Editorial

In spite of number of hurdles January, 2015 issue was released on time. I thank the support extended by one and all. I am thankful to management of IGU for extending support. Thanks are due to Dr.A.S.S.S.R.S.Prasad for extending help at different stages of publication of the journal. I am indebted to couple of Editorial team members for extending help, whenever needed. I thank Ms.Sri Jayanthi of CSIR-NGRI for formatting manuscripts.

Irrespective of our priorities, we need to encourage any innovative research that aims at in addressing societal needs, as we are part and parcel of the society. Since any deceleration of food production, water scarcity, pollution to air-water-land, abnormalities in monsoon activity and natural hazards do affect our well being importance is given to these topics in the editorial. However, as basic, application oriented basic research covering various branches of earth system can enhance our inbuilt urge to do path breaking research we cannot ignore such topics that are given importance by international scientific community. As such the length of the editorial is relatively more. Readers may please note this approach and extend support by going through the editorials and interacting with the Editor, with constructive suggestions.

El Niño fades without westerly wind bursts

For 6 months starting from Feb 2014,experts, semi experts, government officials, economists, farmers and common man were in a fix with media presentations about effects of El Nino and set back to Kharif season and probable impact on Rabi (as El Nino can extend for 28 months). The statements varied week after week, confusing one and all. Even after deluge in September and October weather experts were in a sort of spin trying to understand what really happened to El Nino. Many were happy food production was normal. Many others were either taken aback by heavy rains/ floods or drought. Net result is many got baffled by setbacks in weather forecasting. Even though such a scenario is not encouraging let us not forget that we have come a long way in tracking cyclones and predicting about intra-monsoon aberrations. We were in a cobweb as EL Nino signals from global, regional and local supported on set of El Nino. We could not wriggle out of the negative impact of statements, as even NOAA, Australian Weather Bureau and many other weather recording channels could not categorically suggest the probable course the SW monsoon would follow after third week of July. Instead of blaming one or the other let us look in to some of the explanations given by experts and get wiser**.**

The warm and wet winter of 1997 brought California floods, Florida tornadoes, and an ice storm in the American northeast, prompting climatologists to dub it the El Niño of the century. Earlier in 2014, climate scientists thought the coming winter might bring similar extremes, as equatorial Pacific Ocean conditions resembled those seen in early 1997. However, the signals weakened by summer, and the El Niño predictions were downgraded. Menkes et al., used simulations to examine the differences between the two years. The El Niño–Southern Oscillation is defined by abnormally warm sea surface temperatures in the eastern Pacific Ocean and weaker than usual trade winds. In a typical year, southeast trade winds push surface water toward the Western Pacific "Warm Pool"—a region essential to Earth's climate. The trade winds dramatically weaken or even reverse in El Niño years, and the warm pool extends its reach eastward. Scientists have struggled to predict El Niño because of irregularities in the shape, amplitude, and timing of the surges of warm water. Previous studies suggested that short-lived westerly wind pulses (i.e., 1–2 weeks long) could contribute to this irregularity by triggering and sustaining El Niño events. To understand the vanishing 2014 El Niño, the authors used computer simulations and examined the wind's role. The researchers found pronounced differences between 1997 and 2014. Both years saw strong westerly wind events between January and March, but those disappeared this year as spring approached. In contrast, the westerly winds persisted through summer in 1997. In the past, it was thought that westerly wind pulses were 3 times as likely to form if the warm pool extended east of the date line. That did not occur this year. The team says their analysis shows that El Niño's strength might depend on these short-lived and possibly unpredictable pulses. (**Source**: Geophysical Research

Letters, doi:10.1002/2014GL061186, 2014). In case of India in spite of good rains from third week of August, on an average southwest monsoon was 12 to 20 % below normal, as rains got delayed. It is learnt apart from Kharif set back Rabi crop plantation got delayed due to absence of good rains from north east monsoon. Wheat and pulses production has been affected. So, in a way El Nino effect / monsoon aberration was in operation to an extent leading to below par precipitation. We need to be vigilant in forecasting 2015 monsoon pattern and constantly be in touch with NOAA, Australian weather Bureau and other global weather channels to have a gross outcome regarding El Nino`s presence or absence in 2015 and then build on that base local aberrations.

An apt approach to reduce degradation of our environment:

We are bombarded by articles/ reports/ opinions on Climate Change and Global warming. While such studies are essential to have a proper road map to save our environment, the huge amount of data of varied nature is confusing even the experts and leading them astray. Let us keep in mind common man is not concerned about methane emission, acidification of sea waters etc. He is concerned about his food, shelter and welfare. As such our aim should be to talk in his language and help him in reducing his problems. In case of educated, who have blinkered vision, it is essential that government impose huge penalties for polluting the environment and levy heavy taxes on goods that are exotic but affect the environment. We need to ration use of oil and gas and insist on pooling of private transport and frequent use of public transport. Unless strict measures are taken to lessen pollution of our air, water, food and environment no amount of cleaning processes can yield needed results. This is the stark reality.

