Report on HFR - Ibiza Historical data files QA/QC

Data provider information:

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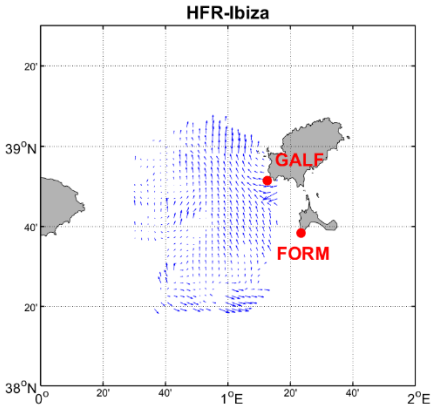
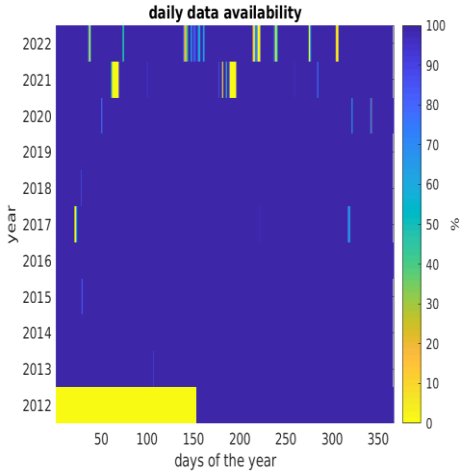
- acknowledgements: Ministerio de ciencia e innovación, Govern de les Illes Balears , Consejo Superior de Investigaciones Científicas (España) -10.13039/501100003339, The network has been designed, implemented and managed through the efforts of SOCIB. The datasets collected were partially supported by the Jerico Next (H2020) and CMEMS-SE and INCREASE projects

System: **Ibiza**
Sites: **FORM, GALF**
Data set: **Totals**
Data source: Totals from the radials combination in de EU Node
Period: **2012-Jun-01 - 2022-Dec-31**



Map of the HFR-NAdr network area. Red dots indicate the position of the sites



Daily data % available during the whole time period

INFO ON QA/QC Settings and Calibration

%%% QC info for all the period 01-Jun-2012 – 31-Dec-2022
OceanSITES quality flagging for GDOP threshold QC test. Threshold set to 2.83
OceanSITES quality flagging for Data density threshold QC test. Threshold set to 3 radials.
OceanSITES quality flagging for Velocity threshold QC test. Threshold set to 0.7 m/s.
OceanSITES quality flagging for variance threshold QC test. Test not applicable to Direction Finding systems. The Temporal Derivative test is applied. Threshold set to 1 m/s.

%%% Calibration info
GALF: 2015-08-18T00:00:00Z;
FORM: 2017-01-26T00:00:00Z
GALF: 2018-11-14T00:00:00Z;
FORM: 2018-11-15T00:00:00Z;
FORM: 2020-03-03T00:00:00Z;

Inconsistencies between the information provided in the header of the radials and the dates of the last calibration performed. This problem is being analysed with the data provider

RESULTS OF HIST DATA INSPECTION

General comments:

We have noticed 3 periods to be controlled and/or reflagged, occurring in:
2013, 2015, 2018
(to be changed after control only if flag is not yet equal to 0 or 4)
High mean current values and standard deviation.

year	General comment	Periods to be reflagged	Reason for new fagging	Sugg. Flag
2013		01-Feb-2013 – 20-mar-2013	high std variability low data availability	2
2015		14-Jan-2015 – 23-Jan-2015	high std variability isolated data period	3
2018		21-Jan-2018 – 22-Feb-2018	high std variability low data availability isolated data period	3

After exchanges with the provided the following periods where reflagged:

Year	General comment	Periods to be reflagged	Reason	New Flag
2013		01-Feb-2013 – 20-mar-2013	**Observations** > Incidence in GALF (Ibiza Radial site) [22/01/2013-20/03/13]. Increase of reflected power from 1 to 6 W; change in loops phase; error related to the 13.5 MHz CODAR SeaSonde antenna design	3

			Consequences > Radial vector count reduction **Actions required** > Change to A4-AISI 316 Stainless Stell Dome Nut and Calibration of the station in April	
2015		14-Jan-2015 – 23-Jan-2015	**Observations** > Incidence in FORM (Formentera Radial Site) [09/01/2015-21/02/2015]. Communication outage and hardware (macmini) outage. **Consequences** > Radial data loss **Actions required** > Reparation of WIMAX antenna and installation of a new macmini configured with SS Radial Suite R7	3
2018		21-Jan-2018 – 22-Feb-2018	**Observations** > Incidence in FORM related to the failure of the AWG module (PPS signal problems; spectrac acquisition restarted every 15 seconds) ; Incidence in GALF related to frequent AC power outage **Consequences** > No generation of spectra, nor radials **Actions required** > change the AWG module in FORM	3

Spatial Coverage vs. Temporal coverage: objective of USCG 80-80% data availability

Period	General comments	Nb. analysed hours	80%-80% obj.
2012	89.5652% spatial availability 80% of the time.	5136	y
2013	89.1304% spatial availability 80% of the time.	8757	y
2014	89.1304% spatial availability 80% of the time.	8760	y
2015	89.5652% spatial availability 80% of the time.	8756	y
2016	90.4348% spatial availability 80% of the time.	8784	y
2017	13.6957% spatial availability 80% of the time.	8681	n

2018	82.1739% spatial availability 80% of the time.	8756	y
2019	90.4348% spatial availability 80% of the time.	8760	y
2020	71.7391% spatial availability 80% of the time.	8751	n
2021	70.6522% spatial availability 80% of the time.	8352	n
2022	67.6087% spatial availability 80% of the time.	8241	n

Annex I Applied QA/QC tests

QC Flag Variable name	Short name	Short description
-	**Syntax**	**Syntax** check: this test will ensure the proper formatting and the existence of all the necessary fields within the total NetCDF file. This test is performed on the NetCDF files and it assesses the presence and correctness of all data and attribute fields and the correct syntax throughout the file. This test is performed by the European HFR Node before pushing data to the distribution platforms.
DDNS_QC	**Data Density Threshold**	**Data** Density **Threshold**: this test labels total velocity vectors with a number of contributing radials bigger than the threshold with a "good data" flag and total velocity vectors with a number of contributing radials smaller than the threshold with a "bad data" flag.
CSPD_QC	**Velocity Threshold**	Velocity **Threshold**: this test labels total velocity vectors whose module is bigger than a maximum velocity threshold with a "bad data" flag and total vectors whose module is smaller than the threshold with a "good data" flag.
VART_QC	**Variance Threshold**	**Variance** Threshold: this test labels total vectors whose temporal variance is bigger than a maximum threshold with a "bad data" flag and total vectors whose temporal variance is smaller than the threshold with a "good data" flag. This test is applicable only to Beam Forming (BF) systems. Data files from Direction Finding (DF) systems will apply instead the "Temporal Derivative" test reporting the explanation "Test not applicable to Direction Finding systems. The Temporal Derivative test is applied." in the comment attribute.
TIME_QC	**Temporal Derivative**	**Temporal** Derivative: for each total bin, the current hour velocity vector is compared with the previous and next hour ones. If the differences are bigger than a threshold (specific for each grid cell and evaluated on the basis of the analysis of one-year-long time series), the present vector is flagged as "bad data", otherwise it is labelled with a "good data" flag. Since this method implies a one-hour delay in the data provision, the current hour file should have the related QC flag set to 0 (no QC performed) until it is updated to the proper values when the next hour file is generated.
GDOP_QC	**GDOP Threshold**	**GDOP** Threshold: this test labels total velocity vectors whose GDOP (Geometrical Dilution Of Precision) is bigger than a maximum threshold with a "bad data" flag and the vectors whose GDOP is smaller than the threshold with a "good data" flag.
QCflag	**Overall QC**	

Annex II QC Flags

Code	Meaning	Comment
0	No QC was performed	-
1	Good data	All real-time QC tests passed.

2	Probably good data	-*
3	Bad data that are potentially correctable	These data are not to be used without scientific correction.*
4	Bad data	Data have failed one or more of the tests.
5	Value changed	Data may be recovered after transmission error.
6	Not used	-
7	Nominal value	-
8	Interpolated value	Missing data may be interpolated from neighbouring data in space or time.
9	Missing value	-

*These two are to be used after examination of the hist data sets and exchanges with the data provider

Annex III Figures for the QA/QC tests

Fig A – Temporal series of the spatial average of the current velocity module (first panel), its standard deviation (second panel), the grid points of the total coverage (third panel), and monthly data availability. Black dots are the values obtained considering all the data in the domain, in green those considering only data with QC flag =1 (good data).

Fig B - Temporal series of the QC flags for all the grid nodes with data and percentage of data with each flag (0,1,2,3,4).

Fig C - Maps of the mean velocity module and the mean value of QC flags for the target year (left column) and their standard deviations (right column) for the target year.

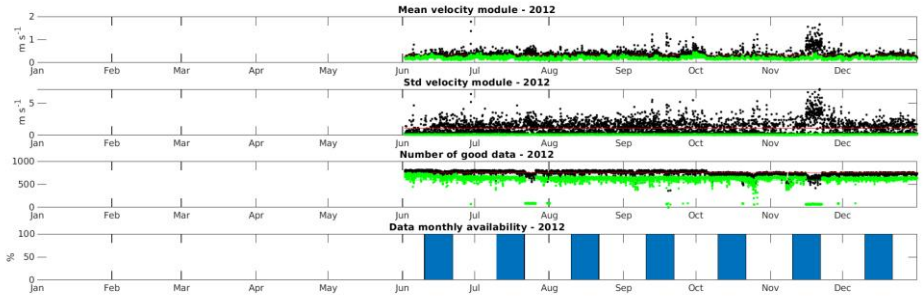
Fig D - Spatial (x-axis) vs. temporal (y-axis) coverage 80/80 annual metric. Allows to check if the system has reached the goal of providing surface currents over the 80% of the area during 80% of the time. The grid points taken in account for the % are the ones inside the GDOP limits defined by the data provider.

Fig E – Map of the % of availability of data in each grid point and contour showing the area of temporal availability >80%

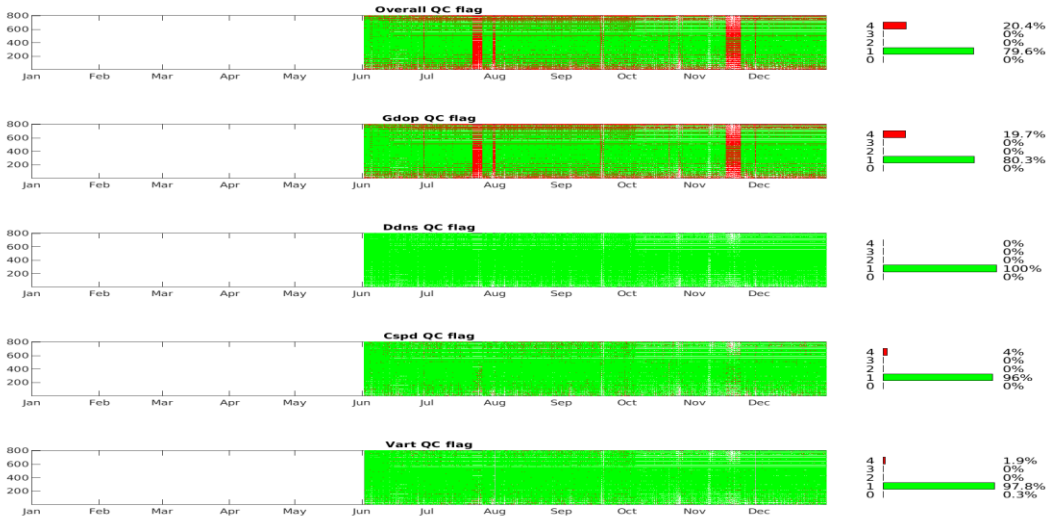
Fig F- Mean surface current maps for the indicated systems and periods. The means are computed in the area of 80% temporal coverage for the target year.

Period: 2012

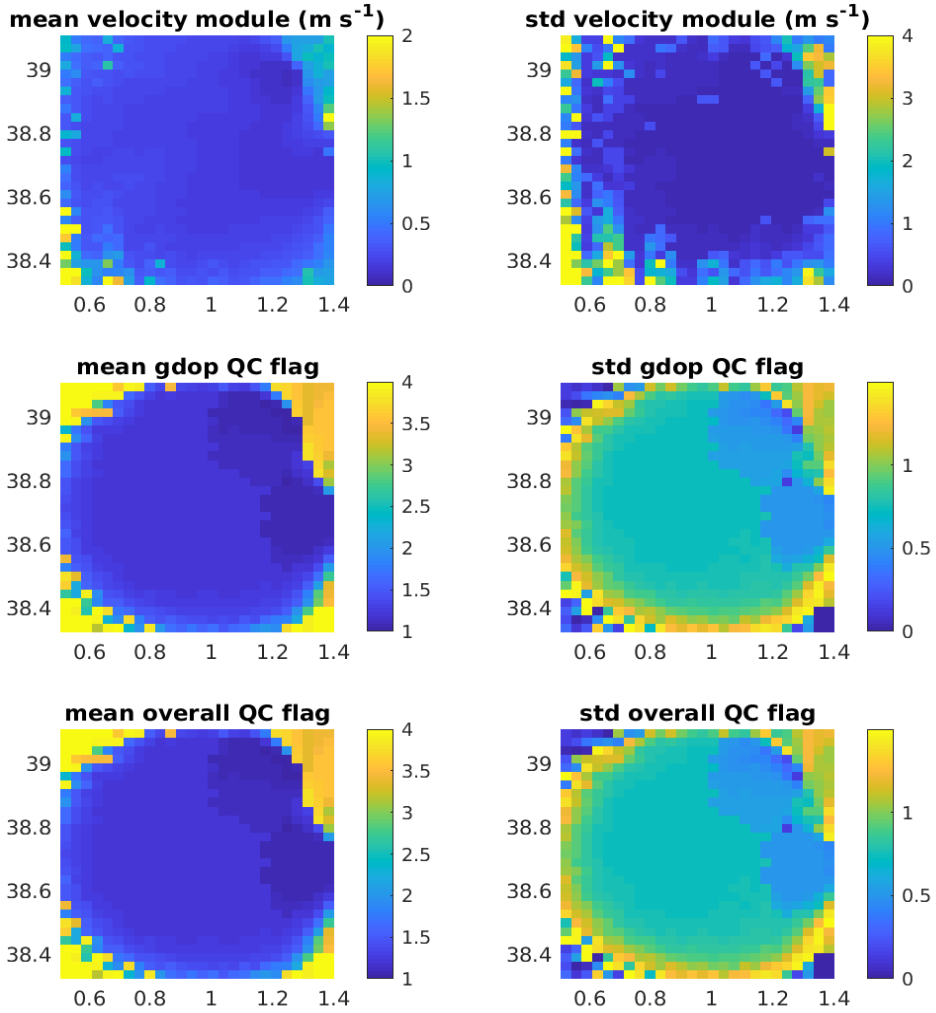
A



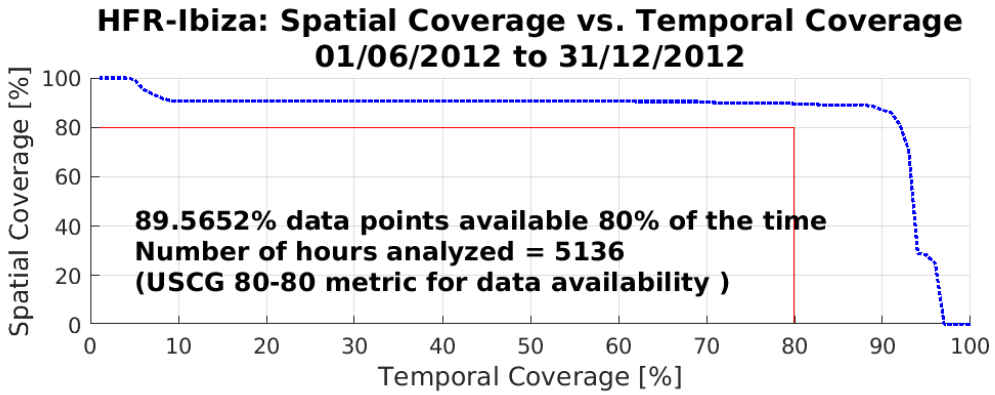
B



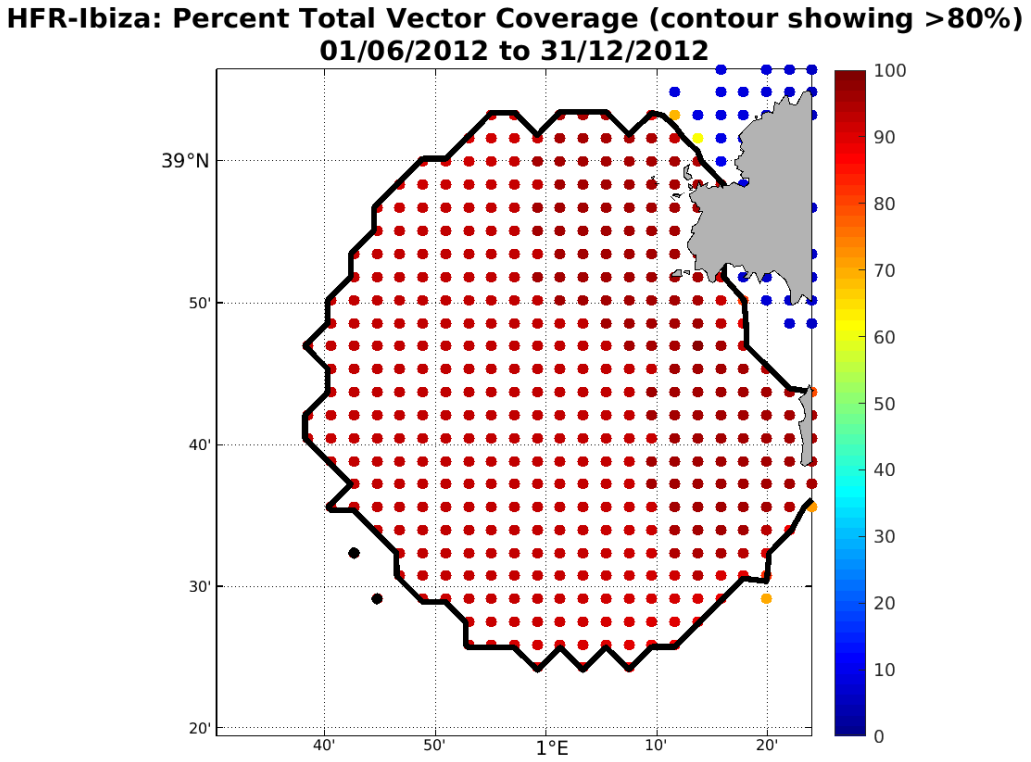
C


mean velocity module (m s-1)
std velocity module (m s-1)
mean gdop QC flag
std gdop QC flag
mean overall QC flag
std overall QC flag
39
38.8
38.6
38.4
0.6
0.8
1
1.2
1.4

