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ILLES
BALEARS



SOCIB
Balearic Island
Coastal Observ
and Forecastin
System



CSIC
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Detección de medusas en el Mar Balear, nueva base de datos sistemática y relación con las condiciones ambientales: hacia el desarrollo de un sistema de predicción pre-operacional



ICMAN

Instituto de Ciencias Marinas de Andalucía

Laura Prieto



CSIC

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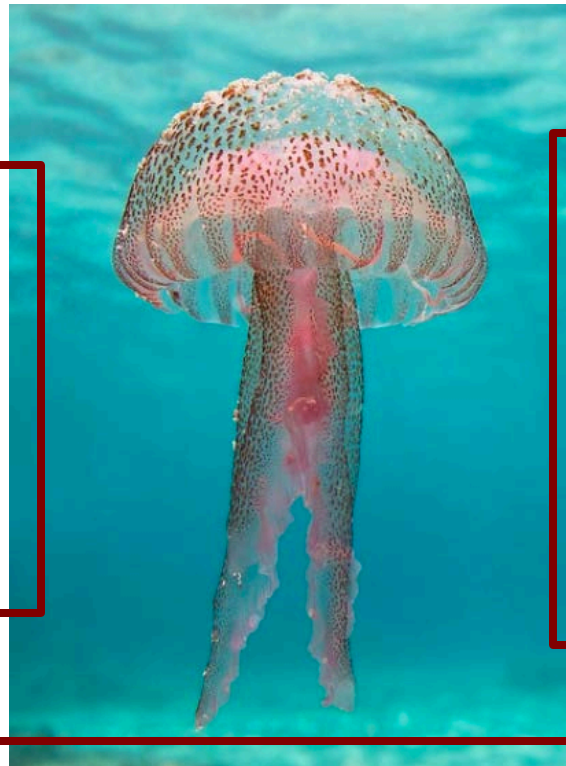
Actores



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Institut Mediterrani d'Estudis Avançats



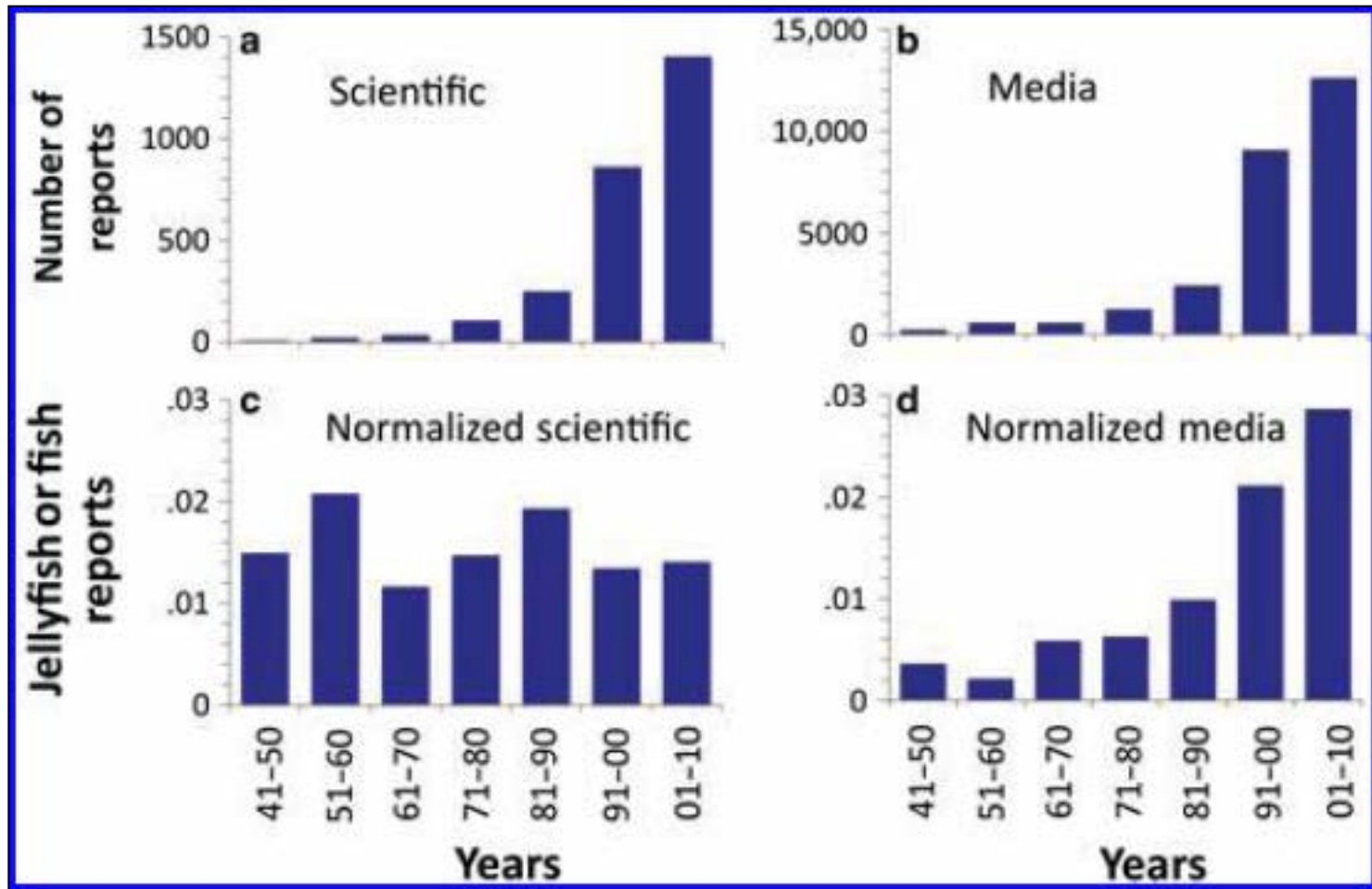
Universitat
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Un paradigma basado en la percepción



¿Está la abundancia de medusas realmente aumentando a escala global?

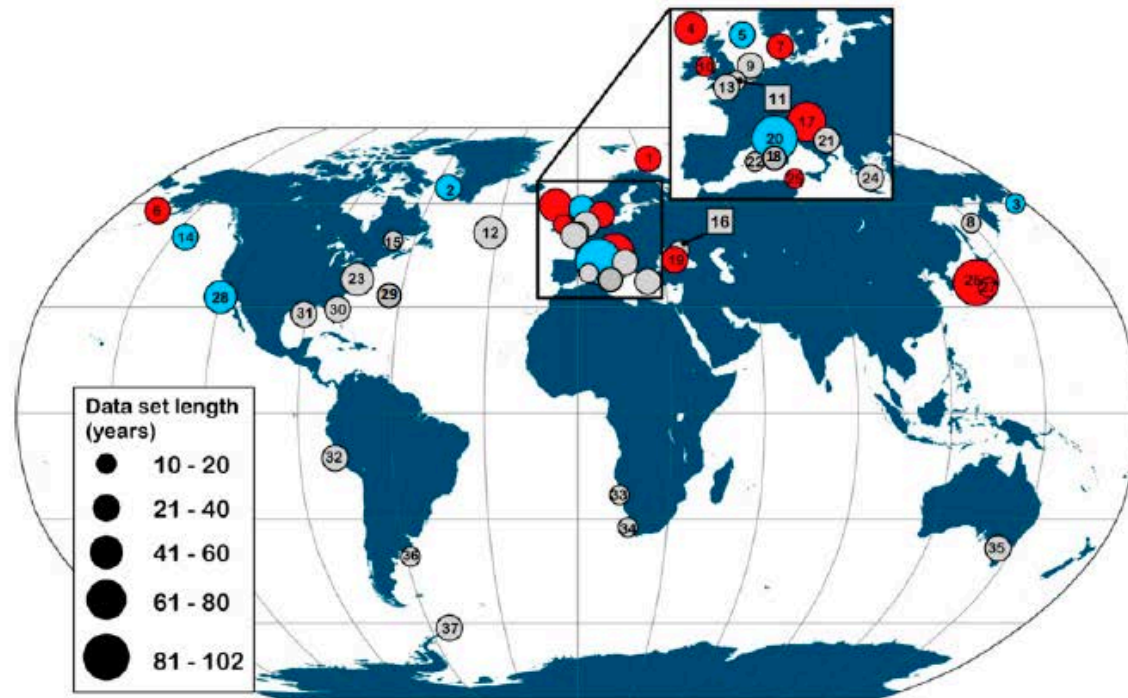


Fig. 1. Distribution of jellyfish time-series. Time-series of observations on jellyfish abundance >10 y in length from 1874 to 2011. The diameter of the symbols is proportional to the duration of the dataset, colors indicate trends (linear regressions, $P < 0.05$): significant decrease (blue), significant increase (red), or no trend (gray) in jellyfish abundance over time for the duration of the study. Numbers identify the datasets described in Table S1. Most datasets were from the northern hemisphere (87%), in particular the Atlantic Ocean (17%) and the Mediterranean region (17%), and comprised medusae (89%).

