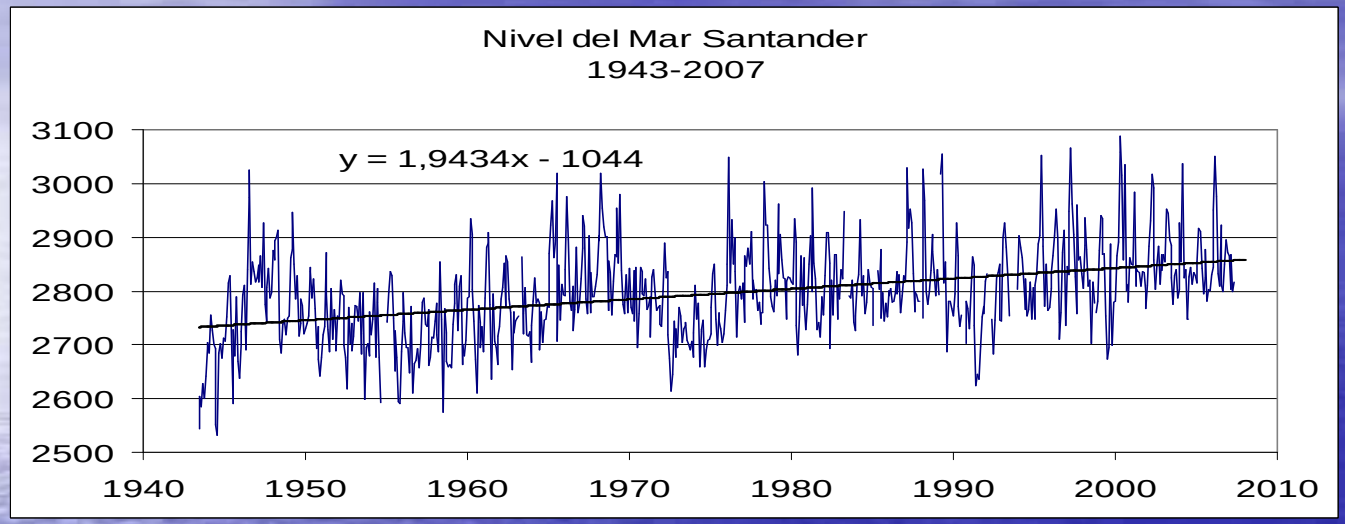
Observing systems at Spain

Alicia Lavín

Instituto Español de Oceanografía
Centro Oceanográfico de Santander

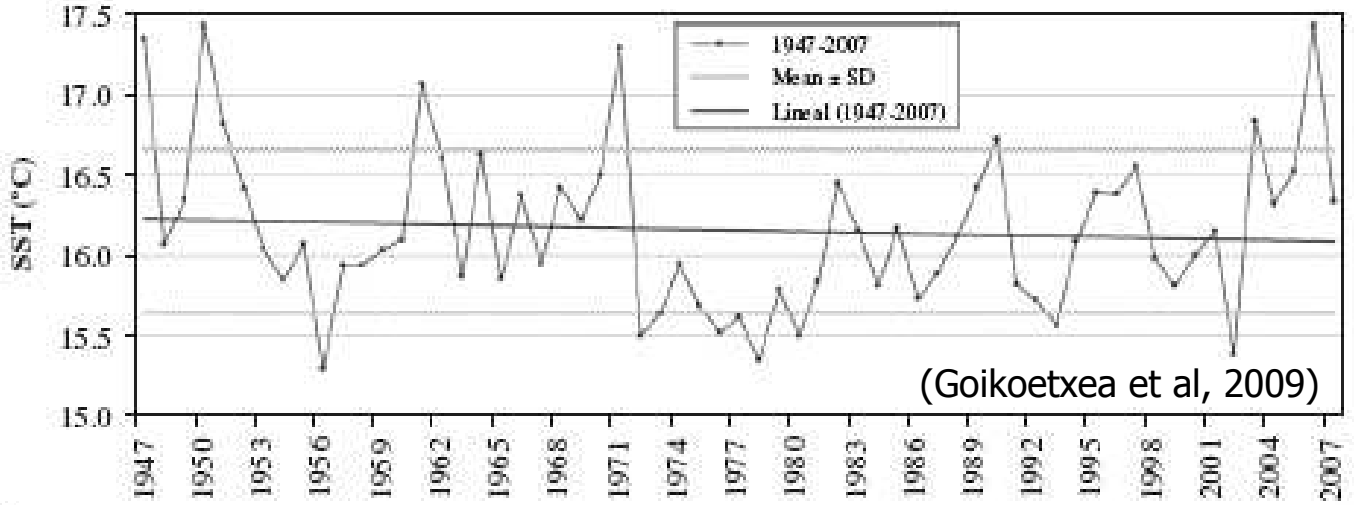
European Maritime Day
Gijón May 19, 2010

Historic time series: sea level and SST



Santander 1886

San Sebastian 1908



(Goikoetxea et al, 2009)

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IEO: The Radiales Program

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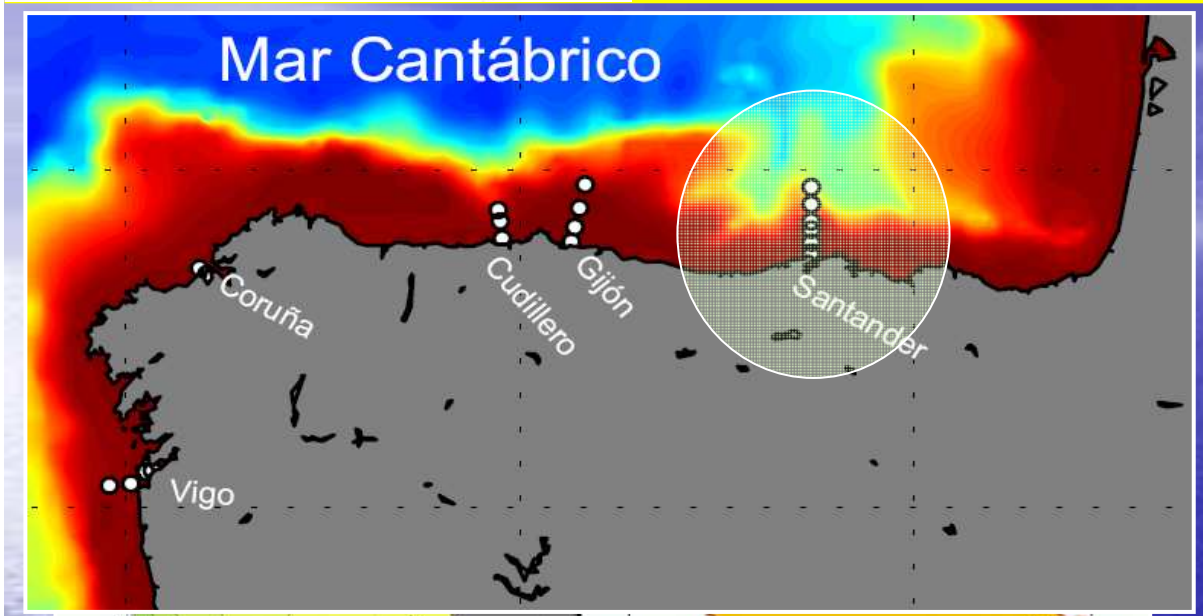

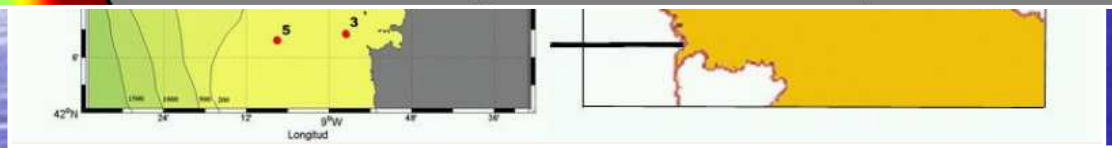

Scientific origin, late 80`s

Systematic sampling (hydrographical and biological) in 8 standard sections around Spanish waters.

Monthly sampling in the Galician-Cantabrian area.

Santander Section. 7 stations, 1 in the shelf break, two over the deep ocean (2400 and 2800)

