y. Niyazi, O. E. Eruteya, A. Moscariello, M. Warne, D. Lerodiconou, **K. Sain**, 2022. Anatomy of intrusion related forced fold in the offshore Otway Basin, SE Australia, *Mar. & Petrol. Geol.*, 141, 105719, 1-12.
- 10) C. Haldar, P. Kumar, S. Kumar, O. P. Pandey & **K. Sain**, 2022. Lower crustal intraplate seismicity in Kachchh region (Gujarat, India) triggered by crustal magmatic infusion: Evidence from shear wave velocity contrast across the Moho, *Geosystems and Geoenvironment* 1:100073, 1-9.
- 11) V. Gupta, B. Ram, S. Kumar & **K. Sain**, 2022. A Case Study of the 12 July 2021 Bhagsunath (McLeod Ganj) Flash Flood in Dharamshala, Himachal Pradesh: A Warning Against Constricting Natural Drainage, *Jour. Geol. Soc. of India*, 98, 607-610.
- 12) P.K. Shukla, D.K. Singha & **K. Sain**, 2022. Modeling of in-situ horizontal stresses and orientation of maximum horizontal stress in the gas-hydrate bearing sediments of the Mahanadi offshore basin, India, *Geomechanics and Geophysics for Geo-energy and Geo-resources*, <https://doi.org/10.1007/s40948-022-00401-6>, 8:90, 1-12.
- 13) P. Chauhan, M.E. Akiner & **K. Sain**, A. Kumar, 2022. Forecasting of suspended sediment concentration in the Pindari-Kafni glacier valley in Central Himalayan region considering the impact of precipitation: using soft computing approach, *Arabian Journal of Geosciences*, 15:683, 1-18.
- 14) P.S.R. Prasad, B. Sai Kiran & **K. Sain**, 2022. Explicating the amino acid effects for methane storage in hydrate form, *Royal Soc. of Chem. Adv.*, 12: 10178, 1-8.
- 15) A. Tiwari, **K. Sain**, A. Kumar, J. Tiwari, A. Paul, N. Kumar, C. Haldar, S. Kumar, & C. Pandey, 2022. Potential seismic precursors and surficial dynamics of a deadly Himalayan disaster: An early warning approach, *Scientific Reports*, 12:3733, 1-13.
- 16) J. Kumar & **K. Sain**, 2022. Empirical mode decomposition approach for delineating gas hydrates and free gas in Mahanadi Offshore, eastern Indian margin, *Exploration Geophysics*, published Online, <https://doi.org/10.1080/08123985.2022.2043125>.
- 17) Laxmi Pandey & **K. Sain**, 2022. Porosity mapping of shallow subsurface sediments: a case study from the offshore Mahanadi basin, India, *Exploration Geophysics*, published Online, <https://doi.org/10.1080/08123985.2021.1994352>.
- 18) P.K. Shukla, D.K. Singha & **K. Sain**, 2022. Anisotropy analysis in shallow marine gas hydrate bearing sediments: A case study from the offshore Mahanadi basin, India, *Mar. Geophys. Res.*, 43:3, 1-18, Published Online, <https://doi.org/10.1007/s11001-021-09465-7>.
- 19) J. Kumar, **K. Sain** & KP Arun, 2022. Time-frequency analysis for delineating gas hydrates and free gas in the Mahanadi offshore, India, *Exploration Geophysics*, 53(1), 52-65, <https://doi.org/10.1080/08123985.2021.1889365>.
- 20) C. Haldar, **K. Sain** & S. Kumar, 2022. Seismic imaging of intra-crustal low velocity layer beneath the Kishtwar region, North-West Himalaya, India using receiver function technique. *Himalayan Geology*, 43(1A), 1-11.

- 21) V. Adlakha, **K. Sain** & K. Mukherjee, 2022. Exhumation process and mechanisms in the Himalayan-Tibetan orogeny: A review. *Himalayan Geology*, 43(1B), 241-252.
- 22) A. Kumar, A. Verma & **K. Sain**, 2022. Decadal response of Dokriani glacier using high-resolution hydrological data, Indian Himalaya, *Jour. Geol. Soc. of India*, 98, 62-68.
- 23) M. Mehta, V. Kumar, **K. Sain**, S.K. Tiwari, A. Kumar & A. Verma, 2021. Causes and consequences of Rishi Ganga flash flood, Nanda Devi Biosphere reserve, central Himalaya, India, *Current Science*, 121, 1483-1487.
- 24) A. Verma, S.K. Tiwari, A. Kumar, **K. Sain**, S.K. Rai & S. Kumari, 2021. Assessment of Water Recharge Source of Geothermal Systems in Garhwal Himalaya (India), *Arabian Journal of Geosciences*, 14(22), 1-18.
- 25) Shugar, D.H., Jacquemart, M., Shean, D., Bhushan, S., Upadhyay, K., Sattar, A., Schwanghart, W., McBride, ... Amit Kumar, ... **K. Sain**, ...et al., (Total 53 Authors) 2021. A massive rock and ice avalanche caused the 2021 disaster at Chamoli, Indian Himalaya. *Science*, 373, 300-306.
- 26) P. C. Kumar, Tiago M. Alves & **K. Sain**, 2021. Submarine canyon systems focusing sub-surface fluid in the Canterbury Basin, South Island, New Zealand", *Scientific Reports*, 11:16990, 1-16.
- 27) S.K. Tiwari & **K. Sain**, 2021. Assessment of geothermal reservoirs temperature using dissolved silica geothermometry: A case study from Garhwal northwest Himalaya, India. *Himalayan Geology*, 42(2), 247-255.
- 28) P. C. Kumar, K.O. Omosanya, O. E. Eruteya & **K. Sain**, 2021. Geomorphological characterization of basal flow markers during recurrent mass movement: a case study from the Taranaki basin, offshore New Zealand, *Basin Research*, 33, 2358-2382.
- 29) A.K. Joshi & **K. Sain**, 2021. Subsurface porosity estimation: a case study from the Krishna-Godavari offshore basin, eastern Indian margin, *Jour. of Natural Gas Sc. & Engg.*, 89, 103866, 1-16.
- 30) R. Ramu & **K. Sain**, 2021. Multi-attribute and artificial neural network analysis of seismic inferred chimney-like features in marine sediments: A study from KG Basin, India, *Jour. Geol. Soc. of India*, 97, 238-242.
- 31) **K. Sain**, A. Kumar, M. Mehta, A. Verma, S.K. Tiwari, P.K. Garg, V. Kumar, S.K. Rai, P. Srivastava & K. Sen, 2021. Perspective on Rishiganga-Dhauliganga flash flood in Nanda Devi Biosphere reserve, Garwal Himalaya, India, *Jour. Geol. Soc. of India*, 97, 335-338.
- 32) C. Ramu, Sri Lakshmi Sunkara, R. Ramu & **K. Sain**, 2021. An ANN-based identification of geological features using multi-attributes: a case study from Krishna-Godavari basin, India, *Arabian Journal of Geosciences*, 14:299, 1-10.
- 33) B. Mukherjee & **K. Sain**, 2021. Vertical lithological proxy for gas hydrate sediments using statistical and artificial intelligence approach: A case study from Krishna-Godavari basin, offshore India (NGHP Expedition-02), *Mar. Geophys. Res.*, 42:3, 1-23.
- 34) V. Pandey, **K. Sain**, & M.K. Sen, 2021. A new concept for the appraisal of gas hydrates: An example from the Krishna-Godavari basin, eastern Indian margin, *Himalayan Geology*, 42(1), 69-84.
- 35) P. C. Kumar, Tiago M. Alves & **K. Sain**, 2021. Forced folding in the Kora volcanic complex, New Zealand: A case study with relevance to the production of hydrocarbons and geothermal energy, *Geothermics*, 89, 101965, 1-17.
- 36) N. Rai, D.K. Singha, P.K. Shukla & **K. Sain**, 2020. Delineation of discontinuity using multi-channel seismic attributes: An implication for identifying fractures in gas hydrate sediments in offshore Mahanadi basin, *Results in Geophysical Sciences*, 1-4, 100007, 1-10.
- 37) B. Mukherjee, P.N.S. Roy & **K. Sain**, 2020. Delineation of hydrocarbon and non-hydrocarbon zones using fractal analysis of well-log data from Bhogpara oil field, NE India, *Carbonates and Evaporites*, 35:22, 1-24.
- 38) L. Chen, S. Merey, I. Pecher, J. Okajima, A. Komiya, J. Diaz-Naveas, S. Li, S. Maruyama, **K. Sain**, B. Kvamme, R. Coffin, 2020. A Review Analysis of Recent Gas Hydrate Exploration Tests: engineering progress and policy trend, *Environmental Geotechnics*, <https://doi.org/10.1680/jenge.19.00208>, 1900208, 1-17.
- 39) P. C. Kumar & **K. Sain**, 2020. A machine learning tool for interpretation of Mass Transport Deposits from seismic data, *Scientific Reports*, 10:14134, 1-10.
- 40) P. C. Kumar & **K. Sain**, 2020. Interpretation of magma transport through saucer sills in shallow sedimentary strata: An automated machine learning approach, *Tectonophysics*, 789:228541, 1-16.
- 41) K.P. Arun, **K. Sain** & Jitender Kumar, 2020. Application of constrained AVO inversion: 2D modelling of gas hydrates and free gas in Mahanadi basin, India, *Jour. of Natural Gas Sci. & Engg.*, 78, 103287, 1-19.

