

CV of Professor Sekhar Muddu

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DATE OF BIRTH 26 AUGUST 1963

QUALIFICATIONS

Degree/award	Year	Discipline/field	Organisation and country
Ph.D.	1993	Civil Indian Institute of Science,	
		Engineering	Bangalore, India
M.E.	1987 Civil Indian Institute of Science		Indian Institute of Science,
		Engineering	Bangalore, India
B.Tech.	.Tech. 1984 Civil Jawaharlal No		Jawaharlal Nehru Technological
		Engineering	University, College of Engineering,
		Engineering	Kakinada, Andhra Pradesh, India

CURRENT AND PREVIOUS POSITIONS HELD

Position held Organisation		Department	Year appointed
Professor	Indian Institute of Science, Bangalore	Dept. of Civil Engineering	2015-
Honorary Full Professor	University of Nebraska – Lincoln (UNL), USA	Nebraska Water Center, Institute of Agriculture and Natural Resources (IANR)	Jan 2021-
Adjunct Professor	Indian Institute of Science, Bangalore	Interdisciplinary Centre for Water Research	2015-
Co-ordinator	Indian Institute of Science, Bangalore	Indo-French Cell for Water Sciences	2020-
Associate Professor	Indian Institute of Science, Bangalore	Dept. of Civil Engineering	2007-2015
Adjunct Faculty	Indian Institute of Science, Bangalore	Center for infrastructure, sustainable transportation and urban planning	2009
Assistant Professor	Indian Institute of Science, Bangalore	Dept. of Civil Engineering	1996-2007
Lecturer	Indian Institute of Science, Bangalore	Dept. of Civil Engineering	1993
Poste Rouge Fellowship	University of Paul Sabatier, Toulouse	CESBIO, OMP, Toulouse	5/2015- 7/2015

Visiting Scientist	INRA, Rennes, France	SAS Laboratory (6/2012-7/2012, 2011- 7/2011, 5/2010-8/2010 & 5/2009-7/2009)	2012, 2011, 2010, 2009
Poste Rouge Fellowship of CNRS	OMP, France	LMTG, Toulouse	4/2006- 12/2006
Visiting Scientist	University of Paul Sabatier, Toulouse	LMTG, Toulouse	5/2005- 7/2005
Visiting Scientist	Technical University Eindhoven	Mathematics & Computational Science	3/2001- 5/2001
Project Leader	Transoft International, Paris & Bangalore	POLLUSOL - Computational fluid dynamics	2/1993- 11/1993

RESEARCH AREAS

I work in the research areas including groundwater hydrology, agro-hydrology, satellite hydrology and urban hydrology, and more specifically on these thematics:

- Groundwater resource assessment under the influence of climatic variations and anthropogenic effects using numerical modeling, statistical tools and field studies.
- Retrieval of near surface soil moisture from radar remote sensing (SAR) and estimating profile soil moisture using modeling and assimilation at watershed scale. Retrieval of rainfall and modeling of ET from remote sensing and assimilating into distributed hydrological models.
- Stochastic modeling of flow and reactive solute transport in heterogeneous porous media. Theoretical studies and field scale experiments.
- Integrated geochemical and hydrological studies in tropical regions using experimental watersheds.
- Modeling groundwater in urban environments and habitat.
- Smart water solutions in agriculture: Integration of Sensors, Satellite & ICT tools.

(1) Retrieval of hydrological variables from remote sensing.

Calibration and validation of satellite retrievals of soil moisture, evapotranspiration, crop variables (e.g. leaf area index) and soil hydraulic properties from optical and microwave remote sensing.

(2) Analysis of groundwater recharge, balance and behaviour at different scales in hard rock aquifers.

Kabini Critical Zone Observatory (<u>https://cefirse.cnrs.fr/</u>) comprises of nested catchments of four orders (< 10 Km², 80 Km², 600 Km² and 8000 Km²) on graniticgnessic rock aquifers of global significance. These are being investigated to develop scale dependent relationships in hard rock aquifers and methods & modelling tools to for groundwater balance and disaggregation approaches for small watershed scales. Modelling recharge in urban scenario is complex due to various conditions and this was performed for Bangalore city (600 Km2) through dedicated monitoring and modelling under BUMP project;

(http://bangalore.urbanmetabolism.asia/2017/10/17/groundwater-levels-from-2015-to-2017/).

(3) Effects of land use and land cover on recharge in semi-arid tropical soils.

The semi-arid areas have relatively higher ET and lower recharge and there is high degree of uncertainty in estimates of recharge in tropical soils. Further, in this millennium, the crop choice, the farming & irrigation practices are resulting in altered recharge. Through test sites in Kabini CZO, recharge, water use efficiency and improved crop productivity are being investigated using coupled models of crop and groundwater. The CZO comprises of paired catchments - forest and agricultural – to compare between the land cover types and to study the effects of climatic variability. (https://cefirse.cnrs.fr/).

(4) Modeling the water-rock interactions in tropical semi-arid catchments.

Tropical semi-arid catchments produce a greater percentage of weathered products (e.g. calcium, magnesium, silica) to the stream and eventually to ocean through the groundwater pathway. As there were no long term observatories in tropics relative to the temperate regions little is known about the fluxes from the groundwater. Paired experimental catchments (forested and agricultural) in Kabini CZO are investigated for chemical fluxes through field experiments and modelling studies.

(5) Analysis of nitrate transport and transformation in semi-arid soils.

The semi-arid agricultural parts of Kabini CZO have higher nitrates in groundwater (several times higher than the drinking water limit). The mechanisms of leaching of nitrate affected by soil & crop types, land use practices, aquifer conditions in tropical semi-arid soils is relatively less known. Investigations through laboratory and field experiments combined with modelling are being pursued in test sites of CZO towards this theme.

(5) Smart water solutions in agriculture: Integration of Sensors, Satellite & ICT tools. To develop a decision support system, which utilizes a framework that combines microwave satellite observations (soil moisture and crop variables) with terrestrial data captured from network of IoT enabled soil sensors to provide smart solutions for agriculture with applications into the area of Irrigation scheduling and water management.

Details are given in http://www.ambhas.com

FUNDED RESEARCH PROJECTS Active projects

- *I.* Integrated model of surface and groundwater to analyse impacts of climate and anthropogenic change: Application to Cauvery river basin. Sponsored by Ministry of Water Resources, Indian National Committee on Ground Water (INCGW). Duration 2 years (2024-2026). [Principal investigator]. (accepted).
- 2. Assimilation of ground and space based CO₂ date to assess CO₂ source/sinks over India Earth System Model. Mission based focused project of ISRO Sponsored by NRSC, ISRO. Duration 2 years (2025-2027). [Principal investigator].
- 3. GANANA: India-EU initiative for scientific high performance computing. Integrating tsunami wave model into the hydrological model. Sponsored by Ministry of Electronics and Information Technology (MeitY). Duration 3 years (2025-2028). [Principal investigator].

- Storage, transport and chemical evolution of infiltrating water in Critical Zone (CZ), western Himalayas. Sponsored by Science & Engineering Research Board. Duration 3 years (2024-2027). [Co-investigator].
- 5. Improved rainfall-runoff modelling by using satellite estimated soil moisture, under the umbrella project of "Early warning system for flood prediction in the river basins of India". Sponsored by CDAC. Duration 6 years (2019-2025). [Principal investigator].
- Large scale reuse of treated wastewater for indirect recharge of ground water. Sponsored by Department of Higher Education, GoI. Swachhta Action plan under the Scheme UNNAT BHARAT ABHIYAN. Duration 3 years (2023-2026) [Coinvestigator].
- Novel conjugated molecule-based solid-state sensors for Nitrate, Fluoride and Chromium in water bodies: Sensor and field study. Scheme for Transformational and Advanced Research in Sciences (STARS). Duration 3 years (2023-2026). [Coinvestigator].
- 8. An integrated study of hydrology and mineralogy for assessment of water quantity and quality in the sub-catchment/ watershed, Sponsored by IRD-France. Duration: 24 years (2001-2029) [Principal investigator].

Completed projects

- 9. INGENIOS; Indo-German Network of Environmental Systems-Hydrology under Indo-German Partnership in Higher Education (IGP). Sponsored by UGC-DAAD. Duration 4 years (2020-2024). [Principal investigator].
- 10. Estimation of higher resolution soil moisture over UK by combining active and passive microwave satellite data. Sponsored by CEH, UK. Duration 6 years (2017-2023). [Principal investigator].
- 11. Transport and transformation of pesticides from an Indian ago-system: Insights from Compound Specific Isotope Analysis (CSIA). Sponsored by International Atomic Energy Agency (IAEA). Duration 5 years (2018-2023). [Co-investigator].
- 12. Evaluating the soil moisture storage estimates using combination of water budget model and GRACE data. Sponsored by NRDMS, DST. Duration 4 years (2018-2022). [Principal investigator].
- 13. Smart water solutions in agriculture: Integration of Sensors, Satellite & ICT tools. Sponsored by IMPRINT, India. Duration 5 years (2017-2022). [Principal investigator].
- 14. Accompanying The adaptation of irrigated agriculture to climate CHAnge (ATCHA). Sponsored by ANR, France. Duration 5 years (2017-2022). [Co-investigator].
- 15. Upscaling Catchment Processes for Sustainable Water Management in Peninsular India. Sponsored by MoES and NERC, Indo-UK project. Duration 3 years (2016-2019). [Co-investigator].
- 16. Developing a new methodology for farm scale soil moisture estimation using radar-only model parameters modified using scattering power decomposition methods. Sponsored by SAC-ISRO, India. Duration 2 years (2017-2019). [Accepted] [Principal investigator].
- 17. Monsoon dynamics and thermodynamics from the land surface, through convection to the continental scale (INCOMPASS). Sponsored by MoES and NERC, Indo-UK project. Duration 3 years (2015-2018). [Co-investigator].
- MEERENDA: Microwave remote sEnsing for watEr Resources managEment iN berambaDi wAtershed. Sponsored by CNRS, France. Duration 3 years (2017-2020). [Co-investigator].

- 19. Bangalore Urban Metabolism Project (BUMP) Informing better governance for urban sustainability. Sponsored by Asia, Cities Alliance, Brussels & SEI, US. Duration 2 years (2015-2017). [Co-investigator].
- 20. Adaptation of irrigated agriculture to climate change. Sponsored by Indo-French CEFIPRA/IFCPAR. Duration: 3 years (2013-2017). [Principal investigator].
- 21. What will the future be? Projecting environmental change in a warming world for semi-arid landscapes. Sponsored by DST-AISRF, Indo-Australian project. Duration: 3 years (2014-2017). [Principal investigator].
- 22. Development of a coupled distributed groundwater model to assimilate RS data. Sponsored by SAC-ISRO under PRACRITI-II. Duration: 2 years (2014-2017). [Co-investigator].
- 23. Modeling of evapotranspiration from remote sensing. Sponsored by ISRO-STC. Duration: 2 years (2015-2017) [Principal investigator].
- 24. Calibration and Validation of SMAP Soil Moisture Product over an Experimental Agricultural Watershed in Karnataka. Sponsored by SAC-ISRO. Duration: 2 years (2015-2017). [Principal investigator].
- 25. Reducing flood loss A data-assimilation framework for improving forecasting capability in sparsely gauged regions. Sponsored by Australian Research Council. Duration: 3 years (2014-2017). [Co- investigator].
- 26. Stochastic modeling of groundwater flow and contaminant transport at the proposed uranium tailings pond. Sponsored by BRNS. Duration: 3 years (2012-2016). [Principal investigator].
- 27. Water security and infrastructure resilience under climate change. Sponsored by DST and UKIERI, Indo-UK project. Duration: 2 years (2014-2016). [Co-investigator].
- 28. Hydrometerological feedbacks and changes in water storage and fluxes in northern India. Sponsored by MoES-NERC Indo-UK Project. Duration: 4 years (2011-2015) [Co- investigator].
- 29. Sensor network based cyber physical Infrastructure for continuous monitoring of water distribution networks. Sponsored by Robert Bosch Cyber Physical Systems, IISc & IBM. Duration: 2 years (2014-2016). [Co-investigator].
- 30. Assessing groundwater storage changes and sustainability due to climate change in the semi-arid watersheds of South India. Sponsored by CSIR-India under the COPEC project. Duration: 3 years (2011-2015). [Prinicipal investigator].
- 31. R&D activities and Capacity building in the area of Sump Pump Model studies (Farakka Stage - III) involving both Physical Modeling as well as CFD model development. Sponsored by NETRA - National Thermal Power Corporation. Duration: 1 and half years (2014-2015). [Co-investigator].
- 32. Energy and mass exchange in vegetative systems. Sponsored by ISRO-SAC. Duration: 3 years (2012-2015). [Prinicipal investigator].
- 33. Estimation of soil hydraulic properties in a catchment using agro-hydrological models and microwave remote sensing. Sponsored by ISRO-STC. Duration: 2 years (2013-2015) [Principal investigator].
- 34. SPMU based solar water pump and smart controller. Sponsored by Cyber Physical Systems, IISc. Duration: 1 year (2014-2015). [Co-investigator].
- 35. Development of land parameter retrieval techniques and tools for polarimetric SAR data analysis. Sponsored by ISRO-SAC. Duration: 3 years (2010-2013) [Principal investigator].
- 36. Validation of MT rain rate products and its application in hydrology in the Kabini river basin. Sponsored by ISRO-DOS. Duration: 3 years (2010-2013) [Principal investigator].

- 37. Assimilation of remote sensing data for modeling the land surface fluxes at watershed scale using a distributed hydrological model. Sponsored by ISRO-STC. Duration: 2 Years (2010-2012) [Principal investigator].
- 38. Sustainable groundwater management in an urban environment. Sponsored by Arghyam-NGO. Duration: 3 years (2008-2011) [Principal investigator].
- 39. Socio-economic Assessment of the rural Vulnerability of water users under stressors of global changes in the Hard rock area of South India. Sponsored by ANR-France. Duration: 3 years (2009-2011) [Co- investigator].
- 40. Retrieval of root zone soil moisture from near-surface measurements. Sponsored by ISRO-STC. Duration: 2 Years (2008-2010) [Principal investigator].
- 41. Characterization of groundwater flow regime in fractured aquifer system. Sponsored by AICTE-GOI. Duration: 3 Years (2006-2009) [Principal investigator].
- Hydro-bio-geochemical cycles in two experimental watersheds of South India. Sponsored by Indo-French CEFIPRA/IFCPAR, India, Duration: 3 years (2005-2008) [Co- investigator].
- 43. Application of integrated surface water and groundwater models using remote sensing and GIS for Gundal river basin. Sponsored by ISRO-STC. Duration: 2 years (2003-2005) [Principal investigator].

