

## From the Desk of the Patron

### *Our Global environment is under Peril- A Challenge to the Survival of the Human race*

*Earth Processes, global warming, climate change, and disasters* are recent issues of discussion because of their increasing frequency and global devastation. In this brief note, a few alarming issues like wildfire and flood fury and acute shortage of water in the near future, and the importance of the treatment of sewage water have been addressed. The more elaboration can be read under the “Earth System Science Panorama” of this issue. Our aim is to aware the global community regarding the devastating effects of earth processes, global warming, and climate change and to adopt certain measures to these hazards.

*Earth processes* like widespread cracks and sinking have appeared in many roads and hundreds of houses in Joshimath, and other parts of Uttarakhand *mostly prone to subsidence-hit zones*. Multiple factors including unplanned construction, over-population, obstruction of the natural flow of water, and hydel power activities are being cited as reasons for subsidence (sinking of the ground because of underground material movement) in Joshimath. Rudraprayag and Tehri Garhwal in Uttarakhand are the most *landslide-prone districts* in the country, according to satellite data by the Indian Space Research Organisation (ISRO). A new report looked at landslide-vulnerable regions in 17 states and two Union Territories of India in the Himalayas and Western Ghats. El Nino is the warm phase of the water cycle in the Pacific Ocean that shapes storms, droughts, and record-breaking heat waves around the world. *July 2023 is on the track to be the hottest month in hundreds, of years," said leading NASA climatologist Gavin Schmidt*. The effects cannot be attributed solely to the El Niño weather pattern, (the warming of ocean surface temperatures in the central and eastern Pacific Ocean) which has just emerged. The major factor of the increasing temperature is that *we are continuing to put greenhouse gases into the atmosphere ultimately causing Global warming and climate change*. Tens of millions of people have been suffering through intense heat this summer.

July 2023 *Greece wildfire*-related to climate crisis shall manifest with greater disasters. Crete of Greece was at “extreme risk” of raging wildfires as local authorities warn the island is next in line to be ravaged by blazes spreading across Greece. *10,000 British tourists are feared to be on the fire-scorched Greek island of Rhodes and Corfu*. Around 2,500 people were evacuated from Corfu, fire officials said, which is experiencing dozens of wildfires damaging major tourist spots in Santa, Megoula, Porta, Palia Perithia, and Sinies with loss of lakhs of dollars. *The blaze in Rhodes prompted “the biggest evacuation” in Greek history*. The Amazon rainforest of South America, the largest tropical forest covers an area of 7,000,000 km<sup>2</sup> (2,700,000 sq mi). The widespread wildfires created environmental havoc from the excess carbon dioxide (CO<sub>2</sub>) and carbon monoxide (CO) due to the fires' emissions, potential impacts on the biodiversity of the Amazon, livestock, and threats to indigenous tribes that live within the forest. *The estimated die-up due to large-scale wildfires may be to the tune of US\$957 billion to US\$3.5 trillion over a 30-year period*. The Amazon is emitting more carbon than it can absorb, in what scientists say is a disturbing new signal that the Earth may be reaching a tipping point on climate change. *A study recently published in the journal Nature suggests that fire and deforestation, along with warmer temperatures and markedly drier conditions, mean the world’s largest rainforest is gradually losing its ability to be a carbon sink*. The impact of changes to the Amazon reaches far beyond South America. For generations, the rainforest has stored an immense amount of carbon in its soil known as *the largest carbon sink in the world*, and enormous trees, play an important role in keeping the global environment stable. When this study shows that the carbon budget from a believed carbon sinking area is actually a source of 0.3 billion tons of carbon per year, it sounds alarm bells,” said Lucas Domingues, an environmental scientist. Over the course of nearly a decade, the researchers used small planes to collect hundreds of air samples at 14,800 feet above sea level. They found that not only were carbon emissions greater in eastern parts of the Amazon than in the west but that the southeastern area — a hot spot of deforestation — is now acting as a source of carbon emissions into the atmosphere rather than a carbon sink. Areas with higher levels of deforestation were responsible for carbon emissions 10 times greater than preserved areas, Domingues said. *In recent years, the combination of rising temperatures, crippling wildfires, and ongoing land clearing for cattle, killed off water-sensitive vegetation and created conditions for more fire*. There is no let-up in wildfires at the Similipal National Park in the Mayurbhanj district of Odisha. The wildfires are spreading rapidly *in the second-largest biosphere reserve in Asia* since February 2023. As a result, core areas of the forest are facing the heat with fires spreading there. There are several types of plant species, rare orchids, and medicinal plants that are getting engulfed in wildfire.