- 42) A. Singh, M. Ojha & **K. Sain**, 2020. Predicting lithology using neural network from downhole data of a gas hydrate reservoir in Krishna-Godavari basin, eastern Indian offshore, **Geophys. Jour. Internat.**, 220 (3), 1813-1837.
- 43) **K. Sain**, R. Sharma, S. Kumar, D.P. Dobhal, V. Gupta, P. Srivastava, R.J.G. Perumal & K. Lokho, 2020. Research status at Wadia Institute of Himalayan Geology (WIHG), Dehradun during 2015-2019, In D.M. Banerjee & Sunil Bajpai (Ed.), **Proceedings of the Indian National Science Academy**, 2015-2019, 86(1), 721-745.
- 44) N. Vedanti, U. Vadapalli & **K. Sain**, 2020. A brief overview of CBM Development in India, In D.M. Banerjee & Sunil Bajpai (Ed.), **Proceedings of the Indian National Science Academy**, 2015-2019, 86(1), 623-629.
- 45) **K. Sain**, 2019. State-of-the-art seismic tools for subsurface imaging, Editorial, **Jour. of Geol. Soc. of India**, 94, 337-340.
- 46) L. Pandey, **K. Sain** & A. K. Joshi, 2019. Estimate of gas hydrates in Krishna-Godavari basin, eastern continental margin of India, NGHP-02 Expedition, **Mar. & Petrol. Geol.**, 108, 581-594.
- 47) A.K. Joshi, **K. Sain** & L. Pandey, 2019. Gas hydrate saturation and reservoir characterization at sites NGHP-02-17-C and NGHP-02-19-C, Krishna-Godavari basin, eastern margin of India, **Mar. & Petrol. Geol.**, 108, 595-608.
- 48) B. Mukherjee & **K. Sain**, 2019. Bed boundary identification from well log data using Walsh transform technique: A case study from NGHP Expedition-02 in the Krishna-Godavari basin, India, **Jour. of Earth System Sci.**, 128:214, 1-15.
- 49) B. Mukherjee & **K. Sain**, 2019. Prediction of reservoir parameters in gas hydrate sediments using artificial intelligence (AI): A case study in the Krishna-Godavari basin (NGHP-02 Expedition), **Jour. of Earth System Sci.**, 128:199, 1-14.
- 50) R. Ramu & **K. Sain**, 2019. Characterization of gas hydrates reservoirs in Krishna-Godavari basin, eastern Indian margin, **Jour. of Geol. Soc. of India**, 93, 539-545.
- 51) J. Kumar, **K. Sain**, & KP Arun, 2019, Seismic attributes for characterizing gas hydrates: A study from the Mahanadi offshore, India, **Mar. Geophys. Res.**, 40, 73-86.
- 52) P. C. Kumar, **K. Sain** & A. Mandal, 2019. Delineation of a buried volcanic system in Kora prospect off New Zealand using artificial neural networks and its implications, **Jour. of App. Geophys.**, 161, 56-75.
- 53) D. K. Singha, P. K. Shukla, R. Chatterjee & **K. Sain**, 2019. Multi-channel seismic constraints on pore pressure- and vertical stress- related gas hydrate in deep offshore of the Mahanadi basin, India, **Jour. of Asian Earth Science**, 180 (103882), 1-10.
- 54) P. C. Kumar, K.O. Omosanya, Tiago M. Alves & **K. Sain**, 2019. A neural network approach for elucidating fluid leakage hard-linked normal faults, **Mar. & Petrol. Geol.**, 161, 56-75.
- 55) P. C. Kumar, K.O. Omosanya & **K. Sain**, 2019. Sill cube: a novel automated approach for the interpretation of magmatic sill complexes on seismic reflection data, **Mar. & Petrol Geol.** 110, 518-538.
- 56) **K. Sain**, 2019. Controlled source seismology in India in the 21<sup>st</sup> century, **In Harsh K. Gupta (Ed.), Proceedings of Indian National Science Academy**, 1919-2019 Centennial Celebrations of International Union of Geodesy and Geophysics (IUGG), Contributions from India, 85(2), pp. 453-468.
- 57) D. Ghosal, S.S. Ganguli, R.N. Singh & **K. Sain**, 2018. Simulating the gas hydrate behavior at equilibrium dissociation: A study from Mahanadi basin, offshore eastern India, **Mar. & Petrol. Geol.**, 98, 802-814.
- 58) P. C. Kumar & **K. Sain**, 2018. Attribute amalgamation-aiding interpretation of faults from seismic data: An example from Waitara 3D prospect, offshore Taranaki basin, New Zealand, **Jour. of App. Geophys.**, 159, 52-68.
- 59) P.S.R. Prasad, B. Sai Kiran & **K. Sain**, 2018, Effectiveness of the amino acids for carbon storage and utilization applications, **Current Science**, 114, 1163-1165.
- 60) K.P. Arun, **K. Sain** & Jitender Kumar, 2017, Estimation of elastic parameters from constrained AVO inversion and saturation of gas hydrates in the Mahanadi offshore basin, India, **Jour. of Natural Gas Sci. & Engg.**, 50, 90-100.
- 61) D. Sarkar & **K. Sain**, 2017. Deep seismic sounding experiments in the Koyna RTS region - an overview of the results, **Jour. of Geol. Soc. of India**, 90, 663-669.
- 62) V. Jyothi, **K. Sain**, V. Pandey & A.K. Bhaumik, 2017. Seismic attenuation for characterization of gas hydrate reservoir in KG basin, eastern Indian margin, **Jour. of Geol. Soc. of India**, 90, 261-266.



- 63) A. K. Bhaumik, Shiv Kumar, S. Ray, G. K. Vishwakarma, A.K. Gupta, P. Kumar & **K. Sain**, 2017. Stable carbon and oxygen isotope study on benthic foraminifera: implication for microhabitat preferences and interspecies correlation, *Jour. of Earth System Sci.*, 126:72, 1-15.
- 64) N. Satyavani, **K. Sain**, & N. Damodara, 2017. Seismic vis-a-vis sonic attenuation in gas hydrate bearing sediments of Krishna-Godavari basin, eastern margin of India, *Geophys. Jour. Internat.*, 209, 1195-1203.
- 65) **K. Sain**, 2017. Gas-hydrates: A possible future energy resource, Editorial, *Jour. of Geol. Soc. of India*, 89, 359-362.
- 66) N. Damodara, V. Vijaya Rao, **K. Sain**, ASSRS Prasad & ASN Murthy, 2017. Basement configuration of the West Bengal sedimentary basin, India as revealed by seismic refraction tomography: its tectonic implications, *Geophys. Jour. Internat.*, 208, 1490-1507.
- 67) S. Jana, M. Ojha, **K. Sain** & Shalivahan, 2017. An approach to estimate gas hydrate saturation from 3-D heterogeneous resistivity model: a study from Krishna-Godavari Basin, eastern Indian offshore, *Mar. & Petrol. Geol.*, 79, 99-107.
- 68) D. Singh, P. C. Kumar & **K. Sain**, 2016. Interpretation of gas chimney from seismic data using artificial neural network: A study from the Maari 3D prospect of Taranaki basin, New Zealand, *Jour. of Natural Gas Sci. & Engg.*, 36, 339-357.
- 69) M. Ojha, M.K. Sen & **K. Sain**, 2016. Use of split spread configuration of marine multichannel seismic data in Full Waveform Inversion, Krishna-Godavari Basin, India, *Jour. of Seis. Expl.*, 25, 359-373.
- 70) J. Qian, X.J. Wang, D.D. Dong, S.G. Wu, **K. Sain** & Y.M. Ye, 2016. Quantitative assessment of free gas beneath gas hydrate stability zone from prestack seismic data and rock physics: a case of hole NGHP01-10A, Krishna-Godavari basin, India, *Chinese Jour. of Geophys.*, 59(7), 2553-2563.
- 71) R. Chatterjee, D.K. Singha, M. Ojha, M.K. Sen & **K. Sain**, 2016. Porosity estimation from pre-stack seismic data in gas hydrate-bearing sediments, Krishna-Godavari basin, India, *Jour. of Natural Gas Sci. & Engg.*, 33, 562-572.
- 72) N. Satyavani, **K. Sain**, & H.K. Gupta, 2016. Ocean bottom seismometer data modelling to infer gas hydrate saturation in Krishna-Godavari (KG) basin, *Jour. of Natural Gas Sci. & Engg.*, 33, 908-917.
- 73) S.K. Sinha, P. Dewangan & **K. Sain**, 2016. Acoustic reflections in the water column of KG offshore basin, Bay of Bengal, *Jour. of Acoustical Soc. of America*, 139(5), 2424-2431.
- 74) A.S.N. Murty, **K. Sain**, V. Sridhar, ASSRS Prasad & S. Raju, 2016. Delineation of Trap and subtrappean Mesozoic sediments in Saurashtra peninsula, *Current Science*, 110, 1844-1851.
- 75) R. Kumar, B. Das, R. Chatterjee & **K. Sain**, 2016. A methodology of porosity estimation from inversion of post-stack seismic data, *Jour. of Natural Gas Sci. & Engg.*, 28, 356-364. Citations = 55
- 76) S. K. Sinha, P. Dewangan & **K. Sain**, 2016. Estimation of Sea Surface Temperature (SST) using marine seismic data, *Pure & App. Geophysics*, 173, 1305-1316.
- 77) K. Chandrakala, O.P. Pandey, ASSRS Prasad & **K. Sain**, 2015. Seismic imaging across the Eastern Ghats Belt-Cuddapah basin collisional zone, southern Indian shield and possible geodynamic implications, *Precambrian Research*, 271, 56-64.
- 78) S. Jana, M. Ojha & **K. Sain**, 2015. Gas hydrate saturation from heterogeneous model constructed from well log in KG basin, eastern Indian offshore, *Geophys. Jour. Internat.*, 203, 246-256.
- 79) N. Satyavani, G. Alekhya & **K. Sain**, 2015. Free gas / gas hydrate inference in Krishna-Godavari basin using seismic and well log data, *Jour. of Natural Gas Sci. & Engg.*, 25, 317-324.
- 80) V. Vijaya Rao, N. Damodara, **K. Sain**, M.K. Sen, ASN Murthy & D. Sarkar, 2015. Upper crust of the Archean Dharwar craton in southern India using seismic refraction tomography and its geotectonic implications, *Geophys. Jour. Internat.*, 200, 652-663.
- 81) N. Satyavani & **K. Sain**, 2015. Seismic insights of a bottom simulating reflector (BSR) in Krishna-Godavari basin, eastern Indian margin, *Marine Georesources & Geotechnology*, 33, 191-201.
- 82) Ch. Eswari, B. Raju, V. D. Chari, P.S.R. Prasad & **K. Sain**, 2014. Laboratory Study of methane hydrate formation kinetics and structural stability in sediments, *Mar. & Petrol. Geol.*, 58, 199-205.
- 83) T. S. Collett, R. Boswell, J.R. Cochran, P. Kumar, M. Lall, A. Mazumdar, M.V. Ramana, T. Ramprasad, M. Riedel, **K. Sain**, A.V. Sathe, K. Vishwanath & the NGHP Expedition 01 Scientific Party, 2014. Geologic implications of gas hydrates in the Indian offshore: Results of the National Gas Hydrate Program Expedition 01, *Mar. & Petrol. Geol.*, 58, 3-28.
- 84) P. Kumar, T. S. Collett, R. Boswell, J.R. Cochran, M. Lall, A. Mazumdar, M.V. Ramana, T. Ramprasad, M. Riedel, **K. Sain**, A.V. Sathe, K. Vishwanath, U.S. Yadav & the NGHP Expedition 01 Scientific Party, 2014. Geologic implications of gas hydrates in the Indian offshore: Krishna-Godavari Basin, Mahanadi Basin, Andaman Sea, Kerala-Konkan Basin, *Mar. & Petrol. Geol.*, 58, 29-98.