CONSULTING PROJECTS

Conducted more than 30 consulting projects in the areas of urban groundwater hydrology, hydraulic model studies for pump-sump design, and hydraulic analysis & design of surge protection systems for water supply projects. Details are given in http://civil.iisc.ernet.in/~muddu

- 1. Groundwater Outlook for Bangalore City. Bangalore Water Supply & Sewerage Board, GoK. (2024-2025). [Co-investigator].
- 2. HYDRO-REWARD:Integrated Project on Hydrological monitoring, Analysis and DSS. Karnataka Watershed Development Department for the REWARD World Bank project (2022-2026). [Principal investigator].
- 3. Lake Restoration and Hydrological Assessments Phase II. Bangalore International Airport Ltd. (2020-2022). [Co-investigator].
- 4. Development of groundwater flow model and preparation of aquifer management plans. Central Ground Water Board, (2017-2021). [Principal investigator].
- Integrated hydrological assessment, Monitoring and documentation Project (2014-2019). Karnataka Watershed Department & World Bank (Sujala Phase III Project) [Principal investigator].
- 6. Lake Restoration and Hydrological Assessments Phase I. Bangalore International Airport Ltd. (2020 -2021). [Co-investigator].
- 7. Hydrogeological study along the tunnel of upper Badhra project. Karnataka Neervari Nigam Limited, Bangalore, July 2009 [Principal investigator].
- 8. Brief study on hydrogeology and land use changes along the Bagur-Navile tunnel in Channarayapatna Taluka of Hassan district. Karnataka Neervari Nigam Limited, Bangalore, Oct 2010 [Principal investigator].
- 9. Geo-Hydrological studies along the Metro- rail alignment in Bangalore. Bangalore Metro Rail Corporation Ltd., Bangalore, June 2007 [Principal investigator].
- 10. Sump model study for BAHR STPP Stage I (3x660MW) CW pump house. M/s. Kirloskar Brothers Ltd., Pune, December 2007 [Co- investigator].
- 11. Hydraulic model study for raw water pump sump and forebay SIPAT Stage II. M/s. Degremont Ltd., New Delhi, September 2007 [Co- investigator].
- 12. Sump model study for SIPAT STPP Stage I (3x660MW) CW pump house. National Thermal Power Corporation, New Delhi, March 2005 [Co- investigator].

- National Circum-stances: Forests, other natural eco-systems and water resources

 "write-up" project, M/s. Winrock International, New Delhi, November 2003 [Co-investigator].
- 14. Impact of Iron Ore mining in the Kudemukh National Park. Karnataka Forest Department, Jan. 2001 [Co- investigator].
- 15. Sardar Sarovar canal drinking water supply project, M/s. Montgomery Watson Consultants, August 2000 [Co- investigator].
- 16. Surge studies for Churu pipe line project PL1 (Parts 1-3), M/s. Bhooratnam & Co., Secunderabad, July 1997, July 1998, December 1998 [Co- investigator].
- 17. Surge analysis for Mhaisal lift irrigation scheme (Stages 3 & 4), Irrigation Department, Government of State of Maharashtra, Pune, October 1998 [Co-investigator].
- 18. Surge studies for the pumping main from Thadoli to Baghera, M/s. Bhooratnam & Co., Secunderabad, August 1998 [Co- investigator].
- 19. Surge protection system for water supply scheme to Industrial growth centre, Dharwad, Karnataka Industrial Areas Development Board, Bangalore, December 1997 [Co- investigator].
- 20. Surge Analysis for Takari lift irrigation scheme (Stages 1 & 2), Irrigation Department, Government of State of Maharashtra, Pune, September 1997 [Co-investigator].

AWARDS & RECOGNITIONS

- 1. National Award for Excellence in Geoscience & Technology for the year 2018 from Ministry of Earth Sciences, Government of India.
- 2. Satish Dhawan Young Engineer Award in "Earth Sciences" for the year 2010 from Karnataka State Government.
- 3. Honorary Full Professor, Nebraska Water Center, University of Nebraska Lincoln (UNL), Institute of Agriculture and Natural Resources, USA since January 2021.
- 4. INC-IAH Smt. Savitri Memorial Award for Excellence in Groundwater Science for 2018.
- 5. Poste Rouge Fellowship, OMP-Toulouse, France, 2015.
- 6. Visiting Professor fellowship, IRD France, 2017 & 2018.
- Co-Chair, Working Group on Water Resources (WGVIII/4) for 2012-2016 in the Commission VIII (Remote Sensing Applications & Policies) of the International Society of Photogrammetry and Remote Sensing.
- 8. NGRI-AHI Distinguished Lecture for the year 2013.
- 9. Member, Working Group on Water Database Development and Management for the 12th Plan (2012-2017), Planning Commission, India, 2011.
- 10. Member, Project Appraisal and Monitoring Committee (PAMC), Hydrology and Cryosphere, Ministry of Earth Sciences. Govt. of India, 2012-2016.
- 11. Member of the Committee for "Reassessment of Water Resources Potential of India", Ministry of Water Resources, River Development & Ganga Rejuvenation, 2016.
- 12. Member of the Central Level Expert Group for overall re-assessment of ground (2015-2018).
- 13. Member, Executive Committee, Karnataka State Natural Disaster Monitoring Center, Government of Karnataka, India (2004- to date).
- 14. Invited by the National Academy of Engineering, USA as a speaker at the Second Indo-American Frontiers of Engineering Meeting, 28th February – 1st March, 2008, Irvine, USA.

MEMBER – EDITORIAL BOARD

- 1. Associate Editor, Hydrological Sciences Journal, 2020-2022.
- 2. Associate Editor, Frontiers in Water: Water and Hydrocomplexity, since Dec. 2018.
- 3. Associate Editor, Journal of Groundwater Research since 2013.
- 4. Editorial Board, Proceedings of ICE Water Management (July 2015-November 2019).

THESIS ADVISOR & MENTOR

Degree	Currently Supervising	Supervised	
Master	3	33	
PhD	7	23	
Post-Doc	0	10	
Total	10	66	

Post-Docs

- 1. Satyanarayan N Rao. (Sep.2022 Aug.2023) Hydro-Reward: Integrated Hydrology project of Karnataka Watershed Development Department. Dr. Satyanarayan obtained his PhD from UC Louvain, Belgium. He is currently post-doc at Juelich, Germany.
- 2. Dr. Rajesh Rajendran. (2018- Dec. 2023). Groundwater modelling in Cauvery Basin. MoES project in ICWaR; Formerly worked in MoES-NERC Upscape Project. Dr. Rajesh obtained his PhD from Anna University Chennai and was a member in the laboratory of Professor L Elango.
- 3. Dr. Lalitha Sarada. (Oct.2021-May 2022) Groundwater modelling in fractured rock aquifers. BIAL Project. Dr. Sarada obtained her PhD from IIT Hyderabad and was a member in the laboratory of Professor KBVN Phanindra.
- 4. Dr Soumendra Banja. (Aug.2019-Jun.2021) Geochemical modelling in groundwater applications. Raman post-doctoral fellow of IISc in ICWaR. Dr. Soumendra obtained his PhD from IIT Khargpur and later was a post-doc in Canada. He is currently post-doc at Oak Ridge National Lab, USA.
- Dr. Tripti Muguli. (2017-2018). Gas emission studies in agricultural plots in Berambadi, Kabini CZO. National Postdoctoral Research Fellow (SERB-DST). Dr. Tripti Muguli was DST-INSPIRE Faculty Member at NCESS, Trivendrum and now a Scientist at National Institute of Hydrology, Roorkee.
- Dr. Raghavendra Jana. (2017-2018). Soil moisture modelling. Karnataka Watershed Project – Sujala III. Dr. Raghu Jana is currently Assistant Professor at Centre for Computational and Data Intensive Science and Engineering, Skolkovo Institute of Science and Technology (SkolTech), Moscow, Russia.
- Dr. Sat K Tomer. (2015-2016). Soil moisture modelling and remote sensing. ICWaR-CEH (UK) Project. Dr. Sat Kumar Tomer is CEO, Satyukt Analytics Pvt Ltd., Bangalore. (http://www.satyukt.com).
- Dr. Parag S. Narvekar. (2015-2016). Soil moisture modelling and RS. Hydrology Project-SujalaIII. Dr. Parag Narvekar is Director, Sensartics Pvt Ltd. (http:// www.sensartics.com).

- 9. Dr. Priyanka Jamwal (2010-2012). Characterising and analysis of Nitrates in surface and groundwater in a semi-arid irrigated tropical watersheds.; Dr. Priyanka is currently a Fellow in ATREE, Bangalore (http://www.atree.org/faculty).
- 10. Dr. Murugan Ramaswamy (2013-2014). Stochastic modeling of groundwater flow and contaminant transport at the proposed uranium tailing pond. Dr. Murugan is currently research scientist at NCESS (MoES), Trivendrum. And formerly was a post doc fellow at Verschuren Centre for Sustainability in Energy and the Environment, Cape Breton University.

PhD

- 1. Abhishek Chakraborty. (2025). An Integrated Assessment of Carbon and Water Use Efficiencies over India using Remote Sensing. (Joint guidance with Prof. Lakshminaryana Rao of CST). (Currently post-doc at University of California Merced USA).
- 2. Rajsekhar K. (2025). Assimilation of near-surface soil temperature and soil moisture in an unsaturated flow model: State and parameter estimation using synthetic and field experiments. (Currently post-doc at University of Reading, UK).
- 3. Deepti Upadhyaya. (2025). Quantification of irrigation and crop water productivity using soil moisture dynamics. (Currently Research Associate at IISc).
- Shubham Goswami. (2025). Analysis of Groundwater Systems Using Lumped and Distributed Hydrological Models: Applications in Indian tropical region. (Submitted April 2025 & Under review) (Currently post-doc at University of Nebraska Lincoln, USA).
- 5. Bhaduri, B. (2024). Modeling and assessment of nitrate travel transit times in groundwater systems. (Dr. Bhaduri currently is a post-doc at University of California, Davis, USA.
- 6. Siva Naga Venkat Nara (2024). Stable Isotope and Geochemical Approaches for Hydrological Characterization and Estimation of Seasonal Groundwater Inputs in the Humid to Semi-Arid Reach of the Kabini River, South India. (Thesis defence is completed). (Joint guidance with Prof. Prosenjit Ghosh of CES). (Dr. Siva Naga Venkat Nara currently is a post doc at University of Melbourne, Australia.
- 7. Subash Y. (2020). Spatial downscaling and analysis of satellite and ground-based rainfall for hydrological modeling. (Dr. Subash is currently member, technical staff, Pixxel Bangalore).
- Buvaneshwari, S. (2018). Impact of agricultural systems on the spatial heterogeneity of groundwater quality in a semi-arid tropical catchment: Characterisation and Modelling. (Joint guidance with Prof. M. S. Mohan Kumar) (Dr.Buvaneshwari was a post-doc as a Hydro Nation International Fellow of Scotland).
- 9. Naveen Kumar, G. (2017). Novel upwind and central schemes for various hyperbolic systems. (Joint guidance under IMI with Prof. S.V. Raghurama Rao). Dr. Navin Kumar Garg is currently an Assistant Professor, Dept of Mathematics, Indian Institute of Technology Kharagpur, formerly; post-doc fellow at Southern University of Science and Technology (SUSTech), China and post doc fellow at TIFR, Bangalore.
- 10. Eswar R. (2016). Modelling evapotranspiration from satellite data using semiempirical models: Applications to the Indian sub-continent. Dr. R. Eswar is Associate Professor, Department of Civil Engineering, Indian Institute of Technology Bombay; formerly post-doc fellow at NASA Jet Propulsion Laboratory, California Institute of Technology, Pasadena, USA. Eswar was formerly a post-doc at JPL, CalTech.

- 11. Ruhi, A. (2016). Novel discrete velocity Bolzmann schemes for incompressible flows. (Joint guidance under IMI with Prof. S.V. Raghurama Rao). Dr. Ruhi is currently a post-doc at University of Mainz, Germany.
- 12. K. Sreelash (2014). Estimation of root zone soil hydraulic properties by inversion of crop model using ground or microwave remote sensing observations. Dr. K. Sreelash was formerly CNES post-doc fellow in INRA PACA, UMR EMMAH, Avignon, France. (http://www.umr-emmah.fr/) and currently a Scientist D at NCESS (MoES), Trivendrum.
- 13. Sat K. Tomer (2013). Soil moisture modeling, retrieval from microwave remote sensing and assimilation in a tropical watershed. Dr. Sat Kumar Tomer was a post-doc in CESBIO, Toulouse, France. http://www.cesbio.ups-tlse.fr/index_us.htm and currently Dr. Sat Kumar Tomer is CEO, Satyukt Analytics Pvt Ltd., Bangalore. (http://www.satyukt.com).
- 14. Yusuf Javeed (2010). Analysis of groundwater dynamics in semi-arid regions: Effect of rainfall variability and pumping. Prof. Yusuf Javeed is a Professor at National Institute of Engineering, Mysore <u>http://www.nie.ac.in/civ/faculty/</u>).
- 15. B. Siva Soumya (2009). Analysis of precipitation controls on hydrochemistry of a groundwater system: Application to upper Cauvery river basin, South India, Dr. Siva Soumya is working as Member of Technical Staff Atkins, formerly Environmental Engineer, dar al-handasah, Pune, http://www.dargroup.com/).
- 16. Abhijit Chaudhuri (2006). Stochastic analysis of flow and solute transport in heterogeneous porous media using perturbation approach. Dr. Chaudhuri is working as a Professor at Indian Institute of Technology, Madras http://apm.iitm.ac.in/fmlab/abhijit/).
- 17. K.V. Hayagreeva Rao (2005). Studies of solute transport and geochemistry in porous media: Numerical modeling and applications. Dr. Hayagreeva Rao is working as a Senior Research Engineer, General Electric, Jack F. Welch Technology Center. <u>http://ge.geglobalresearch.com/locations/bangalore-india/</u>).
- P.K. Majumdar (2007). Modelling of single and multiple recharge wells in layered aquifers (- Joint guidance with Prof. K. Sridharan and Prof. G.C. Mishra; Dr. P.K. Majumdar was formerly Scientist F at National Institute of Hydrology, Roorkee http://www.nih.ernet.in/ and worked as a Professor in an Engineering College in Gujarat).
- 19. G. Suresh Kumar (2003). Numerical Modeling and analysis of solute transport in a single fracture. Prof. Suresh Kumar is currently working as a Professor at IIT Madras. <u>http://www.oec.iitm.ac.in/Suresh kumar home.html</u>).
- Santosh. G. Thampi (2002). Studies on the transport of sorbing and biodegrading solutes in heterogeneous porous media. Prof. Thampi is working as a Professor at NIT Calicut. <u>http://nitc.ac.in/index.php/?url=users/view/85/7/3</u>).
- 21. S. Jyothish (1999). A hybrid finite volume method for reactive solute transport in groundwater (Joint guidance with Prof. M.S. Mohan Kumar). Dr. Jyothish is working as Member Technical Staff, Verizon, Irving, TX, USA).
- 22. M. K. Nagaraj (1999). Parameter estimation of regional groundwater systems (Joint guidance with Prof. K. Sridharan). Prof. Nagaraj worked as a Professor at NIT, Surathkal <u>http://www.nitk.ac.in/index.php?q=935.html</u>).
- K. S. Hari Prasad (1996). Analysis of Unsaturated Flow in Soils: Numerical Modelling and Applications (Joint guidance with Prof. M.S. Mohan Kumar). Prof. Hari Prasad is working as a Professor at Indian Institute of Technology, Roorkee <u>http://www.iitr.ac.in/~CE/suryafce</u>).
- 24. Rajat Kumar Sharma, External Registrant, NCESS, Trivendrum (*under progress*). Analysis of baseflow in peninsular west flowing rivers of India. (External Registration Joint guidance with Dr. Padmalal of NCESS).

