



Uditul Buragohain

# Groundwater Heavy Metal Contamination

A GIS-based Study in Dhemaji District of Assam, India



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# Groundwater Heavy Metal Contamination Gis Based

**Pradeep Bhaskarrao Jadhav**



## **Groundwater Heavy Metal Contamination Gis Based:**

**Groundwater Heavy Metal Contamination** Buragohain Mridul, 2015-11-30 This book provides an overview of the current state of knowledge on the occurrences and distribution of heavy metals viz iron lead arsenic cadmium aluminium copper nickel manganese zinc and chromium problems in water supplies in Dhemaji district of Assam India This book is an attempt to address the groundwater contamination of heavy metals in a regional context A comprehensive analytical statistical and spatial distribution of heavy metals in ground water in the study area has been presented in this book using SPSS r statistical package Window Version 10 0 and curve fitting method in arc view GIS software GIS database helps in decision making process by identifying the most sensitive zones that need immediate attention The concentration of studied heavy metals in the water sources of the area is beyond the permissible limits of WHO The immediate involvement of the research community is needed to combat the slow onset disaster It is hoped that the book can be used as a reference while carrying out regional scale studies of ground water quality in near future *GIS and Geostatistical Techniques for Groundwater Science* Senapathi Venkatramanan, Prasanna Mohan Viswanathan, Sang Yong Chung, 2019-05-28 GIS and Geostatistical Techniques for Groundwater Science provides a detailed synthesis of the application of GIS and geostatistics in groundwater studies As the book illustrates GIS can be a powerful tool for developing solutions for water resource problems assessing water quality and managing water resources Beginning with an introduction to the history of GIS and geostatistical techniques in groundwater studies the book then describes various spatial techniques including case studies for various applications from quality assessment to resource management This book assembles the most up to date techniques in GIS and geostatistics as they relate to groundwater one of our most important natural resources Provides details on the application of GIS and statistics in groundwater studies Includes practical coverage of the use of spatial analysis techniques in groundwater science Bridges the gap between geostatistics and GIS as it relates to groundwater science and management Offers worldwide case studies to illustrate various techniques and applications in addressing groundwater issues

**Groundwater Contamination in Coastal Aquifers** Senapathi Venkatramanan, Selvam Sekar, Prasanna Mohan Viswanathan, Chidambaram Sabarathinam, 2022-06-22 Groundwater Contamination in Coastal Aquifers Assessment and Management first describes groundwater contamination in coastal aquifers and then delves into specific topics surrounding various hydrogeochemical processes Next the book covers case studies of groundwater quality assessment using recent techniques explains the various pollutants and contaminants in coastal aquifers and covers management and remediation methods to control contamination in coastal aquifers This key reference encompasses various topics in broader perspectives on groundwater contamination in coastal aquifers providing a significant contribution to the field of hydrogeology Presents global case studies that show the reader how this issue is affecting sites around the world Includes a remediation plan that solves problems surrounding the management of groundwater water treatment techniques and the management of available

groundwater resources Provides advanced techniques that can be applied and used as methodologies for solving groundwater issues

**Groundwater Geochemistry** Sughosh Madhav, Pardeep Singh, 2021-07-06 This book contains both practical and theoretical aspects of groundwater resources relating to geochemistry Focusing on recent research in groundwater resources this book helps readers to understand the hydrogeochemistry of groundwater resources Dealing primarily with the sources of ions in groundwater the book describes geogenic and anthropogenic input of ions into water Different organic inorganic and emerging contamination and salinity problems are described along with pollution related issues affecting groundwater New trends in groundwater contamination remediation measures are included which will be particularly useful to researchers working in the field of water conservation The book also contains diverse groundwater modelling examples enabling a better understanding of water related issues and their management Groundwater Geochemistry Pollution and Remediation offers the reader An understanding of the quantitative and qualitative challenges of groundwater resources An introduction to the environmental geochemistry of groundwater resources A survey of groundwater pollution related issues Recent trends in groundwater conservation and remediation Mathematical and statistical modeling related to groundwater resources Students lecturers and researchers working in the fields of hydrogeochemistry water pollution and groundwater will find Groundwater Geochemistry an essential companion