- 85) J. Wang, **K. Sain**, X. Wang, N. Satyavani & S. Guo, 2014. Characteristics of bottom-simulating reflectors for hydrate-filled fractured sediments in Krishna-Godavari basin, eastern Indian margin, *Jour. of Petrol. Sci. & Engg.*, 122, 515-523.
- 86) U. Shankar, **K. Sain** & M. Riedel, 2014. Assessment of gas-hydrates stability zone and geothermal modeling of BSR in the Andaman Sea, *Journal of Asian Earth Sci.*, 79, 358-365.
- 87) D.K. Singha, R. Chatterjee, M.K. Sen & **K. Sain**, 2014. Pore pressure prediction in gas hydrate bearing sediments of Krishna-Godavari basin, India, *Marine Geology*, 357, 1-11.
- 88) M. Ojha, & **K. Sain**, 2014. Velocity-porosity and velocity-density relationship for shallow sediments in Kerala-Konkan basin on western margin of India, *Jour. of Geol. Soc. of India*, 84, 187-191.
- 89) N. Satyavani, M.K. Sen, M. Ojha & **K. Sain**, 2013. Azimuthal anisotropy from OBS observations in Mahanadi offshore, India, *Interpretation*, 1(2), T187-T198.
- 90) M. Ojha, & **K. Sain**, 2013. Quantification of gas hydrates and free gas in the Andaman offshore from downhole data, *Current Science*, 105, 512-516.
- 91) X. Wang, **K. Sain**, N. Satyavani, J. Wang, M. Ojha & S. Wu, 2013, Gas hydrates saturation using the geostatistical inversion in fractured reservoir in Krishna-Godavari basin, offshore eastern India, *Mar. & Petrol Geol.*, 45, 224-235.
- 92) U. Shankar, D.K. Gupta, D. Bhowmick & **K. Sain**, 2013. Gas hydrate and free-gas saturations using rock physics modeling at site NGHP-01-05 in Krishna-Godavari basin, eastern Indian margin, *Jour. of Petrol. Sci. & Engg.*, 106, 62-70.
- 93) P.P. Rao, S. Rajput, B. Ashalatha, U. Shankar, **K. Sain**, M.S. Naidu, V. Triveni & N.K. Thakur, 2012. Lithospheric structure model of central Indian Ocean basin using ocean bottom seismometer data, *Jour. of Earth Sci. and Engg.* 2, 344-359.
- 94) U. Shankar & **K. Sain**, 2012. Amplitude variation with offset responses for gas hydrate/free gas models: a case study, *Current Science*, 103, 413-419.
- 95) **K. Sain** & H. K. Gupta, 2012. Gas hydrates in India: Potential and Development, *Gondwana Research*, 22, 645-657.
- 96) **K. Sain**, M. Ojha, N. Satyavani, G.A. Ramadass, T. Ramprasad, S.K. Das & H.K. Gupta, 2012. Gas hydrates in KG and Mahanadi basins: new data, *Jour. of Geol. Soc. of India*, 79, 553-556.
- 97) A. R. Sridhar, ASSRS Prasad, **K. Sain** & D. Sarkar, 2012. Lithospheric structure across the western part of the Narmada-Son Lineament from Wide-angle Seismic data, *Current Science*, 102, 484-489.
- 98) U. Shankar, **K. Sain** & M. Riedel, 2012. Geothermal modeling for the base of gas hydrate stability zone and saturation of gas hydrate in the Krishna-Godavari Basin, eastern Indian margin, *Jour. of Geol. Soc. of India*, 79, 199-209.
- 99) P.K. Singh & **K. Sain**, 2012. 2-D Velocity structure in Kerala-Konkan basin using travel time inversion of seismic data, *Jour. of Geol. Soc. of India*, 79, 53-60.
- 100) **K. Sain**, 2012. Gas hydrates - a probable solution to India's energy crisis, *Internat. Jour. of Earth Sci. & Engg*, Editorial Note, v.5, No.2, p.1-3.
- 101) **K. Sain**, H. Gupta, A. Mazumder, A.K. Bhaumik & P.K. Bhowmick, 2012. Geo-scientific investigations of gas hydrates in India, *In Singhvi, A.K. and Banerjee, D.M., Proceedings of Indian National Science Academy*, 78, pp. 503-511.
- 102) R. Matsumoto, B.J. Ryu, S.R. Lee, S. Lin, S. Wu, **K. Sain**, I. Pecher, M. Riedel, 2011. Occurrence and exploration of gas hydrate in the marginal seas and continental margin of the Asia and Oceania region, *Mar. & Petrol. Geol.*, 28, 1751-1767.
- 103) **K. Sain**, V. Rajesh, N. Satyavani, K.V. Subbarao & C. Subrahmanyam, 2011. Gas hydrate stability thickness map along the Indian continental margin, *Mar. & Petrol. Geol.*, 28, 1779-1786.
- 104) **K. Sain** & A.K. Singh, 2011. Seismic quality factors across a bottom simulating reflector in the Makran accretionary prism, Arabian Sea, *Mar. & Petrol. Geol.*, 28, 1838-1843.
- 105) R. Ghosh, **K. Sain** & M. Ojha, 2010. Estimating the amount of gas hydrate using effective medium theory: a case study in the Blake Ridge, *Sp. issue, Mar. Geophys. Res.*, 31, 29-37.
- 106) **K. Sain**, R. Ghosh & M. Ojha, 2010. Rock physics modeling for assessing gas hydrate and free gas: a case study in the Cascadia accretionary prism, *Mar. Geophys. Res.*, 31, 109-119.
- 107) R. Ghosh, **K. Sain** & M. Ojha, 2010. Effective medium modeling of gas hydrate-filled fractures using the sonic log in the KG basin, offshore eastern India, *Jour. of Geophys. Res.*, 115, B06101, 1-15.
- 108) M. Ojha, **K. Sain** & T.A. Minshull, 2010. Assessment of gas hydrates saturation in the Makran accretionary prism using the offset dependence of seismic amplitudes, *Geophysics*, 75, 2, C1-C6.
- 109) M. Ojha & **K. Sain**, 2009. Seismic attributes for identifying gas hydrates and free-gas zones: application to the Makran accretionary prism, *Episodes*, 32, 264-270.

- 110) A.R. Sridhar, ASSRS. Prasad, N. Satyavani and **K. Sain**, 2009. Sub-Trappean Mesozoic sediments in the Narmada basin based on traveltimes and amplitude modeling - a revisit to old seismic data, **Current Sciences**, 97, 1462-1466.
- 111) **K. Sain**, A.K. Singh, N.K. Thakur & R. K. Khanna, 2009. Seismic quality factor observations for gas hydrate-bearing sediments on western Indian margin, **Mar. Geophys. Res.**, 30, 137-145.
- 112) U. Shankar, S. S. Singh & **K. Sain**, 2009. Signal enhancement and multiple suppression using radon transform - an application to marine multichannel seismic data, **Mar. Geophys. Res.**, 30, 85-93.
- 113) **K. Sain**, 2009. Gas hydrates: a future major potential energy resource of India, **Internat. Jour. of Earth Sci. & Engg.**, 2, 1-11.
- 114) N. Satyavani, **K. Sain**, Malcolm Lall, & B.J.P. Kumar, 2008. Seismic attribute study for gas hydrates in the Andaman offshore, India, **Mar. Geophys. Res.**, 29, 167-175.
- 115) R. Ghosh & **K. Sain**, 2008. Effective medium modeling to assess gas-hydrate and free-gas as evident from velocity structure in the Makran accretionary prism, **Mar. Geophys. Res.**, 29, 267-274.
- 116) A.S.N. Murthy, **K. Sain**, & B.R. Prasad, 2008. Velocity structure of West-Bengal sedimentary basin, India along Palashi-Kandi profile using travel time inversion of wide-angle seismic data and gravity modeling - An Update, **Pure & App. Geophys.**, 165, 1733-1750.
- 117) **K. Sain** & H.K. Gupta, 2008. Gas hydrates: Indian scenario, **Jour. of Geol. Soc. of India**, 72, 299-311.
- 118) U. Shankar, M. Ojha, **K. Sain**, R.K. Khanna, M. Sudhakar & A. Tyagi, 2008. Seafloor geophysical study in search of gas hydrates/gas related evidences in the deep waters of the western continental margin of India, **Jour. of Geol. Soc. of India**, 72, 547-555.
- 119) M. Ojha & **K. Sain**, 2008. Appraisal of gas hydrates/free-gas from VP/VS ratio in the Makran accretionary prism, **Mar. & Petrol. Geol.**, 25, 637-644.
- 120) P.S.R. Prasad, K. Shiva Prasad, Y. Sowjanya & **K. Sain**, 2008. Laser micro Raman investigations on gas hydrates, **Current Science**, 94, 1495-1499.
- 121) A.S.N. Murthy, **K. Sain**, H.C. Tewari & B.R. Prasad, 2008. Crustal velocity inhomogeneities along the Hrapur-Mandla profile in central India and its tectonic implications, **Jour. of Asian Earth Sci.**, 31, 533-545.
- 122) **K. Sain** & H. Gupta, 2008. Gas hydrates – future potential source of energy in India, **In A. K. Singhvi, A. Bhattacharya, and S. Guha, Eds. Glimpses of Geoscience Research in India, Report to IUGS 2004-2008, Proceedings of Indian National Science Academy**, pp. 244-250.
- 123) R.K. Chadha, D. Srinagesh, A. Manglik & **K. Sain**, 2007. A Note on "Planet Earth – Focal theme for the 94th session of the Indian Science Congress, **Jour. of Geol. Soc. of India**, 69, 873-874.
- 124) **K. Sain**, 2007. Gas hydrates - a potential source of energy, **Jour. of Geol. Soc. of India**, 70, 173-174.
- 125) U. Shankar & **K. Sain**, 2007. Specific character of the bottom simulating reflectors near mud diapirs: Western margin of India, **Current Science**, 93, 997-1002.
- 126) V.V. Rao, **K. Sain** & B.R. Prasad, 2007. Dipping Moho in the southern part of the eastern Dharwar craton, India, as revealed by the coincident seismic reflection and refraction Study, **Current Science**, 93, 330-336.
- 127) V.V. Rao, **K. Sain** & V. G. Krishna, 2007. Modeling and inversion of single-ended refraction data from the shot gathers of multifold deep seismic reflection profiling – an approach for deriving the shallow velocity structure, **Geophys. Jour. Internat.**, 169, 507-514.
- 128) D. Sarkar, **K. Sain**, P.R. Reddy, R.D. Catchings, and W.D. Mooney, 2007. Seismic-reflection images of the crust beneath the 2001 M = 7.7 Kutch (Bhuj) epicentral region, western India, **In S. Stein and S. Mazzotti, Eds., Continental Intraplate Earthquakes: Science, Hazard, and Policy Issues, Geological Society of America**, 425, 319-327.
- 129) M. Ojha & **K. Sain**, 2007. Seismic velocities and quantification of gas hydrates from AVA modeling in the western continental margin of India, **Mar. Geophys. Res.**, 28, 101-107.
- 130) L. Behera & **K. Sain**, 2006. Crustal velocity structure of Indian shield from the deep seismic sounding and receiver function studies, **Jour. of Geol. Soc. of India**, 68, 989-992.
- 131) V.V. Rao, **K. Sain**, P.R. Reddy & W.D. Mooney, 2006. Crustal structure and tectonics of the northern part of the southern granulite terrain, India, **Earth & Planet. Sci. Letts**, 251, 90-103.
- 132) R. Ghosh, M. Ojha, **K. Sain** & N.K. Thakur, 2006. Physical parameters of hydrated sediments estimated from marine seismic reflection data: a case study, **Current Science**, 90, 1421-1430.
- 133) S.K. Bhukta, **K. Sain** & H.C. Tewari, 2006. Crustal structure along the Lawrencepur-Astor profile across the Nanga Parbat, **Pure & App. Geophys.**, 163, 1257-1277, 2006.

