



World Meteorological Organization

Weather • Climate • Water

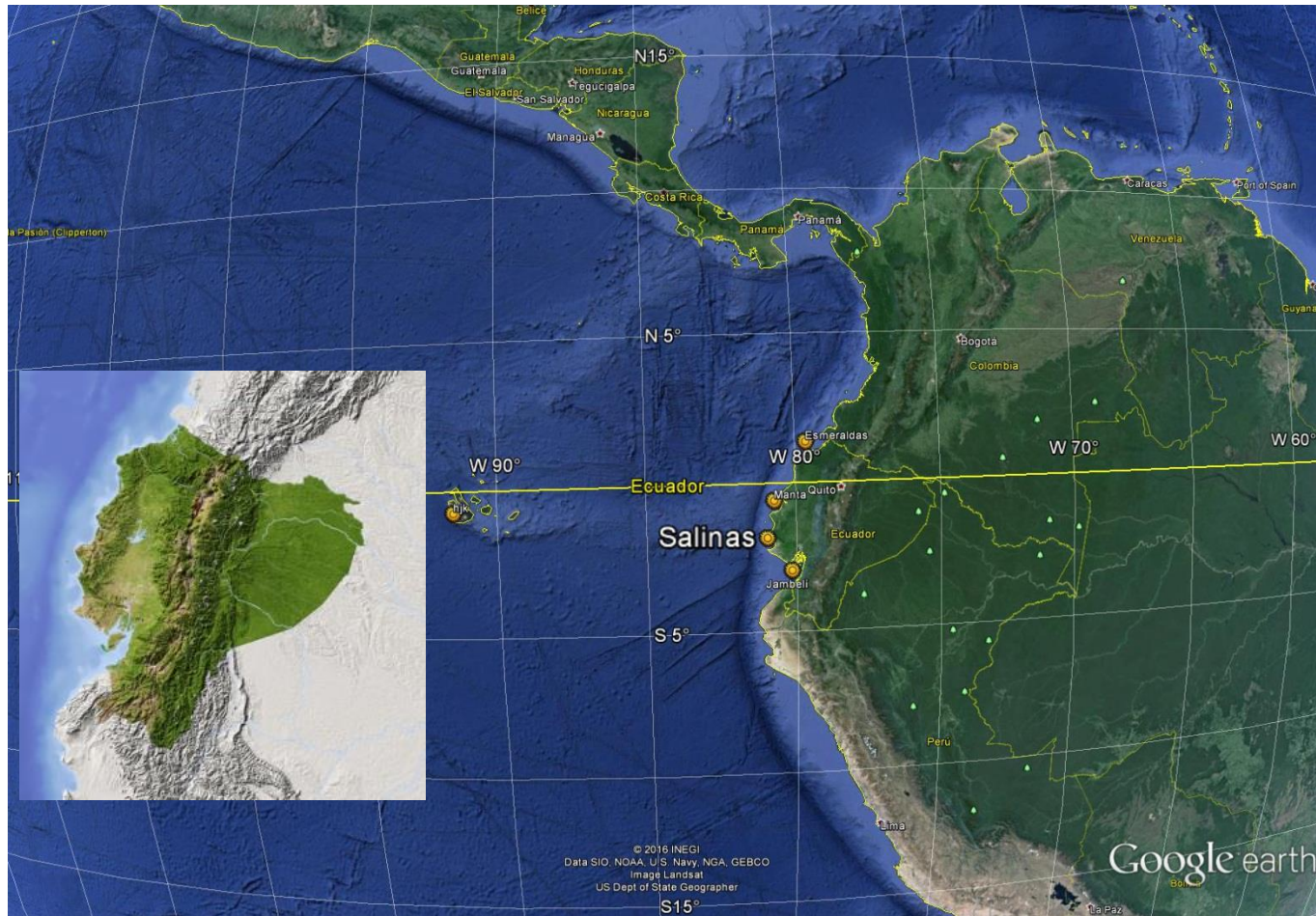
WIGOS/JCOMM Technical Exchange Workshop on Marine Instrumentation for the Regional Association IV

Gulf Coast, Mississippi, USA 29 Febrero-2 Marzo 2015

NATIONAL PERSPECTIVE ON OCEAN OBSERVING SYSTEMS IMPLEMENTATION (Guayaquil-Ecuador)

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INOCAR*

ECUADOR LOCATION



Ecuador is located on the northwest coast of South America. Its length of the coastline is about 640 km., without Galapagos island.

