



Permanent Mission of the Islamic Republic of Iran to the United Nations

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In the Name of God, the Compassionate, the Merciful

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The Permanent Mission of the Islamic Republic of Iran to the United Nations presents its compliments to the Office of Legal Affairs to the United Nations and, with reference to the Note No. TOS/SGR/2020/1/ST dated 14 December 2021 regarding the invitation extended to States for the submission of their input on the theme of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea at its twenty-second meeting to be held from 6 to 10 June 2022 on “Ocean Observing”, has the honor to enclose the input from the relevant authorities of the Islamic Republic of Iran for the preparation of the report of the Secretary-General on the topic of focus of the meeting.

The Permanent Mission of the Islamic Republic of Iran to the United Nations avails itself of this opportunity to renew its compliment to the Office of Legal Affairs to the United Nations the assurances of its highest consideration.

New York, 13 January 2022

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Ocean Observing in the Islamic Republic of Iran

General Observations:

The Islamic Republic of Iran welcomes the theme of this year's United Nations Open-Ended Informal Consultative Process on Oceans and the Law of the Sea and underlines the role that ocean observations play in supporting the safe and effective use of the ocean and ocean resources at the same time as protecting the environment.

As a Country with long coastlines along the Persian Gulf and the Sea of Oman, Iran is hugely vulnerable to the threats and pressures posed to the marine environment such as those related to anthropogenic activities, namely the construction of artificial islands and land reclamation activities. The concern related to the adverse economic, social and environmental impacts of the physical alternation and destruction of marine habitats that may result from such activities has also been expressed in General Assembly Resolution [A/RES/76/72](#).

Despite the legality of the construction of artificial islands under the applicable rules of the international law of the sea, this is subject to taking all the necessary measures to prevent, reduce and control the marine environment. Furthermore, countries should endeavor to ensure that their operations do not damage their own as well as other country's environment. They should also ensure that these developmental activities do not lead to the depletion of marine habitats as well as threatening or putting the marine species in danger of extinction. Land reclamation activities, when taking place in semi-closed water such as Persian Gulf, are much more serious. Not only do these projects threaten the entire marine ecosystem, they are also a threat for the people living along the shores of the Persian Gulf. In this regard, ocean observations and measurements play a fundamental role in the sustainable use of the sea and its resources. Accordingly, it is expected that the coastal state has due regard to the rights and duties of other states and conduct regular environmental impact assessments as well as publish the reports to the existing regional bodies in order to ensure better regional observation of the sea and to better monitor the impacts of such developmental operations on the marine environment and its vulnerable ecosystems.



The Islamic Republic of Iran would like to reiterate the importance of the conservation and sustainable use of oceans and seas and of their resources for the sustainable development. Recalling the proclamation by the United Nations General Assembly at its 72nd session regarding the United Nations Decade of Ocean Science for sustainable development, Iran is of the view that ocean observations play a critical role in this regard. However, lack of capacity and the required knowledge and technology would hinder a better understanding of properties of the seas and the long-term changes in the marine environment due to climate change and the cumulative impact of different stressor. Hence, building the capacity of developing states in marine science, observation and transfer of technology is the core of ocean observations and would empower developing countries to not only better preserve the marine environment but also utilize resources for the benefit of current and future generations.

1. “Iranian National Institute for Oceanography and Atmospheric Science (INIOAS)”

Utilization of the oceans and the seas, with the purpose of transportation, trade, food and pharmaceutical resources, mineral resources and the security of the coastal countries, is of great importance in the world today.

Considering this significance and regarding that a large coastal area of the Islamic Republic of Iran, practically 2700 km, is covered by shorelines of the Caspian Sea (in the north), and the Persian Gulf and the Gulf of Oman (in the south), the existence of an active national center in different fields of marine and oceanographic sciences in the country has always been of strategic importance.

On this basis, the Iranian National Center for Oceanography (INCO) was established in 1992 according to the agreement between the Ministry of Science, Research and Technology of Islamic Republic of Iran and UNESCO. In 19th March 2010, the Ministry of Science, Research and Technology approved the promotion of “Iranian National Center for Oceanography (INCO)” to “Iranian National Institute for Oceanography (INIO)” and on 8th June 2013, approved the promotion of Iranian National Institute for Oceanography (INIO) to the **“Iranian National Institute for Oceanography and Atmospheric Science (INIOAS)”**.