Timeline for Cutting Greenhouse Gas Emissions

I have mentioned above we need to act properly to reduce pollution and degradation of our life saving basic elements. Unfortunately, no tangible understanding exists between governments to bring out a change that is useful to entire globe. Since we have a responsibility to contribute our bit in achieving over all sustainable development, I present below a report on need for fixing a time limit for cutting greenhouse gas emissions. I strongly believe that this can be done not through coercion, but through co-operation. A new report states that "global carbon neutrality" needs to be achieved by 2055–2070 to limit global temperature rise to a 2°C increase relative to the preindustrial period. The report was released a few weeks prior to the United Nations (UN) Climate Change Conference, which was held on 1–12 December, 2014, in Lima, Peru. The Emissions Gap Report 2014, issued by the United Nations Environment Program (UNEP) on 19 November, also states that total global greenhouse emissions need to shrink to net zero between 2080 and 2100 to keep within that 2°C limit. Under a carbon neutral scenario with net zero emissions of carbon dioxide (CO_2), emissions could be compensated by CO_2 uptake through reforestation or techniques such as carbon capture and storage, according to the report.

To limit global temperature rise to 2°C, the total maximum amount of CO_2 that could be emitted to the atmosphere from the 19th century onward needed to be kept to about 2900 gigatons (Gt), notes the report, which builds on the Fifth Assessment Report by the Intergovernmental Panel on Climate Change. However, much of that emissions "budget" already is used up, and to limit temperature rise to 2°C, the maximum amount of emissions since 2012 must be kept at just 1000 Gt, according to the UNEP report. At a news briefing to release the report, Achim Steiner, UN under-secretary-general and UNEP executive director, said that continued emissions present an enormous risk in terms of global warming, particularly under a business-as-usual scenario. However, he also pointed to positive parts of the report, including its emphasis on the amount of emission reductions that could be gained through energy efficiency measures and a greater reliance on renewable energy. In addition, he said that the 12 November, 2014 U.S.-China announcement to limit greenhouse gas emissions—and other measures, including a recent commitment by the European Union to reduce greenhouse gas emissions by 40%—are indications that "the world is, in fact, moving to accelerating to action" to cut emissions. (**Editor`s Note:** There is a possibility to an extent even India might take some steps to limit fossil fuel emissions, after Obama-Modi interaction in January, 2015. In this context I reproduce some excerpts of speech by Obama to US Congress…"The best scientists

in the world are all telling us that our activities are changing the climate, and if we do not act forcefully, we'll continue to see rising oceans, longer, hotter heat waves, dangerous droughts and floods, and massive disruptions that can trigger greater migration, conflict, and hunger around the globe". The co-operation between US and India might yield tangible results with respect to renewable energy, particularly solar energy, in which India has announced the ambitious plan of adding 100GW of capacity by 2022. Officials expressed optimism with regard to shale gas fracking. Another area where the existing partnership between the two will be addressed relates to the phasing out of refrigerant gases like hydrofluorocarbons (HFCs) and the use of climate friendly options with low global warming potential. However, the shape of things to come in the next year is difficult to predict, due to various intricate issues that have profound bearing on Indian economy. India faces a predicament which previous countries that used energy to grow their economies did not face. It stands on the cusp of industrialisation just as the world may finally be willing to take multilateral action to reduce carbon emissions. As it possesses vulnerable coastlines and is reliant on the monsoon and glacial melt, India is as susceptible as any other country to the consequences of collective action failure on climate. But for India, the tradeoffs between environment and growth (and poverty elimination) are harsher than perhaps anywhere else. India's overall size of both population and emissions makes it the most critical low-income country).

At the briefing, Andrew Steer, president and CEO of the World Resources Institute (WRI), said that "on the one hand, we are way off track" in cutting emissions and that with every year that passes, the world is falling further from the least cost solution to climate change. "On the other hand, there is increasing evidence that this can be done much more cheaply than had originally been estimated." WRI is part of a consortium of organizations involved in producing the UNEP report. The report's emission gap figures do not yet incorporate potential emissions reductions that could result from the U.S.-China announcement because it is too recent, Steiner said. However, former U.S. Senator Tim Wirth, vice chair of the United Nations Foundation, suggested at the briefing that reductions could be significant, including possibly a 2–6 Gt reduction with just the U.S.-China agreement. Some scientists recently suggested that the 2°C limit should be abandoned because it might be unrealistic, but Steiner dismissed the notion. "We don't have that choice. It is an unethical choice, it is an irresponsible choice, and it is an unnecessary choice." "You simply first of all cannot defend a set of decisions being deferred for another 20–30 years that lock in generations for 2000 years," he said. "Everything that we are discussing here is not a matter of saying you have the luxury to choose not to act. The question is how do we enable one another to act faster." Steiner added, "With every year that passes, being able to meet that 2° threshold gets more difficult, more expensive, and riskier because you are relying on more dramatic actions, you are relying on more unproven technologies, and you are relying essentially on moments of catharsis where people suddenly have to jump" to act. (**Source**: Eos, Vol. 95, No. 48, 2 December 2014).While I was going through the above article I came across an article, which tries to expose the complicated nature of statements on Climate change. I reproduce below some excerpts, which bring in to focus the complex nature of the problem.

