

Conventional, Renewable Energy Sources and Climate Change Perspective for Energy Security in India

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A two-day national seminar on 'Conventional, renewable energy sources and climate change perspective', was held during June 23 to 24, 2023 at the Hotel Tuli Imperial, Nagpur. The seminar was organized by the Gondwana Geological Society, Nagpur in association with the Geological Survey of India, and convened by Dr. A.K. Chatterjee, President, GGS, Samaya S. Humane (Organizing Secretary), RTM Nagpur University, Nagpur, India and Dr. Milind Dhakate (Organizing Secretary), Geological Survey of India, Central Region, Nagpur. The aim of the national seminar was to mark the significance of conventional and renewable sources of energy for the sustainable development of the country along with coping with climate change scenario. As the Planet Earth has seen rapid climate change and environmental degradation in recent years due to the unprecedented rise in greenhouse gas emissions, significant warming of land-ocean and rise in sea level has developed the necessity for the present seminar. For the control of the untimely changes in environment and excessive exploitation of non-renewable resources, there is a need of awareness among public and policymakers regarding latest technological advancements for sustainable management of our resources. It is true that climate change is causing global warming, and over the last four decades, the average world temperature has increased by 0.8°C. Understanding current climate and environmental changes requires a framework that can be obtained by studying the past climatic and environmental variability. Combining climate change research with the management of conventional and renewable resources for sustainable growth will provide feasible, reliable, sustainable and modern energy, especially for a large growing economy like India.

In the conference, about 150 participants from all over the country participated and presented their research findings as oral and poster presentations. The conference commenced by felicitating the dignitaries and lighting of lamp and inaugurated by the Chief guest Ms. Sushma Rawat, Director (Exploration), ONGC, in the august presence of Shri Ghanshyam Sharma, CMD, MECL, Dr. S. Raju, Former Director General, GSI, Dr. Rasik Ravindra, Former Commissioner of CLCS, UN, Dr. Milind V. Dhakate, Director (G), GSI, CR, Dr. A. K. Chatterjee, President, GGS, Dr. Rajiv Nigam (Formerly at National Institute of Oceanography, Goa) and Dr. Samaya S. Humane, RTM Nagpur University, Nagpur. In her Presidential address and keynote, Sushma Rawat emphasized on reducing energy waste and replacing conventional energy sources with renewable energy. A glimpse of ONGC's battle against its own greenhouse gas emission and a detailed

actionable plan to achieve a net zero scope 1 and 2 emission by the end of 2038 was a primary objective.

The inaugural function was followed by a series of keynote lectures, and technical sessions, wherein the conventional, renewable energy sources and climate change perspective of the country were discussed. In total, 12 keynote lectures were presented under various broad themes in nine technical sessions. These technical sessions were chaired by eminent geoscientists like Dr. Sushma Rawat, Dr. Sudhir Shukla, Dr. Rasik Ravindra, Dr. Rajiv Nigam, Sh. P. K. Gupta, Dr. A. M. Pophare, Dr. V.A. Mendhe, Sh. Vijay Mugal, Dr. Mrinal K. Mukherjee, Dr. S. M. Hussain, Dr. A. K. Raina, Dr. B.S. Manjare, Dr. A. Krishnakumar, Dr. Y.A. Murkute, Dr. L. S. Chamiyal, Dr. Vishwas S. Kale, Sh. Vishal Sakhare, Dr. Hema Achyuthan and Dr. Biswajeet Thakur.

Sudhir Shukla (Formerly at the ONGC, India) in his keynote spoke on the changing paradigms in global energy transitions that have put considerable stress on traditional syllabus and research in the geosciences, to keep relevance and pace with the new perspectives in energy sector, emerging every other day. Rasik Ravindra (Formerly at National Centre for Polar and Ocean Research, Goa) talked about the weakening of Arctic cryosphere and delay in autumn and winter ice growth, that is resulting in increased surface air temperature (SAT) over Arctic Ocean fostering large heat fluxes to the atmosphere thereby affecting the mid-latitude. Rajiv Nigam (Formerly at National Institute of Oceanography, Goa) discussed about the application of foraminifera in studies related to fluctuations in monsoons, sea levels, tsunamis, fisheries, pollution monitoring, marine Archaeology through few examples from the Indian marine waters. Vinod Atmaram Mendhe (CSIR-Central Institute of Mining and Fuel Research, Dhanbad) discussed the conversion of coal bed methane (CBM) to produce hydrogen, which is very lucrative, technically, and economically feasible option for clean energy. Mrinal Kanti Mukherjee (IIT, Dhanbad) talked about the prediction of water flow pattern in an Opencast and Underground mine excavations to determine the pumping capacity requirement. Avtar K. Raina (CSIR-Central Institute of Mining and Fuel Research, Nagpur) reviewed clean and green energy that is a strong impetus on preventing pollution. Presently, E-cars are considered one such solution in this direction but he raised a question whether these E- cars are really a non-polluting due to the charging of the batteries.