- 134) L. Behera, **K. Sain** & P.R. Reddy, 2004. Evidence of underplating from seismic and gravity studies in the Mahanadi delta of eastern India and its tectonic significance, *Jour. of Geophys. Res.*, **109**, B12311, 1-25.
- 135) R.K. Dash, **K. Sain** & N.K. Thakur, 2004. Overpressure detection from seismic AVO response: an application to gas hydrates, *Current Science*, **86**, 985-990.
- 136) N. Satyavani, N.K. Thakur, U. Shankar, S.I. Reddi, A.R. Sridhar, P.P. Rao, **K. Sain** & R. Khanna, 2003. Indicators of gas hydrates: role of velocity and amplitude, *Current Science*, **85**, 1360-1363.
- 137) P. Vohat, **K. Sain** & N.K. Thakur, 2003. Heat flow and geothermal gradient from BSR: a case study, *Current Science*, **85**, 1263-1266.
- 138) P. Kumar, **K. Sain** & H.C. Tewari, 2003. A direct method of estimating the depth to a reflector from wide-angle reflection times, *Geophys. Jour. Internat.*, **152**, 740-748.
- 139) C.A. Zelt, **K. Sain**, J.V. Naumenko & D.S. Sawyer, 2003. Assessment of crustal velocity models using seismic refraction and reflection tomography, *Geophys. Jour. Internat.*, **153**, 609-626.
- 140) P.R. Reddy, B.R. Prasad, V.V. Rao, **K. Sain**, P.P. Rao, P. Khare & M.S. Reddy, 2003. Deep seismic reflection and refraction/wide-angle reflection studies along Kuppam-Palani transect in the southern granulite terrain of India, *Jour. of Geol. Soc. of India*, **50**, 79-106.
- 141) **K. Sain**, C.A. Zelt & P.R. Reddy, 2002. Imaging subvolcanic Mesozoics in Saurashtra peninsula of India using travel time inversion of wide-angle seismic data, *Geophys. Jour. Internat.*, **150**, 820-826.
- 142) L. Behera, **K. Sain**, P.R. Reddy, I.B.P. Rao & V.Y.N. Sharma, 2002. Delineation of shallow structure and Gondwana graben in Mahanadi delta, India using forward modeling of first arrival seismic data, *Jour. of Geodynamics*, **34**, 129-141.
- 143) **K. Sain**, P.R. Reddy & L. Behera, 2002. Imaging of low-velocity Gondwana sediments in the Mahanadi delta of India using travel time inversion of first arrival seismic data, *Jour. of App. Geophys.*, **49**, 163-171.
- 144) D. Sarkar, K. Chandrakala, P.P. Devi, A.R. Sridhar, **K. Sain** & P.R. Reddy, 2001. Crustal velocity structure of western Dharwar craton, south India, *Jour. of Geodynamics*, **31**, 227-241.
- 145) **K. Sain**, Nigel Bruguiet, A.S.N. Murthy & P.R. Reddy, 2000. Shallow velocity structure along the Hirapur-Mandla profile in central India, using travel time inversion of wide-angle seismic data, and its tectonic implications, *Geophys. Jour. Internat.*, **142**, 505-515.
- 146) **K. Sain**, T.A. Minshull, S.C. Singh, & R.W. Hobbs, 2000. Evidence for a thick free-gas layer beneath the bottom-simulating reflector in the Makran accretionary prism, *Marine Geology*, **164**, 3-12.
- 147) P. Kumar, H.C. Tewari & **K. Sain**, 1999. Velocity-depth relationship in selected parts of Indian crust, *Jour. of Geol. Soc. of India*, **54**, 129-136.
- 148) C. Subrahmanium, S.I. Reddy, N.K. Thakur, T.G. Rao & **K. Sain**, 1998. Gas hydrates - a synoptic view, *Jour. of Geol. Soc. of India*, **52**, 497-512.
- 149) K.L. Kaila & **K. Sain**, 1997. Variation of crustal velocity structure in India as determined from DSS studies and their implications on regional tectonics, *Jour. of Geol. Soc. of India*, **49**, 395-407.
- 150) P.R. Reddy, **K. Sain** & A.S.N. Murthy, 1997. On the seismic vulnerability of Jabalpur region – evidence from deep seismic imaging, *Current Science*, **73**, 796-800.
- 151) **K. Sain** & P.R. Reddy, 1997. Use of post-critical reflections in solving the hidden layer problem in seismic refraction work, *Geophysics*, **62**, 285-291.
- 152) **K. Sain** & K.L. Kaila, 1996. Interpretation of first arrival travel times in seismic refraction work, *Pure & App. Geophys.*, **147**, 181-194.
- 153) **K. Sain** & K.L. Kaila, 1996. A direct method of calculating interval velocities and layer thicknesses from wide-angle seismic reflection times, *Pure & App. Geophys.*, **146**, 343-363.
- 154) **K. Sain** & K.L. Kaila, 1996. Ambiguity in the solution to the velocity inversion problem and a solution by joint inversion of seismic refraction and wide-angle reflection times, *Geophys. Jour. Internat.*, **124**, 215-227.
- 155) **K. Sain** & K.L. Kaila, 1996. Direct calculation of interval velocities and layer thicknesses from wide angle seismic reflection times, *Geophys. Jour. Internat.*, **125**, 30-38.
- 156) **K. Sain** & P.R. Reddy, 1995. Direct calculation of thicknesses of high velocity and underlying low velocity layers using post-critical reflection times in seismic refraction experiments, *Jour. of App. Geophys.*, **134**, 125-136.
- 157) **K. Sain** & K.L. Kaila, 1994. Inversion of wide-angle seismic reflection times with damped least squares, *Geophysics*, **59**, 1735-1744.



- 158) K.L. Kaila & **K. Sain**, 1994. Errors in rms velocity and zero offset two-way time as determined from wide-angle seismic reflection times using truncated series, *Jour. of Seis. Expl.*, **3**, 173-188.

**(b) Non-SCI Articles**

- 1) **K. Sain**, A. Kumar & A. Verma, 2022. Glaciers in Indian Himalaya and major concerns, K. S. Valdiya Commemorative Volume, *Jour. Ind. Geol. Cong.*, Vols.12(2) and 13(1&2), in press.
- 2) S. Kumar, **K. Sain**, M. Parija, R. Sushil, A. Tiwari, C. Haldar & U. Bhan, 2022. Re-appraisal of seismicity and seismotectonics, India: A review of current and historical seismicity, K. S. Valdiya Commemorative Volume, *Jour. Ind. Geol. Cong.*, Vols.12(2) and 13(1&2), in press.
- 3) **K. Sain** & P. C. Kumar, 2020. Effectively interpreting seismic data for voluminous geo-resources, *DEW Journal, February Issue*, 29-34.
- 4) **K. Sain** & P. C. Kumar, 2019. Human and Machine: an amalgamation to aid seismic interpretation, *ONGC Bulletin*, 54(2), 1-14.
- 5) A.S.N. Murty, ASSRS Prasad & **K. Sain**, 2019. Delineation of the Trap and sub-trappean sediments in Kutch, Deccan Syncline and Bengal basins – An analysis, *Jour. of Indian Geophys. Union*, 23(1), 28-40.
- 6) N. Satyavani, M. Ravikumar & **K. Sain**, 2018. Wavefield decomposition of multi-component OBS data to enhance the seismic signal, *Jour. of Indian Geophys. Union*, 22(2), 138-142.
- 7) **K. Sain** & ASSRS Prasad, 2018. A report of the 54<sup>th</sup> Annual Convention of Indian Geophysical Union (IGU), *Jour. of Indian Geophys. Union*, 22(2), 247-249.
- 8) U. Shankar, D. Bhowmick & **K. Sain**, 2016. Estimation of gas hydrate saturation using model based acoustic impedance inversion from Mahanadi offshore basin, *Jour. of Indian Geophys. Union*, 20(3), 309-315.
- 9) **K. Sain** & ASSRS Prasad, 2016. A report of the 52<sup>nd</sup> Annual Convention of Indian Geophysical Union (IGU), *Jour. of Indian Geophys. Union*, 20(1), 136-141.
- 10) **K. Sain**, M. Rafique, S. Singh & H. K. Gupta, 2015. A report of the 9th International Methane Hydrates R&D Workshop "Science & Technology of Gas Hydrates: When can they be produced efficiently and safely, *Jour. of Indian Geophys. Union*, 19(3), 353-361.
- 11) T.R.K. Chetty, **K. Sain** & ASSRS Prasad, 2015. The 51st Annual Convention of Indian Geophysical Union: A Report, *Jour. of Indian Geophys. Union*, 19(1), 110-115.
- 12) N. Satyavani, **K. Sain** & V. Jyothi, 2014. Gas hydrates occurrences in the Andaman offshore, India - seismic inferences, *Jour. of Indian Geophys. Union*, 18(4), 440-447.
- 13) **K. Sain**, M. Rai & M.K. Sen, 2014. A review on shale gas prospect in Indian sedimentary basins, *Jour. of Indian Geophys. Union*, 18(2), 183-194.
- 14) **K. Sain** & H.K. Gupta, 2014. Gas-hydrates, a major energy resource of India for the next generation, *Jour. of Indian Geophys. Union*, 18(1), 11-17.
- 15) ASSRS Prasad, **K. Sain** & M.K. Sen, 2013. Imaging sub basalt Mesozoics along Jakhau-Mandvi and Mandvi-Mundra profiles in Kutch sedimentary basin from seismic and gravity modelling, *Geohorizons*, 18(2), 51-56.
- 16) **K. Sain**, 2012. Exploration and assessment of gas-hydrates, *Exploration and Production: Oil and Gas Review*, v.10, issue 2, p.1-3.
- 17) **K. Sain**, 2010. Book Review on 'Fundamentals of Geophysics', *Episodes*, 33, 69-70.
- 18) **K. Sain**, 2011. Gas hydrates - major potential energy resource of India in the 21st century, *Jour. of Geophysics*, 31/32, 81-89.
- 19) **K. Sain**, 2009. Gas hydrates – Future potential energy source: their detection and assessment using seismic methods, *Indian Geological Congress's Third Prof. P.B. Verma Memorial Lecture*, KDMIPE, ONGC, Dehradun, November 14, pp.1-19.
- 20) U. Shankar & **K. Sain**, 2009. Heat flow variation from bottom simulating reflector in the Kerala-Konkan basin of the western continental margin of India, *Indian Jour. of Mar. Sci.*, 38, 110-115.
- 21) **K. Sain** & M. Ojha, 2008. Estimation of gas hydrates and free-gas concentrations using modeling and crossplot of seismic amplitudes from the bottom simulating reflector, *Advances in Geosciences*, Ocean Science, 18, 181-196.
- 22) M. Ojha & **K. Sain**, 2007. Seismic amplitude versus angle (AVA) responses from a bottom simulating reflector of various gas hydrates models, *Geohorizons*, 12, 2, 22-26.
- 23) **K. Sain**, 2007. Gas hydrates: a potential source of energy, *Gond. Geol. Magazine*, Spl. vol. 9, 65-70.