Scientists condemn "spectacularly wrong" climate forecasting

Richard McNider and John Christy declare that the climate consensus is mistaken and scientific legitimacy misattributed. "The truth, this is frustrating for policy-makers," declared John Christy in *Nature* four years ago, "is that scientists' ignorance of the climate system is enormous." Now he and fellow climate scientist Richard McNider have argued in the *Wall Street Journal* that widespread, perverse disregard of gross climate-modeling deficiencies is leading to acceptance of huge overestimates of warming, to needless regulation, to social harm, and to a clear need to invert common belief about climate-science legitimacy. Both authors are fellows of the American Meteorological Society. Both rank as distinguished professors at the University of Alabama in Huntsville. In December 2013 congressional testimony, Christy introduced himself also as Alabama's state climatologist, director of his university's Earth System Science Center, a former lead author, contributing author and reviewer of Intergovernmental Panel on Climate Change assessments, and a holder of NASA's Medal for

Exceptional Scientific Achievement. McNider and Christy don't doubt climate change. They doubt "catastrophic climate change." They stipulate that contrary to simplistic views of climate skepticism, they do embrace the "two fundamental facts . . . that carbon-dioxide levels in the atmosphere have increased due to the burning of fossil fuels" and that "carbon dioxide in the atmosphere is a greenhouse gas, trapping heat before it can escape into space. What is not a known fact is by how much the Earth's atmosphere will warm in response to this added carbon dioxide. The warming numbers most commonly advanced are created by climate computer models built almost entirely by scientists who believe in catastrophic global warming. The rate of warming forecast by these models depends on many assumptions and engineering to replicate a complex world in tractable terms, such as how water vapor and clouds will react to the direct heat added by carbon dioxide or the rate of heat uptake, or absorption, by the oceans.

They point out we might forgive these modelers if their forecasts had not been so consistently and spectacularly wrong. From the beginning of climate modeling in the 1980s, these forecasts have, on average, always overstated the degree to which the Earth is warming compared with what we see in the real climate.

With three lines, their graph—"Warming predictions vs. the real world"—plots temperature rise over the past third of a century. One "real world" line represents satellite datasets, another balloon datasets. The third line represents the average of 102 model runs. That "prediction" line's separation from the two measurement-based lines begins as slight in 1980, but widens to half a degree Celsius after 2010, then continues to rise. Such an abrupt deviation since recent past, according to the two authors, is unrealistic. The co-authors press their charge that models, presently projected by Catastrophe theorists grossly overestimate temperature rise. The climate-change-consensus community points to such indirect evidence of warming as glaciers melting, coral being bleached, more droughts and stronger storms. Yet observations show that the warming of the deep atmosphere (the fundamental sign of carbon-dioxide-caused climate change, which is supposedly behind these natural phenomena) is not occurring at an alarming rate: Instruments aboard NASA and National Oceanic and Atmospheric Association satellites put the Mid-Troposphere warming rate since late 1978 at about 0.7° Celsius, or 1.3° Fahrenheit, per 100 years. For the same period, the models on average give 2.1° Celsius, or 3.8° Fahrenheit, per 100 years.

And they press their charge of widespread, perverse disregard of these claimed modeling deficiencies: It is disturbing that "consensus science" will not acknowledge that such discrepancies are major problems. From the Intergovernmental Panel on Climate Change's beginning, that largely self-selected panel of scientists has embraced the notion that consensus on climate change is the necessary path to taking action and reducing man-made carbon emissions around the world. The consensus community uses this to push the view that "the science is settled" and hold up skeptics to ridicule. "Consensus" science that ignores reality can have tragic consequences if cures are ignored or promising research is abandoned. The climate-change consensus is not endangering lives, but the way it imperils economic growth and warps government policy making has made the future considerably bleaker. The recent Obama administration`s announcement that it would not provide aid for fossil-fuel energy in developing countries, thereby consigning millions of people to energy poverty, is an unfortunate decision. We should not have a climate-science research program that searches only for ways to confirm prevailing theories, and we should not honor only those, who attack others for their inconvenient, fact-based views. "It is unfortunate, in my opinion," said Christy in testimony to that congressional committee in December, "that recent policy has been made based on the projections of these faulty models. Climate science has a long way to go."

