NEWS AT A GLANCE

FORTHCOMING EVENTS:

1. **10th International Conference Air and Water Components of the Environment**

   15 - 17 Mar 2018, Sovata, Romania.

   Topics: Hydrology, Meteorology and climate change, Geography, Global Positioning System, Earth Observation, Oceanography, Ecosystems, Environment and Sustainable Development, Air and water environment monitoring, Climatic and hydrological hazards, Water resource management, Climatic changes and their impact, Pollution and protection of air and water environment, Weather and hydrological forecast

   Event website: http://aerapa.conference.ubbcluj.ro/Engleza/index.htm

2. **Conference "Geodesy, Mine Survey and Aerial Topography**

   05 -16 Feb 2018, Moscow, Russia.

   Topics: Geodesy, Mine Survey and Aerial Photography, Digital Geo information technology,

   Mining & Mineral Processing.

   Event website: http://www.con-fig.com/

3. **National Academy of Sciences**

   Topics: Economics, Environment, and Sustainable Development

   17-18 Jan, 2018, NAS Building, Washington, DC.

   Event Website: http://www.nasonline.org/about-nas/events/?month=1&year=2018

4. **3rd GoGreen Summit -18**

   23 -24 Mar 2018, St Giles Classic Hotel, Manila, Philippines.

   Topics: Earth and planetary sciences, Ecology, Biodiversity, Agriculture, Environmental engineering, Environmental science and toxicology, Bioremediation and Pollution control

   Event website: https://bioleagues.com/conference/gogreensummit/about.php

AWARDS AND RECOGNITION

** **54th Annual Convention of Indian Geophysical Union (IGU)**
During the convention the following awards have been given for 2017 by Prof. Shailesh Nayak, President of IGU.

* **IGU-Dr. Hari Narain Lifetime Achievement Award**
Prof. D. Guptasarma

* **IGU-Decennial Award**
Dr. Anil Bhardwaj

* **IGU-Krishnan Medal**
1. Dr. Nimisha Vedanti
2. Dr. Devleena Mani

* **IGU-Anni Talwani Memorial Prize**
Dr. Shakeel Ahmed

* **IGU-Prof. D. Lal Best Paper Award**
Dr. C.D. Reddy and Dr. Mahesh N Shrivastava.

IGU-Prof. Jegdeo Singh and Dr. S. Balakrishna Memorial Grant for student toppers- 2017 have also been presented.

**** Ministry of Earth Sciences Annual Awards -2017**

* In recognition of empowering many young Indian students to pursue world class research in Isotope Geoscience **Prof. K. Gopalan** has been awarded **"Life Time Excellence Award"** by MOES for the year 2017.

* In recognition of his outstanding contributions in the field of Marine Geophysics, Ministry of Earth Sciences (MoES) honoured **Prof. Kolluru Sree Krishna** with the **"National Award** in the field of Geoscience and Technology" for the year 2017.

* In recognition of his outstanding research contributions in the field of Earth System Science the MOES honoured **Dr. Vikram Vishal** with the "Young Researcher Award in the field of Earth System Science" for the year 2017.

* **Mrs. Shyla Minhas** is awarded the Certificate of Merit by MOES for her outstanding contribution in the field of Atmospheric Science& Technology for the year 2017.

* **Dr. R. R. Mali** is awarded the Certificate of Merit by MOES for his outstanding contributions in the field of Atmospheric Sciences and Technology for the year 2017.

SCIENCE NEWS

Pollution of land, ocean and atmosphere has affected not only environment but life on Earth. One of the pollutants is plastics. In spite of various measures, albeit a half hearted attempt, the pollution has reached unbelievable levels not only affecting land but also oceans. Some of the pertinent details are given below, to motivate one and all to take steps to eradicate this menace.