La respuesta es:
¡NO!

Condon et al 2013

Consecuencias en bienes y servicios:

- Efectos negativos en la industria del turismo



- Competición y depredación en la cadena trófica: impacto en las pesquerías y en la biodiversidad



- Aumento en la obstrucción de las redes de pesca y en las tomas de agua de las centrales térmicas: impactos negativos en las industrias pesqueras y energéticas

PERSEUS International Workshop

Coming to grips with the jellyfish phenomenon in the Southern European and other Seas (SES): research to the rescue of coastal managers

Co-funded by
IOC-UNESCO and CEIMAR

Co-organised by:
Laura Prieto, Alan Deidun,
Alenka Malej, Tamara Shiganova,
and Valentina Tirelli on behalf
of the PERSEUS project

Cadiz (Spain),
Aulario La Bomba,
2-3 March 2015



¡Primer workshop enfocado en gestión!

Name of Participant	Affiliation	Country of residence
Aino Hoisa	Univ Bergen	Norway
Alan Deidun	Univ Malta	Malta
Daniel García	Ayuntamiento Cádiz	Spain
Delphine Thibault	Univ Aix-Marseille	France
Esther Rubio Portillo	Univ Alicante	Spain
Javier Franco	AZTI	Spain
Joaquín Tintoré	SOCIB	Spain
Kylie Pitt	Griffith Univ	Australia
Melissa Acebedo	CSIC	Spain
Nando Boero	CONISMA	Italy
Nondas Christou	HCMR	Greece
Pilar Marin	OCEANA	Spain
Priscilla Licandro	SAHFOS	UK
Sérgio Leandro	IPL-ESTM	Portugal
Agustin Schiariti	INIDEP-CONICET	Argentina
Alejandra Susana Perez	Aquatours	Spain
Alenka Malej	NIB	Slovenia
Dror Angel	Univ Haifa	Israel
Javier Ruiz	CSIC	Spain
Joana Falcao	CFE-University Coimbra	Spain
Karen Kienberger	CSIC	Spain
Lucas Brotz	Univ British Columbia	Canada
Maria Soledad Vivas	Junta Andalucía	Spain
Michalis Skourtos	Univ Aegean	Greece
Mohammed Marhraoui	INRH	Morocco
Sónia Cotrim Marques	CFE-University Coimbra	Spain
Stefano Piraino	CONISMA	Italy

page 41 / PERSEUS International Jellyfish Workshop / Cadiz (Spain), 2-3 March



Participant	Affiliation	Country
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Cathy Lucas	Univ Southampton	UK
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Eduardo Fernandez	Junta Andalucía	Spain
Jack Costello	Providence College	USA
Juan Guillén	Ecologia Litoral	Spain
Laura Prieto	CSIC	Spain
Lluís Cardonas	Univ Barcelona	Spain
Luis Valdés	IOC-UNESCO	Spain
Martin Vodopivec	NIB	Slovenia
Massimo Avian	Univ Degli Studi di Trieste	Italy
Soukaina Zizah	INRH	Morocco
Cynthia Suchman	NSF	USA
Emily Koulouvaris	EIR Development Ltd.	Greece
Fernando Gabriel Orri	Aquatours	Spain
Gabriel Navarro	CSIC	Spain
Ioanna Siokou	HCMR	Greece
Macarena Marambio	CSIC	Spain
Manuel Fernandez	Junta de Andalucía	Spain
Mark Gibbons	Univ Western Cape	South Africa
Susana Garrido	IPMA	Portugal
Temel Oguz	Middle East Technical Univ	Turkey
Tjasa Kogovsek	Hiroshima Univ	Japan
Valentina Tirelli	OGS	Italy

The main outcomes of WG discussions that addressed specific issues were the following:

How to strengthen our capabilities to monitor jellyfish over time? (so as not to rely solely on citizen science for distribution and abundance data over time)?

It was concluded that jellyfish need to be monitored on a regular basis, taking advantage of both citizen science and a **systematic, robust monitoring program**; **ultimately we need to make observations mandatory**. For both approaches, we have to:

- Define purpose: where, when and how often
- Standardize methodologies
- Establish training programs

Different citizen science initiatives/projects need to become more harmonized and coordinated. It was stated that citizen science programmes can go beyond presence/absence information but also that standardization/normalization is necessary. A workshop could be convened among all jellyfish workers to decide on a standard set of monitoring protocols. It would be useful to recruit fishers within the process and to develop observing programmes for, for example, SCUBA dive clubs. Offshore aquaculture operators, MPA supervisors, lifeguards, sailors and enthusiast naturalists could all provide valuable jellyfish data, but it was stressed that monitoring protocols must be simple and need to be consistent through time.



El sistema de observación de I. Baleares

- Existen muchos datos históricos y mucho “know how” pero con bajo nivel sistemático
- Por tanto, tenemos pocas oportunidades para relacionar variabilidad inter-anual de episodios de medusas y su relación potencial con la variabilidad de las condiciones ambientales



- Una nueva herramienta ha sido desarrollada para compilar sistemáticamente y periódicamente la aparición de medusas



El sistema de observación de I. Baleares

¡Se trata de una co-creación entre gestores y científicos (no sólo transferencia, sino bidireccional)!

Objetivo:

Establecer protocolos y una herramienta para obtener:

Un seguimiento sistemático,
periódico,
y rutinario



Protocolos de observación

Series temporales de observación estables y con protocolos estándar

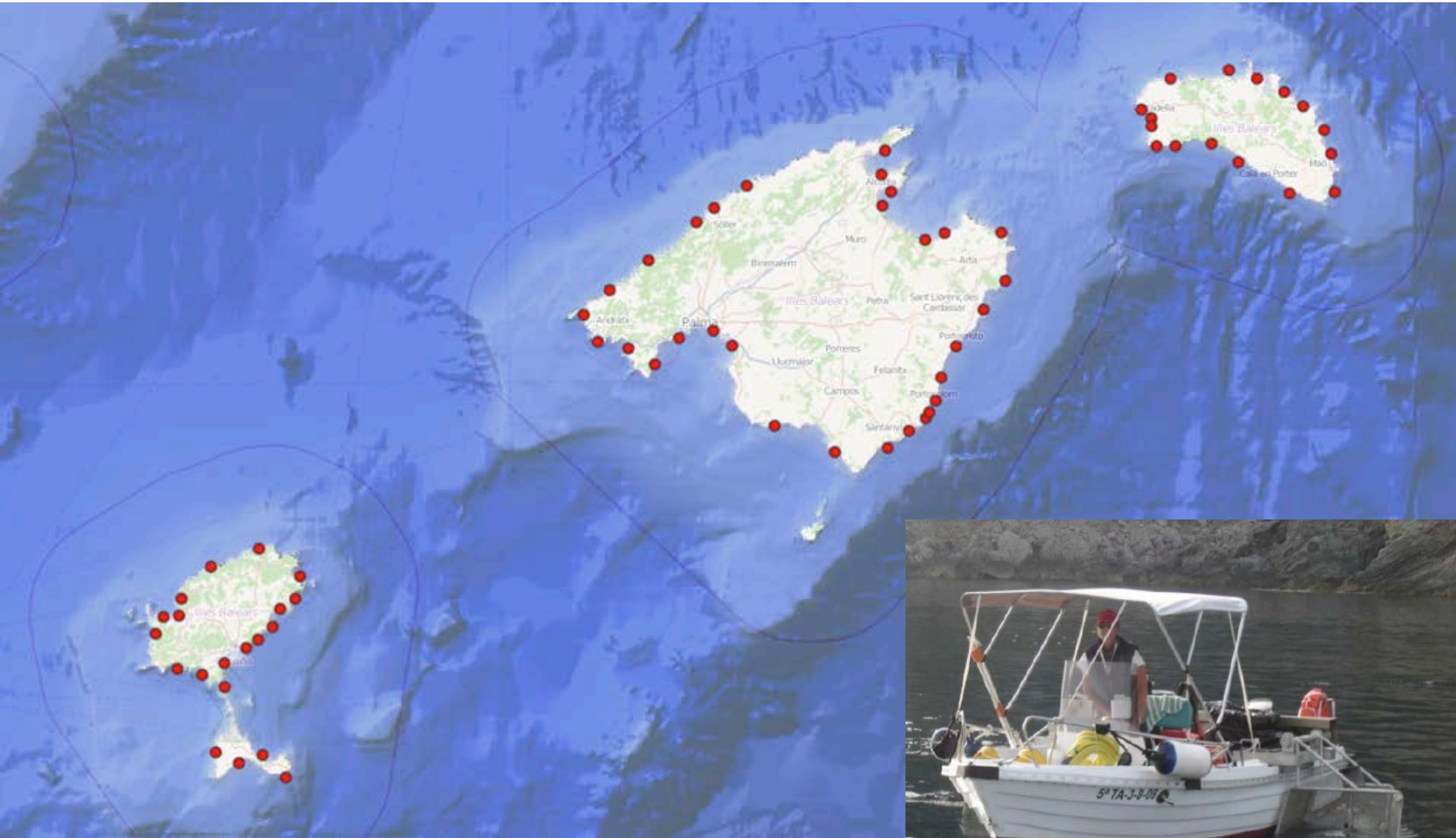
3 niveles de observación:

- Mar abierto: B/O voluntarios
- Plataforma: Embarcaciones del Servei de neteja del litoral y de las Reservas Marinas
- **Zonas de baño: Playas**

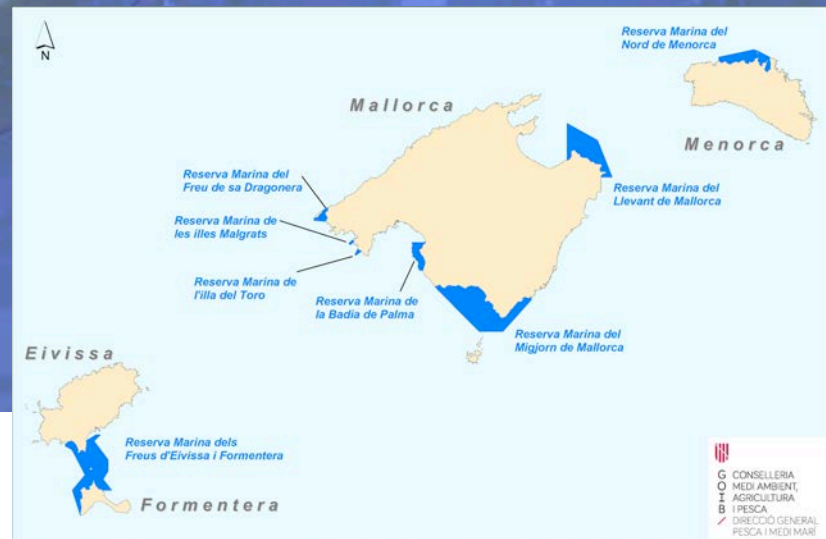
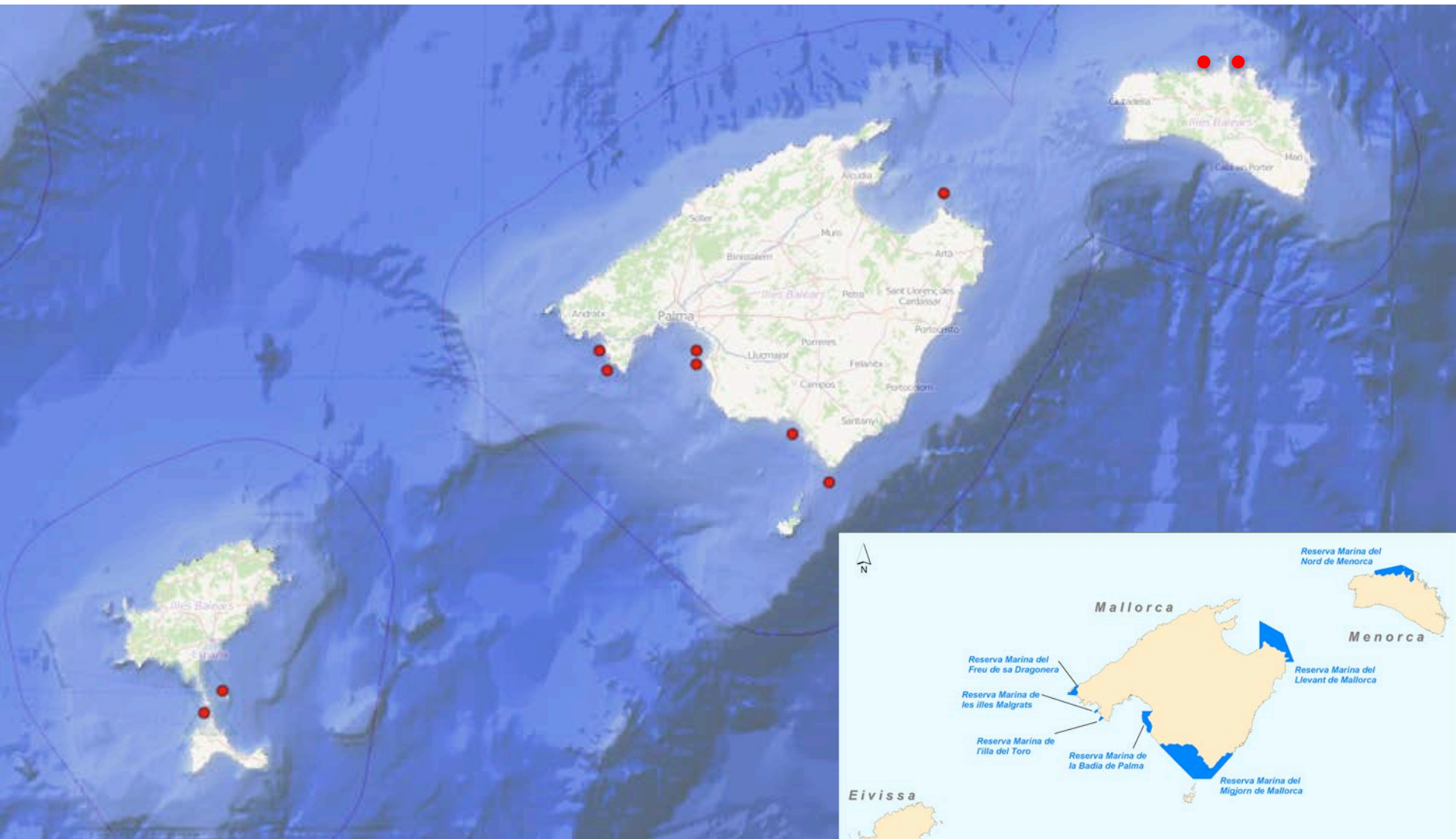
Información océano-meteorológica

- Vientos
- Corrientes superficiales
- Temperaturas

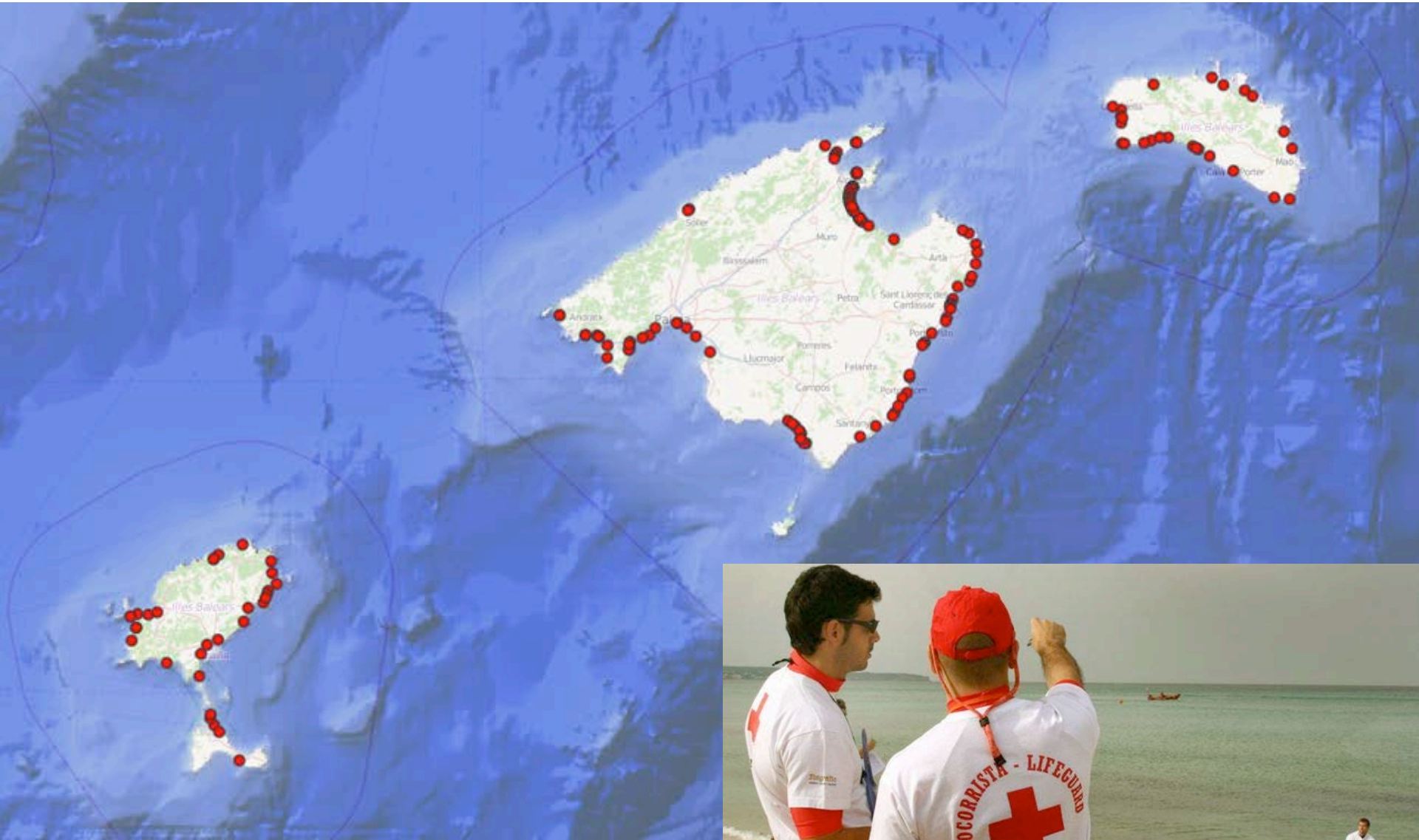
Protocolos de observación. Embarcaciones limpieza