http://www.seriestemporales-ieo.net/

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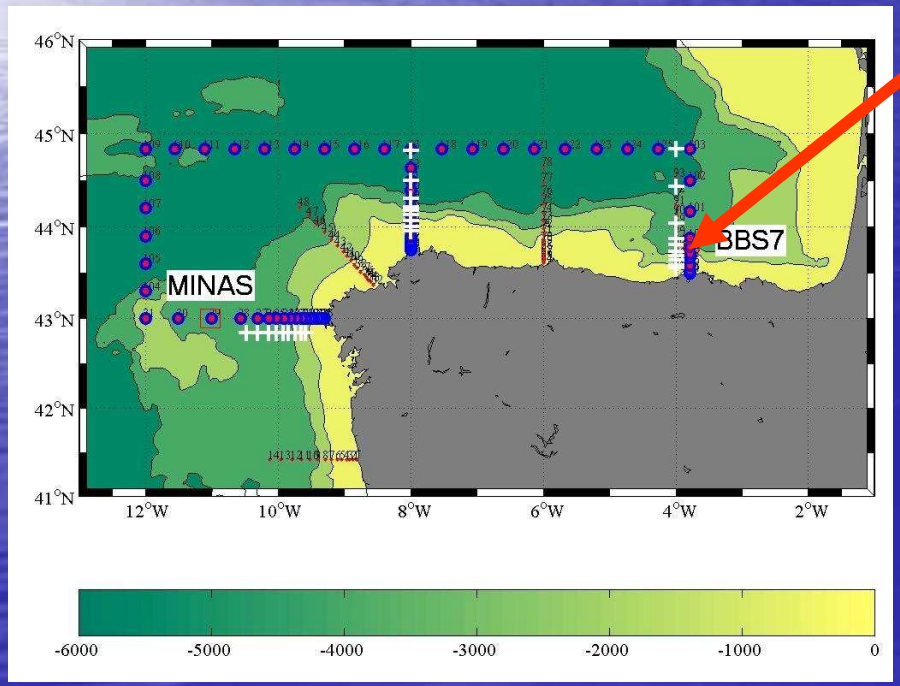
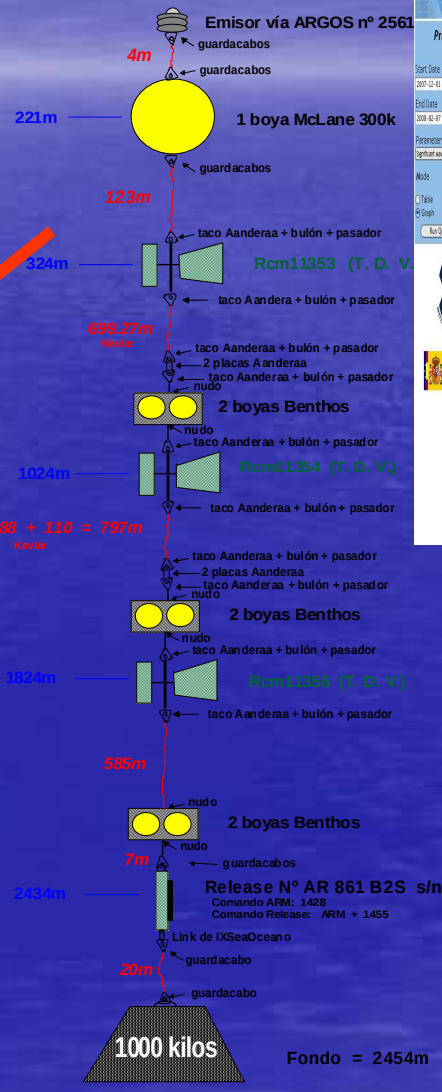
Climatic Variability on Eastern North Atlantic waters CO/VACLAN project: Repeated Deep Standard Sections

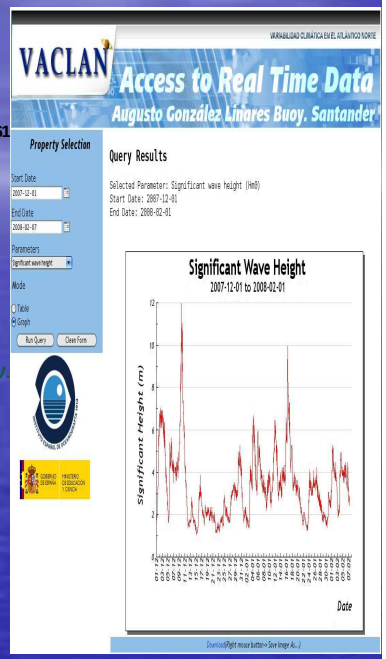
RAPROF0208 cruises since 2003, twice a year

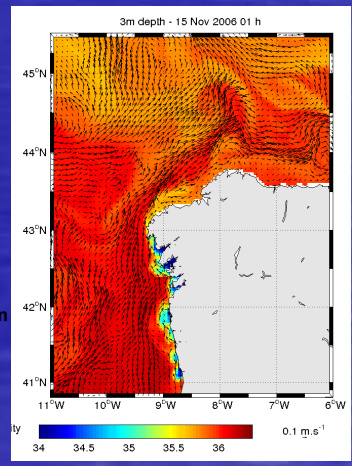
Uncalibrated CTD data sent to Coriolis,



INSTITUTO ESPAÑOL DE OCEANOGRAFÍA







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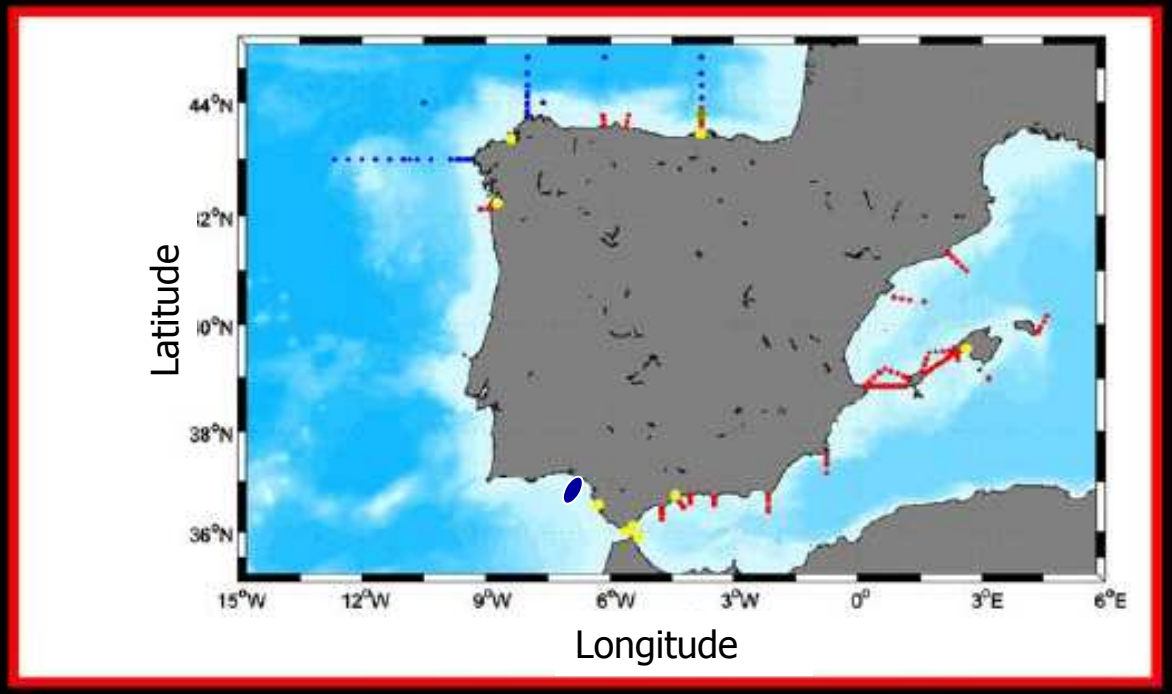
IEO Observing System



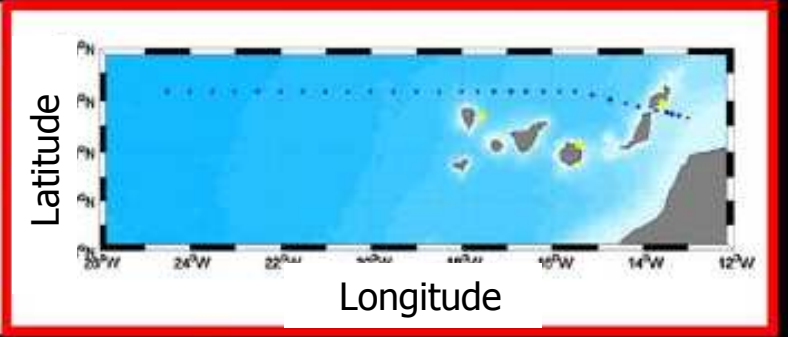
Monthly or term st.

