



Strengthening fisheries sustainability outside EU
CETMAR, Vigo, 26-27 June 2018

What management tools can be designed? (WP6)

Javier Ruiz & Margarita Rincón (CSIC)

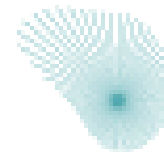
**Responsive Results-Based Management and
capacity building for EU Sustainable Fisheries
Partnership Agreement- and international waters**

Vigo, June 2018



WP6. Development of management tools

Javier Ruiz & Margarita Rincón



Shuttle Thread

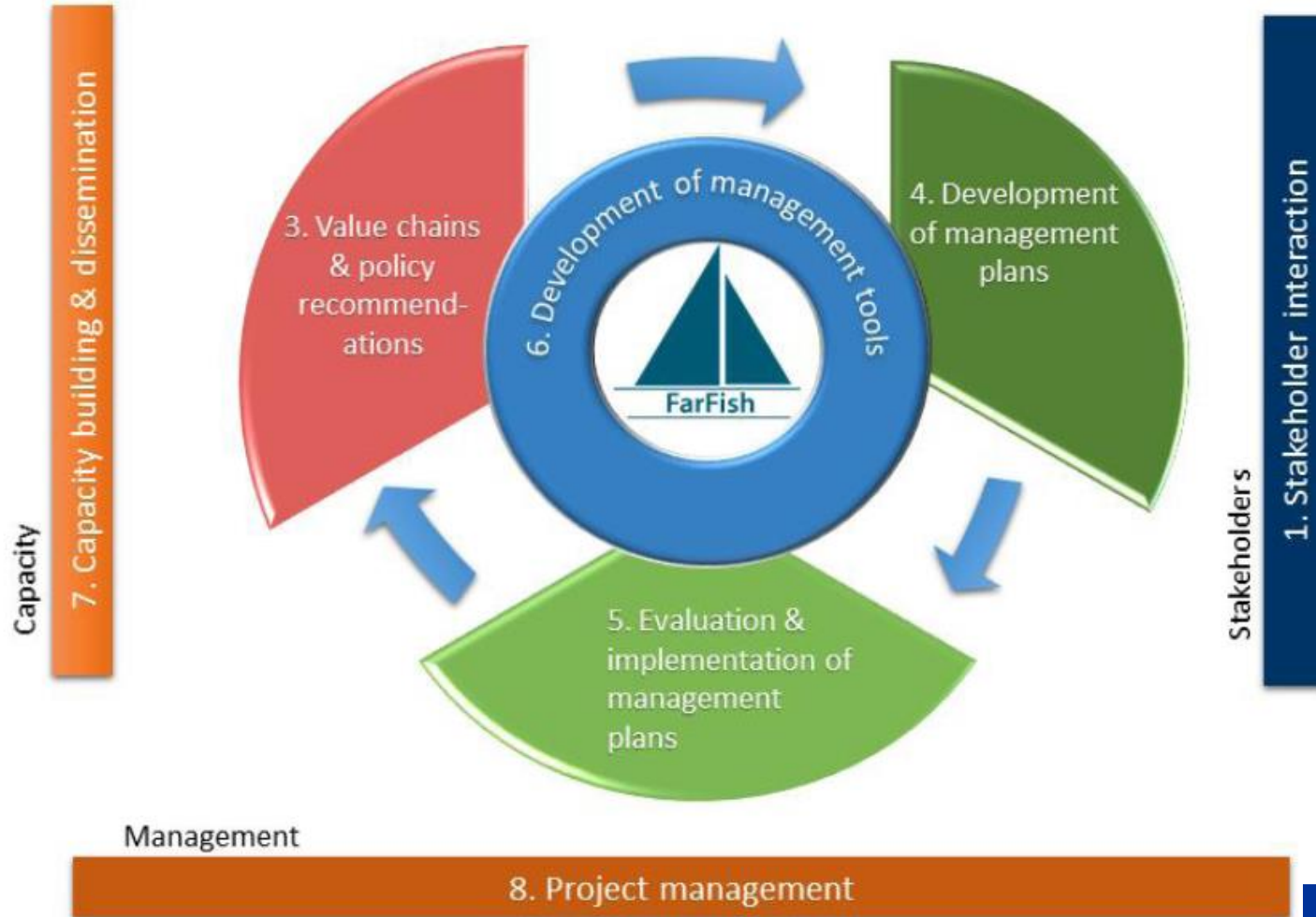
+ Case Study leaders



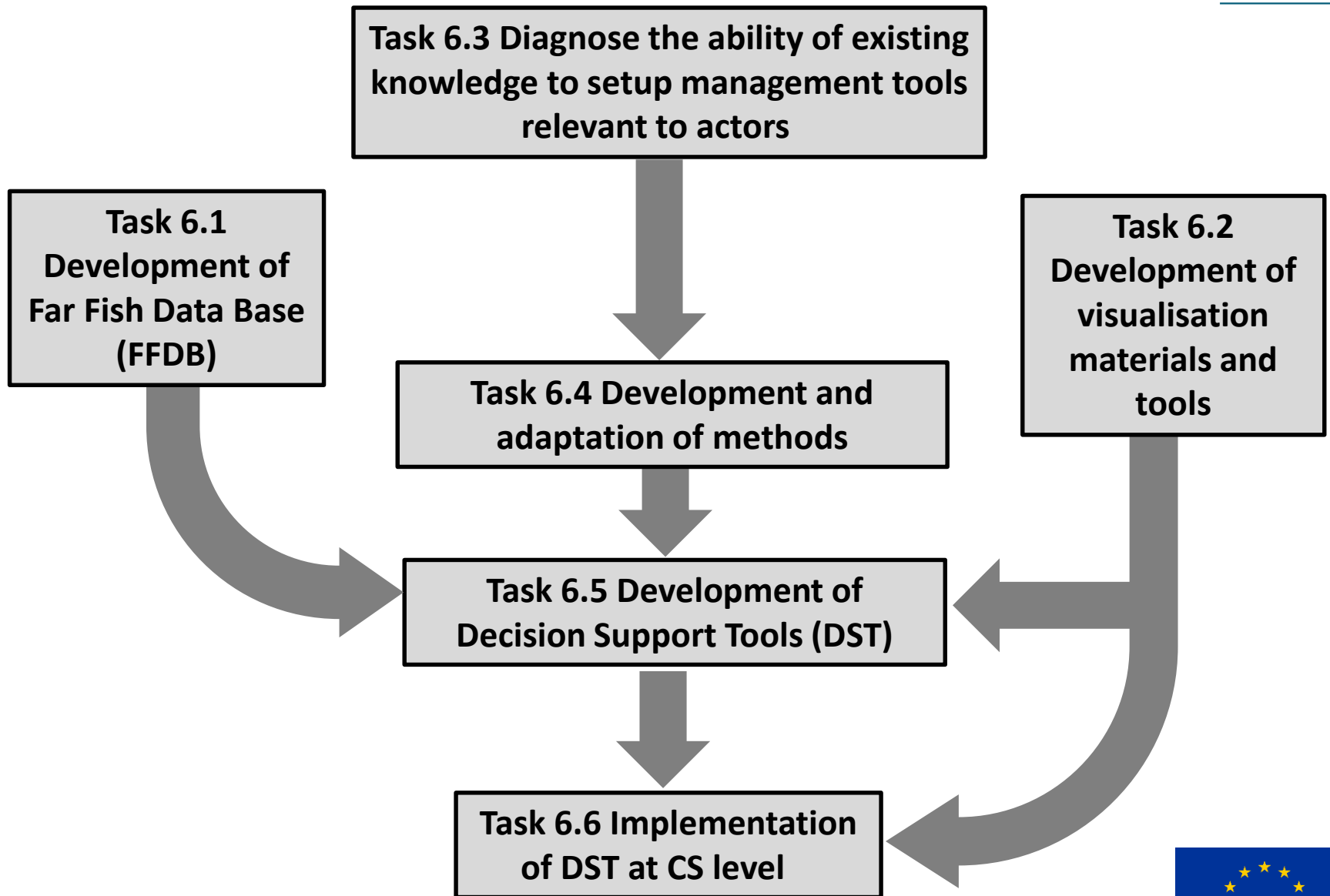
Role of WP6 in FarFish

Current situation

2. Biological knowledge & stock assessment models



Structure of WP6



Characteristics of the Decision Support Tools

Consultation

Added value



Relevant



Technical



Useful

Added Value & Relevance: Consultation



Interaction with actors that are partners of FarFish consortium

*Kick-off meeting
in Vigo*

*Case study and work package
leaders meeting in Faro*

*First annual meeting
Portsmouth*

Interaction with actors that are not partners of FarFish consortium

(Joint work with WP4 to draft MPR0)

RFMO

ICCAT



CECAF



Food and Agriculture
Organization of the
United Nations

IOTC



iotc ctoi

Other Actors



**GLOBAL
FISHING
WATCH**

Usefulness: Technical Characteristics



1) Platforms to host the tools will be free and open access to guarantee reproducibility, interoperability, affordability, and transparency.

