Editorial

Welcome. We wish our readers and members/fellows of IGU season's greetings and a very happy -2013. We extend our thanks to all those associated directly and indirectly with IGU, for the success of recently organized 49th annual convention of IGU at PDPU, Raisan Village, Gandhinagr, Gujarat State. We solicit their support for organizing IGU Golden Jubilee Celebrations, starting from 3rd week of December, 2012.

Outcome of 49th annual convention:

We are happy to inform that the three day annual convention and the post convention workshop provided ample opportunity to the participants, especially the students and young researchers, to better understand the importance of scientific endeavors meant to help the society and the environment. In the session on special theme "Towards the Energy security-Exploration, Exploitation and New Strategies", the invited speakers have brought into light the importance and limitations of renewable and non-renewable energy resources and provided needed information to arrest depletion of natural resources and exploit abundantly available natural resources of renewable category. In the second technical session, speakers, especially those belonging to Institute of seismological research (ISR), Gandhinagar have explicitly projected their studies to understand area specific structural complexities and their impact on the local and regional seismicity. Speakers from other parts of the country have also emphasized the need to carry out area specific investigations, including micro-zonation studies to address earthquake resultant hazards. The two sessions on Marine Geosciences and Atmospheric & Planetary Sciences have covered recent studies carried out in the national research institutes and universities. It is noted that considerable progress has been made in understanding the tectonic evolution of oceanic ridges, continental margins and the mineral wealth of the oceans. In the atmosphere and Planetary session, speakers presented the results of recent studies on ozone, geo-magnetic storms periodicities in solar and ground magnetic field parameters, geochemical and anthropogenic influence on snow composition and aerosols. The last session on Solid Earth Geosciences covered recent studies in exploration-environment; experimental-theoretical; and basic fields of research. We are happy to state that students, young and senior scientists gained from the five technical sessions, award and special invited lectures given by eminent scientists including Padma Bhushan Prof Bikash C Sinha. It is heartening to see the enthusiasm of young students (especially those from Kurukshetra University) in presenting their studies through posters. IGU places on record the support received from local organizing institutes (GERMI,PDPU and ISR), convenors (Profs. T. Harinarayana, P.K. Banik and B.K. Rastogi) & local organising committee and sponsors (CSIR, Electrotek Intl. Inc., DMTGmbH, Geometrics, Resultsmarine, ISRO, SERB/DST, INCOIS, IIGM, NCAOR, NGRI, NIO, ONGC, GCST, GPCL, GSPCL, MOES, MNRE).

Golden Jubilee Celebrations of IGU:

IGU was started on 23rd Dec, 1963 at Visakhapatnam. The first President was Prof.K.R.Ramanathan. The first executive committee comprised of eminent scientists Prof.S.Bhagavantham and Prof.M.S.Krishnan. Dr.S.Balakrishna was the first Hon.Secretary. During the last 50 years, IGU contributed significantly in meeting the needs of earth system scientists. All those associated with IGU directly and indirectly, want the Golden Jubilee year of IGU (Dec,2012- Dec,2013) be celebrated in a befitting way. It is planned to organize two day workshops at NIO,Goa; WIHG, Dehradun; NESAC, Shillong and SRMT, Nanded, in addition to 50th Annual Convention at NGRI, Hyderabad. It is also decided to have some invited talks by peers, covering all the branches of earthsystem sciences. A special volume, covering IGU's contributions during the last 50 years in strengthening earth system scientific research will be released during the 50th annual convention. We request the scientific community to support IGU initiative and ensure success of the celebrations.To properly project the contributions made by IGU, we request you to bring to our notice any information pertaining to IGU activities during the last 50 years.

IGU and AGU co-operation

During 48th annual convention Prof. Surjalal Sharma of US has put forward a proposal for viable co-operation between Indian Geophysical Union (IGU) and American Geophysical Union (AGU). Prof. Sharma, who delivered an invited talk during the 49th annual convention, reiterated the importance of co-operation between AGU and IGU. It is hoped that the co-operation would fructify and help IGU in organizing a special interactive session, during the 50th annual convention, between AGU and IGU members/fellows.