Protocolos de observación. Embarcaciones Reservas



Protocolos de observación. Playas



Observaciones diarias de:

Grumers Observations Observation routes Beach list Administration ▾ laura.prieto ▾ Change language ▾

Observation Map

Specie
Specie: all ▾

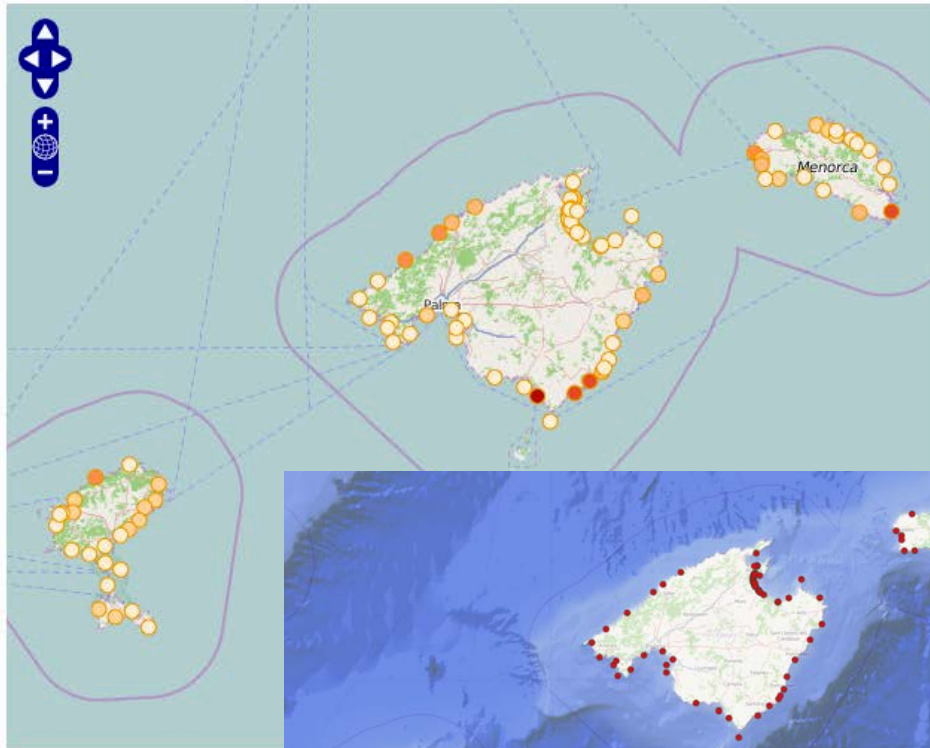
Created by
User: all ▾

Observation route
Route: all ▾

Observation station
Station: all ▾

Source

From date



- 5 Áreas Marinas Protegidas (9 puntos de observación)

- 33 rutas de barcas de limpieza (66 puntos obs.)

- 120 playas (DG Emergencias)



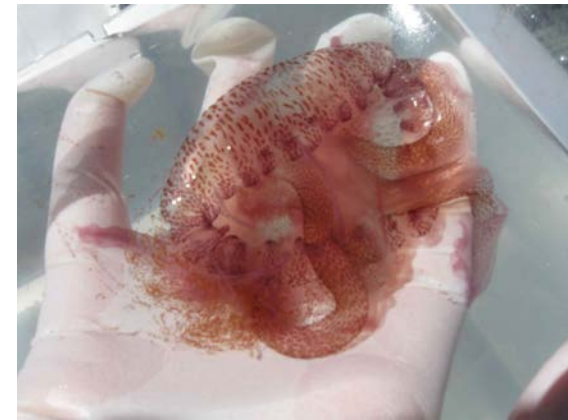
RELEVANCIA DEL PROYECTO A ESCALA INTERNACIONAL

- **Nuevo** sistema de observación en las Islas Baleares y **único** a nivel internacional, tanto por su resolución temporal como espacial.
- **¡¡CLAVE EL PAPEL DE LOS SOCORRISTAS Y DE LAS BARCAS DE LIMPIEZA!!**
- Creación de una **nueva base de datos** que nos ha permitido:
 - identificar episodios de llegada elevada de medusas.
 - relacionar dichos episodios con las condiciones atmosféricas y oceanográficas existentes.

Resultados hasta el 25 de octubre de 2017

Número de observaciones:

	Número de datos
Total	87015
Con medusas	5687



Cantidad de medusas observadas:

Tipo de ruta	Datos totales	Presencia medusas
Barcas de limpieza	20177	3782
Áreas Marinas Protegidas	470	52
Playas DG Emergencia	66368	1853+2072 días asistencias