2) The tools will ensure full access to all actors in the process independently of their technical and/or economic possibilities.

3) The tools will ensure the immediate capacity of all actors to use it once this has been created.

4) Sustainability once FarFish project is finished will be facilitated to interested actors in coordination with the MPs designed in WP4.

5) The codes generated will be implemented within open code platforms, e.g. R, with available interactive facilities to simulate and visualize (e.g. Shiny package).



Tools per Case Study



<u>Demands from MPQ</u>	<u>Demands to WP2</u>	<u>Potential tools</u>	<u>Partners</u>	<u>Risks</u>
SW Atlantic				
Contribute to better compliance in the area by supporting enforcement by utilizing latest available satellite systems and tools		Satellite remote sensing & AIS	CSIC, STL	Not enough sensitivity and/or resolution
SE Atlantic				
Analyse current stock assessment methods Improvements using new or existing tools is dependent on the defined CS objectives and OT, making sure that the FarFish contribution is relevant also by consulting SEAFO (FarFish RG).	(1) Data gathering according to the online template in FarFish D6.1-online site and in coordination with D4.1, D4.3 and D4.4	(2) Implement Data Limited Methods	(1) IMR, CCMAR (2) CSIC	Data do not exist or insufficient
Contribute to better compliance in the area by supporting enforcement by utilizing latest available satellite systems and tools.		Satellite remote sensing & AIS	CSIC, STL	Not enough sensitivity and/or resolution
Cape Verde				
In conformity with ICCAT, collect and analyse data on bycatch of swordfish and blue shark by the EU fleet in the Cape Verde EEZ. If sufficient data is accessible, model scenarios, which may add value to development harvest control rules for these bycatch species. Implementation of biological sampling and data collection programmes (self sampling protocols)	(1) Data gathering according to the online template in FarFish D6.1-online site and in coordination with D4.1, D4.3 and D4.4	(2) DLM for bycatch	(1) IMR, CCMAR (2) IMR, UJT	Data do not exist or insufficient
Contribute to better compliance in the area by supporting enforcement by utilizing latest available satellite systems and tools.		Satellite remote sensing & AIS	CSIC, STL	Not enough sensitivity and/or resolution
Senegal				
Improve stock assessment models and tools, developing networks, working groups and knowledge transfer. FarFish aim to add value to present work in CECAF applying new models and tools.	(1) Self-sampling	(1) Tools for hake stock differentiation (2) Automatic Biodjir run and visualization (3) Authomatic DLM run and visualization	(1) UJT, CCMAR (2) IMR, MATIS (3) CSIC, MATIS	Inexistent data or impossibility to make new operative tools to this aim Further formal contacts with CECAF may identify further tools.
Contribute to better compliance in the area by supporting enforcement by utilizing latest available satellite systems and tools		Satellite remote sensing & AIS	CSIC, STL	Not enough sensitivity and/or resolution



Demands from MPO	Demands to WP2	Potential tools	Partners	Risks
Mauritania				
Advanced knowledge on how the signal of oceanographic processes affects the shrimps stocks and the shrimp fishery will improve assessment and dampen the fluctuations in landings. Given the present capacity of the scientific community to foresee the impact of large-scale climatic oscillations, this might help to rise early warnings and preventive measures to protect the stock and improve long-term profitability of the EU fleet targeting shrimp.		Assess shrimp stock dynamics in an oceanographic context	CSIC CCMAR	No neat assessment is achieved
Seychelles				
Contribute to the assessment of non-target species included in recent discard ban (IOTC, 17/04)	(1) Data gathering according to the online template in FarFish D6.1-online site and in coordination with D4.1, D4.3 and D4.4	(2) DLM for bycatch	(1) IMR, CCMAR (2) IMR, UiT	Data do not exist or insufficient
Contribute to better compliance in the area by supporting enforcement by utilizing latest available satellite systems and tools		Satellite remote sensing & AIS	CSIC	Not enough sensitivity and/or resolution

Tool families

- 1) Model implementation to evaluate stocks.
- 2) Big-Data analysis from satellite in support of compliance.
- 3) Oceanographic support to stock dynamics.
- 4) Tools to differentiate hake stocks in NW Africa.
- 5) Visualization tools.