Semestral Stations

Oceanographic buoy

Current meter. mooring

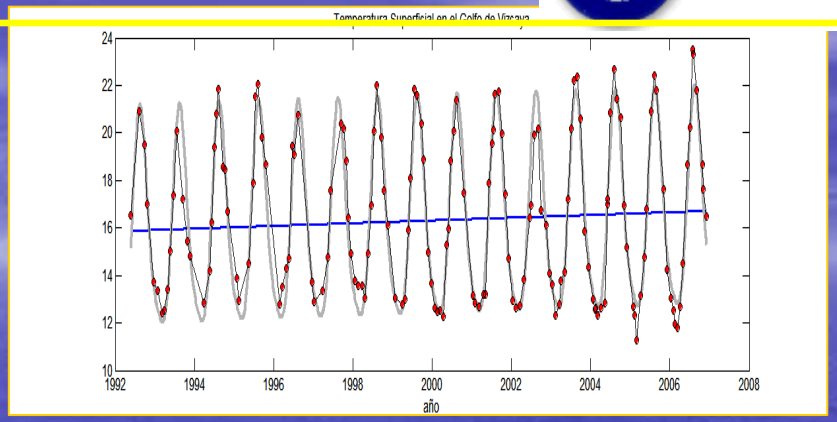
Tide gauges net

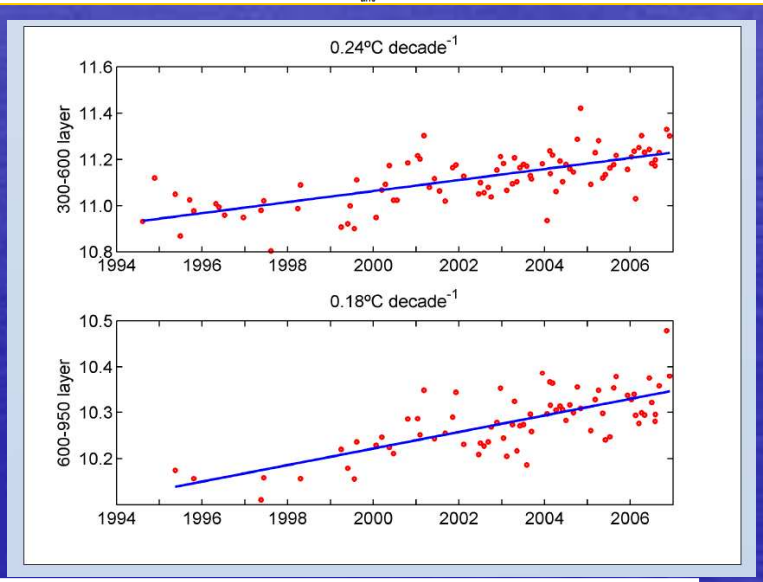


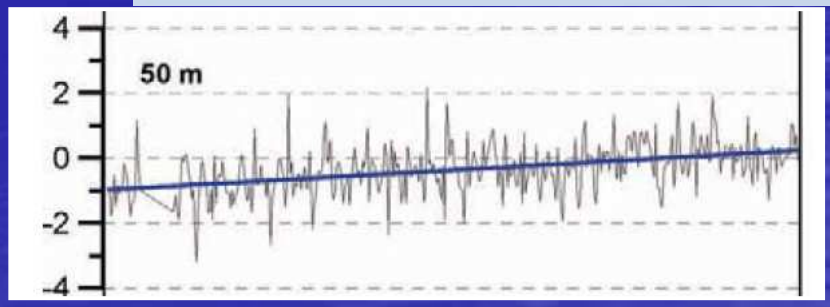
IEO: Monitoring Program

Warming at the Bay of Biscay and Mediterranean Sea

From the IEO monitoring, Increase in temperature in surface waters are around 0.5ºC dec^{-1}



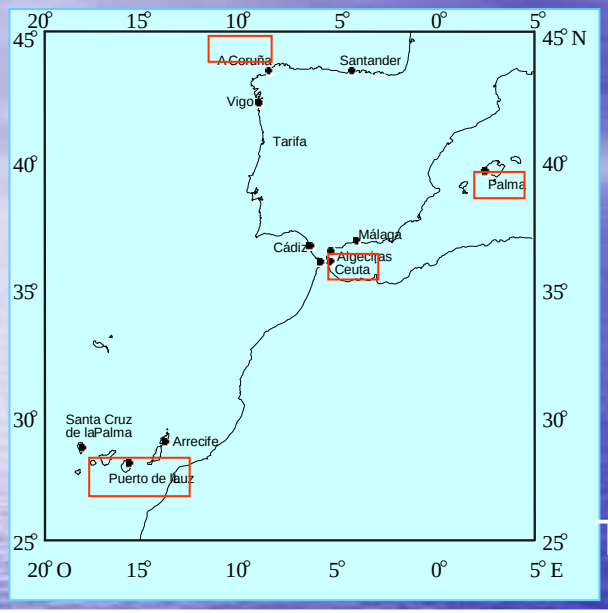


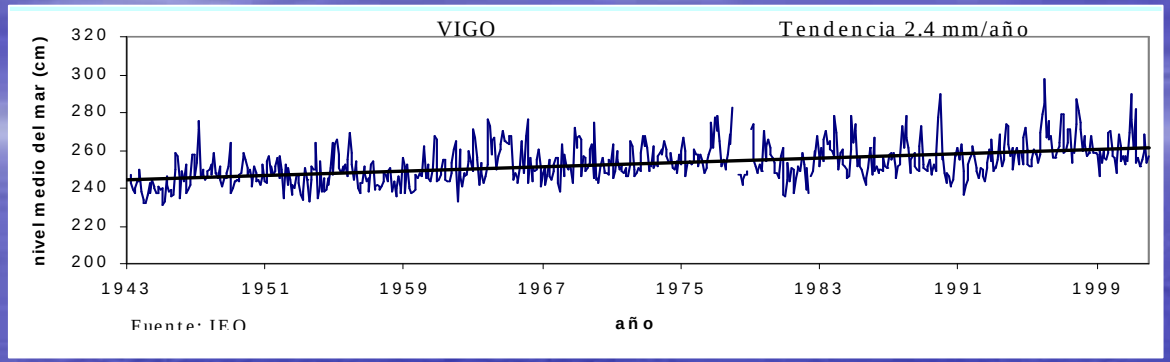


Deep water ~0.2ºC dec-1

Mediterranean ~0.1-0.5ºC dec^{-1}

IEO: Mareographs





Sea-level trend at Vigo from 1943: 2,4 mm/yr

Tsunami in Palma after the Algeria earthquake (may 2003

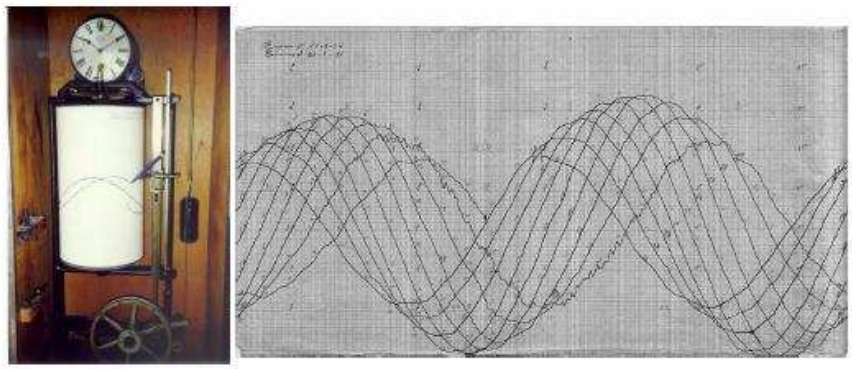
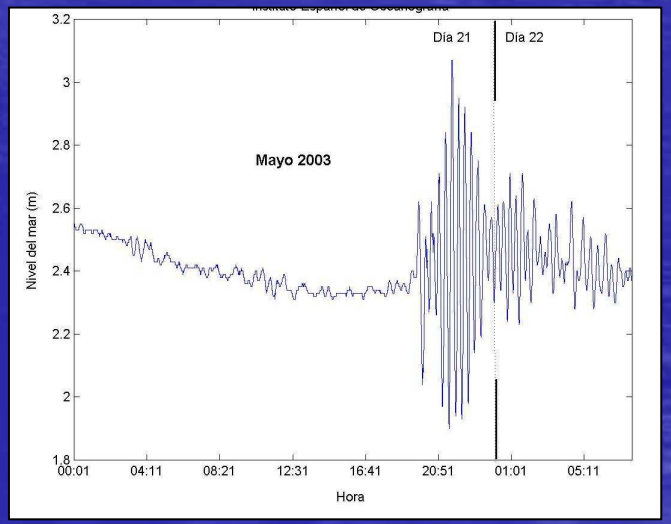


Fig 1.4. Mareógrafo histórico del IEO (Foto: Joaquín Molinero).

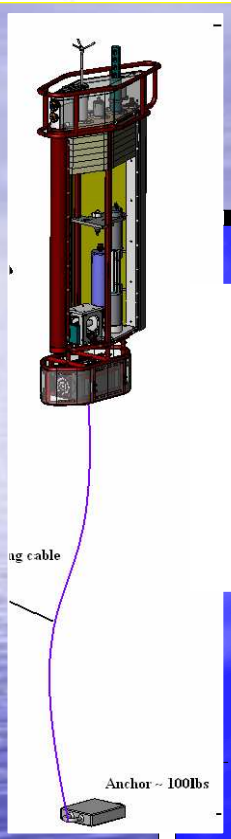
Fig. 1.5. Mareograma. Cádiz, 11-Ago-1954. (Archivo IEO).

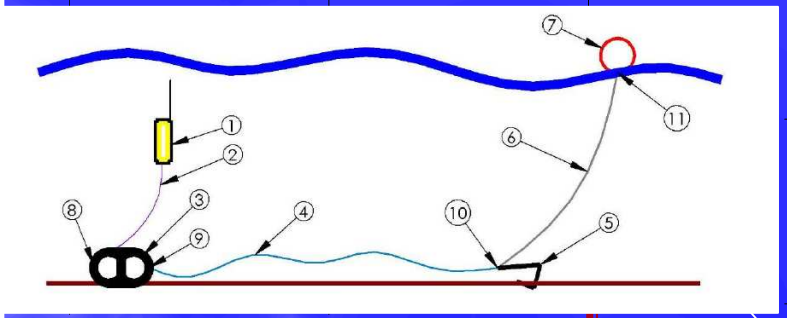


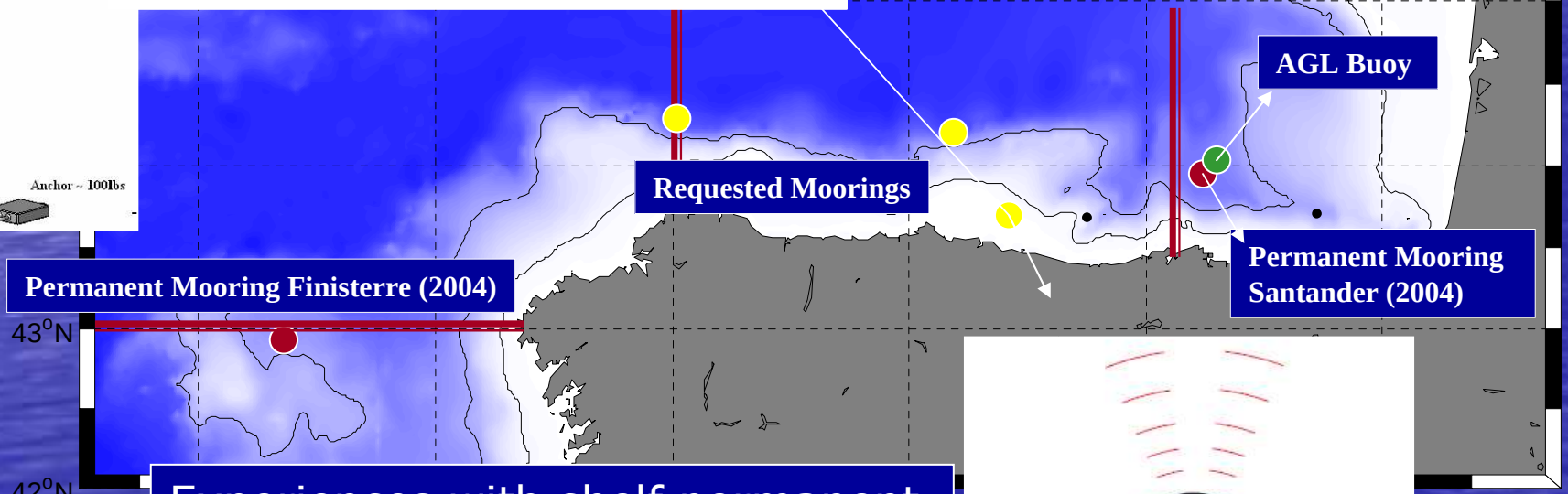
ESEAS-RI (European Sea Level Service-Research Infraestructure)

Other IEO monitoring programs

Oceano-meteorological buoy Augusto González de Linares. Moored in June 2007.