(**Source***:Steven T. Corneliussen, a media analyst for the American Institute of Physics,* http://scitation.aip.org/)

After reading the above I am convinced that "Climate change" issue needs to take in to cognizance various views and arrive at a solution, which is more or less non controversial and free from Global Politics. The fact is, whether you believe in global warming or you don't we need to lessen pollution. We need

to give due credit to the two scientists (McNider and Christy) for coming out with results that are important from many ways. For any investigation, we need to show the error bounds. The 0.7°C in 100 yrs clearly points out that the projected rise of 2°C is rather high. Everyone agrees that Global warming exists. None is questioning that. The disagreement is with regard to dimension. Many of us read multitude of articles for and against global warming. The truth is exaggeration has unnecessarily complicated the issue. As of now there exists evidence against "catastrophe theory". Exaggerating the amount of harm Global warming causes and impose restrictions on use of fossil fuels is not proper, as it has direct impact on millions of people from under developed and developing nations. Climate Change issue is something very different from normal issues. Unfortunately, it is linked with POLITICS and MONEY. Unless this is accepted, as the reality, we will be groping in dark. While efforts need to be continued to encourage co-operation amongst developed and developing nations, it is essential to sharpen our scientific capabilities in better knowing basic causes for climate change and how various factors contribute to subtle changes in space and time, without worrying about GLOBAL POLITICS. Developing countries, like India, however, need to take apt measures to lessen pollution of our land, water and atmosphere, as POLLUTION can cause significant harm to all of us. After Obama`s visit tangible steps, as promised, will be taken by India during the next 5 years, to impress one and all that India is ready to co-operate to help well being of entire humanity. And in turn it would insist that the developed countries should extend needed help to avoid deceleration of its development. The first problem will be solved if the second too is solved.

It is interesting to note clouds not only play significant part in weather variations but also contribute to climate change, with time. I reproduce below an interesting article.

Cloud variations in current climate a guide to climate changes

Clouds come in many flavors–like wispy cirrus, cotton-puff altocumulus, and ominous stratus–and each presents a unique set of challenges for scientists trying to understand their effects on climate. Because of this, clouds have long accounted for much of the disagreement between climate models, and for most of the uncertainty in estimates of how much the Earth is expected to warm with a doubling of atmospheric carbon dioxide (CO_2).This uncertainty stems from the fact that models suggest the extent, altitude, and optical thickness (a measure of how much shortwave radiation penetrates through a cloud) will change in different ways for different kinds of clouds in a warming world. To better understand these changes, Gordon and Klein analyzed low clouds in an ensemble of climate models. Then they assessed how model predictions of the change in low-cloud optical thickness with temperature compared to short term variations in low clouds observed by satellites in the current climate. The researchers found that both models and real-world observations show that optical thickness increased with warming for the cold, low clouds common at mid latitudes to high latitudes, contributing to an overall negative climate feedback. The researchers attributed this trend to an increase in the water content of clouds at higher temperatures. For warm, low clouds, on the other hand, the study found that optical depth decreases with temperature in model simulations and satellite measurements, probably because these clouds tend to get thinner as they warm. The researchers showed that variations in the optical depth and temperature of low clouds in the current climate provide a reasonable guide for how low clouds might behave under future climate changes, and could be used as a target for calibrating climate models. Currently, however, models overestimate the temperature dependence of optical thickness, suggesting cloud feedbacks are more positive than previously thought.

(**Source**: Journal of Geophysical Research: Atmospheres, doi: 10.1002/2013JD021052, 2014).

Are we prepared to face Natural Hazards?

Every administrator associated with Relief and Rehabilitation faces year after year barrage of questions from influential to common man; why needed steps have not been taken prior to a natural calamity? Why people could not be motivated to prepare themselves to face a natural calamity? Is such a situation restricted to our country or is it a global phenomenon? It is interesting to learn that

even in USA people are not prepared to meet natural calamities. I reproduce below important excerpts from a recent study.