1) Model implementation to evaluate stocks with limited data.



JOINT WP2&6 TEMPLATE FORMAT FOR DATA

sh.eu/upload

Farfish FFDB upload

Upload type: Document name:

Data description

Please fill the form with all the data available for your stock, if you are not sure about the value of some category please enter 'NA'. If a field heading is underlined you can hover over for a more detailed description.

Based on DLMtool package (Tom Carruthers and Adrian Hordyk (2016). DLMtool: Data-Limited Methods Toolkit. R package version 3.1. <https://CRAN.R-project.org/package=DLMtool>).

	Value										
Species											
Location											
Case study											

Catch data

Catch data should be in tonnes.

Start year: End year:

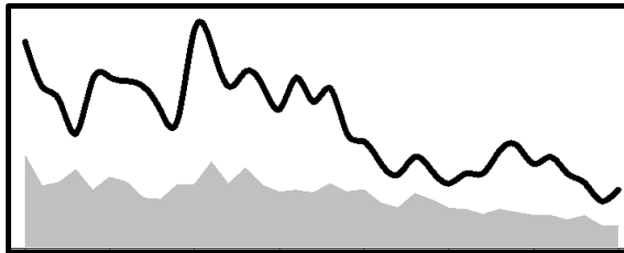
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Catch	104.7041	112.2076	111.3035	128.2866	149.8358	137.8407	162.6785	191.1055	174.8697	205.1042	193.6927
Abundance index	.2	.3	.2	.3	.2	.3	.2	.3	2.	.3	2.

Catch at age

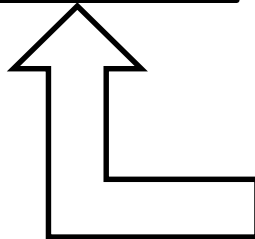
Age data should be in numbers.

Bins: Start year: End year:

	1	2	3	4	5	6	7	8	9	10	11
2000	0	0	3999	1.0013	3999	8.9993	5.9985	3.0008	3.0008	0	0
2001	0	5	4	2	2	2	1	0	2	0	2
2002	0	1001	5005	41002	6994	33995	2002	3003	18005	7995	2002
2003	0	999	8.0031	3996	24.9972	3996	31.0023	2997	999	12.9981	11.9991
2004	0	0	27	11.0016	0	14.9976	2.0016	9	0	1.0008	4.9968
2005	0	0	2.9997	8.0001	2.0007	2.0007	8.9991	999	999	0	0
2006	0	0	0	1.0003	1.9999	1.0003	0	3.0002	0	0	0
2007	0	0	0	0	3.0002	3.9998	0	0	0	0	0



ASSESSMENT



AUTOMATIC DLM RUN



Method	Variation	Source
Depletion-Based Stock Reduction Analysis	DBSRA	Dick and MacCall (2011)
Depletion-Corrected Average Catch	DCAC	MacCall, (2009)
Beddington and Kirkwood Life-History Analysis	BK	Beddington and Kirkwood (2005)
F _{MSY} To M Ratio (F _{RATIO})	F _{RATIO}	Walters and Martell (2002)
Yield Per Recruit Analysis	YPR	Beverton and Holt, (1957)
Surplus Production Stock Reduction Analysis	SPSRA	McAllister et al. (2001)
Demographic F _{MSY}	F _{DEM}	McAllister et al. (2001)

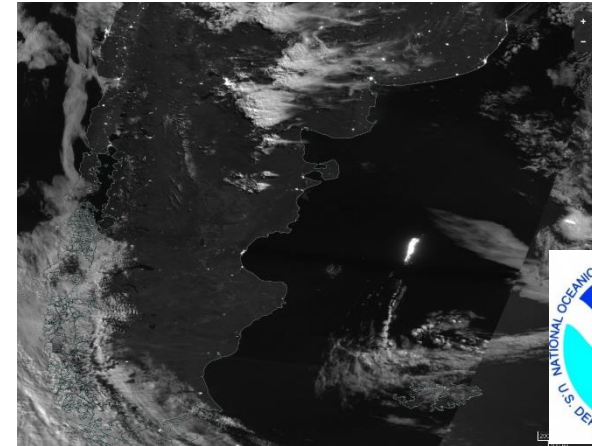
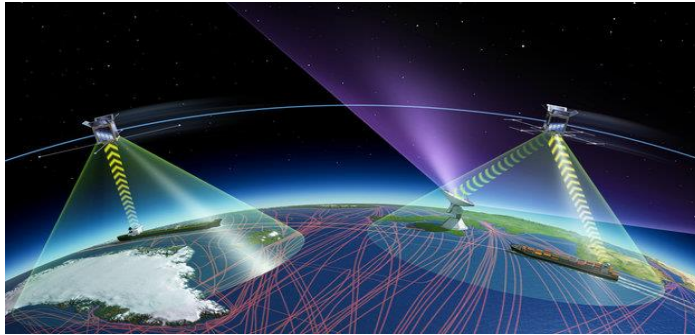


2) Big-Data analysis from satellite in support of compliance.