Experiences with shelf permanent monitoring equipments

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Deep Current meters permanent moorings

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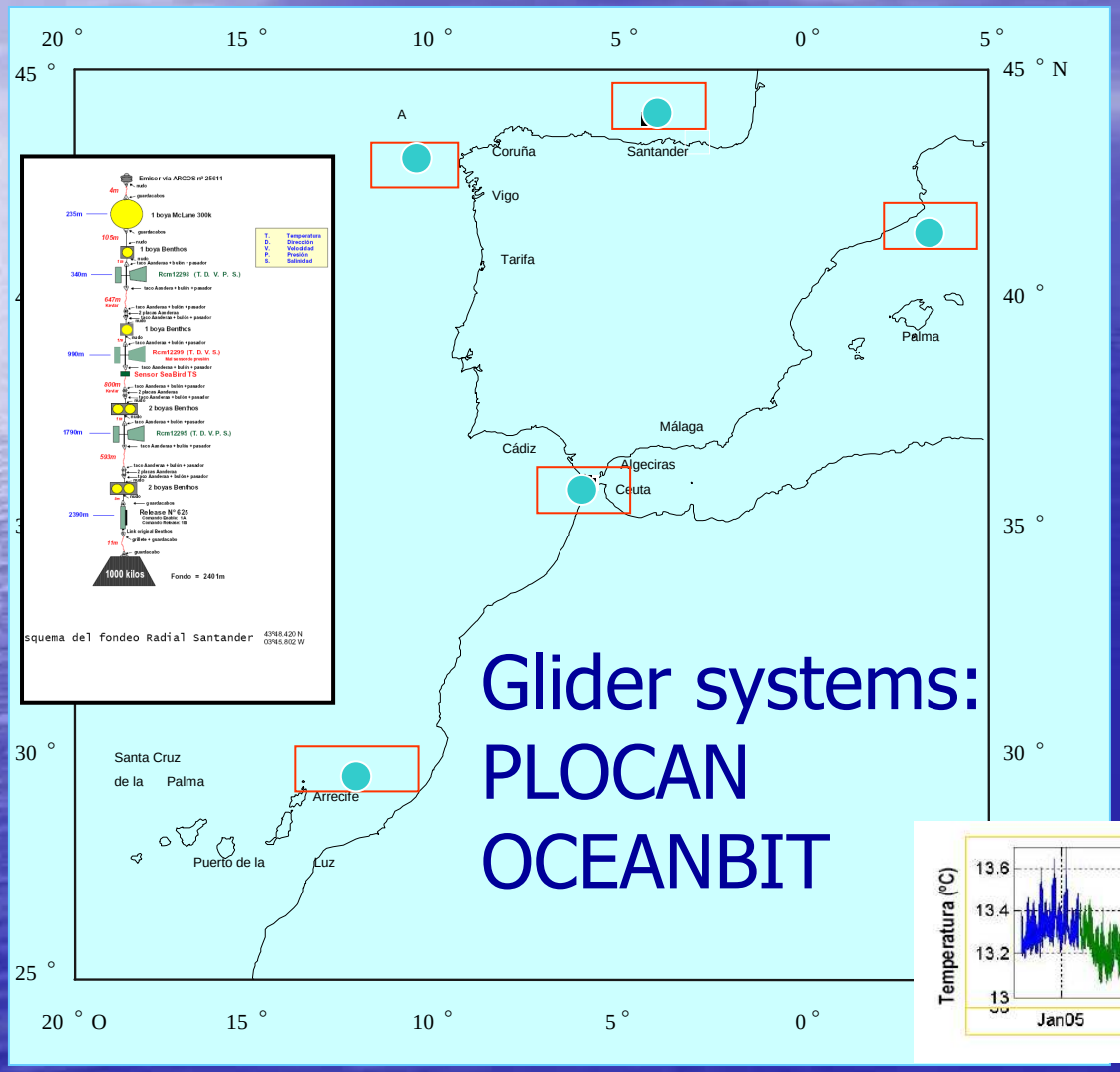
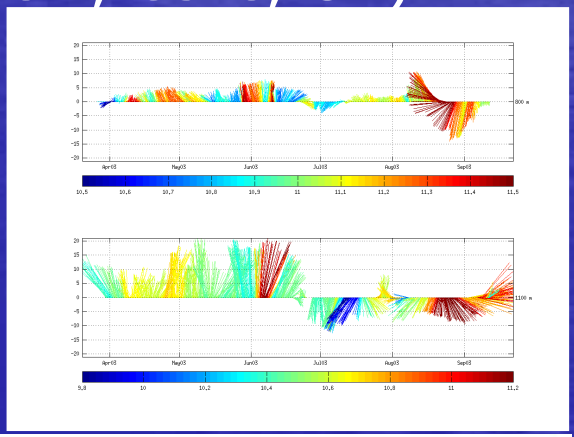
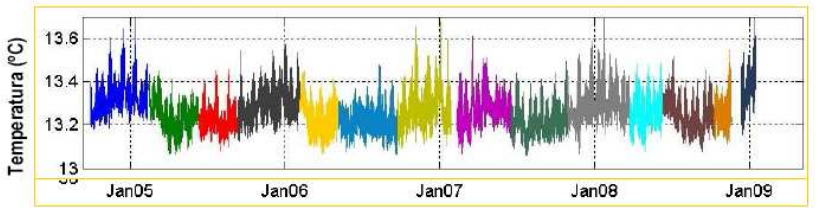
Bay of Biscay (IEO)
Finisterre (IEO)
Gibraltar (UMalaga/IEO)
Canary basin (IEO /ESTOC ICCM)
Blanes Canyon (ICM, CSIC, UB)







Strong necessity: Moorings over the shelf-break/slope !!

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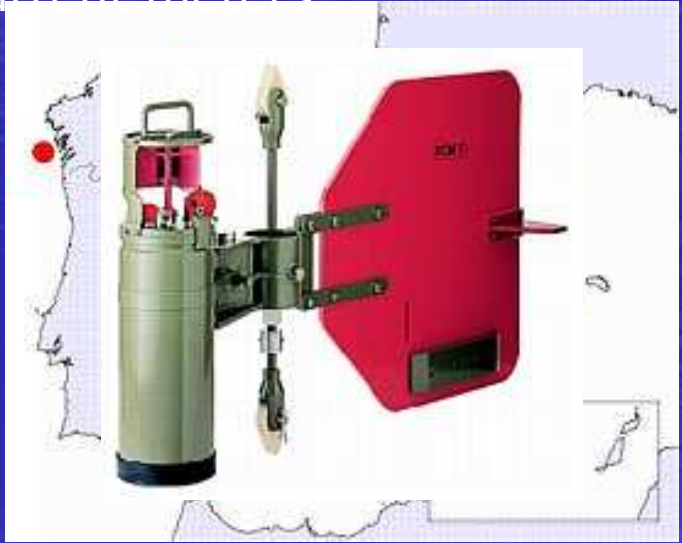
Puertos del Estado networks

Tide gauges

Coastal buoys

Deep Water buoys

Current meters



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Puertos del Estado networks

Real Time Data Access

Deep Sea Network | Coastal Network | Tide Gauge Network | RadarHF Demo | Propagations

Access to the latest data from every instrument

Simultaneous Data Table

Data Links by stations and sensors — how do I use the table?

	PreAtm	TempAir	VelVi	DirVi	VelCo	DirCor	TempAg	SalAg	Olas	Posic
Bilbao-Vizcaya	TG	TG	TGP	TGP	TG	TG	TG	TG	TGP	T
Santander-IEO (AGL)	TG	TG	TGP	TGP	TG	TG	TG	TG	TGP	T
Cabo de Peñas	TG	TG	TGP	TGP	TG	TG	TG	TG	TGP	T
Estaca de Bares	●	●	●	●	●	●	●	●	●	●
Villano-Sisargas	TG	TG	TGP	TGP	TG	TG	TG	TG	TGP	T
Cabo Silleiro	●	●	●	●	●	●	●	●	●	●
Golfo de Cádiz	TG	TG	TGP	TGP	TG	TG	TG	TG	TGP	T
Cabo de Gata	●	●	●	●	TG	TG	TG	TG	TGP	T
Cabo de Palos	TG	TG	TGP	●	TG	TG	TG	TG	TGP	T
Valencia	TG	TG	TGP	TGP	TG	TG	TG	TG	TGP	T
Tarragona	TG	TG	TGP	TGP	TG	TG	TG	TG	TGP	T
Cabo Begur	TG	TG	TGP	TGP	-	-	-	-	TGP	T
Dragonera	●	TG	TGP	TGP	TG	TG	TG	-	TGP	T
Mahón	TG	TG	●	TGP	-	-	-	-	TGP	T
Gran Canaria	TG	TG	TGP	TGP	TG	TG	TG	TG	TGP	T
Tenerife Sur	TG	TG	TGP	TGP	TG	TG	TG	TG	TGP	T

Sensors : ● correct; ● dubious; ● incorrect. **Data :** T ->table; G ->graphs; P ->forecast.