INIOAS operates under the auspices of the Ministry of Science, Research and Technology with the following aims:

- Basic oceanographic studies and theorization
- Planning long-term programs for protection, preservation and promotion of the marine ecosystems as well as optimum utilization of them
- Development of research-based decision making and decision taking in different marine and oceanographic fields
- Promoting the scientific developments in different oceanographic fields taking the foresight approach
- Developing the financial sources of the institute and utilization of the financial supports of national and international organizations as well as the support of private section, especially the scientific societies and non-governmental organizations.
- Giving services to the society and expanding the general and specialized oceanographic trainings.
- Developing interactions between related national and international organizations for raising the role of marine resources in economical, social, political and cultural developments.

Functions:

The most important functions and responsibilities of INIOAS are:

- Implementation of major scientific and applied researches in all marine fields
- Establishment and development of marine research laboratories in the institute and Centers at the coasts of the Persian Gulf, the Gulf of Oman and the Caspian Sea.



- Cooperation with various organizations in the implementation of their research projects considering the agreement between both parties
- Organizing national, regional and international training courses, seminars and conferences in different oceanographic fields
- Helping universities in establishing courses for marine sciences and technologies
- Providing necessary facilities for conducting new marine technologies into the country
- Information exchange with other marine centers and organizations
- Providing consultation to the authorities of the related marine organizations for defining the country marine policies
- Initiating communication and cooperation with international and regional oceanographic organizations.

Research Groups

► Biological Oceanography

The Biological Oceanography research group investigates the biological characteristics of aquatic animals, plants, and protists and other marine micro/macro organisms. Studying the creatures and their reciprocal interaction with each other and with the biological environment are their other research fields with the aim of identifying the hazardous factors which are endangering the marine life and to have a better understanding of how to save/protect the susceptible marine micro/macro organisms. The scientific staffs of this research section are engaged in the following three divisions:



- **Marine Biology division**



- **Marine Chemistry and Environment division**
- **Marine Technology division**

▶ **Geophysical Oceanography**

The Geophysical Oceanography research group, through taking advantage of the scientific capability of experienced scientific staffs in the field of physical oceanography, marine geology, and having well-equipped and modern laboratories, has performed a series of specialized researches through external and internal funds. The specialty of the fields of this section are analysis of physical characteristics of sea water, the study of the hydrodynamic of waves and currents, the numerical modeling of currents, and climate change in-marine environments. This research department operates in the following two divisions:

- **Marine physics division**
- **Marine geology division**



▶ **Marine Policy**

This research group has been established with the aim performing activities in the field of supporting peace, security, and economic and social development, as well as the analysis of marine laws and bylaws at national and regional levels. The development of marine and ocean industries, the analysis and studying of national marine laws and proposing improvements to these laws, and the analysis of the United Nations convention in the field of law of the sea form part of activities of this department. Studying and researching in the field of marine management and economics and marine policy making constitute other fields of activity for this research group.



Laboratories

Iranian National Institute for Oceanography has the following modern equipped laboratories:

► Marine Living Science Labs

1) Marine Biology Laboratory

Marine Biology Laboratory is the core of marine biological research at Iranian National Institute for Oceanography. The studies which are carried out in this laboratory are on different biological and ecological aspects of marine organisms and their ecological threats and their protection. Using experienced staff and equipped with modern instruments, the laboratory is active in marine biology and ecological studies and collaborates with other marine organizations, centers and universities.

Services:

- Determination of basic parameters of marine biology
- Marine ecological studies
- Environmental Impact Assessment (EIA)
- Marine ecological studies and ecological monitoring
- Presenting projects to related organizations for sustainable use of marine living Science
- Researches on biological characteristics of the seas especially of marine sensitive ecosystems
- Preservation of sensitive ecosystems, biodiversity and endangered species
- Contribution to the implementation and improvement of resources management for the sustainable development objectives
- Laboratory services in different marine aspects including Plankton, Benthos, and Nekton
- Organizing scientific seminars and workshops at regional and international levels



Field and Laboratory Researches

- Test designs and data statistical inference using Statistica and Primer for marine biological research
- Sampling, identifying and determining the Benthos abundance
- Sampling, identifying and determining the abundance of phytoplankton, zooplankton, Mollusc, Pelagic polychaetes, determination of biomass, Neuston (water surface plankton)



Using Plankton Nets

- Taxonomic studies, transmittal range, recognition the health of sensitive marine ecosystem such as coral reefs.



