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STUDY OF POLLUTION IN ARABIAN SEA: MONITORING AND MARINE ENVIORNMENT

BY

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ABSTRACT

In 21st century, with the rapid increase of pollution and serious shortage of resources the marine environment has been destroyed due to many people visit to sea and go out to sea without permission, regardless of the legal constraints, fishing. Such type of practices leads the marine environment to get worst and worst, finally monitoring of the marine environment time to time is essential. This article deals the pollution in sea with monitoring and marine environment. The actual situation on the sea can be clearly understood on the basis application of today's technology so that we can improve the speed of data processing, monitoring personnel and finally solve the problems faster.

KEY WORDS: Pollution, Monitoring, Marine Environment & Technology

INTRODUCTION

With the rapid degradation of the marine environment all around the world due to various factors, monitoring is necessary through today's technology. With the development of national / international economy and the increasing frequency of man-made marine activities, all coastal areas are facing major problems such as water quality degradation, environment degradation, reduced sustainable use capacity, serious pollution and eutrophication. Overexploitation of the marine environment will extinct certain rare species, seriously threatening the lives of local fisherman and seriously affecting the development of marine fisheries. Information explosion has become the computer industry's most intuitive performance. Smart business, social networking and mobile devices greatly expand the range of information. The purpose is to use modern advanced technology to provide a more convenient way for marine environment monitoring and improved the efficiency and accuracy of monitoring thereby reducing the damage to the marine environment.

In 21st century and modern era, there are many people who have shallow awareness of caring for the environment, in particular the damage to the marine environment is very serious, so the monitoring of the marine environment is extremely important for the protection of aquatic plants and animals. We believe that the ocean is vital to the health of the planet and humanity. The

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marine Eco-system should be protected from pollution factors through continuous monitoring; this monitoring method should be as green as possible, that is, based on sensors made from bio-compatible and easily handled raw materials. The main approach to laid the foundation after the future development of marine environmental bio-sensors based in sea urchin cells cultured on nanoporous alumina. Bio-chemical characterization was performed to examine the cholinergic system path-ways by exposure to daylight induced serotonin auto fluorescence and the expression and function of neuroactive molecules.

REVIEW OF LITERATURE

Marine environment is highly valuable as they host environments are productive ecosystem. These ecosystems provide important goods (i.e., consumable fish, water and raw materials) and services (i.e., tourism, food and pollution control, transportation) for humans. Marine pollution has the potential to affect human health, marine organisms and water quality etc. Marine ecosystems are currently highly greathearted because of marine pollution. Human activities are responsible for a major decline of the world's biological diversity, and the problem is so critical that combined human impacts could be accelerated present extinction rate f to 1000 -10,000 times the natural rate.

The Arabian Sea is one of the most productive regions in the world and is characterized by strong seasonal oscillations in biological production . In summer, the strong southwest monsoon causes intense up-welling in the western Arabian Sea, while in winter surface cooling in the north results in enhanced vertical mixing. In both the above cases the photic zone gets nutrients from below which results in high productivity, i.e. phytoplankton fixes carbon through photosynthesis. The Arabian Sea also has a global significance; the increased production in the above two seasons leads to the formation of oxygen minimum zone (at depths of 150–1000 m) where denitrification takes place, in the northern part of Arabian Sea. Emission of N2O as a result of denitrification, which is a potent greenhouse gas, is a cause of concern and has significant implication to the global warming.

Environmental contamination is not an amoral phenomenon; rather it is the inevitable consequence of the process of development. Pollutants can be native or natural which are not caused by man, genera ted by man but not created by him, and synthetic pollutants wholly created by man (Johnston, 1976). In relation to the equator, the Indian Ocean has an asymetric shape largely due to the presence of the Asian continent. This results in this ocean being separated from the deep-reaching vertical convection areas of the northern hemisphere. Such an-asymmetric configuration leads to a weak circulation and poor' renewal at depths of the Northern Indian Ocean (Dietrich 1973).