Data measurements displayed are collected in real time with a soft quality control, for this reason Puertos del Estado won't accept any responsability from the use of the data.

Doubts, comments and suggestions:

Puertos del Estado networks

Silleiro - Microsoft Internet Explorer

Archivo Edición Ver Favoritos Herramientas Ayuda

Variables description

Date: Measurement date (day/month)
Hour: Measurement time (GMT)
Hs: Sinificant wave height (m)
Tp: Peak wave period (s)
Dirp: Wave proced. direction (deg)
Tm: Mean wave period (s)

Angle convention

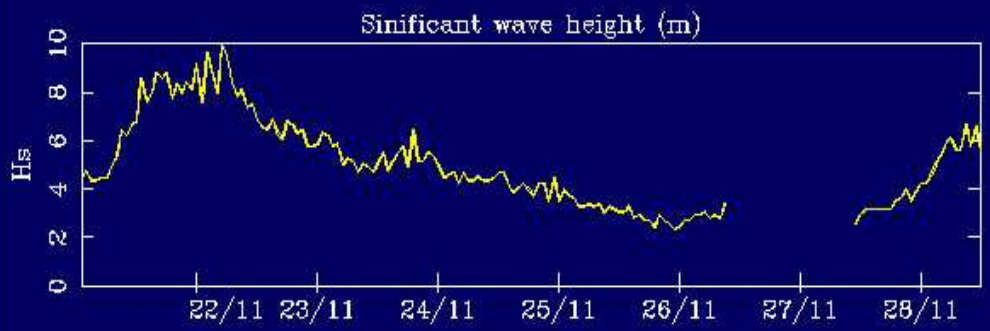
Other data from this instr.

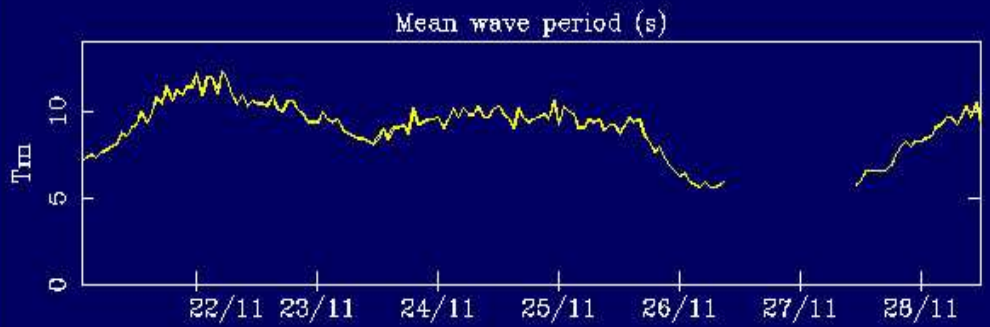
Oceanogr. Meteor.

This data in table format

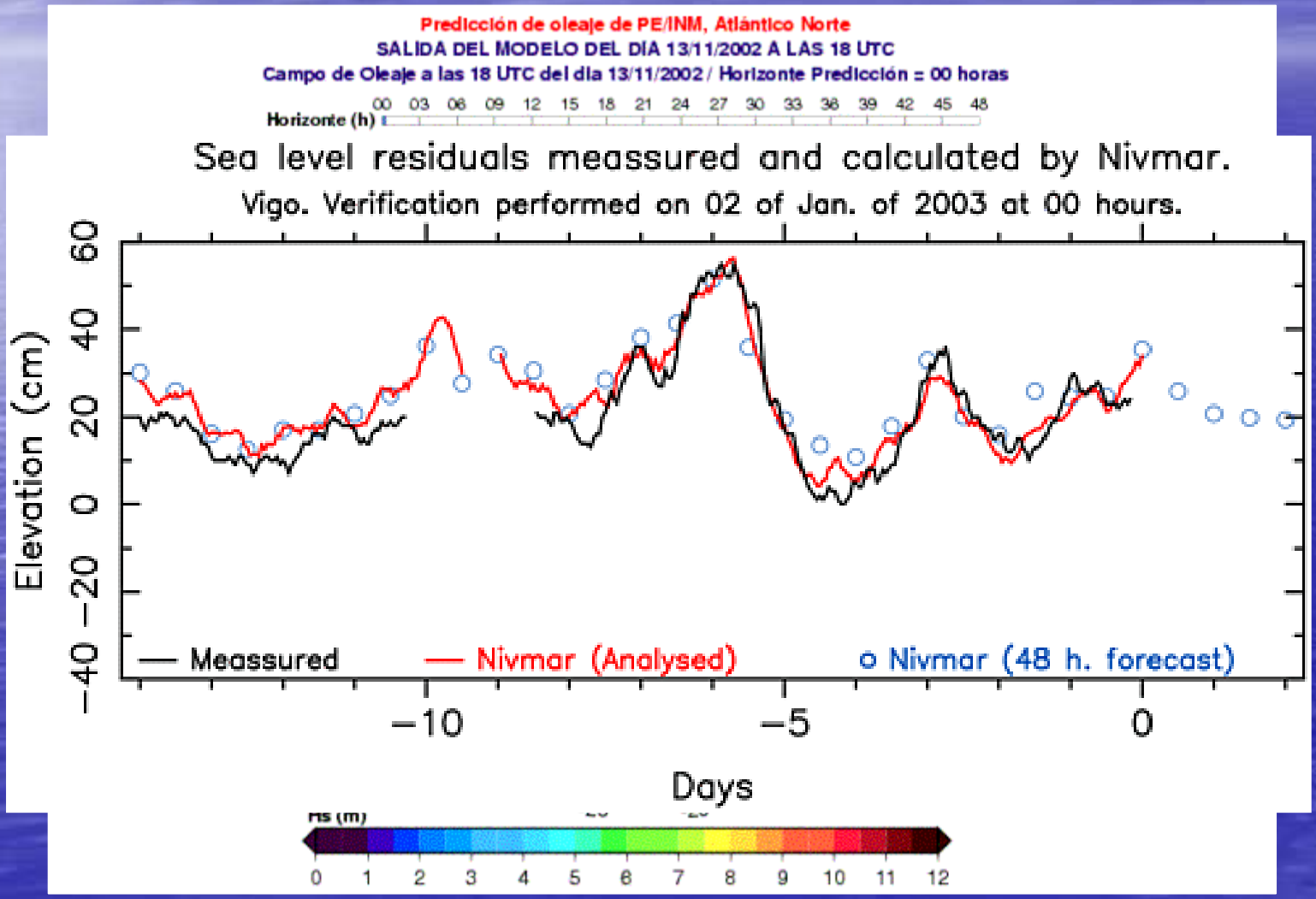
This data in table format

Data graphics





Puertos del Estado/AEMET wave and sea-level forecast



Puertos is participant in Mersea and MyOcean E.U. projects

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Puertos del Estado networks

Red aguas profundas | Red costera | Red correntímetros | Red mareógrafos | Red Radares AF

La tecnología Radar de Alta Frecuencia permite la monitorización remota en tiempo real de corrientes y oleaje en un área con rango entre centenas y miles de kilómetros cuadrados. La red de radar HF, fruto de una serie de acuerdos interinstitucionales, consta actualmente de dos instalaciones: Galicia y Barcelona.

Descripción de las Estaciones
Mapa Sensible

Enlaces : Últimos datos recibidos | Informe validación (inglés)

