Recent environmental geochemical trends in water and sediments—a framework on OSPRC

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Recent expansion of science and technology has been sustaining the development of industrial and economical activities as well as populations throughout the world. These expansions, however, pose severe environmental stresses in the region, including increased levels of pollution in the air, water, soil, and foods and deterioration of health status in humans and wildlife. It is an urgent task to grasp the current environmental situation, to identify and reduce the major pollution sources, to assess and prioritize risks, and to establish appropriate chemical and waste management frameworks in order to establish healthy and safe societies and to contribute to sustainable development in the region. It is a well-known fact that environmental geochemical trends have grown rapidly in the last few decades. As we progress, newer environmental pollution trends of OSPRC (Origin, Sources, Pathways, Receptors and Consequences) framework are being developed and providing better management of fresh and marine ecosystems to avoid pollution to the human and aquatic biota. OSPRC framework is key aspect for the success of any pollution sources. The current and future trends are developing in geochemical modelling systems which can learn, adapt and auto update

for the contamination signals. This includes in developing various modelling techniques to minimize the contamination which can update itself even after linked with various pathways and databases across the world.

This special issue seeks to address the gaps of recent geochemical trends by bringing together specialists from a range of various disciplines, practices, and environmental sectors to discuss the latest developments on evaluating the geochemical trends in different environments. It looks at the latest research and critical thinking in the evaluation of various assessments, covering a wide range of techniques, and also engaging theoretical approaches and methodological tools. Apart from innovative research, the issue includes critical reflections about the potential and shortcomings of evaluation research in various geochemical pathways of elements and its impact on flora, fauna, and human health.

The high number and diversity of submissions we received to our call is an indication of the growing importance of this geochemical trends research. It is also recognized that this special issue fills a gap by bringing to the various recent techniques for geochemical studies. The quality of the articles we received was, in most cases, also very high. In our selection for this special issue, the focus was on articles that did not just present a specific traditional approach but went beyond that to critically analyze in sufficient depth or breadth how this was used and valued by researcher to address the issues. The selected articles are also demonstrate that they were innovative in their methodological or theoretical approaches. Overall, we favored articles that framed the case studied in a broader context, so as to enable practitioners and researchers in the field to draw comparable or wider lessons.

This special issue includes selected studies from various environmental fields that will provide readers with some insights into the current scientific activities carried out in different parts of the world, that are directed at diverse aspects of environmental pollution. Karunanidhi et al. has investigated the groundwater quality for agricultural practice and artificial recharge using GIS and remote sensing. Groundwater quality deterioration

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studies were also conducted in coastal region by NŻstor et al and Jianmin et al. Khan et al. proposes the impact of hydrogeochemical processes and its evolution in controlling groundwater chemistry and evaluates the microplastics in sediments and washing machine outlet waste (Sajimol et al. Sarva Mangala et al). Subramani et al. uses geospatial techniques of disparity on groundwater fluctuation. The groundwater risk assessment studies indicated different health issues (Deepali et al. Kang et al., Tirumalesh et al, Karunanidhi et al. Purushothaman et al. Sivakumar et al, Ata Allah et al. Rajesh Kumar et al) . Ananta Man Singh et al. exhibit the deep neural network to capture groundwater potential zone. The facile fabrication of green nano pure CeO₂ and Mn decorated CeO₂ with Cassia angustifolia seed extract in water refinement (Rakhi et al). Vasudevan et al. present the influence of transient porosity in a coupled fracture-skin-matrix system at the scale of a single fracture.

The collection of recent trends in geochemistry evaluation included in the issue clearly highlights the strong interdisciplinary nature of this area of evaluation work, which draws from a range of fields to inform both theoretical and methodological approaches. It also shows the need to develop diverse various recent techniques. They also highlight the need for more reflection, robustness, honesty, and sharing of both positive and negative outcomes that evaluation might bring out. We also thank the international pool of contributors who honored us with the time and effort they put into various interesting papers and for contributing to their improvement of special issue.

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Dr. Venkatramanan Senapathi has completed his PhD in the field of Environmental Geochemistry at Annamalai University, India, in 2013. Further, Postdoctoral fellow in School of Earth Environmental Hazard System, Pukyong National University, Busan, South Korea, from 2013 to 2017. Also he worked as a visiting research faculty in Department for Management of Science and Technology Development, Faculty of Applied Science, Ton Duc Thang

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Science” published by Elsevier in June 2019. Moreover, presently editing books on “*Groundwater Contamination in Coastal Aquifers*” and “*Meso and Microplastic Risk Assessment in Marine Environments: New threats*” by Elsevier. His research mainly focused on environmental geochemistry of water and sediments for emerging pollutants and its sustainable management.

Dr. Selvam Sekar has received a Gold Medal in Master's degree in Geology from Manonmaniam Sundaranar University, Tirunelveli, India, in 2009, and PhD at the same university (Studies on Environmental Impact Assessment, Human Health and Evaluation of groundwater pollution in and around Tuticorin city, Tamil Nadu) in 2013. In 2009, he joined as an Assistant Professor in Geology, V.O. Chidambaram College, Tuticorin for more than 10 years.

Dr. Selvam's overall research focus for the past 11 years has been directed toward understanding the environment through water and sediments. He has published around 62 International research paper in SCI/SCIE indexed journal (https://www.researchgate.net/profile/Selvam_S3) which over speciation of water and sediments, particularly heavy metals, fluoride, arsenic, GLADIT and DRASTIC model, RS and GIS, ANN model, and FUZZY model. He has 4 research project completed during the year 2010–2018, and he is currently working two projects on Submarine Groundwater Discharge (SGD) funded by DST and MoES, Government of India.

Dr M.V. Prasanna is currently working as an Associate Professor in Curtin University, Malaysia. He completed his PhD degree in 2008 at Annamalai University, India. He was a gold medalist in Postgraduate degree. He has 15 years of teaching and research experience and produced 2 PhD and 3 MPhil students under his guidance. He has published more than 90 Journal papers and 11 book chapters, indexed in Thomson Reuters and Scopus (<https://www.researchgate.net/profile/Mv-Prasanna>).

He has the h-index of 21 from Thomson Reuter's data. He has edited a book on “*GIS and Geo-statistical Techniques for Groundwater Science*,” published by Elsevier in June 2019. Currently, he is also editing a book on “*Environmental Resilience and Transformation in Times of COVID-19: Climate Change Effects on Environmental Functionality*,” publishing by Elsevier. His research focuses on geochemical controls on water and sediment characteristics and their linkage to human health and environment.