Global Warming

It is now accepted by one and all that Global warming is taking place. Antarctica, Arctic and Green Land ice sheets are melting, glaciers are receding, sea temperatures are rising and environmental disturbances are taking place unabatedly and natural resources are relentlessly plundered in the name of development. Kyoto conference took place 15 years back, followed by yearly meetings and seminars. None of the resolutions have been implemented properly and everyone is only trying to find loopholes to pass on the blame to others. These diplomatic games and maneuvers are only complicating the issues. Water and food scarcity is going to affect millions of people and destabilize the peaceful atmosphere in an irrevocable manner. We have become mute spectators to all these developments. What should we do to save life on this planet? How to bring out lasting solutions to vexed problems? Let us put into practice some of the acts that can become path breaking developments. Let us show to the administrators, politicians and common man (rather to the entire world) that solutions are possible if there is a will to solve the problems. Since we are scientists and believe in finding lasting solutions to various problems, let a part of our leisure time be diverted to educate our neighbor hood. We are still respected by many, as they believe that our works are aimed at over all development of the society. As such, let us pool in our resources to get rid of water and air pollution, at least, in our neighbor hood and then bring out brochures that can help other segments of our society to implement the changes brought out by us.

Coastal Ecology and Marine Bio-Diversity:

The global change currently observed generates an intensification of the coastal erosion phenomena and, probably, an increase in frequency and intensity of proximal weather events and, simultaneously, the rise of sea levels and expected disappearance of coral reef barriers.

Recent studies carried out by research organizations, including NRSC,NIO,NIOT,INCOIS, NCAOR and ISRO, have clearly established that rise in sea levels has resulted in erosion of our coastal belt. It is clearly noticed that considerable erosion of our coastal corridor has happened in the last 7 to 8 years. The Nilam cyclone of October 2012, has affected a significant segment of our coastal corridor, bringing in to focus the extent of damage to our coastal corridor, due to cyclones of Nilam magnitude. The probability of occurrence of such extreme weather events in the coming years is high. The wind and tide resultant sea water intrusion has affected the soil cover and ground water regime of the coastal belt, leading to conversion of fertile lands in to waste lands. Such super cyclones also affect the oceans. It is noticed, world over, after such cyclones one can notice a sharp increment in water turbidity, chemical oxygen demand, phytopigments, micronutrients, phosphate concentration and degradation of the organic matter. This in turn, often resulted in the reduction of zooplankton biomass, density and specific diversity. As such combined effect of global warming and extreme weather events has an adverse impact on our coastal ecology and marine health.

In our coastal corridor we have significant number of industries and efforts are being made to introduce more number of industries. If sea levels continue to increase, unabated, there is every possibility of many of these commercial activities getting closed, leading to deceleration of economic growth and misery to millions of people living along our coastal belt.It is opined by experts that a struggle for balance between

preservation of biodiversity and entropic pressure induced by economic and social growth will take a new dimension, in order to achieve eco-development. To achieve eco-development we need to protect mangroves and wetlands, sustain mobilization use of water resources, control of domestic-agricultural-industrial pollutions, control of land erosion and hyper sedimentation, management of risks induced by sea level rise and adaptation of the coastal corridor to climate change. As a part of risk management plans we need to build environmental information system based on regional land use and land cover mapping and digital elevation models. Even though Global Land Cover Mapping, Global Land Cover Facility are in existence, information from such maps is not of much use. Only the regional scale is appropriate for comparison of the status of the environment on one date or to monitor its evolution in the relevant area. As such we need to develop regional maps and identify segments that are more vulnerable to take up appropriate preventive and curative measures. Erosion and subsidence monitoring need to be carried out periodically through precise leveling and GPS measurements. Vertical and horizontal displacement details, on a periodical basis, need to be obtained to properly plan and execute measures that can lessen erosion and subsidence related setbacks.