D

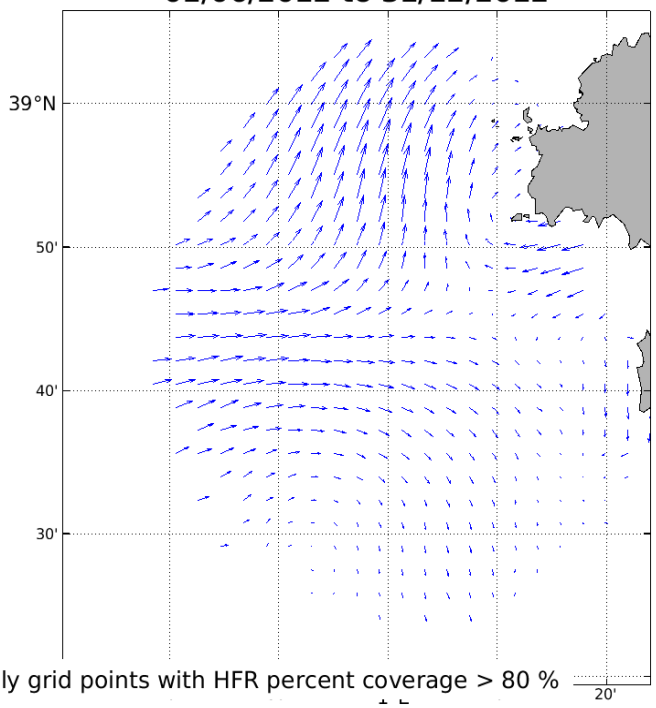

HFR-Ibiza: Spatial Coverage vs. Temporal Coverage
01/06/2012 to 31/12/2012
Spatial Coverage [%]
Temporal Coverage [%]
89.5652% data points available 80% of the time
Number of hours analyzed = 5136
(USCG 80-80 metric for data availability)

E


HFR-Ibiza: Percent Total Vector Coverage (contour showing >80%)
01/06/2012 to 31/12/2012
39°N
50'
40'
30'
20'
40'
50'
1°E
10'
20'

F

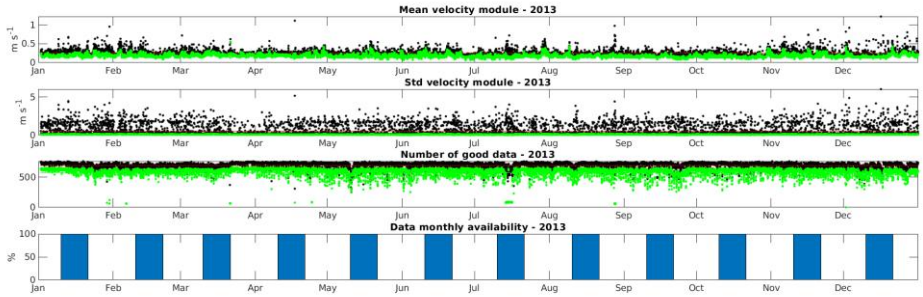
HFR-Ibiza: HFR Surface current average [m/s]
01/06/2012 to 31/12/2012



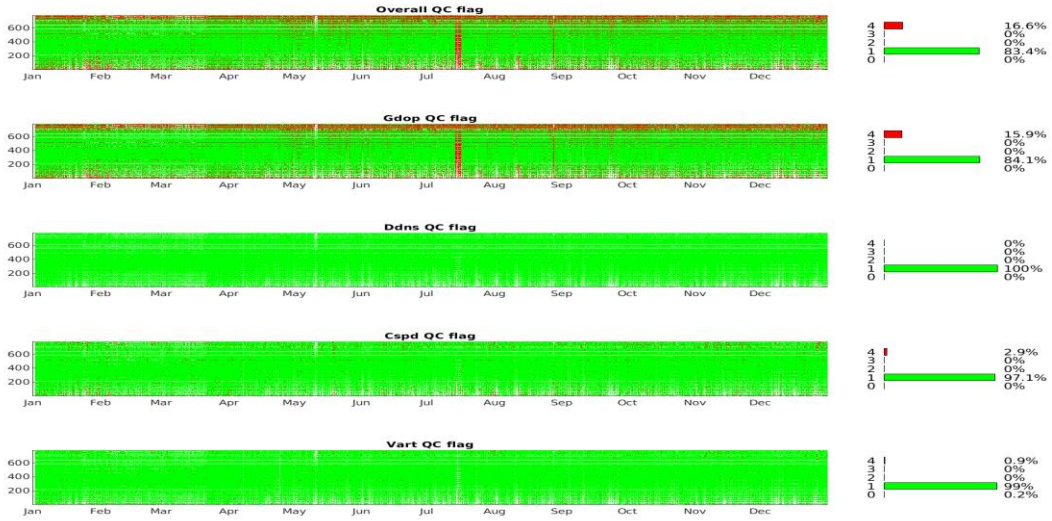
Only grid points with HFR percent coverage > 80 %

Period: 2013

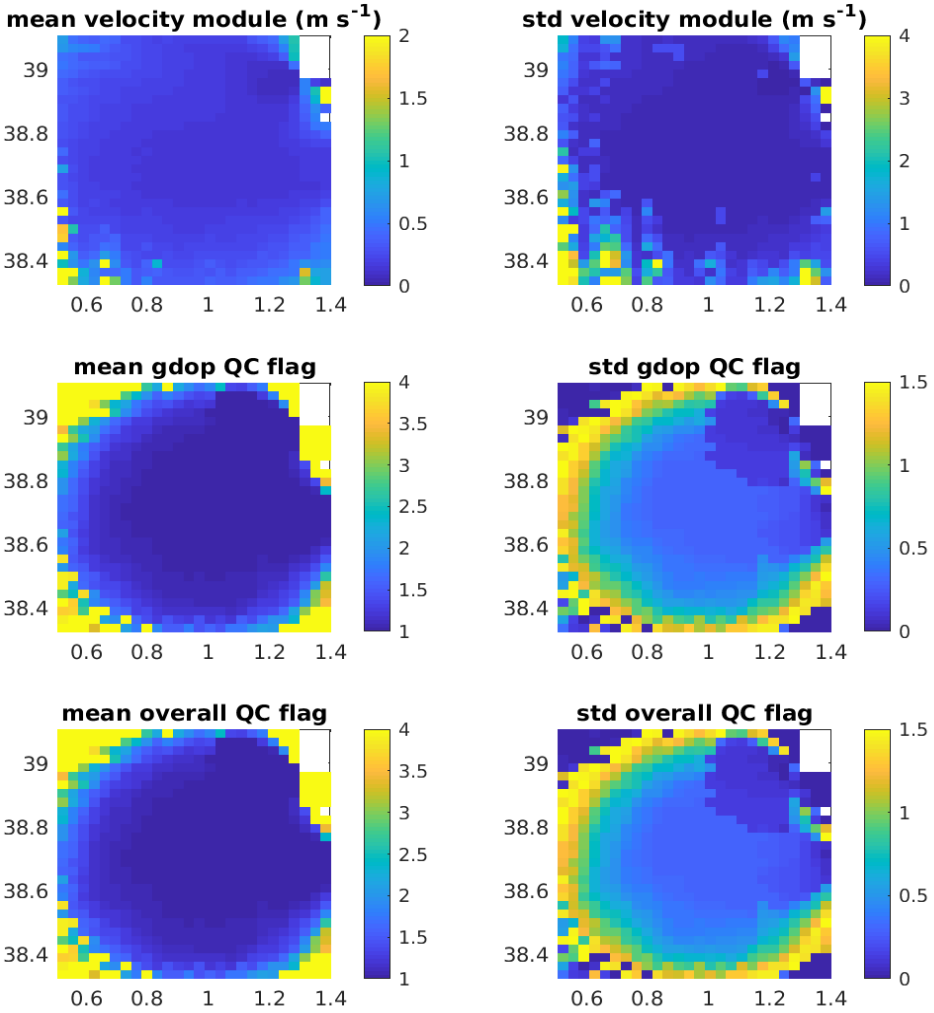
A



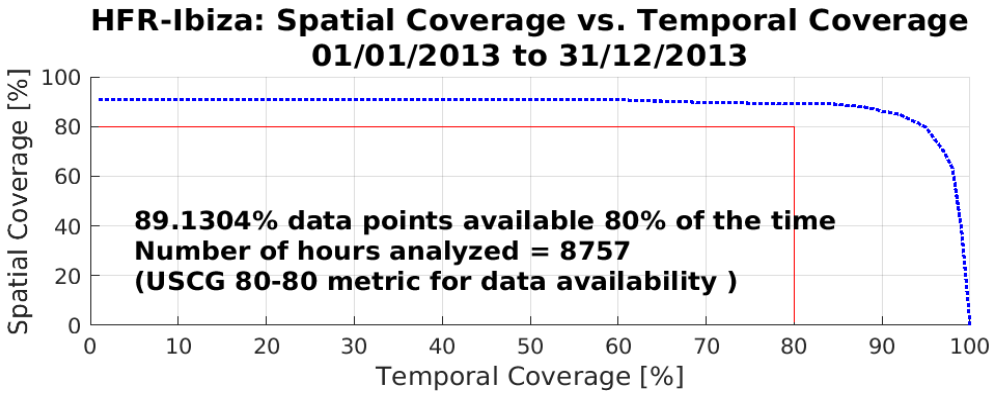
B



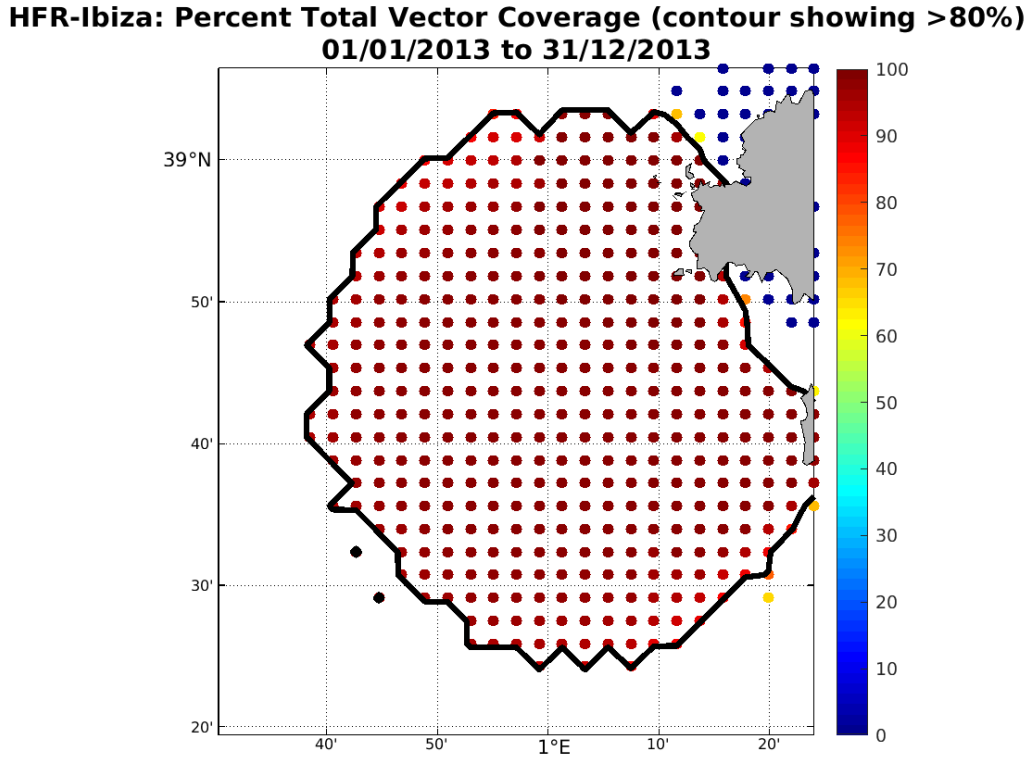
C

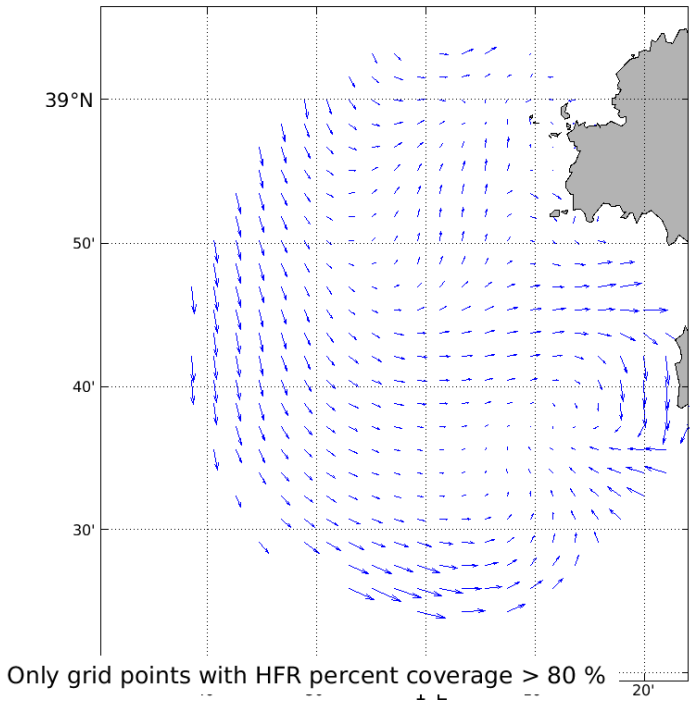

mean velocity module (m s-1)
std velocity module (m s-1)
mean gdop QC flag
std gdop QC flag
mean overall QC flag
std overall QC flag
39
38.8
38.6
38.4
0.6
0.8
1
1.2
1.4

D


HFR-Ibiza: Spatial Coverage vs. Temporal Coverage
01/01/2013 to 31/12/2013
Spatial Coverage [%]
Temporal Coverage [%]
89.1304% data points available 80% of the time
Number of hours analyzed = 8757
(USCG 80-80 metric for data availability)

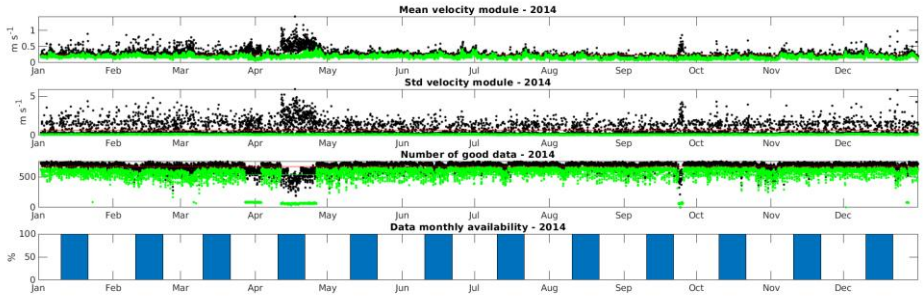
E


HFR-Ibiza: Percent Total Vector Coverage (contour showing >80%)
01/01/2013 to 31/12/2013
39°N
50'
40'
30'
20'
40'
50'
1°E
10'
20'

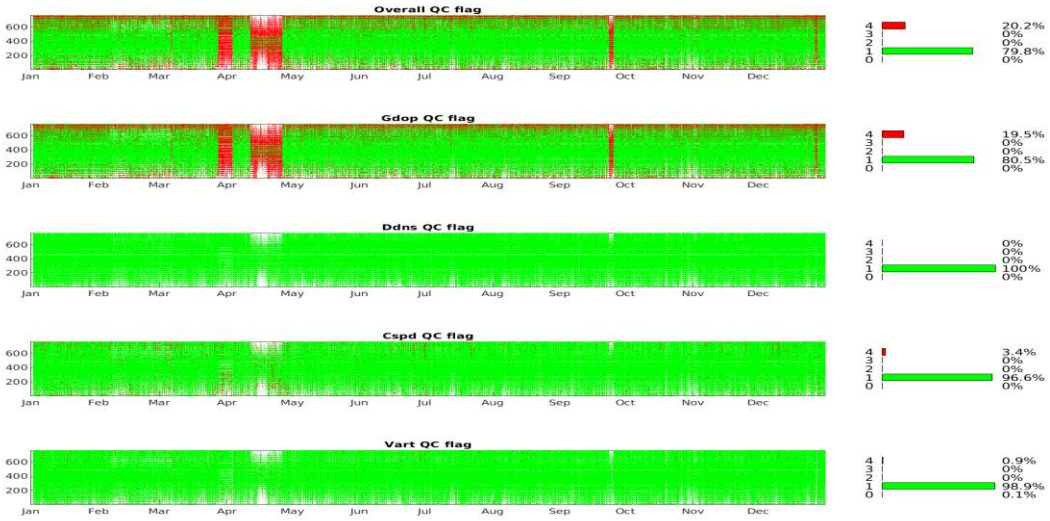
F	**HFR-Ibiza: HFR Surface current average [m/s]** **01/01/2013 to 31/12/2013**  Only grid points with HFR percent coverage > 80 %