The Indian ocean occupies an area of 74.92 x 106 km2 including the marginal seas (Dietrich 1963). Its average depth is 3873 m. It is a huge sea area ranging from Eastern Africa to Western Australia and bordered on the North by the Asian subcontinent. The area between 25° N and 30° S latitude and between 40° E and 98° E longitude has been considered for this review.

During the Indian JGOFS, the Arabian Sea was studied in detail – the biological and chemical properties of the ocean and the physical forcing responsible for the same. However, these studies were limited to a seasonal time span. There is still not much detail about the inter-annual

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variability in terms of biological properties. The only possible way to monitor the variation in biological properties of the ocean on a larger spatial scale is by remote sensing, a method of collecting information about the constituents of water using optical signals in the visible range. It is well established that the concentration of phytoplankton influences the colour of the ocean water. Chlorophyll *a* (Chl *a*), which is the main photosynthetic constituent in the phytoplankton, absorbs more in blue than in green; as the concentration of phytoplankton increases, the back-scattered light progressively shifts towards the green. This property is successfully used to derive the Chl *a* concentration with the help of a satellite. Phytoplankton and sunlight are the fundamental requirements for primary production in the oceans. In the tropics, where variation in sunlight is not significant on an inter-annual scale, variation in chlorophyll concentration can indicate variation in primary production. Satellite ocean colour data provide the spatial and temporal variations in phytoplankton biomass and hence in the primary production on a larger scale. Since the launch of SeaWiFS (sea-viewing wide field of view sensor) in August 1997, global ocean colour data are available to the science community on a regular basis.

1. Gregg *et* Smith, S. L., Understanding the Arabian Sea: Reflections on the 1994–1996 Arabian Sea expedition. *Deep-Sea Res. II*, 2001, **48**, 1385–1402.

al. were the first to report an increase in the primary production of northern Indian Ocean (which includes both the Arabian Sea and the Bay of Bengal). This was confirmed by Goes *et al.*. They used satellite data to show that summer productivity in the western Arabian Sea (47°–55°E and 5°S to 10°N; 52°–57°E and 5°S to 10°N) has been increasing, and proposed the cause to be the warming of the Eurasian land mass – the melting of the Himalayan snow cover in the recent past due to global warming resulted in enhancement of the land–sea contrast in summer temperature, thus enhancing monsoon winds. Notably this attribution was not made by Gregg *et al.*.

ANALYSIS OF POLLUTION IN SEA

Sea water turbidity caused by marine pollution will seriously affect the photosynthesis of sea plants (phytoplankton and algae), thus affecting the productivity of the sea the fish are also harmful. Heavy metals and toxic organic compounds and other toxic substances accumulate in the sea, and through the enrichment of marine life, marine animals and other animals to feed poisoning. Sea water hypoxia can cause marine life death. Oil will make economic fish, shellfish and other sea food produce has oil smell, adult fish, shellfish in the long-term living in the polluted sea water in the accumulation of certain harmful substances, when we eat them, it will harm the human health. Because of organic matter and nitrogen and phosphorous pollution, some algae plankton inseam water can multiply quickly and rapidly. Different algae have different colors, which cause red, pink and green colors, which are called red tide. The red tide caused by sea water hypoxia.Will make a large number of fish, shellfish and often marine animals due to lack of oxygen and suffocation. Oceans as an important part of human life, its charges will directly or indirectly affect human life. Sea pollution will have a great impact on human life.