The Rio principle that the Eco System Approach (ESA) for development and deployment of natural resources has to be anthropo-centric is now accepted after a tumultuous decade, which saw several controversies. Economy encompasses careful management of natural and man-made resources through socio-economic activities. Both words-Ecology/ Economy are derived from the Greek root Eikos-meaning Home. They really constitute two sides of the same coin. Science, Technology and Engineering should constitute the Hardware for the two. Policies, Governance comprise the Software. As such, if we want to survive and sustain our economic growth we need to ensure healthy Ecology. To ensure that, however, we should never forget that our house can only be set right by us and the support from external sources is at best be limited and, at times , can even introduce impediments. So, it is essential for us to properly fix up our priorities and take measures to save our coastal corridor. In the recently held COP-11 Bio Diversity meet, India has stressed the need to save Marine Bio Diversity and announced a grant of US $ 50 million to the international forum. While appreciating the stand taken by India, we urge the Government of India to take needed measures to save our marine life and the coastal corridor, before an irrevocable damage sets in. It is time we establish Marine sanctuaries, banning fishing in those zones and conserving marine life (including that of corals).The steps initiated by Australia and some of the smaller countries in the Indian Ocean are worth emulating.

Environmental Safety

Since ISRO has successfully launched micro wave imaging satellites, the images could be used in many ways to discourage rampant misuse of surface water bodies and agricultural lands. These satellite images need to be used in a big way in arresting degradation of our environment and restricting conversion of agricultural lands located in the suburbs of mega and medium sized cities into real estate properties. It is time we introduce a legislation to stop conversion of large chunks of agricultural lands into commercial properties, within a particular distance from urban conglomerations. We also should enforce implementation of already passed government orders that do not permit construction of high rise structures and confluence of resorts etc within a particular zone near surface water bodies, as such buildings arrest/ affect rain water flows into the surface water bodies and damage catchment areas. Rehabilitation of tanks need to be given priority, as many urban and rural surface water bodies have been damaged or encroached or polluted , resulting in large scale misuse of water storage facilities. In addition, we have to ensure application of technologically appropriate irrigation practices, arresting of saline water intrusion in the coastal belts, introduction of artificial ground water recharge facilities in hard rock terrain, introduction of soil specific cropping pattern in different segments of the country, cultivating drought resistant crops in arid and semi arid regions and water resistant cropping in flood

prone zones, practicing mechanized farming to overcome labour centric problems, using pest resistant and soil strengthening organic fertilizers and natural pesticides, ensuring availability of appropriate food storage facilities in every mandal/ revenue division, government supported organized transportation of the agriculture/ horticulture produce and strengthening sustainable marketing practices. If the above suggested curative and preventive steps are not taken in the near future, we are afraid, we would be not only going back to pre green -revolution days, a development that would nullify all the technological achievements and economic growth achieved during the last two to three decades and make us an under developed nation, but also create an irrevocable damage to our eco system. It is essential that a dynamic system of agriculture that ensures better yields should be put into practice, taking the guidance of luminaries like Prof.Swaminathan, father of green revolution and selfless experts having appropriate expertise in engineering, technology and science. In addition, we need to educate both the rulers and ruled to come together and understand the gravity of the situation and bring out revolutionary changes in our way of living, which is causing unprecedented damage to our environment.

Ecotourism:

Government has set up number of ecotourism centers to enhance tourism to generate additional revenue and help the tourists have an exposure to natural habitat of flora and fauna. It is noticed that tourists, instead of enjoying the natural beauty of the forest environment, are disturbing the serene environment by polluting the environment with plastic and garbage. Many, even while visiting Zoos, are noticed to disturb the birds and animals by throwing objects on them and teasing them by loud noise etc.We are pained to state that majority of us have no empathy for the flora and fauna and act as if the earth is only for the human beings, a distressing attitude. Let us advocate the importance of preserving our environment and saving the flora and fauna, as a part of daily activity. Such an approach/ act is as important as our scientific research.

