

AERIAL SURVEY DESIGN OF THE ATLANTIC-WIDE RESEARCH PROGRAMME ON BLUEFIN TUNA (ICCAT-GBYP Phase 7 - 2017)

Report

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Survey design methods

Program DISTANCE <http://www.ruwpa.st-and.ac.uk/distance/>, the “industry standard” software for line transect distance sampling, includes a robust software engine for designing survey transects to achieve equal coverage probability over the survey area. Input to the program includes survey area coordinates or a GIS shape file of the same, information on coverage (e.g. spacing, number of transects, total length of transect), whether transects should be laid out as parallel or zig-zag lines, etc. From this input, the program simulates multiple surveys according to the design specified and generates information on the survey, including a visual representation of how well equal coverage probability has been achieved. The survey design input parameters can then be modified until an optimum design is achieved.

Aerial surveys for bluefin tuna in the Mediterranean Sea are designed here using program DISTANCE based on: the four defined survey areas (overlap survey areas A to G as defined in the 2015 report), target survey time available (equivalent to 32,000 km on effort) and time for circling over detected schools to estimate their size (set at 10%). The time for flying in between lines and from and to airport each day are not considered in these calculations as they are off effort.

Transect lines are placed in a north-south direction to be approximately perpendicular to the coast or the bathymetry in all blocks.

Surveys are designed as equal spaced parallel lines rather than zig-zag lines. Parallel line designs achieve equal coverage probability exactly – an important design feature. However, a disadvantage (compared to a zig-zag design) is that some flying time is spent in transit between transects. Time spent transiting can be minimised by increasing airspeed between transects. In addition, there is some advantage to having short off-effort periods between transects to allow observer(s) to rest.

Survey design

The areas identified by the GBTP Steering Committee were used to create survey blocks in program DISTANCE (overlap survey areas A to G, see Figure 1). These areas correspond to: A: Balearic Sea; C: Southern Tyrrhenian Sea, E: Central-southern Mediterranean Sea; and G: Levantine Sea.

For the calculations of the percentage of coverage for each block, an effective half strip width of 4 km was considered. This value was chosen as it was the mean effective half strip width for all years and all areas analyzed in the previous surveys (2010, 2011, 2013 and 2015).

The proportion of the total trackline effort (32,000km) was calculated for each block according to the proportion of the surface area of each block (see Table 1).

Four replicas were assigned to each area given the high coverage given by the allocated effort in them, while keeping similar track line spacing as previous years.

Additionally, two extra replicas were designed both each area in the event that enough time is left and therefore more effort can be allocated. This should be the case in most areas, given that the total allocated

effort is 82% of the total (32,000 km), leaving in average 18% “free” leftover time for circling and potential extra replica (see Table 1 for leftover time for each area).

Table 1 shows the effort allocated to each area (primary tracks), on effort tracklines Table 2 shows the effort allocated to the extra tracklines.

The Projected Coordinate System used to calculate distances and areas in DISTANCE software was TRANSVERSE MERCATOR.

Appendix 1 gives a simple map and the list of coordinates for all primary tracks for each block. Appendix 2 gives the same information for the extra tracks.

Figures 2 to 9 show the primary tracks for all blocks, and Figure 10 the extra tracks.