Studying the status of coral reefs



Measuring the sedimentation rate in Larak coral reefs



Sampling corals for taxonomic studies



Exploring micro organisms using florescent and inverted microscope

2) Marine Chemistry Laboratory



laboratory.

Marine Chemistry Laboratories of Iranian National Institute for Oceanography is active with the aim of researches on living and non-living environments, measurements of pollutants and theirs Science in the marine environments, sediments and marine organisms. Specialized laboratory and field services in marine chemistry and marine biology can be carried out in this

► Marine Non-Living Science Labs

1) Marine Physics Laboratory

Introduction

The Marine Physics Laboratory (MPL) is one of the well equipped laboratories of Iranian National Institute for Oceanography and Atmospheric Science (INIOAS) which has been set up in order to measure the physical characteristics of seawater.



Considering the MPL's facilities, some parameters such as meteorological, chemical and biological parameters are also measured in this laboratory.

The MPL's facilities and human capacities make INIOAS able to complete a huge variety of projects in the fields of the physical and dynamical oceanography in the Persian Gulf, Gulf of Oman and Caspian Sea as well as the Iranian lakes, rivers, and reservoirs.

Goals of the MPL

- Completing the physical oceanography projects in the Iranian waters and optimized utilization of the adjacent water basins
- Monitoring the physical parameters of seawater
- Capacity building in the field of physical oceanography, developing the knowledge and physical oceanography methods inside the country
- Developing the national and international collaborations in the field of physical oceanography
- Carrying out scientific services in the field of physical oceanography

Activities of the MPL

Before field operations, all instrumentations' sensors are calibrated and then are verified. The mentioned instrumentations' sensors are reviewed based on the standard conditions and the calibration coefficient. Being confident of the sensors performance is essential before starting the field operations.

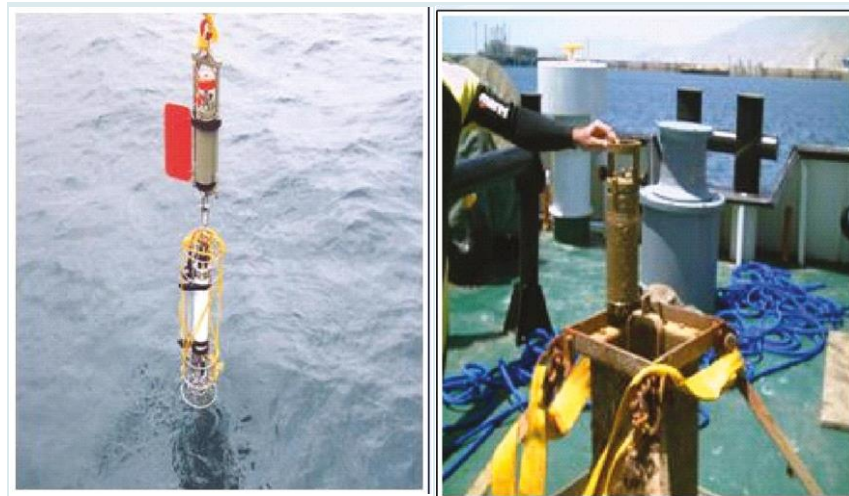
Maintenance, repair, replacement and fault detection of instrumentations' sensors are other examples of MPL's activities.

Field operations

Field operations are done for measuring the following parameters using the existing facilities inside the MPL:

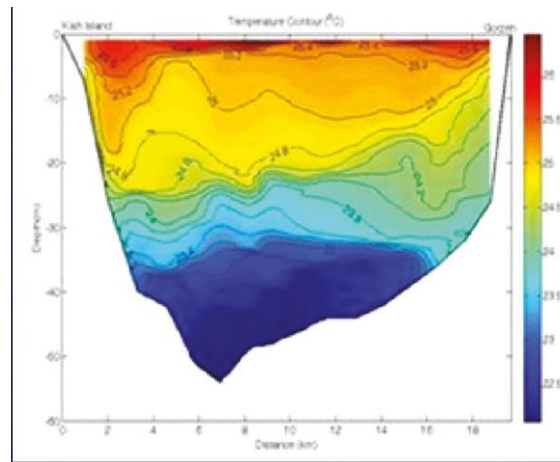


- ▶ Measuring and recording temperature, conductivity, turbidity, chlorophyll-a, dissolved oxygen, pH, and water depth
- ▶ Current profiling, measurements and record the characteristics and spectrum of directional waves
- ▶ The non-directional waves and water level measurements
- ▶ Measurement and record of horizontal current speed and its direction
- ▶ Measuring and recording the parameters of wind speed and direction, air temperature, air pressure, relative humidity, atmospheric radiations, precipitation rate
- ▶ Retrieval of marine measurement instruments deployed in deep waters



Data retrieval, analysis, and processing

After field operations, the recorded data are retrieved, analyzed and processed using related software. Using the results from field operations the physical and hydrodynamic phenomena are studied. Furthermore, these data are used as an input for ocean models.