Similipal is home to many types of birds, reptiles, and amphibians and they are the worst affected. Due to the extreme heat caused by the wildfire, the animals and birds are flying and running helter-skelter seeking shelters elsewhere. With a large portion of the forest continuing to burn, the survival of these animals is at stake. As many as 25 fire points including 19 points in north Similipal and six points in south Similipal were found during 2023.

**Floods** have caused widespread devastation across the country, especially in New Delhi and north India (Himachal Pradesh, Uttarakhand, Jammu and Kashmir) Maharashtra, Gujarat, Telangana, Andhra Pradesh, Odisha, etc. in July 2023 amid torrential rainfall. The inclement weather had left tourists and locals stranded, washed away houses and roads, and caused staggering losses to public and private property. As per the SBI's research report, Ecowrap the early estimates of this month's weather patterns have led to a loss of at least 15,000 crores of rupees. The heavy toll of these floods, as well as natural disasters such as the recent Biparjoy cyclone, is a matter of grave concern for the country. ***It added that locational and geographical features make the country vulnerable to a number of natural hazards. India has faced the third-highest number of natural disasters since 1990, next only to the US and China. Including disasters such as landslides, storms, earthquakes, floods, and droughts, India recorded 764 instances of natural disasters since 1900. While from 1900 to 2000, India witnessed 402 events, and from 2001-2022, witnessed 361 events. The frequency of such events has set new records of economic stress.***

As the global population increases and resource-intensive economic development continues, many countries' water resources and infrastructure are failing to meet accelerating demand. Climate change is making water scarcity worse. The impacts of a changing climate are making water more unpredictable. The growing incidence of extreme and prolonged droughts is also stressing ecosystems, with dire consequences for both plant and animal species. In this context, the treatment of total wastewater shall supplement the acute water shortage. According to the Mongabay-India newsletter, ***urban India generates 72,368 million litres (MLD) of sewage water every day, and only 28% is treated and reused. The remaining untreated wastewater is allowed to freely flow into groundwater, rivers, and lakes where it pollutes, spreads diseases and harms aquatic life. The 2021 National Inventory of Sewage Treatment Plants notes a wide gap between the bludgeoning trend of sewage generation in comparison with the capacity to treat sewage. It observed that India's urban population has increased by three-fold since 1971, leading to sewage generation increasing from 7,067 to 62,000 MLD. However, the capacity of sewage treatment plants (STPs) only increased from 2,758 to 23,277 MLD. Published by the Central Pollution Control Board, the inventory also notes that most of the water supplied for domestic uses is released as toxic wastewater and is not utilised. A new report by the Council on Energy, Environment and Water (CEEW), states that 80% of wastewater generated by urban India has the potential to be treated and reused for non-potable purposes like irrigation, which can relieve the immense pressure on water bodies, lower pollution levels and provide water security in the face of climate crisis-induced weather events that can render water bodies unreliable. A large-scale recharge of groundwater in the Kolar district of Karnataka, with treated wastewater pumped from Bengaluru, has helped improve groundwater quality and agricultural production and could serve as a model for other states and districts.*** The central government has released a National Framework for Safe Reuse of Treated Water for states to draft and implement wastewater treatment policies.

From recent research by Ajay Patel et al. in April 2023 published in Current Pollution Reports, it is mentioned that Socioeconomic and environmental factors have led the scientific community to find alternative approaches for the management of agro-industrial waste. This has resulted in the Bioconversion of Industrial Waste into Bacterial Cellulose, a multi-faceted biomaterial with desirable attributes including biodegradability, biocompatibility, great tensile strength, cellulose purity, and porosity. Therefore, these wastes have ***diverse applications in the field of environment, wound healing, drug delivery, dental treatment, etc., with an emphasis on new economic opportunities and play a vital role in the control and management of pollution.***

According to the analysis, just last year, ***Elon Musk's travels burned 837,934 litres of jet fuel and resulted in 2,112 tonnes of CO2 emissions, just 132 times than an American travel.*** After the completion of his takeover of the social media, Twitter, the chief executive of Tesla and SpaceX organisations and the world's second-richest man has always been at the centre of news related to investments, research, and technology. Elon Musk uses private aircraft more than any other billionaire, according to a new analysis from the Institute for Policy

Studies and the Patriotic Millionaires, leaving almost 2,000 tonnes of carbon emissions in his wake. This is published in a report, titled "High Flyers 2023: How Ultra-Rich Private Jet Travel Costs the Rest of US and Burns Up the Planet.

