

- 1. Name** Dr. Kalachand Sain
- 2. Position:** Director, Wadia Institute of Himalayan Geology-DST, Dehradun  
Hon. Outstanding Prof. at Academy of Scientific & Innovative Research, Ghaziabad  
Former Head, Seismic Group at CSIR-NGRI, Hyderabad
- 3. Specialization:** Inversion, Modelling, Processing and Interpretation of Geophysical Data  
Seismic Traveltime & Full Waveform Tomography, Rock Physics  
Artificial Intelligence/Machine Learning, Attribute Characterization

**4. Research Interests:**

- Delineation, Characterization and Appraisal of Marine Gas-hydrates
- Glaciers/Glacier-lakes Dynamics in the Himalaya
- Evolution of Sedimentary basins and Geotectonics over Indian Provinces
- Imaging Sub-volcanic sediments (onshore and offshore)
- Seismotectonics and Geodynamics of Himalaya
- Assessment of Geothermal Energy resources
- Assessment of avalanches, GLOFs, landslides, flash floods, earthquakes
- Early warnings of Himalayan geo-hazards



- 5. Mailing Address:** Wadia Institute of Himalayan Geology  
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- 6. Date & Place of Birth:** 05-02-1964, Burdwan (West Bengal)

**7. 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			

**8. 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

**9. Supervision/Training/Teaching:**

- a. Supervision/Guidance to Ph.D. Students:** 13 awarded; 2 have submitted; 5 more are pursuing
- b. Training:** Imparted training & mentored for 70 Dissertations of Master students in App. Geophysics
- c. Teaching:**
- (i) Professor at the Academy of Scientific & Innovative Research (2012-2019)
  - (ii) Outstanding Professor at the Academy of Scientific & Innovative Research (2020- till date)
  - (iii) Guest Faculty at the University of Hyderabad (2006-2018)

- (iv) Guest Lecturer at Al-Habeeb College of Eng. & Tech, Hyderabad (2015-16)
- (v) Guest Faculty at the Rajasthan Technical University at Kota, Rajasthan (2013-2015)
- (vi) Explains to public and school-students about the mysteries of Solid Earth & Ocean

## 10. Major Scientific Achievements

Developed several innovative approaches and addressed diversified challenges through acquisition and procurement of geoscientific data, and application of methodologies in following areas:

- **Identified and characterized gas-hydrates** (future major potential energy resources) in Krishna-Godavari (KG), Mahanadi and Andaman offshore basins, presence of which were later validated with drilling and coring by Indian National Gas Hydrates Program
- **Estimated and projected a great promise of gas-hydrates to energy security of India**, and also **assessed critical parameters** (porosity, permeability, pore pressure) that are **pre-requisite for development of** geology-specific and economically-viable **production technology**
- **Developed AI-enabled novel approaches**, first of its kind, **for semi-automatic delineation of subsurface geologic features**: fault system, gas plume, mass transport deposit, dyke, sill, magma ascent, carbonate reef, channel, fluid plumbing from high-resolution 3D seismic data off India, New Zealand, Norway, and Australia
- **Imaged large-scale velocity-structures of sub-volcanic sediments** (may be oil prospective) in western Indian onshore and offshore by travelttime tomography of wide-angle seismic data, **probing of which have been rather difficult** by conventional geophysical tools
- **Developed full waveform tomography** of wide-angle seismic data, **first time in India**, for imaging subsurface finer details, which could delineate fine-scale velocity-structure of sub-volcanic sediments in Kerala-Konkan and gas-hydrates bearing sediments in KG offshore
- **Identified 40 geo-thermal springs (GTS)** with their estimated reservoir temperatures and energy potential equivalent to 10,600 MW power in Kumaun-Garhwal Himalaya, which can be utilized **for space heating, balenotherapy and generation of green electricity** in hilly areas
- **Mapped landslide risk zones** in the Kumaun-Garhwal Himalaya that can be converted into land-use maps as input to city planners and decision makers **for development of green corridors**
- **Demonstrated subsurface hydrological imbalance to the reasons for land sliding and surface-cracks development at Joshimath (2023)** in UK Himalaya by establishing a link between subsurface features with the surface observations through an integrated geological and geophysical surveys
- **Explained scientific causes of recent (2021-2023) climate-induced phenomena**: (a) ice-rock mass avalanche (2021) in Chamoli; (ii) snow avalanches (2022) in Kedarnath temple town and Hemkund Sahib shrine; (iii) Flash Floods (2022-2023) in Maldevta-Dehradun, Dharchula-Pithoragarh, Arakot-Uttarkashi in UK, Mcleodgunj in HP, and Amarnath holy cave in J&K Himalayas, and suggested for their mitigation
- **Identified precursory events, first of its kind**, before the main ice-rock mass detachment in 2021 at Chamoli on seismological data, **which can be coupled with the hydro-meteoro-seismological data** for real-time monitoring through transmission of field data to lab **and development of an Early Warning System against glacial hazards**
- **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, Kumaun-Garhwal Himalaya, Indo-Gangetic Plains, Bengal basin, Mahanadi delta, upper Assam basin, and Andaman subduction zone, and provided answers to some basic questions on basin evolution, geodynamics, seismotectonics, and internal structures of the Earth
- **Delineated plate geometry at collision/subduction boundaries** for understanding seismogenesis in Himalayan collision and Andaman subduction zones
- **Projected hydrocarbon and renewable energy Resources of India** as a measure of climate change mitigation and Energy Security through an edited volume "Emerging Energy Resources in India", published by Geological Society of India
- **Developed trained manpower in contemporary tools** like seismic tomography, full-waveform inversion, attribute characterization, AVO modeling, prestack depth migration, rock physics, and AI/ML
- **Established Gas Hydrates Research Center at CSIR-NGRI**, Hyderabad in 2010 with world-class facilities for processing and modeling of geophysical data, and Laboratory studies for dissociation and formation kinetics of gas-hydrates.