Observation Heatmap

Specie

Specie: all

Created by

User: all

Island

Island: all

Municipality

Municipality: all

Observation route

Route: all

Observation route type

Route type: all

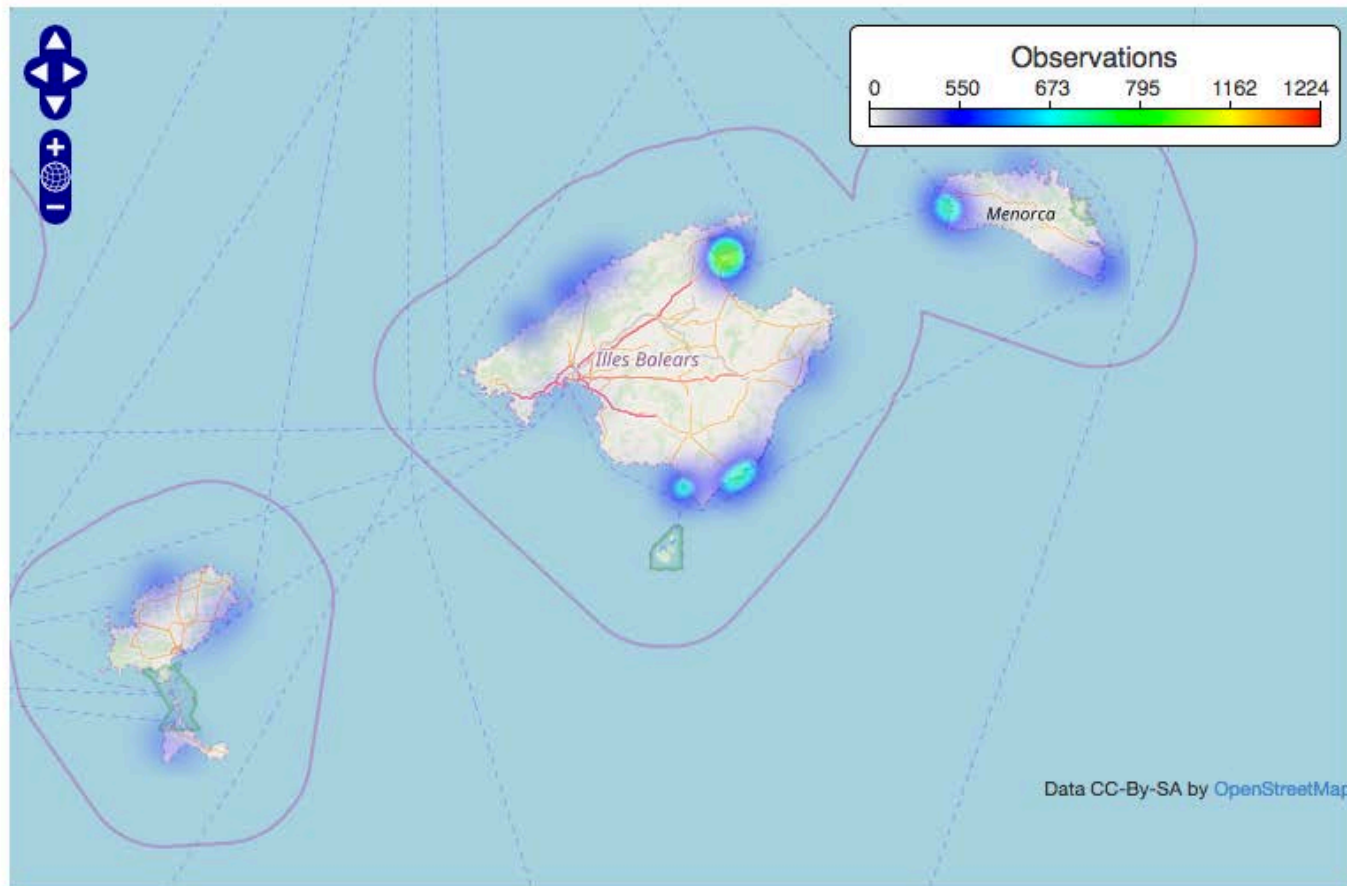
Observation station

Station: all

Source

From date

1/04/2014



Observation Heatmap

Specie

Specie: all

Created by

User: all

Island

Island: all

Municipality

Municipality: all

Observation route

Route: all

Observation route type

Route type: all

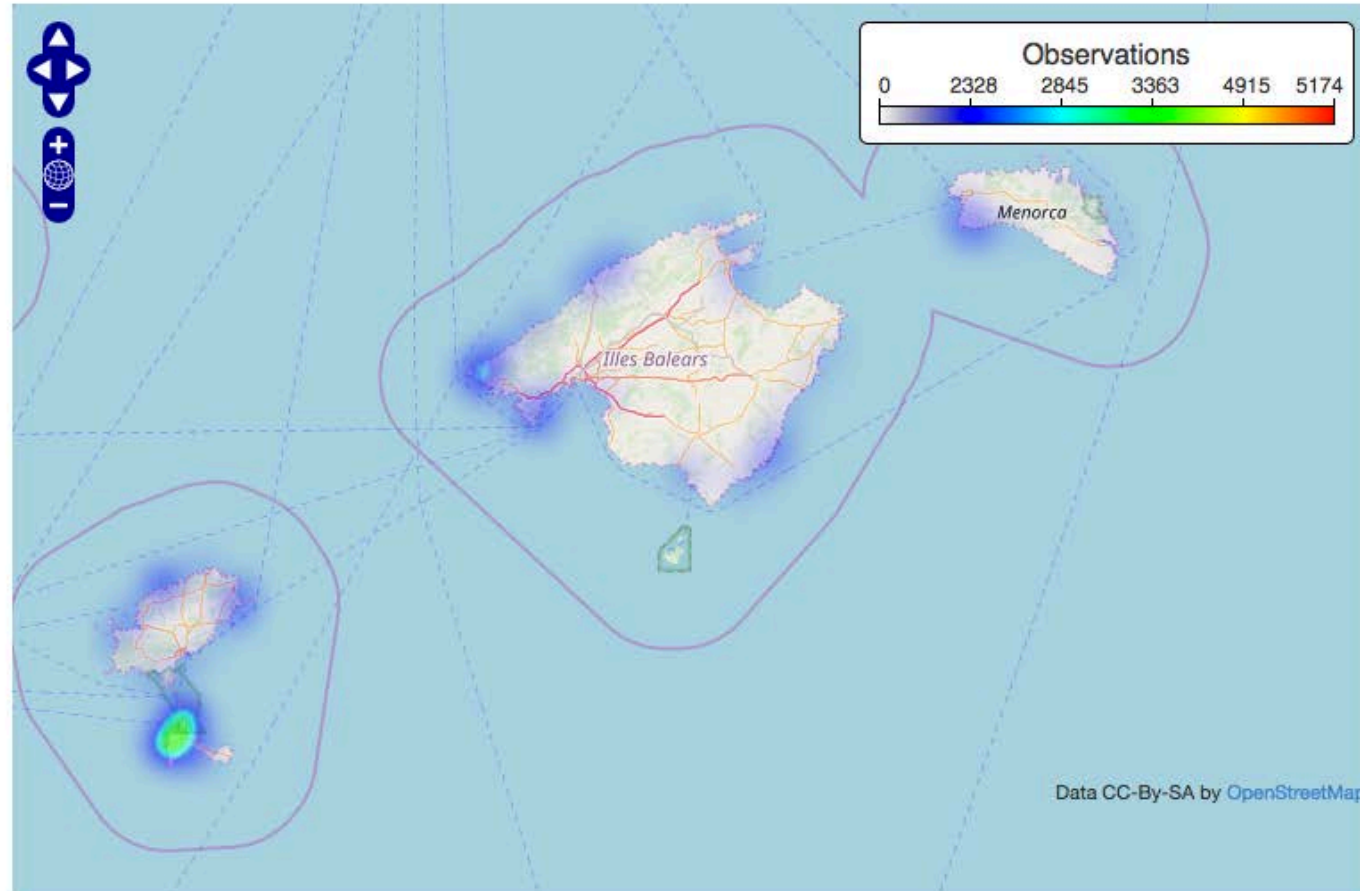
Observation station

Station: all

Source

From date

1/01/2015



Observation Heatmap

Specie

Specie: all

Created by

User: all

Island

Island: all

Municipality