*** What is Plastic Pollution?**

As the world's population continues to grow, so does the amount of garbage that people produce. On-the-go lifestyles require easily disposable products, such as soda cans or bottles of water, but the accumulation of these products has led to increasing amounts of plastic pollution around the world. As plastic is composed of major toxic pollutants, it has the potential to cause great harm to the environment in the form of air, water and land pollution. Put simply, plastic pollution is when plastic has gathered in an area and has begun to negatively impact the natural environment and create problems for plants, wildlife and even human population. Often this includes killing plant life and posing dangers to local animals. Plastic is an incredibly useful material, but it is

also made from toxic compounds known to cause illness, and because it is meant for durability, it is not biodegradable.

Plastic pollution involves the accumulation of plastic products in the environment that adversely affects wildlife, wildlife habitat, or humans. Plastics that act as pollutants are categorized into micro-, meso-, or macro debris, based on size. The prominence of plastic pollution is correlated with plastics being inexpensive and durable, which lends to high levels of plastics used by humans.[3] However, it is slow to degrade.[4] Plastic pollution can unfavourably affect lands, waterways and oceans. Living organisms, particularly marine animals, can also be affected through entanglement, direct ingestion of plastic waste, or through exposure to chemicals within plastics that cause interruptions in biological functions. Humans are also affected by plastic pollution, such as through the disruption of the thyroid hormone axis or hormone levels. In the UK alone, more than 5 million tonnes of plastic are consumed each year, of which an estimated mere 24% makes it into recycling systems. That leaves a remaining 3.8 million tonnes of waste, destined for landfills. Plastic reduction efforts have occurred in some areas in attempts to reduce plastic consumption and pollution and promote plastic recycling.

*** Effects of Plastic Pollution**

It seems rather obvious that this amount of a material that isn't meant to break down can wreak havoc on natural environments, leading to long-term issues for plants, animals, and people. Some of the major long-term effects of plastic pollution are:

1. It Upsets the Food Chain: Because it comes in sizes large and small, polluting plastics even affect the world's tiniest organisms such as plankton. When these organisms become poisoned due to plastic ingestion, this causes problems for the larger animals that depend on them for food. This can cause a whole slew of problems, each step further along the food chain. Plus, it means that plastic are present in the fish that many people eat every day.

2. Groundwater Pollution: Water conservation is already a concern in places ranging from California to parts of India, but the world's water is in great danger because of leaking plastics and waste. If you've ever seen a garbage dump, imagine what happens every time it rains – then imagine that being in your drinking water. Groundwater and reservoirs are susceptible to leaking environmental toxins. Most of the litter and pollution affecting the world's oceans also derives from plastics. This has had terrible consequences on many marine species, which can lead to consequences for those that eat fish and marine life for nutrients – including people.

3. Land Pollution: Chlorinated plastic can release harmful chemicals into the surrounding soil, which can then seep into groundwater or other surrounding water sources and also the ecosystem. This can cause serious harm to the species that drink the water. Landfill areas contain many different types of plastics. In these landfills, there are many microorganisms which speed up the biodegradation of plastics. The microorganisms include bacteria such as *Pseudomonas*, nylon-eating bacteria, and Flavobacteria. These bacteria break down nylon through the activity of the nylonase enzyme Breakdown of biodegradable plastics releases methane, is a very powerful greenhouse gasthat contributes significantly to global warming.

4. Ocean Pollution: In 2012, it was estimated that there was approximately 165 million tons of plastic pollution in the world's oceans. One type of plastic that is of concern in terms of ocean plastic pollution is nurdles. Nurdles are manufactured plastic pellets (a type of microplastic) used in the creation of plastic products and are often shipped via cargo ship. Many billions of nurdles are spilled into oceans each year, and it has been estimated that globally, around 10% of beach litter consists of nurdles. Plastics in oceans typically degrade within a year, but not entirely. In the process, toxic chemicals such as bisphenol A and polystyrene can leach into waters from some plastics. Polystyrene pieces and nurdles are the most common types of plastic pollution in oceans, and combined with plastic bags and food containers make up the majority of oceanic debris. One study estimated that there are more than 5 trillion plastic pieces (defined into the four classes of small microplastics, large microplastics, meso- and macroplastics) afloat at sea. The litter that is being delivered into the oceans is toxic to marine life, and humans. The toxins that are components of plastic include diethylhexyl phthalate, which is a toxic carcinogen, as well as lead, cadmium, and mercury.Plankton, fish, and ultimately the human race, through the food chain, ingest these highly toxic carcinogens and chemicals. Consuming the fish that contain these toxins can cause an increase in cancer, immune disorders, and birth defects. The majority of the litter near and in the ocean is made up of plastics. According to Dr. Marcus Eriksen of The 5 Gyres Institute, there are 5.25 trillion particles of plastic pollution that weigh as much as 270,000 tons (2016). This plastic is taken by the ocean currents and accumulates in large vortexes known as ocean gyres. The majority of the gyres become pollution dumps filled with plastic.