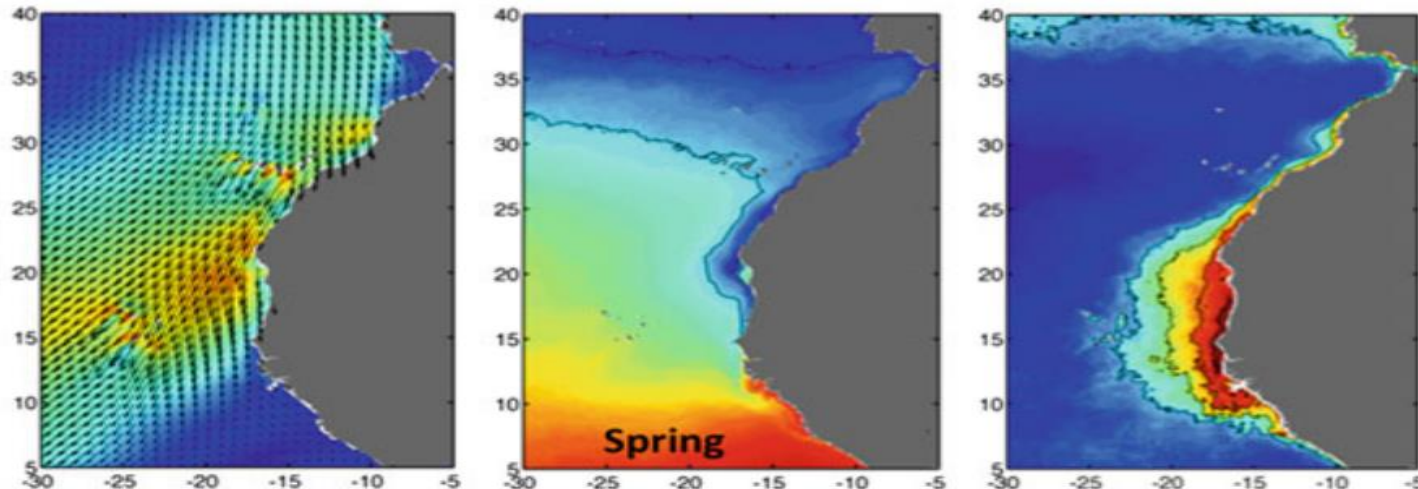
2.8 Gb of high resolution SAT-AIS data

Open-access tools to focus on effort at CSs

Recording dark activities with VIIRS

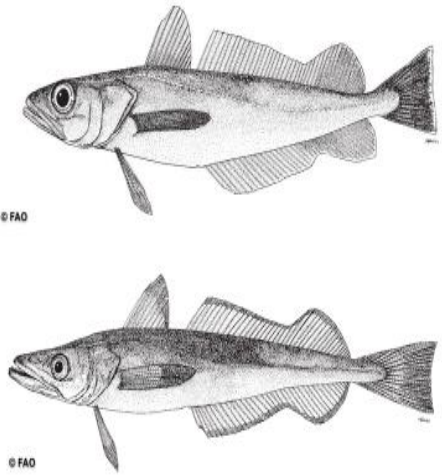


3) Oceanographic support to the stocks dynamics of mid-trophic species .



4) Tools to differentiate hake stocks in NW Africa.

Potential identification keys for Black hake *M. polli* and *M. Senegalensis*



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Descriptive characteristics of juvenile and adult:

1. Position of mouth
 - M. polli: terminal
 - M. senegalensis: superior

Meristic characteristics:

1. Gill rakers (total)
 - M. polli: 8-12
 - M. senegalensis: 13-18

MORFOLOGICAL DIFFERENTIATION IN FISHING VESSELS:

- Self-sampling (coordination with WP2)
- Training (coordination with WP7)

5) Visualization.

- As a tool to make easier the message got from the output of models in CECAF
- As a tool to focus GLOBAL AIS data into CS áreas particular interest

