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Protect Climate, Earth and Environment

CEHESH TRUST OF INDIA

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(CEHESH – Climate, Earth, Health, Environmental Sciences and HUMANITY)

CEHESH TRUST OF INDIA, a Non-Government Organization was established on 17th December 2021. It was registered on **29th April 2022** in Keonjhar, Odisha. **CEHESH stands for Climate, Earth, Health, Environmental Sciences and Humanity**. This Trust was formed by a small group of dedicated geo- scientists, Climate and Environment friendly community with the following aims and objectives.

- a. Dissemination of Earth System Science (Climate, Earth and Environmental Science) knowledge through offline and online teaching to +3 Degree and postgraduate students on **free of cost**.
- b. Publication of a biannual journal with the title **“JOURNAL OF GEOINTERFACE”** comprising Earth, Climate, planetary and Environmental Sciences.
- c. Conduct of National and International Seminar/symposium/workshop in the field of the Earth System Science (Earth, climate and Environmental Sciences).
- d. Introduction of **“GEO EXCELLENCE AWARD”**, **“YOUTH AWARD FOR ACADEMIC DISTINCTION”** **“NATIONAL AWARD FOR ENVIRONMENT PROTECTION”** and **“CEHESH TRUST OF INDIA” AWARDS** from our country and abroad to those distinguished teaching/industrial/intellectual communities who have substantial contributions in the field of the Earth System Science on behalf of this TRUST.
- e. Establishment of a library related to these sciences.
- f. To organize and assist in the Field Training Programmes of students of Geology depts. of different colleges and universities.
- g. To organize special programmes in different schools and colleges to aware students on climate change, earth and environmental sciences, water and energy conservation along with action plans. In addition, awareness shall be developed through seminars and essay competitions on moral and ethical science, cultural and spiritual heritage of India and burning social problems of our country.
- h. To assist students for their placement in different earth science related organizations.
- i. Conduct of systematic plantation programmes with proper nourishment in different areas. In addition to it, a special drive to throw fruit bearing seeds of Mango, Jamun, Jack fruit etc. on barren lands and mounds (at 2-3inch depth if it is possible) has been taken up in western Odisha in the fruit season.
- j. To take up welfare activities in rural areas related to the provisions of safe **drinking water, health and sanitation**. **We were successful in establishing one safe drinking water project in an area dominated by tribal and underprivileged people of Keonjhar district where drinking water was highly unsafe, mostly muddy with dominance of iron content**. The people were suffering from various types of stomach diseases prior to our drinking water project. The location of the second project has also been detected and surveyed. It will be materialized subject to the availability of fund.
- k. Conduct of Health Checkup camps and **“Yogic Exercises for Health Care”** programmes in different schools and colleges.

The Earth, Climate and Environment friendly community of our country and abroad are cordially invited to join this noble mission and to shoulder the responsibility of the execution of certain objectives and action plans of this registered Trust.

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Dr. B. Mishra

On behalf of the CEHESH TRUST OF INDIA

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Preface

Exploring Diverse Perspectives in Earth Sciences

Welcome to final issue of 2023 of *JOURNAL OF GEOINTERFACE*. The authors and the valued audience of the journal will notice a complete makeover, which aligns with contemporary trends in STEM typesetting worldwide. Each article is set in double column, with hyperlinking of citations, references, figures and tables, as well as enabling of tool tip pop-ups for figures and tables. These are value-added services aimed at enhancing the credibility of articles as well as of the journal.

In this volume we present a collection of nine papers that delve into various aspects of Earth sciences, offering insights into intriguing phenomena and critical environmental challenges. These contributions span a wide spectrum of topics, showcasing the depth and breadth of research within the Earth and Environmental Sciences.

1. **Hydrogen Emanations from SCSDs:** *King and Esposito* revisit previous studies on hydrogen emanations from semi-circular, shallow depressions (SCSDs) globally, proposing a new hydrogen-emitting area in southern Belize.
2. **Terrane Boundary Shear Zone in EGMB:** *Singh et al.* investigate the NE-SW trending Mesoproterozoic Eastern Ghats Mobile Belt (EGMB) and its Terrane Boundary Shear Zone, unraveling the shear kinematics on the NW and N margins.
3. **Siliciclastics and Carbonates:** *Chakroborthy* dwells on sedimentology, and challenges the traditional separation of siliciclastics and carbonates, focusing on the mixing mechanisms in heterolithic settings with implications for hydrocarbon exploration.
4. **Kallar Aquifer System:** *Chandran et al.* explore the hydrogeological complexities of the Kallar Aquifer System in Tamil Nadu, India, addressing challenges related to low aquifer yields, sustainability, and contamination issues.
5. **Gundar River Basin Aquifer Geometry:** *Mohanty et al.* employs geophysical data to define hydrostratigraphic units and aquifer geometry in the Gundar river basin of Tamil Nadu, providing insights for sustainable groundwater development.
6. **Flood Simulation in Cuttack City:** *Sahoo et al.* utilize high-resolution data for flood simulation in parts of Cuttack City, offering valuable insights to minimize damage during flooding.
7. **Copper Mineralization in India:** *Sahoo and Khan* review major copper deposits in India, emphasizing geological characteristics and economic implications, aiming to contribute to global knowledge exchange.
8. **Impact of Devotional Music on Crop Growth:** *Sharan et al.* explore the impact of devotional music on Mung bean crop growth, revealing significant improvements in germination, vegetative, and reproductive parameters.
9. **Mining Impact on Land Use and Land Cover:** *Sahu et al.* investigate the impact of mineral mining on land use and land cover in the Balda village of Barbil tehsil, Keonjhar district, Odisha, emphasizing the need for sustainable practices.