*** Solutions to Plastic waste Pollution**

The reality is that the only way this problem can be addressed is by individuals and companies around the world agreeing to implement practices that reduce waste on every level.

*** The top tips for reducing plastic waste are:**

Shop Friendly: Plastic bags were once a modern convenience but can be efficiently replaced by reusable bags, many of which fold up compactly in order to be portable. Just think about how many bags you typically carry out of a grocery store, and multiply that by the number of times you grocery shop. That's a lot of plastic! Carry a bag and always reuse plastic bags as much as possible if you have them. **Get Rid of Bottled Water:** People are meant to drink lots of water each day, and plastic water bottles have become a great way to stay hydrated throughout the day. However, most of these are only recommended for single use, and that means that every time someone finishes a bottle it goes into the trash. Many companies now sell reusable water bottles as a substitute, reducing plastic waste and exposure to leaking bottles. **Forget to-go Containers:** You would be surprised at how much plastic is involved in the making and packaging of food containers. Think the coffee shop's drink cup is paper? It's likely lined with plastic for insulation (pour a cup of coffee on some cardboard and see what happens).Plastic food containers, lids, and utensils are all easily replaced by reusable containers, which will cut down significantly on even a single meal's waste. **Educate Businesses:** Speak to local restaurants and businesses about options that they can switch to for packaging, storing, and bagging items. Many companies are starting to come up with excellent low-cost replacements, such as bamboo utensils in place of plastic ones. **Get Involved:** Speak to lawmakers and get involved with government on any level, and you'll see how many special interest groups have made it so that we are dependent on plastic without needing to be. Encourage development of items, and propose alternatives when applicable. **Recycle Everything:** Try and select items that come in non-plastic recycled and recyclable packaging, to do your best to properly handle items that can't be reused. Check everything before you put it in the trash, as more and more items are able to be recycled these days. Remember that because plastic doesn't break down easily (if ever), recycling plastic means that it is still plastic, just being used for a different purpose. Therefore, you're not actually reducing plastic amounts or exposure, even in the recycling process.
(Sources: https://en.wikipedia.org/wiki/Plastic_pollution & https://www.conserve-energy-future.com/causes-effects-solutions-of-plastic-pollution.php)

Even though solutions are suggested it is going to be a mammoth task to eliminate/ reduce already created pollution. Significant success can be achieved only when every human being makes a concerted effort to arrest the plastic waste pollution. I am stating so after knowing that the plastic waste has literally encompassed every segment of our earth.

The following article elaborates it clearly.
'Extraordinary' levels of pollutants found in 10km deep Mariana trench
Scientists have discovered "extraordinary" levels of toxic pollution in the most remote and inaccessible place on the planet – the 10km deep Mariana trench in the Pacific Ocean. Small crustaceans that live in the pitch-black waters of the trench, captured by a robotic submarine, were contaminated with 50 times more toxic chemicals than crabs that survive in heavily polluted rivers in China. "The fact that we found such extraordinary levels of these pollutants really brings home the long-term, devastating impact that mankind is having on the planet," Jamieson of UK said. Jamieson's team identified two key types of severely toxic industrial chemicals that were banned in the late 1970s, but do not break down in the environment, known as persistent organic pollutants (POPs). These chemicals have previously been found at high levels in Inuit people in the Canadian Arctic and in killer whales and dolphins in Western Europe. The research, published in the journal Nature Ecology and Evolution, suggests that the POPs infiltrate the deepest parts of the oceans as dead animals and particles of plastic fall downwards. POPs accumulate in fat and are therefore concentrated in creatures up the food chain. They are also water-repellent and so stick to plastic waste.