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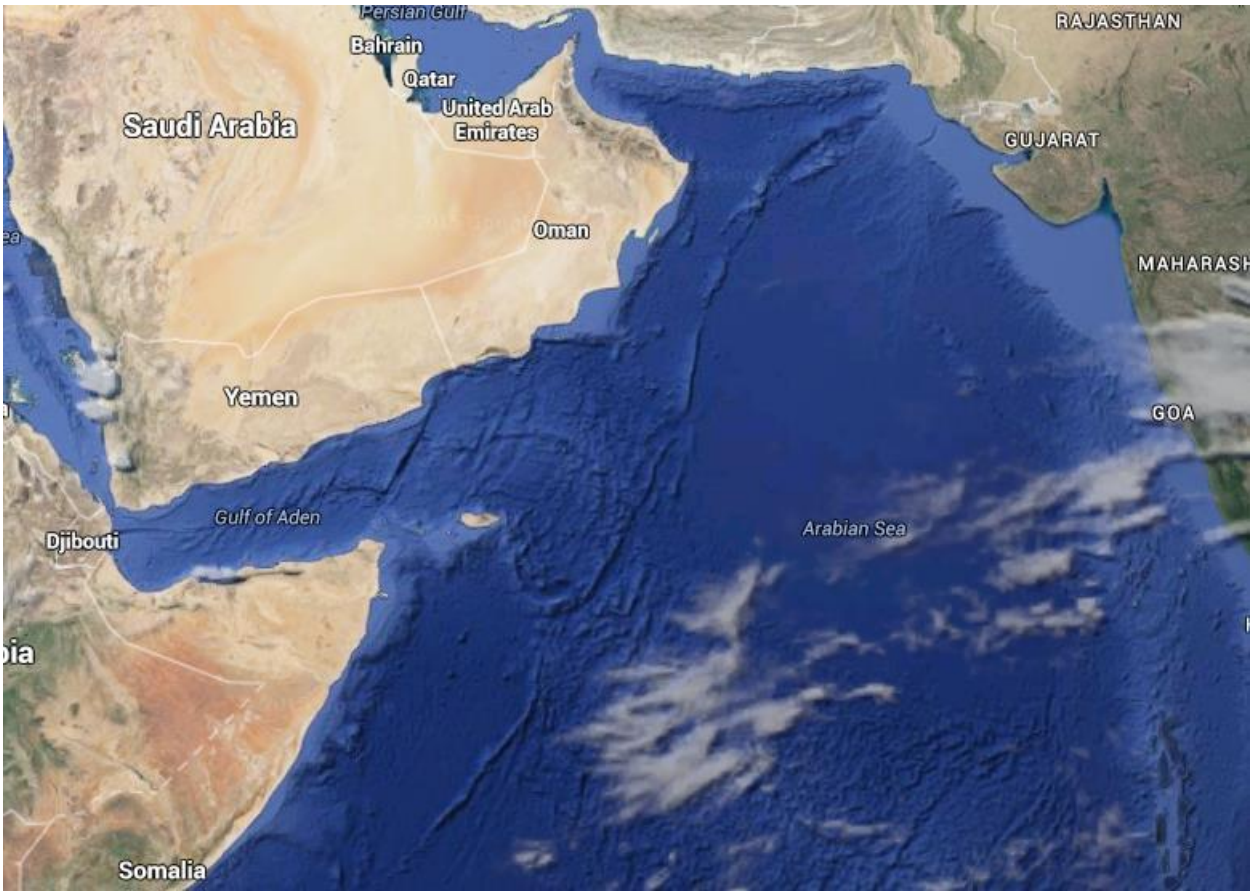