MAIN REQUIREMENTS FOR OCEAN DATA IN THE COUNTRY

Waves:

- Operational forecasting of marine conditions in coastal areas and Galapagos island
- Studies of coastal erosion, navigation and tourism industry, rip currents, and extreme events.
- Potential energetic of this resource.
- Validation of wave models

Marine currents

- Operational report in case of accidents or lost boats.
- Research about local circulation.

TSM

To study El Niño-La Niña event.

Support of research of weather and climate and interannual variability (El Niño)

Marine Biodiversity

Marine nutrients

The users are INOCAR's researchers, universities and private companies.

Users require data in different levels of processing

INOCAR: OCEANOGRAPHIC NAVY INSTITUTE

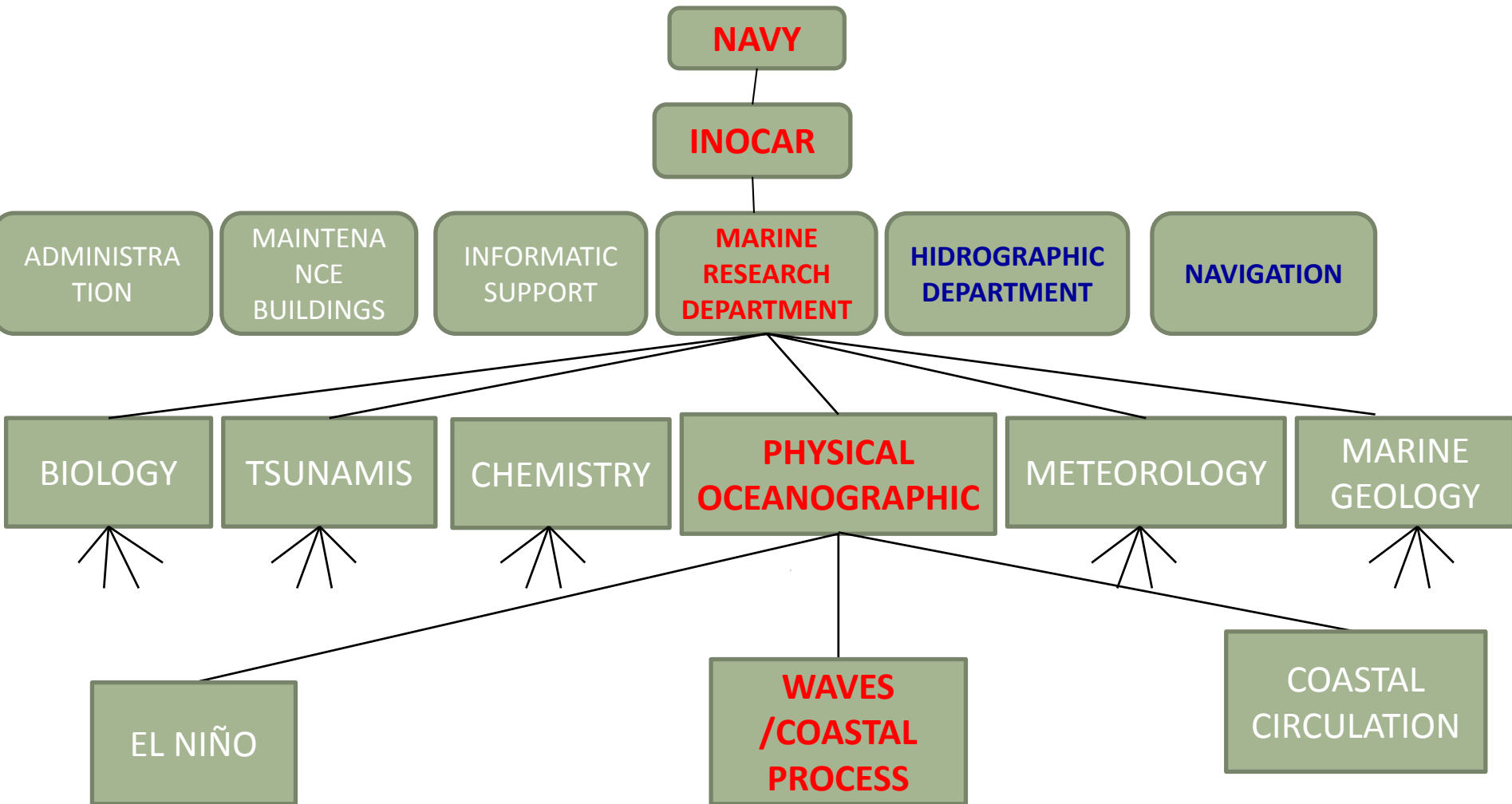
MISSION

Planning, leading and control of technical and administrative activities related with Hydrographic Service, Navigation, Oceanography, Meteorology, Marine Sciences and Nautical signage.

MAIN ACTIVITIES

- Perform and control all explorations and oceanographic, geophysics and environment marine research
- Elaborate national navigation charts.
- In charge of building, management, control and maintenance of lighthouses, buoys and beacons on the coasts for safe navigation.
- **Be the official technical and permanent governmental institute, representing officially in all related to oceanographic, hydrographic, navigation and navigational aids research**

INOCAR - ORGANIZACIÓN