"The very bottom of the deep trenches like the Mariana are inhabited by incredibly efficient scavenging animals, like the 2cm-long amphipods we sampled, so any little bit of organic material that falls down, these guys turn up in huge numbers and devour it. It was not unexpected that some POPs would be found in the deepest parts of the oceans. When it gets down into the trenches, there is nowhere else for it to go. The surprise was just how high the levels were – the contamination in the animals was sky high."Jamieson pointed out. The level of one type of POP, called polychlorinated biphenyls (PCBs), was only equalled anywhere in the northwest Pacific in Suruga Bay in Japan, an infamous pollution blackspot. The researchers also found severe contamination in amphipods collected in the Kermadec trench, which is 7,000km from the Mariana trench. The pollution was ubiquitous, found "in all samples across all species at all depths in both trenches", the scientists said.

PCBs were manufactured from the 1930s to the 1970s, when their appalling impact on people and wildlife was realised. About a third of the 1.3m tonnes produced has already leaked into coastal sediments and the open oceans, with a steady stream still thought to be coming from poorly protected landfill sites. An expedition conducted by the US National Oceanic and Atmospheric Administration last year also found various manmade items on the slopes leading to the Sirena Deep, part of the Mariana trench, and the nearby Enigma Seamount. The results are both significant and disturbing, said the marine ecologist Katherine Dafforn at the University of New South Wales in Australia. The trenches are many miles away from any industrial source and suggests that the delivery of these pollutants occurs over long distances despite regulation since the 1970s.She said the new research showed that the deep ocean trenches are not as isolated as people imagine. Jamieson's team has provided clear evidence that the deep ocean, rather than being remote, is highly connected to surface waters. Their findings are crucial for future monitoring and management of these unique environments. POPs cause a wide range of damage to life, particularly harming reproductive success. Jamieson is now assessing the impact on the hardy trench creatures, which survive water pressures equivalent to balancing a tonne weight on a fingertip and temperatures of just 1C.

Plastic pollution, feared to be widespread in the oceans, which has been the focus of much recent attention, leading to bans on plastic microbeads in cosmetics in the UK and US. Jamieson said it had been positive that the dangers of POPs had been identified and their use ended but that plastic pollution presented a new concern for contamination of the oceans.
(**Source:**https://www.theguardian.com/environment/2017/feb/13/extraordinary-levels-of-toxic-pollution-found-in-10km-deep-mariana-trench

SIGNIFICANT CONTRIBUTION IN PROPAGATING THE IMPORTANCE OF GEOCHRONOLOGY

Kunchithapadam Gopalan

Kunchithapadam Gopalan (born 1938) is an Indian geochronologist of eminence and contributed significantly in propagating the importance of Geochronology, while working as a senior scientist and emeritus scientist at National Geophysical Research Institute. He is known for his studies on the chronologies of critical rock suites of the Indian subcontinent and is an elected fellow of the Indian Academy of Sciences, Indian National Science Academy, Indian Geophysical Union and the National Academy of Sciences, India. The Council of Scientific and Industrial Research, the apex agency of the Government of India for scientific research, awarded him the Shanti Swarup Bhatnagar Prize for Science and Technology, one of the highest Indian science awards for his contributions to earth, atmosphere, ocean and planetary sciences in 1982.

