NEWS AND VIEWS AT A GLANCE

We want to make this subsection both interesting and informative. One of the problems is the three month gap between two issues of the journal and the lack of interaction with the readers. This problem can be solved by you and as such we request you to come forward and help us.

FORTHCOMING CONFERENCES

October 2012

An International Biodiversity Conference of Parties (COP-11) on biological diversity will be organized from October 1 to 9, 2012, at Hyderabad International Convention Centre.

November 2012

Fourth International Conference on Science in Society Berkeley, United States of America; 15th November

International Conference on Biodiversity and Sustainable Energy Development, Hyderabad, India; 19th November

2012 Geological Society of America (GSA) Annual Meeting

Dates 04 Nov 2012 ➝ 07 Nov 2012
Location Charlotte, North Carolina, United States
Weblink http://www.geosociety.org/meetings/2012/

AGU Chapman Conference on Longitude and Hemispheric Dependence of Space Weather

Dates 12 Nov 2012 ➝ 16 Nov 2012
Location Addis Ababa, Ethiopia
Weblink http://www.agu.org/meetings/chapman/2012/fcall/

December 2012

GEOS 2012 — Annual International Conference on Geological & Earth Sciences

Dates 03 Dec 2012 ➝ 04 Dec 2012
Location Singapore, Singapore
Weblink http://www.geoearth.org/

2012 AGU Fall Meeting

Dates 03 Dec 2012 ➝ 18 Dec 2012
Location San Francisco, Calif., United States
Weblink http://fallmeeting.agu.org/2012/
Contact AGU Meetings Department 2000 Florida Avenue, NW Washington D.C. U.S.A. ; Phone: (+1-202-777-7333)

January 2013

Ninth International Conference on Environmental, Cultural, Economic and Social Sustainability, Hiroshima, Japan; 23rd January

April - June 2013

Seismological Society of America (SSA) Annual Meeting

Dates 17 Apr 2013 ➝ 19 Apr 2013
Location Salt Lake City, Utah, United States
Weblink http://www.seismosoc.org/meetings/index.php#2013
Contact Email: info@seismosoc.org

ECROFI — 22nd European Current Research on Fluid Inclusions

Dates 05 Jun 2013 ➝ 09 Jun 2013
Location Antalya, Turkey
Weblink http://www.ecrofi2013.org
Email: info@ecrofi2013.org

HONOURS AND AWARDS:

Prof. Mrinal K Sen, Director, NGRI was awarded SPG honorary membership-February, 2012.

Dr. A. Sarkar, Senior Principal Scientist, NIO, Goa received Bharat Jyoti Award (IIFS, New Delhi-2012)

Five scientists have been selected to receive Dr Vikram Sarabhai Research Award – 2011. They received the awards in August-2012. The awardees are 1) Prof. Tarun Souradeep-Pune, 2) Dr. Biswajit Paul- Bangalore, 3) Dr. N.R. Patel-Dehradun, 4) Dr. Ashwin Gumaste-Mumbai and 5) Dr. Vineet K. Gahalaut-Hyderabad

SCIENCE NEWS

Life

Survival of life on our planet is intricately connected with the interactions that influence processes that entwine atmosphere, hydrosphere and geosphere. For life to exist and survive we need the right percentage of various gases and elements. The volume of the water is a key element in Earth`s climate and habitability. Scientists are now conversant with the right mixture that helped genesis and sustenance of life on our planet. If we want to understand in totality the genesis of life on this planet we have to decipher the mechanism that is keeping the earth`s different spheres in balance with each other. Once such a development is achieved we can extrapolate the theories to locate and identify different hues of life present on billions of planets floating in the Milky Way, even though an amount of subjectivity always exists. An in-depth knowledge of this subject requires a different level of understanding----- philosophy of life. We do not venture to enter into that cobweb, as we are not competent enough to wriggle out of it. Please go through the details given below to excite your thinking power. Those who are capable of venturing in to this field of research will have our best wishes.