- 24) D. Sarkar, **K. Sain**, P.R. Reddy, R.D. Catchings & W.D. Mooney, 2006. Seismic reflection images of crust beneath 2001 M=7.7 Kutch (Bhuj) epicentral region, western India, **EOS Trans, AGU**, 87, 52, S53A 1312.
- 25) **K. Sain**, 2006, Estimation of various physical parameters from BSR and quantification of gas hydrates – a case study, **Geohorizons**, 11, 2, 18-23.
- 26) P.R. Reddy, L. Behera & **K. Sain**, 2005. Magmatic Underplating in the Mahanadi delta: Results from seismic and gravity studies, **DCS Newsletter, Dept. of Sci. & Tech.**, 15, 21-24.
- 27) **K. Sain**, 2004. Present status of worldwide R&D on the utilization of Gas hydrates for power production, International Union of Physics and Applied Physics (IUPAP) Working Group on Energy, ANNEX A – FOSSIL ENERGY, [www.iupap.org/wg/energy/annex-1a.pdf](http://www.iupap.org/wg/energy/annex-1a.pdf), p. 27-31
- 28) V.K. Rao & **K. Sain**, 2002. 'Gas Hydrate: barffily aag ek akshun urja ka bhandar', **Vasundhara**, 8, 7-14
- 29) **K. Sain**, 2001. Gas-hydrate – a potential source of hydrocarbon energy, **BOYSCAST News Letter** (Dept. of Sci. & Tech., India), 2, 1-4.
- 30) C.A. Zelt, **K. Sain**, J.V. Naumenko & D.S. Sawyer, 2000. Assessment of crustal velocity models using seismic refraction and reflection tomography, **EOS**, 81, F876, 2000
- 31) K.L. Kaila & **K. Sain**, 1994. Errors in rms velocity by hyperbolic fitting of the wide-angle seismic reflection times and a method for their inversion to determine the interval velocity structure, **ONGC Bull.**, 31, 33-49.

### (c) Chapter in Books

- 1) A. Kumar, **K. Sain** & A. Verma, 2022. Hydrological importance of Himalayan Glaciers: A perspective from Garhwal Himalaya. 'Water Resources: Scarcity, Contamination and Management' to be published by Elsevier in 2022, in press.
- 2) P. Chauhan, S.K. Tiwari & **K. Sain**, 2022. Quantification of potential evapotranspiration from Pindari-Kafni glacier valleys in Kumaun central Himalaya, in Sustainability Development: A Geospatial and Statistical Perspectives" at CRC Press (A Taylor & Francis Group).
- 3) **K. Sain**, 2022. Characterization and quantification of gas-hydrates – future source of energy in India. 'Emerging Energy resources in India' to be published by Springer- Geological Society of India, In Sain, K., Roy, S. & Gupta, H.K., in press
- 4) V. Adlakha & **K. Sain**, 2022. Crustal Evolution of the Himalaya since Paleoproterozoic. 'Earth's Crust and its Evolution - From Pangea to the Present Continents' to be published by IntechOpen in 2022, in press.
- 5) V. Gupta, **K. Sain**, & R. S. Tandon, 2022. Landslides and slope instability in Mussoorie and Nainital townships (Uttarakhand) in present climate – change scenario, **In Unnikrishnan, A.S., Tangang, F., T., and Durrheim, R., Ed., Understanding & Managing Extreme Natural Events: Challenges for Developing Countries**, Springer, in press.
- 6) **K. Sain** & P. C. Kumar, 2021. Seismic, Artificial Intelligence to Neural Intelligence for Advanced Interpretation, **In Gupta H.K., Ed., 2<sup>nd</sup> Edition, Encyclopedia of Solid Earth Geophysics**, Springer, The Netherlands, p.1562-1567.
- 7) **K. Sain**, 2021(a). Energy partitioning of seismic waves, **In Gupta H.K., 2<sup>nd</sup> Edition, Ed., Encyclopedia of Solid Earth Geophysics**, Springer, The Netherlands, p.368-371.
- 8) **K. Sain**, 2021(b). Seismic velocity and temperature relationships, **In Gupta H.K., 2<sup>nd</sup> Edition, Ed., Encyclopedia of Solid Earth Geophys.**, Springer, The Netherlands, p.1511-1512.
- 9) **K. Sain**, 2021(a). Seismic velocity and density relationships, **In Gupta H.K., 2<sup>nd</sup> Edition, Ed., Encyclopedia of Solid Earth Geophysics**, Springer, The Netherlands, p.1607-1608.
- 10) N. Kumar, D. Hazarika & **K. Sain**, 2020. Earthquakes: Basics of seismology and computational techniques, **In Samui, P., Dixon, B., and Bui, D.T., Ed., Basics of Computational Geophysics**, Elsevier, USA, Chapter 4, 47-80.
- 11) A. Kumar, A. Verma, R. Bhambri & **K. Sain**, 2020. Seasonal characterization of glacier melt water storage and drainage from Garhwal Himalaya: Time series analysis of hydrometeorological data, **In Samui, P., Dixon, B., and Bui, D.T., Ed., Basics of Computational Geophysics**, Elsevier, USA, USA, Chapter 20, 373-388.
- 12) **K. Sain**, D.P. Dobhal, V. Gupta & R. Sharma, 2019. Geo-resources and impact assessment from geological studies, pp.1-27, **in Gupta, A., ed., Status of ecosystem health in the Indian Himalaya region, A Report under National Mission for Sustaining the Himalayan Ecosystem, Dept. of Sci. & Tech., Climate Change Program**, p. 172.

- 13) H.K. Gupta & **K. Sain**, 2013. Gas-hydrates: Natural Hazard, *In Bobrowsky, P., Ed., Encyclopedia of Natural Hazards*, Springer, p.377-378.
- 14) S. Ramesh, D.V. Rao, B.R. Rao, **K. Sain**, O. Khlystov, M.A. Grachev & S. Kathirolu, 2013. Gas hydrate exploration and sampling in Kukuya canyon, north of Selenga delta, Lake Baikal, Russia, *In R. Venkatachalapathy, (Ed.), Earth Resources and Environment, Research Publishing, Singapore*, ISBN: 978-981-08-6942-7, pp.132-140.
- 15) **K. Sain**, 2013. Gas hydrate: a viable future major energy resource of India, *In Sinha, R. and Ravindra, R., Earth System Processes and Disaster Management, Society of Earth Scientists Series 1, DOI 10.1007/978-3-642-28845-6\_14, Springer-Verlag, Berlin Heidelberg*, pp. 205-211.
- 16) **K. Sain**, 2011(a). Velocity-density relationship, *In Gupta H.K., 1<sup>st</sup> Edition, Ed., Encyclopedia of Solid Earth Geophysics*, Springer, The Netherlands, p.1198-1199.
- 17) **K. Sain**, 2011(b). Velocity-temperature relationship, *In Gupta H.K., 1<sup>st</sup> Edition, Ed., Encyclopedia of Solid Earth Geophys.*, Springer, The Netherlands, p.1199-1200.
- 18) **K. Sain**, 2011(c). Energy partitioning of seismic waves, *In Gupta H.K., 1<sup>st</sup> Edition, Ed., Encyclopedia of Solid Earth Geophysics*, Springer, The Netherlands, p.291-294.
- 19) A. Manglik, S.K. Verma, **K. Sain**, T. Harinarayana, & V.V. Rao, 2011. Joint inversion of seismic and MT Data – an example from southern granulite terrain, India, *In E. Petrovský et al. (eds.), Earth's Magnetic Interior*, IAGA Special Sopron Book Series 1, Springer Sci., DOI 10.1007/978-94-007-0323-0\_5, p.83-90.
- 20) **K. Sain** & M. Ojha, 2008. Estimation of gas hydrates and free-gas concentrations using modeling and crossplot of seismic amplitudes from the bottom simulating reflector, *In J. Gan, Ed., Advances in Geosciences*, Ocean Science, Singapore: World Scientific vol. 18, p. 181-196.
- 21) **K. Sain**, 2008. An overview of deep sounding studies in India and their geotectonic implications, *In Singh, B. and Dimri, V.P., (Eds.), Memoir, Geol. Soc. of India*, 68, 123-150.
- 22) **K. Sain** & M. Ojha, 2008. Identification and quantification of gas hydrates: a viable source of energy in 21st century, *In Singh, B. and Dimri, V.P., (Eds.), Memoir, Geol. Soc. of India*, 68, 273-288.
- 23) H.K. Gupta & **K. Sain**, 2005. Detection and quantitative assessment of gas hydrates - an initiative along the continental margins of India, *In H.K. Gupta, H.K., Ed., Oceanology, University Press (India) Private Limited, Hyderabad*, pp. 118-137.
- 24) H.K. Gupta & **K. Sain**, 2002. Need for gas hydrates investigation along the continental margins of India, *In S.K. Malik and S. Varadarajan, Eds., Energy and Food Security: Advances in science for sustainable environment and development in India during the next decade*, Indian National Science Academy, New Delhi, pp. 41-48.
- 25) P.R. Reddy, P.K. Rao & **K. Sain**, 1999. Crustal configuration along the Narmada-Son lineament in central India from deep seismic sounding studies, *In K.V. Subbarao, Ed., Memoir, Geol. Soc. of India*, 43, 353-365.