Storm water drains:

Water Portal, Bengaluru as a News item published…."Crores of rupees are spent every year on the construction of storm water drains alongside roads in cities and towns, supposedly to prevent floods during the monsoons. Yet, not many of us know where all this collected water goes and if it really is being put to any use. Rain centre, Chennai, a one-stop information and assistance centre on rainwater harvesting and ecological sanitation set up in 2002, has been working with local authorities in their city, on the issue of storm water drains, and are exploring if the rainwater collected through these drains (which is currently being wasted) can be used to recharge groundwater instead."Water Portal requested the readers to comment about this exercise.

We are of the opinion that this is a good step. However, these storm water drains may not be recharging hard rock acquifers.Polluted waters from these drains, are found to pollute rivulets, ponds and tanks. Our experience in Hyderabad (a hard rock terrain) is rather unpleasant. The rain water drains have become centers of pollution and locales for mosquitoes' growth. The polluted waters are discharged in to Musi, Hussainsagar and some other surface water bodies. The rain water drains are ill maintained and in many places they have been converted in to waste dumping yards, both by the local residents and waste removing government organizations. The drainage and drinking water pipes that are placed across these drains have got inter mixed, leading to severe health hazards. It is time the municipalities and corporations develop area specific designs that can ensure proper installation and maintenance of rain water drains and probable usage of them as ground water recharging conduits. Such a step can ensure better management of our environment. Importance of the suggested step is strengthened by the report by CMS-ENVIS, detailed below.

There seems to be no end to the menace of storm water drains discharging sewage and liquid waste into water bodies and other open places. Constructed for the purpose of discharging rain water runoff during the Monsoon into lakes and tanks, these drains for several decades have been responsible for contamination, pollution of water bodies. Water bodies in many urban conglomerations and their surroundings, which were once potable, have now been thoroughly degraded. Water bodies located in the midst of residential localities, commercial establishments and industries are on the brink of extinction. In Tamilnadu, Karnataka and Andhra Pradesh among the more than couple of thousands of major lakes and tanks and many more smaller water bodies, only a few have managed to survive the onslaught of pollution. The condition of these drains only reflected the loss of several crores of rupees from the tax payers' pockets. Residents from the affected regions point out that local bodies` administration did not attach much importance to proper maintenance of these drains that were clogged with plastic and paper waste. In these affected zones drinking water supply is adversely affected as main and distribution lines passed through storm water drains and due to corrosive condition of these pipes, sewage mixing with the drinking water has become a common occurrence. (Courtesy: CMS-ENVIS).It is a pity that we, the common man, are made to live with these adversities, leading to deterioration of environment and ill health to the tax payers.

Contents- A brief introduction

This issue has one invited review article and five research articles. T.M. Mahadevan, former Director, AMD and a strong supporter of Deep Continental Studies Program, has contributed a review article entitled "Evolution of the Indian Continental Lithosphere: Insights from Episodes of Crustal Evolution and Geophysical Models". IGU is indebted to him for his support and guidance. Many of us have to learn from him, the importance of positive approach. He believes, at the age of 86, that learning is a continuous process and one needs to appreciate the contributions made by the young and old, irrespective of their status. He also believes in passing on the acquired knowledge to the scientific community, instead of holding the knowledge to oneself and burying the growth. In the review article, Mahadevan has brought out in a succinct manner the distinct patterns of the Indian Lithosphere by synthesizing geological, geophysical and geochronological inputs. We strongly believe that this article will excite researchers and lead to generation of more refined structural and evolutionary models of the Indian Lithosphere. In this context we appreciate the initiative of NGRI in training the young researchers, through presentations made by internationally renowned scientists. The three day training lectures given by Dr.Walter D Mooney and scientists of NGRI have brought in to focus the basics associated with research pursuits, world over, on Lithosphere Structure and Evolution. We are happy to say that through IGU journal (Editorials and News-Views), we are striving to provide useful information (Please see News-Views of Oct, 2012 issue).