Origin of Earth and Life supporting elements

Earth formed from a sequence of violent accretionary collisions with objects ranging in size from dust particles to modest planetesimals to the Mars sized planetary embryo thought to be responsible for the origin of the moon. Isotopic similarities between meteorites and terrestrial water support the idea that earth's water comes primarily from rocky planetesimals or embryos. But the accumulation of water through collisions was complex: the heat from most impacts would have produced an early steam atmosphere, and the largest impacts would have ablated that atmosphere. Indeed, the giant Moon-forming impact may have blown off much of Earth's primordial water, effectively desiccating the planet.All the Carbon- C- that was initially delivered to Earth and that escaped sequestration to the core should have ended up in the atmosphere rather than in the mantle. The thick C- rich atmosphere and its demise may have had a violent influence on Earth`s early climate.Today the inventory of C in the mantle far exceeds that locked in sediments and rocks of the crust.No one knows whether the reversal came about early on or developed over billions of years of plate tectonics. The extent of the loss of water and other volatiles to space during giant impacts may have depended on whether liquid oceans existed. If Earth was desiccated by the giant impact, it must have regained water and other volatiles through the accretion of the" veneer"-the last few percent of Earth's mass that was added by the arrival of planetesimals after the Moon-forming impact. In Earth's earliest history, though, the heat of impacts was sufficient to melt all or much of the

planet, perhaps repeatedly. The steam atmosphere soon condensed to form the early oceans, which are known from the most ancient mineral samples to have existed at least as far back as 4.45 billion years – within 100 million years of Earth's formation. After the earlier impacts and formation of oceans and land surfaces the Earth's hydrosphere, geosphere and atmosphere repeatedly undervent changes.The changes that took place in the first billion of years resulted in a conducive environment for life to originate. The fluxes of outgassing and ingassing water, Carbon and other volatiles are governed by plate tectonics and simultaneously greatly influence the vigor of the tectonic processes through an incompletely understood feedback mechanism(Courtesy: Physics Today, March, 2012).

However, Tomas Naæraa has pointed out that plate tectonics was not operative prior to 3 billion years and there was a completely different mechanism in operation for over a billion years .From this it can be conjectured that Earth was very hot during the first 600 to 700 million years and as in the case of present day Venus was not controlled by plate tectonics.However, this theory may not be correct when we take into consideration the presence of Zircon, almost since more than 4.4 billion years. Earth's oldest preserved continental crust dates to about 4 billion years ago, much after Earth's formation (4.55 billion years ago); a major question has been how much continental crust had formed previously and been recycled back into the mantle. Some early rocks in Australia contain relic crystals of zircon, recycled from earlier rocks. Zircon harbors uranium, and these have been dated to up to 4.4 billion years ago. Harrison et al. (Science, 2005) have analyzed lutetium and hafnium isotopes in a large number of these early zircons. This isotopic system provides information on the differentiation of major silicate reservoirs on the Earth. The data imply that significant continental crust must have formed on Earth early on, perhaps by nearly 4.5 billion years ago. A final and perhaps most intriguing question is the mechanism whereby the signatures of extreme differentiation in the mantle-crust system during the first 500 million years were almost completely erased. Although there is some evidence for early differentiation in the oldest rocks, the average 176Hf/177Hf evolution curve defined by most mantle-derived rocks over the rest of Earth's history diverges from the chondritic curve at about 4 billion years, which is when the rock record begins. Something reset the clock on a planetary scale. On the basis of the lunar record, a period of massive meteorite bombardment is thought to have occurred at that time. If so, it must have induced homogenization of mantle and crust on a scale vastly greater than can be explained by recent plate tectonic processes. We are indeed fortunate that the fragmented memory of an earlier time has survived in the form of zircon crystals. NASA has pointed out that Venus`s high surface temperature, about 450 degrees Celsius, removed water from its lithosphere and prevented the localized deformation necessary to initiate subduction.Earth, like present Venus, was very hot in the beginning. And as such the basic subduction process linked with plate tectonics was not in operation in the beginning. But after about 400 to 500 million years an abrupt phenomenon brought down the temperature on the earth`s surface leading to subsequent origin of life on the earth. Even though such a hypothesis looks good it cannot unequivocally bring into focus the basic cause that brought down the temperatures abruptly leading to life`s presence from around 3.6 billion years. From the details given above the conducive atmosphere/ environment on Earth for life to originate and survive

developed more abruptly due to unknown tectonic process or due to mega meteoritic impact. Research is being carried out by geoscientists, to know more about this abrupt process.

Keeping these details in view let us try to understand LIFE`s Origin and evolution on Earth.

Life supporting Environment

For life to sustain we need presence of a compatible environment, including hospitable atmosphere. The atmosphere contains numerous gaseous elements, crucial to sustaining life on Earth, as well as to powering up its heating processes and maintaining its existing moisture. This concoction of 11 gases shrouding the planet includes the three major components of nitrogen, oxygen and argon---known as the constant gases because their concentration remains unchanging---as well as eight equally significant trace gases---including carbon dioxide, water vapor and ozone.