- 25. Sarat C. (*under progress*). Dynamics of Groundwater and Climatic Interactions in Central India. (Joint guidance with Prof. V Venugopal of CAoS). (PMRF awardee).
- 26. Vaibhav Gupta (*under progress*). Estimation of the SHPs of vadose zone coupled with land-atmosphere interaction at the catchment scale using remotely sensed data. (PMRF awardee).
- 27. Ankush Kaundal (*under progress*). Development of a groundwater model integrating finer scale attributes of the catchment.
- 28. Yuji Shigefuji. Foreign Registrant from Japan. (*under progress*). Water and Carbon nexus in agro-forestry watersheds.
- 29. Burra Karthik. (*under progress*). Water and carbon budget modelling in cropping systems with groundwater irrigation.
- 30. Vishnudatha V. (*under progress*). Modeling the recycle water systems. (Joint guidance with Prof. Lakshminarayana Rao).

MSc(Engg.)

- 1. Akshay Dahiwale (2024). Numerical modelling of sediment transport using ANUGA Sed: Application to Mahanadi river basin, India. Working as a Scientist in NIH, Roorkee.
- Teddy Kizza (2013). Modeling salinity impact on groundwater irrigated Turmeric crop. Ms. Teddy Kizza is working as a scientist in National Agricultural Organisation of Uganda in Kampala.
- 3. S.N. Rasmi (2005). Importance of lateral flow in groundwater modeling: A case study of hard rock aquifer of Gundal sub basin.
- 4. Anjani Kumar (2003). Numerical modeling of aerobic in-situ biodegradation in heterogeneous porous media. Mr. Anjani Kumar is working as a Research Engineer, General Electric, Jack F. Welch Technology Center, Bangalore).
- 5. M. R. V. P. Narayana (2003). Application of groundwater model coupled with GIS and remote sensing for Gundal watershed.
- 6. C. Srinivasan (2000). Analysis of solute transport in porous media for nonreactive and sorbing solutes using hybrid FCT model.

ΜE

- 7. Soil moisture modelling using remote sensed data (Anjali P.S., ongoing).
- 8. Urban groundwater modelling using ML approaches (Pragya Singh, ongoing).
- 9. Sediment transport modelling and measurements for a catchment near Ooty (Thiyageshwaran N., *Ongoing*).
- 10. Soil moisture modelling using ML approaches (Satish Kumar Nukala, 2023).
- 11. Sediment transport modelling in Berambadi catchment (Arun V.H., 2023).
- 12. Urban groundwater modeling. (Ankit Kumar, 2022).
- 13. Modeling the crop water budget and optimal groundwater irrigation water requirement. (Manish Kumar, 2020).
- 14. Soil moisture estimation using L Band SAR data. (Deepak Kumar, 2019).
- 15. Modelling of crop and water productivity in rainfed agrosystems of Berambadi catchment in KABINI CZO. (Kayalvizhi, S., 2018).
- 16. Knowledge extraction in agriculture using machine learning algorithms. (Rukmangadan, D., 2018).
- 17. Sandarbh A. (2017). An inter-comparison of TerraSAR-X and Sentinel-1 data behavior over different vegetation covers in Berambadi region.
- 18. Prajakt R. (2015). Analysis of soil moisture using ground penetrating radar.

- 19. Satendra K Dhiman (2013). Estimation of groundwater recharge using soil moisture modeling: Experiments in Berambadi catchment. Mr. Satendra is working as an Assistant Professor in College of Engineering, Teri, Uttaranchal.
- 20. Manish Gautam (2013). Groundwater modeling in Bangalore city using GRASS-GIS. Mr. Manish is working as a scientist with Indian Institute of Human Settlements, Bangalore.
- 21. N. Madhusudhan (2012). Lumped and distributed groundwater modeling: A case study in Gundal basin. Mr. Madhusudhan is working as Engineer with KPTCL, Karnataka.
- 22. Prateek Chandrayan (2011). Characterizing subsurface fracture and its hydraulic properties using Fiber Optics.
- 23. M. Shindekar (2011). Modeling the Groundwater in Urban-Periurban System Using PORFLOW. Mr. Mayur is working with Border Road Services, New Delhi under Indian Engineering Service.
- 24. Jowon Siket (2010). Spatio-temporal analysis of groundwater levels in heterogenous aquifers. Mr. Jowon Siket is working with Central Water Commission, New Delhi under Indian Engineering Service.
- 25. Sat K. Tomer (2008). Soil moisture modelling and assimilation using field experiments in semi arid plots. Mr. Sat Kumar is Dr. Sat Kumar Tomer is a post-doc in CESBIO, Toulouse, France. http://www.cesbio.ups-tlse.fr/index_us.htm
- 26. Pradeep V. Mandapaka (2003). Watershed modeling using remotely sensed data and SWAT. Dr. Pradeep completed his PhD at University of Iowa, USA and is a post-doc at NUS, Singapore.
- 27. B. Raghuram Singh (2003). Modeling of total phosphorous for lakes.
- 28. G. Babu Rao (2001). Parameter estimation model for dissolved oxygen in a stream.
- 29. J. Srinivasulu (2000). Urban storm water modeling in the Vrishabhavati subwatershed using SWMM and GIS.
- 30. N. Stanley Joseph (1999). A visual basic software for risk assessment of petroleum release sites.
- 31. L.P. Murali Krishna (1998). Analysis and parameter estimation of non-uniform aquifers.
- 32. C.V. Abdul Nazir (1997). Sampling network design using genetic algorithm for inverse problem in groundwater hydrology.
- 33. A. Hara Gopal (1997). A numerical model for flow in an unsaturated soil.
- 34. V. Ramesh (1996). Analysis of multilayered leaky aquifer system.
- 35. P. Sreenivas Rao (1995). Modelling contaminant transport in groundwater.

Integrated MSc

1. Arjun, C (2016). Modeling the nitrogen gas fluxes from agricultural plots in AMBHAS experimental observatory. Arjun obtained his PhD in University of Stockholm. And currently pursuing his post-doc in the same university.

WORKSHOPS ORGANISED

- 1. Indo-US Bilateral Workshop on Addressing the Nexus of Food, Energy, and Water (FEW) in the Context of Societal Challenges (April 2017). Sponsored by IUSTF.[Co-Principal investigator].
- 2. Indo-UK Workshop on Water Quality Source Protection (30 March 1 April, 2016). Sponsored by James Hutton Institute, Scotland.
- 3. Near real time forecasting of soil moisture for water resources management (2014). Sponsored by Indo-German Bilateral Agency. [Co- Principal investigator].

- Sustainability of soil and water management in the uplands of Asia: LUC and CC in question (Dec 2013). Sponsored by SELTAR, IRD, France. [Co- Principal investigator].
- 5. Water resources management using microwave remote sensing. Sponsored by Indo-French Water Network. (Nov 2013). [Co- Principal investigator].
- Indo-UK perspective on Water quality: Threats, technologies and options (August 2013). Sponsored by RSC, UK Science & Innovation Network, Shell Technology Centre. [Co- Principal investigator].

GRADUATE TEACHING

Developed and taught courses during 1994-2012: Groundwater Hydrology, Advanced Groundwater Hydrology, Pollution Science and Engineering, Water Quality Modelling, Remote Sensing for Natural Resources Management.

MEMBERSHIP OF PROFESSIONAL SOCIETIES AND INSTITUTIONS:

Member, International Association of Hydrogeologists; Member, American Geophysical Union; Member, International Association for Hydrological Sciences; Member, European Geophysical Union

PUBLICATIONS

About 140 peer reviewed publications in Journals and book chapters in the areas of Hydrology, Water Resources and Environmental Engineering. Detailed list of other publications are given in http://civil.iisc.ernet.in/~muddu

http://scholar.google.com/citations?user=faU9COIAAAAJ

BOOKS

Ray, C., Sekhar, M. and Sharma, S. Food, Energy and Water Nexus: A consideration for the 21st Century. 2022, p.1-259, Springer, ISBN 978-3-030-85727-1. (https://link.springer.com/book/10.1007/978-3-030-85728-8).

JOURNALS

- Masbou, L, Grail, C., Payraudeau, S., Ruiz, L., Sekhar, M., Riotte, J., Imfeld, G. (2025).Dissipation of the insecticide profenofos in tropical agricultural soils (Berambadi catchment, South India): Insight from compound-specific isotope analysis (CSIA). Journal of Hazardous Materials 488, 137428. <u>https://doi.org/10.1016/j.jhazmat.2025.137428</u>.
- Rajendran, R., Lakshmanan, E., Sekhar, M., Rajmohan, N., Senapathi, V., Brindha, K. (2025). Multi-indices approach for comprehensive appraisal of groundwater quality and the implication on human health in the Amaravathi basin, Southern India. Environ. Monit Assess., 197:153 https://doi.org/10.1007/s10661-024-13546-6.
- Gomez, C., Amelin, J., Coulouma, G., Gaab, J., Dharumarajan, S., Riotte, J., Sekhar, M. and Ruiz, L. (2025). Reuse of bottom sediment from reservoirs to cropland is a promising agroecological practice that must be rationalized. Scientific Reports, 15:7523. <u>https://doi.org/10.1038/s41598-025-92206-2</u>.
- 4. Brauns, B., Chandra, S., Civil, W., Lapworth, D.J., MacDonald, A.M., McKenzie, A.A., Read, D.S., Sekhar, M., Singer, A.C., Thankachan, A., Tipper, H.J. (2024).

Presence of emerging organic contaminants and microbial indicators in surface water and groundwater in urban India. Environmental Pollution, 362, 124983. https://doi.org/10.1016/j.envpol.2024.124983.

 Pandey, D.K, Srivastava, P.K, Dave, R., Setia, R.K., Ompal, Sinha, R., Sekhar, M., Parmar, M., Gupta, S., Putrevu, D., Mehra, R., Ramanujam, V., Bhattacharya, B.K. and Raj Kumar (2024). Operational 500 m surface soil moisture product using EOS-04 C-band SAR over Indian agricultural croplands. Current Science, Vol. 126, No. 9, 10.

https://doi.org/10.18520/cs/v126/i9/1061-1068.

- Jeelani, Gh., Absar, A., Agnihotri, V., Ahmed, S., Alam, A., Azam, M.F., Bhat, M.S., Deshpande, R.D., Dimri, A.P., Jain, S., Juyal, N., Lone, S..A., Mal, S., Maharana, P., Maurya, A.S., Mukherjee, A., Sekhar, M., Pottakkal, J., Romshoo, S.A., Sarin, M.A., Sain, K., Sharma P., and Shrestha, A.B. (204). Policy framework to combat the challenges of climate change in the Upper Indus Basin. Current Science, Vol. 127, No. 6. <u>https://doi.org/10.18520/cs/v127/i6/669-673</u>.
- Chakraborty, A., Sekhar, M. and Rao, L. (2023). The Fate of Vegetation Carbon Stocks of India: Insights from a Remote-Sensed Evaluation of Carbon Use Efficiency. Ecological Informatics, 78, 102374. (<u>https://doi.org/10.1016/j.ecoinf.2023.102374</u>).
- Kandala, R., Franssen, H.-J. H., Chaudhuri, A. and Sekhar, M. (2023). The value of soil temperature data versus soil moisture data for state, parameter, and flux estimation in unsaturated flow model. Vadose Zone Journal, e20298. (<u>https://doi.org/10.1002/vzj2.20298</u>).
- Baccar, M., Raynal, H., Sekhar, M., Bergez, J.-E., Willaume, M., Casel, P., Giriraj, P., Murthy, S. and Ruiz, L. (2023). Dynamics of crop category choices reveal strategies and tactics used by smallholder farmers in India to cope with unreliable water availability. Agricultural Systems, 211, 103744. (<u>https://doi.org/10.1016/j.agsy.2023.103744</u>).
- Verma, K., Manisha, M., Santrupt, R.M., Anirudha, T. P., Goswami, S., Sekhar, M., Ramesh, N., Mohan Kumar, M.S., Chanakya, H.N. and Rao, L. (2023). Assessing groundwater recharge rates, water quality changes, and agricultural impacts of large-scale water recycling. Science of the Total Environment, 877, 162869. (<u>https://doi.org/10.1016/j.scitotenv.2023.162869</u>).
- Baron, H.E., Keller, V.D.J., Horan, R., MacAllister, D.J., Simpson, M., Jackson, C.R., Houghton-Carr, H.A., Rickards, N., Garg, K.K., Sekhar, M., MacDonald, A. and Rees, G. (2023). Improving the representation of groundwater processes in a large-scale water resources model. Hydrological Sciences Journal. https://doi.org/10.1080/02626667.2023.2208755
- Ponni, M G. and Sekhar, M. (2022). Base flow simulation using a physically based subsurface model- the case of a tropical basin in the Western Ghats, India. Journal of Hydrology, Volume 613, Part B, 128451. <u>https://doi.org/10.1016/j.jhydrol.2022.128451</u>
- Goswami, S. and Sekhar, M. (2022). Investigation and evidence of high episodic groundwater recharge events in tropical hard-rock aquifers of southern India. Frontiers in Water, 4:960669. (<u>https://doi.org/10.3389/frwa.2022.960669</u>).