WAVES /COASTAL PROCESS

PRODUCTS

**FORECAST
BOLLETIN:
TWICE A WEEK**

**CONDITIONS
BULLEIN:
ONCE PER
WEEK**

**DAYLY REPORT
FOR SAILORS**

BUOYS
OPERATION



REVIEW
OUTPUT OF
WAVE
MODEL



WAVE DATA
MANAGMENT:

BUOYS DATA
ANOTHER
EQUIPMENTS

HISTORIC AND
CURRENT DATA



TECHNICAL
DOCUMENTS
ABOUT
WAVES



ADMINISTRATIVE PROCESS RELATED WITH WAVES:

PURCHASES, ACCIDENT REPORTS FOR INSURANCE COMPANY, FILL FORMATS TO PROVIDE DATA, OPERATIONAL REPORTS TO SEND EQUIPMENTS FOR CALIBRATION, ETC.

WORKING WITH BUOYS

- INOCAR installed four bouys along the coastal zone since september 2014.
- Always the installation was on depths lower than 40 m.
- Three of them were lower than 2 miles of coast
- The trasnmission of data was by satellite or GPRS.
- There were activated an warning system to alarm off position.
- The data was stored in a virtual repository.
- Every three months the buoys were cleaned and cheked.
- At least once of buoys have a year installed.



WORKING WITH BUOYS

- All the buoys we've installed had accidents because of collision with vessel and vandalism.
- We have problems with the intensive fishing and navigation
- After the accidents: one of the buoys was never recovered, another was seriously damaged, two have to return to provider to check. Just one is ready to be installed again.
- The mooring systems were never recovered and It has been very difficult to install again the buoys.
- **Currently we don't have any wave buoy installed**