- **Established AI Centre of Excellence at WIHG**, Dehradun in 2020 for analysis and advanced interpretation of Geosciences data, and providing solutions to industry-challenges, building institute-industry partnership and realizing the Himalayan geo-hazards
- **Led Scientific Cruises** (i) off Goa and Cochin in 2007 for **heat-flow studies**, (ii) in KG and Mahanadi basins in 2010 for **gas-hydrates investigation**, and (iii) off Andaman island in 2017 for **comprehending seismotectonics and subduction zone phenomena, respectively**
- **Participated Indo-Russian Joint Expedition** both in summer (2005) and winter (2006) and **recognized attenuation characteristics from known gas-hydrate reservoirs in Lake Baikal**, knowledge of which was later applied for the **investigation of gas-hydrates in the Indian offshore**
- **Leading a Project** on “**Characterization and Assessment of surface and subsurface Processes in Himalaya (CAP-Himalaya) for Geo-hazards, Natural resources & Geodynamics**”

## 11. Chair Person / Member of National Committees/Research Advisory/Board of Studies

### a. Chair Person in National Committees

- (i) **Convener** of Sectional Committee IV (Earth & Atmospheric Sciences) of INSA; (ii) **Expert Committee of Intensification of Research in High Priority Areas (IRHPA) for Earth & Atm. Sciences (E&AS)** under SERB-DST (2022-now); (iii) **Program Advisory Committee on Sustainable Habitat domain of Impacting Research Innovation & Tech. (IMPRINT)** in E&AS of MHRD-DST Scheme (2022-now); (iv) **Program Advisory Committee (PAC)** for Core Research Grant in E&AS of SERB-DST (2022-now); (v) **Committee on ‘SERB International Research Experience (SIRE)’ Program** in E&AS of SERB-DST (2021-now); (vi) **Screening Committee for Promoting Opportunities for Women in Exploratory Research (POWER)** in E&AS of SERB-DST (2022-now)

### b. Core Member of National Committees

- (i) **PAC on Scientific & Useful Profound Research Advancement (SUPRA)** in E&AS of SERB-DST (2022-now); (ii) **Selection Committee of Visiting Advanced Joint Research (VAJRA) Faculty Scheme** in E&AS of SERB-DST (2022-now); (iii) **Scheme for Transformational & Advanced Research in Science (STARS)** of Min. of Edu. (2022-now); (iv) **DST Fund for Improvement of S&T Infrastructure (FIST) Program** (2019-now); **Expert Member of (v) Steering Committee for Sophisticated Analytical Instrument Facilities (SAIF)** of DST (2022-now); (vi) **PAC-DST for International Sci. & Tech. Cooperation** in area of Water, Ocean & Atm. Sciences (2021-2024); (vii) **National Committee** on coastal & deep sea mining, renewable offshore energy and R&D of MoES – promotion of **Blue Economy** (2022-now); (viii) **Expert Committee of Climate Change Program (CCP)** of DST (2021-now); (ix) **Steering Committee of UNFCCC** for adaptation (2021-now); (x) **Standing Committee on Geosciences** under Space Application Management System, PSA to GoI (2021-now); (xi) **National Review Committee – IODP India** (2022-now); (xii) **High Powered Committees** of CSIR, MoES, DST, Science Academies (INSA, IAS, NASI) (2020-now); (xiii) **NICES-Program Management Council** at Natl. Remote Sensing Center (2019-2022), Hyderabad; (xiv) **National Gas Hydrates Program** (2000 – till date)

### c. Member of Governing Body/Research Council/Board of Studies

- (i) **Governing Council** of Indian Institute of Geomagnetism, Mumbai (2023-now); (ii) **Governing Body and Research Advisory Council** of ESSO-NCESS, Trivandrum (2022-now); (iii) **Mentor Cohort for Academic Framework** at NSB Univ. of Excellence, Sikkim (2021-2024); (iv) **Scientific Advisory Committee** (2020-2023) at GB Pant Natl. Inst. of Himalayan Env., Almora; (v) **Research Advisory Committee** (2020-2023) at Himalaya University, Dehradun; (vi) **Advisory Committee** (2020-2023) for Earth Sci. Dept. at Central Univ. of Jammu; (vii) **Board of Research Studies (Science)** at Assam University at Silchar, (2023-now); (viii) **Council Member** of Geol. Soc. of India (2019-2022-2025); (ix) **Board of Studies** for M.Sc. (Tech) in App. Geophys. at IIT-ISM (2006-2008); (x) **Board of Studies** for M.Sc. in Dept. of Geology at Aligarh Muslim University (2023-now); (xi) Member to prepare 15-years Vision Document of DOD (2000); (xii) Member to prepare 10th, 11th, 12th FYP of CSIR on Hydrocarbons & Gas-hydrates; (xiii) **Research Advisory Committee** of DOD (2002-2004).