- Bhaduri, B., Sekhar, M., Fovet, O. and Ruiz, L. (2022) Travel time modelling using time series of nitrate concentration in groundwater improves hydrological process understanding: A case study of a small agricultural catchment in Brittany, France. Journal of Hydrology, Volume 613, Part A, 128390. (<u>https://doi.org/10.1016/j.jhydrol.2022.128390</u>).
- Bregez, J.E., Baccar, M., Sekhar, M. and Ruiz, L. (2022). NIRAVARI: A Parsimonious Bio-Decisional Model for Assessing the Sustainability and Vulnerability of Rainfed or Groundwater-Irrigated Farming Systems in Indian Agriculture. Water, 14, 3211. (<u>https://doi.org/10.3390/w14203211</u>)
- Brauns, B., Chattopadhyay, S., Lapworth, D.J., Loveless, S.E., MacDonald, A.M., McKenzie, A.A., Sekhar, M., Nara, S.N.V. and Srinivasan, V. (2022). Assessing the role of groundwater recharge from tanks in crystalline bedrock aquifers in Karnataka, India, using hydrochemical tracers. Journal of Hydrology, Vol.15, 100121. (<u>https://doi.org/10.1016/j.hydroa.2022.100121</u>).
- Ruhi, A., Raghurama Rao, S.V. and Sekhar, M. (2022). A lattice Boltzmann relaxation scheme for incompressible fluid flows. Int J Adv Eng Sci Appl Math. (<u>https://doi.org/10.1007/s12572-022-00320-5</u>)
- Das, B.S., Wani, S.P., Benbi, D.K., Sekhar, M., Bhattacharya, T. et al. (2022). Soil health and its relationship with food security and human health to meet the sustainable goals in India. Soil Security, Vol.8., 100071. (<u>https://doi.org/10.1016/j.soisec.2022.100071</u>)
- Souissi, R., Zribi, M., Corbari, C., Mancini, M., Sekhar, M., Tomer, S. K., Upadhyaya, D. B., and Al Bitar, A. (2022). Integrating process-related information into an artificial neural network for root-zone soil moisture prediction, Hydrol. Earth Syst. Sci., 26, 3263–3297. (<u>https://doi.org/10.5194/hess-26-3263-2022</u>)
- Fischer, C., Aubron, C., Trouvé, A., Sekhar, M. and Ruiz, L. (2022). Groundwater irrigation reduces overall poverty but increases socioeconomic vulnerability in a semiarid region of southern India. Scientific Reports - Nature, Vol.12, 8850. (<u>https://doi.org/10.1038/s41598-022-12814-0</u>).
- Bellè, S.-L., Riotte, J., Backhaus, N., Sekhar, M., Jouquet, P. and Abiven, S. (2022). Tailor-made biochar systems: Interdisciplinary evaluations of ecosystem services and farmer livelihoods in tropical agro-ecosystems. PLOS ONE, Vol. 17(1), e0263302. (https://doi.org/10.1371/journal.pone.0263302).
- Bellè, S.-L., Riotte, J., Sekhar, M., Ruiz, L., Schiedung, M. and Abiven, S. (2022). Soil organic carbon stocks and quality in small-scale tropical, sub-humid and semi-arid watersheds under shrubland and dry deciduous forest in southwestern India. Geoderma, Vol. 409, 115606. (https://doi.org/10.1016/j.geoderma.2021.115606).
- Lagacherie, P., Bui, S., Constantin, J., Dharumarajan, S., Ruiz, L. and Sekhar, M. (2021). Evaluating the impact of using digital soil mapping products as input for spatializing a crop model: The case of drainage and maize yield simulated by STICS in the Berambadi catchment (India). Geoderma, Vol. 406, 115503. (<u>https://doi.org/10.1016/j.geoderma.2021.115503</u>).
- 24. Lapworth, D.J., Brauns, B., Chattopadhyay, S., Gooddy, D.C., Loveless, S.E., MacDonald, A.M., McKenzie, A.A., Sekhar, M., Nara, S.N.V. (2021). Elevated

uranium in drinking water sources in basement aquifers of southern India. Applied Geochemistry, Vol. 133, 105092.

(https://doi.org/10.1016/j.apgeochem.2021.105092).

- Baccar, M., Bergez, J.E., Couture, S., Sekhar, M., Ruiz, L., and Leenhardt, D. (2021). Building climate change adaptation scenarios with stakeholders for water management: A hybrid approach adapted to the South Indian water crisis. Sustainability, Vol. 13, 8459. (https://doi.org/10.3390/su13158459).
- 26. Horan, R., Rickards, N.J., Kaelin, A., Baron, H.E., Thomas, T., Keller, V.D.J., Mishra, P.K., Nema, M.K., Sekhar, M., Garg, K.K., Pathak, R., Houghton-Carr, H.A., Dixon, H., Jain, S.K. and Rees, G. (2021). Extending a Large-Scale Model to Better Represent Water Resources without Increasing the Model's Complexity. Water, Vol. 13, 3067. (https://doi.org/10.3390/w13213067).
- Schwendimann, L., Sivaprakasam, I., Buvaneshwari, S., Gurumurthy, G.P., Mishra, S., Ruiz, L., Sekhar, M., Fleiss, B., Riotte, J., Shyamala, M. and Gressens, P. (2021). Agricultural groundwater with high nitrates and dissolved salts given to pregnant mice alters brain development in the offspring. Ecotoxicology and Environmental Safety, Vol. 224, 112635. (https://doi.org/10.1016/j.ecoenv.2021.112635).
- Choudhury, I., Bhattacharya, B.K., Eswar, R. and Sekhar, M. (2021). Decadal assessment of green and blue consumptive water uses and water productivities over Indian agroecosystems in the context of water scarcity and climate change. International Journal of Remote Sensing. (https://doi.org/10.1080/01431161.2021.1939905).
- Riotte, J., Ruiz, L., Audry, S., et al. and Sekhar, M. (2021). The Multiscale TROPIcal CatchmentS critical zone observatory M-TROPICS dataset III: Hydrogeochemical monitoring of the Mule Hole catchment, south India. Hydrological Processes. (<u>https://doi.org/10.1002/hyp.14196</u>).
- Gomez, C., Dharumarajan, S., Lagacherie, P., Riotte, J., Ferrant, S. Sekhar, M., Ruiz, L. (2021). Mapping of tank silt application using Sentinel-2 images over the Berambadi catchment (India). Geoderma Regional. (https://doi.org/10.1016/j.geodrs.2021.e00389).
- Sharma, A. K., Hubert-Moy, L. Buvaneshwari, S., Sekhar, M., Ruiz, L., Moger, H., Bandyopadhyay, S. and Corgne, S. (2021). Identifying Seasonal Groundwater-Irrigated Cropland Using Multi-Source NDVI Time-Series Images. Remote Sensing, 13, 1960. (https://doi.org/10.3390/rs13101960).
- Scheidegger, J. M., Jackson, C. R., Sekhar, M., Tomer, S. K. and Filgueira, R. (2021). Integration of 2D Lateral Groundwater Flow into the Variable Infiltration Capacity (VIC) Model and Effects on Simulated Fluxes for Different Grid Resolutions and Aquifer Diffusivities, Water, 13, 663. (https://doi.org/10.3390/w13050663).
- Upadhyaya, D. B., Evans, J., Sekhar, M., Tomer, S. K. et al. (2021). The Indian COSMOS Network (ICON): Validating L-Band Remote Sensing and Modelled Soil Moisture Data Products. Remote Sensing, 13, 537. (https://doi.org/10.3390/rs13030537)
- 34. Tomer, S. K., Sekhar, M., Balakrishnan, K., Malghan, D., Thiyaku S., Gautam, M. and Mehta, V.K. (2020). A model based estimate of the groundwater budget

and associated uncertainties in Bengaluru, India. Urban Water Journal, 18(1), pp.1-11. (https://doi.org/10.1080/1573062X.2020.1836237)

- 35. Zribi, M., Foucras, M., Baghdadi, N., Demarty, J., Sekhar, M. (2020). A new reflectivity index for the retrieval of surface soil moisture from radar data. IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing. (https://doi.org/10.1109/JSTARS.2020.3033132).
- Yeggina, S., Teegavarapu, R.S.V. and Sekhar, M. (2020). Evaluation and Bias Corrections of Gridded Precipitation Data for Hydrologic Modeling Support in Kabini River Basin, India. Theoretical and Applied Climatology. (https://doi.org/10.1007/s00704-020-03175-7).
- Collins, S., Loveless, S., Sekhar, M., Buvaneshwari, S., Palamakumbura, R., Krabbendam, M., Lapworth, D., Jackson, C., Gooddy, D., Venkat Nara, S. N., Chattopadhyay, S. and MacDonald, A. (2020). Groundwater connectivity of a sheared gneiss aquifer system in the Cauvery River Basin (Peninsular India). Hydrogeology Journal. (https://doi.org/10.1007/s10040-020-02140-y).
- Buvaneshwari, S., Riotte, J., Sekhar, M., Sharma, A. K., Helliwell, R., Kumar, M. S., Braun, J. J., Ruiz, L. (2020). Potash fertilizer promotes incipient salinization in groundwater irrigated semi-arid agriculture. Scientific Reports. 10:3691. (https://doi.org/10.1038/s41598-020-60365-z).
- Landy, F., Ruiz, L., Jacquet, J., Richard-Ferroudji, A., Sekhar, M., Guétat-Bernard, H., Oger-Marengo, M., Venkatasubramanian, G., Noûs, C. (2020). Commons as Demanding Social Constructions: The Case of Aquifers in Rural Karnataka. International Journal of Rural Management. (https://doi.org/10.1177/0973005220945428).
- Garg, N.K., Maruthi, N.H., Raghurama Rao, S.V. and Sekhar, M. (2019). Use of Jordon forms for convection-pressure split Euler solvers. Journal of Computational Physics. Volume 407, 109258, pp.1-23. (https://doi.org/10.1016/j.jcp.2020.109258)
- Zribi, M., Sekhar, M., Bousbih, S., Al Bitar, A., Tomer, S.K., Baghdadi, N. and Bandyopadhyay, S. (2019). Analysis of L-Band SAR Data for Soil Moisture Estimations over Agricultural Areas in the Tropics. Remote Sensing, 11(9), 1122. (https://doi.org/10.3390/rs11091122).
- 42. Yeggina, S., Teegavarapu, R.S.V., Sekhar, M. (2019). A conceptually superior variant of Shepard's method with modified neighbourhood selection for precipitation interpolation. International Journal of Climatology. (https://doi.org/10.1002/joc.6091).
- 43. Sharma, A.K., Hubert-Moy, L., Buvaneshwari, S., Sekhar, M., Ruiz, L., Bandyopadhyay, S., Shiv Mohan and Corgne, S. (2019). Evaluation of Radarsat-2 quad-pol SAR time series images for monitoring groundwater irrigation. International Journal of Digital Earth.

(https://doi.org/10.1080/17538947.2019.1604834).

 Gomez, C., Dharumarajan, S., Féret, J.-B., Lagacherie, P., Ruiz, L. and Sekhar, M. (2019). Use of Sentinel-2 Time-series images for classification and uncertainty analysis of inherent biophysical property: Case of soil texture mapping. Remote Sensing, 11, 565, pp.1-20. (https://doi.org/10.3390/rs11050565).

- Gaillardet, J., Braud, I., Hankard, F., Anquetin, S., Bour, O., Dorfliger, N. et al. (2018). OZCAR: The French network of critical zone observatories. Vadose Zone Journal, 17:180067, pp.1-24. (https://doi.org/10.2136/vzj2018.04.0067)
- Chaudhuri, A., Hendricks Franssen, H.-J. and Sekhar, M. (2018). Iterative filter based estimation of fully 3D heterogeneous fields of permeability and Mualemvan Genuchten parameters. Advances in Water Resources, 122, pp. 340–354. (https://doi.org/10.1016/j.advwatres.2018.10.023)
- Sharma, A. Hubert-Moy, L., Buvaneshwari, S., Sekhar, M., Ruiz, L., Bandyopadhyay, S., Corgne, S. (2018). Irrigation history estimation using multitemporal Landsat satellite images: Application to an intensive groundwater irrigated agricultural watershed in India. Remote Sensing, 10, 893. (http://dx.doi.org/10.3390/rs10060893).
- Riotte, J., Meunier, J.-D., Zambardi, T., Audry,S., Barboni, D., Anupama, K., Prasad, S., Chmeleff, J., Poitrasson, F., Sekhar, M., Braun, J.-J. (2018). Processes controlling silicon isotopic fractionation in a forested tropical watershed: Mule Hole Critical Zone Observatory (Southern India). Geochimica et Cosmochimica Acta, 228, pp. 301–319. (https://doi.org/10.1016/j.gca.2018.02.046).
- Sekhar, M., Tomer, S. K., Thiyaku, S., Giriraj, P., Sanjeeva Murthy, Mehta, V. K. (2018). Groundwater Level Dynamics in Bengaluru City, India. Sustainability, 10, 26, pp.1-22. (http://dx.doi.org/10.3390/su10010026).
- Robert, M., Thomas, A., Sekhar, M., Raynal, H., Casellas, E., Casel, P., Chabrier, P., Joannon, A. and Bergez, J.-E. (2018). A dynamic model for water management at the farm level integrating strategic, tactical and operational decisions. Environmental Modeling and Software, 100, pp. 123-135. (http://dx.doi.org/10.1016/j.envsoft.2017.11.013).
- Eswar, R., Sekhar, M., Bhattacharya, B. K., Bandyopadhyay, S. (2017). Comparison of three remote sensing based models for the estimation of latent heat flux over India. Hydrological Sciences Journal, 62(17), 2705-2719. (http://dx.doi.org/10.1080/02626667.2017.1404067).
- 52. Eswar, R., Sekhar, M., Bhattacharya, B. K., Bandyopadhyay, S. (2017). Spatial disaggregation of latent heat flux using contextual models over India. Remote Sensing, 9, 949. (http://dx.doi.org/10.3390/rs9090949).
- 53. Anoop, S., Maurya, D.K., Rao, P.V.N., Sekhar, M. (2017). Validation and comparison of LPRM retrieved soil moisture using AMSR2 brightness temperature at two spatial resolutions in the Indian region. IEEE Geoscience and Remote Sensing Letters, 4(9), pp.1561-1564.
- Montzka, C., Bogena, H. R., Zreda, M., Monerris, A., Morrison, R., Sekhar, M. and Vereecken, H. (2017). Validation of spaceborne and modelled surface soil moisture products with cosmic-ray neutron probes. Remote Sensing, 9, 103; doi:10.3390/rs9020103.
- Sreelash, K., Buis, S., Sekhar, M., Ruiz, L., Guerif, M. (2017). Inversion of a crop model for estimating multilayered soil hydraulic properties: effect of crop type and water regime. Journal of Hydrology, 546, pp.166-178. (http://dx.doi.org/10.1016/j.jhydrol.2016.12.049).

- Tomer, S.K., Al Bitar, A., Sekhar, M., Zribi, M., Bandyopadhyay, S., Kerr, Y. (2017). MAPSM: A Conceptual Spatio-temporal Algorithm to Merge Active and Passive Soil Moisture. Remote Sensing, 8, 990. (http://dx.doi.org/10.3390/rs8120990).
- 57. Buvaneshwari S., Riotte, J., Sekhar, M., Mohan Kumar, M. S., Sharma, A. K., Duprey, J.-L., Audry, S., Giriraj, P.R., Praveen, Y., Hemanth, M., Durand, P., Braun, J.J., Ruiz., L. (2017). Groundwater resource vulnerability and spatial variability of nitrate contamination: insights from high density tubewell monitoring in a hard rock aquifer. Science of Total Environment, 579, pp.838-847. (http://dx.doi.org/10.1016/j.scitotenv.2016.11.017).
- Robert, M., Thomas, A., Sekhar, M., Badiger, S., Ruiz, L., Willaume, M., Leenhardt, D. and Bergez, J.-E. (2017). Farm typology in the Berambadi watershed (India): Farming systems are determined by farm size and access to groundwater. Water, 9, 51. (http://dx.doi.org/10.3390/w9010051).
- 59. Barik, B., Ghosh, S., Sahana, A. S., Pathak, A., Sekhar, M. (2016). Water Food Energy Nexus: Changing scenarios in India during recent decades. Hydrol. Earth Syst. Sci. Discuss.,. (http://dx.doi.org/10.5194/hess-2016-647).
- 60. Kizza, T., Sekhar, M., Sudhakar Rao, M., Ruiz, L. (2016). Model based estimation of Turmeric yield response to saline groundwater irrigation. International Journal of Scientific Research and Engineering Studies (IJSRES), 3(10), pp.8-12.
- Sekhar, M., Riotte, J., Ruiz, L., Jouquet, P., Braun, J.J. (2016). Influences of Climate and Agriculture on Water and Biogeochemical Cycles: Kabini Critical Zone Observatory. Proceedings of Indian National Science Academy, Vol. 82 (3), pp.833-846. (http://dx.doi.org/10.16943/ptinsa/2016/48488).
- Mondal, A., Narasimhan, B., Sekhar, M., Mujumdar, P. P. (2016). Hydrological Modeling. Proceedings of Indian National Science Academy, Vol. 82 (3), pp.817-832. (http://dx.doi.org/10.16943/ptinsa/2016/48487).
- Robert, M., Dury, J., Thomas, A., Therond, O., Sekhar, M., Badiger, S., Ruiz, L., Raynal, H., Bergez, J.-E. (2016). CMFDM: A methodology to guide the design of a conceptual model of farmers' decision-making processes. Agricultural Systems, Vol. 148, pp.86-94. (http://dx.doi.org/10.1016/j.agsy.2016.07.010).
- Robert, M., Thomas, A., Sekhar, M., Badiger, S., Ruiz, L., Raynal, H., Bergez, J.-E. (2016). Adaptive and dynamic decision-making processes: A conceptual model of production systems on Indian farms. Agricultural Systems, (http://dx.doi.org/10.1016/j.agsy.2016.08.001).
- 65. Narvekar, P.S., Tomer, S.K., Sekhar, M., Shiv Mohan, Bandyopadhyay, S., Jackson, T. and Entekhabi, D. (2016). High Resolution Land Surface Geophysical Parameters Estimation from ALOS PALSAR data. Journal of The Remote Sensing Society of Japan, Vol.36 (4). (In Press).
- 66. Eswar, R., Sekhar, M., Bhattacharya, B.K. (2016). Disaggregation of LST over India: Comparative analysis of different vegetation indices. International Journal of Remote Sensing, (http://dx.doi.org/10.1080/01431161.2016.1145363).
- Crouseilles, N., Lemou, M., Raghurama Rao, S.V., Ruhi, A., Sekhar, M. (2016). Asymptotic preserving scheme for a kinetic model describing incompressible fluids. American Institute of Mathematical Sciences, Vol. 9(1), 51-74. (http://dx.doi.org/10.3934/krm.2016.9.51).