Measurement methods of physical and hydrodynamic parameters

- 1- Time series measurements through the installation of the instrumentations in the sea floor (Bottom mount ADCP) or on the mooring line.
- 2- CTD profiling and ADCP measurements in the predefined stations.
- 3- Measurement of the physical oceanography parameters by installing the equipment on the vessel or vessel towing equipment.





2) Marine Geology Lab

Marine Geology Laboratory of Iranian National Institute for Oceanography and Atmospheric Science (INIOAS) is equipped with a collection of field and laboratory instruments which are used for studying marine environments. These instruments are specially made for studying marine and ocean environments. There are plenty of experiences in this laboratory of studying marine and coastal environment, subsurface structures, coastal typology, sediment transportation, paleoclimatology and marine hazard studies.

Measurable parameters of Marine Geology Laboratory

- Measuring organic matters (OM)
- Measuring carbonate content
- Grain size analysis
- Density measurement
- Magnetic susceptibility measurement
- Mineralogy studies
- Macrofossils and Microfossils studies



Core sampling from old coral rocks using Rock Corer

International Activities

This Institute has a wide range of international activities. INIOAS cooperates with international and regional governmental and non-governmental institutes, organizations, and companies. The Iranian National Institute for Oceanography and Atmospheric Science has organized many national, regional and international workshops, training courses and conferences in cooperation with the international organizations. The organizations, projects and networks which INIOAS is their national or regional coordinators are:

“Intergovernmental Oceanographic Commission (IOC/UNESCO)”, “International Oceanographic Data and Information Exchange (IODE)”, “Global Ocean Observing System for Indian Ocean (IOGOOS)”, “Global Coral Reef Monitoring Network (GCRMN)”, “Indian Ocean Tsunami Warning System (IOTWS)”.

Furthermore, the Operational Center of International Oceanography Institute (IOI) in Iran is located in the Iranian National Institute for Oceanography and Atmospheric



Science. This institute is also the national reference of “Inter-Islamic Science and Technology Network on Oceanography (INOC)”.

Centers

Achieving its goals and accessing the coastal areas more easily, INIOAS had established 4 Center in the northern and southern coasts of Iran.

- ▶ *Gulf of Oman and Indian Ocean Center (Chabahar)*
- ▶ *Caspian Sea Oceanography Center (Nowshahr)*
- ▶ *Persian Gulf Oceanography Center (Boushehr)*
- ▶ *Persian Gulf Oceanography Center (Bandar Abbas)*