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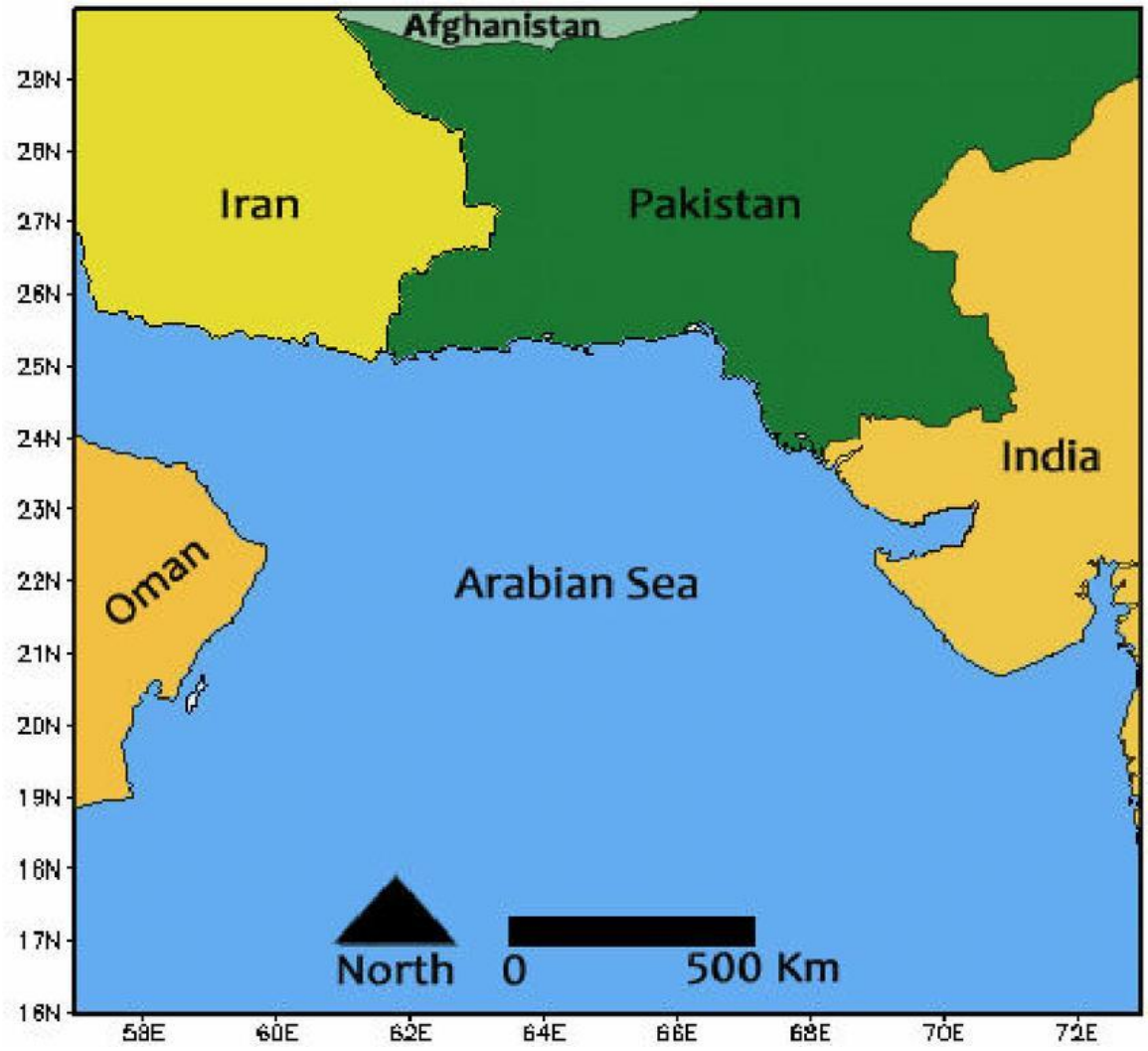

CAUSES OF SEA POLLUTION

1. **Sea pollution caused by ships**

   Because of its low cost and the advantages of large cargo volume, ship transportation has become the most important transportation's mode. With the great development of industrial technology and rapid population growth the volume of sea freight has increased Significantly years by year, and the tonnage and size of ships have been increasing. But with the emergence of sea pollution problems are becoming more serious. Ship in the course of the operation, it is inevitable to introduce some pollutants into the ocean, causing sea pollution.

2. **Oil Pollution caused by ship transportation**

   The oil pollution caused by ship transport mainly induces two categories: The first is the pollution caused by normal navigation, keg. Cabin bilge water, oil tanker ballast water, washing water and so on. The second category is due to shipping accidents, e.g. Oil spill, among all types of sea pollution, oil pollution should be said that the most serious.

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Oceans are dangerously affected by oil pollution, where term oil refers to crude petroleum or refined petroleum products. Oil pollution is an inevitable consequence of the dependence of a rapidly growing population on oil-based technology.