K. Gopalan, born on 12 August 1938 in the south Indian state of Tamil Nadu, graduated in physics (Bsc hons) from the University of Madras in 1959 and completed his master's degree in nuclear physics from Andhra University in 1960, standing first in the university. As a graduate student in 1960 in the Physics Department of IISC, Bangalore, Gopalan switched from physics to earth sciences. His work was on quantitative dating of extraterrestrial (cosmochronology) and terrestrial rocks (geochronology) based on the time dependent transformation of naturally- occurring radioactive (parent) isotopes of some elements into isotopes (daughter) of other elements Enrolling at the Indian Institute of Science for his doctoral studies, he secured a PhD in 1966, working under the guidance of V. S. Venkatasubramanian and moved to the University of California, Los Angeles where he did his postdoctoral studies at the laboratory of George Wetherill on meteorites and lunar samples. As a postdoctoral associate of Prof. G.W. Wetherill in UCLA, Los Angeles, Gopalan determined Rb-Sr ages of close to 4,600 million years for individual groups of meteorites, thereby validating a few previous model dependent ages. He was selected for his expertise on meteorites to the team of scientists to analyze the first batch moon rocks from the Apollo II mission in July 1969. Although moon samples were harder than meteorites to date, Gopalan succeeded in dating them to give the first indication that the moon was volcanically active in its infancy. The US government invited him, as a Fulbright scholar, to talk on his work on lunar rocks in major Indian cities during the exhibition of a moon rock there in early 1970.On his return to India he joined the research group of Prof. D. Lal in the TIFR, Mumbai to initiate geochronological research in India. For this he designed and built a mass spectrometer, as commercial instruments were too expensive. He could, however, try out this instrument only after he moved to the Physical Research Laboratory (PRL) in Ahmedabad in 1974 following the appointment of Dr. D. Lal as its director. Interacting with GSI scientists in the collection of key rocks from Rajasthan, Gopalan discovered very old (Archean) crustal remnants to the east of the Aravalli Mountains and apossible ancient tectonic plate margin to the west.

The prevailing view then was that volcanic rocks extruded on oceanic and continental crusts were derived from isotopically distinct mantle

segments. Gopalan saw an opportunity to test this dichotomy from strontium and neodymium isotopic ratios in different layers of the volcanic edifice, known as the Deccan basalts, in central India. Measuring these ratios precisely in collaboration with Prof. Macdougall of the Scripps Institution of Oceanography, Dr. Gopalan showed convincingly that the apparent difference between sub-continental and sub-oceanic mantles was an interact of crustal assimilation by the primary melt in the former case. Another important outcome of this work was the distinctness of the mantle sources of the older Raj Mahal basalts in eastern India and the younger Deccan basalts.

The Deccan volcanic eruption about 65 million years ago attracted global scientific interest, as it was believed to have been triggered by a large meteorite impact and caused the global mass extinction and deposition of iridium rich clay layer at that time. Dr. Gopalan developed 40Ar-39Ar dating facility involving neutron irradiation of samples to precisely date the basal layers of the Deccan sequence. His results delinked Deccan eruption from a bolide impact. K/T mass extinction and clay layer are now believed to be due to a meteorite impact in the Atlantic ocean close to the US-Mexico eastern border and slightly later than the Deccan initiation.

Realizing that commercial mass spectrometers with much higher precision and sensitivity than possible with home-made instruments were indispensable for sophisticated studies, Gopalan accepted prof. V.K.Gaur's invitation in 1984 to organize a world class isotope laboratory around a commercial mass spectrometer in the National Geophysical Research Institute, Hyderabad. Before leaving PRL, he helped in establishing sophisticated mass spectrometric facilities for his colleagues to pursue other types of research. Dr. Gopalan built a clean chemical lab in NGRI for contamination-free chemical processing of samples to preserve their isotopic integrity, and introduced Sm-Nd analyses to complement Rb-Sr analyses.

Dr. Gopalan focused on mantle-derived rocks like kimberlites and carbonites in his new lab. He showed that diamond-bearing kimberlites in Andhra Pradesh (Vajrakarur) and Madhya Pradesh (Panna) were episodically emplaced just at one time-1100 million years ago. He discovered two spatially very close carbonatite bodies in Tamil Nadu (Sevatur and Hognekal) but which were emplaced at two incredibly-different times- 2400 and 700 million years ago. Their initial Sr and Nd ratios imply that both were derived from the same mantle source that evolved in isolation for as long as 2000 million years. Dr. Gopalan reported a precise Sm-Nd age of 4.570+0.023 by for a recently fallen meteorite (Piplia Kalan) in the international conference in Ahmedabad in 1997. Prof. Wasserburg, a giant in the subject, commented from the audience that if the age result was correct, meteorite should contain evidence of the earliest solar system events. Dr. Gopalan's PRL colleagues indeed found that long elusive evidence later, validating the very old age of Piplia Kalan.