The Persian Gulf and Gulf of Oman Oceanographic Monitoring Program

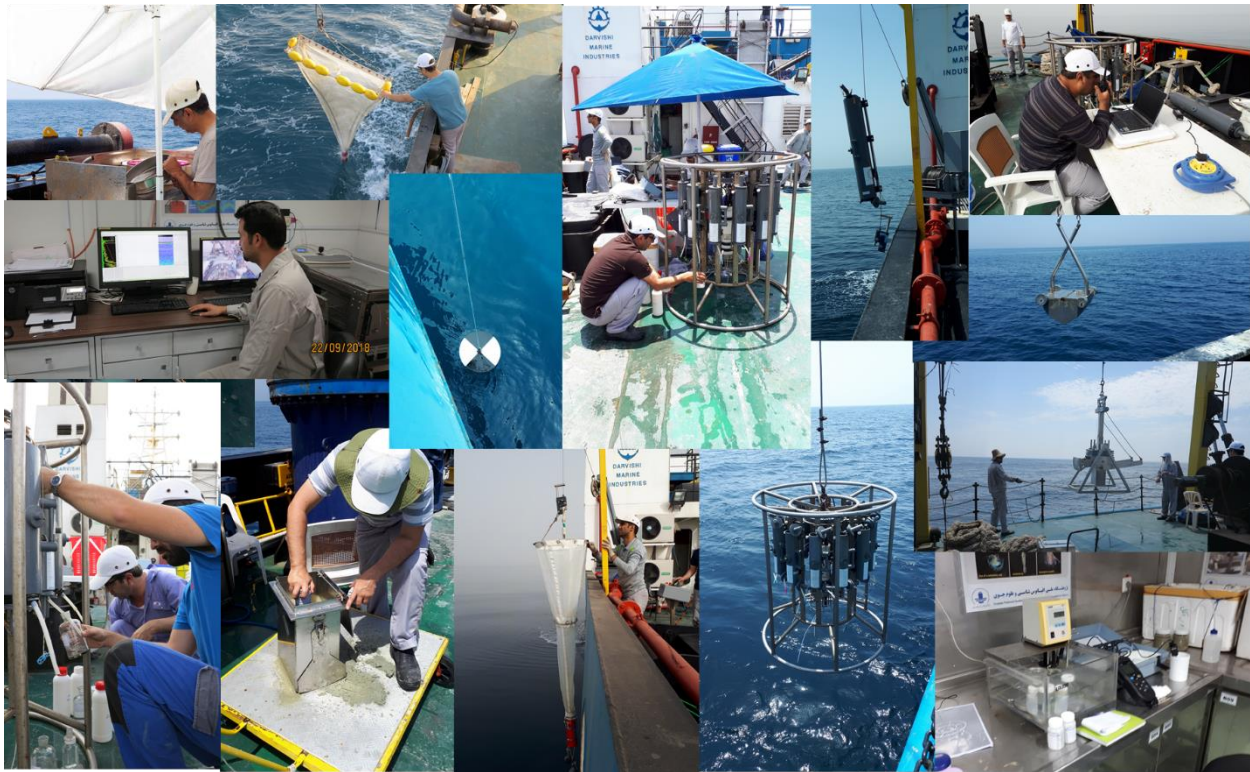
Given the importance of the Persian Gulf, the Strait of Hormuz and the Gulf of Oman in terms of biotic and abiotic resources and various strategic issues and considering the increasing stress on these valuable marine environments, the development of a long-term monitoring program in its all related fields seems to be essential. The Iranian National Institute for Oceanography and Atmospheric Science, in line with its missions has formulated a long-term monitoring program (applying advanced measurement and sampling equipment , specialized staffs in various oceanographic sciences, it's well-equipped laboratories and research vessel (Kavoshgar-e-Khalij-e-Fars) to study and monitor the biotic and abiotic factors in the Persian Gulf, the Strait of Hormuz and the Gulf of Oman in the field of oceanography. Regular studies in various fields including physical, chemical and biological oceanography, marine geology, satellite oceanography and atmospheric science are programmed in a specified monitoring network with a defined timetable.