Each paper in this collection offers valuable contributions to the understanding of Earth's processes, from geological phenomena to environmental impacts. We hope this compilation inspires further exploration and discussion within the scientific community.

Prof. (Dr.) A.P. Pradeepkumar,
Editor-in-Chief,
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From the Desk of the Patron

Prologue

The Patron's column encapsulates the critical need to address the pressing environmental challenges we face today. It eloquently highlights the intricate interconnections within the scientific realms of earth, climate, planetary and environmental sciences. Moreover, it emphasizes the severe consequences and imminent dangers posed by the depletion of resources, climate anomalies, and global warming on earth system and suggests possible mitigation and adaptation measures.

Brief Elucidation

The patron's column which is the comprehensive version of the Earth System Science Panorama of this issue, addresses various earth and environmental aspects, including extreme weather events like heatwaves and floods, pervasive pollution across air, water, and land; acute water scarcity in urban and rural areas, unpredictable rainfall patterns, expanding arid regions, rapid deforestation, the perilous situation faced by animal and plant species, and resource discovery, evaluation and management strategy. Additionally, it sheds light on the plight of vulnerable populations in impoverished nations struggling to sustain their livelihoods due to the impacts of climate change. The correlation between soil microbiome and microbial response to global warming; the significance of Community Forest Governance (CFG) in maintaining carbon balance, biodiversity and livelihoods; and environmental crises due to extreme weather and climate events are some of the critical issues and require thorough understanding to resolve the challenges facing the earth system. Furthermore, it lauds significant advancements such as NASA's TEMPO mission, and ongoing extensive research in carbon sequestration, and sustainable technologies aimed at controlling water pollution and fostering conservation. Mention of various eco-friendly technologies like aquatic vegetation restoration, eco-remediation, bio-manipulation, wetlands rehabilitation, floating aquatic-plant bed systems, and adsorption technology showcases innovative solutions to environmental issues. Additionally, advocating for the transition to alternative energy sources from fossil fuels and stressing individual responsibility through actions like refraining from plastic use, prudent management of water and elec-

tricity, promoting cleanliness, biodiversity conservation, and implementing educational awareness programs in schools and colleges underline the holistic approach required for the survival of humanity. The UN Climate Change conferences, often referred to as Conference of the Parties (COP), are indeed crucial global events where different heads of nations deliberate and negotiate strategies to mitigate the effects of climate change. These conferences serve as pivotal forums for international cooperation and policymaking, fostering agreements and commitments to tackle climate-related challenges collectively. COP 28 in Dubai emphasizes the importance of this multilateral platform as the primary decision-making body focused on climate change. **Central objectives include setting ambitious targets to limit global temperature rise, aiding vulnerable communities in adapting to climate change impacts, and striving for net-zero emissions by 2050.** These goals are crucial for mitigating the adverse effects of climate change and safeguarding the planet's future. Pope Francis's remarks underscore the urgent need for decisive action, acknowledging the inadequacy of past responses to the unfolding environmental crisis. His call for binding agreements during the UN climate talks highlights the pivotal role of transitioning from fossil fuels to renewable energy sources like wind and solar power. This transition is crucial in reducing greenhouse gas emissions and combating climate change. The increasing intensity and frequency of disasters, including cyclones, floods, heavy rain, lightning, thunderstorms, heat waves, and the loss of biodiversity, is indicative of the profound challenges facing earth system. These events not only threaten human lives and infrastructure but also endanger ecosystems and biodiversity. While some countries have taken measures to address climate-related challenges, the need for global cooperation and more robust, comprehensive actions are of paramount significance. **Collaboration among nations, adherence to binding agreements, adoption of sustainable practices, and investment in renewable energy are essential for mitigating the impacts of climate change and ensuring the survival of human communities on Earth.** It's crucial to continue prioritizing climate action, implementing measures to mitigate emissions, adapt to changing environmental conditions, and foster resilience in the face of climate-related challenges for the well-being of current and

future generations. The ESS Panorama, Section-2 of this issue presents an insightful and comprehensive overview of various mitigation measures and commendable initiatives undertaken by India to address climate change and pollution. Massive Phosphate discovery in Norway has significant implications for global resource availability, **particularly in fertilizers, solar panels, and electric vehicle batteries**. The deposit, estimated at 70 billion metric tons, could potentially address global demand for essential resources and reduce dependency on external suppliers for Europe and other countries. The development of an optimization algorithm for quarrying dimension stones **aims to reduce waste production and resource loss represents Environmentally sustainable mining**. This algorithm considers discontinuities in rock masses, optimizing cutting patterns to enhance extraction while minimizing operational costs and environmental impact. The extraction of a rock core beneath 500 meters in Greenland's ice could provide insights into past ice stability and help in understanding the rate of ice melt due to global warming. This core contains valuable infor-

mation about past exposures and changes in Greenland's ice. India's Chandrayaan-3 lander successfully landed near the lunar south pole, conducting various experiments and measurements on the Moon's surface. This mission revealed the presence of elements like sulphur and offered insights into lunar soil composition, temperature variations, and subsurface characteristics. The occurrence of rare red auroras due to a hole in the Earth's magnetic field highlights unique astronomical phenomena.

Epilogue

These scientific discoveries and missions showcase significant advancements in space exploration, environmental research, resource discovery, and sustainable practices. They contribute to our understanding of various phenomena, paving the way for further advancements and addressing challenges related to climate change, resource sustainability, and environmental conservation. **The epilogue emphasizes the importance of balancing scientific progress with environmental stewardship for the sustainable existence of humanity.**

Dr. B. Mishra,

Patron

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