- Tomer, S.K., Al Bitar, A., Sekhar, M., Corgne, S., Bandyopadhyay, S., Sreelash, K., Sharma, A.K., Zribi, M., and Kerr, Y. (2015). Retrieval and multi-scale validation of soil moisture from multi-temporal SAR data in a tropical region. Remote Sensing, Vol. 7(6), 8128-8153 (<u>http://dx.doi.org/10.3390/rs70608128</u>).
- Ruiz L., Sekhar M., Thomas A., Badiger S., Bergez J.E., Buis S., Corgne S., Riotte J., Raynal H., Bandhyopadhya S. & Gascuel C. (2015). Adaptation of Irrigated agriculture to climate CHAnge: trans-disciplinary modelling of a watershed in South India. Hydrological Sciences and Water Security: Past, Present and Future. Proceedings of the International Association of Hydrological Sciences, Volume 366, 2015, pp.137-138. (http://dx.doi.org/10.5194/piahs-366-137-2015).
- Naveen K Garg, Raghurama Rao, S. V., Sekhar, M. (2015). Weak-strong hyperbolic splitting for simulating conservation laws. International Journal of Advances in Engineering Sciences and Applied Mathematics. (http://dx.doi.org/10.1007/s12572-015-0135-0).
- Papa, F., Frappart, F., Malbeteau, Y., Shamsudduha, M., Venugopal, V., Sekhar, M., Ramillien, G., Prigent, C., Aires, F., Pandey, R.K., Bala, K., Calmant, S. (2015). Satellite-derived surface and sub-surface water storage in the Ganges-Brahmaputra river basin. Journal of Hydrology- Regional Studies, (http://dx.doi.org/10.1016/j.ejrh.2015.03.004).
- Fovet, O., Ruiz, L., Faucheux, M., Molenat, J., Sekhar, M., Vertes, F., Aquilina, L., Gascuel-Odoux, C., Durand, P. (2015). Using long time series of agriculturalderived nitrates for estimating catchment transit times. Journal of Hydrology, Vol. 522, pp. 603–617 (http://dx.doi.org/10.1016/j.jhydrol.2015.01.030).
- Meunier, J.D., Riotte, J., Braun, J. J., Sekhar, M., Chalié, F., Barboni, D. and Saccone, L. (2015). Controls of DSi in streams and reservoirs along the Kaveri River, South India. Science of the Total Environment, Vol. 502, pp.103-113. (http://dx.doi.org/10.1016/j.scitotenv.2014.07.107).
- 74. Riotte, J., Ruiz, L., Audry, S., Sekhar, M., Mohan Kumar, M. S., Siva Soumya, B. and Braun, J.J. (2014). Impact of vegetation and decennial rainfall fluctuations on the weathering fluxes exported from a dry tropical forest (Mule Hole). Procedia Earth and Planetary Science, Vol. 10, pp.34-37. (http://dx.doi.org/10.1016/j.proeps.2014.08.007).
- 75. Orgogozo, L., Renon, N., Soulaine, C., Henon, F., Tomer, S.K., Labat, D., Pokrovsky, O.S., Sekhar, M., Abbaou, R., Quintard, M. (2014). An open source massively parallel solver for Richards equation: Mechanistic modelling of water fluxes at the watershed scale. Computer Physics Communications, Vol. 185, pp.3358-3371. (http://dx.doi.org/10.1016/j.cpc.2014.08.004).
- 76. Mehta, V.K., Goswami, R., Kemp Benedict, E., Sekhar, M., Malghan, D. (2014). Metabolic urbanism and environmental justice: The water conundrum in Bangalore, India. Environmental Justice, Vol. 7, No.5, pp.130-137.
- Riotte, J., Marechal, J. C., Audry, S., Kumar, C., Bedimo, J. P., Ruiz, L., Sekhar, M., Varma, M.R.R., Lagane, C. and Braun, J.J. (2014). Vegetation impact on stream chemical fluxes: Mule Hole watershed (South India) Geochimica and Cosmochmica Acta, Vol. 145, pp.116-138.

(http://dx.doi.org/10.1016/j.gca.2014.09.015).

- Eswar, R., Sekhar, M., Bhattacharya, B. K. (2013). A simple model for spatial disaggregation of evaporative fraction- Comparative study with thermal sharpened land surface temperature data over India. Journal of Geophysical Research Atmospheres, Vol. 118 (21), 12,029-12,044, (http://dx.doi.org/10.1002/2013JD020813).
- 79. Chaudhuri, A., Sekhar, M., Descloitres, M., Godderis, Y. and Braun, J.J. (2013). Constraining complex aquifer geometry with geophysics (2D ERT and MRS measurements) for stochastic modeling of groundwater flow. Journal of Applied Geophysics, Vol.98, 288-297.
- Sekhar, M., Shindekar, M., Tomer, S. K., and Goswami, P. (2013). Modeling the vulnerability of an urban groundwater system due to the combined impacts of climate change and management scenarios. Earth Interactions (AGU), Vol. 17(10), pp.1-25. (http://dx.doi.org/10.1175/2012EI000499.1).
- Sreelash, K., Sekhar, M., Ruiz, L., Buis, S., Bandyopadhyay, S. (2013). Improved modeling of groundwater recharge in agricultural watersheds using a combination of crop model and remote sensing. Special Issue of Journal of Indian Institute of Science, Vol. 93(2), pp. 189-207.
- Mehta, V.K., Sekhar, M., Malghan, D. (2013). Groundwater impacts of water consumption patterns in Bengaluru, India. Journal of Groundwater Research, Vol.2(1), pp.143-154.
- Siva Soumya, B., Sekhar, M., Riotte, J., Banerjee, A., Braun, J.J. (2013) Characterization of groundwater chemistry under the influence of lithologic and anthropogenic factors along a climatic gradient in Upper Cauvery basin, South India. Environmental Earth Sciences, Vol. 69 (7), pp.2311-2335. (http://dx.doi.org/10.1007/s12665-012-2060-x).
- 84. Rao, M. S., Sekhar, M., Rao, R. (2013). Impact of pit-toilet leachate on groundwater chemistry and role of vadose zone in removal of nitrate and E. coli pollutants. Environmental Earth Sciences, Vol. 68(4), pp.927-938.
- Mehta, V.K., Goswami, R., Kemp Benedict, E., Sekhar, M., Malghan, D. (2013). The social ecology of domestic water use in Bangalore. Economic and Political Weekly. Vol. XLVIII, No.15, pp. 40-50.
- 86. Majumdar, P.K., Sridharan, K., Mishra, G.C. and Sekhar, M. (2013). Unsteady equation for free recharge in a confined aquifer. Journal of Geology and Mining Research, Vol. 5 (5), pp. 114-123. (http://dx.doi.org/10.5897/JGMR11.023).
- 87. Tomer, S. K., Sekhar, M., Mohan Kumar, M. S., Mougin, E., Bandyopadhyay, S., Shiv Mohan. Estimation of surface soil moisture using SAR: a comparison between linear regression and copulas, IEEE Transactions on Geoscience and Remote Sensing. (Tentatively Accepted)
- Braun, J.J., Marechal, J.C., Riotte, J., Boeglin, J.L., Bedimo, J.P., Ndam Ngoupayou, J.R., Nyeck, B., Robain, H., Sekhar, M. and Viers, J. Elemental weathering fluxes and saprolite production rate in a Central African lateritic terrain (Nsimi, South Cameroon). (2012). Geochimica and Cosmochmica Acta. Vol. 99, pp. 243-270. (http://dx.doi.org/10.1016/j.gca.2012.09.024).
- 89. Sreelash, K., Sekhar, M., Ruiz, L., Sat Kumar, Guérif, M., Buis, S., Durand, P., and Gascuel - Odoux, C. (2012). Parameter estimation of a two-horizon soil profile by combining crop canopy and surface soil moisture observations using

GLUE. Journal of Hydrology, Vol. 456-457, pp. 57-67. (http://dx.doi.org/10.1016/j.jhydrol.2012.06.012).

 Mangiarotti, S., Sekhar, M., Berthon, L., Javeed, Y., Mazzega, P. (2012). Causality analysis of groundwater dynamics based on a Vector Autoregressive model in the semi-arid basin of Gundal (South India). Journal of Applied Geophysics, Vol. 83, pp.1-10.

(http://dx.doi.org/10.1016/j.jappgeo.2012.04.003.

- Sharma, P. K., Sekhar, M., Srivastava, R., Ojha, C. S. P. (2012). Temporal Moments for Reactive Transport through Fractured Impermeable / Permeable Formations. Journal of Hydrologic Engineering (ASCE), Vol. 17(12), pp. 1302-1314. (http://dx.doi.org/10.1061/(ASCE)HE.1943-5584.0000586).
- 92. de Bruin, A., de Condappa, D., Mikhail, M., Tomer, S. K., Sekhar, M., Barron, J. (2012). Simulated water resource impacts and livelihood implications of stakeholder developed scenarios in the Jaldhaka basin, India. Water International. Vol. 37(4), pp.492-508. (http://dx.doi.org/10.1080/02508060.2012.708976).
- 93. Siva Soumya, B., Sekhar, M., Riotte, J., Audry, S., Lagane, C., Braun, J. J. (2011). Inverse models to analyze the spatiotemporal variations of chemical weathering fluxes in a granito-gneissic watershed: Mule Hole, South India. Geoderma, Vol. 165, pp.12-24. (http://dx.doi.org/10.1016/j.geoderma.2011.06.015).
- 94. Meunier, J.D., Braun, J.J., Riotte, J., Kumar, C. and Sekhar, M. (2011). Importance of weathering and human perturbations on the riverine transport of Si. Aplied Geochemistry, Vol. 26, pp.S360-S362. (http://dx.doi.org/10.1016/j.apgeochem.2011.03.060).
- 95. Suresh Kumar, G., Sekhar, M. and Misra, D. (2011). Spatial and temporal moment analyses of decaying solute transport in a single fracture with matrix diffusion. Journal of Petroleum and Geosystems Science and Engineering, Vol.1(1), pp.1-20.
- Parate H. R., Mohan Kumar, M.S., Descloitres, M., Barbiero L., Ruiz L., Braun J. J., Sekhar M., Kumar C. (2011). Comparison of electrical resistivity by geophysical method and neutron probe logging for soil moisture monitoring in forested watershed. Current Science, Vol. 100, No.9, 1405-1412.
- 97. Sat Kumar, Sekhar, M., Mohan Kumar and Reddy, D. V. (2010). Estimation of soil hydraulic properties and their uncertainty: comparison between laboratory and field experiment. Hydrological processes, Vol. 24, pp. 3426-3435. (http://dx.doi.org/10.1002/hyp.7775).
- 98. Violette, A., Riotte, J, Braun, J.J., Oliva, P., Marechal, J.C., Sekhar, M., Jeandel, C., Subramanian, S., Prunier, J., Barbiero, L., Dupre, B. (2010). Formation and preservation of pedogenic carbonates in South India, links with paleomonsoon and pedological conditions: Clues from Sr isotopes, U Th series and REE s. Geochimica and Cosmochmica Acta. Vol. 74, Issue 24, pp.7059-7085 (http://dx.doi.org/10.1016/j.gca.2010.09.006).
- 99. Violette, A., Goddéris, Y., Maréchal, J.C., Riotte, J., Oliva, P., Mohan Kumar, M.S., Sekhar, M., Braun, J.J. (2010). Modelling the chemical weathering fluxes at the watershed scale in the Tropics (Mule Hole, South India): Relative

contribution of the smectite/kaolinite assemblage versus primary minerals. Chemical Geology, Vol. 277, Issues 1-2, pp.42-60. (http://dx.doi.org/10.1016/j.chemgeo.2010.07.009).