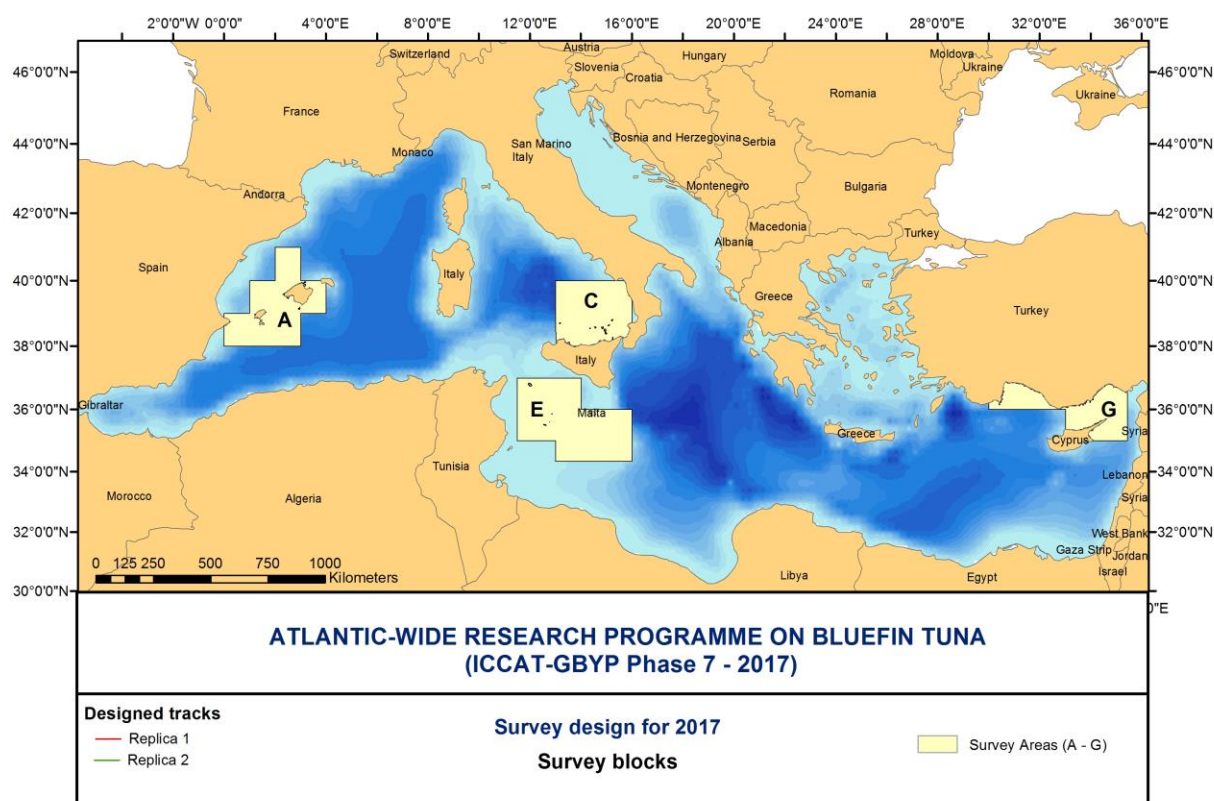


Figure 1. Survey blocks

TABLES

Table 1. Primary tracks.

Sub-area	Area (km ²)	Proport. of total area	Expected proprot. Length of Trackline on Effort	Expected proprot. Length of Trackline on Effort (minus 10% for circling)	% coverage	Line spacing per replica	On effort track Replica 1	On effort track Replica 2	On effort track Replica 3	On effort track Replica 4	Total on effort track	Leftover effort
A	61,933	23.3	7,461	6,715	20.1	35.0	1,659	1,589	1,629	1,523	6,400	14.2
C	53,868	20.3	6,489	5,841	18.7	42.5	1,270	1,273	1,228	1,332	5,103	21.4
E	93,614	35.2	11,278	10,150	19.3	41.3	2,199	2,216	2,326	2,321	9,062	19.6
G	56,211	21.2	6,772	6,095	19.6	39.5	1,431	1,410	1,404	1,455	5,700	15.8
Total	265,626		32,000	28,800			6,559	6,488	6,587	6,631	26,265	17.9

Table 2. Extra tracks.