Period: 2014

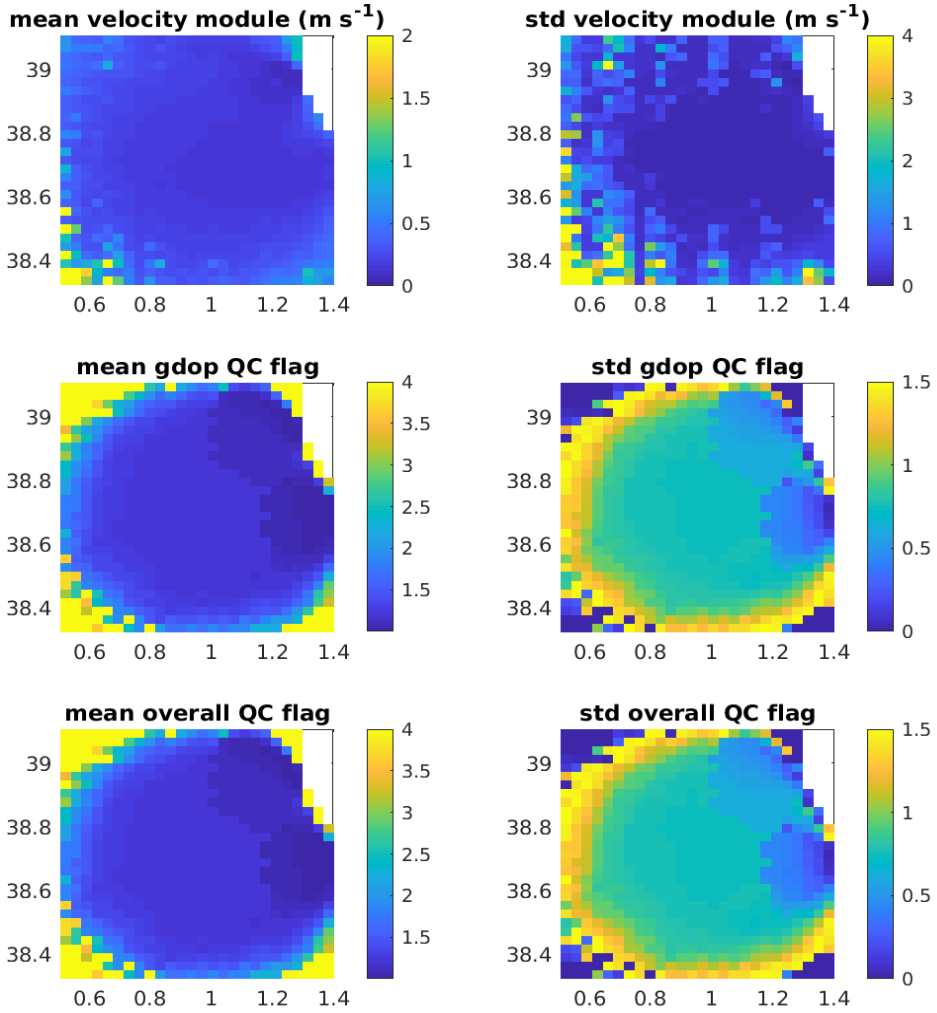
A



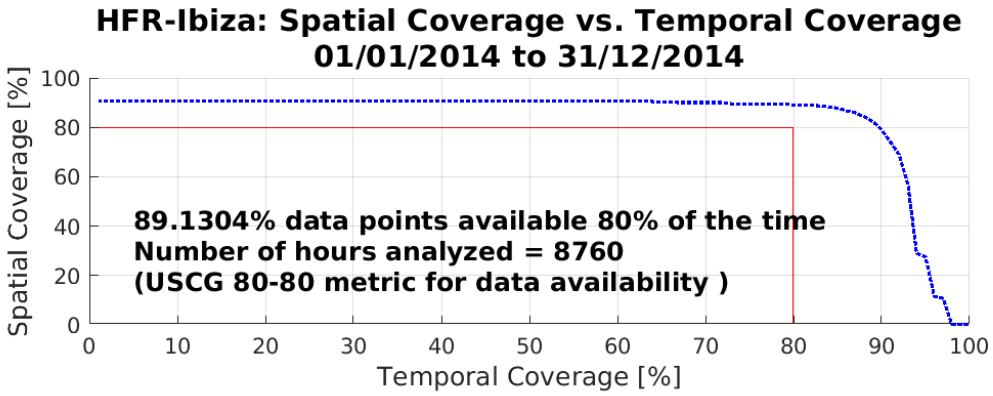
B



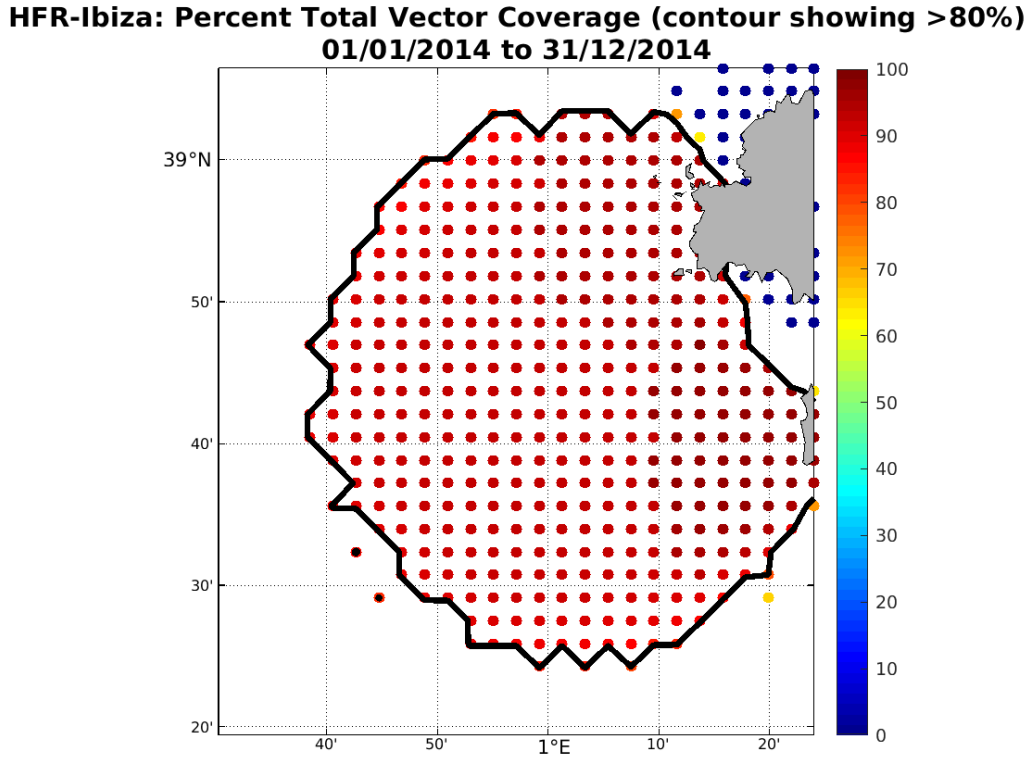
C


mean velocity module (m s-1)
std velocity module (m s-1)
mean gdop QC flag
std gdop QC flag
mean overall QC flag
std overall QC flag
39
38.8
38.6
38.4
0.6
0.8
1
1.2
1.4

D

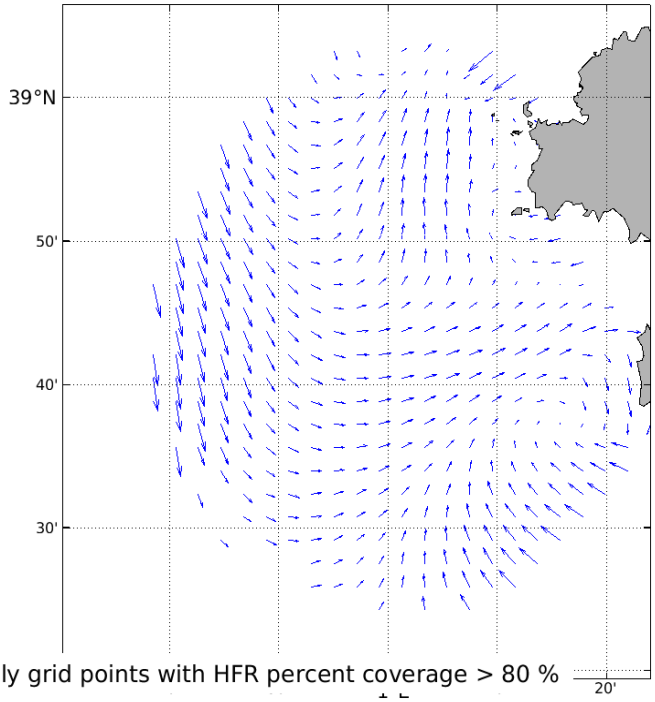

HFR-Ibiza: Spatial Coverage vs. Temporal Coverage
01/01/2014 to 31/12/2014
Spatial Coverage [%]
Temporal Coverage [%]
89.1304% data points available 80% of the time
Number of hours analyzed = 8760
(USCG 80-80 metric for data availability)

E


HFR-Ibiza: Percent Total Vector Coverage (contour showing >80%)
01/01/2014 to 31/12/2014
39°N
50'
40'
30'
20'
40'
50'
1°E
10'
20'

F

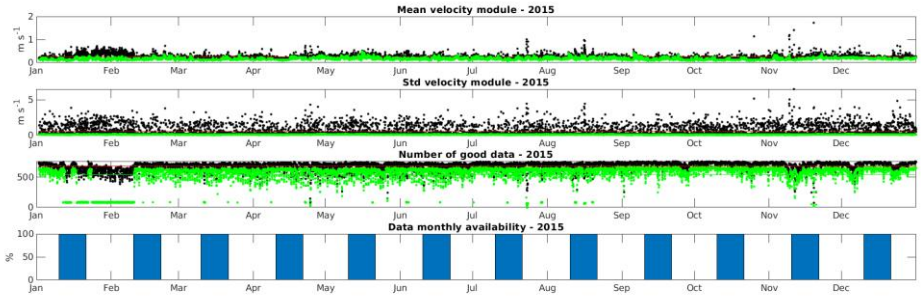
HFR-Ibiza: HFR Surface current average [m/s]
01/01/2014 to 31/12/2014



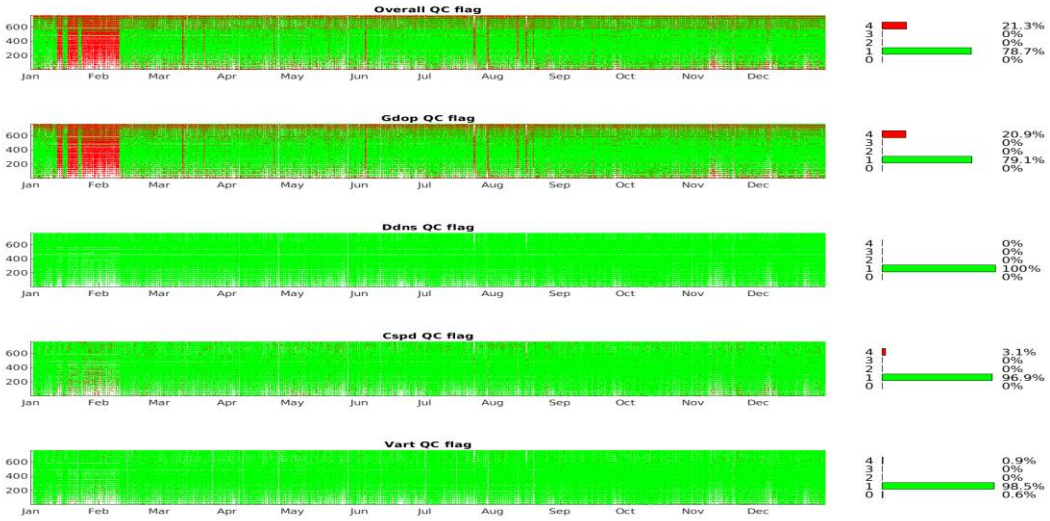
Only grid points with HFR percent coverage > 80 %