Programmed sampling stations' map

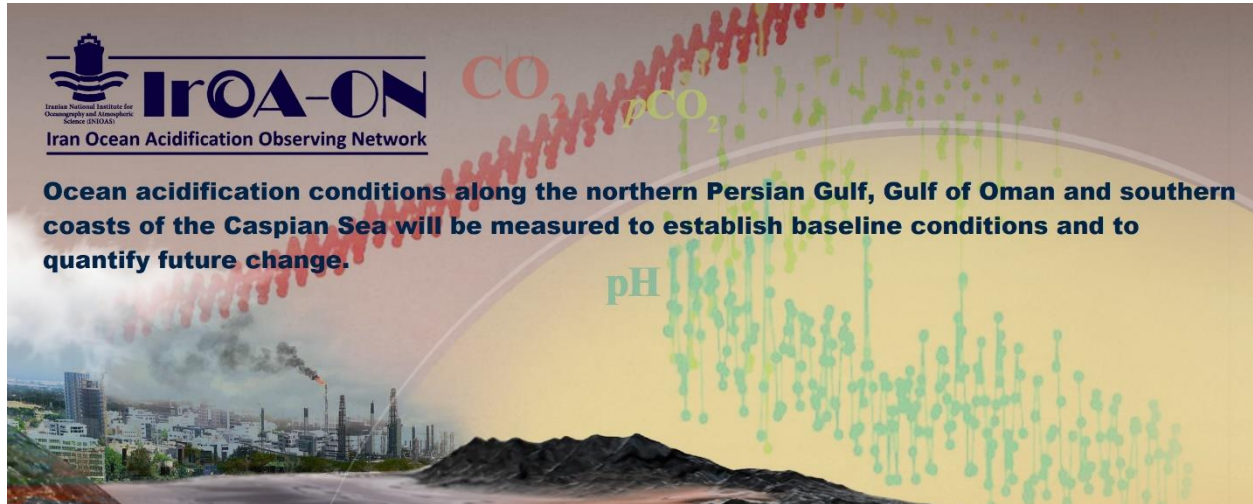


In the first phase of this program (2018-2019) due to insufficient understanding of physical, chemical and biological processes in this environment and lack of accurate knowledge of short term (monthly and inter-annual) changes in environmental characteristics, monitoring expeditions at selected stations in the Persian Gulf, the Strait of Hormuz and the Oman Sea was performed 4 times a year. Since the launch of the research vessel (Dec. 2017), according to the Persian Gulf and the Gulf of Oman Oceanographic Monitoring Program (PGGOOMP), six expeditions (PGE1801, PGE1802, PGE1803, PGE1804, PGE1901 and PGE1902) in the region were organized in different seasons of the year (Jan 2018, May 2018, September 2018, December 2018, May 2019 and Nov 2019).





Iran Ocean Acidification Observing Network



Introduction

When carbon dioxide (CO_2) is absorbed by seawater, chemical reactions occur that reduce seawater pH, carbonate ion concentration, and saturation states of biologically important calcium carbonate minerals. Land practices, such as high nutrient run-off, can also impact the acidity of coastal waters. Studies have shown that lower environmental calcium carbonate saturation states can have a dramatic effect on some calcifying species, including oysters, clams, sea urchins, shallow water corals, deep sea corals, and calcareous plankton. Researchers in the Iranian National Institute for Oceanography and Atmospheric Science have been measuring ocean carbon chemistry in the waters in some coral sites in the Persian Gulf since 2012 (Saleh et al. 2020). There is a considerable seasonal and interannual variability, however the long-term trend should be a gradual increase in acidity (Saleh 2020), in line with what is being observed at other places around the world. However, we do not know much about other Iranian marine locations, particularly coastal regions.

The aim

The IrOA-ON will be a network of coastal sites at the north and south of the country. For the beginning, we have started with 4 coastal sites including: northern coast of the Gulf of Oman (Gulf of Oman and Indian Ocean Center- Chabahar), north of the



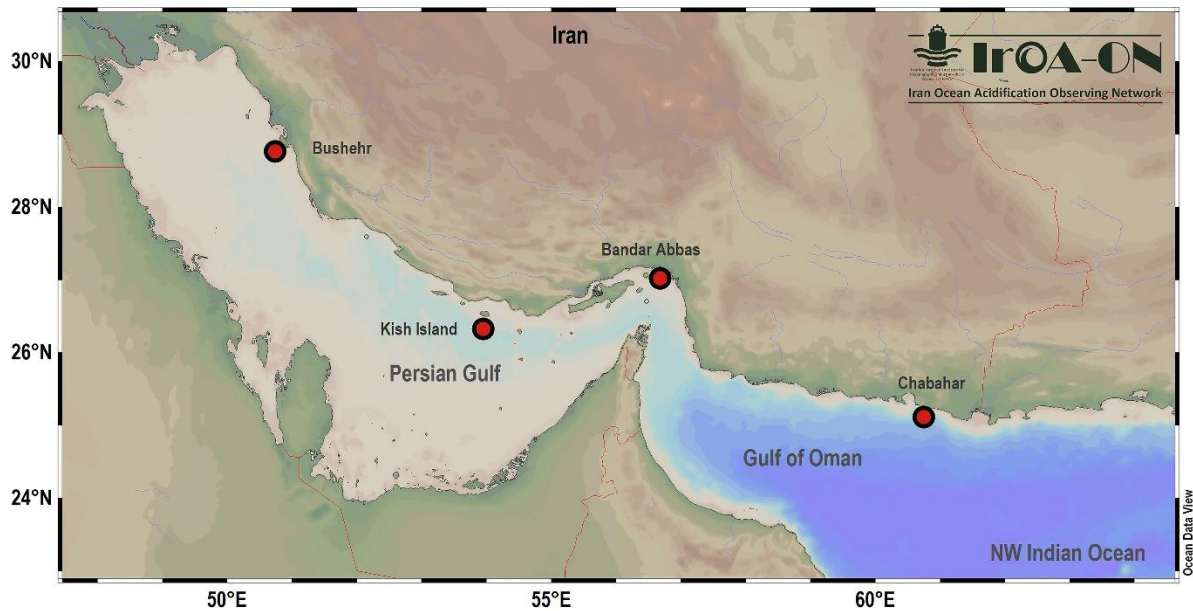
Strait of Hormuz (Persian Gulf Oceanography Center- Bandar Abbas), Kish Island (Kish Free Zone Organization - Department of Environment) and northern coasts of the Persian Gulf (Persian Gulf Oceanography Center- Bushehr) (Fig. 1). Data will be used to determine local conditions, and to provide a baseline against which to measure future change. This network has been registered in the Global Ocean Acidification Observing Network (GOA-ON) portal