Americans are very worried about the threat of natural disasters—but don't seem to be prepared for one. This conclusion comes from Chapman University's recent Survey on American Fears, released on 21 October, 2014. The survey asked 1500 Americans to rank how worried they were about several types of natural disasters and then how prepared they were for each. Tornadoes and hurricanes topped the list of fears, followed by earthquakes, floods, pandemics, and power outages. When asked if they were prepared for a disaster, however, an overwhelming majority of Americans responded "no." The answer isn't surprising, according to Ann Gordon, associate dean at Chapman University's Wilkinson College of Humanities and Social Sciences, who headed up the natural disasters section of the survey. A 2013 poll by the Federal Emergency Management Agency (FEMA) found similar results: Americans are mostly unprepared for natural disasters, even those in the most vulnerable areas. Unprepared for Tornadoes and Hurricanes even in areas where natural disasters are a regular, yearly occurrence—such as in Tornado Alley, which stretches from northern Texas to South Dakota and experiences more than 1000 tornadoes per year—most of those surveyed said they weren't prepared. Specifically, most Americans don't have a disaster preparedness kit that includes such items as batteries, several days' worth of water, emergency blankets, and non-perishable food. Gordon and her colleagues then conducted a follow-up survey, asking respondents why they weren't prepared. The majority of those polled (34%) said they thought that emergency services would help them. Gordon also found that those Americans with a higher income tended to be more prepared than those with lesser economic means. Even those who can afford to be are not prepared for various reasons. Robert Meyer, co-director of the Wharton Risk Management and Decision Processes Center at the University of Pennsylvania, did extensive research on communities affected by Hurricane Sandy in 2012. He found that even though people were worried about their homes or livelihoods, they didn't think they would be affected personally. This is what psychologists call an "optimistic bias," Meyer explained. "People tend to think that others are more likely to have bad things happen to them than themselves," he said. Why Aren't People Prepared? Another reason people weren't prepared was because they prepared for the wrong thing. During Hurricane Sandy, people thought the wind would be the most damaging aspect; in reality, flooding caused the most damage to homes and lives. Even people living next to water think of hurricanes as wind storms, Meyer said. "People have poor mental models of hazards," he added. Meyer also found that people who had already been through a hurricane and had suffered significant damage were the most likely to be prepared. Those least likely to be ready had experienced a natural disaster but had not suffered significant damage. "As a consequence, when it comes down to 'next time,' people have the tendency to think they don't need to put out as much effort," Meyer said. Motivating Preparedness The next step will be to find out what messages about preparedness will motivate people to act.

(**Source:** Eos, Vol. 95, No. 44, 4 November 2014)

When such is the scenario in the most developed country, one can visualize the probable scenario in India where 85 % of the country is prone to one natural calamity or the other. Details of a study by Thomson Reuters Foundation on India's preparedness for natural disasters are given below, to have an insight in to existing scenario.

In June-July 2013 , Indians were shocked when catastrophic floods hit the state of Uttarkhand, killing more than 5,500 and affecting more than 100,000. Experts blamed the heavy toll in part on the state government's lack of preparedness to handle disasters, despite a history of calamities in the region, including 1998 flooding that killed over 300 people in one village. These floods, considered India's worst natural disaster since the 2004 Asian tsunami, has left experts questioning whether the country is adequately prepared to respond to disasters, particularly at the state and local level."Each disaster continues to frustrate the government and the community. The country needs professional approaches," said Chandan Ghosh, head of the geo-hazard risk management division at the National Institute of Disaster Management. According to the South Asian Association for Regional Cooperation, India's disaster profile is alarming. Almost 85 percent of the country is vulnerable to one

or more hazards such as earthquakes, floods, droughts, cyclones and landslides. More than 50 million people are affected by natural disasters annually, according to the National Institute of Disaster Management (NIDM). Yet India's preparedness lags far behind what is needed given the magnitude of the potential dangers, experts say. "There are significant gaps in preparedness on various aspects of risk management, particularly for catastrophic disasters like major earthquakes and floods," said P.G. Dhar Chakraborti, a former head of the disaster management authority and a senior fellow at The Energy and Resources Institute (TERI), a New Delhi-based think tank. According to him, India's vulnerability arises in part because of a lack of know-how for assessing risks at very local level, poor enforcement of standards and regulations, and inadequate risk mitigation. Although a 2005 law on disaster management has been put into effect at the national level, it exists only on paper in a few states and districts, experts say. The act created a National Disaster Management Authority, with the power to allocate resources and supervise disaster management across the country. A national disaster response force was also formed for rescue and evacuation. In addition, the act authorised the government to strengthen existing infrastructure in disaster-prone areas and help create an early-warning system. The few states with functioning state disaster management authorities, such as Odisha, Andhra Pradesh, Gujarat and Bihar, are the ones with the most serious history of natural disasters, said Dhar. But other vulnerable states like Jammu and Kashmir, Uttarakhand, West Bengal, Tamil Nadu, Sikkim and Assam need to step up their preparedness considerably, he said (As cautioned Kashmir suffered considerably due to Sept, 2014 floods). A 2014 World Development Report said Maharashtra's largest and most cosmopolitan city, Mumbai, remains highly vulnerable to the heavy rains that occur almost annually, despite well-identified solutions to reduce the risks. The city's drainage system is over 100 years old and incapable of handling annual monsoon rains, the report said. Following a heavy monsoon in 2005 that killed over 400 people and caused huge damage to infrastructure and buildings, a committee recommended overhauling the drainage system, but implementation of the plan has lagged, the report said. Although all of India's states have departments of disaster management or relief and rehabilitation, they are still poorly prepared to lend support in times of disasters, according to the UN Development Programme (UNDP), which has been working with the central government and several states over the past decade to prepare disaster management plans, set up emergency operations centres, assess risks and train search and rescue teams. "Facilities such as emergency operations centres, emergency communications, and search and rescue teams are being made available... but these systems and facilities need to be strengthened," said Krishna Vatsa, the UNDP's Bangkok-based regional disaster risk-reduction advisor. Ironically, the problem is not one of money. The national government has budgeted a total of around $5 billion to prepare for disasters for the period 2010–2015, with the central government contributing 75 percent and the states the remainder. With these resources, the state governments can set up systems, train staff and improve their coordination with districts, Vatsa said. But in a number of recent disasters, 2010 mudslides in Leh (India's second largest district in Jammu and Kashmir state), a Sikkim earthquake in 2011 and the Uttarkhand floods of 2013, the level of preparedness was inadequate, leading to high levels of mortality and displacement of people, according to TERI.