Period: 2015

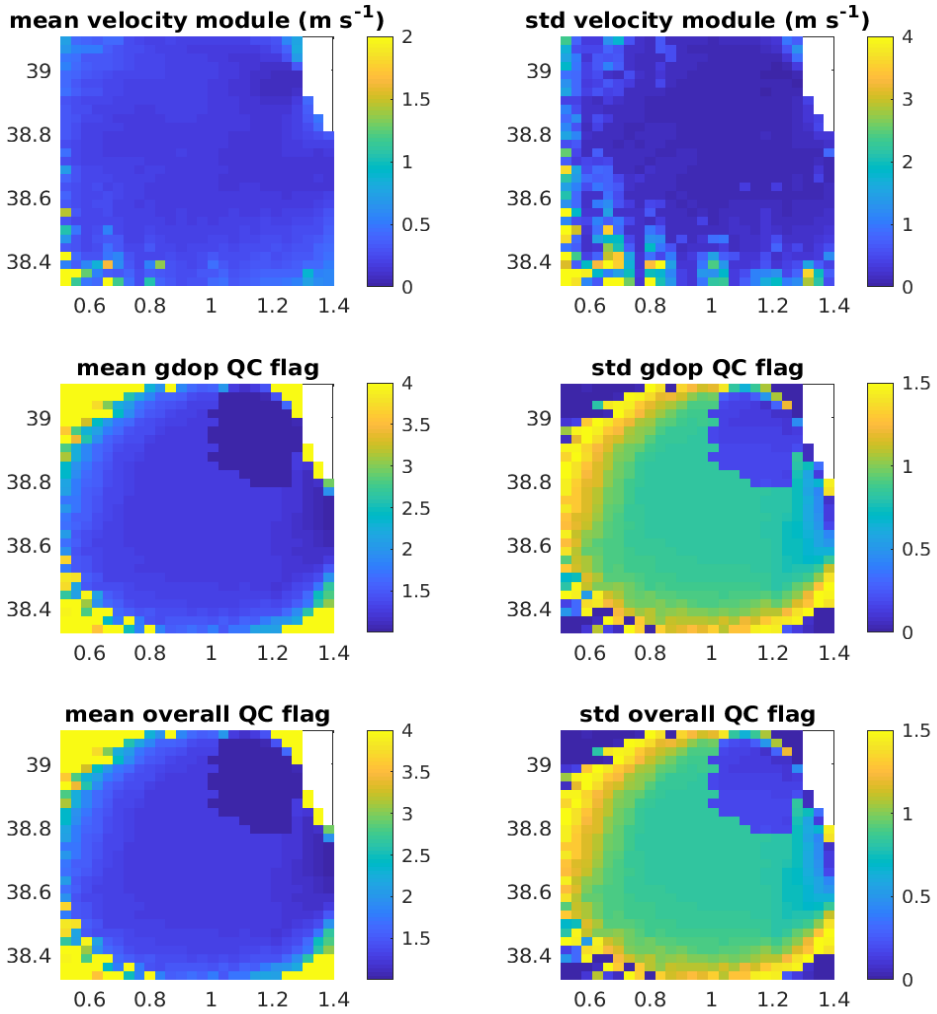
A



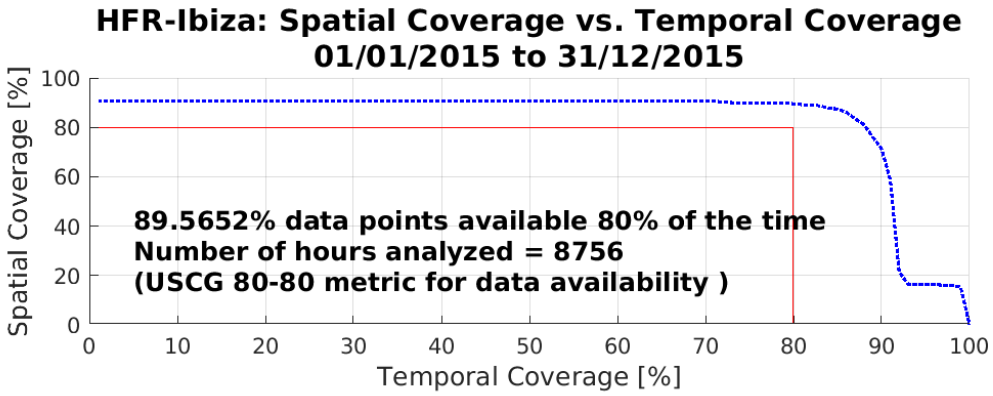
B



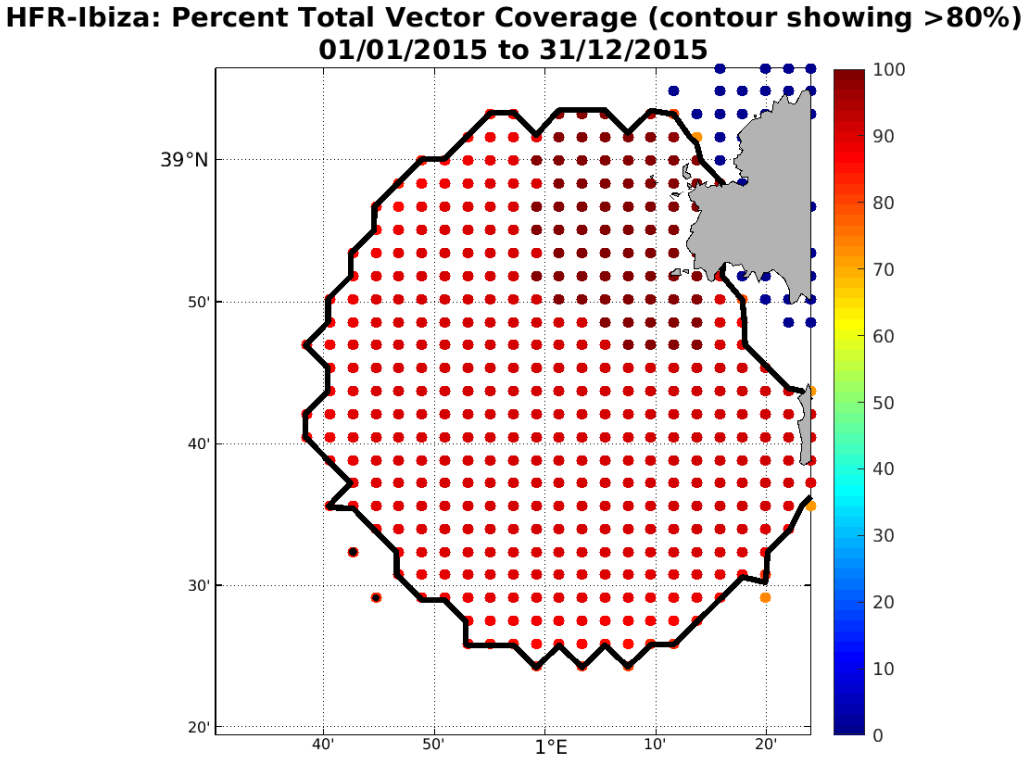
C

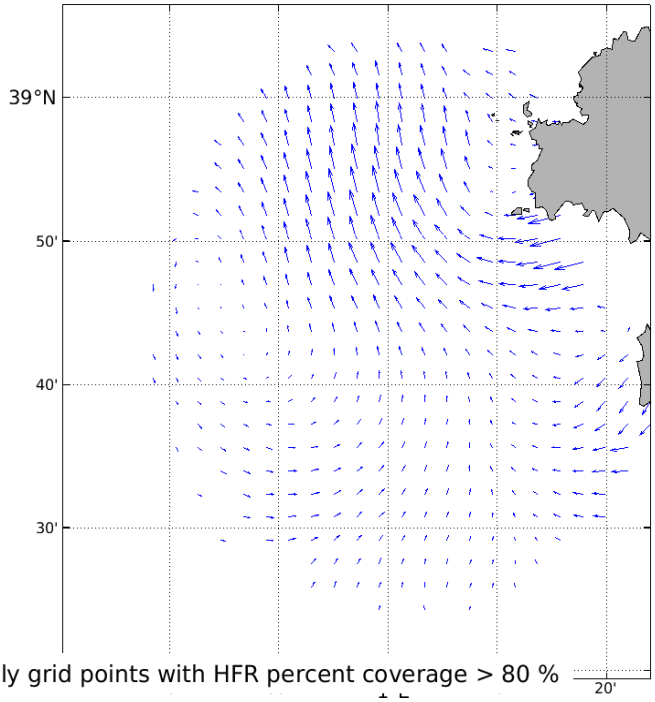

mean velocity module (m s-1)
std velocity module (m s-1)
mean gdop QC flag
std gdop QC flag
mean overall QC flag
std overall QC flag
39
38.8
38.6
38.4
0.6
0.8
1
1.2
1.4

D


HFR-Ibiza: Spatial Coverage vs. Temporal Coverage
01/01/2015 to 31/12/2015
Spatial Coverage [%]
Temporal Coverage [%]
89.5652% data points available 80% of the time
Number of hours analyzed = 8756
(USCG 80-80 metric for data availability)

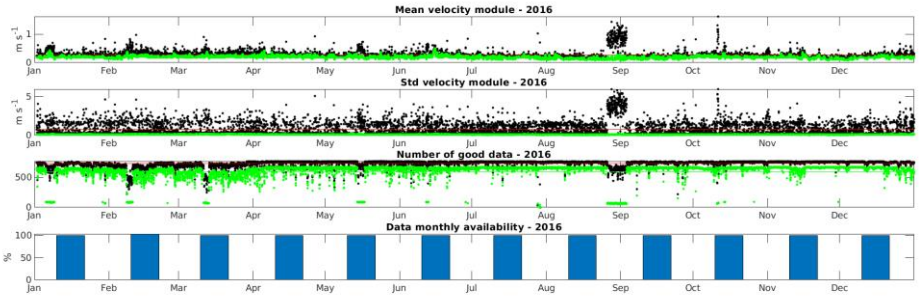
E


HFR-Ibiza: Percent Total Vector Coverage (contour showing >80%)
01/01/2015 to 31/12/2015
39°N
50'
40'
30'
20'
40'
50'
1°E
10'
20'

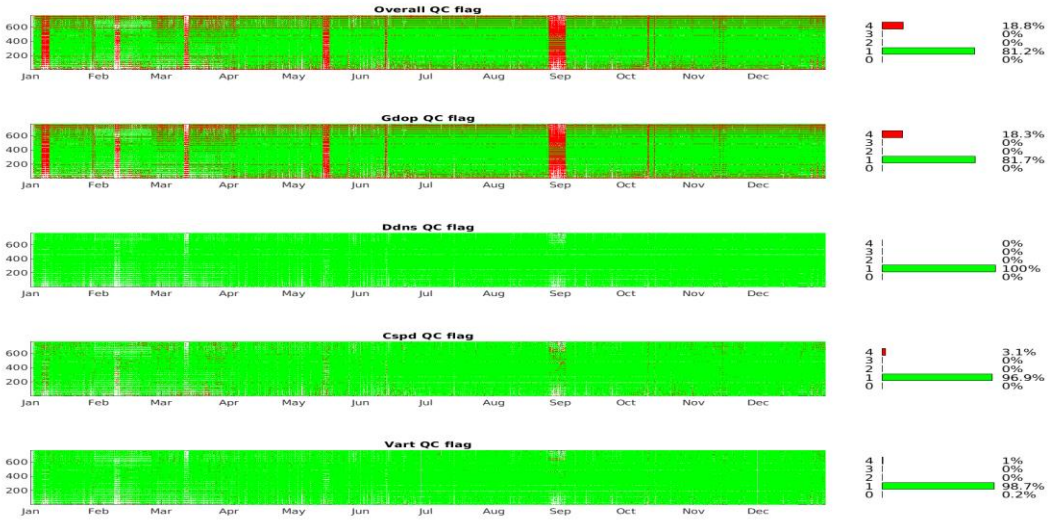
F	**HFR-Ibiza: HFR Surface current average [m/s]** **01/01/2015 to 31/12/2015**  Only grid points with HFR percent coverage > 80 %

Period: 2016

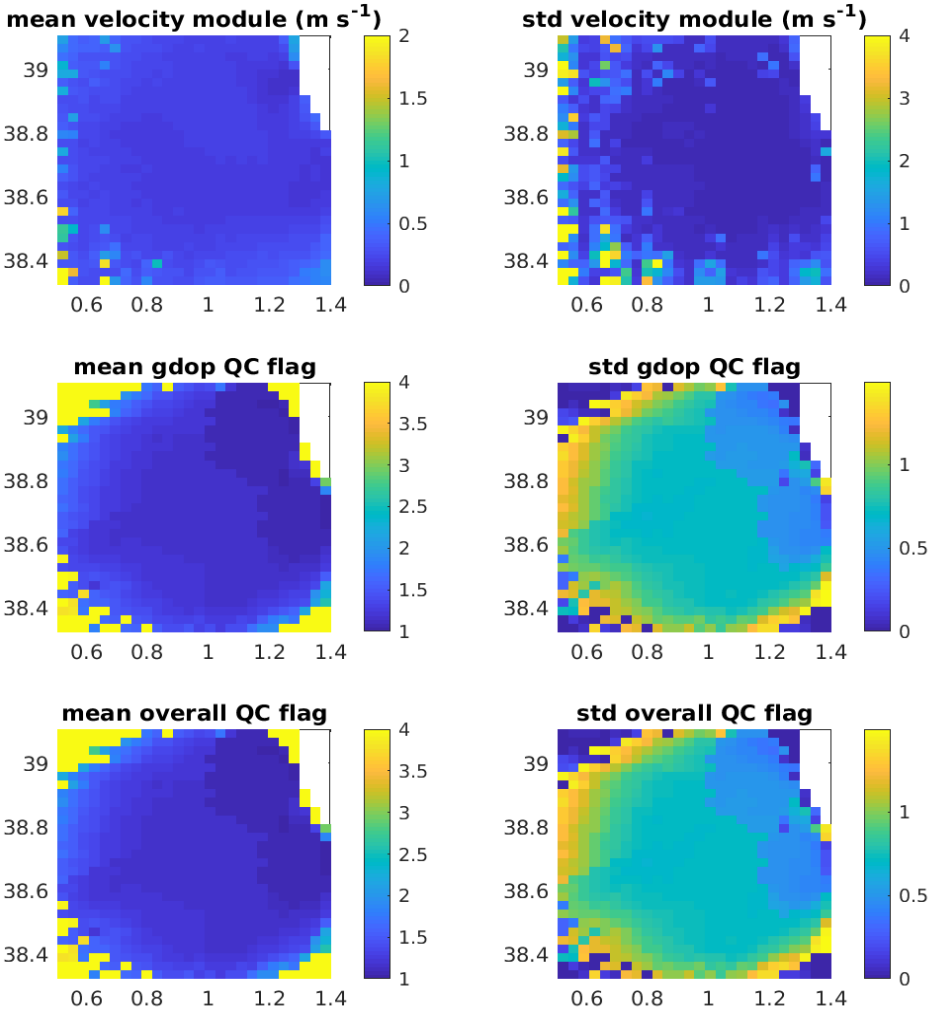
A



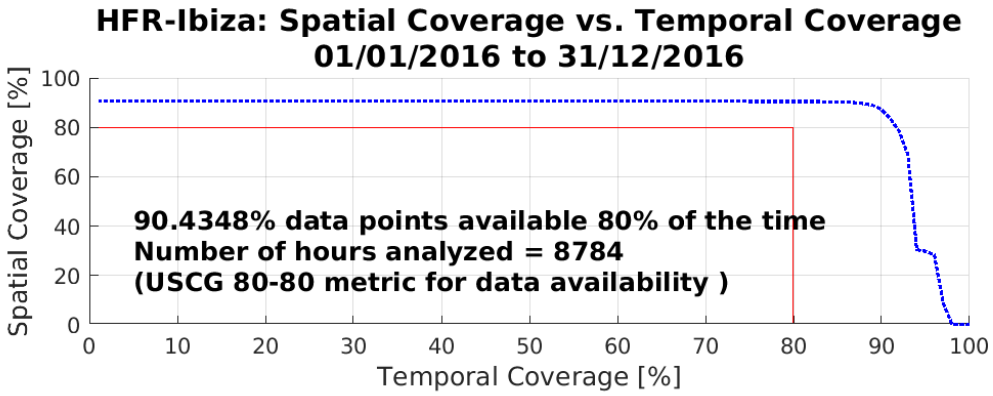
B



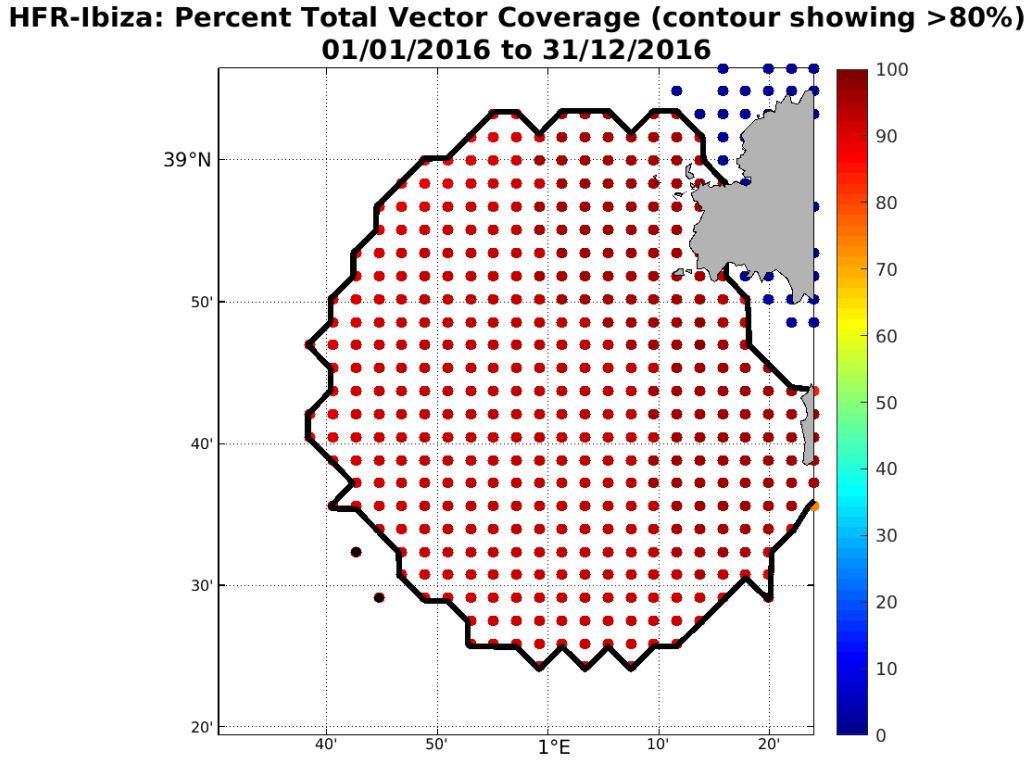
C

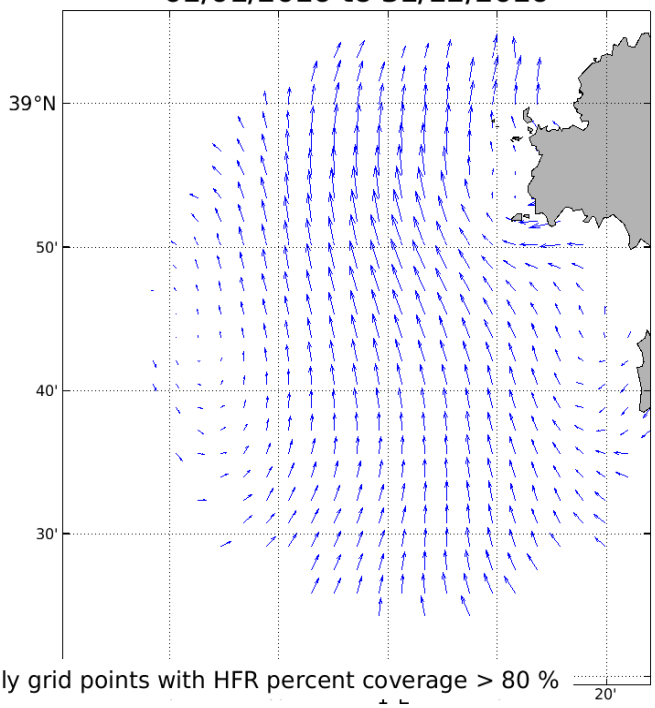

mean velocity module (m s-1)
std velocity module (m s-1)
mean gdop QC flag
std gdop QC flag
mean overall QC flag
std overall QC flag
39
38.8
38.6
38.4
0.6
0.8
1
1.2
1.4

D


HFR-Ibiza: Spatial Coverage vs. Temporal Coverage
01/01/2016 to 31/12/2016
Spatial Coverage [%]
Temporal Coverage [%]
90.4348% data points available 80% of the time
Number of hours analyzed = 8784
(USCG 80-80 metric for data availability)

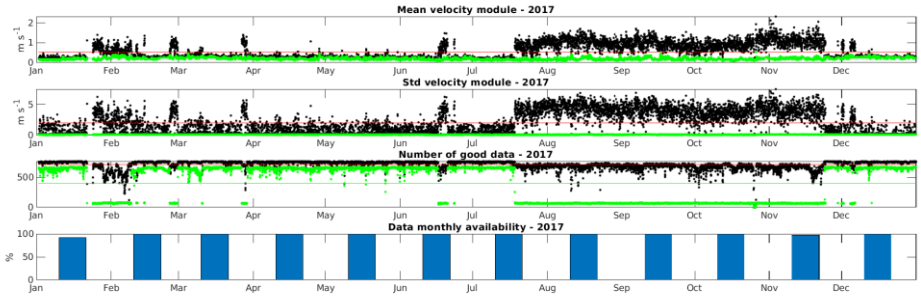
E


HFR-Ibiza: Percent Total Vector Coverage (contour showing >80%)
01/01/2016 to 31/12/2016
39°N
50'
40'
30'
20'
40'
50'
1°E
10'
20'

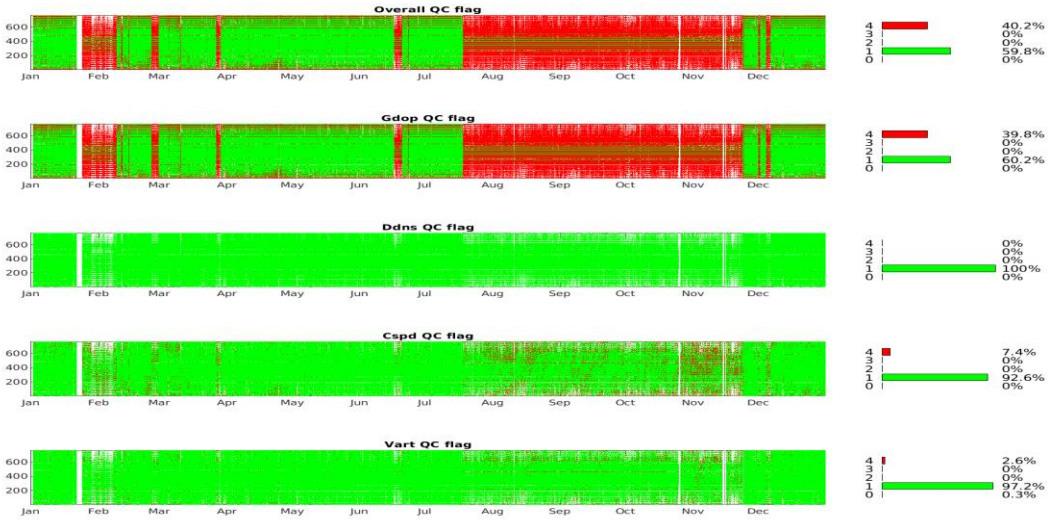
F	**HFR-Ibiza: HFR Surface current average [m/s]** **01/01/2016 to 31/12/2016**  Only grid points with HFR percent coverage > 80 %