After his early studies on meteorites and lunar samples, Gopalan's focus shifted during his PRL days to geochronology. His work has been primarily in the field of geochronology and he is known to have conducted extensive studies on the chronologies of several critical rock suites of the Indian subcontinent for which he developed custom-built equipment. He worked on the precambrian Rajasthan and Madhya Pradesh using Rb-Sr dating techniques with mass spectrometer as well as the volcanic rocks of the Deccan plateau and his researches have assisted in a wider understanding of the ages of solid bodies in the solar system and basaltic volcanism in Mare Tranquillitatis. He is credited with the setting up of a mass spectrometer, a facility for Argon–argon dating of rocks, and an isotope facility at Physical Research Laboratory, a geochronology laboratory at National geophysical Research Institute and an Accelerator Mass Spectrometer for radiocarbon dating at the Institute of Physics, Bhubaneswar, the first such facility in India. His studies have been detailed in several peer reviewed articles; a number of them have been listed by online article repositories such as Research Gate and Google Scholar. He has been associated with many science journals including the Academy Proceedings in Earth and Planetary Sciences as a member of their editorial boards and has delivered several invited or plenary lectures. His work has been cited by many authors and he has also mentored 8 doctoral scholars in their studies.

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Dr. Gopalan's enduring satisfaction was to have empowered many young Indian students to pursue world-class research in isotope geosciences. He hopes that his concise book on radiometric dating (Cambridge University Press, 2017) will stimulate many young Indian students to take up a serious study of isotope geology.

AWARDS AND HONOURS

Gopalan, a Fulbright scholar during his doctoral studies, received the Krishnan Medal of the Indian Geophysical Union in 1982. The Council of Scientific and Industrial Research awarded him the Shanti Swarup Bhatnagar Prize, one of the highest Indian science awards, the same year. He was awarded the Eminent Mass Spectrometrist Award of the Indian Society for Mass Spectrometry in 1991. The Indian Academy of Sciences elected him as a fellow in 1986, followed by Indian National Science Academy in 1986, Indian Geophysical Union in 1988 and the National Academy of Sciences, India in 1992.He received " Prof.K.R.Ramanathan Mmorial lecture Award " from Indian Geophysical Union. In 2017 Prof. Gopalan received **"Lifetime Achievement Award"** from Ministry of Earth Sciences (MOES) .

His significant research publications include:

Gopalan, K., Trivedi, J.R., M.N., Balasubrahmanyan, Ray, S.K., and Anjaneya Sastry, C., (September 1979). "Rb-Sr Chronology of the Khetri Copper Belt, Rajasthan". Geological Society of India. v.20, no.9.

Murari, R., Krishnamurthy, P., Tikhonenko, P. I., and Gopalan, K., (December 1993). "Magnesian Ilmenites in Picrite Basalts from Siberian and Deccan Traps—Additional Mineralogical Evidence for Primary Melt Compositions (?)". Mineralogical Magazine, v.57, no.389, pp: 733–735. doi:10.1180/minmag.1993.057.389.18.

Gopalan, K., Douglas Macdougall, J., and Christopher Macisaac, (September 2007). "High Precision Determination of 48Ca/42Ca Ratio by TIMS for Ca Isotope Fractionation Studies". Geostandards and Geoanalytical Research, v.31, no.3, pp: 227–236. doi:10.1111/j.1751-908X.2007.00847.x.

Gopalan, K., (April 2013). "A Simple Chemical Resistant Hotplate for Geochemical Applications". Geological Society of India, v.81, no.4.

Gopalan, K., Kumar, A., Kumar, S., and Vijayagopal, B., (August 2013). "Depositional history of the Upper Vindhyan succession, central India: Time constraints from Pb–Pb isochron ages of its carbonate components". Precambrian Research, v.233, pp: 108–117. doi:10.1016/j.precamres.2013.04.014.

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