Sub-area	Area (km ²)	Line spacing per replica	On effort Extra track 1	On effort Extra track 2
A	61,933	35.0	1,653	1,442
C	53,868	42.5	1,325	1,236
E	93,614	41.3	2,319	2,227
G	56,211	39.5	1,435	1,412
Total	265,626		6,732	6,317

Figure 2. Primary Tracks for all areas

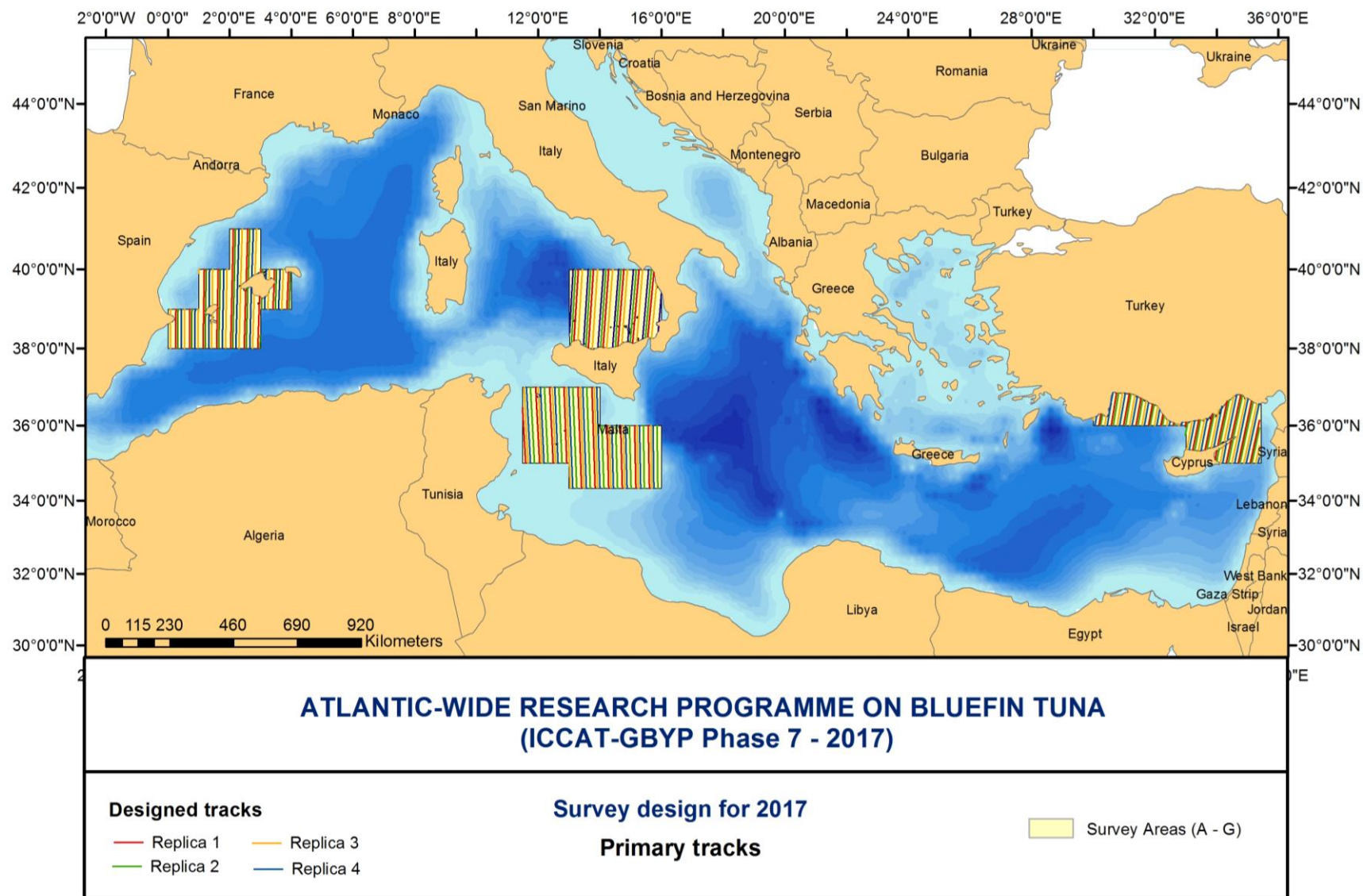


Figure 3. Primary Tracks for Area A

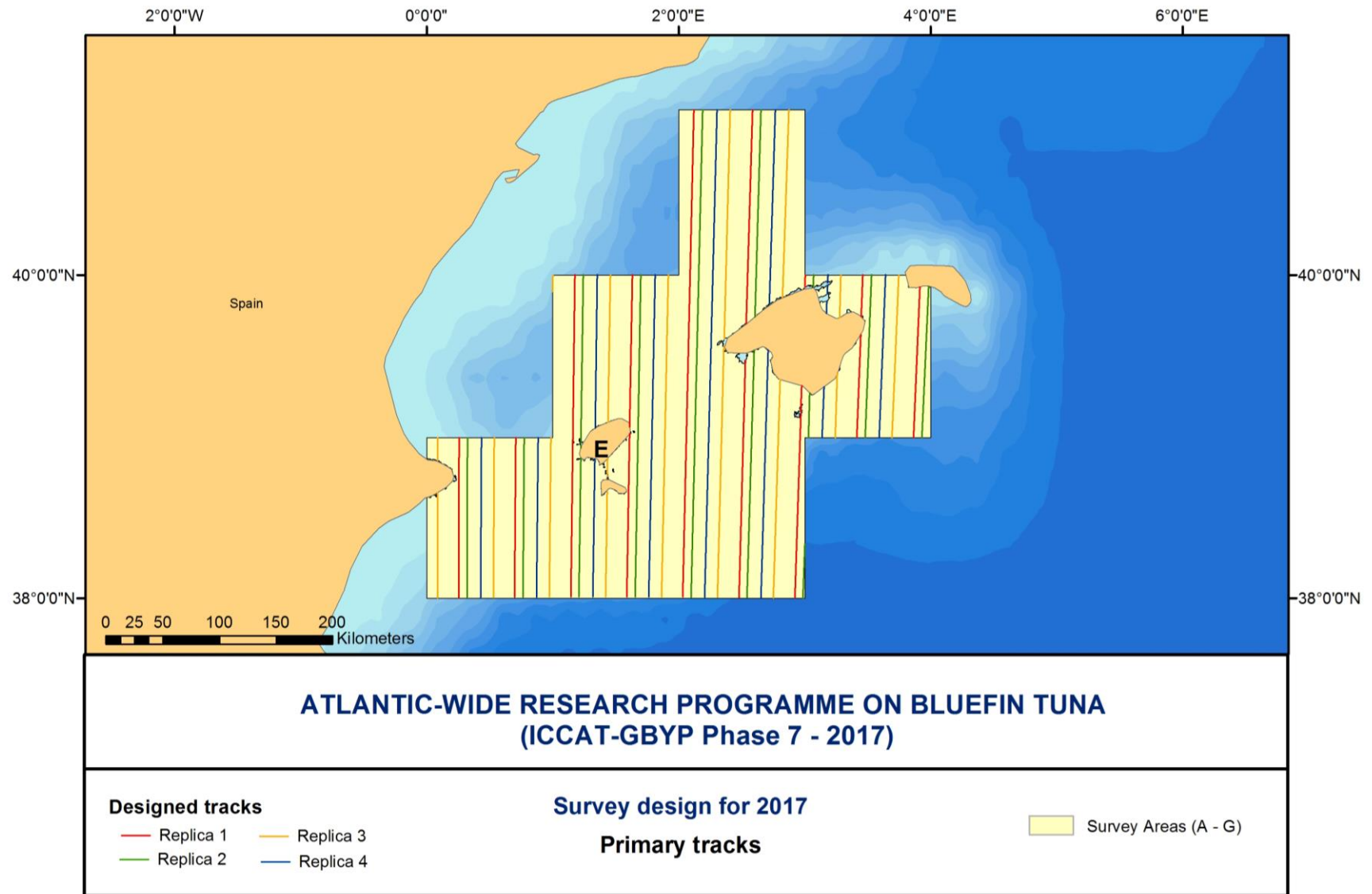