Origin of Life on Earth:

As detailed above Isotopic similarities between meteorites and terrestrial water, support the idea that Earth`s water primarily comes from rocky planetesimals or Embryos. Many Earth scientists now suspect that the dynamics of plate tectonics and perhaps also the maintenance of a habitable climate are directly related to the storage, influences, and fluxes of water deep inside Earth. So, one can as well conceptualize that abundance of water on the surface and deep inside Earth facilitated origin of life and it`s sustenance. So, life has started on the earth about 3.6 billion years back, from one type of living organism and diversified into millions of species, including human beings. It is still not clear the origin of this ancestor, responsible for life on the earth. While we are conjecturing various hypotheses scientists have found evidences for life on billions of planets. This finding is both exciting and intriguing.

When the earth formed some 4.6 billion years ago, it was lifeless and inhospitable to living organisms. One billion years later it was already teeming with prokaryotic life forms, ancestors to all present living things. What would these early progenitors of life be like? If we make the reasonable assumption that the last common ancestor of all presently living organisms must have had those characteristics which are now shared by the organisms which constitute the five living kingdoms, then a listing of the common characteristics of living species also describes the minimum characteristics of the last common ancestor(Courtesy: Wikipedia). Some believe the life originated on the earth due to extra terrestrial influence---- Spores containing organisms floated from distant Milky Way and fell on the earth leading to generation of life on the earth. Presence of water might have played an important role in this process.

Evolutionary History:

The evolutionary history of life on Earth traces the processes by which living and fossil organisms have evolved since life on Earth first originated until the present day. Oxygen played a major role in the evolution of life and in coupling biogeochemical cycles. The similarities between all present-day organisms indicate the presence of a common ancestor from which all known species has diverged through the process of evolution.

Microbial mats of coexisting bacteria and archaea were the dominant form of life in the early Archean.The evolution of oxygenic photosynthesis, around 3.5 Ga, eventually led to the oxygenation of the atmosphere, beginning around 2.4 Ga. The earliest evidence of eukaryotes

(complex cells with organelles), dates from 1.85 Ga. Later, around 1.7 Ga, multicellular organisms began to appear, with differentiated cells performing specialised functions.

The earliest land plants date back to around 450 Ma . Land plants were so successful that they are thought to have contributed to the late Devonian extinction event. Invertebrate animals appeared during the Vendian period, while vertebrates originated about 525 Ma during the Cambrian explosion. During the Permian period, synapsids, including the ancestors of mammals, dominated the land, but the Permian–Triassic extinction event 251 Ma came close to wiping out all complex life. During the recovery from this catastrophe, archosaurs became the most abundant land vertebrates, displacing therapsids in the mid-Triassic. One archosaur group, the dinosaurs, dominated the Jurassic and Cretaceous periods, with the ancestors of mammals surviving only as small insectivores. After the Cretaceous–Paleogene extinction event, 65 Ma back, killed the non-avian dinosaurs, mammals increased rapidly in size and diversity.

Fossil evidence indicates that flowering plants appeared and rapidly diversified in the Early Cretaceous (130 to 90 Ma) probably helped by co-evolution with pollinating insects. Flowering plants and marine phytoplankton are still the dominant producers of organic matter. Social insects appeared around the same time as flowering plants. Although they occupy only small parts of the insect "family tree", they now form over half the total mass of insects. Humans evolved from a lineage of upright-walking apes whose earliest fossils date from over 6 Ma. Although early members of this lineage had chimpanzee-sized brains, there are signs of a steady increase in brain size after about 3 Ma. (Courtesy; Wikipedia)

Sustaining Life on Earth: Biodiversity - The Web of Life

Biological diversity - or biodiversity - is the term given to the variety of life on Earth and the natural patterns it forms. The biodiversity we see today is the fruit of billions of years of evolution, shaped by natural processes and, increasingly, by the influence of humans. It forms the web of life of which we are an integral part and upon which we so fully depend.

This diversity is often understood in terms of the wide variety of plants, animals and microorganisms. So far, about 1.75 million species have been identified, mostly small creatures such as insects. Scientists reckon that there are actually about 13 million species.

Biodiversity also includes genetic differences within each species. Chromosomes, genes, and DNA-the building blocks of life-determine the uniqueness of each individual and each species. Yet another aspect of biodiversity is the variety of ecosystems. In each ecosystem, living creatures, including humans, form a community, interacting with one another and with the air, water, and soil around them. It is the combination of life forms and their interactions with each other and with the rest of the environment that has made Earth a uniquely habitable place for humans.