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

### a. Awards/Medals/Prizes:

- (i) **Excellence in Research Award** (2023) by Dehradun International Science & Technology Festival; (ii) **Best Paper Award** (2023) by WIHG-DST; (iii) Uttarakhand **Ratan Shree Award** (2022) by UK State Govt.; (iv) **Best Paper Award** (2022) by WIHG-DST; (v) **National Award of Excellence in Geosciences** (2021) by MoES; (vi) **Best Paper Award** (2020) for ONGC Bulletin; (vii) **Sriram**

**Srinivasan Award** (2019) by Association of Exploration Geophysicists; (viii) **Prof. Jagdeo Singh Memorial Best Paper Award** (2018) and **NN Chatterjee Award** (2010) by Geol. Soc. of India; (ix) **Distinguished Alumnus Award** (2017) by IIT(ISM); (x) **Decennial Award** (2016), **Anni Talwani Memorial Prize** (2014) and **Krishnan Medal** (1996) by IGU; (xi) **Best Paper Award** (2012) by International Association of Gondwana Research; (xii) **AP Scientist Award** (2011); (xiii); **Best Poster Award** (2007) by Petrotech Int. Conf. & Exp. on Oil & Gas; (xiv) **National Mineral Award** (2005) by Min. of Mines; (xv) **Best Paper Medal** (2002) by AP Academy of Sci.; (xvi) **Swarnajayanti Project Award** (2001) by DST; (xvii) **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) **Krishnanunni Memorial Lecture** (2023) of Natl. Instt. of Adv. Studies; (ii) **Foundation Day** (2023) at Assam University, Silchar; (iii) **V.V. Sastri Memorial Lecture** (2022) of Geol. Soc. of India; (iv) **Foundation Day Lecture** (2022) at GSI-Dehradun; (v) **Prof. K.N. Khatri Memorial Lecture** (2021) at IIT-Roorkee; (vi) **National Science Day Lecture** (2020) at CSIR-CBRI, Roorkee; (vii) **Prof. Jagdeo Singh Memorial Lecture** (2019) of IIT(ISM), Dhanbad; (viii) **Dr. M.N. Bose Memorial Lecture** (2019) of BSIP, Lucknow; (ix) **CSIR Foundation Day Lecture** (2019) at CSIR-IIP, Dehradun; (x) **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) **Secretary General** of Federation of Indian Geosciences Association (2022-2025); (v) **Alternate Delegate of Asia Pacific Region to AAPG House of Delegates** (2015-2017); (vi) **Hon. Secretary** of IGU (2014-2020); (vii) **Treasurer** of Federation of Indian Geosciences Association (2014-2019); (viii) **Vice President** for Soc. of Petroleum Geophysicists, Hyderabad Chapter (2011-2014); (ix) **Thesis Supervisor** at Univ. of Hyderabad (2011 onward), Andhra University (2011 onward) and Osmania University (2007 onward); (x) **Chief Scientist** for three cruises (2007, 2010 & 2017); (xi) **Bureau Member of Int. Lithosphere Program** under IUGG (2007-2015); (xii) **Among 50 Emerging Stars** (2003) by 'The Week' Magazine; (xiii) **1<sup>st</sup> Place** in 'Science Writing in Hindi' (2002) by CSIR.

### 13. Services

#### a. Membership of Professional Scientific Bodies:

(i) Active Member of **AAPG** (2012 -2020); (ii) Active Member of **SEG** (2015 - now); (iii) Member of **Asia Oceania Geosci. Soc.** (2003 – now); (iv) Member of **AGU** (2001-2004; 2013-2016); (v) Life member of **Indian Geophys. Union** (1996-now), (vi) Life member of **Indian Sci. Cong. Ass.** (1997-now); (vii) Member of **Indian Geological Congress** (2009-now).

#### b. Editorial Board:

(i) **Subject** (Earth & Planetary Sciences) **Editor Indian Jour. of INSA** (2024-2027); (ii) **Subject** (Applied Geology, Environment) **Editor Indian Jour. of Pure & App. Physics** (2022-2025); (iii) **Patron of Jour. of Himalayan Geology** (2019 onward); (iv) **Jour. Geol. Soc. India** (2011 onward); (v) **Int. Jour. Earth Sci. & Eng.** (2008 onward); (vi) Open Access **Jour. of Geophys. & Remote Sensing** (2013 onward); (vii) **Executive Editor** of Jour. of Indian Geophys. Union (2014 - 2016); (viii) **Episodes** (2007 - 2011); (ix) **Geohorizons** (2007 - 2011); (x) Open Access **Int. Jour. of Geosci. Res.** (2013 -)

#### c. Volume Editor:

(i) **1 Authored volume** on 'Analysis and Interpretation of Borehole logs', **Wiley and in progress (2024)**; (ii) **1 Authored volume** on 'Meta-Attributes' & Artificial Networking' (2022), **Wiley & AGU**, p.262; (iii) **1 Authored volume** on 'Active Seismic Tomography' (2023), **Wiley, P.124**; (iv) **2 Authored volumes** on (a) Evaluation of Gas-hydrates (2012) and (b) Attenuation characteristics of Gas-hydrates (2017), both by **Lambert Academic Publishing**; (v) **1 Edited volume** on 'AI/ML in Earth System Sciences', **JESS and in progress (2024)**; (vi) **1 Edited Volume** on 'Integrated Studies on Glacier Hydrology', **Frontiers in**



Earth Science and in progress (2024); (vii) **1 Edited volume** on Emerging Energy Resources in India (2022), **Geol. Soc. of India**, p.222; (viii) **3 Edited volumes** (2011, 2014, 2019) on 'Gas-hydrates', **Marine & Petroleum Geology, Elsevier**; (ix) **Section (Seismic) Editor** for the 1<sup>st</sup> (2011) & 2<sup>nd</sup> (2021) Edition of the Encyclopaedia of Solid Earth Geophysics, Springer.