**(d) Books-authored/Edited volume:**

- 1) **K. Sain**, S. Roy & H.K. Gupta, 2022. "Emerging Energy resources in India", Eds. Publisher: Springer- Geological Society of India, in press.
- 2) **K. Sain** & P. C. Kumar, 2022. "Meta-Attributes and Artificial Networking: A New Tool for Seismic Interpretation", Eds. Publisher: AGU & Wiley, Special Publication Series, in press.
- 3) **K. Sain** & Nara Damodara, 2022. "Active Source Seismic Tomography: Theory and Application", Eds. Publisher: AGU, Proposal Accepted, MOU Signed, Book under preparation.
- 4) K. Arora, A. Cazenave, ER Engdahl, R. Kind, A. Manglik, S. Roy, **K. Sain** & S. Uyeda, 2021. (Editorial Board). 2nd Edition, Encyclopedia of Solid Earth Geophysics, Springer, Ed. H.K. Gupta, p.1921.
- 5) M. Pratap, S.K. Singh, K.K. Chpra, P. Kumar, Y. Yamada, N. Tenma, **K. Sain**, U.S. Sahay, R. Boswell, W. Waite & T.S. Collett, 2019. **Marine gas hydrate reservoir systems along the eastern continental margin of India: Results of the National Gas Hydrate Program Expedition 02**, Eds., *Marine and Petroleum Geology, Elsevier*, vol. 108, p.746
- 6) A.K. Singh & **K. Sain**, 2017. Seismic attenuation for the investigation of gas-hydrates, *Lambert Academic Publishing*, p.128.
- 7) M.V. Ramana, T. Ramprasad, T.S. Collett, P. Kumar, R.M. Boswell, M. Riedel, A.V. Sathe, M. Lall, K. Vishwanath, A. Mazumdar, **K. Sain** & J. Cochran, J., 2014. **Geologic implications of gas**

- hydrates in the offshore of India: Results of the National Gas Hydrate Program Expedition 01, Eds., **Marine and Petroleum Geology**, Elsevier, vol. 58, Part A, p. 550.
- 8) R. Ghosh, M. Ojha & **K. Sain**, 2012. Evaluating resource potential of gas-hydrates using EMT, **Lambert Academic Publishing**, p.164.
  - 9) S. Lin, R. Matsumoto, M. Riedel, BJ Ryu and **K. Sain**, 2011. **Occurrence and exploration of gas hydrate in the marginal sea and continental margin of the Asia and Oceania region**, Eds., **Marine and Petroleum Geology**, Elsevier.
  - 10) K. Arora, A. Cazenave, ER Engdahl, R. Kind, A. Manglik, S. Roy, **K. Sain** & S. Uyeda, 2011 (Editorial Board). 2nd Edition, **Encyclopedia of Solid Earth Geophysics**, Springer, Ed. H.K. Gupta, p. 1527.

**(e) Abstract volume:**

- 1) **K. Sain** & ASSSRS Prasad, 2018. '**Changing Water Cycle and Water Resources**', Edited **Abstract Volume of the 55<sup>th</sup> Annual Convention of Indian Geophysical Union** held at Rabindranath Tagore University, Bhopal during December 5-7, 2018, Eds., **www.igu.in**, p.94.
- 2) **K. Sain** & ASSSRS Prasad, 2017. '**Recent advances in geophysics with special reference to Earthquake Seismology**', Edited **Abstract Volume of the 54<sup>th</sup> Annual Convention of Indian Geophysical Union** held at CSIR-NGRI, Hyderabad during December 3-7, 2017, Eds., **www.igu.in**, vol.1, p.132.
- 3) **K. Sain**, ASSSRS Prasad, & P. R. Prasad, 2016. '**Geosciences for Sustainability**', Edited **Abstract Volume of the Federation of Indian Geosciences Association** held at IIT (ISM), Dhanbad during November 8-10, 2016, Eds., **www.igu.in**, vol.1, p.206.
- 4) **K. Sain**, ASSSRS Prasad, & P. R. Prasad, 2016. '**Geosciences for Sustainability**', Edited **Abstract Volume of the Federation of Indian Geosciences Association** held at IIT (ISM), Dhanbad during November 8-10, 2016, Eds., **www.igu.in**, vol.2, p.138.
- 5) P.R. Reddy & **K. Sain**, 2015. '**Near Surface Earth System Sciences**', Edited **Abstract Volume of the 52<sup>nd</sup> Annual Convention of Indian Geophysical Union** held at NCAOR, Goa during November 3-5, 2015, Eds., **www.igu.in**, p.195
- 6) **K. Sain**, ASSSRS Prasad, 2014. '**Earth Sciences and Society**', Edited **Abstract Volume of 51<sup>st</sup> Annual Convention of Indian Geophysical Union** at Kurukshetra University, Kurukshetra November 19-21, 2014, Eds., **www.igu.in**, p.200.
- 7) **K. Sain**, 2014. '**Science & Technology of gas hydrates: When can they be produced efficiently and safely**', Edited **Abstract Volume of the 9<sup>th</sup> International Methane Hydrates R&D Workshop (Fiery Ice 2014)** held at Hyderabad (India) during November 9-12, 2014, Ed., **www.fieryice2014.org**.
- 8) N. Nagarajan, **K. Sain (Convener)**, V.M. Tiwari, L. Behera, B.P.K. Patro & P. Kumar, 2000. Hydrocarbon Exploration - Benchmark document for this decade, **NGRI (CSIR)** (Unpublished).
- 9) **K. Sain**, 1995, Inversion of seismic wide-angle reflection traveltimes data with applications, Ph. D. Thesis, **Osmania University** (Unpublished).
- 10) **K. Sain**, 1987, Variation of seismic velocities with depth for marine sediments, **M.Sc. (Tech) dissertation at ISM**, Dhanbad under the supervision of Prof. R.K.S. Chouhan, p. 125 (Unpublished).

**(f) Reports/Other Documents:**

- 1) **K. Sain**, Nara Damodara, Pandey Vivekanand, Singh Satendra, Sreenivas, B., Patil, D.J., Chandrasekhar, N., Pandurangi, L.S., Mane, P.H. & Katiyar, G.C., 2018. **Full waveform tomography of wide-angle SBN** and modelling of gravity/magnetic data in the Kerala-Konkan offshore for delineation of basalt and sub-basalt formations (**Unpublished Report**), submitted to ONGC, Mumbai.
- 2) **K. Sain**, U. Shankar, N. Satyavani, M. Ojha, M. Rafique & S. Singh, 2013. Identification, delineation and quantitative assessment of gas-hydrates in Krishna-Godavari offshore from high resolution MCS data, **NGRI Tech. Rep. No. NGRI-2013-EXP-412** (Unpublished) submitted to DGH, NOIDA.
- 3) **K. Sain**, M. Ojha, N. Satyavani, M. Rafique & S. Singh, 2011. Multi-channel and Ocean bottom seismic data for gas-hydrate investigation in KG and Mahanadi basins, **NGRI Prelim. Rep. No. NGRI-2011-EXP-392** (Unpublished) submitted to MoES, Delhi.
- 4) D. Venkata Rao, S. Ramesh, **K. Sain**, B. R. Rao, M.A. Grachev, I.Z. Tamara, N.G. Granin, C. Alexendr, O.M. Khlystov, A.P. Fedetov, G. Alexie, V. Stoyanov & V.V. Shapovalenko, 2007, **Joint**



- Research in Lake Baikal for Gas Hydrate Studies**, Tech. Rep. (Unpublished) submitted DST, Delhi.
- 5) **K. Sain**, 2006. Development of method for quantification of gas-hydrates from MCS data and its application to Indian offshore, **NGRI Tech. Rep. No. NGRI-2013-EXP-378** (Unpublished) submitted to DST, Delhi.
  - 6) N.K. Thakur, **K. Sain**, S.I. Reddi B. Ashalatha, P.P. Rao, U. Shanker & N. Satyavani, 2003. Reprocessing and waveform inversion of multi-channel seismic data of OIL for gas-hydrate investigation in offshore Saurashtra, **NGRI Tech. Rep. No. NGRI-2003-EXP-328** (Unpublished).
  - 7) S.I. Reddy, N.K. Thakur, B. Ashalatha, **K. Sain**, Y. Hanumantha Rao & S. Chand, 2001. Reprocessing of multichannel seismic data of ONGC Limited for gas-hydrate exploration in offshore Goa, (**Part-I: Basic Processing**) **NGRI Tech. Rep. No. NGRI-2001-EXP-307** (Unpublished).
  - 8) S.I. Reddy, N.K. Thakur, B. Ashalatha & **K. Sain**, 2001. Reprocessing of multichannel seismic data of ONGC Limited for gas-hydrate investigation in offshore Goa, (**Part-II: Special Processing**) **NGRI Tech. Rep. No. NGRI-2001-EXP-307** (Unpublished).
  - 9) P.R. Reddy & 49 others of CSS, MT, DRS, Gravity, Geology and Geochronology groups, 2001. Modeling the tectonic evolution of southern granulite belt of the Indian shield using coincident seismic reflection/refraction, geological/geochemical, geochronological, gravity / magnetic, **magnetotelluric and deep resistivity studies along the southern geotranssect. NGRI Tech. Rep. No. NGRI-2001-EXP-317** (a member of CSS group) (Unpublished).
  - 10) P.R. Reddy, D. Sarkar, & **K. Sain**, 2001. A report of a collaborative scientific study at USGS, Menlo Park, USA (Unpublished).
  - 11) H.K. Gupta & 60 others of CSS, MT, Gravity and DRS Groups, 1998. Integrated geophysical studies for hydrocarbon exploration in Saurashtra. **Tech. Rep. No. NGRI-98-EXP-237** (Unpublished).
  - 12) S.C. Singh, P. Henry, Y. Ji & **K. Sain**, 1998, Confidential Report on Effective medium theory, waveform inversion of VSP and OBH data, **Bullard Laboratories, Cambridge University (Unpublished Report)**.
  - 13) S.C. Singh, **K. Sain** & Valerie Rousseau, 1997, Confidential Report on Waveform inversion of MCS data, **Bullard Laboratories, Cambridge University, (Unpublished Report)**.