Dey and Paul in the article "Grain Scale Physical Signatures……Tripura "attempted to assess the micro structural signatures of early seismo-tectonic occurrences preserved in fault rocks. They have come out with a conceptual model, to explain the physical mechanism of grain scale deformation during early seismo-tectonic occurrence. (We are shocked and grieved to learn that Sudip Dey is no more. Our earth Science community has lost a young scientist of eminence. We condole his demise and extend our support to his family). Sridharan and Ramasamy, in the second article titled "Geomagnetic field variations in India….. Clustering", tried to identify the pattern of geomagnetic field variations between the internationally declared quiet and disturbed days in the Indian region. They have presented an analytical technique and the results of the analysis. In the third article Samuel Selvaraj and his co-authors have carried out a correlative study on solar activity and all India rainfall cycle. The results indicate an anti correlation between the sunspot activity and rainfall. In the fourth article Harvir Singh and O.P.Singh studied the importance of satellite derived precipitation estimates over Indian region during southwest monsoon. In the last article Prasad et al tried seasonal forecasting of southwest monsoon rainfall, at district level, through an empirical model.

We request monsoon forecasting experts to take in to view, the recent aberrations in forecasting. Since any forecasting of monsoon activity has a direct impact on our society we request the experts to take in to consideration the influence of various factors---local/ regional/ global in carrying out their studies and spell out the limitations of the generated models. Studies need to address problems created by increased frequency of extreme weather events that are probably influenced by global warming and climate change. As pointed out by Prof.M.S.Swaminathan, an end to end approach will have to be adopted in climate research, if the knowledge and information gained form climate research are to be used in strengthening food and livelihood security in the rural sector and overcome weather related setbacks both in the rural and urban sectors. Meteorological research should help our rural and urban population in deriving maximum benefit from the information/ results given in the manuscripts. As spelt out by M.S.Swaminathan, in an article published in Mausam-2001 what farmers need is location-specific information and advice. Similarly, the urban population needs information that can help them in meeting weather related disasters/ hazards. The saying" Indian agriculture is a gamble in the monsoon' should be replaced by the saying" India`s agriculture strength lies in its capacity to manage the monsoons". Such a change can only be achieved if the researchers are more pragmatic, in interpreting their research findings and coming out with apt and objective models/ results.

In the sub section- News & Views at a Glance, we have tried to include some useful details that expose the present scenario pertaining to the dismal state of our ENVIRONMENT. We strongly believe that our scientific community, if willing, can play a significant role in decelerating some of the environmental degradation activities.

The year of 2012

The year of 2012 exposed us to various setbacks created by natural calamities, including Sandy Hurricane and Nilam cyclone.As this editorial being prepared (9th Dec) we have learnt that the Doha gateway became a reality on 8th Dec, 2012 with countries adopting all the proposals tabled except for the U.S, which rejected the idea of equity by refusing to be part of a new agreement under the United Nations Framework Convention on Climate Change. Russia rejected amendments to Kyoto Protocol. The key issue is money and we are running out of time. Science is urging the international influential community to take quick decisions. But, the continued stalemate due to the lack of ambition in emission cuts by developed countries keeps us exposed to nature`s fury and degradation of our ENVIRONMET.

As we are disturbed by these developments and gearing up to face enhanced solar flares, we are shocked to learn that Prof. Devendra Lal, reputed geophysicist and visiting professor at the Scripps Institution of Oceanography of the University of California, San Diego, USA and recipient of IGU-Harinarain Lifetime achievement Award for 2012 breathed his last on 1st December, 2012 at his San Diego home. In November he informed us that he would receive the gold medal during his proposed visit to India in the third week of December. He was a legend and contributed significantly in studying the records of climate found in terrestrial minerals and chemical history of ocean waters based on marine biogenic minerals. While he was Director of PRL, Ahmedabad he established state of the art laboratory facilities and enhanced the reputation of PRL. IGU condoles this loss.

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We once again wish all the readers –A Happy and Prosperous 2013 and solicit their continued support to IGU and Journal of IGU.

P.R. Reddy
P. Koteswara Rao