Figure 4. Primary Tracks for Area C

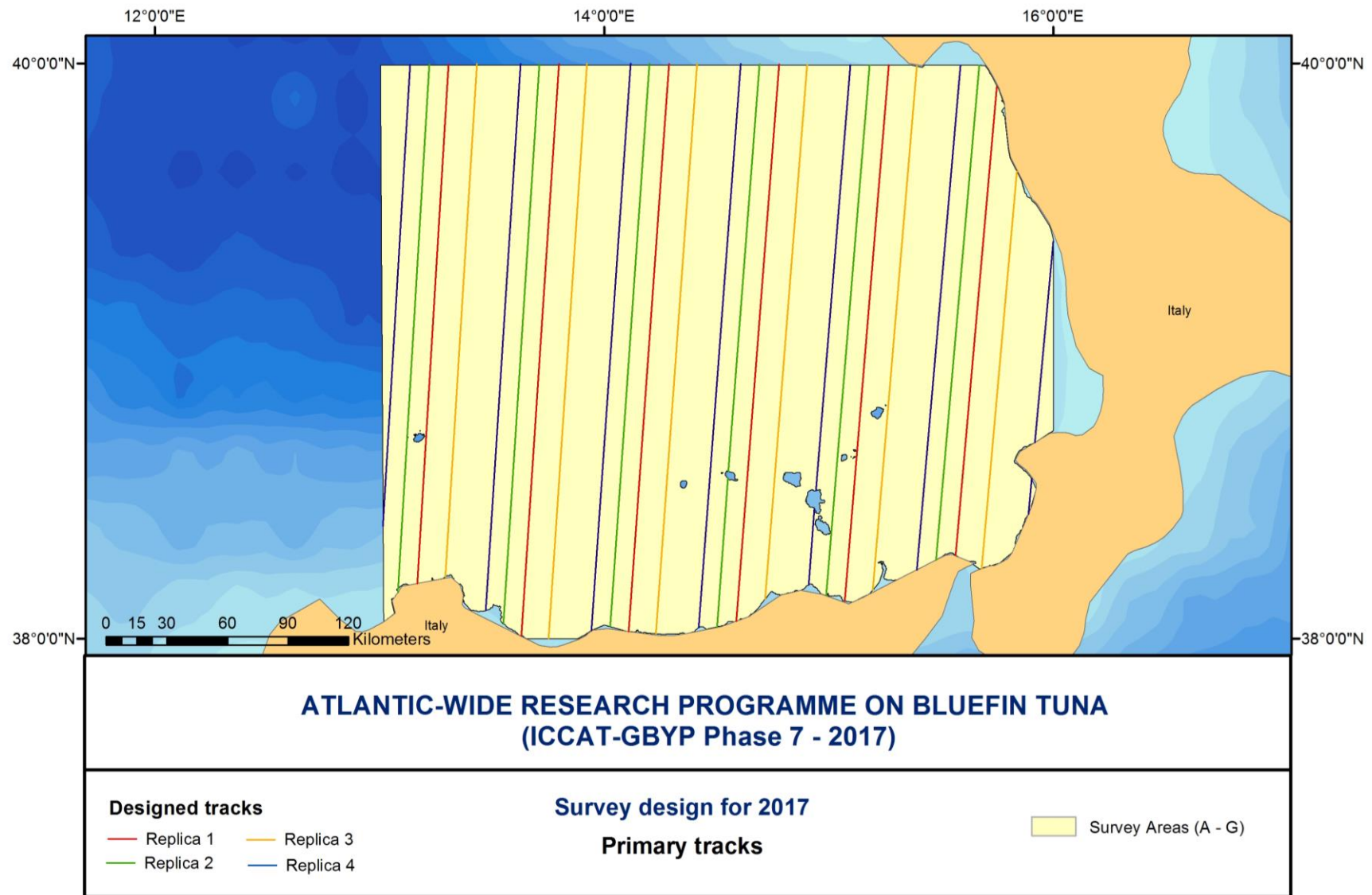


Figure 5. Primary Tracks for Area E

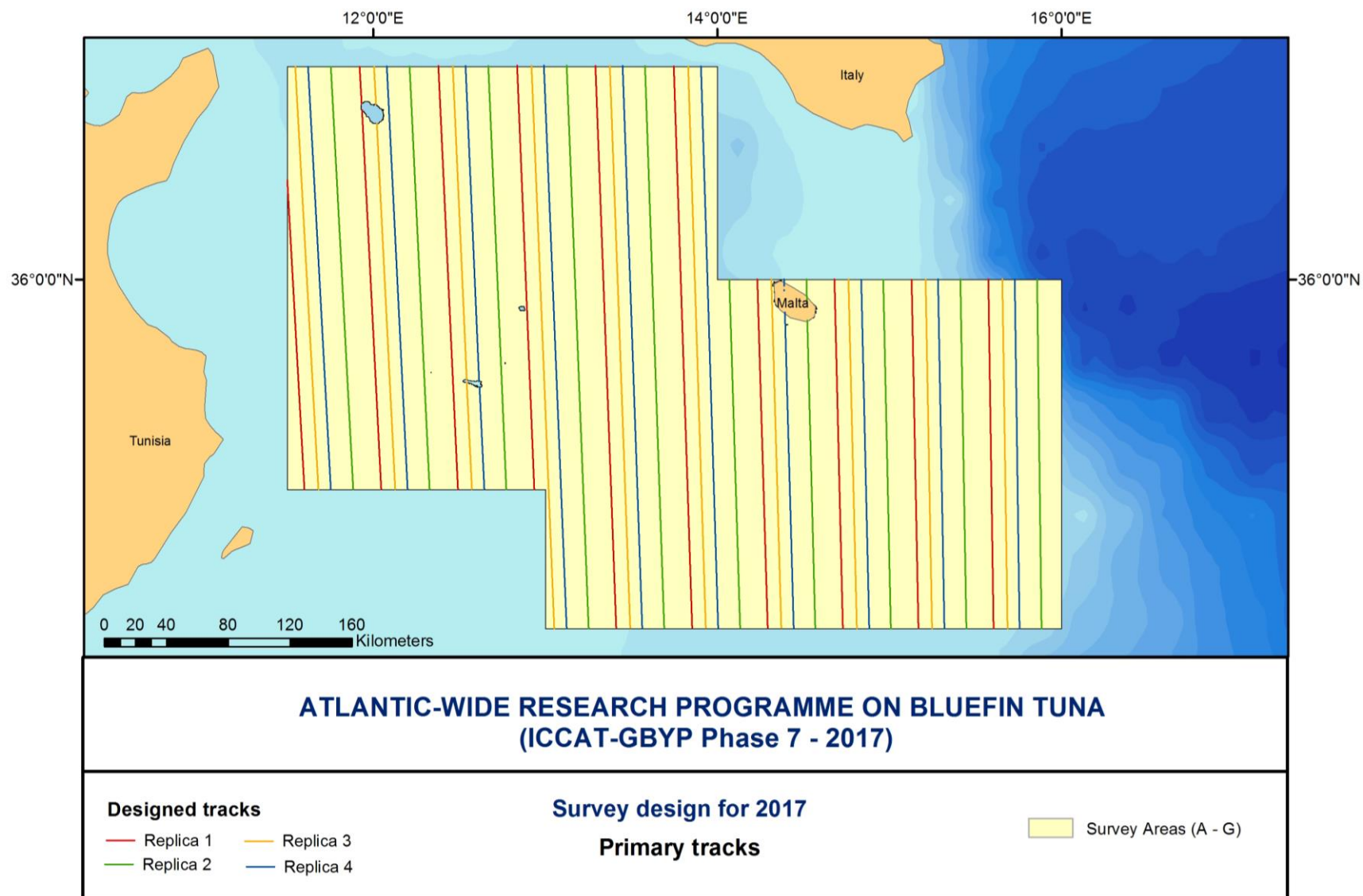