TAB02442
Salinas 1



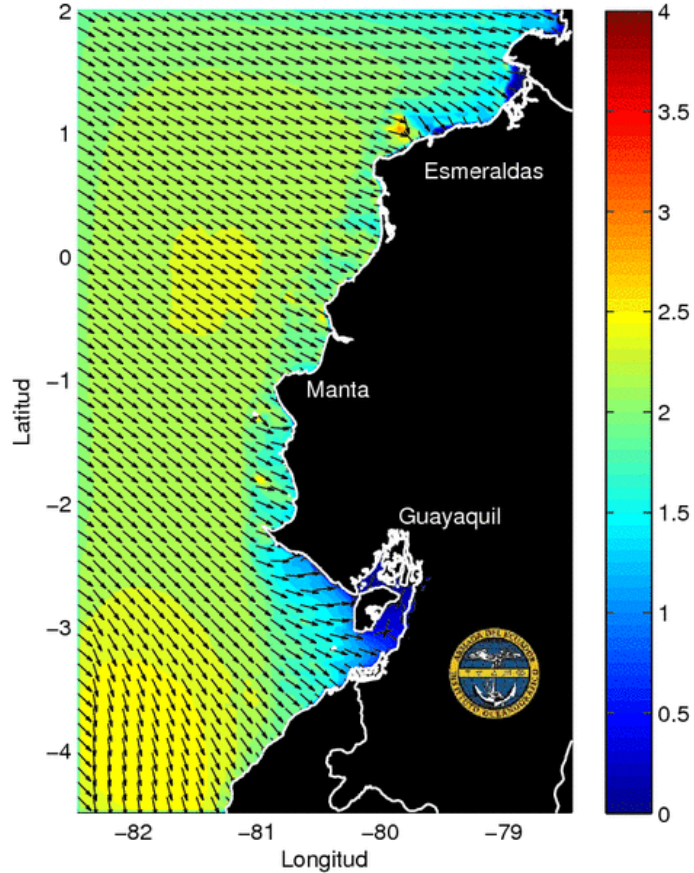
TAB02602
Salinas 2



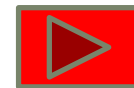
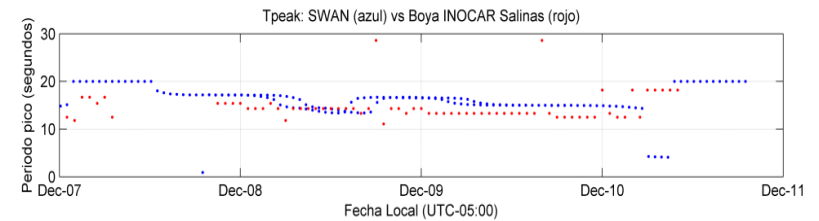
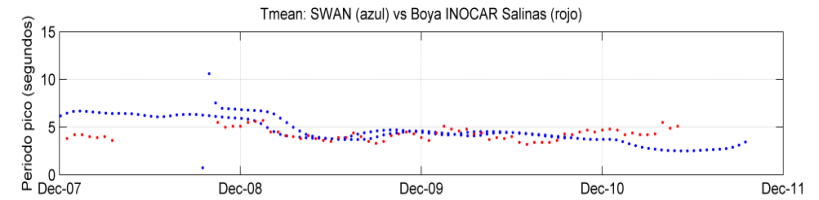
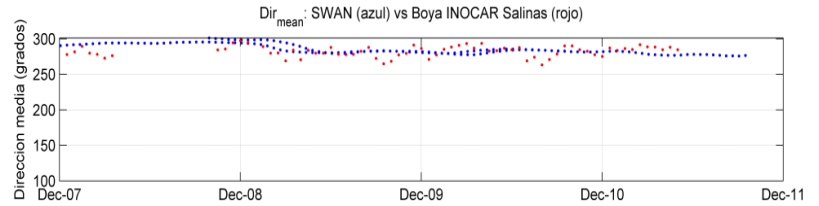
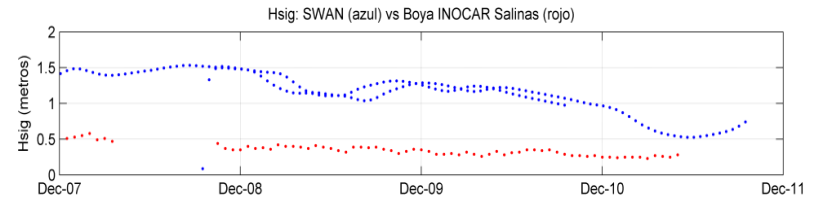
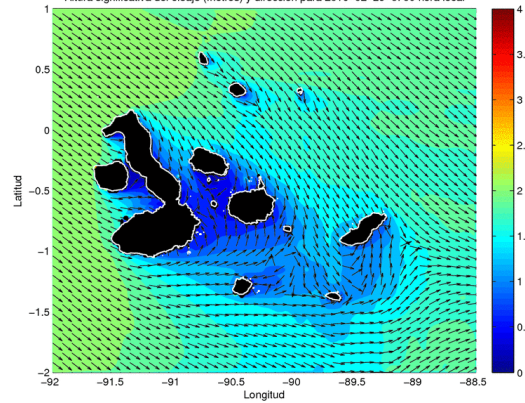
OPERATIONAL WAVE MODEL