We have achieved landmark and spectacular achievements in the field of space science. ISRO launched India's third lunar mission, Chandrayaan-3 perched on GSLV Mark 3 (LVM-3) heavy-lift launch vehicle, named 'Bahubali' rocket, at 2.35 p.m. on 14th July 2023 from Satish Dhawan Space Centre-SHAR, Sriharikota in Andhra Pradesh and added a new chapter in Indian space odyssey. With this spirit of intensive research attitude, if we can diversify our study on lessening greenhouse gases and pollution combined with a large-scale systematic plantation program and prevention of unnecessary waste of natural resources with the reduction of single-use plastics, then these can lead to a safer environment and survival of humanity. Some steps by the Govts. of different states and centres are being taken up which do not seem to be adequate to combat climate change consequences. In this context, the role of our citizens plays a vital role to adopt certain preventive measures as discussed in the "Earth System Science Panorama" of this issue.

I am thankful to Prof. A.P. Pradeepkumar, the Editor-in-Chief of this journal, and members of the editorial board for their untiring and wholehearted support for the finalisation and publication of this issue. and the unwavering support of Dr. R.M. Pradhan, the managing editor, is highly appreciated. We would like to extend our thanks to our esteemed authors viz., Dr. Siba Sundar Sahu (Geologist, Geological Survey of India), Hitesh Malagar, Ramkamal Bani, Manoj Kumar Sahu, Bhaskar Prasad, Bhargava Kumar Iyengar, Tanveer Haidar (Chhattisgarh Council of Science and Technology Raipur, Chhattisgarh and Department of Applied Geology, National Institute of Technology Raipur, Chhattisgarh, India), Bankim Mahanta, Uditangshu Chakraborty (School of Earth, Ocean and Climate Sciences, Indian Institute of Technology Bhubaneswar), Kailash Chandra Sahoo (Geological Survey of India, State Unit, Odisha, Bhubaneswar), Prasanta Kumar Mishra (Department of Geology, Dharanidhar Autonomous College, Keonjhar, Odisha), V. R. Renjith, (Department of History, University of Kerala, Trivandrum), R. S. Prasanth (School of Environmental Sciences, Mahatma Gandhi University, Kottayam, Kerala), J. K. Joseph (Loyola College of Social Sciences, Sreekariyam, Thiruvanthapuram), K. Akhildev (Charitable Society for Humanitarian Assistance and Emergency Response Training (CHAERT), Kottayam) and A.P. Pradeepkumar (Department of Geology, University of Kerala, Thiruvananthapuram), Dr. R.M. Pradhan (IIT Kharagpur) and Ajit Kumar Behera (Marine Geoscience Group, National Centre for Earth Science Studies, Thiruvananthapuram), P. S. Shiny, D.R. Sherly (Department of Geology, Malankara Catholic College, Mariagiri, Kaliyakkavilai, Tamil Nadu), K. Jisha, M. Suresh Gandhi, Annmaria K George, M. Muthukumar, Emiliya Joy, M. Alan Rose, G.S. Gayathri (Department of Geology, University of Madras, Guindy Campus, Chennai), Ajit Kumar Sahoo (Department of Geology, Institute of Science, Banaras Hindu University, Varanasi), Rajagopal Krishnamurthi (Department of Earth Sciences, Indian Institute of Technology, Roorkee), Prabhakar Sangurmth (Former Executive Director, Hutti Gold Mines Company, Hutti) for their contribution of papers to this July 2023 issue. Prof. M. Suresh Gandhi of the University of Madras, Prof. R. Nagendra (Retd.) of Anna University, and Dr. A.N. Reddy have also extended their unwavering support to us being an integral part of the journal and the Trust.

Dr. B. Mishra, Patron  
**JOURNAL OF GEOINTERFACE**