Period: 2017

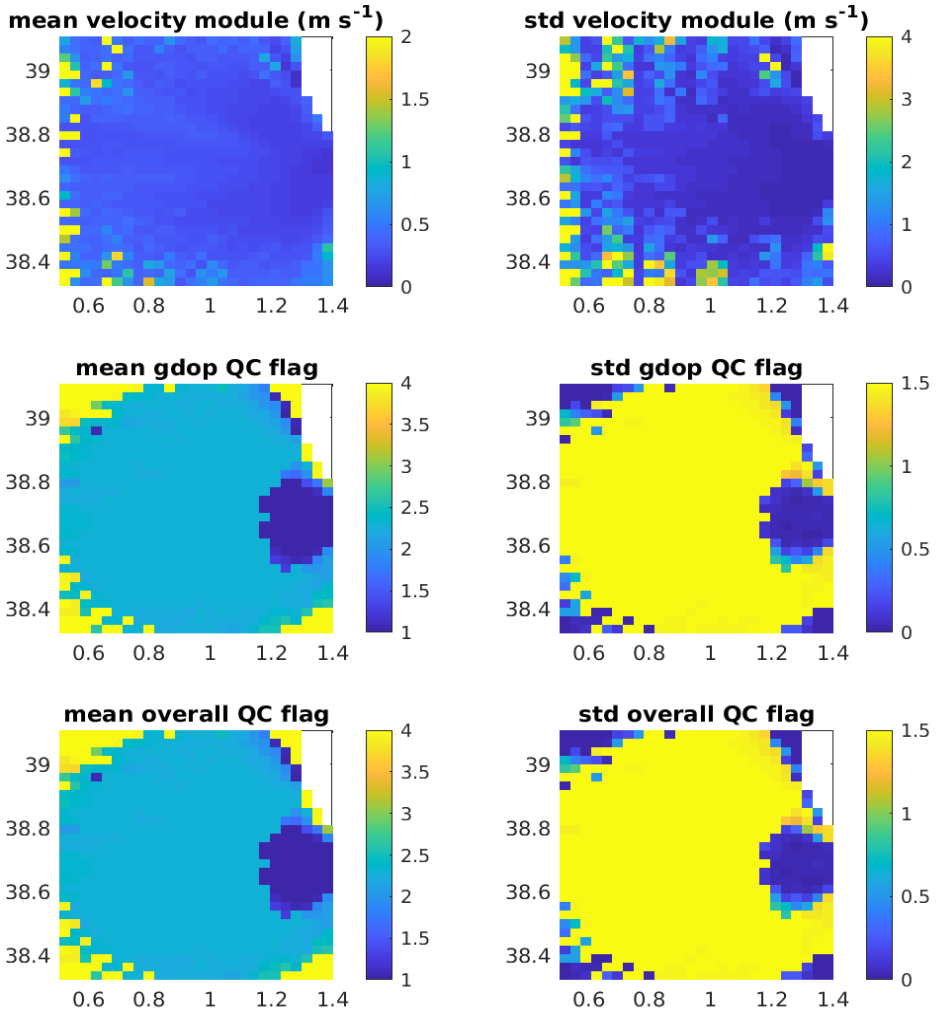
A



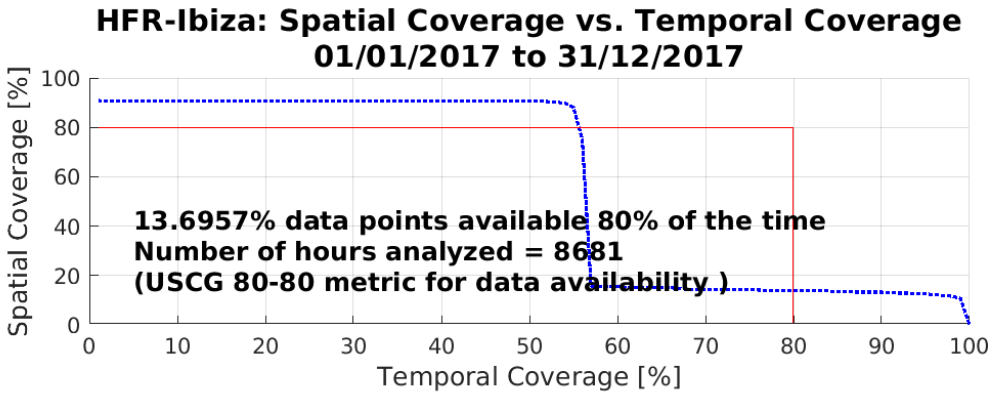
B



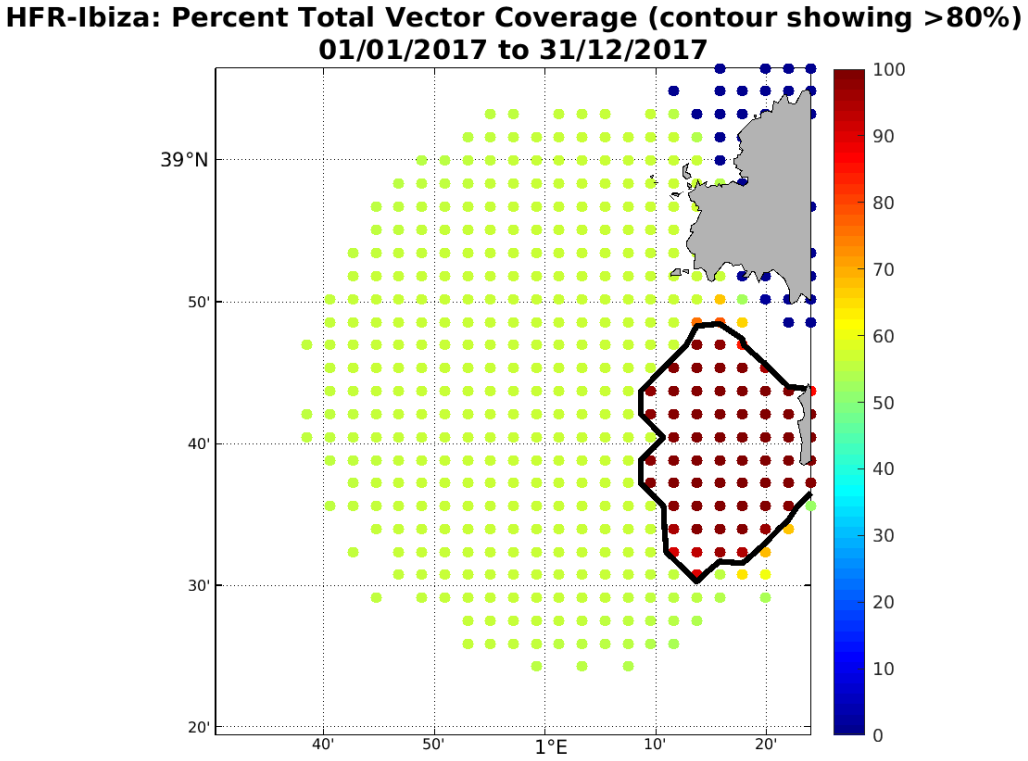
C

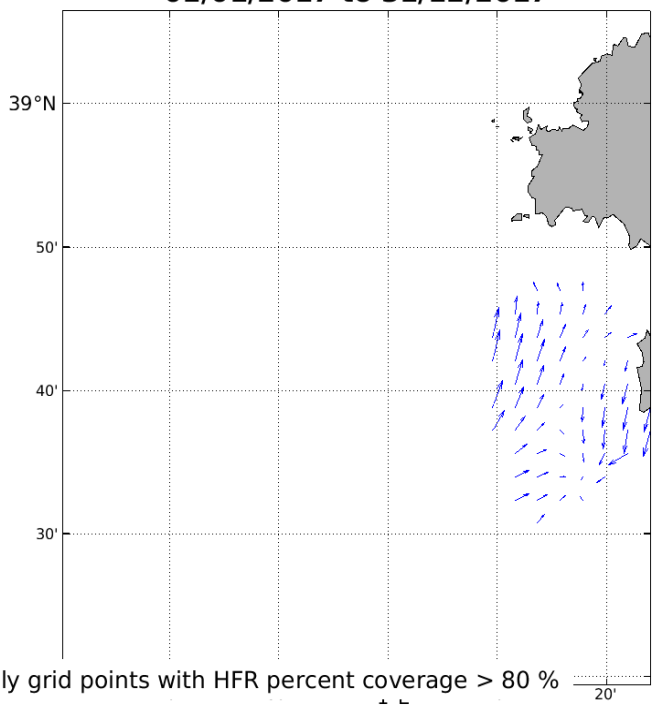

mean velocity module (m s-1)
std velocity module (m s-1)
mean gdop QC flag
std gdop QC flag
mean overall QC flag
std overall QC flag
39
38.8
38.6
38.4
0.6
0.8
1
1.2
1.4

D


HFR-Ibiza: Spatial Coverage vs. Temporal Coverage
01/01/2017 to 31/12/2017
Spatial Coverage [%]
Temporal Coverage [%]
13.6957% data points available 80% of the time
Number of hours analyzed = 8681
(USCG 80-80 metric for data availability)

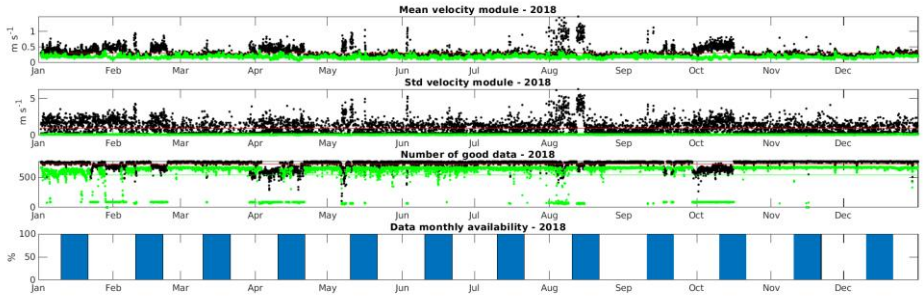
E


HFR-Ibiza: Percent Total Vector Coverage (contour showing >80%)
01/01/2017 to 31/12/2017
39°N
50'
40'
30'
20'
40'
50'
1°E
10'
20'

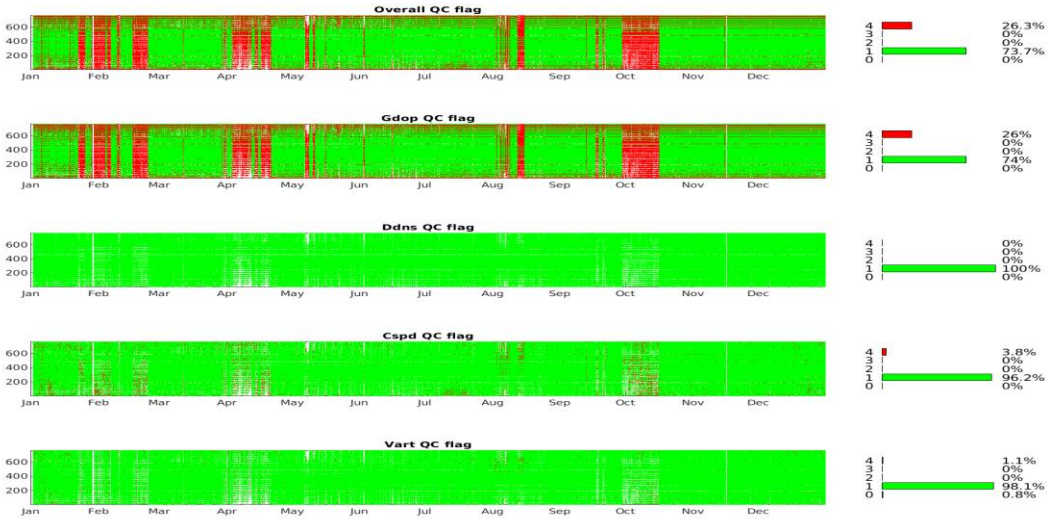
F	**HFR-Ibiza: HFR Surface current average [m/s]** **01/01/2017 to 31/12/2017**  Only grid points with HFR percent coverage > 80 %

Period: 2018

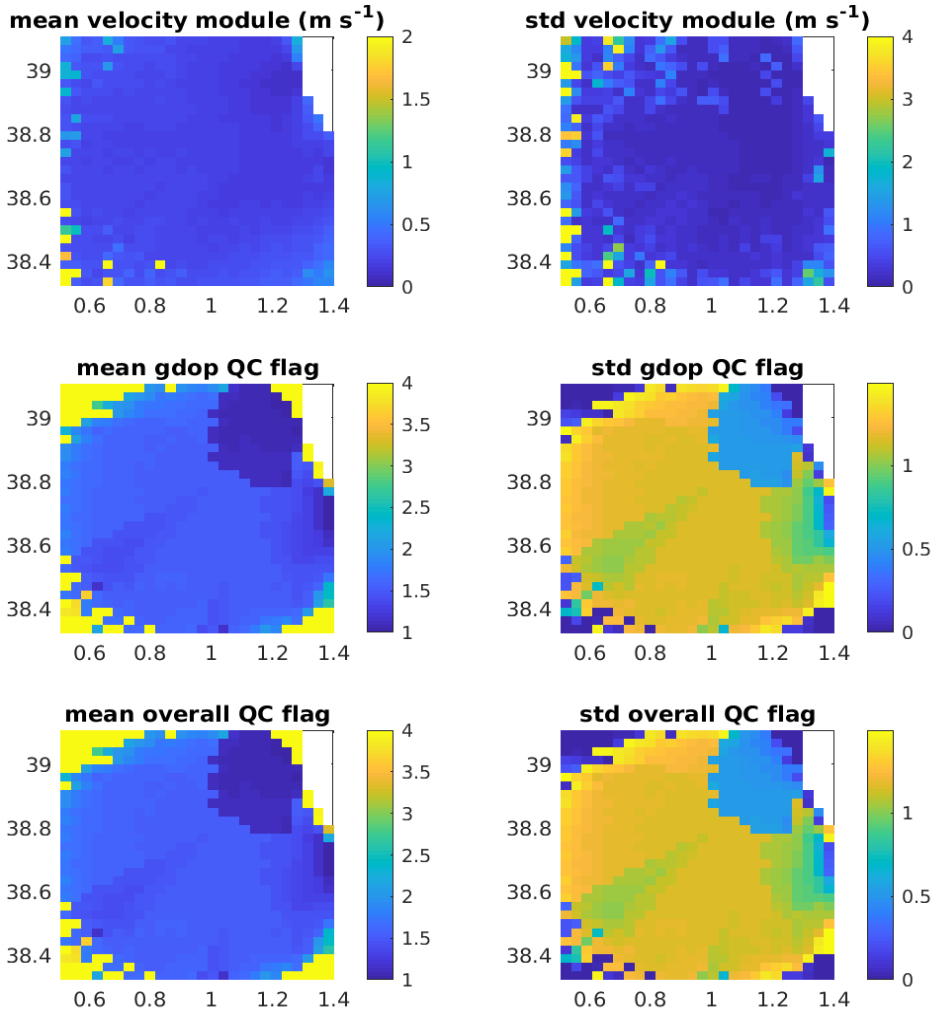
A



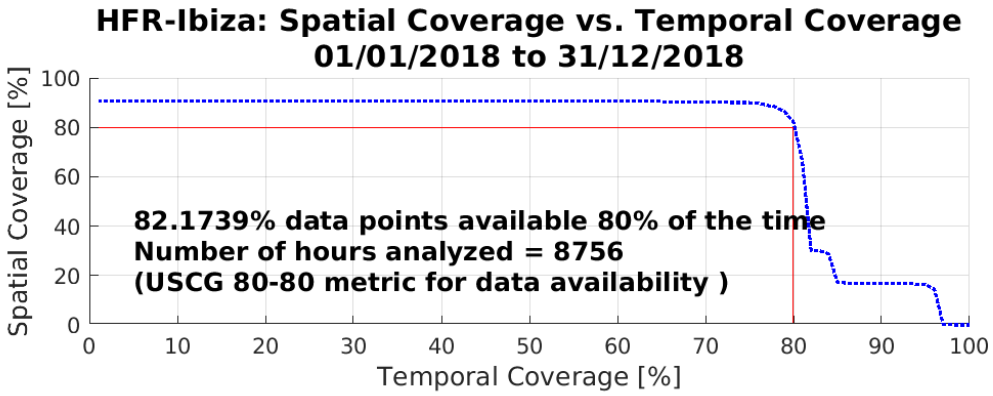
B



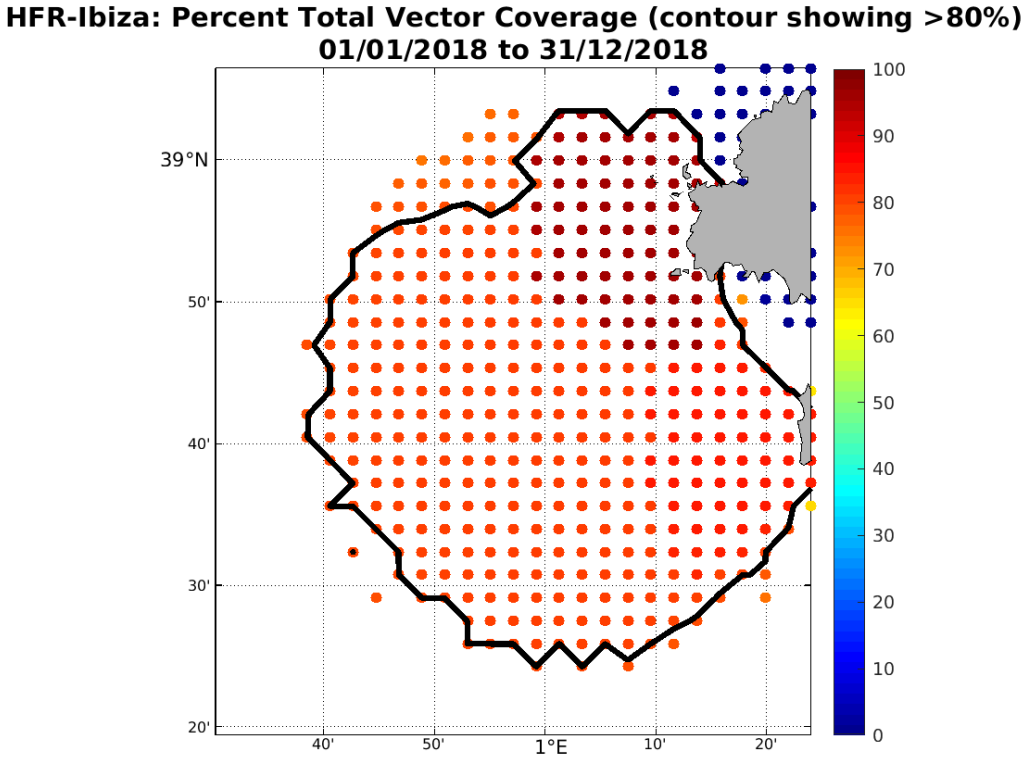
C


mean velocity module (m s-1)
std velocity module (m s-1)
mean gdop QC flag
std gdop QC flag
mean overall QC flag
std overall QC flag
39
38.8
38.6
38.4
0.6
0.8
1
1.2
1.4