- Majumdar, P. K., Mishra, G. C., Sekhar, M., Sridharan, K. (2009). Coupled solution for forced recharge in confined aquifers. Journal of Hydrological Engineering, Vol.14 (12), pp. 1351-1358. (http://dx.doi.org/10.1061/(ASCE)1084-0699(2009)14:12(1351)).
- 101. Sat Kumar, Sekhar, M., Bandyopadhyay, S. (2009). Assimilation of remote sensing and hydrological data using adaptive filtering techniques for watershed modeling. Current Science, Vol.97(8), pp.1196-1202 (Invited article in Section: Civil engineering Research).
- 102. Ruiz, L., Murari, R. R. V., Mohan Kumar, M. S., Sekhar, M., Maréchal, J.C., Descloitres, M., Riotte, J., Sat Kumar, Kumar, C. and Braun, J.J. (2009). Water balance modelling in a tropical watershed under deciduous forest (Mule Hole, India) : regolith matric storage buffers the groundwater recharge process. Journal of Hydrology, Vol.380, Issue 3-4, pp.460-472. (http://dx.doi.org/10.1016/j.jhydrol.2009.11.020).
- 103. Soumya, B., Sekhar, M., Riotte, J. and Braun, J.J. (2009). Non-linear regression model for spatial variation in precipitation chemistry for South India. Atmospheric Environment, Vol. 43(5), pp. 1147-1152. (http://dx.doi.org/10.1016/j.atmosenv.2008.09.021).
- 104. Sat Kumar, Sekhar, M. and Reddy, D. V. (2009). Improving the disaggregation of daily rainfall into hourly rainfall using hourly soil moisture. Hydroinformatics in hydrology, hydrogeology and water resources. IAHS Publication. 331, pp.236-244.
- 105. Javeed, Y., Sekhar, M., Bandyopadhyay, S. and Mangiarotti, S. (2009). EOF and SSA analyses of hydrological time series to assess climatic variability and land use effects: a case study in the Kabini River basin of South India. IAHS Publication. 329, pp.167-177.
- Marechal, J. C., Varma, M. R. R., Riotte, J., Vouillamoz, J. M., Kumar, M. S. M., Ruiz, L., Sekhar, M., Braun, J. J. (2009). Indirect and direct recharges in a tropical forested watershed: Mule Hole, India. Journal of Hydrology, Vol. 364(3-4), pp. 272-284. (http://dx.doi.org/10.1016/j.jhydrol.2008.11.006).
- 107. Braun, J.J., Descloitres, M., Riotte, J., Fleury, S., Barbiero, L., Boeglin, J. L., Violette, A., Lacarce, E., Ruiz, L., Sekhar, M., Kumar, M.S. M., Subramanian, S., Dupre, B. (2009). Regolith mass balance inferred from combined mineralogical, geochemical and geophysical studies: Mule Hole gneissic watershed, South India. Geochimica and Cosmochmica Acta, Vol. 73 (4), pp. 935-961. (http://dx.doi.org/10.1016/j.gca.2008.11.013).
- 108. Majumdar, P. K., Sekhar, M., Sridharan, K, Mishra, G. C. (2008). Numerical simulation of groundwater flow with gradually increasing heterogeneity due to clogging. Journal of Irrigiation and Drainage Engineering (ASCE), Vol. 134(3), pp. 400-404. (http://dx.doi.org/10.1061/(ASCE)0733-9437(2008)134:3(400)).
- 109. Sekhar, M., Braun, J. J., Rao, K.V. H., Ruiz, L., Robain, H., Viers, J., Ndam, J. R., Dupre, B. (2008). Hydrogeochemical modeling of organo-metallic colloids in

the Nsimi experimental watershed, South Cameroon. Environmental Geology, Vol. 54(4), pp. 831-841. (http://dx.doi.org/10.1007/s00254-007-0866-8).

- Descloitres, M., Ruiz, L., Sekhar, M., Legchenko, A., Braun, J. J., Kumar, M. S. M., Subramanian, S. (2008). Characterization of seasonal local recharge using electrical resistivity tomography and magnetic resonance sounding. Hydrological Processes, Vol. 22(3), pp. 384-394. (http://dx.doi.org/10.1002/hyp.6608).
- 111. Chaudhuri, A., Sekhar, M. (2008). Modelling of solute transport in a mild heterogeneous porous medium using stochastic finite element method: Effects of random source conditions. International Journal for Numerical Methods in Fluids, Vol. 56(5), pp.557-586. (http://dx.doi.org/10.1002/fld.1541).
- 112. Kumar, G. S., Sekhar, M., Misra, D. (2008). Time-dependent dispersivity of linearly sorbing solutes in a single fracture with matrix diffusion. Journal of Hydrological Engineering (ASCE), Vol.13(4), pp. 250-257. (http://dx.doi.org/10.1061/(ASCE)1084-0699(2008)13:4(250)).
- Chaudhuri, A. and Sekhar, M. (2007). Stochastic finite element method for analysis of transport of nonlinearly sorbing solutes in 3-D heterogeneous porous media. Water Resources Research, 43, W07442. (http://dx.doi.org/10.1029/2006WR004892).
- 114. Chaudhuri, A. and Sekhar, M. (2007). Analysis of biodegradation in a 3-D heterogeneous porous medium using nonlinear stochastic finite element method. Advances in Water Resources, Vol.30, pp.589-605. (http://dx.doi.org/10.1016/j.advwatres.2006.04.001).
- 115. Sekhar, M., Suresh Kumar, G., and Misra, D. (2006). Numerical Modeling and Analysis of Solute Velocity and Macrodispersion for Linearly and Nonlinearly Sorbing Solutes in a Single Fracture with Matrix Diffusion. Journal of Hydrological Engineering (ASCE), Vol. 11(4), pp.319-328. (http://dx.doi.org/10.1061/(ASCE)1084-0699(2006)11:4(319)).
- 116. Sekhar, M. and Suresh Kumar, G. (2006). Modelling transport of linearly sorbing solutes in a single fracture: Asymptotic behavior of solute velocity and dispersivity. Geotechnical and Geological Engineering, Vol.24, pp.183-201. (http://dx.doi.org/10.1007/s10706-004-3053-7).
- 117. Chaudhuri, A. and Sekhar, M. (2006). Stochastic modeling of solute transport in 3-D heterogeneous media with random source condition. Stochastic Environmental Research and Risk Assessment, Vol.21, pp.159-173. (http://dx.doi.org/10.1007/s00477-006-0053-6).
- 118. Legchenko, A., Descloitres, M., Bost, A., Ruiz, L., Reddy, M., Girard, J.F., Sekhar, M., Mohan Kumar, M.S., Braun, J.J. (2006). Efficiency of Magnetic Resonance Soundings applied to characterization of anisotropic crystalline basement aquifers. Groundwater, Vol. 44 (4), pp.547-554. (http://dx.doi.org/10.1111/j.1745-6584.2006.00198.x).
- 119. Suresh Kumar, G., Sekhar, M.and Misra, D. (2006). Time dependent dispersivity behavior of non-reactive solutes in a system of parallel fractures. Hydrology and Earth System Science Discussions, Vol. 3(3), pp. 895-923.
- Anuraga, T.S., Ruiz, L., Mohan Kumar, M.S., and Sekhar, M., Leijnse, A. (2006). Modeling the effects of land use pattern on groundwater budget in semiarid regions – A case study of Bethamanagala sub-watershed, Kolar district,

South India. Agricultural Water Management, Vol. 84, 65-76. (http://dx.doi.org/10.1016/j.agwat.2006.01.017).

- 121. Sekhar, M., Rasmi, S.N., Javeed, Y., Gowrisankar, D., and Ruiz, L. (2006). Modeling the groundwater dynamics in a semi-arid hard rock aquifer influenced by boundary fluxes, spatial and temporal variability in pumping/recharge. Advances in Geoscience, Hydrological Sciences (ed) Park, N., Vol. 4, p. 173-181.
- 122. Chaudhuri, A. and Sekhar, M. (2005) Stochastic finite element method for probabilistic analysis of flow and transport in a 3-D heterogeneous porous formation. Water Resources Research, Vol.41, W09404. (http://dx.doi.org/10.1029/2004WR003844).
- 123. Suresh Kumar, G. and Sekhar, M.(2005) Spatial Moment analysis for transport of non-reactive solutes in a fracture-matrix system. Journal of Hydrologic Engineering (ASCE), Vol.10(3), pp.192-199. (http://dx.doi.org/10.1061/(ASCE)1084-0699(2005)10:3(192)).
- 124. Chaudhuri, A. and Sekhar, M. Analytical solutions for macrodispersion in 3-D heterogeneous porous medium with random hydraulic conductivity and dispersivity. Transport in Porous media, Vol.58(3), pp.217-241. (http://dx.doi.org/10.1007/s11242-004-6300-8).
- 125. Chaudhuri, A and Sekhar, M. (2005). Probabilistic analysis of pollutant migration from a landfill using stochastic finite element method. Journal of Geotechnical and Geoenvironmental Engineering (ASCE), Vol.131, No.8, pp.1042-1049. (http://dx.doi.org/10.1061/(ASCE)1090-0241(2005)131:8(1042)).
- 126. Hari Prasad, K. S., Mohan Kumar, M. S. and Sekhar, M. (2005). Analysis of saturated-unsaturated flow near a pumping well in an aquifer-water table aquitard system. Hydrology Journal, Vol. 28, No.1-2, pp. 19-32.
- 127. Hari Prasad, K.S., Mohan Kumar, M.S., Sekhar, M. and Chandrasekhar, B., (2005). A Simple Numerical Model for Assessment of Ground Water Recharge. Indian Water Resources Journal, Vol. 25(1), pp. 49-60.
- 128. Sekhar, M., Rasmi, S.N., Sivapullaiah, P.V. and Ruiz, L. (2004). Groundwater flow modeling of Gundal sub-basin in Kabini river basin, India. Asian Journal of Water, Environment and Pollution, Vol. 1(1-2), pp. 65-77.
- 129. Sekhar, M. and Sandhya, C. (2003). Modeling of in-situ aerobic biodegradation of BTEX compounds in groundwater: Impact of soil and chemical properties. Nature, Environment and Pollution Technology (Pub: Technoscience), Vol. 2(4), 2003, pp.411-421.
- Hari Prasad, K.S., Mohan Kumar, M.S. and Sekhar, M. (2001). Modelling Flow Through Unsaturated Zones: Sensitivity Unsaturated Soil Properties, Sadhana, (Pub: Proceedings of Indian Academy of Sciences in Engineering Sciences), Vol. 26(6), 2001, pp.517-528. (http://dx.doi.org/10.1007/BF02703457).
- Sekhar, M., Mohan Kumar, M.S. and Sridharan, K. (1994). A leaky aquifer model for hard rock aquifers. Applied Hydrogeology (Pub: Springer, Germany), Vol. 3, pp. 32-39. (http://dx.doi.org/10.1007/s100400050039).
- 132. Sekhar, M., Mohan Kumar, M.S. and Sridharan, K. (1994). Parameter estimation in an anisotropic leaky aquifer system. Journal of Hydrology (Pub:

Elsevier, The Netherlands), Vol. 163, pp. 373-391. (http://dx.doi.org/10.1016/0022-1694(94)90149-X).

- Sekhar, M., Mohan Kumar, M.S. and Sridharan, K. (1992). Parameter estimation in an aquifer water-table aquitard system. Journal of Hydrology (Pub: Elsevier, The Netherlands), V. 136, pp.177-192. (http://dx.doi.org/10.1016/0022-1694(92)90010-S).
- Sridharan, K., Sekhar, M. and Mohan Kumar, M.S. (1990). Analysis of aquifer water table aquitard system. Journal of Hydrology (Pub: Elsevier, The Netherlands), Vol. 114, pp. 175-189. (<u>http://dx.doi.org/10.1016/0022-1694(90)90080-H</u>).
- 135. Suryawanshi, M.R. Kumar, K.S., Chethan V. A., Shaw, B., Sukumaran, V., Kochar, A., Sekhar, M., Goswami, S, Chander, S., Bhaskar, Nikam, R., Nagesh Kumar, D. and Vishwakarma, B.D. A new law links specific yield to water level, impacting global groundwater estimates. Nature Water (under review).
- 136. Jia, A., Mallick, K., Upadhyaya, D., Hu, T., Szantoi, Z., Bhattacharya, B., Sekhar, M., Skoković, D., Sobrino, J.A., Ruiz, L., Boulet, G. A New Agricultural Drought Index at High Spatial Resolution Utilizing ECOSTRESS Land Surface Temperatures. Remote Sensing of Environment (Under review).
- 137. Gupta, V., Pandey, D., Baghdadi, N., Zribi, M. and Sekhar, M. Synergistic Evaluation of Sentinel-1A and EOS-04 C-band SAR based Surface Soil Moisture Retrieval Over an Indian Agricultural Watershed. IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (JSTARS). (Under review).
- 138. Chakraborty, A., Banja, S.N., Rao, L.N., Sekhar. M. Deciphering the Role of Water Table Depths in Shaping India's Carbon and Water Use Efficiencies. Ecological Informatics. (Under review).
- 139. Najem, S., Baghdadi, N., Bazzi, H.H., Zribi, M., Pandey, D.K. and Sekhar, M. Bare Surface Soil Moisture and Surface Roughness Estimation Using Multiband Multi-Polarization NISAR-like SAR Data. Frontiers in Remote Sensing. (Under review).

BOOK CHAPTERS

- 140. Ray. C., Sekhar, M. and Sharma, S. (2022). Unfolding Food, Energy, and Water Nexus. (In: Food, Energy and Water Nexus, Editors: C. Ray, M. Sekhar and S. Sharma). Chapter 1, pp.1-9. Springer. ISBN 978-3-030-85727-1. (https://link.springer.com/book/10.1007/978-3-030-85728-8).
- Sarangi and Sekhar, M. (2022). Technologies for enhancing water productivity in irrigated agriculture. (In: Food, Energy and Water Nexus, Editors: C. Ray, M. Sekhar and S. Sharma). Chapter 4, pp.67-95. Springer. ISBN 978-3-030-85727-1. (https://link.springer.com/book/10.1007/978-3-030-85728-8).
- 142. Upadhyaya, D.B. and Sekhar, M. (2022). State of agriculture in Karnataka, India and a case study of Food, Energy and Water Nexus from the Kabini Observatory. (In: Food, Energy and Water Nexus, Editors: C. Ray, M. Sekhar

and S. Sharma). Chapter 6, pp.109-127. Springer. ISBN 978-3-030-85727-1. (https://link.springer.com/book/10.1007/978-3-030-85728-8).

- 143. Tomer, S. K., Sreelash, K., Ruiz. L., and Sekhar, M. (2019). Management of ground water resources for agriculture under climate change: A case study in south India. (In: Water futures of India: Status of Science and Technology, Editors: P.P. Mujumdar and V.M. Tiwari). (In Press).
- 144. Subash, Y., Sekhar, M., Tomer, S.K., Sharma, A.K. (2017) A framework for assessment of climate change impacts on the groundwater system. (In: Sustainable Water Resources Management, Editors: C.S.P Ojha, S. Rao, T. Zhang and A. Bardossy). Chapter 14, ASCE Book Chapter, pp.375-397. (http://www.asce.org/templates/publications-book-detail.aspx?id=25740).
- 145. Sekhar, M., Javeed, Y., Bandyopadhyay, S., Mangiarotti, S. and Mazzega, P. (2011). Groundwater management practices and emerging challenges: Lessons from a case study in the Karnataka State of South India. In: IAHR Monograph on Groundwater Management Practices (eds.) Findkakis, A.N, and K. Sato. Chapter 5, CRC Press, ISBN 10: 0415619874.
- 146. Mohan Kumar, M.S., Manohar, U., D'Souza, C. D., Jamwal, P., and Sekhar, M. (2011). Urban water supply and management: A case study of Bangalore city, India. In: Bengaluru-Water Problems of the Fastest Growing City of India, (edited by) Subhajyoti Das, Geological Society of India, pp. 50-76.
- 147. Sekhar, M. and Ruiz, L. (2006). Regional Groundwater Modeling: A Case study of Gundal sub-basin, Karnataka, India. In: Hydrology and Watershed Services in the Western Ghats of India (eds) J. Krishnaswamy, S. Lele and R. Jayakumar. Publishers: Tata McGraw Hill, New Delhi, ISBN 0-07-058568-7, pp.81-103.
- 148. Sekhar, M. (2006). Flow and Contaminant Transport Modelling in Fractured Rock Media. In: "Groundwater Modelling and Management", (ed.) N. C. Ghosh and K. D. Sharma. Capital Publishing Company, New Delhi, p.612, ISBN 81-85589-44-5.
- 149. Pradeep, M. V. and Sekhar, M. (2004). Hydrologic Simulation Using SWAT Model: A case study for TG Halli catchment in Arkavati River Basin, Karnataka. In: "Integrated Water Resources Planning and Management" (eds.) K. Srinivasa Raju, A.K.Sarkar and Motilal Dash. Publishers: Jain Brothers, New Delhi, ISBN 81-86321-98-5, pp.91-98.