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

(i) Organized a Pre-Congress Workshop on 'Himalayan Hazards and Way Forward' on Nov. 24 at WIHG, convened a Special Session on the 'Joshimath Episode' on Nov. 29, and co-chaired a Plenary Session on 'Resilience & Sustainable Development in the Himalaya' on Nov. 30 during the 6th World Congress on Disaster Management in Dehradun (2023); (ii) **Organized the 42<sup>nd</sup> Annual Convention** of Ass. of Expl. Geophysicists (AEG) at WIHG during Dec. 2-3, 2021; (iii) **Organized 7<sup>th</sup>** (September 12-14, 2023), **6<sup>th</sup>** (June 7-9, 2022), **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 Meet**; (iv) **Organized the 3<sup>rd</sup>** (November 16-18, 2022 at WIHG, Dehradun), **2<sup>nd</sup>** (October 13-16, 2019 at CSIR-NGRI, Hyderabad) and **1<sup>st</sup>** (November 8-10, 2016 at IIT-ISM, Dhanbad) **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 9<sup>th</sup> International Methane Hydrates R&D Workshop** in Hyderabad during November 9-12, 2014; (vii) **Convened International Workshop on Exploration & Exploitation of Shale Gas** in Hyderabad during December 19-20, 2012; (viii) **Organized an Indo-Russian Seminar on Gas Hydrates** at NIOT, Chennai during February 4-5, 2007; (ix) **Organized/convened 25 sessions in International/ National Seminars/ Conferences**; (x) **Chaired 45 sessions**; (xi) **Delivered 80 offline & 40 online invited/ keynote/ plenary talks**; (xii) **Attended 122 conferences**; (xiii) **Taught Courses on 'Seismic Tomography' at International Conference & Exposition of SPG-India, 2015; 'Seismic Modeling' at International Conference & Exposition of SPG-India, 2017; 'Non-seismic techniques in hydrocarbon exploration' at International Conference & Exposition of GEO-India, (Oct, 12, 2022)**; (xiv) **Organized International Workshop on 'Assessment & Mitigation of Landslides' (Oct 28-29, 2020) at WIHG**; (xv) **Convened E-Workshop on 'Luminescence dating & New Applications' (Nov 25-27, 2020) at WIHG**; (xvi) **Conducted a pre-Convention Workshop on AI for advanced interpretation of 3D Seismic Data (Dec 1, 2021) at 42<sup>nd</sup> AEG; a pre-Congress Workshop on AI applications to Geosciences (Nov 15, 2022) at 3<sup>rd</sup> FIGA**; (xvii) **Organized One-Day Indo-Norwegian Webinar on Himalayan Geo-hazards & Georesources (June 1, 2022)**; (xviii) **Organized One-Day Indo-Russian Webinar on Seismic Forecasting (June 30, 2022)**.

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

(i) **INR 68 Crores** worth 3D seismic data in fore deep and foothills of Himalaya **from DGH, Noida**; (ii) **INR 15 Lakhs from SERB-DST** under JC Bose National Fellowship every year for 5 years (2021-2025); (iii) **INR 21 Lakhs from Uttarakhand State Disaster Management Authority** for studying Vasudhara Tal, Purvi Kamet (Raykana) Glacier in Dhauliganga valley, Uttarakhand (2021-2022); (iv) **INR 184 Lakhs from Uttarakhand State Disaster Management Authority** for long-term monitoring of Gongotri glacier, Uttarakhand (2021-2024); (v) **INR 4886 Lakhs from MoES** for investigation of gas-hydrates (2007 - 2017) (PL); (vi) **INR 60 Lakhs from OIDB** for quantification on gas-hydrates (2007 - 2012) (PL); (vii) **INR 36 Lakhs** under **Swarnajayanti Project from DST** for delineation & assessment of gas-hydrates (2002 - 2006) (PL); (viii) **INR 25 Lakhs by MoES** for understanding petroleum system of gas hydrates in KG basin (2014-2017) (PL); (ix) **Procured INR 92 Crores** worth ocean bottom & multi-channel seismic data **from ONGC-Mumbai** in Kerala-Konkan offshore for the investigation of sub-volcanic sediments (2015-2018) (PL); (x) **PL of MLP Project on "Gas Hydrates & Conventional Hydrocarbons"**; (xi) **Nodal Officer** of GENIAS, and **PL** of SHORE & GEOSCAPE - important projects under 12th FYP of CSIR.

**f. 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).

**g. Interviews/Conversations in Media, Lectures, and Articles in Newspapers/Magazines: > 125**

(available in websites and YouTube on diversified topics: climate change and consequences; geo-hazards due to landslides, avalanches, lakes outbursts, flash floods, earthquakes, etc.; early warnings and disaster risk reduction; seismotectonics, geotectonic and basin evolution; hydrocarbons in Himalayan thrust fold belts; unconventional gas-hydrates; geothermal energy resources; imaging sub-volcanics; advancement of geophysical tools; application of AI/ML to Geosciences.