Billions of life bearing planets float in the Milky Way

A few hundred thousand billion free-floating life-bearing earth-sized planets may exist in the space between stars in the Milky Way, says a study. The idea is being propounded by an international team of astronomers led by Chandra Wickramasinghe, professor and director of the Buckingham Centre for Astrobiology at the University of Buckingham. They have proposed that these life-bearing planets originated in the early universe within a few million

years of the Big Bang, and that they make up most of the so-called "missing mass" of galaxies. The scientists calculate that such a planetary body would cross the inner solar system every 25 million years on the average and during each transit, zodiacal dust, including a component of the solar system's living cells, becomes implanted at its surface. The free-floating planets would then have the added property of mixing the products of local biological evolution on a galaxy-wide scale.

Since 1995, when the first extra solar planet was reported, interest in searching for planets has reached a feverish pitch. The 750 or so detections of exo-planets are all of planets orbiting stars, and very few, if any, have been deemed potential candidates for life. The possibility of a much larger number of planets was first suggested in earlier studies where the effects of gravitational lensing of distant quasars (most distant objects) by intervening planet-sized bodies were measured. Recently several groups of investigators have suggested that a few billion such objects could exist in the galaxy.

Wickramasinghe and team have increased this grand total of planets to a few hundred thousand billions (a few thousand for every Milky Way star) - each one harboring the legacy of cosmic primordial (beginning) life (Courtesy. IANS).

This study clearly exposes our capabilities and limitations in understanding the origin of life, its various hues and evolution. Mean while Mc Master University, Ontario scientist has come out with a theory that both aliens and human beings have same DNA.He points out that out of 20 components that constitute a DNA structure 10 can survive adverse and inhospitable high temperature and pressure environment. These 10 components are present even in the meteorites. The other 10 components do survive in the low temperature and low pressure environment; the one present on the Earth. As such the basic DNA characteristics do support that both the aliens living on numerous planets that are floating in the Milky Way do have same DNA and thereby same ancestor. This finding is very interesting when we take into consideration the Higgs Boson (God particle).

Details given above have brought into light various theories proposed to explain life on earth. In reality, the details given cover only a miniscule of available information. Even though many agree that life on Earth is unique in many ways, we often forget this fact and try to annihilate the life from this planet. In reality the Earth is threatened by nature through various processes and we need to learn to cope with these setbacks. We detail below about the threats from space and abnormally super threats from within.

Fragile Earth:

In a recent interview NASA astronauts have brought into focus the fragile nature of Earth.André Kuipers, a medical doctor and Dutch astronaut, elaborated, "We're only at the beginning of the discovery of our universe. It's like the whole ocean that is there to discover and you're only standing there with your toes in the water. So you still have to go with your feet and your legs and all the way to great depths. And we'll do the same thing with the universe. He further said "It's a fantastic planet but also very fragile. I wish everybody could see this and realize that it's one planet with limited resources, beautiful but fragile. And I think this is one of the most important things that I can bring back home." NASA astronaut Joseph Acabahis, also commented on the fragility of the planet. "When you come up to space and you look back at the Earth, it's just a beautiful site and you have a chance for the first time really to

look at the big picture. A lot of what we do in geology is we look at small pieces and try to build together a bigger map. From space, you get to see that: You see the atmosphere; you see how different parts of the Earth interact with each other. The importance of protecting the planet is very, very evident from space, the planet is very fragile and we need to do much to protect it."(Courtesy: EOS,3 rd July)

Potentially Civilization-Ending Super-Eruptions May Have Surprisingly Short Fuses

Enormous volcanic eruptions with potential to end civilizations may have surprisingly short fuses, researchers have discovered. These eruptions are known as super-eruptions because they are more than 100 times the size of ordinary volcanic eruptions like Mount St. Helens. They spew out tremendous flows of super-heated gas, ash and rock capable of blanketing entire continents and inject enough particulate into the stratosphere to throw the global climate into decade-long volcanic winters. In fact, there is evidence that one super-eruption, which took place in Indonesia 74,000 years ago, may have come remarkably close to wiping out the entire human species. Geologists generally believe that a super-eruption is produced by a giant pool of magma that forms a couple of miles below the surface and then simmers for 100,000 to 200,000 years before erupting. But a new study suggests that once they form, these giant magma bodies may only exist for a few thousand years, perhaps only a few hundred years, before erupting.(Courtesy : science daily).This finding is vital to understand the genesis and dynamics of Magma chambers and the threats from super volcanisms-----like Deccan..