#### (g) Articles in Proceeding Volumes

- 1) N. Damodara, & **K. Sain**, 2018. Workflow for an initial model of seismic tomography. Expanded abstract, In: **8th International Conference & Exhibition of EAGE, Saint Petersburg, Russia**, Doi: 10.3997/2214-4609.201800304.
- 2) Arun, K.P., Aayush Agarwal & **K. Sain**, 2017. Constrained AVO inversion using genetic algorithm and FDR-PSO method and estimation of gas-hydrate and free-gas in Mahanadi offshore basin, India, **SEG International Exposition & 87<sup>th</sup> Annual Meeting during September 26-28, 2017**, p.637-642.
- 3) Jitender Kumar & **K. Sain**, 2017. Application of spectral decomposition for gas hydrate exploration: a study from Mahanadi offshore, India, **SEG International Exposition and 87<sup>th</sup> Annual Meeting during September 26-28, 2017**, p.2195-2199.
- 4) A. K. Joshi, Laxmi Pandey & **K. Sain**, 2017. Identification of BSR and estimation of gas-hydrates from well log data at NGHP-021-04A and 11A in Krishna-Godavari basin, eastern Indian margin, **SEG International Exposition and 87<sup>th</sup> Annual Meeting during September 26-28, 2017**, p.3483-3487.
- 5) Rowtu Ramu & **K. Sain**, 2017. Identification of Gas Chimney in the Krishna-Godavari basin, eastern Indian margin, **SPG-Jaipur during November 17-19, 2017**, P-054, p.1-4
- 6) N. Damodara & **K. Sain**, 2017. Visco-acoustic Full Waveform Tomography of Synthetic Ocean Bottom Seismic Data, **SPG-Jaipur during November 17-19, 2017**, P-062, p.1-4
- 7) Laxmi Pandey, A. K. Joshi & **K. Sain**, 2017. Estimation of porosity using post-stack seismic and well log data at site NGHP-01-9A in Mahanadi offshore basin-a case study, **SPG-Jaipur during November 17-19, 2017**, P-127, p.1-5
- 8) **K. Sain**, N. Damodara, N. Chandrasekhar, Lata S. Pandurangi & G.C. Katiyar, 2017. Imaging finer details of subsurface by full waveform tomography, Kerala-Konkan offshore, **SPG-Jaipur during November 17-19, 2017**, P-132, p.1-4
- 9) A. K. Joshi, Laxmi Pandey, Arun K.P., & **K. Sain**, 2017. Gas Hydrate Characterization from seismic and well log data: Krishna-Godavari basin, **SPG-Jaipur during November 17-19, 2017**, P-135, p.1-5
- 10) Abhishek Dubey, Arka Das & **K. Sain**, 2017. Stochastic inversion of Post-stack seismic data using fractal-based initial model, **SPG-Jaipur during November 17-19, 2017**, P-139, p.1-4

- 11) **K. Sain** & N. Damodara, 2015. Seismic tomography of wide-angle seismic data: selected examples from Indian onshore and offshore, **SPG-Jaipur during December 3-5, 2015**, P-69, p.1-4.
- 12) Kamal Kumar Munda, K.P. Arun, Sandhya Krishnan, Jitender Kumar & **K. Sain**, 2015. Application of seismic attributes in enhancing thin beds: an example from North Sea, **SPG-Jaipur during December 3-5, 2015**, P-199, p.1-5.
- 13) **K. Sain**, 2014. Geophysical investigation of gas hydrates at NGRI, In **Abstract Volume of the 9th International Methane Hydrates R&D Workshop (Fiery Ice 2014) held at Hyderabad, India, November 9-12, 2014**, Paper ID 57, p106.
- 14) N. Satyavani, M.K. Sen & **K. Sain**, 2014. OBS studies in the Indian offshore for gas hydrate investigation, In **Abstract Volume of the 9th International Methane Hydrates R&D Workshop (Fiery Ice 2014) held at Hyderabad, India, November 9-12, 2014**, Paper ID 17, p45-48.
- 15) V. Jyothi & **K. Sain**, 2014. Seismic attenuation for the delineation of gas hydrates: application to seismic data in Krishna-Godavari basin, eastern Indian margin, In **Abstract Volume of the 9th International Methane Hydrates R&D Workshop (Fiery Ice 2014) held at Hyderabad, India, November 9-12, 2014**, Paper ID 28, p68-70.
- 16) S. Jana, M. Ojha & **K. Sain**, 2014. Estimation of gas hydrates for heterogeneous model constructed from well log in Krishna-Godavari basin, Eastern Indian offshore, In **Abstract Volume of the 9th International Methane Hydrates R&D Workshop (Fiery Ice 2014) held at Hyderabad, India, November 9-12, 2014**, Paper ID 31, p75-76.
- 17) V. Pandey, **K. Sain** & M. K. Sen 2014. Quantification of gas hydrates in fracture media: a new approach, In **Abstract Volume of the 9th International Methane Hydrates R&D Workshop (Fiery Ice 2014) held at Hyderabad, India, November 9-12, 2014**, Paper ID 33, p79-82.
- 18) G. Alekhya, N. Satyavani & **K. Sain**, 2014. Inferring free gas occurrence in Krishna-Godavari basin using log and seismic data, In **Abstract Volume of the 9th International Methane Hydrates R&D Workshop (Fiery Ice 2014) held at Hyderabad, India, November 9-12, 2014**, Paper ID 38, p90-92.
- 19) R. Chatterjee, D. Kumar & **K. Sain**, 2014. Pore pressure and porosity mapping in gas hydrate bearing sediments in Krishna-Godavari basin, India, In **Abstract Volume of the 9th International Methane Hydrates R&D Workshop (Fiery Ice 2014) held at Hyderabad, India, November 9-12, 2014**, Paper ID 39, p93-95.
- 20) **K. Sain**, 2014. Gas-hydrates in India, a major energy resource for the next generation, **Proc. of the 8th International Conference on Gas Hydrates (ICGH 2014) held at Beijing, China, July 28 - August 1, 2014**, T3-69, p1-5.
- 21) N. Satyavani, **K. Sain** & H.K. Gupta, 2014. P- and S-wave velocity structure in a gas hydrate reservoir in the Krishna-Godavari basin, eastern Indian margin, **Proc. of the 8th International Conference on Gas Hydrates (ICGH 2014) held at Beijing, China, July 28 - August 1, 2014**, T2-58, p1-2.
- 22) **K. Sain** & A.K. Singh, 2012. Seismic attenuation across a BSR in the Makran offshore, **Proc. of the 7th International Conference & Exhibition on Petroleum Geophysics held at Hyderabad, India, February 16-18, 2012**, PID 084, p1-4.
- 23) M. Ojha & **K. Sain**, 2012. Empirical trends of velocity-porosity and velocity-density in shallow sediments in Kerala-Konkan basin on the west coast of India, **Proc. of the 7th International Conference & Exhibition on Petroleum Geophysics held at Hyderabad, India, February 16-18, 2012**, PID 444, p1-5.
- 24) U. Shankar & **K. Sain** 2012. Gas hydrate stability zone modeling in Krishna-Godavari basin, eastern margin of India, **Proc. of the 7th International Conference & Exhibition on Petroleum Geophysics held at Hyderabad, India, February 16-18, 2012**, PID 223, p1-6.
- 25) N. Satyavani, X. Wang, **K. Sain** & BJP Kumar, 2012. Estimation of gas hydrate along a seismic line in the Andaman offshore using acoustic impedance and resistivity log, **Proc. of the 7th International Conference & Exhibition on Petroleum Geophysics held at Hyderabad, India, February 16-18, 2012**, PID 413, p1-4.
- 26) D. Bhowmick, D.K. Gupta, U. Shankar & **K. Sain** 2012. A transformation from acoustic and density properties to reservoir properties applied to KG basin, **Proc. of 7th International Conference & Exhibition on Petroleum Geophysics held at Hyderabad, India, February 16-18, 2012**, PID 439, p1-6.
- 27) **K. Sain**, 2011. Seismic detection and quantification of gas-hydrates - application to Indian continental margin, **Proc. of the 7th International Conference on Gas Hydrates (ICGH 2011) held at Edinburgh, UK, July 17-21, 2011**, PID 646, p1-5.