The data of the IrOA-ON will be deposited on the Iranian National Centre for Ocean Data (INCOD) portal.

The activity of IrOA-ON is one of the main activities in the "Iranian Coastal Monitoring Program (ICMP)", one of the major programs of the National Institute for Oceanography and Atmospheric Science of Iran.

Sampling Partners

Sampling partners will collect the water samples, possibly as part of existing monitoring programs, and will have access to the data to help them with their own management strategies. Sampling partners will be scientists from INIOAS and other marine institutes as well as local volunteers.



Current IrOA-ON Sampling sites

Method Overview

- Water samples should be taken every two weeks at each site (in duplicate) (see Figure 1 for the sampling sites) by the sampling partners (Table 1), then the full crates (including 8 samples) are returned (every two months) to INIOAS' Marine Chemistry Lab in Tehran for analysis of acidity parameters and to Caspian Sea Oceanography Center- Nowshahr Chemistry Lab for nutrients analysis.



Sampling packs of IrOA-ON

- IrOA provides sampling partners with bottles, crates, chemically resistant gloves and training (including health and safety information) (Fig. 2). The actual sampling isn't difficult, however sampling partners are required to use a droplet bottle to add a couple of drops of mercuric chloride (which is toxic) into the full sample bottles, so that the seawater is 'preserved' until it gets to the lab.
- Data will be deposited in INCOD and available on request.

2. "Ports and Maritime Organization"

At early 90's, Ports and Maritime Organization of Iran has launched various research projects in the field of marine parameters monitoring and modeling in order to satisfy the need of having a comprehensive database as an authorized organization.

Using mathematical simulation for hydrodynamic phenomenon, sedimentation and hydrography along with equipping ports and coastal area with site measurement systems (permanent and temporary) were the main parts of this process, which are explained in details in the following paragraphs.



a) Marine Parameters Database:

1. Wave buoys: a significant number of wave buoys were installed at Caspian Sea, Persian Gulf and Oman Sea in order to measure meteorology (wind velocity and direction, temperature, relative humidity, and air pressure) and oceanography (wave, salinity and water temperature) data.
2. Water level flocculation: a number of stations were utilized to measure tide variation at northern and southern ports.

b) Iranian Sea Wave Modeling (ISWM):

In this research Iranian sea waves for duration of 12 years were modeled using Mike 21. The wave rose were derived from wind data (simulated by ECMWF).

c) Monitoring and Modeling of Iranian Coasts:

Sustainable developments in accordance with political, economic and social goals are going to be the final achievements of this plan.

The main objectives of this project are as follows:

1. Gathering hydrodynamic and morphological data to be used in the integrated coastal zone management plan of the Iran (ICZM), the Iranian commercial ports master plan, tourism along the coasts, discern of codes and standards of marine construction, and coastal land use.
2. Observing the existing problems in studied coastal areas and provision of engineering solutions to solve these problems.
3. Achieving a reliable source of information to be used in studying and designing coastal and offshore structures in the studied regions.
4. Completing the comprehensive plan of the optimized network of marine parameters measured in the northern and southern waters.



d) PMO Dynamics:

Persian Model for Ocean Dynamics is an Iranian numerical model developed for coastal engineering studies by Iranian experts. The growing need to a coastal engineering software and dealing with difficulties such as lack of technical knowledge transfer, and considering the need to a valid native numerical model, the Ports & Maritime Organization (PMO) decided to invest in development of this model.

This model is applicable in various fields of coastal engineering. It can simulate in tidal currents, wind-driven currents, Coriolis induced currents, currents in large scale environments (oceans), wave-generated currents. Also, this model can be applied for large and small scale wave generation and wave propagation simulations, coastal morphology, sediment transportation and finally tidal analysis and tidal parameters extraction.