Accidental oil spills during transportation of huge quantities is a rare occurring, but its impact can be equated to that of an atomic explosion. Since 1901 up-to-date 71 oil spills of magnitude over 10,000 tones have taken place. Moreover, oil originating from the ballast, bilge and cooling water of the tankers are the main sources of oil contamination in the Indian Ocean. Due to rapid industrialization domestic and industrial effluent is also contributing significant towards the marine oil pollution. Oil pollution has both short-term and long term effects. Short term effects include:

- Acute toxicity
- Asphyxiation and covering of avifauna benthic fauna
- Dissolved oxygen reduction
- Reduction of light transmission in the sea
- Deposition of tarry lumps (the end-product of oil reaching the marine environment) on the beaches.

3. Harmful substances caused by sea pollution

With the transport of dangerous chemicals increased ship, harmful substances caused by pollution is also growing. In general, this type of pollution includes: (a) Pollution caused by the transportation of liquid toxic substances in bulk and the other is due to the accident caused by the large number of toxic hazardous substances spill over. And loading and unloading operations in the drop, leakage and so on. (B) Packaging harmful substances caused by the pollution. When the emergency abandonment of the goods will also cause serious pollution in sea

4. Pollution from domestic sewage and garbage

Ship sewage usually is the excreta from daily, such as toilet discharge, medical room discharge, the activities of the premises of the discharge material. Ship waste is mainly solid waste, such as a variety of daily necessities, food and work supplies. As the sewage water containing bacteria, viruses and various eutrophication substances, resulting in emission of sea water after the pollution and plastic difficult to degrade.

RESULT AND DISCUSSION

Data of Tanker routs from middle east to Japan and Bombay High oil ring (BH) in the Arabian Sea location wise.

Table No. 1

Stations	Alkanes					
	Pr/Ph	CPI	L/H	C17/18	C17/Ph	C18/Ph
Stations 1	0.75	1.10	3.91	0.87	1.57	1.37
Stations 2	0.72	1.10	0.83	0.75	1.16	1.12
Stations 3	0.75	1.09	0.91	0.81	1.13	1.05
Stations 4	0.80	1.07	0.90	0.82	1.05	1.04
Stations 5	0.72	1.10	0.92	0.75	1.13	1.09

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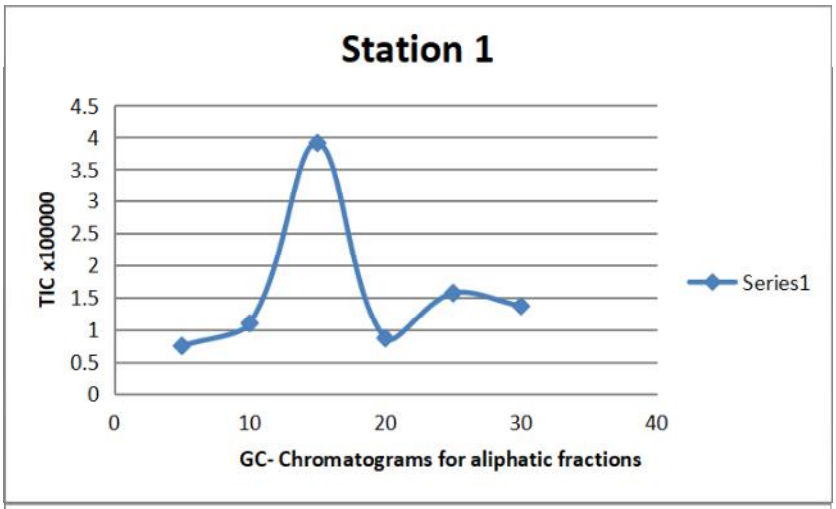
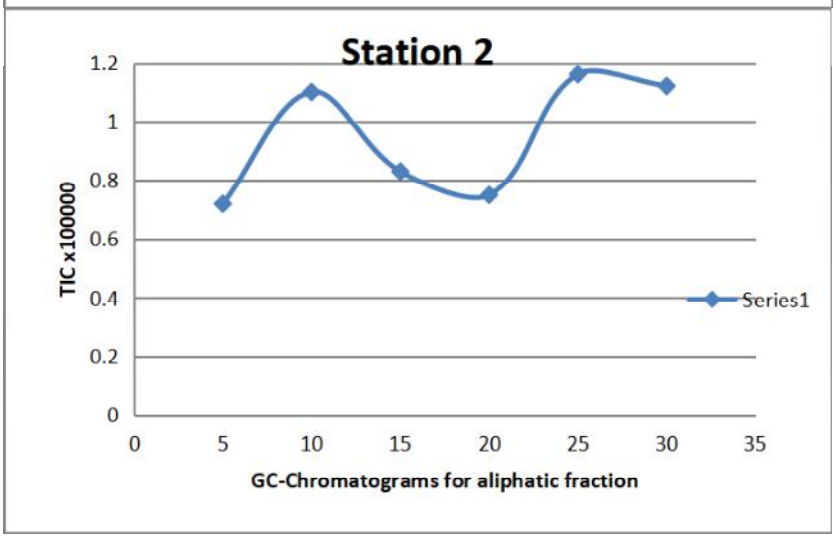
Stations 6	0.74	1.11	0.69	0.78	0.99	0.95
Stations 7	2.95	1.05	2.52	1.04	0.91	2.55