- 28) U. Shankar, **K. Sain** & M. Riedel, 2011. Assessment of heat flow and gas-hydrates in Krishna-Godavari basin, constrained from 2D/3D seismic and well log data, **Proc. of 7th International Conference on Gas Hydrates (ICGH 2011) held at Edinburgh, UK, July 17-21, 2011**, PID 451, p1-5.
- 29) **K. Sain**, R. Ghosh & M. Ojha, 2010. Effective medium modeling of gas hydrate-filled fractures using sonic velocity in the Krishna-Godavari basin, eastern Indian offshore, **Proc. of 9th International Oil & Gas Conference & Exhibition of Petrotech-2010**, PID-20100389, p1-6.
- 30) S. Kumar, N. Satyavani & **K. Sain**, 2010. Prestack time migration and its effect on the identification of BSR in western coast of India, **8th International Conference & Exposition on Petroleum Geophysics, Hyderabad-2010, SPG**, p-155, 1-4.
- 31) **K. Sain**, M. Ojha & T.A. Minshull, 2009. Assessing gas hydrates along a seismic line in the Makran accretionary prism using AVO crossplot, **Proc. of the 8th International Oil & Gas Conference & Exhibition of Petrotech-2009**, P-865, p1-6.
- 32) **K. Sain**, 2008. Seismic Methods for Recognition and Evaluation of Gas hydrates, **Proc. of the 12th International Conference of International Association for Computer Methods and Advances in Geomechanics (IACMAG) held at Goa during October 1-6, 2008**, <http://www.gndec.ac.in/~hsrai/civil/resources/conf/GOA/IACMAG08/pdfs/H22.pdf>.
- 33) U. Shankar, M. Ojha, **K. Sain**, R.K. Khanna, M. Sudhakar & A. Tyagi, 2008. Utility of seafloor geophysical study in search of gas hydrates / gas related evidences in the deep waters of western Indian margin, **7th International Conference & Exposition on Petroleum Geophysics, Hyderabad-2008, SPG**, p-2227, 1-5.
- 34) S.S. Singh, U. Shankar & **K. Sain**, 2008. Multiple suppression and data quality enhancement using radon transform: a case study, **7th International Conference & Exposition on Petroleum Geophysics, Hyderabad-2008, SPG**, p-268, 1-6.
- 35) **K. Sain**, & M. Ojha, 2008. Methods for identifying and quantifying gas hydrates - an alternate source of energy, **7th International Conference & Exposition on Petroleum Geophysics, Hyderabad-2008, SPG**, p-94, 1-4.
- 36) S. Ram, U. Shankar, **K. Sain**, & N.K. Thakur, 2008. Saturation estimation of gas hydrates with relevant velocity models, **7th International Conference & Exposition on Petroleum Geophysics, Hyderabad-2008, SPG**, p-125, 1-7.
- 37) A.R. Sridhar, ASSRS Prasad, N. Satyavani & **K. Sain**, 2008. Sub-trappean Mesozoic sediments in the Narmada basin based on amplitude studies – a revisit to the old DSS data, **7th International Conference & Exposition on Petroleum Geophysics, Hyderabad-2008, SPG**, p-603, 1-5.
- 38) **K. Sain**, & C.A. Zelt, 2008. Velocity structure of sub-basalt Mesozoics around the Lodhika well in the Saurashtra peninsula from inversion of wide-angle seismic data, **7th International Conference & Exposition on Petroleum Geophysics, Hyderabad-2008, SPG**, p-602, 1-3.
- 39) **K. Sain** & H.K. Gupta, 2007. Seismic methods for identifying and quantifying gas hydrates – viable source of energy in India, **Proceedings of International Conference on Gas Hydrates – Energy, Climate and Environment, held at Taipei, Taiwan during October 4-5, 2007**, [http://140.112.68.2/ghc/2007 Gas Hydrate Conference. Files/ab07.pdf](http://140.112.68.2/ghc/2007%20Gas%20Hydrate%20Conference%20Files/ab07.pdf), p.39-42.
- 40) **K. Sain**, N.K. Thakur & R.K. Khanna, 2007. Seismic quality factor observation in gas-hydrated sediments on the western Indian margin, **Proceedings in 7th International Oil & Gas Conference & Exhibition of Petrotech-2007**, P-541, p1-6.
- 41) **K. Sain** & N.K. Thakur, 2006. Geothermal gradient and heat flow from a bottom simulating reflector in the Makran offshore, **Proceedings of ASC held in Armenia**, p.1-6.
- 42) **K. Sain**, M. Ojha & N.K. Thakur, 2006. Quantitative assessment of gas hydrates from AVO crossplot, **6th International Conference & Exposition on Petroleum Geophysics, Kolkata-2006, SPG**, pp. 208-211.
- 43) ASSRS Prasad, **K. Sain** & B.R. Prasad, 2006. High-velocity gradients in West Bengal sedimentary basin, India from travelttime inversion of wide-angle seismic data and multiples of first arrivals, **6th International Conference & Exposition on Petroleum Geophysics, Kolkata-2006, SPG**, pp. 863-865.
- 44) P.K. Rao, M.M. Dixit, P. Khare, G.K. Rao, S. Raju, **K. Sain**, A.S.N. Murthy, V.Y.N. Sarma, ASSRS Prasad, V. Sridher, M.S. Reddy, P.R. Reddy & D. Sarkar, 2004. Hidden Mesozoic sediments – searching with seismic refraction tool, **5th International Conference & Exposition on Petroleum Geophysics, Hyderabad-2004, SPG**, pp. 81-84.

- 45) P.K. Bera, M. Ojha & **K. Sain**, 2004. Ambiguities in seismic wave velocity analysis and its AVO response in Gas Hydrate bearing sediments, *5th International Conference & Exposition on Petroleum Geophysics, Hyderabad-2004, SPG*, pp. 512-517.
- 46) **K. Sain**, F. Gao, G.R. Pratt & C.A. Zelt, 2004. Stratigraphy of sub-volcanic sediments using 2-D waveform tomography of wide-angle seismic data, *5th International Conference & Exposition on Petroleum Geophysics, Hyderabad-2004, SPG*, pp. 503-507.
- 47) **K. Sain**, S.I. Reddy, N.K. Thakur & C. Subrahmanium, 2002. Gas-hydrate investigations of NGRI – relevance for gas-hydrate quantification, *Proceedings of Indo-Russian Joint Workshop on Gas hydrates under ILTP* held in New Delhi, 2001, DOD, Govt. of India, pp. 166-175. <http://dod.nic.in/pro/gasright.htm>

#### (h) Papers Submitted/Under Revision/Preparation in SCI Journals

- 1) A. Tiwari, A. Paul, R. Singh, **K. Sain** & R. Upadhyay, 2022. Depth dependent seismicity and potential stress asperity associated with fluid driven crustal structure in central seismic gap, NW Himalaya, submitted.
- 2) Sunita Kumari, Jairam Singh Yadav, Kalachand Sain, Rakesh Bhambri, Sameer K. Tiwari, 2022. Reconciling Geothermal Reservoir Temperature of Kumaun Himalaya: Implications for Harnessing the Geothermal Energy, submitted.
- 3) A. Tiwari, **K. Sain** N. Kumar, A. Paul, A. Kumar & V. Shukla, 2022. Radon and seismic anomalies: Steady-state to dynamic progression of creep and slip (2021 Chamoli disaster), submitted.
- 4) P. Chauhan, **K. Sain**, M. Mehta & S. K. Singh, 2022. Cloudburst Triggered Flash Flood and Landslides on August 18, 2019 at Arakot Region in Uttarkashi district of Uttarakhand, submitted.
- 5) J.S. Yadav, S.K. Tiwari, **K. Sain**, R. Bhambri, P. Patidar & A. Baiswar, 2022. Inter-intra-seasonality of meteorological drivers of Chorabari Glacier, central Himalaya: a multi-proxy assessment of glacier-induced hazards, submitted.
- 6) P. Chauhan, D. Malviya, **K. Sain**, R.L. Ray and S.K. Singh, 2022. Assessing the vulnerability of watersheds to environmental degradation in the Lesser Himalayan region using a series of models, submitted.
- 7) R. Bhambri, S. Schmidt, P. Chand, M. Nüsser, **K. Sain**, S. Tiwari, & J.S. Yadav, 2022. Heterogeneity in glacier thinning patterns and slow-down of ice movement in the Garhwal Himalaya, India, submitted.
- 8) L. Pandey & **K. Sain**, 2022. Joint inversion of resistivity and sonic velocity logs using gradient descent method for estimates of gas hydrate saturation in the Krishna Godavari offshore basin, India, submitted
- 9) P.C. Kumar, **K. Sain**, & K. O. Omosanya, 2022. Dynamics of strike-slip faults within a fold-and-thrust triangle zone: insights from the Cenozoic succession of Upper Assam Basin, NE India, submitted.
- 10) S.K. Tiwari, **K. Sain**, J.S. Yadav, S.K. Rai, A. Kharya, V. Kumar & P. Sethy, 2022. Rejuvenation of Upper Ganga and Upper Yamuna Indian river systems during COVID-19 pandemic-induced lockdown, submitted.
- 11) C. Haldar, **K. Sain** & S. Kumar 2022. Seismic structure of the crust and upper mantle beneath the Kishtwar region, NW Himalaya, India using receiver function technique, submitted.
- 12) P. Chauhan, N. Singh, **K. Sain**, R. Ahmad, J. R. Yadav & S.K. Rai, 2022. Hydrologic behavior and biophysical controls in Pindar-Kafni glacier valleys, central Indian Himalaya, submitted.
- 13) P. C. Kumar, Nicolas Waldmann & **K. Sain**, 2022. Structural illumination of a submarine buried stratovolcano: a case study from offshore Taranaki Basin, New Zealand, submitted.
- 14) A. Verma, A. Kumar, S.K. Tiwari, R. Bhambri, **K. Sain** & S.K. Rai, 2022. Defining hydrological processes using meteorology and stable water isotopes from glacierized basins in Garhwal Himalaya, India, submitted.
- 15) Sushil Kumar, M. Parija, **K. Sain**, A. Biswas, A. Tiwari, N. Kumar, P. Kumar, S. Biswal, R. Singh, R. Sushil, 2022. Source parameters and moment tensor of the February 06 2017 Mw5.7 Garhwal earthquake: Emphasis on the Seismotectonics of the Garhwal Himalayan Region, India, submitted.
- 16) K. Bhaumik, Shiv Kumar, T. Behra, **K. Sain**, A. K. Gupta & P. Kumar, 2020. Palaeochannel sediments, a potential site for gas hydrate in the KG basin, India, submitted
- 17) V. Pandey & **K. Sain**, 2021. Estimating Seismic Q using the Centroid Frequency Shift method based on improved S-transform spectrum, in prep.



- 18) B. Mukherjee & K. Sain, 2021. Formation interface recognition using combined wavelet and Fourier transform of borehole data: A case study from Krishna-Godavari basin (NGHP-02 Expedition), in prep.
- 19) Madhab Biswas & K. Sain, 2021. Geometry of subsurface faults and deformational history from seismic data in F3 Block of North Sea, in prep
- 20) Rowtu Ramu & K. Sain, 2021. Appraisal of Faults by Using Seismic Attributes: A Study from Opunake field, Offshore Taranaki Basin, New Zealand, in prep.
- 21) Rowtu Ramu, K. Sain, & B. Mukherjee, 2021. Characterization and Quantification of gas hydrates in the Krishna Godavari Basin, eastern Indian margin, in prep.
- 22) Laxmi Pandey, M. Ojha & K. Sain, 2021. Borehole washout modelling and characterization of fractures: Inferences from expedition of NGHP-02 in Area-B of Krishna-Godavari basin, India, in prep.

A handwritten signature in blue ink, appearing to read 'K. Sain', with a horizontal line underneath it.