Heavy Metal Contamination in Wastewater and Its Bioremediation by Microbial-Based Approaches Veer Singh, Vishal Mishra, Sachchida Nand Rai, Maulin P. Shah, 2025-10-09 This book covers various aspects of heavy metal contamination in wastewater and its removal by microbial based approaches The heavy metal contamination in water is generally caused due to natural and anthropogenic activities There are many industrial processes responsible for such a contamination for example leather tanning coal washeries agriculture activities chrome plating and paint industries The industrial effluent directly or indirectly discharges into water sources and heavy metal containing wastewater decreases the quality of surface water and groundwater The heavy metal contamination causes various types of health issues in human and other living organisms including kidney and liver damage heart failure mental retardation cancers and skin and gastric problems The high level of heavy metal concentration in the cell generates reactive oxygen species ROS which may cause damage to cell organelles Due to their high toxicity there is an urgent need to develop effective heavy metal removal method for wastewater treatment There are several conventional methods available for the removal of heavy metal ions from contaminated sites These methods have some disadvantages such as the generation of secondary toxic sludge and high operation cost Hence it is required to develop cost effective and eco friendly methods for decontamination Microorganisms have tendency to accumulate heavy metal ions into their intracellular space and can grow in various high stress environments and microbial based methods are considered as eco friendly and cost effective Moreover the integrated approach of wastewater treatment and utilization of microbial biomass for bioenergy production can be beneficial in terms of heavy metal bioremediation and zero waste

generation This book focuses on the heavy metal contamination their toxicity and microbial methods for the removal of heavy metal ions from contaminated sites *Soil and Groundwater Remediation Technologies* Yong Sik Ok,Jörg Rinklebe,Deyi Hou,Daniel C.W. Tsang,Filip M.G. Tack,2020-03-23 This book offers various soil and water treatment technologies due to increasing global soil and water pollution In many countries the management of contaminated land has matured and it is developing in many others Topics covered include chemical and ecological risk assessment of contaminated sites phytomanagement of contaminants arsenic removal selection and technology diffusion technologies and socio environmental management post remediation long term management soil and groundwater laws and regulations and trace element regulation limits in soil Future prospects of soil and groundwater remediation are critically discussed in this book Hence readers will learn to understand the future prospects of soil and groundwater contaminants and remediation measures Key Features Discusses conventional and novel aspects of soil and groundwater remediation technologies Includes new monitoring sensing technologies for soil and groundwater pollution Features a case study of remediation of contaminated sites in the old industrial Ruhr area in Germany Highlights soil washing soil flushing and stabilization solidification Presents information on emerging contaminants that exhibit new challenges This book is designed for undergraduate and graduate courses and can be used as a handbook for researchers policy makers and local governmental institutes *Soil and Groundwater Remediation Technologies A Practical Guide* is written by a team of leading global experts in the field

*Groundwater Resource Management Planning Strategies* Vangala Sunitha,Bandi Muralidhara Reddy,Yenugu Sudharshan Reddy,Mannala Prasad,Badapalli Pradeep Kumar,Etikala Balaji,2025-07-18 Geospatial tools to Groundwater Resources explain the most recent methods in Geographic Information Systems GIS and geostatistics as they apply to groundwater through complete case studies that demonstrate actual remote sensing applications in this field Due to the rising demand for water its decreasing quality and its limited supply water resource management has grown to be a serious issue In many places of the world groundwater is the main supply of fresh water but certain areas are growing unduly reliant on it utilising groundwater more quickly than it can be replenished naturally and resulting in an unceasing decrease in water tables For the efficient use management and modelling of this priceless but diminishing natural resource systematic planning of groundwater consumption using current approaches is crucial Remote sensing GIS GPS Global Positioning Systems and geostatistical approaches are among the effective water management methods that have developed with the introduction of powerful and fast personal computers Now more than ever it is possible to analyse with greater accuracy the relationships between environmental elements and human health and wellbeing Our understanding of the continuum between environment and health consequences on many different sizes from the global to even the individual has evolved thanks to a number of transdisciplinary accomplishments This book covers a wide range of geospatial health related topics and methods including climate change healthcare utilisation health disparities air quality assessment asthma water quality assessment and

machine learning It also advances scientific understanding development and application of geospatial technologies related to water resource management Researchers and postgraduate students in Earth and Environmental Sciences particularly GIS agriculture hydrology natural resources and soil science who need to be able to apply the most recent innovations in groundwater research in a practical way will find Case Studies in Geospatial Applications to Groundwater Resources to be a valuable resource This edited volume will concentrate on the most recent studies and uses of geospatial methods in water resource management offering insights into the difficulties and possibilities of applying these methods to solve practical issues