PATENT

150. Guru Prasad, A.S., Sundarrajan, A., Sekhar, M., Prateek, C. (2014). Detection and characterization of fractures in bore-wells using single FBG sensor device. Patent No. 3378/CHE/2014.

CONFERENCES

1. Zribi, M., Huc, M., Antokoletz, S., Sekhar, M. (2019). Soil moisture estimation using CYGNSS constellation. IGARSS 2019, 28 July- 2 August 2019, Yokohama, Japan.

- Scheidegger, J., Joseph, J., Jackson, C., Ghosh, S., Sekhar, M., Tomer, S. K., O'Keeffe, J., and Moulds, S. (2019). Towards modelling the effects of groundwater-fed irrigation on the Ganges basin: incorporating 2D lateral groundwater flow and groundwater and surface water-fed irrigation in the VIC macroscale hydrological model. EGU 2019, 7-12 April 2019, Vienna.
- 3. Troldborg, M., Buvaneshwari, S., Nowak, W., Ruiz, L., Helliwell, R., Ferrier, R.C., Sekhar, M. (2019). Stochastic inverse modelling of groundwater flow and nitrate pollution in the Berambadi catchment. EGU 2019, 7-12 April 2019, Vienna.
- Upadhyaya, D., Sekhar, M., Sudhakar Rao, M., Ruiz, L. (2018). Scale effects in estimation of water budgets in semi-arid irrigated agricultural plots. EGU General Assembly 2018, Session HS8.3.4/SSS13.81 - Soil Root Interactions, April 2018, Vienna.
- 5. Scheidegger, J., Jackson, C., Filgueira, R., Sekhar, M., Tomer, S. K., O'Keeffe, J., and Moulds, S. (2018). Towards modelling the effects of groundwater-fed irrigation on the Ganges basin: incorporating 2D lateral groundwater flow in the VIC macroscale hydrological model. EGU 2018, April 2018, Vienna.
- 6. Sekhar, M. (2015). Adaptation of Irrigated agriculture to climate CHAnge: Retrieving relevant information for distributed modeling of impact of Climate Change of water resources. International conference on Our Common Future Under Climate Change, July 7-10, 2015, Paris. (Key note presentation in Session 25 - Agriculture adaptation).
- Ruiz, L., Sekhar, M., Thomas, A., Badiger, S., Bergez, J.E., Buis, S., Corgne, S., Riotte, J., Raynal, H., Bandyopadhyay, S., Gascule, C. (2015). Adaptation of irrigated agriculture to climate change: trans-disciplinary modelling of a watershed in South India. Hydrological Sciences and Water Security: Past, Present and Future. Proceedings of the 11th Kovacs Colloquium, Paris, France, June 2014. IAHS Publ. 366, 2015.
- 8. Sreelash, K., Buis, S., Guerif, M., Sekhar, M., Ruiz, L. (2014). Quantifying the uncertainty in the estimation of multi-layered soil hydraulic properties at catchment scale. TERENO International Conference, Sep. 29-Oct. 2, 2014, Bonn, Germany.
- 9. Tomer, S.K., Al Bitar, A., Sekhar, M., Corgne, S., Kerr, Y. H. (2014). Spatiotemporal downscaling of soil moisture from passive microwave using active microwave. Microrad-2014, 13th meeting on Microwave Radiometry and Remote Sensing of the Environment. 24-27 March, Pasadena, CA, USA.
- Orgogozo, L., Renon, N., Soulaine, C., Henon, F., Tomer, S.K., Labat, D., Pokrovsky, O.S., Sekhar, M., Abbaou, R., Quintard, M. (2014). RichardsFOAM: A massively parallel solver for Richards equation. 9th OpenFOAM workshop, Zagreb, June 2014.
- Tomer, S.K., Al Bitar, A., Sekhar, M., Merlin, O., Bandyopadhyay, S., Kerr, Y. H. (2013). Synergy between passive (SMOS) and active (RADARSAT-2) microwave soil moisture over Berambadi, India. EGU General Assembly Conference Abstracts 15, 9848.
- 12. Buis, S., Sreelash K., Guerif, M., Sekhar, M., Ruiz, L., Tomer, S.K., Sharma, A.K., Ruget, F. (2013). Estimation of multilayered soil properties by inversion of a crop model using surface soil moisture and LAI: evaluation on experimental

datasets. 15th Annual Conference of the International Association for Mathematical Geosciences. Madrid, Spain, 2-6 September 2013.

- Guillerme, S., Maire E., Kumar C., Braun J.J., Riotte J., Sekhar, M. (2013). From Ragi to Paddy- Agricultural changes induced by irrigation and impact of public policies on the farmers' practices (Karnataka – India). International, Interdisciplinary conference on Environmental dynamics, public policies and local practices: How to deal with interactions? 4-7 June 2013, Toulouse, France.
- 14. Sreelash, K., Sekhar, M., Ruiz, L., Tomer, S. K., Bandyopadhyay, S., Buis, S., Guerif, M. and Gascuel Odoux, C. (2012). Uncertainty in estimation of potential recharge in tropical and temperate catchments using a crop model and microwave remote sensing. (Oral presentation) in H24C session Remote sensing, Modeling, and Ground-Based monitoring of groundwater resources. AGU Fall meeting, December 3-7, 2012, San Francisco, USA. AGU Fall Meeting Abstracts 1, 05.
- Ruiz, L., Fovet, O., Sekhar, M., Riotte, J., Braun J.J, Gascuel Odoux, C., Durand, P. (2012). Imbalances of Water and Solutes in Experimental Watersheds: Spatial or Temporal Origin? H11G: Imbalance of Water in Nature, #1270, AGU Fall meeting 2012, December 3-7, 2012, San Francisco, USA. Eposter: http://fallmeeting.agu.org/2012/eposters/eposter/h11g-1270/. AGU Fall Meeting Abstracts 1, 1270.
- Tomer, S.K., Al Bitar, A., Sekhar, M., Merlin, O., Bandyopadhyay, S., Kerr, Y. H. (2012). An Inter-comparison of RADARSAT-2, SMOS and Field Measured Soil Moisture in the Berambadi Watershed, South India. H13F: Pushing the Envelope in Remote Sensing for Hydrology: SMOS and Future Mission/Sensor Concepts, # 1425, AGU Fall meeting 2012, December 3-7, 2012, San Francisco, USA. AGU Fall Meeting Abstracts 1, 1425.
- Sekhar, M., Mehta, V.K., Malghan, D., Kemp Benedict, E. (2012). The coupled social-hydrology of Bangalore city, India. H23F: Sociohydrology: Discovering Patterns in Coupled Human-Water Resource Systems, #1459, AGU Fall meeting 2012, 3-7 December, San Francisco, USA. Eposter: <u>http://fallmeeting.aqu.org/2012/eposters/eposter/h23f-1459/</u>
- Sreelash, K., Sekhar, M., Ruiz, L., Tomer, S. K., Bandyopadhyay, S. and Gascuel - Odoux, C. (2012). Agro-hydrological models combined with microwave remote sensing data for improved management of groundwater irrigation, 5th International Groundwater Conference, December 18-21, 2012, Aurangabad, India (Keynote – Invited).
- Sreelash, K., Sekhar, M., M., Ruiz, L., Tomer, S. K., Bandyopadhyay, S., Buis, S., Guerif, M., Durand, P., Gascuel Odoux, C. (2012). Estimation of multilayered soil properties using agro-hydrological models and microwave remote sensing. 2nd International Conference on Hydropedology, Leipzig, Germany, July 2012.
- de Condappa, D., Tomer, S.K., Sekhar, M., de Bruin, A., Mikhail, M., Barron, J. (2011). Assessing the effects of agricultural changes on the surface and ground water resources in the Jaldhaka sub-basin of Brahmaputra river basin, India. Fourth International Groundwater Conference, Madurai, October 2011.
- 21. Tomer, S.K., Sreelash, K., Sekhar, M., Ruiz, L. and Gascuel Odoux, C. (2011). Coupling agricultural and hydrological models for improved management of

groundwater irrigation under climate change. Vol. 13, EGU General Assembly 2011.

- 22. de Condappa, D., de Bruin, A., Mikhail, M., Barron, J., Tomer, S.K., Sekhar, M. (2011). The challenges and potential for improved agricultural water management in the Jaldhaka watershed. International Conference On Sustainable Water Resources Management And Climate Change Adaptation, 17 19 February 2011, Durgapur.
- 23. Sat Kumar, Javeed, Y. and Sekhar, M. (2010). An alternative approach for estimation of groundwater recharge and discharge in a hard rock aquifer. Workshop on Groundwater Resources Estimation, February 23-24, 2010, New Delhi.
- Sat Kumar, Sekhar, M., Mohan Kumar, M. S., Bandyopadhyay, S. (2010). Estimating soil moisture and its uncertainty by assimilating remote sensing data into a distributed hydrological model at the watershed scale. AOGS 2010, HS07-A008, July 5-9, 2010, Hyderabad.
- 25. Ruiz, L., Varma, R.M., Mohan Kumar, M.S., Sekhar, M., Molenat, J., Marechal, J.C., Descloitres, M., Riotte, J., Tomer, S.K, Braun, J.J. (2010). Transpiration by tree roots in the deep unsaturated regolith buffers the recharge process in a tropical watershed under deciduous forest (Mule Hole, India). Vol. 12, EGU General Assembly 2010, May 2-7, 2010, Vienna.
- Deschamps, P., Sylvestre, R., Hamelin, B., Bourlès, D., Riotte, J., Javeed, Y., Sekhar, M., and Braun, J-J. (2010). Long-term erosion rates in tropical zone inferred from cosmogenic nuclides: Kabini / Kaveri Basin - Southern India. GM3.1, EGU General Assembly 2010, May 2-7, 2010, Vienna.
- 27. Sekhar, M., Javeed, Y., Soumya, B., Bandyopadhyay, S. and Mazzega, P. (2009). Time series and water balance models to assess the climatic variability and land use effects in Kabini river basin, South India. Goldschmidt 2009, June 2009, Davos, Switzerland.
- 28. Soumya, B. S., Sekhar, M., Riotte, J., Braun, J.J. (2010). Weathering rate estimate of groundwater in silicate rocks using mass balance approach. International conference by EWRI ASCE, 5 7 January 2010, Chennai.
- Braun, J.J., Descloitres, M., Riotte, J., Deschamps, P., Violette, A., Maréchal, J.C., Sekhar, M., Mohan Kumar, M.S. and Subramanian, S. (2009). Contemporary versus long-term weathering rates in Tropics: Mule Hole, South India. Goldschmidt 2009, June 2009, Davos, Switzerland.
- Riotte, J., Marechal, J.C., Akerman, A., Audry, S., Oliva, P., Ruiz, L., Fraysse, F., Pokrovski, O., Lagane, C., Sekhar, M., and Braun, J.J. (2009). Influence of vegetation on chemical fluxes in a tropical watershed: Mule Hole, South India. Goldschmidt 2009, June 2009, Davos, Switzerland.
- 31. Sekhar, M., Javeed, Y., Bandyopadhyay S. and Mazzega, P. (2009). Analysis of groundwater dynamics due to climatic variability and land use effects. Proceedings of workshop on Groundwater scenario, water quality and enhancement of water use efficiency in Karnataka & Goa. Central Ground Water Board, Bangalore, 25-26 Feb 2009, pp. 58-65.

- 32. Sekhar, M., Javeed, Y., and Mangiarotti, S. (2008). Climatic variability and anthropogenic effects on groundwater behavior in Cauvery River Basin, South India. International Groundwater Conference, March 2008, Jaipur, India.
- 33. Soumya, B., Sekhar, M., Braun, J.J. and Riotte, J. (2008). Hydrogeochemistry in the narrow zone of climatic variation in the Kabini river basin, Southern India. Intl conference 'Water down under 2008', April 2008.
- 34. Varma, M. R. R., Mohan Kumar, M. S., Marechal, J.C., Ruiz, L., Sekhar, M. and Braun, J.J. (2008). Estimation of evapotranspiration in an experimental watershed in a deciduous forest in South India. In Proceedings of International Symposium on Low Land Technology, ISLT 2008, Busan, Korea.
- 35. Chaudhuri, A. and Sekhar, M. (2007). Prediction uncertainty of solute transport in heterogeneous porous media under random recharge. International conference on Civil Engineering in the New Millennium: Opportunities and Challenges (CENeM-2007), January 2007, Howrah, India.
- 36. Descloitres, M., Ruiz, L., Sekhar, M., Legchenko, A., Bost, A., Mohan Reddy, M., and Harshad, P. (2006). MRS and ERT for localizing temporary recharge in heterogeneous aquifer. MRS 2006 Conference, November 2006, Madrid, Spain.
- Twarakavi, N.K.C., Misra, D., and Sekhar, M. (2006). Influence of spatial scales on the performance of saturated subsurface flow and transport models. American society of Agricultural and Biological Engineers (ASABE) Annual International Meeting, July 2006, Portland, Oregon, USA.
- 38. Chaudhuri, A. and Sekhar, M. (2006). Modeling of solute transport in a heterogeneous porous medium with a random source using stochastic finite element method, CMWR XVI, June 2006, Copenhagen, Denmark.
- 39. Sekhar, M., Chaudhuri, A., Fleury, S. and Descloitres, M. (2006). Stochastic modeling of groundwater flow in the saprolite of a tropical gneissic watershed. International conference IAHR-GW2006 on Groundwater in Complex Environments, June 2006, Toulouse, France.
- Legchenko, A., Descloitres, M., Bost, A., Ruiz, L., Reddy, M., Girard, J.F., Sekhar, M., Mohan Kumar, M.S., and Braun, J.J. (2005). Etude de capacitédes sondages RMP à localiser les aquifères de socle, 5ème colloque, GEOFCAN, Septembre 2005, Orléans, France.
- 41. Legchenko, A., Descloitres, M., Bost, A., Ruiz, L., Reddy, M., Girard, J.F., Sekhar, M., Kumar, M.S., and Braun, J.J. (2005). Characterization of fractured rock aquifers by surface geophysical methods. 11th European Meeting of Environmental and Engineering Geophysics, September 2005, Palermo, Italy.
- 42. Chaudhuri, A., Sekhar, M., Descloitres, M. and Legchenko, A. (2005). Stochastic modeling combined with geophysical investigations for groundwater fluxes at watershed scale in the weathered gneissic formations of South India, MODELCARE-2005, June 2005, The Hague, The Netherlands.
- 43. Sekhar, M., Rasmi, S.N., Javeed, Y. and Ruiz, L. (2005). Modeling the groundwater dynamics in a hard rock aquifer influenced by boundary fluxes, spatial and temporal variability in pumping/recharge in a semi-arid, intensely irrigated agricultural basin, 2nd Asia-Oceania Geophysical Society Annual Meeting (AOGS-2005), Singapore, June 2005 (Invited Paper).