Municipality: all

Observation route

Route: all

Observation route type

Route type: all

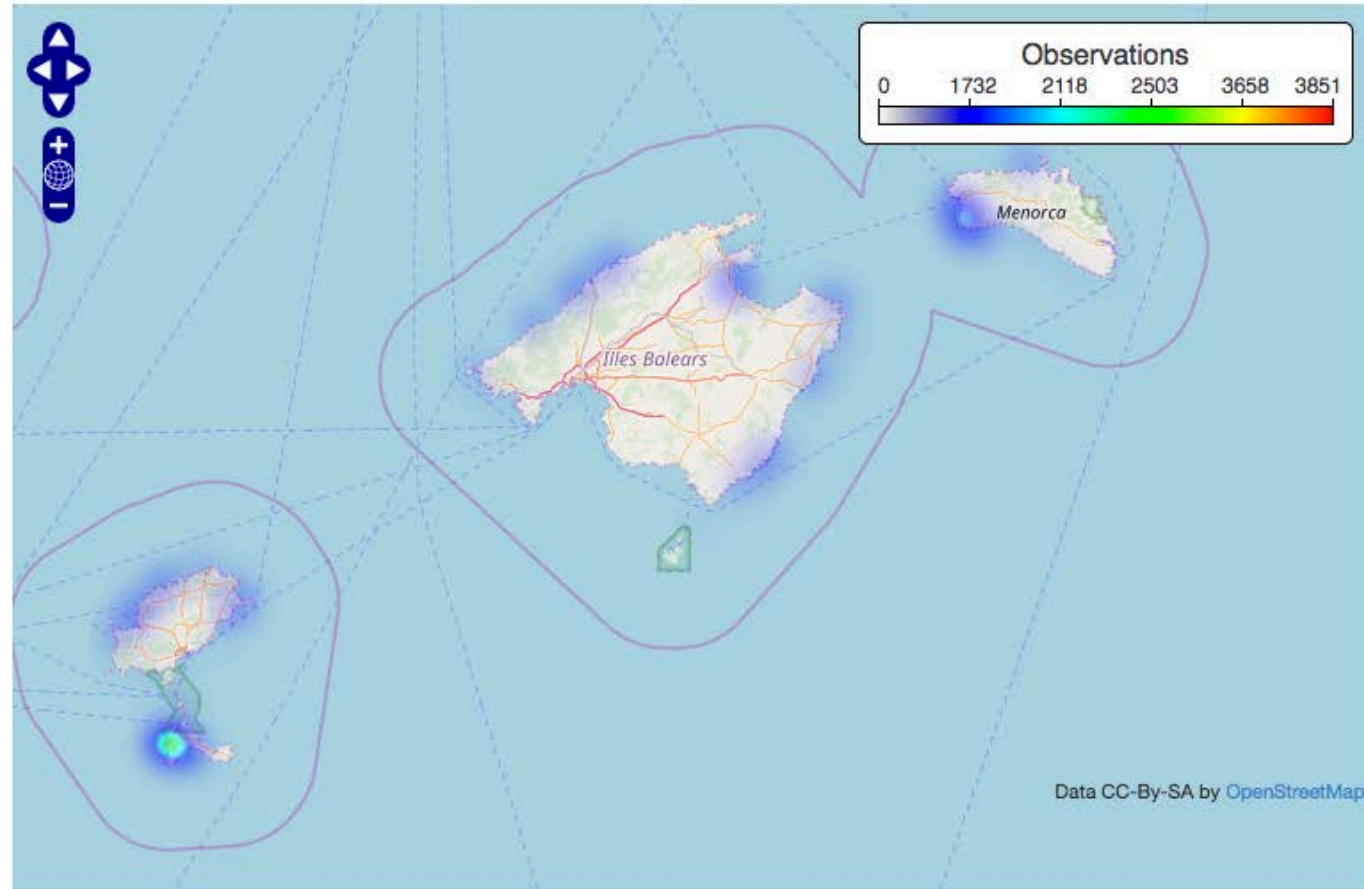
Observation station

Station: all

Source

From date

1/01/2016



Observation Heatmap

Specie
Specie: all

Created by
User: all

Island
Island: all

Municipality
Municipality: all

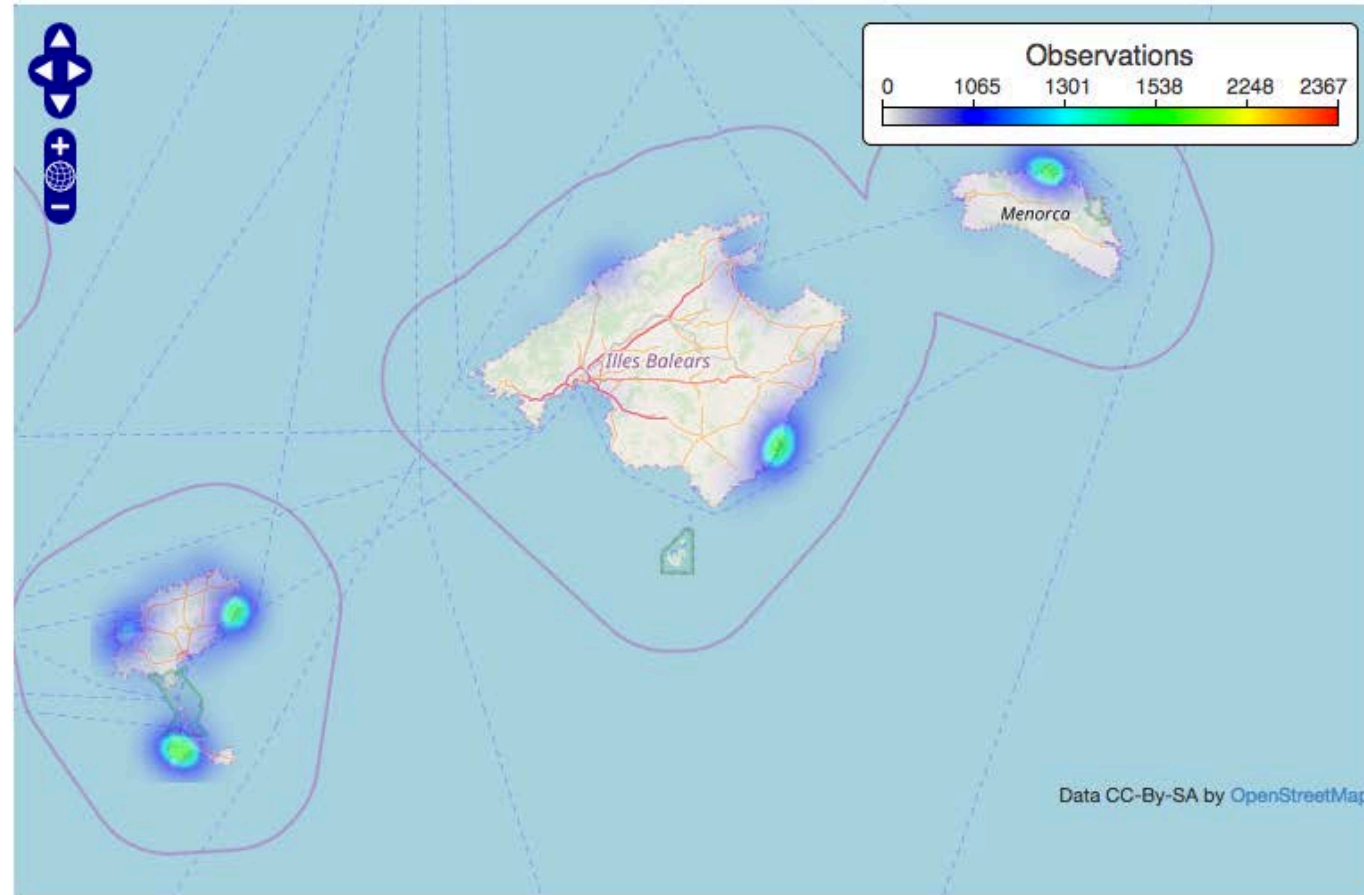
Observation route
Route: all

Observation route type
Route type: all

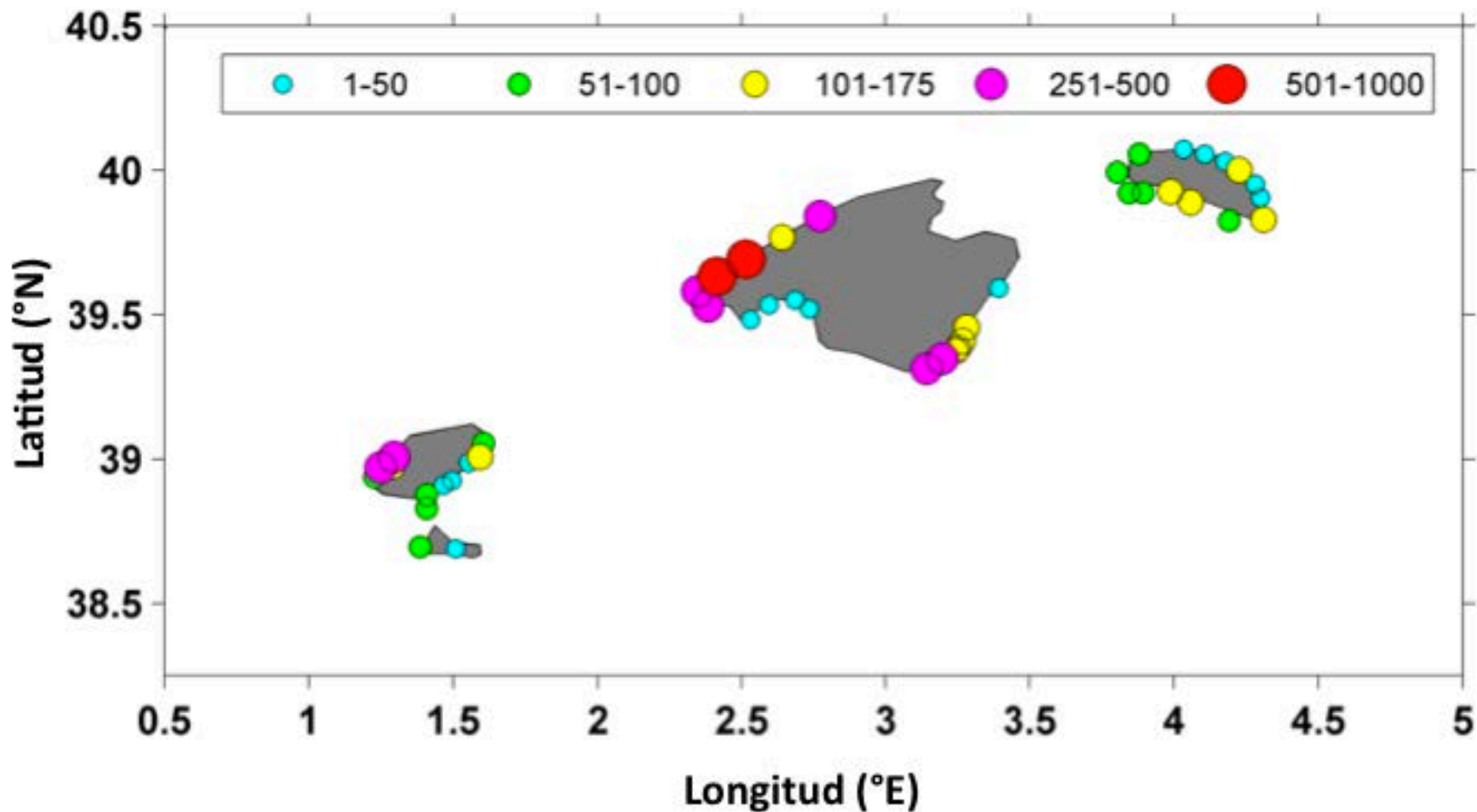
Observation station
Station: all

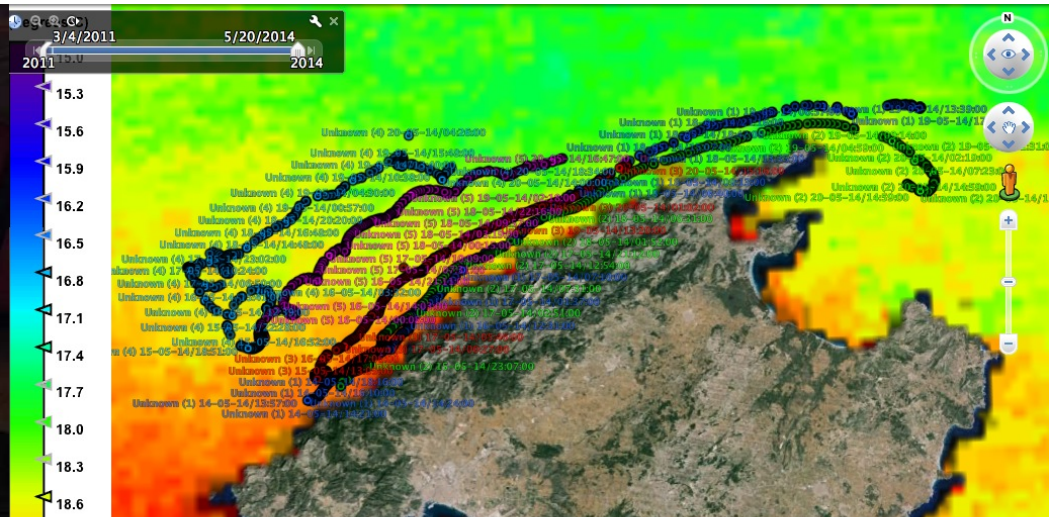
Source

From date
1/01/2017



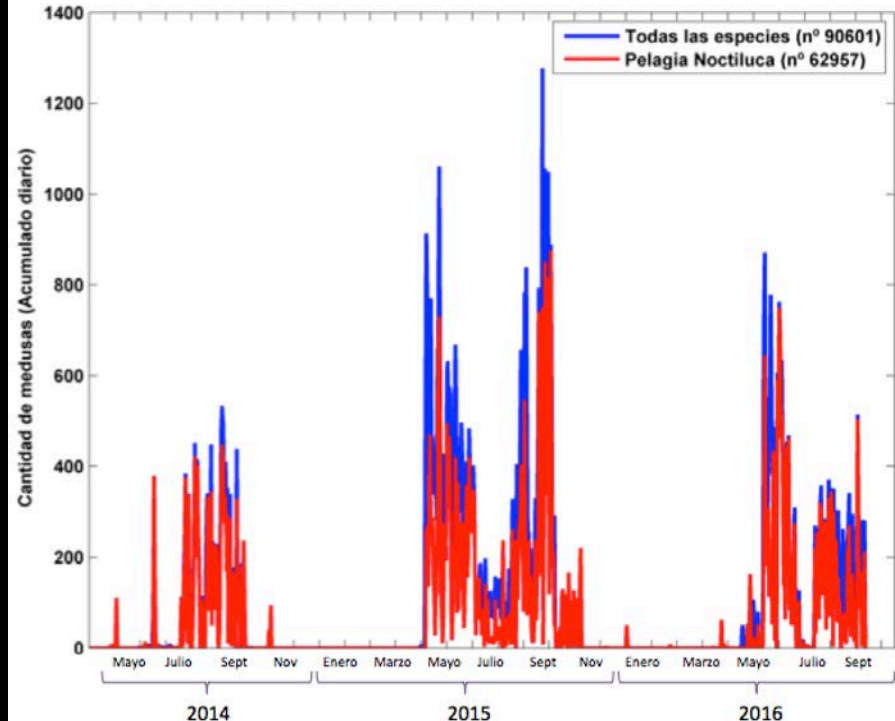
Medusas totales: mayo 2015 (*Pelagia noctiluca*)





Have you seen jellyfish?