D


HFR-Ibiza: Spatial Coverage vs. Temporal Coverage
01/01/2018 to 31/12/2018
Spatial Coverage [%]
Temporal Coverage [%]
82.1739% data points available 80% of the time
Number of hours analyzed = 8756
(USCG 80-80 metric for data availability)

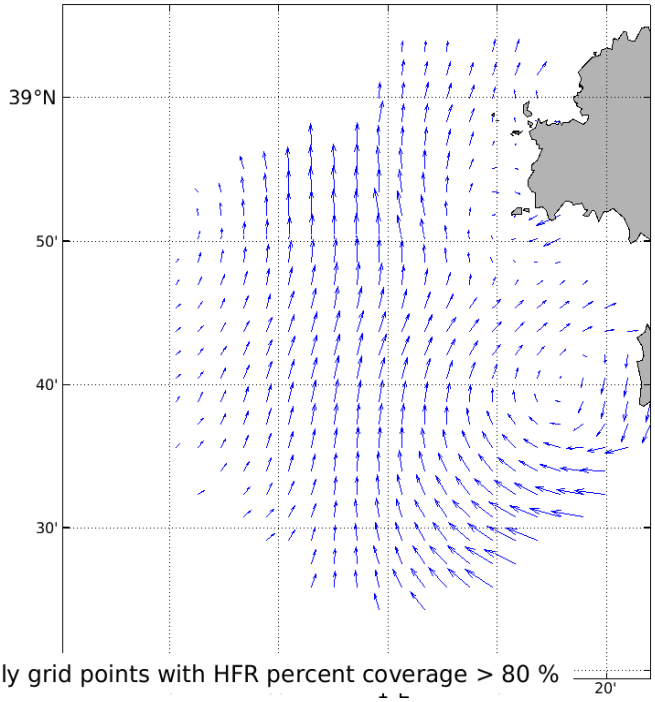
E


HFR-Ibiza: Percent Total Vector Coverage (contour showing >80%)
01/01/2018 to 31/12/2018
39°N
50'
40'
30'
20'
40'
50'
1°E
10'
20'

SOCIB
Balearic Islands
Coastal Observing
and Forecasting System

F

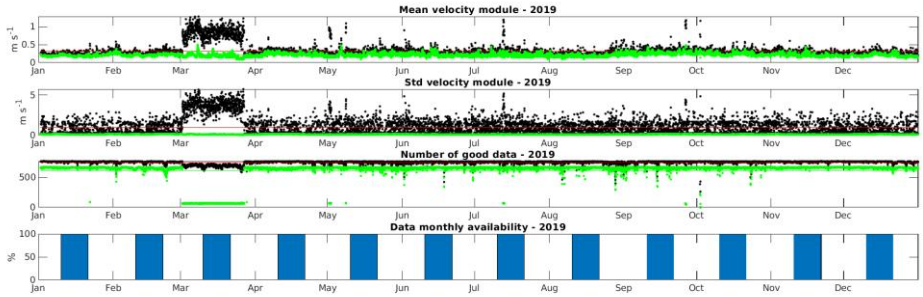
HFR-Ibiza: HFR Surface current average [m/s]
01/01/2018 to 31/12/2018



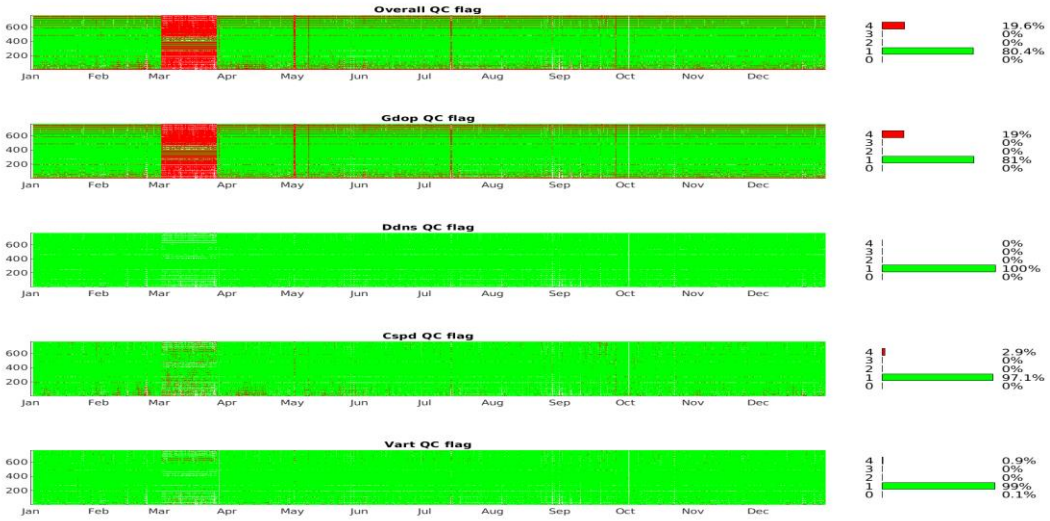
Only grid points with HFR percent coverage > 80 %

Period: 2019

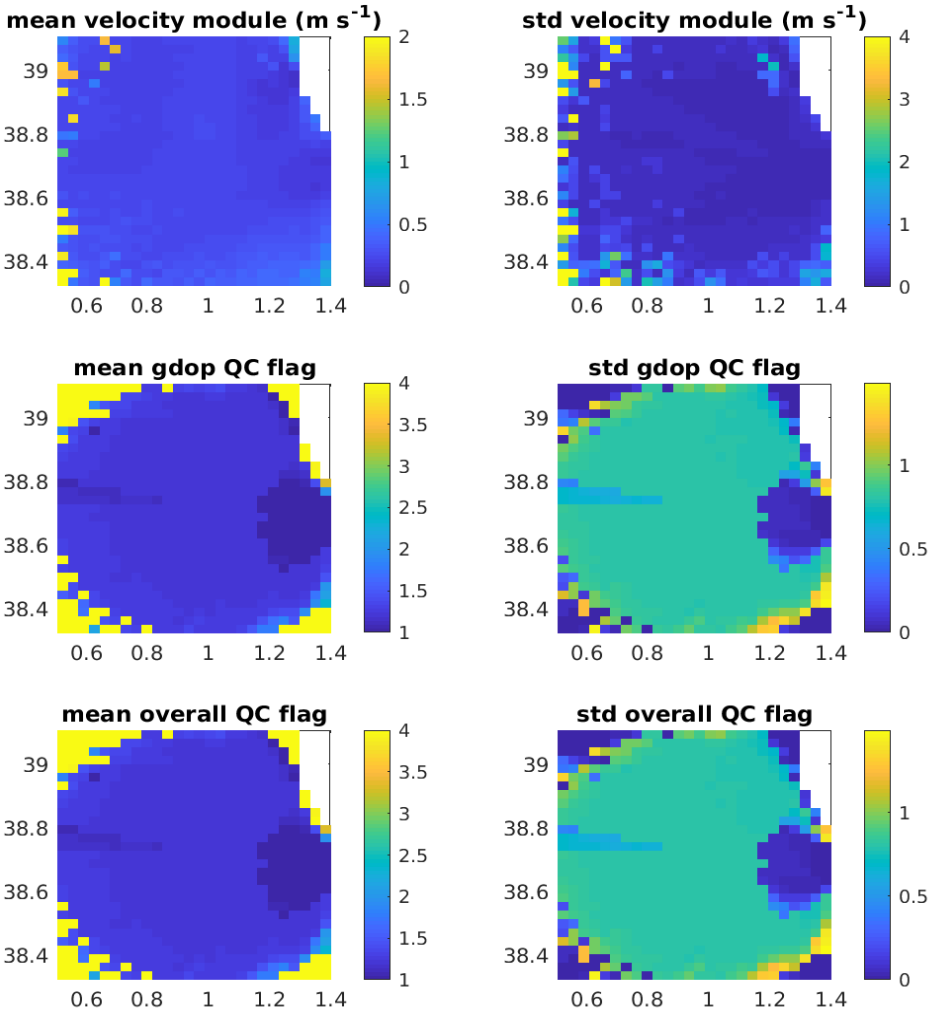
A



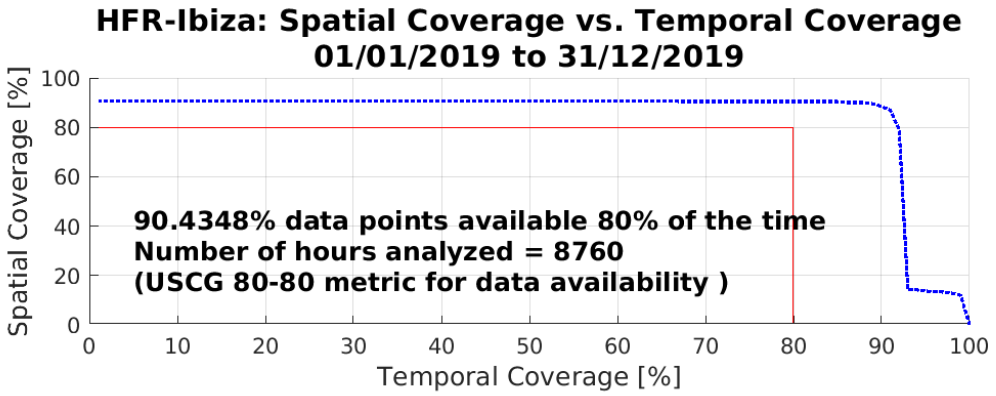
B



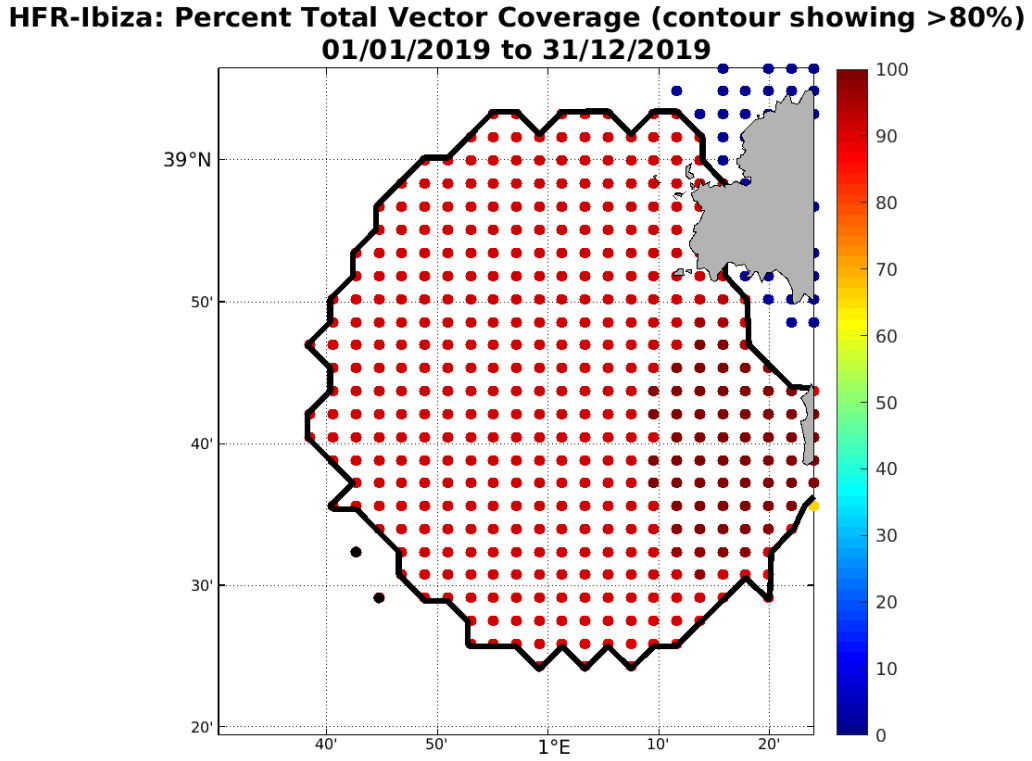
C

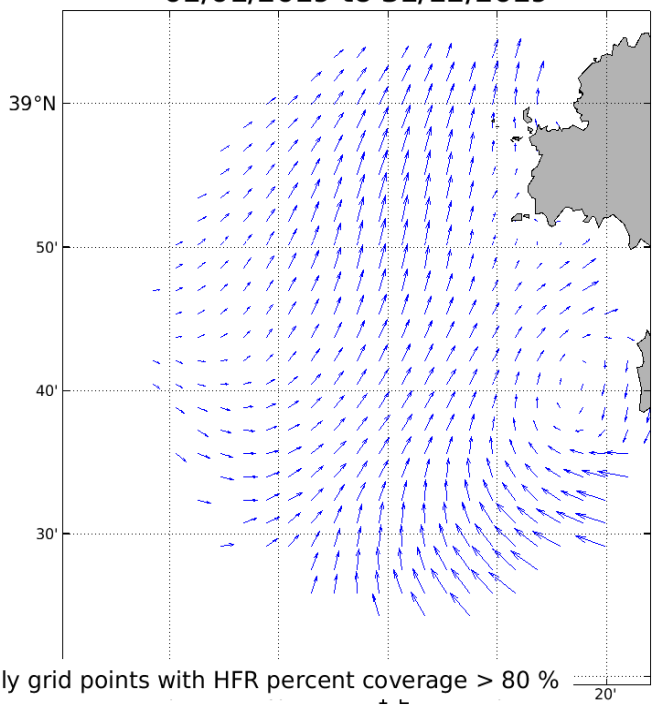

mean velocity module (m s-1)
std velocity module (m s-1)
mean gdop QC flag
std gdop QC flag
mean overall QC flag
std overall QC flag
39
38.8
38.6
38.4
0.6
0.8
1
1.2
1.4

D


HFR-Ibiza: Spatial Coverage vs. Temporal Coverage
01/01/2019 to 31/12/2019
Spatial Coverage [%]
Temporal Coverage [%]
90.4348% data points available 80% of the time
Number of hours analyzed = 8760
(USCG 80-80 metric for data availability)

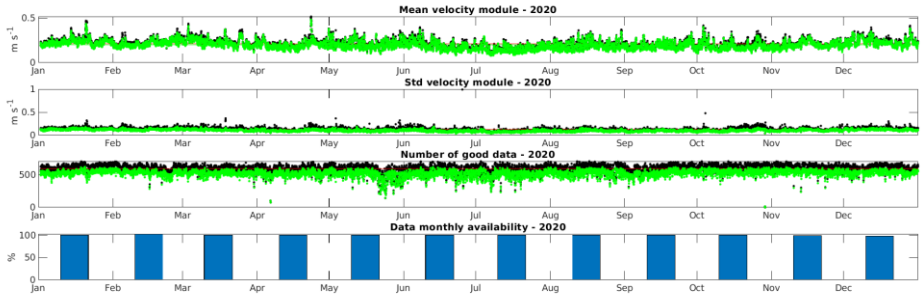
E


HFR-Ibiza: Percent Total Vector Coverage (contour showing >80%)
01/01/2019 to 31/12/2019
39°N
50'
40'
30'
20'
40'
50'
1°E
10'
20'