Table No. 2

Stations	Triterpanes		
	C29/C30	∑G1 – G5/C30	Ocean/C30
Stations 1	0.86	1.15	0.24
Stations 2	---	--	--
Stations 3	0.57	1.41	0.33
Stations 4	--	--	0.29
Stations 5	0.98	1.25	0.27
Stations 6	0.85	1.24	0.78
Stations 7	0.69	0.87	0.04





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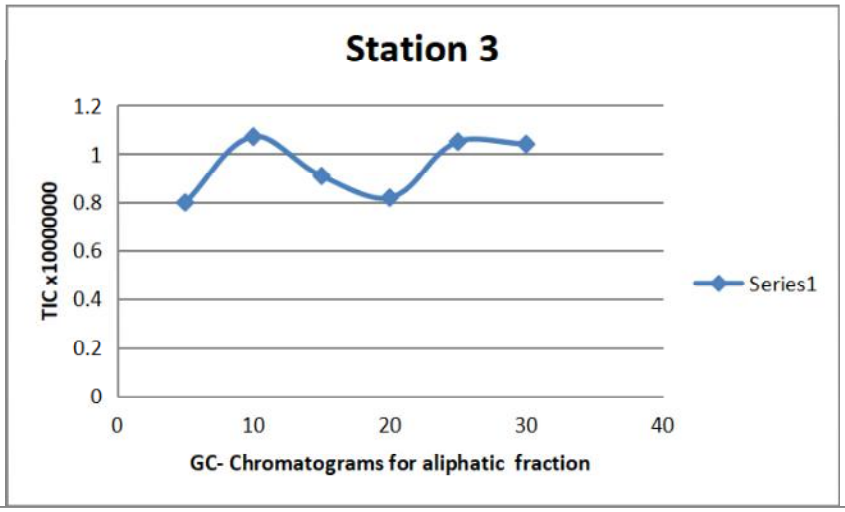