Disaster management is yet to be seen as an essential part of good governance and integral to development planning. The biggest concern is the attitude of policy makers, implementers and local government towards investing in people-oriented preparedness at different levels," said Aslam Perwaiz, head of disaster risk management systems at the Asian Disaster Preparedness Centre. India's capacity to manage disaster risk is challenged by its size and huge population, according to a report by the Overseas Development Institute, a British think tank. The report said the country is likely to have the greatest exposure of any nation in the world to extreme weather and natural disasters by 2030. It is expressed by experts that local adaptation efforts driven solely by communities are no longer sufficient and additional, scientifically planned adaptation is needed, which will require government support.

All that is mentioned above is known to many, including administrators. There has been considerable progress in forecasting tropical cyclones. Odisha, won acclaim for its effective response to cyclone Phailin in

October 2013. The death toll was fewer than 50 after the successful evacuation of nearly a million people to cyclone shelters and safe locations in the state and in neighboring Andhra Pradesh state, according to the National Institute of Disaster Management. In 1999, over 10,000 people were killed by a cyclone in the same area.

"A lot of initiatives are taking place on the ground" to strengthen vulnerable communities, including preparedness and mitigation measures in 176 districts prone to multiple hazards across 17 vulnerable states. At the national level, the National Disaster Management Authority has a trained national disaster response force with 10 battalions, each with 5,000-10,000 personnel, stationed in several parts of the country for speedy deployment for rescue, evacuation and response.

But, the biggest problem is enhanced magnitude of these disasters in the last decade, making good efforts go down the drain. A recent example is devastation caused by Hud-Hud Cyclone in October, 2014. The devastation was unprecedented. Our present technology could not predict the extent of impact as the cyclone gathered momentum at the last minute.

In nut shell, we are absolutely at the mercy of the Nature. We cannot tame it. We can at best lessen the negative impact by fully getting prepared, instead of blaming one or the other. Global co-operation is paramount to gather proper data and decipher it in time, to take apt measures. People need to be motivated to face the disasters as one family, and be prepared to meet the calamities with resilience.

Research shines light on asthenosphere's contribution to hot spots

The asthenosphere—the weak, ductile layer that underlies the Earth's crust—may play a larger role in tectonic activities, including those that cause midplate volcanism known as hot spots, than previously thought. A new paper published in the 4 December, 2014 issue of Science (doi:10.1126/science.1261831) examines the prevailing theory about hot spots, namely, that they are fueled by narrow plumes of magma originating at the core-mantle boundary. The new paper discusses an alternative theory—that the asthenosphere plays a larger role. "What's going on in the asthenosphere is probably more important toward our understanding of hot spots than continuing to search for conduits to the deep mantle," Scott King, professor of geophysics at Virginia Polytechnic Institute and State University and coauthor on the paper, told Eos. There are some inconsistencies with the plume theory, King explained. For instance, when a weak, low-viscosity layer like the asthenosphere is added to three-dimensional spherical models of the Earth, what researchers see is not the many narrow plumes rising from the core-mantle boundary but, instead, one or two large upwellings of hot material. "This causes you to rethink the sort of mental picture of the Earth", King said, "and whatever it is that causes hot spots doesn't come from core-boundary regions in terms of plumes". King also explained that lava from hot spots does not exhibit the same extensive mixing as lava from mid-ocean ridges because it interacts with the asthenosphere as it rises to the surface. "We think that has more to say [about] mixing in the asthenosphere than it does about a different source coming from a significantly different part of the Earth," King said. Some scientists disagree with this alternative theory. Barbara Romanowicz, professor of geophysics and director of the Seismological Laboratory at the University of California, Berkeley, said that although it is important to consider the role of the asthenosphere, it may not be the answer to what fuels hot spots. "I don't think that the fact that the asthenosphere is active [and] is producing the melt that is needed for hot spots necessarily rules out the existence of deep mantle plumes," Romanowicz told Eos , "I think more work should be done at the fine scale to elucidate what's going on." "The community needs to kind of take a step back and recognize that understanding the processes in the asthenosphere is incredibly important to understanding what's going on at hot spots," King said. "[The asthenosphere] has been particularly underappreciated in terms of its importance**."**