L.S. Chamiyal (formerly at the M. S. University of Baroda, Vadodara) talked about the investigation on the huge sediment records exposed along the major river channels of semi arid regions of western

India and have revealed a major change in the late Pleistocene and Holocene fluvial landscape. Based on sediment sequences, facies and geochronology, he put-forth the reconstruction of last >100 ka, 98 -69 ka and 49 -30 ka and 30 ka to present. Vishwas S. Kale (formerly at the SP Pune University, Pune) spoke about the spatially variable impacts of late Quaternary climatic changes on the dynamics of the Deccan traps river systems and their catchment hydrology.

Hema Achyuthan (Anna University, Chennai) explained the role of the lake sediments reconstruct the palaeoenvironment of late Quaternary and discussed the hydrological regime and palaeoenvironment shifts, based on the limnological characteristics of various lakes from Eastern Ghats of India. Ranjan Sinha spoke about the mechanism to determine the impact of saline water abstraction on the shallow freshwater system with the aid of multi-parameter transducer to monitor aquifer pressure and electrical conductivity. Mohammad Firoze Quamar (BSIP, Lucknow) reviewed the significance of palynology in reconstruction of palaeo vegetation and palaeoclimate over last 2000 years emphasising the abrupt climatic changes. Yamuna Singh (University of Hyderabad, Hyderabad) spoke about the significant rare-earth element (REE) resources that are hosted in beach sand deposits along the coastal stretches of India, and stream placer deposits in Chhotanagpur granite gneiss complex terrain of eastern and central India. James Peter (Formerly at the ONGC, India) debated on substantial resource base of Coal Bed Methane (CBM) in Indian coalfields. R. H. Chavhan (GSI, Nagpur) discussed the geological surprises and geophysical constraints in concealed coal exploration area from Wardha Valley Coal Field, Central India. Meena S. Gupta (GSI, Nagpur) debated the petrographic and geochemical characterisation of coal by analysing the maceral from Lathi- Kesurli Area, Wardha Valley Coal Field, Maharashtra. Md. Merajuddin Khan (GSI, Nagpur) spoke about the high resolution syn-sedimentary faulting analysis in basal Talchir Formation of Gondwana Super Group in

Satpura Basin. Shradha Shukla (GSI, Gandhinagar) talked about the sedimentary architecture of Saraswati river basin resembles the braided river environment with mixed characters of Platte type and Bijou Creek type but the evidences of marine transgression are also recorded in its middle reaches.

Alpa Sridhar (The M. S. University of Baroda, Vadodara) discussed the occurrence of high magnitude flood events during weak monsoon periods around 0.5 and 1.7 cal ka BP is also reflected in the modern flood and rainfall data. Sivakumar A. (Presidency College, Chennai) discussed the identification of fresh water aquifer in coastal area of Velippalayam village in Nagappattinam district, Tamil Nadu using electrical resistivity survey.

There were 23 abstracts presented during poster presentation session under various theme of the conference.

During the valedictory function of the conference, experts from the various disciplines expressed their thoughts on the successful completion of this national seminar and felicitated the winners of best oral presentation, best female oral presentation and best poster presentation. Alpa Sridhar was awarded the best oral presentation, Shradha Shukla was given best female presenter award and the best poster presentation award was given to Pooja Tiwari. The conference provided an excellent opportunity to the scientists, especially to the young researchers to interact with the learned experts of various disciplines from within the country.

We hope and believe that this platform may foster an exchange of ideas and networking among researchers with shared goals and interests to explore interconnected issues surrounding climate change, global warming, and vital role of renewable and non-renewable energy resources in shaping our future.

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