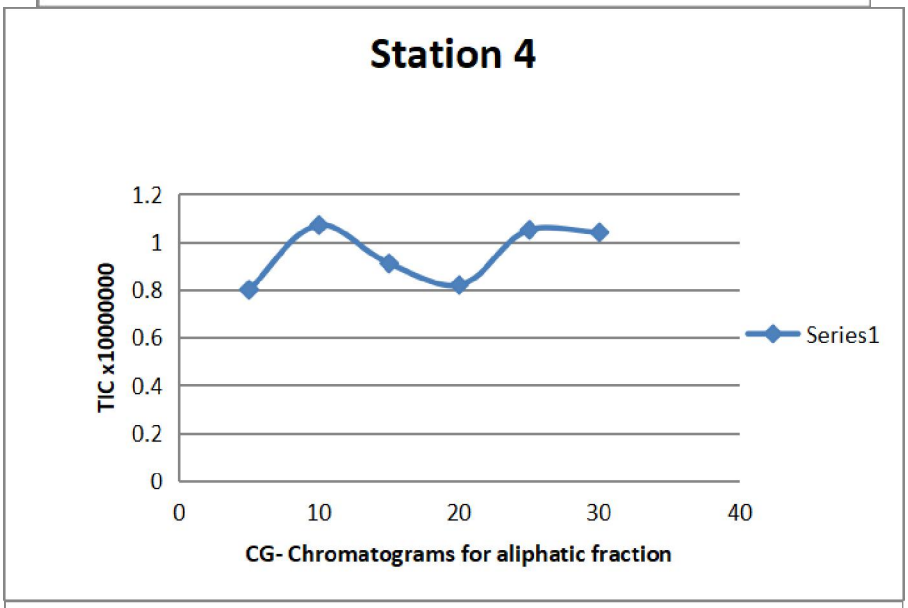

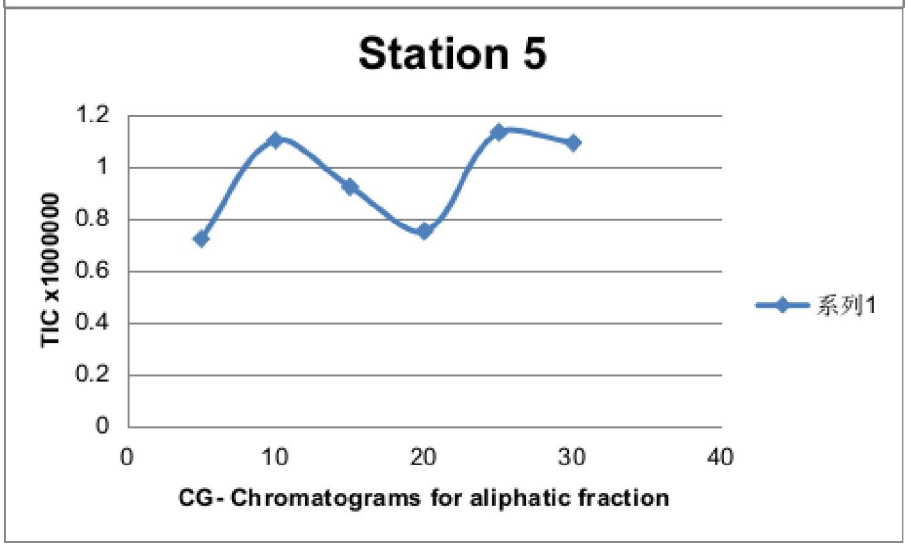

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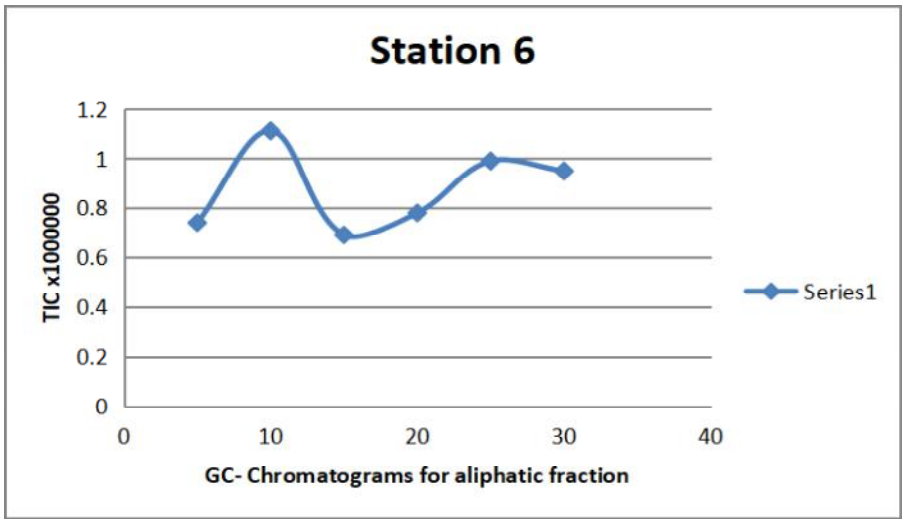