#### 14. 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.

#### 15. National and International Collaboration:

(i) Indo-UK (2018 -2022): Dr. K. Sain & Prof. Tiago M. Alves, Cardiff University, UK; (ii) CSIR-NGRI & ONGC Joint Study (2013-2018): 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, 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

#### 16. Patent Granted:

A patent on 'Borehole Acoustic Televiwer Probe' (Design No. 6318405) by Bappa Mukherjee and Kalachand Sain, granted by the UK Intellectual Property Office on October 18, 2023 [<https://www.registered-design.service.gov.uk/find/>]

A patent on 'Borehole AI Televiwer Probe' (Design No. 6323496) by Bappa Mukherjee and Kalachand Sain, granted by the UK Intellectual Property Office on November 14, 2023 [<https://www.registered-design.service.gov.uk/find/>]

A Copyright on 'Borehole Acoustic Televiwer Probe' (Registration No. L-146503/2024) by Bappa Mukherjee and Kalachand Sain, has been granted by Copyright Office, Govt. of India on April 9, 2024

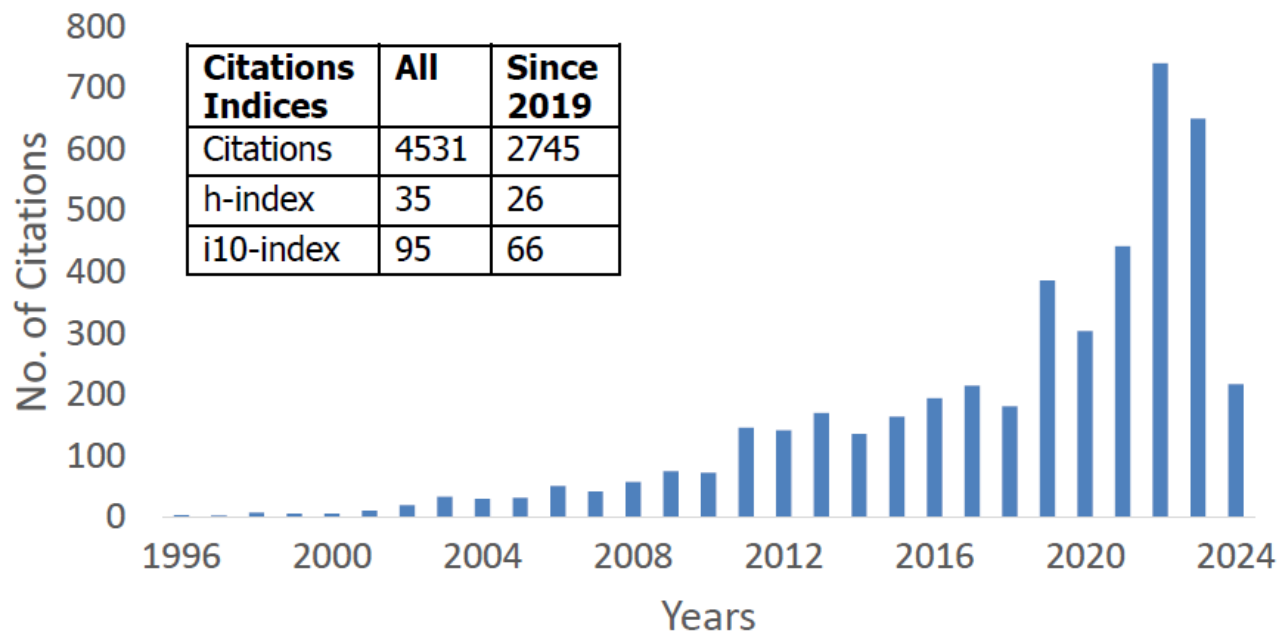
A document on "Semi-automated Lithological Edge Recognition Method from Geophysical Logs Assisted by Synergistic Implementation Multi-resolution Analysis and Hampel Filter" has been filed by Bappa Mukherjee and Kalachand Sain for US patent at the United States Patent and Trademark Office (USPTO) on 08.09.2023 (Application Number 18/243,698)

#### 17. Publications at a glance – 343 Peer-reviewed articles – 246

SCI Papers – 205; Authored Books – 5; Edited Volumes: – 7; Book Chapters – 26; Non-SCI Papers/Reports – 100; Papers submitted – 17

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|---|---|
| (i) Science (IF=47.73) – 1                            | (xxi) Am. Assoc. of Petrol. Geol. Bull. (IF=3.86) – 1 |
| (ii) Science of the Total Env. (IF=10.75) – 1         | (xxii) Jour. of Geophys. Research (SE) (IF=3.85) – 2  |
| (iii) Renewable Energy (IF=8.63) – 1                  | (xxiii) Tectonophysics (IF=3.66) – 1                  |
| (iv) Sustble. Enrgy Tech. Assmt. (IF=8.00) – 1        | (xxiv) Marine Geology (IF=3.55) – 2                   |
| (v) Geology (IF=6.32) – 1                             | (xxv) Jour. of Asian Earth Sciences (IF=3.45) – 5     |
| (vi) Gondwana Research (IF=6.15) – 1                  | (xxvi) Tectonophysics (IF=3.93) – 1                   |
| (vii) Jour. of Hydrology: Reg. Study (IF=5.44) – 1    | (xxvii) Geo-mech-phys-energy resources(IF=3.7) – 15   |
| (viii) Earth & Planetary Science Letter (IF=5.26) – 1 | (xxviii) Royal Soc. of Chem. Adv. (IF=3.25) – 1       |
| (ix) Env. Sci. & Pollution Res. (IF=5.19) – 1         | (xxix) Frontiers in Earth Science (IF=3.23) – 1       |
| (x) Precambrian Research (IF=5.09) – 1                | (xxx) Env. Monitoring & Assessment (IF=3.21) – 1      |
| (xi) Scientific Reports (IF=4.98) – 4                 | (xxxi) Geophysical Jour. International (IF=2.93) – 12 |
| (xii) Jour. of Natural Gas Sci. & Engg. (IF=4.97) – 8 | (xxxii) Marine Geophys. Researches (IF=2.69) – 11     |
| (xiii) Geocarto International (IF=4.90) – 1           | (xxxiii) Mar. Georesources & Geotech. (IF=2.67) – 1   |
| (xiv) Geological Society of America (IF=4.5) – 1      | (xxxiv) Episodes (IF=2.49) – 2                        |
| (xv) Jour. of Petrol. Sci & Engg. (IF=4.35) – 2       | (xxxv) Jour. of Geodynamics (IF=2.35) – 2             |
| (xvi) Mar. & Petrol. Geology (IF=4.35) – 16           | (xxxvi) Pure & Applied Geophysics (IF=2.34) – 6       |
| (xvii) Basin Research (IF=4.31) – 1                   | (xxxvii) Acta Geophysica (IF=2.29) – 1                |
| (xviii) Geothermics (IF=4.28) – 1                     | (xxxviii) Geological Journal (IF=2.13) – 2            |
| (xix) Earth Surface Process & Landform (IF=3.96) – 1  | (xxxix) Jour. of Applied Geophysics (IF=2.12) – 5     |
| (xx) Sustainability (IF=3.89) – 1                     | (xl) Jour. of Earth System Science (IF=1.95) – 6      |