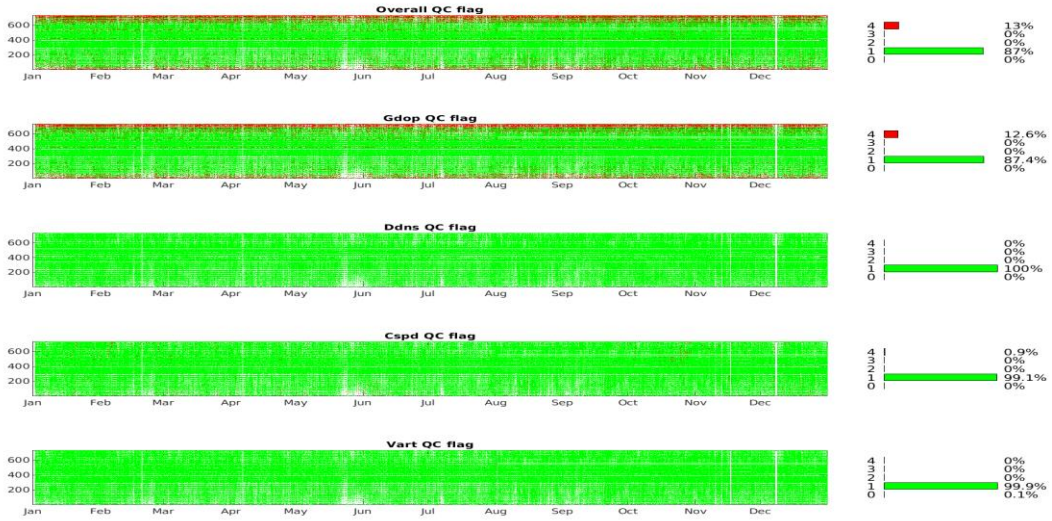
F	**HFR-Ibiza: HFR Surface current average [m/s]** **01/01/2019 to 31/12/2019**  Only grid points with HFR percent coverage > 80 %

Period: 2020

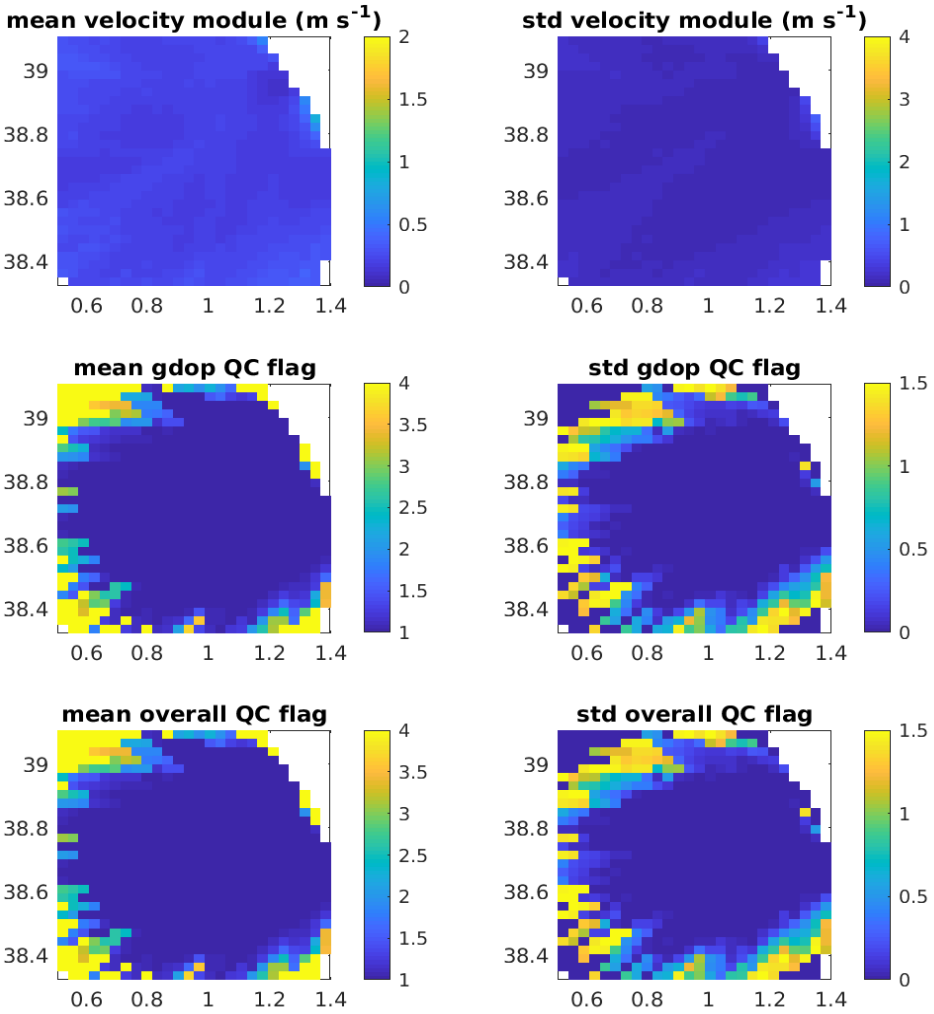
A



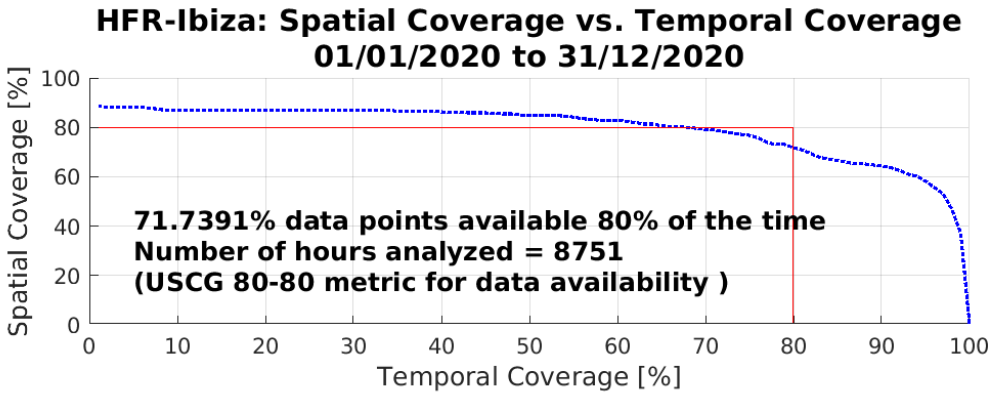
B



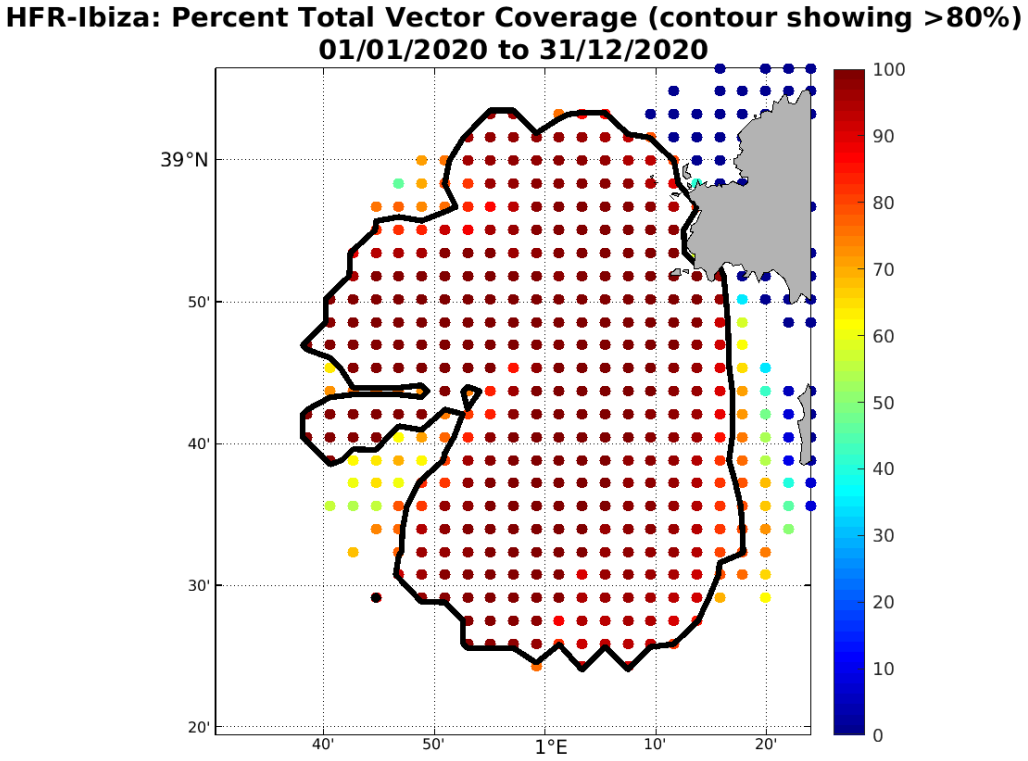
C

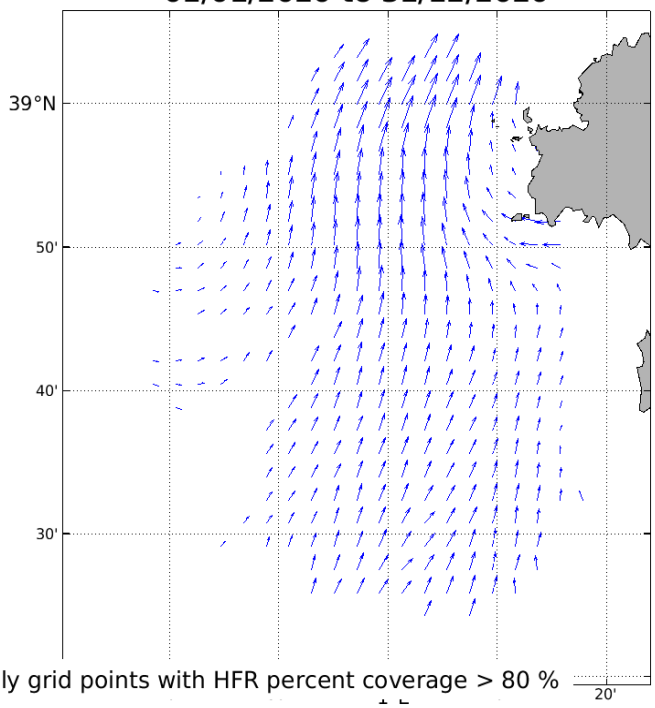

mean velocity module (m s-1)
std velocity module (m s-1)
mean gdop QC flag
std gdop QC flag
mean overall QC flag
std overall QC flag
39
38.8
38.6
38.4
0.6
0.8
1
1.2
1.4

D


HFR-Ibiza: Spatial Coverage vs. Temporal Coverage
01/01/2020 to 31/12/2020
Spatial Coverage [%]
Temporal Coverage [%]
71.7391% data points available 80% of the time
Number of hours analyzed = 8751
(USCG 80-80 metric for data availability)

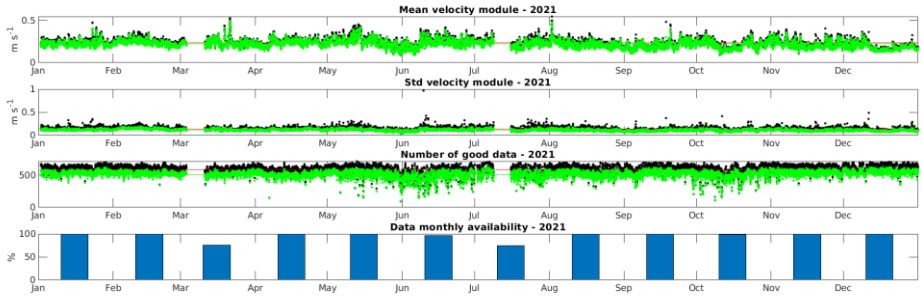
E


HFR-Ibiza: Percent Total Vector Coverage (contour showing >80%)
01/01/2020 to 31/12/2020
39°N
50'
40'
30'
20'
40'
50'
1°E
10'
20'

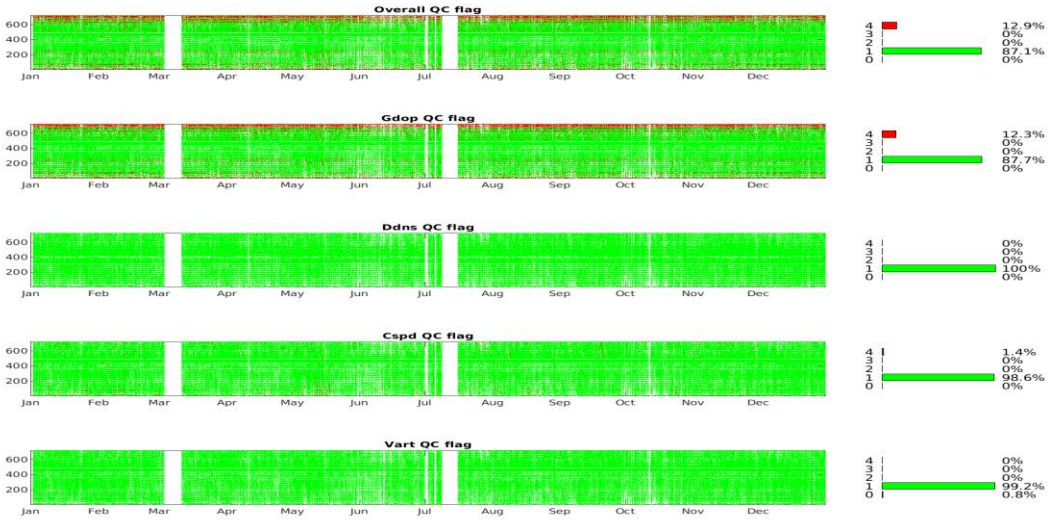
F	**HFR-Ibiza: HFR Surface current average [m/s]** **01/01/2020 to 31/12/2020**  Only grid points with HFR percent coverage > 80 %