**ICRRM 2019 - System Reliability, Quality Control, Safety, Maintenance and Management** Vinit Kumar Gunjan, Sri Niwas Singh, Tran Duc-Tan, Gloria Jeanette Rincon Aponte, Amit Kumar, 2019-06-13 Content of this proceedings discusses emerging trends in structural reliability safety and disaster management covering topics like total quality management risk maintenance and design for reliability Some papers also address chemical process reliability reliability analysis and engineering applications in chemical process equipment systems and includes a chapter on reliability evaluation models of chemical systems Accepted papers from 2019 International Conference on Reliability Risk Maintenance and Engineering Management ICRRM 2019 are part of this conference proceeding It offers useful insights to road safety engineers disaster management professionals involved in product design and probabilistic methods in manufacturing systems

Surface and Groundwater Resources Development and Management in Semi-arid Region Chaitanya B. Pande, Manish Kumar, N. L. Kushwaha, 2023-05-19 This book explains the challenges for efficient sustainable surface and groundwater development and management with the focus on India and other countries providing a stable output presentation by using machine learning data mining methods and modeling It is a combination of machine learning modeling google earth engine climate data modeling remote sensing and GIS techniques surface water modeling AHP modeling groundwater quality analysis aquifer mapping land use and land cover analysis forecasting of water and rainfall and so on its use to sustainable development planning and management of groundwater purposes in India and other countries The main purpose of this book will develop better outlines for the development of surface and groundwater and management in the semi arid region climate which supports the Sustainable Development Goals SDGs in India especially on sustainable surface water and groundwater resources management This book provides a multidisciplinary overview for the faculty members administrators scientists policymakers social science and professionals involved in the various aspects of sustainable groundwater development planning and management

Water Scarcity, Contamination and Management Ashwani Kumar Tiwari, Amit Kumar, Abhay Kumar Singh, T.N. Singh, Enrico Suozzi, Gagan Matta, Stefano Lo Russo, 2022-10-15 Water Scarcity Contamination and Management presents new and updated material including case studies step by step guidance on key procedures and protocols and timely topics such as climate change and integrated water resource management This book is divided into three key sections Section 1 Water Resource Scarcity focuses on sustainable development and management of water

resources and techniques and methods for improving water use efficiency Section 2 Contamination of Water Resources focuses on understanding the quality of water resources migration of pollutant sources geochemical processes groundwater depletion and seasonal variations in contaminant concentration water resources quality status and associated human health risks Section 3 Water Resource Management considers a consolidated and coordinated approach to find the solution to water resource issues Presenting a comprehensive overview of the water management field the book serves as a valuable reference for students professors scholars researchers and consultants in the fields of water resources civil engineering environmental science and engineering and hydrology Provides an overview of the current status of water resources utilization the likely scenario of future demands and the advantages and disadvantages of systems techniques Includes numerous examples and real world case studies Presents the roles of remote sensing and GIS in solving the water resource crisis

**Remediation and Health Risks of Heavy Metal Contaminated Soils** Qi Liao, Mariusz Gusiatin, Weichun Yang, 2024-10-18 Soil is the essential foundation for human survival However soil pollution and environmental problems have become increasingly evident in recent years In particular heavy metal pollution at various sites poses a serious threat to human health and ecological safety becoming a significant social issue worldwide Greener and environmentally friendly remediation technologies coupled with accurate evaluation of the potential risks environmental impact and human health of heavy metals in the soil have become urgently required This Research Topic aims to gather the latest advancements in scientific research and applicable studies on i the potential risk or impact of recently problematic heavy metals such as Sb TI and cases of combined heavy metal pollution ii pollution formation migration and remediation of heavy metal in soil and groundwater iii novel methods to treat and reduce heavy metals in contaminated sites iv environmentally friendly remediation technology such as enhanced bioremediation and in situ remediation and v assessment or modeling of the environmental or human health impact of heavy metals

Environmental Processes and Management Prabhakar Shukla, Prachi Singh, Raj Mohan Singh, 2023-03-01 This book is Volume 2 which is published to complement Environmental Processes and Management Tools and Practices <https://link.springer.com/book/10.1007/9783030381523> 2020 This book provides an in depth well researched and science based approach to applying key project management and spatial tools and practices in environmental projects This book is an important read for leaders considering projects that balance social economic growth against minimizing its ill effects on Planet Earth This book brings together several aspects of groundwater engineering as well as the formula and analytical approaches required for more informed decision making It also highlights the vital importance of understanding the technological economic and social dimensions of environmental studies explained through dynamic approaches and illustrative figures that have short term results and long term impacts This book emphasizes on encouraging the modern and vibrant research works conducted by young researchers across the world This book clearly details the general application of fundamental groundwater processes the character of the different types of systems in which they occur and the way in which

these factors influence process dynamics environmental systems and their possible remedies The book sets a possible recommendation for the professionalism with which environmental research should be planned executed monitored assessed and delivered While primarily intended for professionals responsible for the management of groundwater projects or interested in improving the overall efficiency of such projects it is also useful for managers in the private public and not for profit sectors The book is a valuable resource for students at both undergraduate and postgraduate levels In addition this book serves as an indispensable guide for anyone willing to develop their skills in modern groundwater environmental management and related techniques