- (xli) Environmental Geotechnics (IF=1.93) – 1  
 (xlii) Petrol. & Petrochem. Eng. Jour. (IF=1.87) - 1  
 (xliii) Arabian Jour. of Geosciences (IF=1.83) – 3  
 (xliv) Geophysics (IF=1.80) – 3  
 (xlv) Advances in Geosciences (IF=1.70) – 1  
 (xlvi) J. of Acoustic Soc. of America (IF=1.57) – 1  
 (xlvii) Jour. of Geol. Soc. of India (IF=1.46) – 39  
 (xlviii) Himalayan Geology (IF=1.29) – 7  
 (xlix) Carbonates & Evaporites (IF=1.30) – 1  
 (l) Current Science (IF=1.10) – 17  
 (li) Exploration Geophysics (IF=0.94) – 3  
 (lii) Chinese Journal of Geophysics (IF=0.85) – 1  
 (liii) Interpretation (IF=0.61) – 1  
 (liv) Jour. of Seismic Exploration (IF=1.83) – 2  
 (lv) Proceedings of INSA (IF=0.87) – 6  
 (lvi) Environmental Process (IF=0.57) – 1  
 (lvii) Indian Jour. of Geo-Marine Sci. (IF=0.49) – 1  
 (lviii) Geosystems and Geoenvironment – 2  
 (lix) Int. Jour. of Earth Sci. & Engg. – 2  
 (lx) Results in Geophysical Sciences – 2  
 (lxi) Artificial Intelligence in Geosciences – 2  
 (lxii) Memoir Geol. Soc. of India – 3  
 (lxiii) Jour. of Indian Geophys. Union – 7  
 (lxiv) Jour. of Earth Sci. & Engineering – 1  
 (lxv) Encyclopedia of Solid Earth Geophys. – 4 Ch  
 (lxvi) Encyclopedia of Natural Hazard – 1 Ch  
 (lxvii) Geological Soc. of America, Sp. Paper – 1 Ch  
 (lxviii) Earth's Magnetic Interior, Springer Book – 1 Ch  
 (lxix) Earth's System Process, Springer Book – 1 Ch  
 (lxx) Memoir, geol. Soc. of India – 3 Ch  
 (lxxi) Basics of Computational Geophysics – 2 Ch



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

## 18. Full List of Publications:

### (a) SCI Papers

- 1) A. Tiwari, **K. Sain**, N. Kumar, A. Paul, A. Kumar & V. Shukla, 2024. Seismic and Radon signatures: A multi-disciplinary approach to monitor surface dynamics of a hazardous 2021 rock-ice avalanche, Chamoli Himalaya, **Earth Surface Processes and Landforms**, accepted.
- 2) S. Kumar, S Chowdhuri, S. Mohanty, **K. Sain**, M. Mukherjee, P. Kumar, A.K. Gupta, & A.K. Bhaumik, 2024. Accumulation of gas-hydrates in mass transport deposit at Krishna-Godavari basin, Bay of Bengal: Foraminiferal, Sedimentological, and Seismic Evidence, **American Association of Petroleum Geology Bulletin**, accepted.
- 3) **K. Sain**, D. Hazarika, K. Sen & RJG Perumal, 2024. Status of Geo-scientific research at Wadia Institute of Himalayan Geology, Dehradun during 2020-2023, **Proceedings of the Indian National Science Academy**, accepted.
- 4) J. Kumar, B. Mukherjee & **K. Sain**, 2024. Porosity prediction using ensemble machine learning approaches: A case-study from Upper-Assam basin, **Jour. of Earth System Sci.**, accepted.
- 5) A. Kumar, **K. Sain**, K. Kumar, P. Patidar, Meenakshi, A. Reza, A. Verma & A. Mishra, 2024. Anticipating impact of glaciers, landslides and extreme climatic events on vulnerable hydropower projects and the development of an integrated multi-hazard warning system (IMWS), **Sustainable Energy Technologies and Assessments**, accepted.