Puertos del Estado, Ports Authorities, Autonomic Governments

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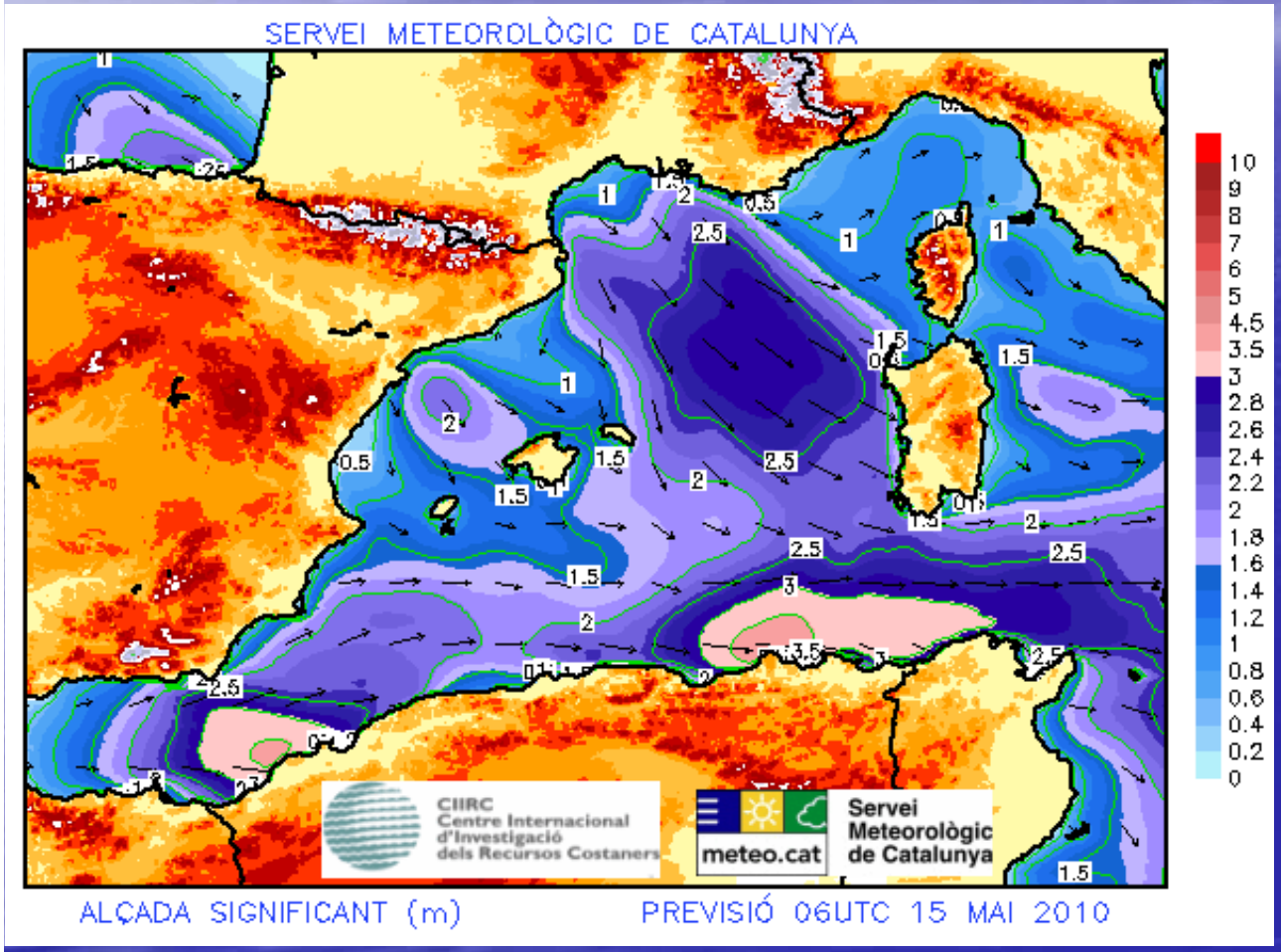
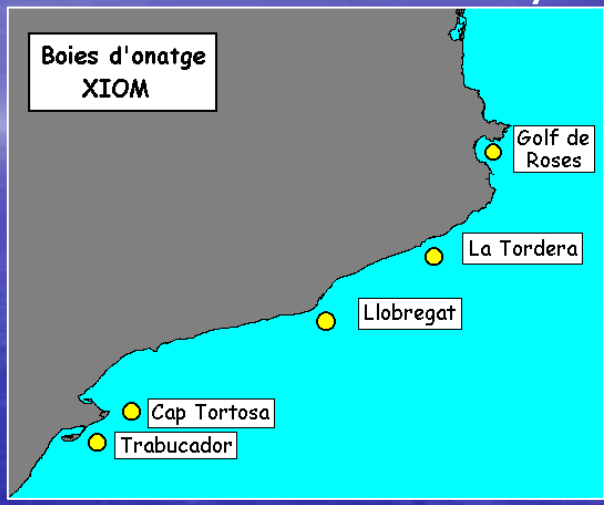
UPC and Catalunya Gover.

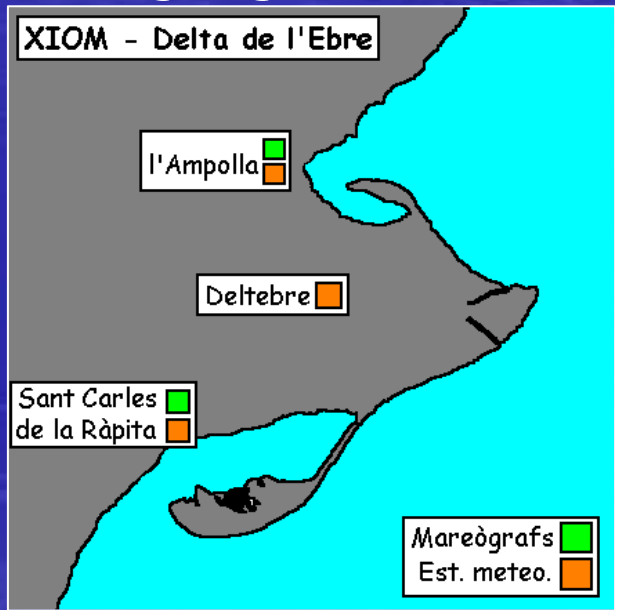
XIOM, measuring and forecast.



Coastal buoys



Tide gauges and Met.



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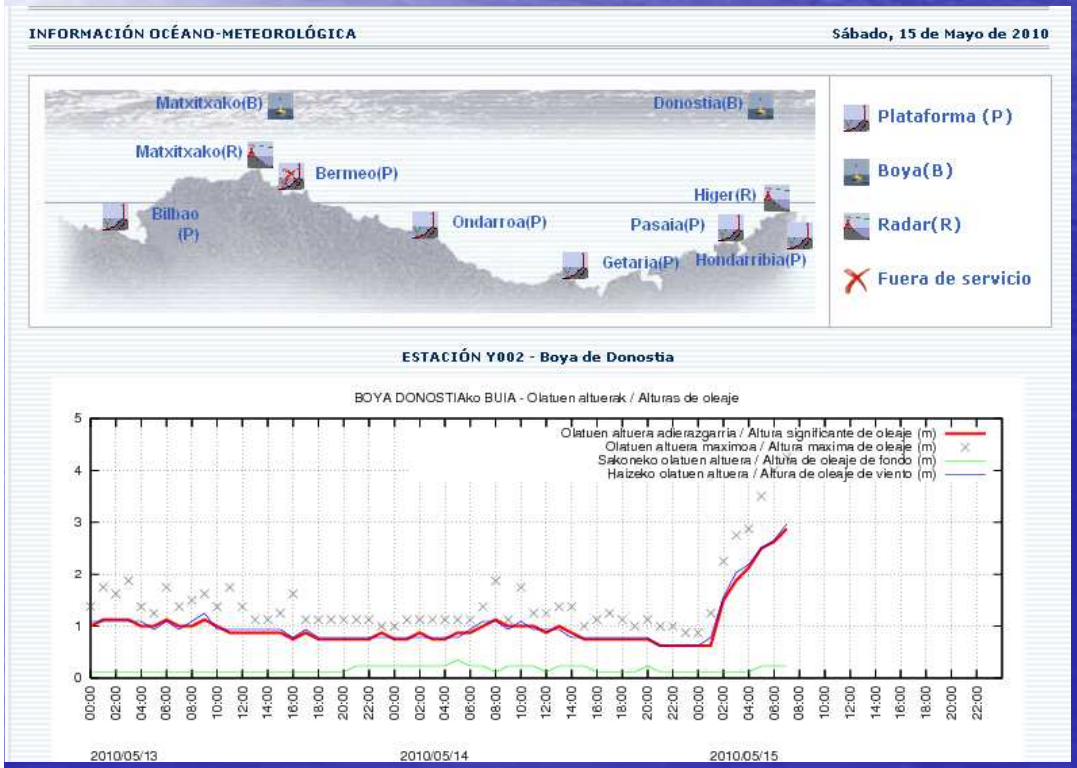
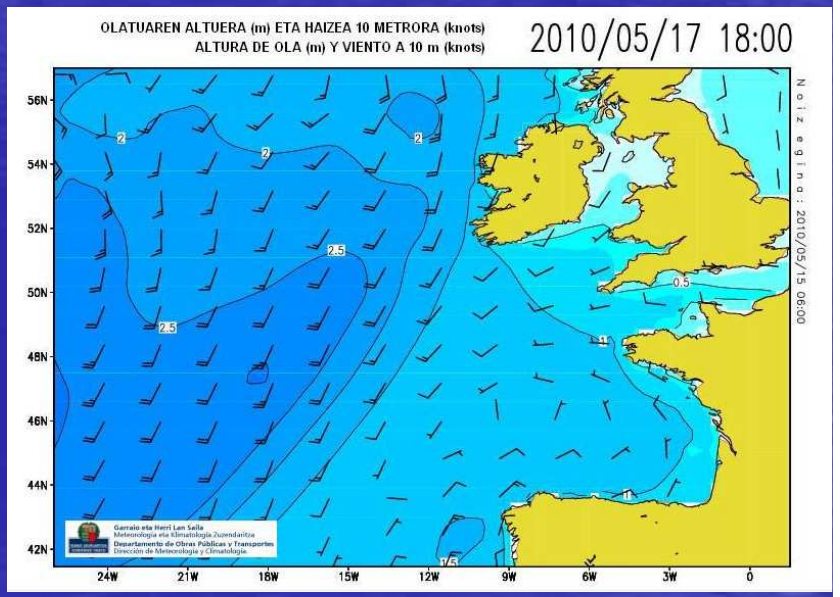
Euskalmet & AZTI
Basque Goverment
Observation and modelling





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XUNTA DE GALICIA
CONSELLERÍA DE MEDIO AMBIENTE
TERRITORIO E INFRAESTRUTURAS