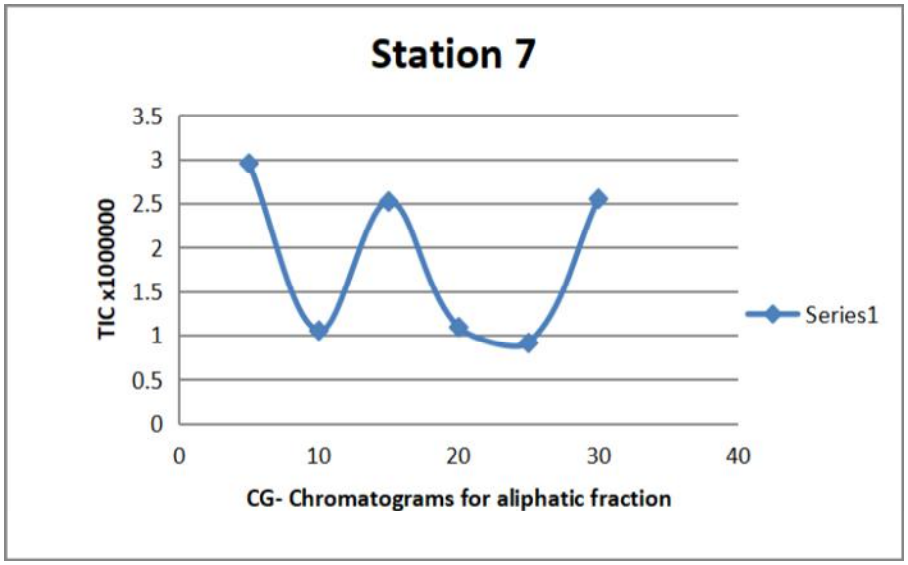

Several methods have been developed in the recent past to investigate the oil composition, weakening processes and the source. Ships and their product's using Ge/MS is the best method available today to identify the source. In the present study, we have taken seven representatives for both samples and one crude oil sample for specific target analyses including individual n-alkanes ($C_{12} – C_{36}$), is oprenoid hydrocarbons and their characterization of samples.

Based on the above analysis it is discussed that the tar balls that were deposited along the Goa Coast during the present study in 2019 to 2020.

Marine Pollution Prevention Treaties and Convention

At the international level, there have been a number of initiatives taken by the international community to address the marine pollution problem. The international instruments relating to

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marine pollution and signed by Indian Ocean countries are discussed briefly in chronological order below:

1. The International Convention for the Prevention of Pollution of the Sea by Oil (1954):
The convention was first attempt to prevent pollution of the sea by oil tankers. It prohibited the discharge of oil or oil mixture by tankers within prohibited zones from the coastline.

2. The Geneva Convention on the High Seas (1958):
The convention contains two Articles, i.e., Article 24 and 25 on marine pollution and through this Convention states were obliged to cooperate with the competent international organizations in taking measures to prevent the pollution. From among the South Asian countries, Nepal, Pakistan and Sri Lanka are parties to this Convention.

3. International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (1969):
It is a multilateral treaty which empowers the coastal states to take measures beyond the limits of their territorial sea in case of maritime casualty involving oil pollution from ships which may cause major harmful consequences.

4. The International Convention on Civil Liability for Oil Pollution Damage (1969):
CLC creates a scheme of liability for oil pollution damage caused by oil tankers and further provides that the ship owner is strictly liable for oil pollution damage, without any need to prove negligence or fault except in certain circumstances, e.g. war and insurrection.

5. The Convention on the Prevention of Marine Pollution by the Dumping of Wastes and other Matter (1972):
It regulates the deliberate disposal of certain substances at sea, including oily wastes, dredging and land-generated wastes, excluding the oil pollution caused by normal operational discharges of ships and pollution caused by maritime casualties. Pakistan and Afghanistan are parties to this Convention.

CONCLUSIONS

Ocean pollution is a global problem. It arises from multiple sources and crosses all the boundaries. It is the consequences of reckless, shortsighted, and unsustainable explorations of the earth's resources. It endangers marine ecosystems. The global ocean is teeming with undiscovered species and resources in vast under explore areas. Yet even as our dependence on healthy, functioning marine ecosystem grows, our knowledge about the ocean and its role in keeping earth's system in balance remains constrained.

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