Modelo Operacional INOCAR-SWAN: Grilla de Ecuador

Altura significativa del oleaje (metros) y direccion para 2016-02-29-0700 hora local



Modelo Operacional INOCAR-SWAN: Grilla de Galapagos
Altura significativa del oleaje (metros) y direccion para 2016-02-29-0700 hora local



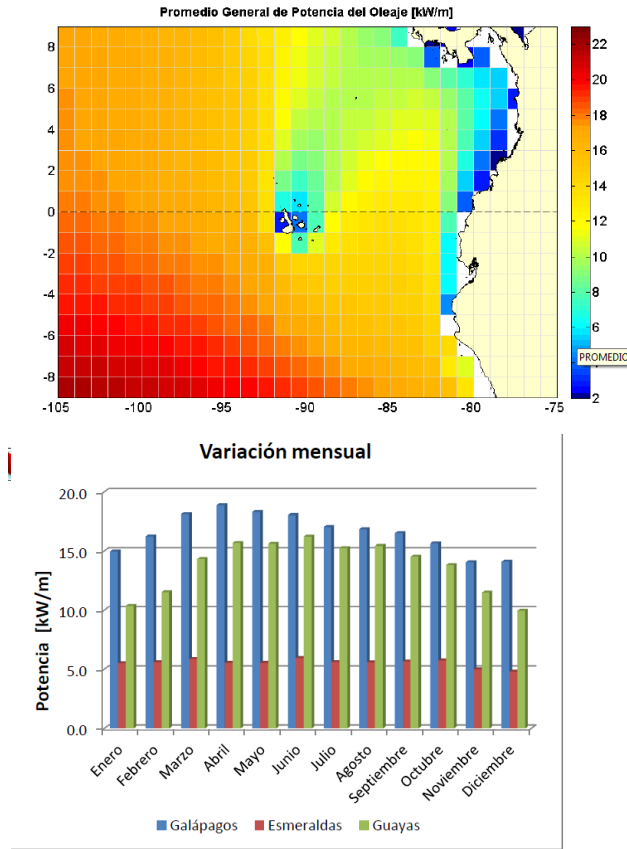
WAVE DATA

1. Buoy data is transferred by telemetry
2. Data is stored in a virtual server
3. Data is transferred to a temporal repository
4. The access to data is restricted for group which work with data.
5. The data has no quality control
6. If external users request data, outliers are eliminated before to give them.
7. A new repository is in progress, but it has had problems with uploading wave data automatically.
8. Historic data has started to be uploaded to the repository too.