METEOGALICIA

estacións
océano-meteorolóxicas

Inicio

Rede de estacións océano-meteorolóxicas

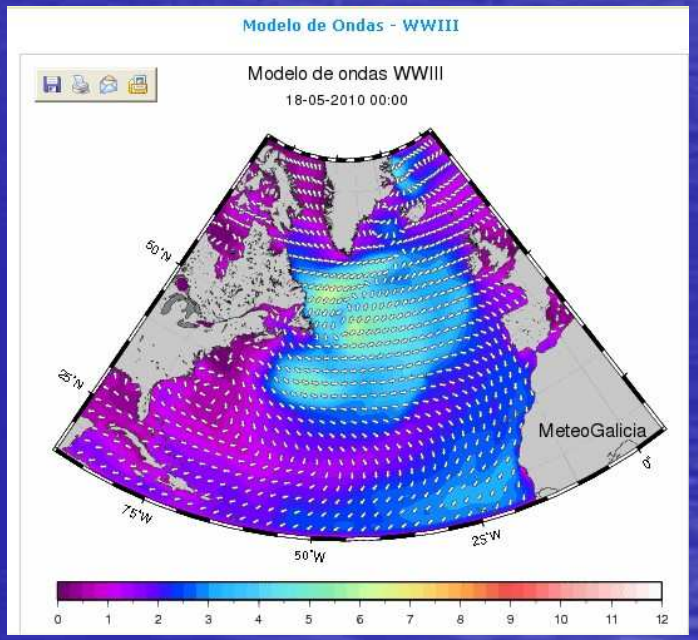
- Boia de Ons [WMO:] (Bueu)
- Pilar de Rande [WMO: 6201039] (Redondela)
- Boia de Cíes [WMO: 6201040] (Vigo)
- Plataforma de Cortegada [WMO: 6201038] (Vilagarcía)

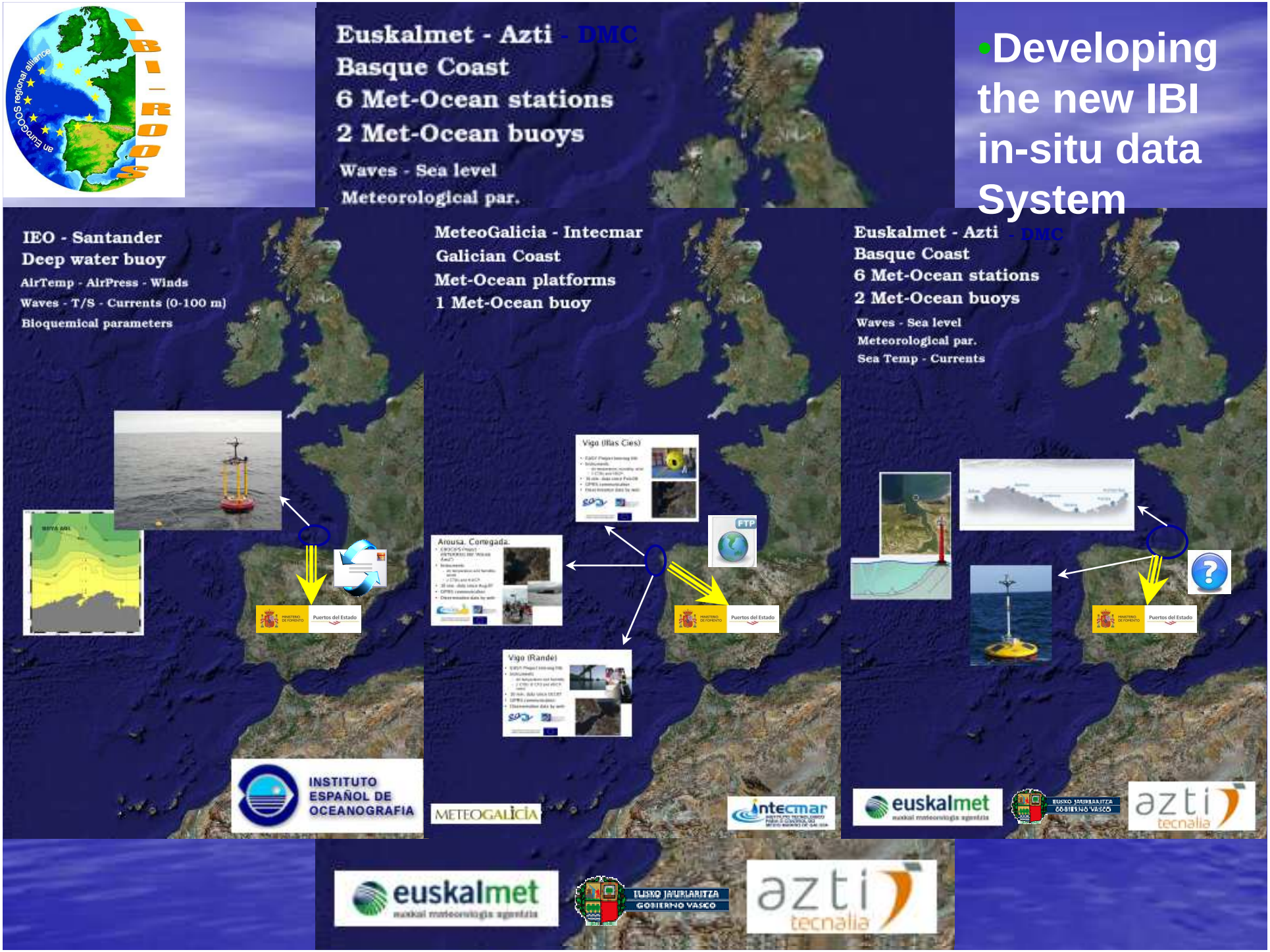
Plataforma de Cortegada

Nome:	Plataforma de Cortegada
Concello:	Vilagarcía
Provincia:	Pontevedra
Lonxitude:	517850 UTMX-29T ED-50
Latitude:	4719483 UTMY-29T ED-50

- Información da plataforma

INTERREG RAIA project
Xunta de Galicia
INTECMAR
CETMAR
U. Vigo
IIM
IEO
CIMAR




IBI-ROOS
an EuroGOOS regional alliance
Euskalmet - Azti - DMC
Basque Coast
6 Met-Ocean stations
2 Met-Ocean buoys
Waves - Sea level
Meteorological par.
•Developing the new IBI in-situ data System
IEO - Santander
Deep water buoy
AirTemp - AirPress - Winds
Waves - T/S - Currents (0-100 m)
Bioquemical parameters
MeteoGalicia - Intecmar
Galician Coast
Met-Ocean platforms
1 Met-Ocean buoy
Vigo (Illas Cies)
Arousa. Comegada.
Vigo (Randé)
FTP
Euskalmet - Azti - DMC
Basque Coast
6 Met-Ocean stations
2 Met-Ocean buoys
Waves - Sea level
Meteorological par.
Sea Temp - Currents
Puertos del Estado
INSTITUTO ESPAÑOL DE OCEANOGRAFIA
METEOGALICIA
intecmar
euskalmet
azti tecnalia

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EuroARGO

AGL Buoy: Combination of Observing Systems

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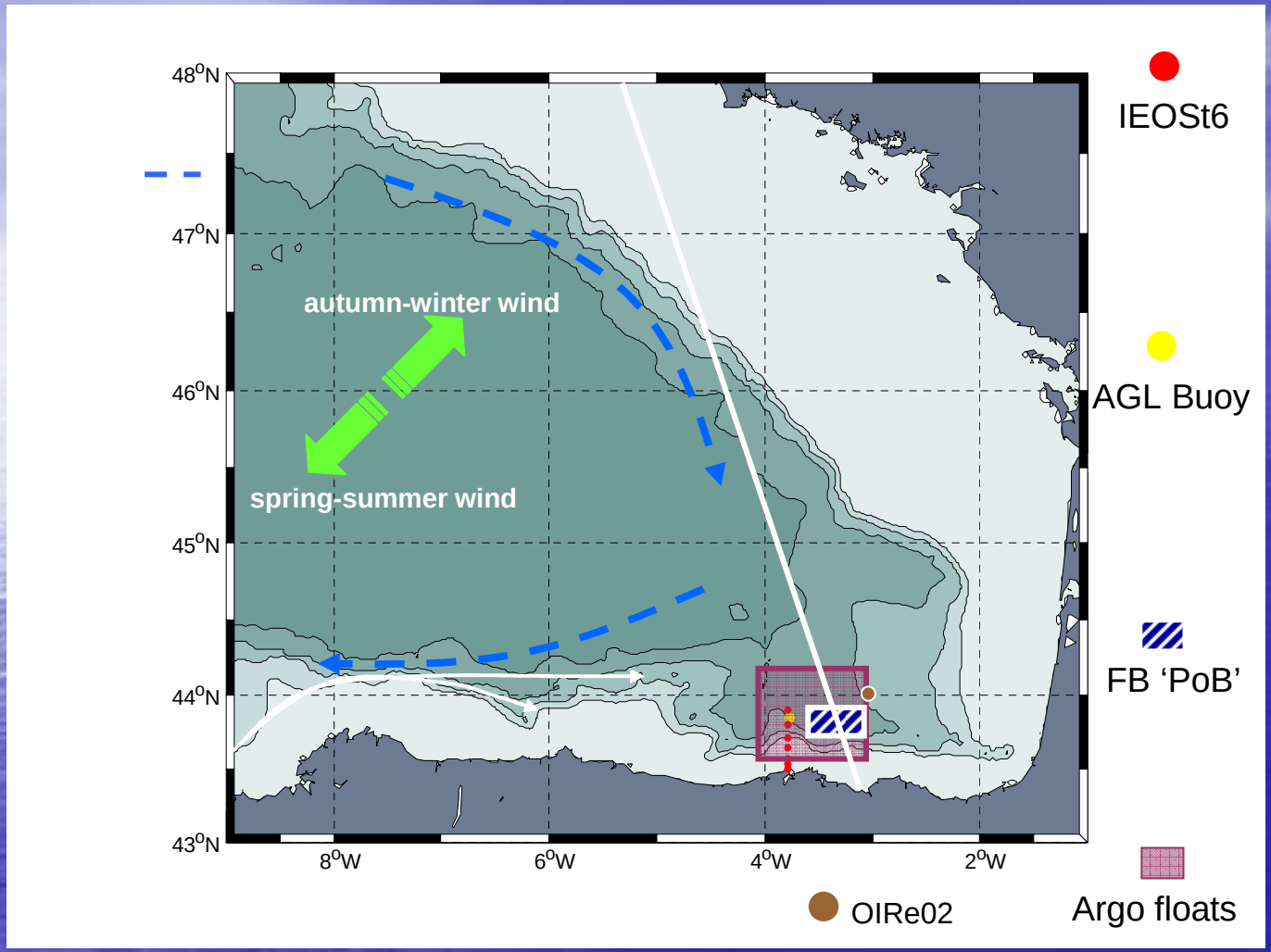
http://www.cdc.noaa.gov/



Sampling methods gathering in the Bay of Biscay.