Potentially Hazardous Asteroids:

It is strongly believed that external threats influence triggering of internal reactions, leading to destruction of life on the planet. Asteroids do pose a threat.

Observations from NASA's Wide-field Infrared Survey Explorer (WISE) have led to the best assessment yet of our solar system's population of potentially hazardous asteroids. The results reveal new information about their total numbers, origins and the possible dangers they may pose. Potentially hazardous asteroids, or PHAs, are a subset of the larger group of near-Earth asteroids. The PHAs have the closest orbits to Earth's, coming within five million miles , and they are big enough to survive passing through Earth's atmosphere and cause damage on a regional, or greater, scale. The new results come from the asteroid-hunting portion of the WISE mission, called NEOWISE. The project sampled 107 PHAs to make predictions about the entire population as a whole. Findings indicate there are roughly 4,700 PHAs, plus or minus 1,500, with diameters larger than about 100 meters. So far, an estimated 20 to 30 percent of these objects have been found.

The new analysis also suggests that about twice as many PHAs as previously thought are likely to reside in "lower-inclination" orbits, which are more aligned with the plane of Earth's orbit. In addition, these lower-inclination objects appear to be somewhat brighter and smaller than the other near-Earth asteroids that spend more time far away from Earth. A possible explanation is that many of the PHAs may have originated from a collision between two asteroids in the main belt lying between Mars and Jupiter. A larger body with a low-inclination orbit may have broken up in the main belt, causing some of the fragments to drift into orbits closer to Earth and eventually become PHAs. Asteroids with lower-inclination orbits would be more likely to encounter Earth and would be easier to reach. The results therefore suggest more near-Earth objects might be available

for future robotic or human missions. The discovery that many PHAs tend to be bright says something about their composition; they are more likely to be either stony, like granite, or metallic. This type of information is important in assessing the space rocks' potential hazards to Earth. The composition of the bodies would affect how quickly they might burn up in our atmosphere if an encounter were to take place (Courtesy: NASA News).

Solar Storms

Space weather could pose serious problems here on Earth in the coming years. The space weather threat is becoming more dire as our sun ramps up toward its period of solar maximum, predicted for around 2013. Activity on the sun fluctuates on a roughly 11-year cycle, and our star has been relatively dormant for a while. As we enter into a period of enhanced solar activity it seems pretty clear that we are going to be looking at the possibility of not only more solar events but also the possibility of some very strong events.

The recent flare unleashed a wave of charged particles that streamed immediately toward Earth, as well as coronal mass ejections, or blobs of plasma, that took days to arrive here. When they did, they interacted with Earth's magnetic field to cause geomagnetic storms that wiped out radio communications in the Western Pacific Ocean and parts of Asia, and caused airlines to reroute some polar flights to avoid radio outages.

However, experts say we got off fairly lucky with this recent solar storm, and that future eruptions could cause worse damage, particularly to the sensitive transformers and capacitors in power grids. If some of these were harmed, there could be power outages for days, weeks, months, or even, in the case of severe damage, years, experts warned. Space weather hasn't posed quite such a threat before, because during the last solar maximum, around 10 years ago, the world wasn't as dependent on satellite telecommunications, cell phones and global positioning system (GPS) – all technologies that could be disrupted by solar flares. The problem is likely to get even worse as the world could likely become more technologically dependent by the time the next solar maximum rolls around, and the next.

The world needs greater international cooperation to meet the threat of dangerous weather. We have an urgent need to start sharing expertise and connecting our systems for warning and for response. This cooperation has to be put in place before a disaster hits.

Despite the risk, though, some experts stressed that there's reason to be optimistic. There is work being done to improve our ability to forecast solar storms in advance, equip more satellites with radiation shielding and fortify power grids with resilient transformers and capacitors(Courtesy: NASA News).

It is clear from the details given above our scientific pursuits, started at least couple of thousand years back to understand Man`s presence on the Earth and his association/ dis- association with other forms of LIFE, are continued. Still we are groping in dark. While our scientific achievements have enhanced our technological capabilities, they have destroyed the very structure of LIFE on Earth, leading to various Environmental problems. We will discuss about these issues in the next issue of the Journal.

We once again earnestly solicit your valuable inputs to make this section of the journal more informative and useful.