- 6) **K. Sain**, 2024. Disasters in Himalaya: Landslides, Avalanches, Flash-floods, Earthquakes, and their Plausible Mitigation with reference to the UK Himalaya, *Jour. Geol. Soc. of India*, accepted.
- 7) B. Mukherjee & **K. Sain**, 2024. Semi-automated rock layer recognition from borehole log data using combined wavelet and Fourier transform: A case study in the KG basin, India, *Jour. Geol. Soc. of India*, in press.
- 8) A. Mishra, A. Kumar, **K. Sain**, A. Verma & P. Patidar, 2024. Glacier changes and fragmentation in Birahi Ganga Basin, Garhwal Himalaya: Implications for water resources, *Jour. Geol. Soc. of India*, in press.
- 9) R. Ravindra, A.V. Kulkarni, A.P. Dimri, **K. Sain**, M.C. Sharma, A. Banerjee, P. Sharma, T. Meloth, I. Rashid, N.C. Pant, 2024. Recent Indian studies in Himalayan cryosphere, **Proceedings of the Indian National Science Academy**, Published Online, <https://doi.org/10.1007/s43538-024-00237-6>, 1-12.
- 10) P. Chauhan, M. E. Akiner & **K. Sain**, 2024. Forecast future disasters from hydro-meteorological datasets in the Yamuna river basin, western Himalaya using Markov Chain and LSTM approach, *Artificial Intelligence in Geosciences*, 5:100069, 1-23.
- 11) B. Mukherjee, P.K.R. Gautam & **K. Sain**, 2024. Machine learning assisted GPS velocity proxy: A case study over the Tibetan Plateau and its surroundings, *Jour. of Asian Earth Sciences*, 262, 106004: 1-16.
- 12) S. Konar, B. Mukherjee & **K. Sain**, 2024. Machine learning assisted gas hydrate saturation proxy: A case study from KG basin, India, *Himalayan Geology*, 45(1), 89-107.
- 13) G. Rawat, K. Mohan, S. Damodaran, H. Dadhich, P. Chingtham, **K. Sain** & O.P. Mishra, 2023. Geoelectric characterization of the junction of seismically active Delhi-Hardwar ridge and Delhi Sargoda ridge, *Scientific Reports*, 13:18488, 1-11.
- 14) A.K. Gupta, P. Mandal, D. Srinagesh, A. Tiwari, **K. Sain** & A. Paul, 2023. One dimensional regional shear velocity structure from joint inversion of fundamental mode group velocity dispersion measurements of Love and Raleigh waves – application to the Uttarakhand Himalaya, *Acta Geophysica*, 71(12), 2619–2632.
- 15) S.K. Tiwari, **K. Sain**, S. Kaur, J.S. Yadav, A. Baiswar, 2023. Degassed versus consumed flux of CO<sub>2</sub> from the third pole, *Jour. Geol. Soc. of India*, 99, 1305-1308.
- 16) M. Biswas & **K. Sain**, 2023. Surin-Mastgarh Anticline in NW Himalaya from 2D seismic data, and its Implication on Geotectonics and Hydrocarbon Exploration, *Jour. of Asian Earth Sciences*, 257:105840,1-15.
- 17) P.C. Kumar, J. Kumar & **K. Sain**, 2023. Cenozoic tectonic subsidence in the Upper Assam Basin: A case study from NE India, *Geosystems and Geoenvironment*, 3: 100223,1-14.
- 18) N. Kumar, C. Haldar, **K. Sain**, 2023. Seismological evidence for intra-crustal low velocity and thick mantle transition zones in the NW Himalaya, *Jour. of Earth System Sci.*, 132, 89:1-14
- 19) P. Yadav, D.K. Singha & **K. Sain**, 2023. Rock physics modeling for estimation of gas hydrate saturation using NGHP-02 well data in the Krishna-Godavari basin, *Pure & App. Geophys.*, 180(8):1-20.
- 20) A. Kumar, A. Verma, S.K. Tiwari, R. Bhambri, **K. Sain**, S.K. Rai, P. Patidar, 2023. Heterogeneity in glacio-hydrological processes and estimation of different components in streamflow from central Himalayan glaciers, *Jour. of Hydrology: Regional Studies*, 49, 101495: 1-25.
- 21) J. Kumar, P.C. Kumar & **K. Sain**, 2023. Appraisal of reservoir porosity using a machine learning approach: A study from the Eocene-Miocene interval of Upper Assam Basin, NE India, *Geological Journal*, 58:4181–4193.
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- 24) A. Tiwari, P. Kumar, **K. Sain** & A. Paul, 2023. Possible implications of the recent M6.3 Doti earthquake for seismicity monitoring in the Himalayan central seismic gap, *Himalayan Geology*, 44(2), 57-63.