- Sekhar, M., Rasmi, S. N., Kumar, C., and Ruiz, L. (2005). Importance of lateral groundwater flow modeling in a semi-arid, intensely irrigated agricultural basin: A Case study of Gundal sub-basin in Cauvery river basin, India. International Conference on Hydrological Perspectives for Sustainable Development (HYPESD-2005), 23-25 February 2005, Roorkee, India.
- 45. Sekhar, M. and Sivapullaiah, P.V. (2004). Carbonate and bicarbonate chemistry for assessing hydrogeological dynamics in a sub-basin of Kabini river basin in Karnataka. 11th National Symposium on Hydrology, November 2004, Roorkee, India.
- 46. Chaudhuri, A. and Sekhar, M. (2004). Numerical modeling of solute transport in heterogeneous porous media using upscaling of flow and transport parameters, International conference on Hydraulic Engineering: Research and Practice (ICON-HERP-2004), Oct. 2004, Roorkee, India.
- 47. Sekhar, M., Rasmi, S. N., and Ruiz, L. (2004). Regional groundwater modeling: A case study of gundal sub-basin, Karnataka, India. National Seminar on Forest, Water and People (FORWAP - 2004), July 2004, Belgaum, India.
- 48. Sekhar, M., Rasmi, S.N. and Hayagreeva Rao, K.V. (2004). Hydrogeochemical modeling: A case study of Gundal sub-basin of Kabini river basin, Karnataka, India. Workshop on Interaction of Surface water and Groundwater, April 2004, Deltaic Regional Centre (NIH), Kakinada, India.
- 49. Sekhar, M., Hayagreeva Rao, K.V. and Braun, J.J. (2004). Modeling Hydrogeochemical behavior of a swamp: A case study of Mengong brook watershed in Nyong basin, Cameroon. Invited paper for the International workshop on Riverbank Filtration, March 2004, Roorkee, India.
- Sekhar, M. and Pradeep, M. V. (2003). Hydrologic modeling of a watershed using SWAT model: A case study for Arkavati river basin, Karnataka, India, International Conference on Water and Environment (WE – 2003), Dec 2003, Bhopal, India.
- 51. Thampi, S. and Sekhar, M. (2002). Effect of sorption kinetics on aerobic biodegradation in stratified porous media, International Conference on Water and Wastewater: Perspectives of Developing Countries, Dec 2002, New Delhi.
- 52. Suresh Kumar, G. and Sekhar, M. (2002). Scale dependent dispersivity behavior of non-reactive solutes in a fracture-matrix system, International Conference on Water and Wastewater: Perspectives of Developing Countries, Dec 2002, New Delhi.
- 53. Thampi, S. and Sekhar, M. (2002). Analysis of the effects of rate limited desorption on the transport of nonlinearly biodegradable contaminants, XIV International Conference on Computational Methods in Water Resources, Delft, June 2002.
- 54. Hayagreeva Rao, K. V. and Sekhar, M. (2002). A numerical model for simulating transport and geochemistry in groundwater, International Conference on Sustainable Development and Management of Groundwater Resources in Semi-Arid Region with Special regerence to Hard Rock, Dindigul, India, Feb. 2002.
- 55. Sekhar, M., Hayagreeva Rao, K.V. and Jyothish, S. (2002). Application of a hydrogeochemical model for analysing quality of groundwater during mining

activity, National Seminar on Modern Trends in Geo-Scientific Techniques (Geotechniques: 2002), Ranchi, India, June 2002.

- 56. Nagaraj, M.K., Sridharan, K. and Sekhar, M. (2001). Sequential estimation of aquifer parameters in regional groundwater system, International Conference on Civil Engineering, Bangalore, July 2001.
- 57. Jyothish, S., Sekhar, M. and Mohan Kumar, M. S. (1997). A finite volume method for modelling in-situ bioremediation of a groundwater system, 7th Asian Congress of Fluid Mechanics (7ACFM), Madras, India, December 1997.
- Sekhar, M., Jyothish, S. and Mohan Kumar, M. S. (1997). Numerical Modelling for the Design of In-Situ Aquifer Bioremediation, Indo-German Workshop on Water Pollution – Assessment and Management, October 1997, NGRI, Hyderabad, India.
- 59. Jyothish, S. and Sekhar, M. (1996). Groundwater Pollution: A Numerical Approach, Environmental Pollution, WEEP-96, Kollam, August 1996.
- 60. Sekhar, M., Nagaraj, M.K., Niranjan Reddy, P.V. and Sridharan, K. (1996). Parameter Estimation in Hydrologic and Hydraulic Systems, HYDRO -96, December 1996, Kanpur, India.
- 61. Sekhar, M. and Jyothish, S. (1996). Groundwater Contamination Pollutant Transport Modelling, Nat. Symp. on Recent Advances in Civil Engineering, December 1996, Tirupati, India.
- 62. Hari Prasad, K.S., Mohan Kumar, M.S. and Sekhar, M. (1995). Assessment of Parameter Estimates in a Hard rock Aquifer: Influence of the Unsaturated zone", Solutions 95, XXVI IAH Congress, Canada, June 1995.
- 63. Mohan Kumar, M.S., Hari Prasad, K.S. and Sekhar, M. (1995). A Finite Analytic Model for Analysis of Recharge through Unsaturated Soils, First International Conference on Unsaturated Soils, Paris, Sept. 1995, pp.1095-1100.
- Sekhar, M. and Sridharan, K. (1994). Methodology for Assessment of Ground water in Critical and SemiCritical Hard Rock Areas, 1994. National Workshop on Development of ground Water in Critical and Semi-Critical Areas, Alternatives, Options and Strategies, Jan.1994, pp.31-44.
- 65. Hari Prasad, K.S., Mohan Kumar, M.S. and Sekhar, M. (1994). Flow to a Well in a Fractured Aquifer : Influence of the Unsaturated Zone, Computational Methods in Water Resources X, Heidelberg Germany, A. Peters et al. (eds), Kluwer Academic Press, 1994, pp.675-682.
- 66. Sekhar, M., Hari Prasad, K.S., Mohan Kumar, M.S. and Sridharan, K. (1992). Uncertainties and Data Requirements in the Parameter Estimation of an Anisotropic Leaky Aquifer System, IX International Conference on Computer Methods in Water Resources, Denver, USA, June 1992.
- 67. Sridharan, K. and Sekhar, M. (1992). A Numerical model for Artificial Recharge in Granitic Terrains, Workshop on Artificial Recharge of Ground Water in Granitic Terrain, Banglaore, India, Oct. 1992, pp. 171-193.
- 68. Sridharan, K., Mohan Kumar, M.S. and Sekhar, M. (1992). Ground Water Flow and Storage in Hard rock Aquifers, Workshop on Artificial Recharge of Ground Water in Granitic Terrain, Bangalore, India, Oct. 1992, pp. 86-107.
- 69. Sridharan, K., Mohan Kumar, M.S. and Sekhar, M. (1989). An Overview of Flow Simulation Models in Fractured Aquifers, International Workshop on Appropriate

Methodologies for Development and Management of Groundwater Resources in Developing Countries (IGC-89), Hyderabad, India, Feb. 28 - March 4, 1989, pp. 485-498.

TECHNICAL REPORTS

- 1. Sekhar, M. (2022). Development of groundwater flow model and preparation of aquifer management plans. Central Ground Water Board.
- Sekhar, M. (2019). Integrated hydrological assessment, Monitoring and Documentation. Sponsored by Karnataka Watershed Development Department & World Bank (Sujala III Project).
- Sekhar, M. and Mujumdar, P.P (2017). Evaluation of Scheme of Ground Water Management & Regulation. Report prepared for Central Ground Water Board, Ministry of Water Resources, River Development & Ganga Rejuvenation, Govt. of India., 31p.
- Sreelash, K., Sekhar, M., Tomer, S. K., Bandyopadhyay, S., and Mohan Kumar, M. S. (2014). Estimation of soil hydraulic properties in a catchment using agro-hydrological models and microwave remote sensing. Summary technical report for the Project no ISTC/MCV/MSE/302, November 2014, pp. 1-6.
- Sreelash, K., Sekhar, M., Tomer, S. K., Bandyopadhyay, S., and Mohan Kumar, M. S. (2014). Estimation of soil hydraulic properties in a catchment using agro-hydrological models and microwave remote sensing. Summary technical report for the Project no ISTC/MCV/MSE/302, November 2014, pp. 1-6.
- Tomer, S. K., Sekhar, M., Mohan Kumar, M. S., Mougin, E., Bandyopadhyay, S., Maity, S. and Shiv Mohan (2013). Near surface soil moisture retrieval using RISAT SAR data at watershed scale - technique development towards operational drought assessment. Technical report for the ISRO/MCV/MSE/098 project, January 2013, pp.1-35.
- Tomer, S. K., Sekhar, M., Bandyopadhyay, S., Maity, S., Sreelash, K., Sharma, A.K., Al Bitar, A., Kerr, Y. (2013). A Preliminary Report on Retrieval of Surface Soil Moisture using RISAT-1. Technical report for the ISRO/MCV/MSE/098 project, September 2013, pp.1-14.
- de Condappa, D., Barron, J., Tomer, S.K., Sekhar, M. (2012). Application of SWAT and a Groundwater Model for Impact Assessment of Agricultural Water Management Interventions in Jaldhaka Watershed: Data and Set Up of Models. Stockholm Environment Institute, Technical Report - 2012, (http://awmsolutions.iwmi.org/Data/Sites/3/Documents/PDF/publicationoutputs/learning-anddiscussion- briefs/application-of-swat.pdf), 72pp.
- Sekhar, M. (2012). Groundwater level dynamics, Spatio-temporal analysis of groundwater levels, Groundwater balance estimates and Numerical Modeling of Groundwater Flow in the Mulbagal Town. Technical reports for the Project no. ARGO/MCV/MSE/001, May 2012, Part 1 (pp.1-57), Part 2 (pp.1-21), Part 3 (pp.1-23), Part 4 (pp.1-47).

- 10. Tomer, S. K., Sekhar, M., Mohan Kumar, M. S., Bandyopadhyay, S., Maity, S. and Shiv Mohan (2012). Near surface soil moisture retrieval using RISAT SAR data at watershed scale technique development towards operational drought assessment. Technical report for the ISRO/MCV/MSE/098 project, January 2012, pp.1-16.
- 11. Sat K. Tomer, Sekhar, M., Mohan Kumar, M.S., Bandhyopadhyay, S. (2012). Estimation of evapotranspiration using only Satellite data at AMBHAS site. Summary technical report for the Project no. ISTC/MCV/MSE/248, January 2012, pp. 1-5.
- 12. Sekhar, M. (2011). Brief study on hydrogeology and land use changes along the Bagur-Navile tunnel in Channarayapatna Taluka of Hassan district. Karnataka Neervari Nigam Limited (KNNL), Bangalore, April 2011, 31pp.
- Sekhar, M. and Mohan Kumar, M. S. (2010). Hydrogeological study along the proposed tunnel of upper Bhadra project near Ajjampura in Tarikere taluka of Chikmaglur district. Karnataka Neeravari Nigama Ltd. (KNNL), Bangalore, May 2010, 102pp.
- 14. Sat K. Tomer, Sekhar, M., Mohan Kumar, M.S., Bandhyopadhyay, S. (2010). Root zone soil moisture retrieval by assimilation of near surface measurements. Summary technical report for the Project no. ISTC/CCE/MS/214, January 2010, pp. 1-8.
- 15. Sekhar, M. and Mohan Kumar, M. S. (2009). Geohydrological studies along the Metro rail alignment in Bangalore. Bangalore Metro Rail Corporation Ltd., Bangalore. January 2009, 56p.
- Mohan Kumar, M.S., Sekhar, M., Sridharan, K., Govindaram, H.S. (2007). Sump model study for SIPAT STPP Stage - I (3x660MW) CW pump house, M/s. National Thermal Power Corporation Ltd., Noida, September 2007, 20p.
- 17. Mohan Kumar, M.S., Sekhar, M., Sridharan, K., Govindaram, H.S. (2005). Hydraulic model study for raw water pump sump and forebay - SIPAT stage II, M/s. Degremont Ltd., New Delhi, March 2005, 24p.
- Legchenko, A., Descloitres, M., Bost, A., Ruiz, L., Reddy, M. M., Sekhar, M., Mohan Kumar, M.S., and Braun, J-J. (2005). Characterization of anisotropic crystalline basement aquifers using magnetic resonance soundings (Southern India), IRD-IISc Report, Feb. 2005, 140p.
- 19. Sekhar, M., Mohan Kumar, M.S., Sivapullaiah, P.V., Braun, J-J., Ruiz, L., Descloitres, M., Barbiero, L., and Riotte, J. (2005). An integrated study of hydrology and mineralogy for assessment of water quantity and quality in the sub-catchment/ watershed. IRD-IISc Report, March 2005.
- 20. Sekhar, M., Gourisankar, D., Rasmi, S.N. and Ruiz, L. (2005). Application of integrated surface water and groundwater models using remote sensing and GIS for Gundal river basin, IISc & ISRO Space Technology Cell Report, August 2005.
- Sekhar, M., Pradeep, M.V., Narayana, M.R.V.P. and Hayagreeva Rao, K.V. (2003). Water quality modeling combined with Remote Sensing and GIS (Parts A & B), IISc & ISRO Space Technology Cell Report, November 2003, 128p.

- 22. Sukumar, R., Mujumdar, P.P. and Sekhar, M. (2003). National circumstances: Forests and other natural ecosystems and water resources, M/s. Winrock International, New Delhi, November 2003, 44p.
- 23. Sukumar, R., Mujumdar, P.P., Sekhar, M. and Sivapullaiah, P.V. (2001). Impact of Iron Ore mining in the Kudemukh National Park, Karnataka Forest Department, Bangalore, January 2001.
- 24. Sridharan, K. and Sekhar, M. (2000). Sardar Sarovar canal based drinking water supply project, Surge analysis for A and K networks, M/s. Montgomery Watson Consultants, August 2000, 55p.
- 25. Sridharan, K. and Sekhar, M.(1998). Surge studies for the pumping main from Thadoli to Baghera, M/s. Bhoortanam & co., Secunderabad, August 1998, 11p.
- Sridharan, K. and Sekhar, M.(1998). Surge analysis for Mhaisal lift irrigation scheme Stage 3 and Stage 4, Irrigation Department, Government of Maharashtra, October 1998, 46p.
- Sridharan, K. and Sekhar, M. (1998). Surge studies for Churu pipe line project - PL1 (Part 2), M/s. Bhooratnam & Co., Secunderabad, July 1998, 16p.
- 28. Sridharan, K. and Sekhar, M. (1998). Surge studies for Churu pipe line project - PL1 (Part 3), M/s. Bhooratnam & Co., Secunderabad, December 1998, 27p.
- Sridharan, K. and Sekhar, M. (1997). Surge studies for Churu pipe line project - PL1 (Part 1), M/s. Shridhan International, Bangalore, July 1997, 36p.
- 30. Sridharan, K. and Sekhar, M. (1997). Surge studies for Churu pipe line project PL2, M/s. Subhash Projects and Marketing Ltd., New Delhi, March 1997, 23p.
- Sridharan, K. and Sekhar, M. (1997). Surge analysis for Takari lift irrigation scheme Stage 1 and Stage 2, Irrigation Department, Government of Maharashtra, September 1997, 56p.
- 32. Sridharan, K. and Sekhar, M. (1997). Surge protection system for water supply scheme to industrial growth centre, Dharwad, Karnataka Industrial Areas Development Board, Bangalore, December 1997, 25p.