If you see any of these species, send your record to lp@csic.es
We count on your help!

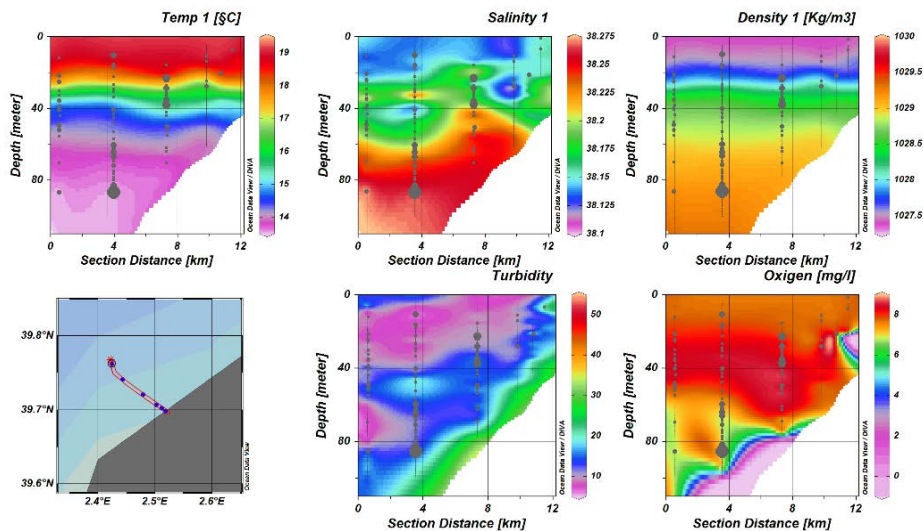


Send a message, if possible with a photo, including the following information:
NAME OF JELLYFISH: see poster
LOCATION (name and/or geographic coordinates): coastal water, stranded, offshore
NUMBER OF JELLYFISH SEEN: 1 individual, 2 to 5 individuals, 6 to 10 individuals, 11 to 99 individuals, more than 100 individuals

Ratificación de la migración vertical diurna de la especie *Pelagia noctiluca* cuando se encuentra en mar abierto y en el borde de la plataforma

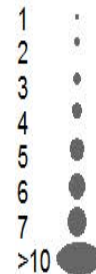
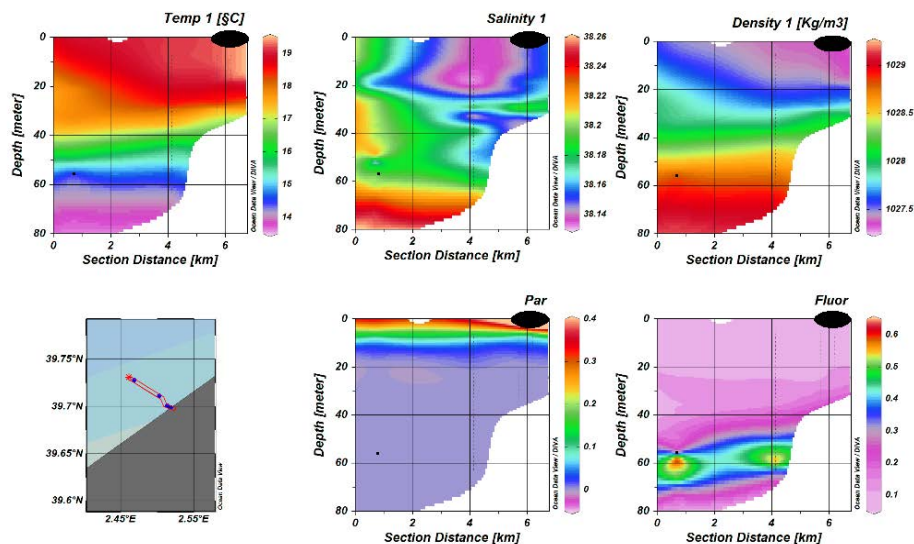
DÍA