(**Source**: Eos, Vol. 95, No. 50, 16 December 2014)

Editor's note: Don L. Anderson, the paper's lead author, passed away a few days before its publication. I still remember his encouraging comments, as a reviewer, on the article co-authored by me (Bulletin Seismological Society of America, 1969).

Mantle below North American plate newly modeled

Dynamics of the Earth's mantle play an important role in processes that occur farther up toward the surface. For instance, although the eastern coast of the United States is considered a passive margin, convection in the upper mantle can result in activity in the crust. To get a better look at the mantle underneath the North American plate, Schmandt and Lin analyzed data collected by the Earthscope project, which installed a vast network of seismometers across the United States. By cataloguing the different types of waves that propagate through the mantle underneath the continental United States, the authors built a model of what this mantle looks like and how it interacts with the overlain crust. Major findings from the research include two low-velocity anomalies detected in the central and northern Appalachians that coincide with a known episode of basaltic magmatism that occurred 56–33.9 million years ago and volcanism from a hot spot, respectively. The authors also found high-velocity anomalies beneath the central and eastern United States, which they suggest could be remnants of a subducted slab that has not yet sunk into the lower mantle. Although their findings provide a new, more in-depth look at the Earth's mantle, the authors note that more investigations are needed to understand how some mantle processes affect the geologic evolution of various parts of the United States.

(**Source:** Geophysical Research Letters, doi:10.1002/2014GL061231, 2014).

Indian crust and mantle is known to be significantly complex, with mobile belts & cratons and ever growing Himalayan mountain chain with conspicuous subduction of Indian crust and upper mantle below Asian. Since both Himalayan belt and Narmada-Son lineament are categorized as seismically vulnerable continental segments it is essential to have Earthscope type imaging. Since Himalayan seismicity is in general comes under subduction category and after a subduction earthquake, Earth's crust continues to deform, Indian seismologists have been monitoring segments of Himalayas (eg: Sikkim, Chamoli, Uttarkashi), especially the areas near the earthquakes rupture zones to estimate further seismic hazards. Added information from Earthscope type imaging to GPS study might help in better understanding of rupture process and subduction phenomenon.

Astrophysicist Adam Frank frames Earth's sustainability trans galactically

The University of Rochester astrophysicist and science popularizer Adam Frank sees a meaningful, and maybe portentous, linkage of exoplanets and astrobiology with planetary sustainability and climate science. Frank and Sullivan invoke the Drake equation, a formula for estimating the number of Milky Way galaxy civilizations whose electromagnetic emissions are detectable. Using it "as a vehicle to explore the gamut of astrobiology," they write, "we focus on its most import factor for sustainability: the mean lifetime...of an ensemble of Species with Energy-Intensive Technology (SWEIT). We cast the problem into the language of dynamical system theory and introduce the concept of a trajectory bundle for SWEIT evolution."They summarize implications, discussing "how astrobiological results usefully inform the creation of dynamical equations, their constraints and initial conditions." They engage three "specific examples of how astrobiological considerations can be folded into discussions of sustainability": "(1) concepts of planetary habitability, (2) mass extinctions and their possible relation to the current, so-called Anthropocene epoch, and (3) today's changes in atmospheric chemistry (and the climate change it entails) in the context of pervious epochs of biosphere-driven atmospheric and climate alteration (i.e. the Great Oxidation Event)." The Great Oxidation Event figures centrally in Frank's message to the public. The Great Oxidation Event alone shows that when life (intelligent or otherwise) becomes highly successful, it can dramatically change its host planet. And what is true here is likely to be true on other planets as well. Frank's observation that if life forms on exoplanets "use energy to produce work, they're generating entropy. There's no way around that, whether they're human-looking Star Trek creatures with antenna on their foreheads, or they're nothing more than single-cell organisms with collective mega-intelligence. And that entropy will

almost certainly have strong feedback effects on their planet's habitability, as we are already beginning to see here on Earth."

(**Source:** Physics Today: http://scitation.aip.org/content/aip/magazine/physicstoday/news/10.1063/PT.5.8095?).

One gets excited reading such articles, especially if he has an urge to do cutting edge research. This article while telling Climate Change is inevitable due to natural and anthropogenic causes can have profound impact on any planet`s habitability. These planets include exoplanets.