AGL Buoy

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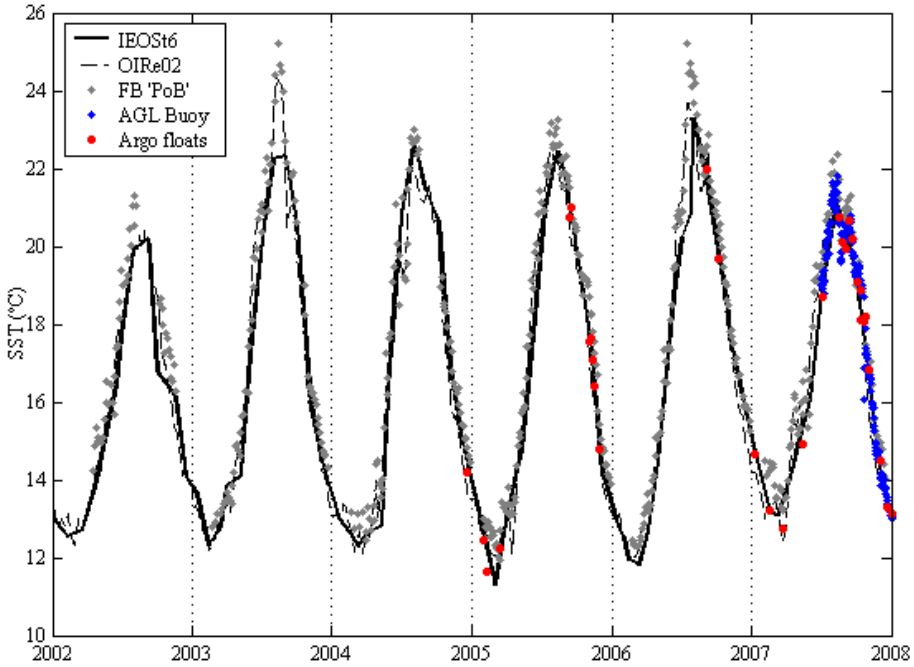
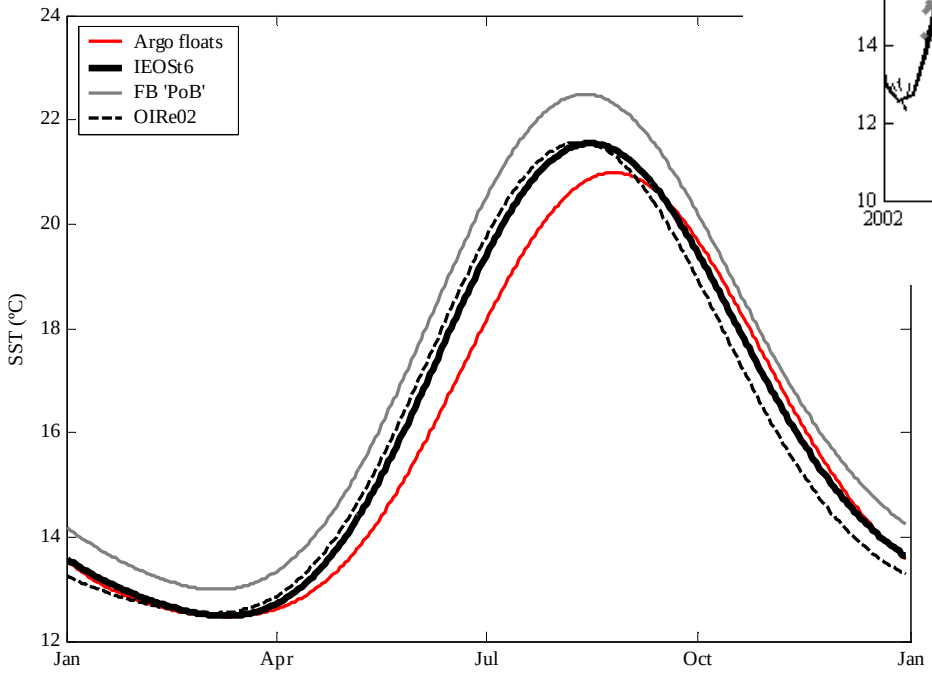
Inter-annual variability and seasonal cycle

SST at Santander section St6 (solid black line) and from OIRe02 (dash black line), FerryBox 'Pride of Bilbao' (grey diamonds), AGL buoy (blue diamonds) and Argo floats (red circles).





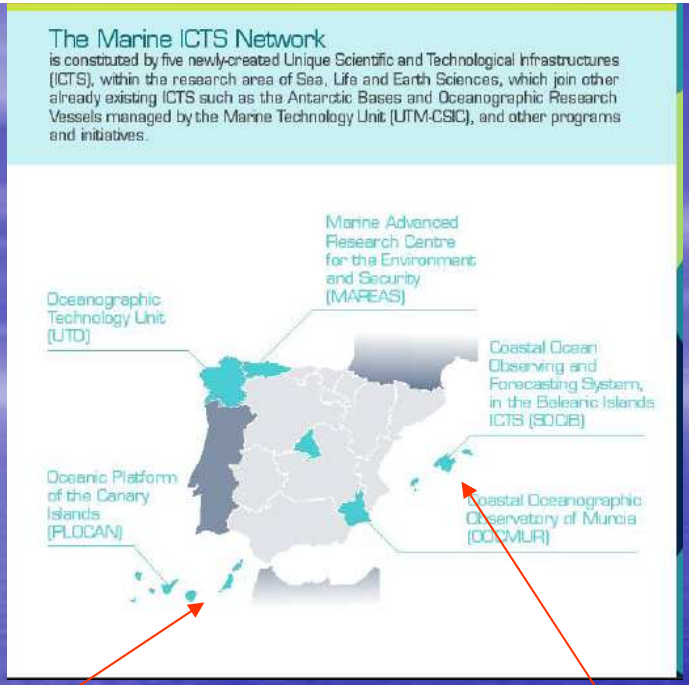
Mean SST seasonal cycle from IEOSt6 (solid black line), OIRe02 (dash black line), FerryBox 'Pride of Bilbao' (grey line), and Argo floats (red line).

ESA Soil Moisture and Ocean Salinity Mission (SMOS)

SMOS Co-Lead Investigator: Jordi Font, ICM/CSIC, Barcelona (Ocean Salinity)

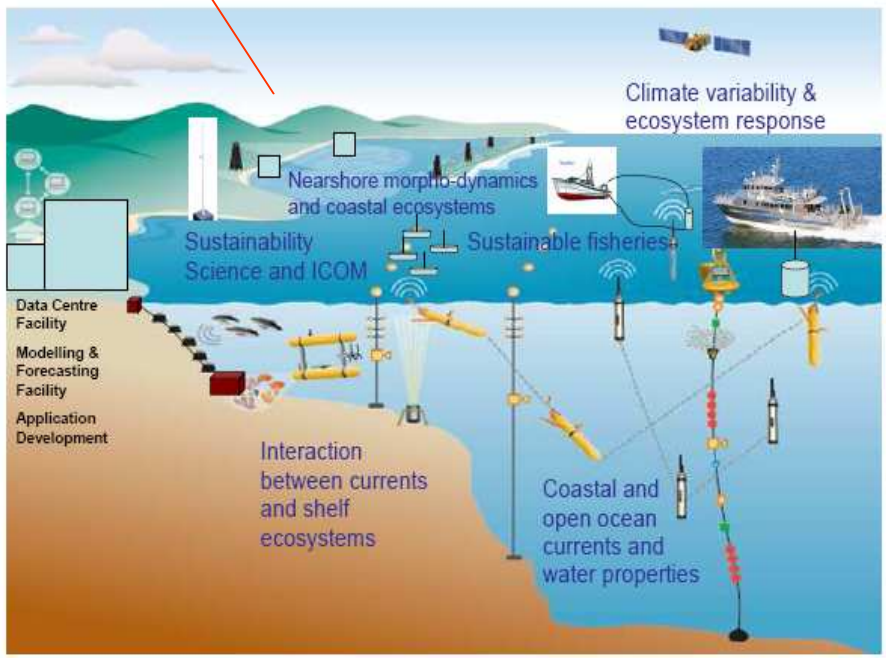
Scientific and Technological Infrastructures

PLOCAN: Canary Island Oceanic Platform



OceanBit Observing and forecast system for the Balearic Island

View of the Platform and mooring area



Discussion:

Spanish Institutions are members of international programs: GOOS, EUROGOOS, ESEAS, ICES, Mersea, MyOcean etc.

Data Centres are integrated in European Initiatives (SeaDataNet, SEPRISE)

Observing Systems are financed with institution's funds and National or European projects.

Regional governments have developed systems in their areas.

Long term Initiatives (National + Regional funds) as ICTS could have significant impact.

Thanks for your attention