Period: 2021

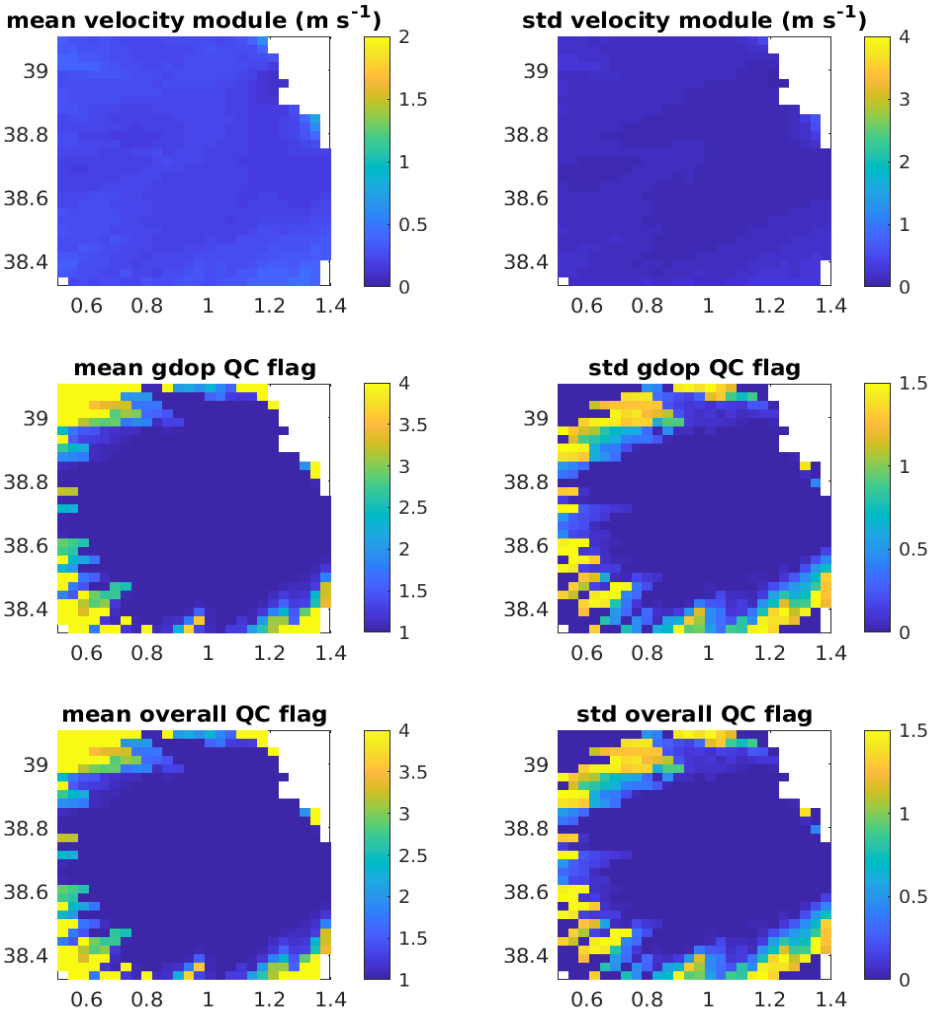
A



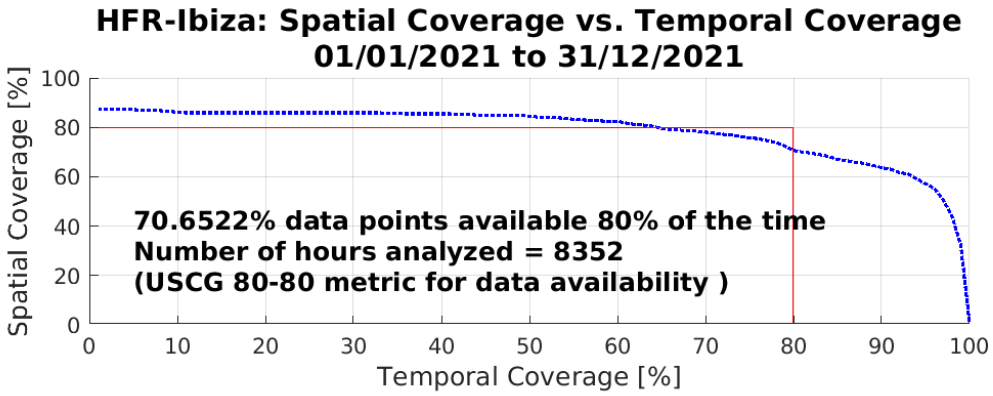
B



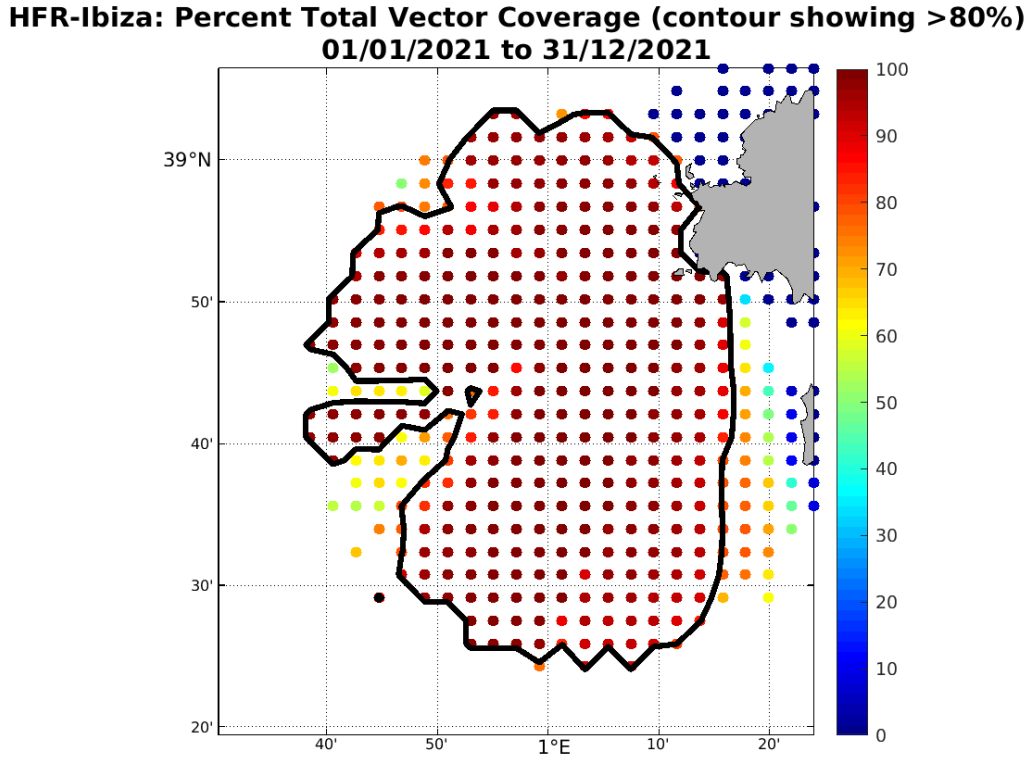
C

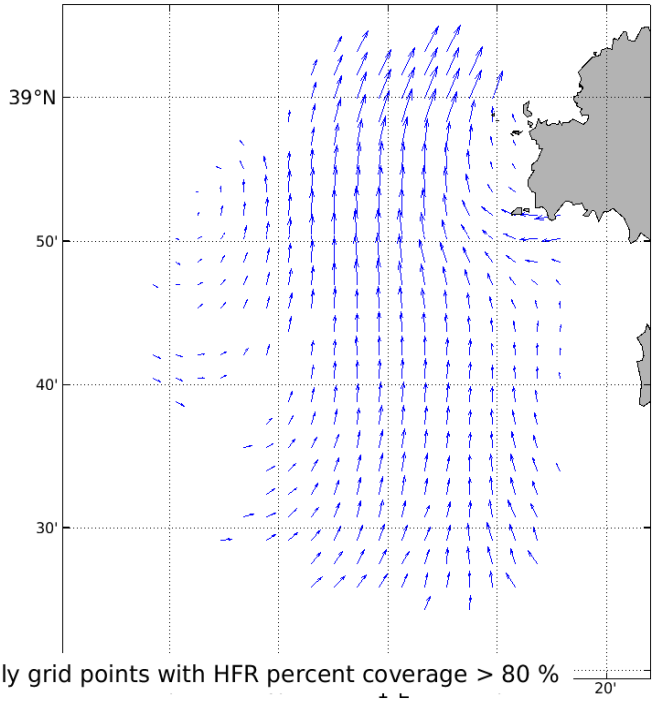

mean velocity module (m s-1)
std velocity module (m s-1)
mean gdop QC flag
std gdop QC flag
mean overall QC flag
std overall QC flag
39
38.8
38.6
38.4
0.6
0.8
1
1.2
1.4

D


HFR-Ibiza: Spatial Coverage vs. Temporal Coverage
01/01/2021 to 31/12/2021
Spatial Coverage [%]
Temporal Coverage [%]
70.6522% data points available 80% of the time
Number of hours analyzed = 8352
(USCG 80-80 metric for data availability)

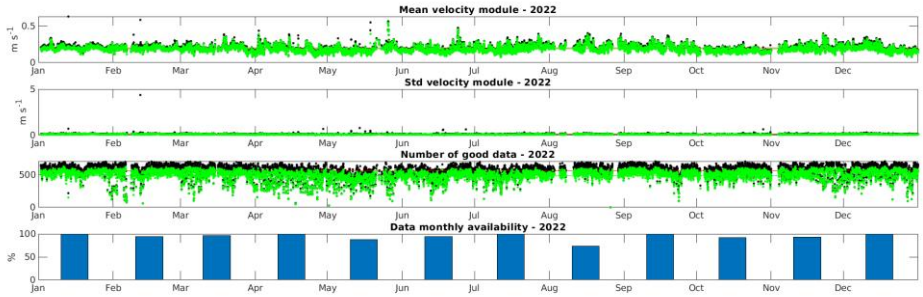
E


HFR-Ibiza: Percent Total Vector Coverage (contour showing >80%)
01/01/2021 to 31/12/2021
39°N
50'
40'
30'
20'
40'
50'
1°E
10'
20'

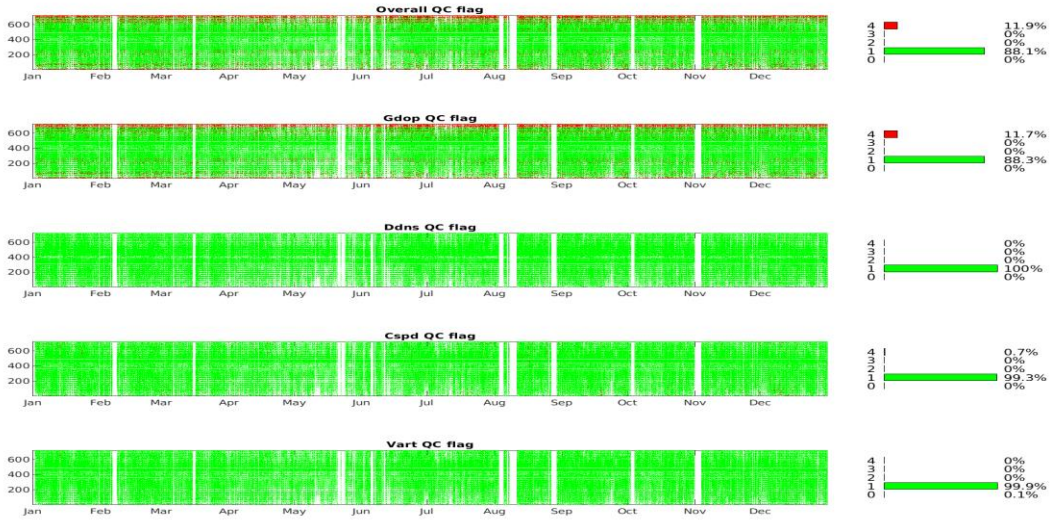
F	**HFR-Ibiza: HFR Surface current average [m/s]** **01/01/2021 to 31/12/2021**  Only grid points with HFR percent coverage > 80 %

Period: 2022

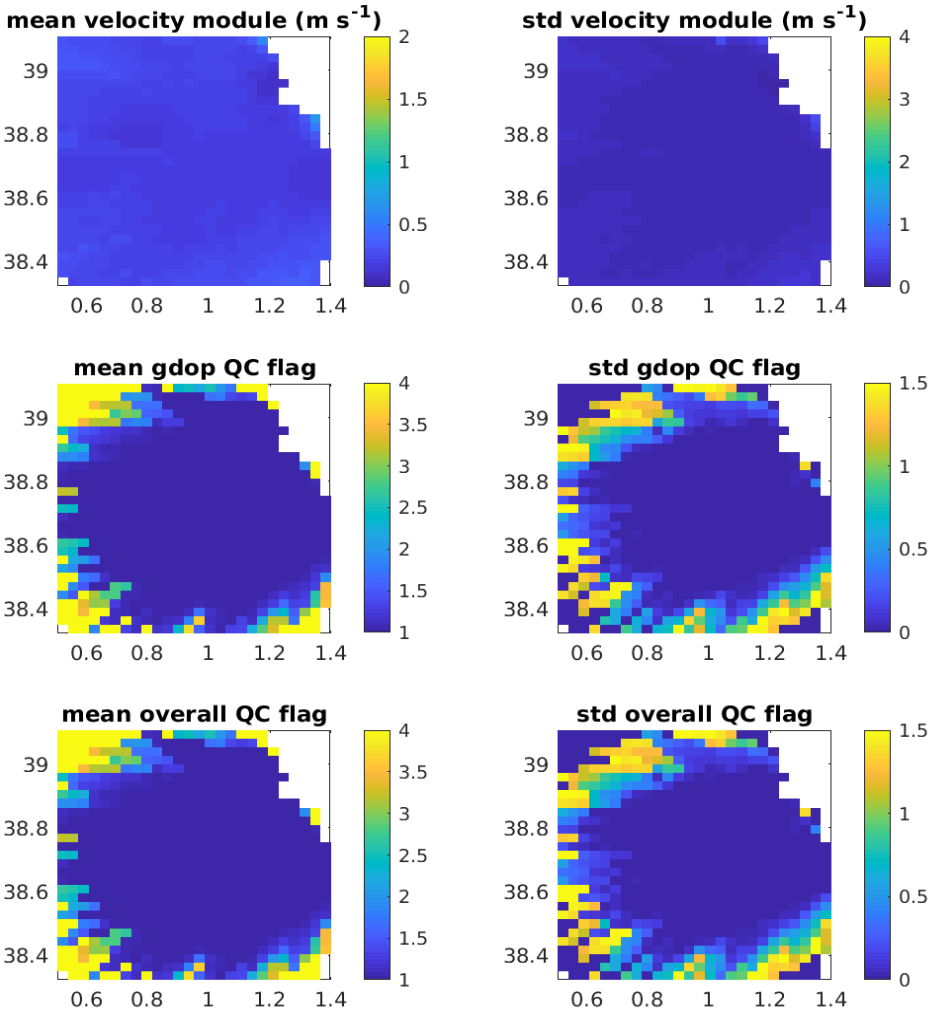
A



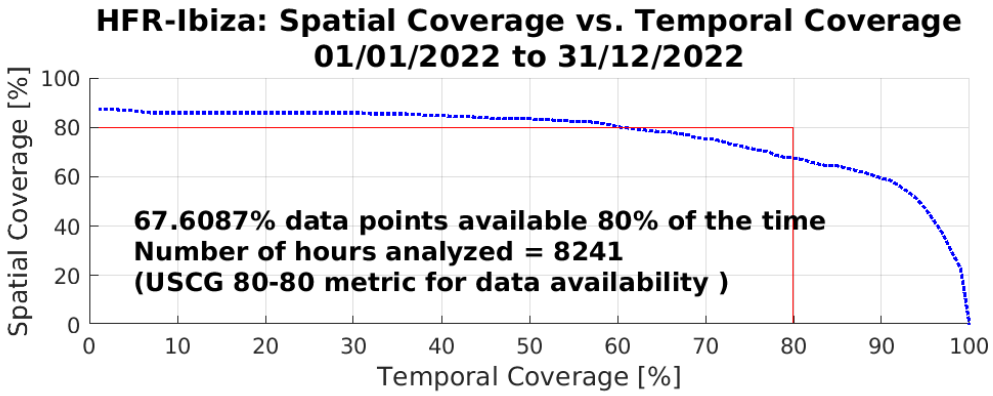
B



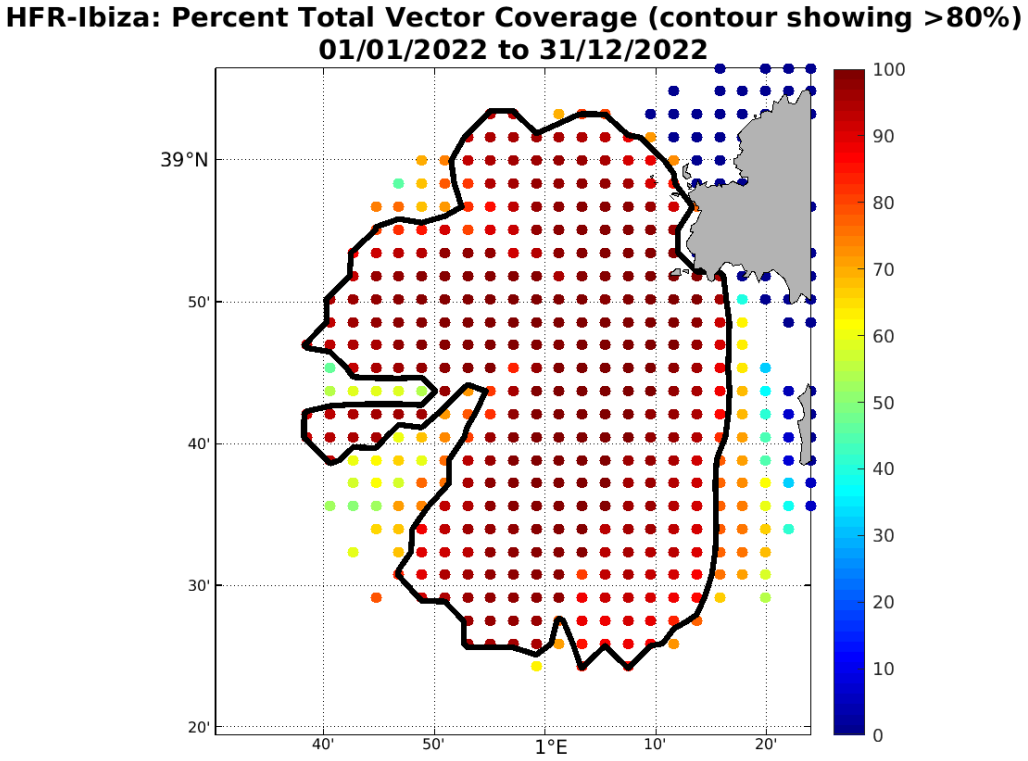
C


mean velocity module (m s-1)
std velocity module (m s-1)
mean gdop QC flag
std gdop QC flag
mean overall QC flag
std overall QC flag
39
38.8
38.6
38.4
0.6
0.8
1
1.2
1.4

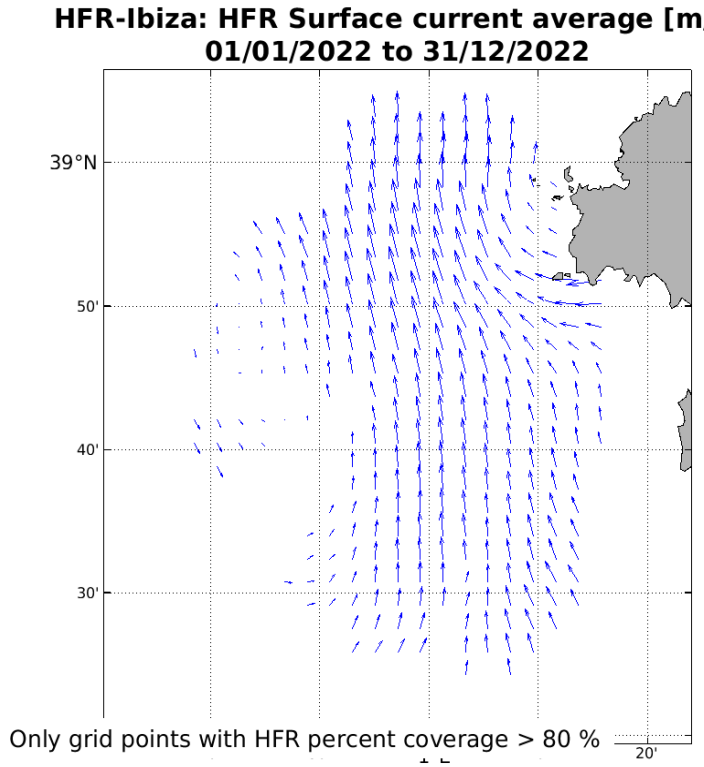
D


HFR-Ibiza: Spatial Coverage vs. Temporal Coverage
01/01/2022 to 31/12/2022
Spatial Coverage [%]
Temporal Coverage [%]
67.6087% data points available 80% of the time
Number of hours analyzed = 8241
(USCG 80-80 metric for data availability)

E


HFR-Ibiza: Percent Total Vector Coverage (contour showing >80%)
01/01/2022 to 31/12/2022
39°N
50'
40'
30'
20'
40'
50'
1°E
10'
20'

F



Version of the report	Changes made by	Nature of changes
V2	M. Chifflet/ A. Rubio	First complete version of the report
V3	M. Chifflet/ A. Rubio	Version including Figures
V4	M. Chifflet/ A. Rubio /E. Reyes	New version after reflagging
VR2020_12	L. Solabarrieta & A. Rubio	Updated for 2020
VR2023_11	L. Solabarrieta & I. Manso-Narvarte	Updated for 2021-22
Contact the EU HFR general Node email for more information about this report: euhfrnode@azti.es Other possible contacts: lsolabarrieta@azti.es; arubio@azti.es; jmader@azti.es;		