In this issue:

In this issue we have included nine research articles, a report on IAGA conference held in October, 2014 at CSIR-NGRI and one book review, apart from Editorial and News and Views at a glance. It is heartening to see good response from scientific community. We thank all the authors for their contributions and experts for reviewing the manuscripts**.** In the first paper entitled "Slow Spreading Ridges of the Indian Ocean: An Overview of Marine Geophysical Investigations" Kamesh Raju et al., pointed out that topography, magnetic and gravity signatures indicate non-transform discontinuity over Carlsberg Ridge(CR).They state that that CR has relatively slower spreading history than Central Indian Ridge (CIR). The analysis of the tectonic and magmatic character of the CR and CIR based on the available high resolution data suggests that both these slow spreading ridge sections have the potential to host high temperature active hydrothermal vents and need to be investigated by AUV and ROV experiments to identify the causative mechanism of these vents and their association with unique seafloor and sub-seafloor deep-sea ecosystems. These ridges hold great promise of mineral resources. This review is very informative. In the second paper Satish Kumar et al., have carried out aeromagnetic analysis to locate potential ground water zone in a segment of Eastern Dharwar Craton. Spectral and quantitative analysis of the aeromagnetic data of the study area has indicated 150 m thick top layer associated with weathered and sheared granite gneissic terrain. This is interpreted as a profitable zone for ground water exploitation. Use of aeromagnetic data in association with ground surveys would enhance detection capabilities. In the third paper using Chirp Sonar and Electrical Resistivity Imaging survey, M.S.Chaudhari assessed the quality of concrete lining at the bed of Nangal Hydal Channel, which is an integral part of Bhakra Nangal dam. The integrity of channel lining was identified by measuring reflection coefficient (R) values between water and channel bed interface. Electrical resistivity imaging (ERI) survey conducted along two profiles on the banks of the channel revealed a few zones of comparatively higher resistivity (205 Ω m - 700 Ω m).These zones with varying dimensions are prone to excessive seepage. It is inferred that water is getting leaked due to inferior quality of the concrete in the channel bed and is coming out from the adjacent banks of the channel, where the same is observed in ERI sections as high resistivity zones. Such surveys not only reduce cost of quality assessment investigations but also avoid any structural damage due to coring of strata. In the fourth paper Talukdar and Chalapathi Rao tested the applicability of Perovskite oxybarometry and bulk-rock transition element geochemistry constraints to the well-characterized Mesoproterozoic kimberlites from the Wajrakarur field, eastern Dharwar craton, southern India, whose diamond incidence is well-established. With the new results obtained from their study, the authors attempted to demonstrate that a combination of perovskite oxybarometry and transition element geochemistry in conjunction with petrography could yield better results on the prognostication of the primary diamond host rocks. It is advisable to make use of such studies, as a part of integrated investigations instead of terming them as academic exercises. In the fifth paper Suman Kilaru et al., using dense seismic network of 97 stations in the Koyna-Warna region delineated a 1-D P-wave velocity model to solve hypocentral parameters. The 1-D velocity (Vp) model, extending to 10 km, significantly reduced RMS error and improved earthquake locations. It is essential to extend these investigations to farther distances, to delineate deeper strata velocity structure, as middle and lower crustal structural complexities do have their impact on shallower strata. In the sixth paper Lasitha tried to analyse the importance of Changes in seismic moment rate and long term deformation before and after the December, 2004 mega thrust earthquake in Andaman-Sumatra region. It is essential to carry out further studies in Andaman-Nicobar isles region as it is prone to high

magnitude earthquakes. In the seventh paper Sinha and Mohanty have carried out Post stack inversion for reservoir characterization of KG basin associated with gas hydrate prospects. They state that model based and band limited inversion results have helped in delineating the stratigraphic prospect in the study area. They further state that this study demonstrates the effectiveness of using acoustic impedance volume for performing stratigraphic interpretation and reservoir characterization. Through well articulated presentation (research note) on atmospheric dust Kulshrestha and Sharma stressed the importance of mineral aerosol studies in better resolving various issues associated with high loadings of particulate matter generally reported in the atmosphere in Indian region. They have urged the scientists to give due importance to aerosol research especially climatic and health effects associated with carbon mixed mineral aerosols. Earth system scientists would be benefited by going through the review article by A.D.Sarma on "Navigational Electronics: Present Status, Future Demands and Strategies to Enhance Quality". IAGA Report has brought in to light the significance of " Hands On " exercises and close interaction of participants in generating and using data during international conferences. Book review has exposed readers to the various travails of field scientists/technicians.

All these studies tell us Indian Scientists are motivated to carry out research that is useful and informative.

On behalf of the Editorial team, I wish one andall better summer and good monsoon, as majority of us are affected by water scarcity and heat waves .I solicit support from one and all, as the journal can survive and grow only with the support extended by the scientific community.

P. R. Reddy