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- 26) S. Kumari, J.S. Yadav, **K. Sain**, R. Bhambri & S.K. Tiwari, 2023. Assessment of geothermal potential of Kumaun Himalaya: A perspective for harnessing green energy, **Renewable Energy**, 212:940-952.
- 27) J. Kumar, P.C. Kumar & **K. Sain**, 2023. Identification of oil-water contact from 3D seismic reflection data of the Upper Assam Basin, NE India, **Geological Journal**, Published Online, DOI: 10.1002/gj.4789, 1-11.
- 28) A. Verma, **K. Sain** & A. Kumar, 2023. Environmental changes in Antarctica using a shallow ice core from Dronning Maud Land (DML), East Antarctica, **Environmental Process**, 10:22,1-21.
- 29) P. C. Kumar, J. Kumar & **K. Sain**, 2023. Subsurface fluid flow: A case study from the Indo-Gangetic Peripheral Foreland Basin, **Results in Geophysical Sciences**, 14, 100057:1-12.
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- 32) A. Gupta, P. Mandal & **K. Sain**, 2023. Modeling of earthquake source parameters and scaling relations in the Uttarakhand Himalayan region, India, **Jour. of Earth System Sci.**, 13273:1-11.
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- 34) B. Mukherjee & **K. Sain**, 2023. A comparative study on appraisal of lithological boundaries and litho-models using well log data at Bhogpara oil field in Assam of NE India, **Petrol. & Petrochem. Eng. Jour.**, 7(1):000335, 1-15.
- 35) **K. Sain**, 2023. Geo-hazards in the Himalaya and remedial measures: some observations in the light of recent developments at Joshimath, Guest Editorial, **Current Science**, 124(6), 659-660.
- 36) R. Bhambri, S. Schmidt, P. Chand, M. Nüsser, **K. Sain**, S.K. Tiwari, & J.S. Yadav, 2023. Heterogeneity in glacier thinning and slowdown of ice movement in the Garhwal Himalaya, India, **Science of the Total Environment**, 875:162625,1-16.
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- 38) J. Kumar & **K. Sain**, 2023. Empirical mode decomposition approach for delineating gas hydrates and free gas in Mahanadi Offshore, eastern Indian margin, **Exploration Geophysics**, 54(1), 88-100.
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- 41) **K. Sain**, M. Mehta & V. Kumar, 2023. Avalanche hazards in Kedarnath temple town, Mandakini river valley, UK state of India – a case study, **Jour. of Geol. Soc. of India**, 99:173-176.
- 42) C. Haldar & **K. Sain**, 2023. The P-receiver function technique, **Himalayan Geology**, 44(1), 106-116.
- 43) Laxmi Pandey & **K. Sain**, 2022. Porosity mapping of shallow subsurface sediments: a case study from the offshore Mahanadi basin, India, **Exploration Geophysics**, 53(5), 517-531.
- 44) A. Baiswar, J.S. Yadav, **K. Sain**, R. Bhambri, A. Pandey, S.K. Tiwari, 2022. Emission of greenhouse gases due to anthropogenic activities: an environmental assessment from paddy rice fields, **Env. Sci. & Pollution Res.**, 30:37039–37054.
- 45) P. Chauhan, D. Malviya, **K. Sain**, R.L. Ray, S.K. Singh & D. Singh, 2022. Assessing the vulnerability of watersheds to environmental degradation in the Lesser Himalaya using a series of models, **Jour. of Geocarto Int.**, 37(27), 18372-18399.
- 46) P. C. Kumar & **K. Sain**, 2022. Seismic Texture of Tertiary successions: insights from Tipam and Barail Formations in the Upper Assam Basin, NE India, **Jour. Geol. Soc. of India**, 98:1671-1679.
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- 52) L. Montagnani, N. Singh, M. Shekhar, B. R. Parida, A. K. Gupta, **K. Sain**, S. K Rai, A. Braeuning, J. Singh Charkaborty, V. Sharma, R. K. Tiwari, P. Chauhan, 2022. Tree-ring isotopic records suggest seasonal importance of moisture dynamics over glacial valleys of the Central Himalaya, **Frontiers in Earth Science**, 10:868357, 1-18.
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- 59) 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.
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#### (h) Papers Submitted/Under Revision/Preparation in SCI Journals

- 1) **K. Sain**, P. Chauhan, P. Bisht, & S. Vaideswaran, 2024. Cloudburst-caused flash floods in Lasko valley, Pithoragarh district at India-Nepal border, submitted.
- 2) N. Singh, B.R. Parida, M. Shekhar, **K. Sain**, A. Bräuning, J.S. Chakraborty, M. Aquib, & S. Kanjilal, 2024. Pronounced Increase in Carbon Sequestration at the Cost of Water Cycle in Central Himalayan Glacial Valleys, submitted.
- 3) Rowtu Ramu, **K. Sain** & M. Abioui, 2024. Fault analysis based on similarity attribute using Neural Network Application “a case study from offshore Taranaki basin, New Zealand, submitted.
- 4) J. Kumar & **K. Sain**, 2024. Seismic attributes for elucidation of subsurface structures: A case study from Upper Assam Basin, NE India, submitted.
- 5) **K. Sain**, 2024. Geo-hazards in the Uttarakhand Himalaya and plausible mitigation, submitted.

- 6) M. Biswas & **K. Sain**, 2024. Terminated MHT, Evidence of Pre-Siwalik Tertiary rocks beneath and Evolution of NW Himalayan Foreland Basin, submitted.
- 7) A. Verma, **K. Sain** & A. Kumar, 2023. Environmental changes in Antarctica using a shallow ice core from Dronning Maud Land (DML), East Antarctica, submitted.
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- 14) P. C. Kumar, Nicolas Waldmann & **K. Sain**, 2023. Structural illumination of a submarine buried stratovolcano: a case study from offshore Taranaki Basin, New Zealand, submitted.
- 15) A. Verma, A. Kumar, S.K. Tiwari, R. Bhambri, **K. Sain** & S.K. Rai, 2023. Defining hydrological processes using meteorology and stable water isotopes from glacierized basins in Garhwal Himalaya, India, submitted.
- 16) Sushil Kumar, M. Parija, **K. Sain**, A. Biswas, A. Tiwari, N. Kumar, P. Kumar, S. Biswal, R. Singh, R. Sushil, 2023. 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.