NÚMERO DE MEDUSAS SUBIDA
 15/05/2014 09:41
 15/05/2014 14:20

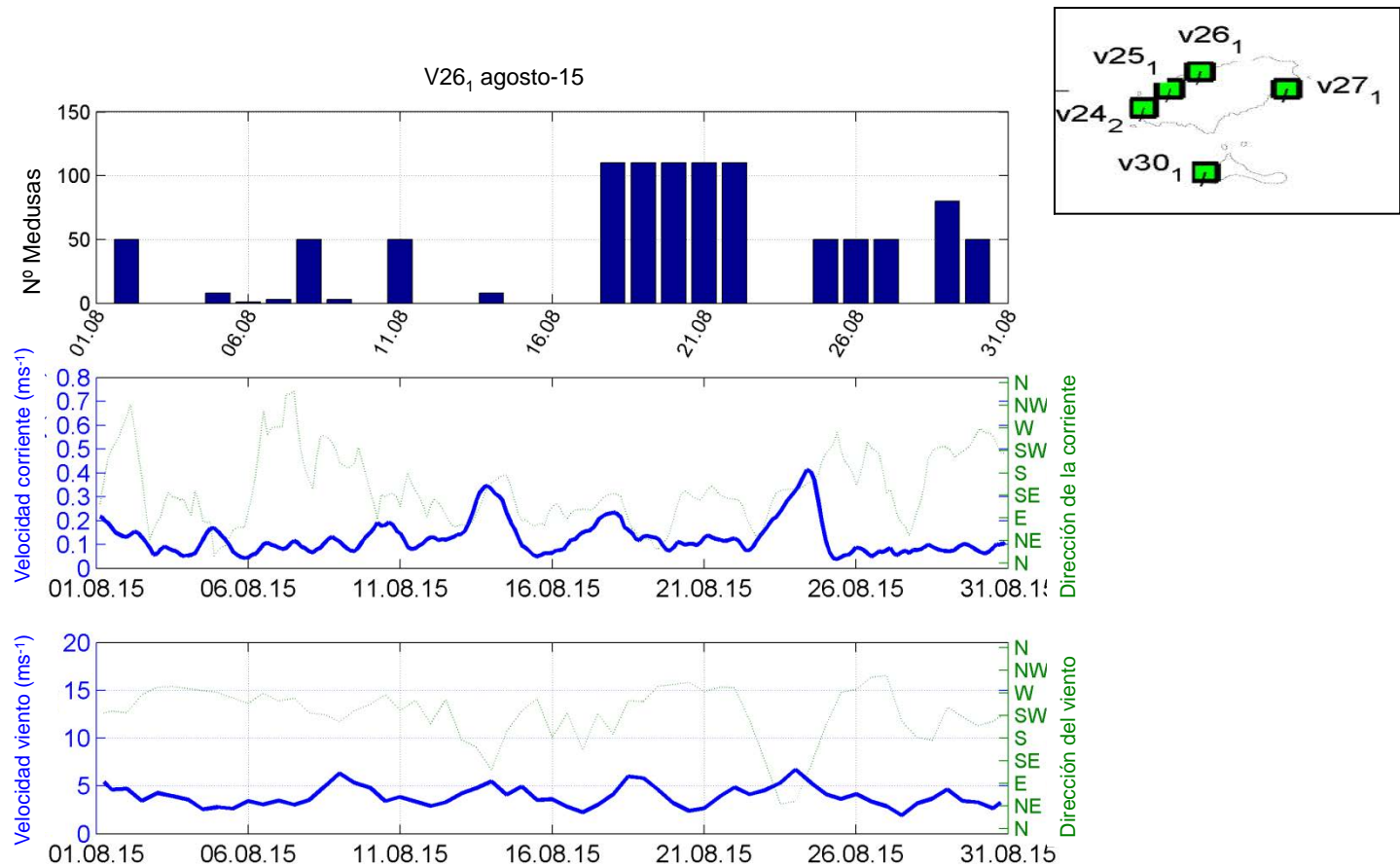


NOCHE

NÚMERO DE MEDUSAS BAJADA
 14/05/2014 21:00
 14/05/2014 21:52



La aparición de *Pelagia noctiluca* en las zonas de baño depende de la orientación de la costa, de la circulación oceanográfica de dicha área y del viento (tanto su dirección como su intensidad)



Reconocimiento y relevancia internacional



GRUMERS: Web-site platform to upload jellyfish observations by workers involved in coastal services in the Balearic Sea

2nd Scientific Workshop, Marrakech 2-4 December 2014


Laura Prieto, Biel Frontera, Guillermo Vizoso, Josep Maria Aguiló, Joan Pol Pujol, Charles Troupin, Antonio M. Grau, Javier Ruiz, Joaquín Tintoré




A new website platform for uploading data from a systematic jellyfish monitoring system in the Balearic Islands: a joint science-society approach


PERSEUS International Jellyfish Workshop, Cádiz 2-3 March 2015

Laura Prieto, Biel Frontera, Guillermo Vizoso, Josep Maria Aguiló, Joan Pol Pujol, Charles Troupin, Antonio M. Grau, Javier Ruiz, Joaquín Tintoré

A website platform for uploading data from a new systematic jellyfish monitoring system in the Balearic Islands: a joint science-society approach

Laura Prieto, Biel Frontera, Guillermo Vizoso, Josep Maria Aguiló, Joan Pol Pujol, Charles Troupin, Antoni Mira, Antonio M. Grau, Javier Ruiz, Joaquín Tintoré



INTRODUCTION

Jellyfish swarms in the Mediterranean coast are a recurrent phenomenon of high scientific interest (Sagoruck et al., 2012) and with relevant implications at the marine and socio-economic level (Kontogianni and Emmanouilidou, 2014; Prieto et al., 2015). There is however a gap of systematic and periodic data on jellyfish occurrence in beaches. These data can help to understand the inter-annual variability of the episodes and its potential relation with the variability of environmental conditions. Joint strategies with tools available to scientists, administration, policy makers and stakeholders can optimize the cost of obtaining these in situ data and the benefit achieved from its scientific analysis.

MATERIALS AND METHODS

A joint science-society oriented strategy was designed and tested in the Balearic Island during Summer 2014 (starting July 1st) and beyond, in the frame of SOCIB activities of the Strategic Issues and Applications Division (Tintoré et al., 2013). In the second year, 2015, it was operative from January 1st. The system involved the regional fisheries, environmental and emergency administrations, charter associations as well as CSIC institutes and SOCIB. For the first time, a routine and systematic program of surveillance of jellyfish-observations was established with qualified and trained personnel, monitoring at high spatial and temporal resolution in three different types of coastal areas: the marine reserves, the coastal waters around 1 mile offshore, and the beaches. The system includes a web platform and an associated database that contains the data gathering in 3 Marine Protected Areas, both several observation sites each by DG Fisheries personnel and an associated database that contains the data gathering in 3 Marine Protected Areas, both several observation sites each by DG Fisheries personnel, in 33 routes (with 65 sites) from the coastal area boat cleaning services from DG Water Quality and in 202 beaches, where monitoring was carried out by Magadors from the DG Emergencies. All observations were performed following established protocols to obtain a systematic, periodic, routine monitoring. The application allows the filtering per location or period. A "heat map" showing where is the highest abundance of jellyfish is also available. Right now the access is restricted to participating institutions and each user is identified. The entire dataset that is being accumulated will be available for download by the users.

RESULTS

The total number of observations registered on the website during both years is 30,388, although from all those observations only in 1754 cases were jellyfish observed. In the first pilot year, a total of 799 positive jellyfish sightings were registered. In that year, the most abundant species was *Physalia physalis* (131), followed by *Cotyleclopsis tuberculata* (119) and *Thysanoessa aestiva* (71). During the second year, 2015, a total of 955 jellyfish sightings were reported. In 2015, again the most abundant species was *Physalia physalis* (536). The rest of the jellyfish species were one order of magnitude lower, being *Physalia physalis* (98), *Cotyleclopsis tuberculata* (70) and *Thysanoessa aestiva* (32). The most active users are the beach emergency staff (with 2,400 observations), followed by the workers from the routes of the boat cleaning services (8700) and from the marine protected areas (260). The database is being created to incorporate information from meteorology and oceanography later on, in order to advance in the understanding of the links among the jellyfish swarms in the shore and the different scales of variability at which they are affected.

CONCLUSIONS

In a pioneer effort, several governmental services from the Balearic Islands have worked together with scientists and upload jellyfish observations in real time, establishing a new database generated under scientific standards to allow a solid understanding of the episodes and the implementation of appropriate knowledge-based future mitigation actions.

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Implicaciones a niveles social, económico y ecológico



problemas de observación, dificultad de muestreo, dificultad para mantener en cultivo, dificultad para su preservación

Necesidad de **nuevas tecnologías** y de **programas de seguimiento sistemáticos, robustos y rutinarios**. La co-creación con los **stakeholders es obligatoria**