**Risk, Reliability and Sustainable Remediation in the Field of Civil and Environmental Engineering** Thendiyath Roshni,Pijush Samui,Dieu Tien Bui,Dookie Kim,Rahman Khatibi,2022-03-22 Risk Reliability and Sustainable Remediation in the Field of Civil and Environmental Engineering illustrates the concepts of risk reliability analysis its estimation and the decisions leading to sustainable development in the field of civil and environmental engineering The book provides key ideas on risks in performance failure and structural failures of all processes involved in civil and environmental systems evaluates reliability and discusses the implications of measurable indicators of sustainability in important aspects of multitude of civil engineering projects It will help practitioners become familiar with tolerances in design parameters uncertainties in the environment and applications in civil and environmental systems Furthermore the book emphasizes the importance of risks involved in design and planning stages and covers reliability techniques to discover and remove the potential failures to achieve a sustainable development Contains relevant theory and practice related to risk reliability and sustainability in the field of civil and environment engineering Gives firsthand experience of new tools to integrate existing artificial intelligence models with large information obtained from different sources Provides engineering solutions that have a positive impact on sustainability

**Urban Geology** Pradeep Bhaskarrao Jadhav,2025-09-26 This book presents the result of an innovative challenge to create a systematic literature overview driven by machine generated content Questions and related keywords were prepared for the machine to query discover collate and structure by Artificial Intelligence AI clustering The AI based approach seemed especially suitable to provide an innovative perspective as the topics are indeed both complex interdisciplinary and multidisciplinary for example climate planetary and evolution sciences Springer Nature has published much on these topics in its journals over the years so the challenge was for the machine to identify the most relevant content and present it in a structured way that the reader would find useful The automatically generated literature summaries in this book are intended as a springboard to further discoverability They are particularly useful to readers with limited time looking to learn more about the subject quickly and especially if they are new to the topics Springer Nature seeks to support anyone who needs a fast and effective start in their content discovery journey from the undergraduate student exploring interdisciplinary content to Master or PhD thesis developing research questions to the practitioner seeking support materials this book can serve as an inspiration to name a few examples It is important to us as a



publisher to make the advances in technology easily accessible to our authors and find new ways of AI based author services that allow human machine interaction to generate readable usable collated research content

**Geospatial Technology and Smart Cities** Poonam Sharma, 2021-07-06 This book presents fundamental and applied research in developing geospatial modeling solutions to manage the challenges that urban areas are facing today It aims to connect the academics researchers experts town planners investors and government officials to exchange ideas The areas addressed include urban heat island analysis urban flood vulnerability and risk mapping green spaces solar energy infrastructure management among others The book suggests directions for smart city research and outlines practical propositions As an emerging and critical area of research and development much research is now being done with regard to cities At the international level and in India alike the smart cities concept is a vital topic for universities and research centers and well as for civic bodies town planners and policymakers As such the book offers a valuable resource for a broad readership

**Climate Change Impact on Groundwater Resources** Balamurugan Panneerselvam, Chaitanya Baliram Pande, Kirubakaran Muniraj, Anand Balasubramanian, Nagavinothini Ravichandran, 2022-08-24 This volume discusses climate change impacts on groundwater quality in arid and semi arid regions and provides human health risk assessments due to pollution of surface and groundwater The book presents recent trends in monitoring groundwater management and implementing pollution mitigation strategies including practices involving remote sensing and GIS techniques entropy water quality index weighted arithmetic water quality index fuzzy logic applications and improved irrigation methods The book also outlines hydrological processes in arid and semi arid regions and hydrochemical properties of surface and groundwater as a necessary background for understanding how pollution impacts groundwater quality and resources and how geographical modeling of hydrological processes can aid in human health risk assessments The book is intended for academics administrators policymakers social scientists and professionals involved in the various aspects of climate change impact on groundwater quality hydrological process pollution mitigation strategies sustainable development and environmental planning and management