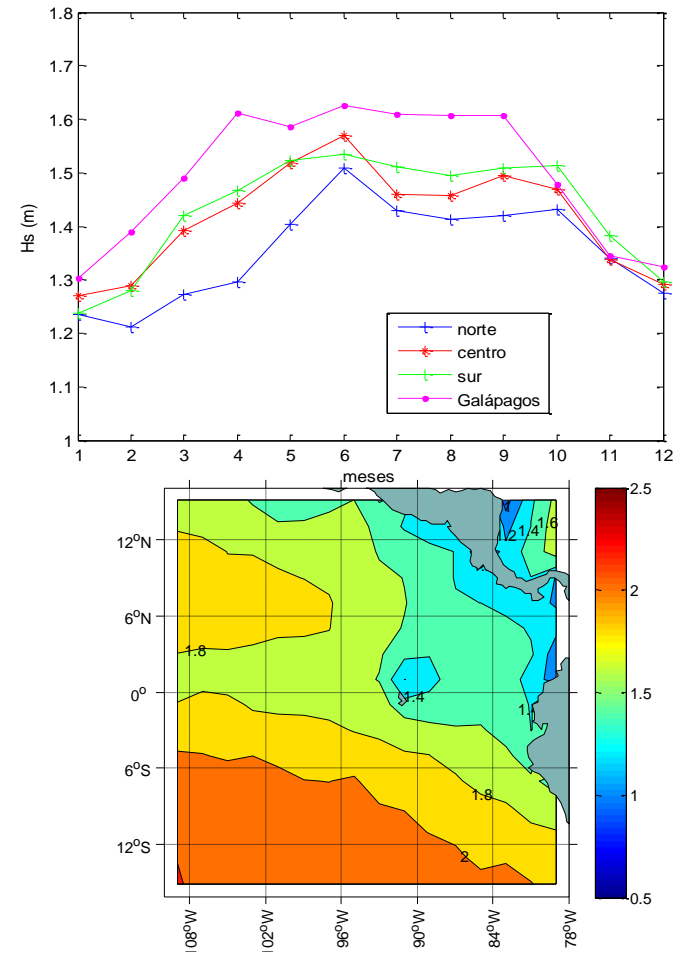
TECHNICAL DOCUMENTS

THE ENERGY OF WAVES



Variaciones mensuales de potencia de oleaje para puntos específicos

CLIMATOLOGY WITH SATELLITE DATA



IN PROGRESS:

IDENTIFICATION OF SWELL AND SEA WAVES USING DATA BUOYS

WAVE RESONANCE IN SANTA ROSA



IDENTIFIED GAPS

- The group working in waves is not enough.
- Lack of technical experience in maintenance and repair of buoys and communication. Total foreign dependence in maintenance and reparation of buoys.
- The administrative process to send a buoy to the provider could take a year or more if there isn't enough money.
- Problems working with data, deficient knowledgment or Quality Control application
- It is difficult to set comparison with real data, because there is no buoys at equatorial zone.
- To improve the buoys system it is required an increase in budgetary expenditure and manpower, but we can't.

ADDRESSING THE GAPS:

- **Instrument/Platform handling & deployment ship time:** INOCAR as part of Army has the opportunity to use big boats for coastal and research vessels for shelf/open ocean.
- **Financial/budget:** It is very difficult to keep on the observational system.
- **Staff:** A continuous self training and willpower is essential to keep the system.
- **Purchase of instruments:** In this year maybe will purchase one (We will try to acquire one with the money of insurance devolution)

ADDRESSING THE GAPS:

- **Data collection:** Direct transmission and data immediately available through satellite or GPRS each hour and stored in computers in the ground station
- **Data processing and QC:** An oceanographer in INOCAR and users also provide different levels of quality control.
- **Data exchange:** No data exchange.
- **Data use, products & services:** Research, students, wave data.
- **Storage:** At the INOCAR facilities

INTERINSTITUTIONAL RELATIONS

- ERFEN**: Regional Association to study El Niño with Colombia, Ecuador, Perú and Chile. Trough CPPS (Permanent Commission of South Pacific) issue a monthly named BAC ([Warning Climate Bulletin](#)) about the oceanic and atmospheric conditions related to El Niño.
- INOCAR-GRASP** (GOOS Regional Alliance for the South-East Pacific region)
INOCAR has been one of the Ecuadorian National Entities pioneers in the process of creation and establishment of the GOOS Regional Alliance for the South Pacific - GRASP. Actually INOCAR is the main Ecuadorian institution working in the local organization of the IV Global Forum of GOOS.
- INOCAR-SCOR**: Has a national member. Now we are trying to get capacitation by means of Visiting of experts i oceanography.
- SCRIPT-WOODS HOLE OCEANOGRAPHIC INSTITUTION**: Together with INOCAR have launched glidders to study the sea between continental coast and Galápagos.
- PTWC**: INOCAR is part of this group

Proposals and Recommendations

- To Establish cooperation agreements with international organizations for wave buoys donations. The INOCAR commitment will be maintenance costs and data interchange.
- To establish relationships with organizations who could cooperate with us in free training.
- To Establish a new deployment arrange to minimize the collisions.
- To request by training building on interpretation and quality management to of data for whom operate the buoys.
- Increase the national monitoring network, including to Galapagos island.
- Enhancement Program to improve the data storage.
- To maintain the program of measurement on quasi real time.
- To investigate about the implementation of ISO to data buoys.
- To associate with local or foreign universities to investigate about buoys technology.
- It is very difficult for the government to allocate funds for research, but we are willing to sign cooperation agreements with another countries.



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THANK YOU!!!