**Remote Sensing of Ocean and Coastal Environments** Meenu Rani, Kaliraj Seenipandi, Sufia Rehman, Pavan Kumar, Haroon Sajjad, 2020-09-27 Remote Sensing of Ocean and Coastal Environments advances the scientific understanding and application of technologies to address a variety of areas relating to sustainable development including environmental systems analysis environmental management clean processes green chemistry and green engineering Through each contributed chapter the book covers ocean remote sensing ocean color monitoring modeling biomass and the carbon of oceanic ecosystems sea surface temperature SST and sea surface salinity ocean monitoring for oil spills and pollutions coastal erosion and accretion measurement This book is aimed at those with a common interest in oceanography techniques sustainable development and other diverse backgrounds within earth and ocean science fields This book is ideal for academicians scientists environmentalists meteorologists environmental consultants and computing experts working in the areas of earth and ocean

sciences Provides a comprehensive assessment of various ocean processes and their relative phenomena Includes graphical abstract and photosets in each chapter Presents literature reviews case studies and applications *Geospatial Analytics for Environmental Pollution Modeling* Fayma Mushtaq,Majid Farooq,Alok Bhushan Mukherjee,Mili Ghosh Nee Lala,2023-12-01 This book aims to provide a comprehensive study on various aspects of environmental pollution dynamics using geospatial technology and modeling techniques The utility of geospatial technology will be demonstrated for the effective study of environmental pollution as space and location are very important for effective environmental health surveillance The timeliness of the work is due to the increasing relevance of geospatial technology applications in environmental health investigations Moreover different types of pollution are covered in detail including air and soil all of which are analyzed using latest Remote Sensing and GIS technology The basics of environmental pollution and its impacts are covered in the book s first part while the second part focuses on the use of geospatial technology in investigating and modeling various instances of environmental pollution The third part discusses policy measures for mitigating environmental pollution hazards usinggeospatial analyses and data to craft informed policy decisions The primary audience for the book is researchers working in the field of environmental pollution with incorporation of geospatial technology including upper level undergraduate and graduate students taking courses in remote sensing and its environmental applications The secondary audience is academicians planners environmentalists and policymakers working in the field of environment protection and management **Proceedings of the Canadian Society for Civil Engineering Annual Conference 2023, Volume 9** Serge Desjardins,Amir Hossein Azimi,Gérard J. Poitras,2024-10-09 This book comprises the proceedings of the Annual Conference of the Canadian Society for Civil Engineering 2023 The contents of this volume focus on the specialty track in hydrotechnical engineering with topics on hydraulic structures river engineering water management hydrology and machine learning fluvial hydraulics and sediment transport among others This volume will prove a valuable resource for researchers and professionals Sustainable Materials for Sensing and Remediation of Noxious Pollutants Inderjeet Tyagi,Joanna Goscianska,Mohammad Hadi Dehghani,Rama Rao Karri,2022-08-05 Due to rapid urbanization and development water get polluted by the noxious waste released from industrial sewage and agricultural runoffs Sustainable Materials for Sensing and Remediation of Noxious Pollutants covers two most widely used aspects in the field of wastewater i e sensing and rapid remediation with a possible solution of successful technology commercialization Chapters include information on low cost materials as sensing and remediating agents for the rapid removal of noxious impurities from wastewater It includes chapters on the sensing of noxious metals low cost adsorbents for the removal of noxious impurities i e inorganic metal ions and organic dyes Additional chapters include future upcoming scopes of work and one chapter on the general introduction of the field The book content will be technical and focused for the audience like graduate students academicians researchers and industrial professionals Sustainable Materials for Sensing and Remediation of Noxious Pollutants is single reference

source for environmental scientists and engineers interested in low cost sensing and remediation strategies Assists readers in developing new strategies to address the issues related to sensing and remediation activities Includes low cost materials for sensor and adsorbent development allowing professionals to make decisions based on economic considerations Provides alternatives for the development of socioeconomically sustainable products for sensing and remediation application

## Enjoying the Track of Phrase: An Mental Symphony within **Groundwater Heavy Metal Contamination Gis Based**

In some sort of used by displays and the ceaseless chatter of immediate connection, the melodic elegance and emotional symphony developed by the published term frequently disappear into the background, eclipsed by the relentless noise and disturbances that permeate our lives. Nevertheless, set within the pages of **Groundwater Heavy Metal Contamination Gis Based** a wonderful literary treasure filled with raw thoughts, lies an immersive symphony waiting to be embraced. Crafted by an outstanding composer of language, this charming masterpiece conducts viewers on a mental trip, skillfully unraveling the concealed melodies and profound impact resonating within each carefully constructed phrase. Within the depths with this touching review, we can investigate the book is central harmonies, analyze its enthralling writing type, and surrender ourselves to the profound resonance that echoes in the depths of readers souls.

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### **Groundwater Heavy Metal Contamination Gis Based Introduction**

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