Figure 6. Primary Tracks for Area G

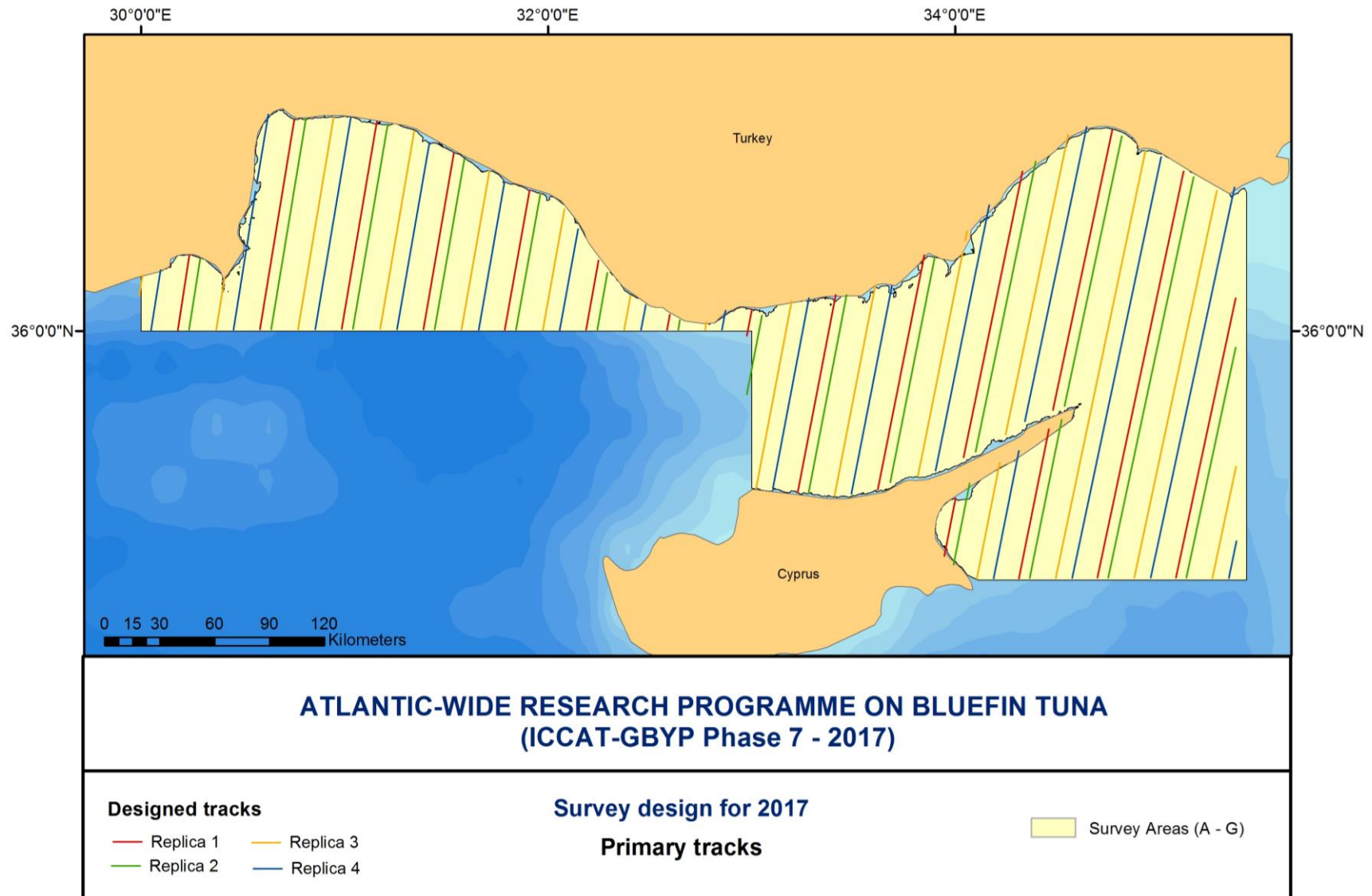


Figure 7. Extra Tracks for Area A

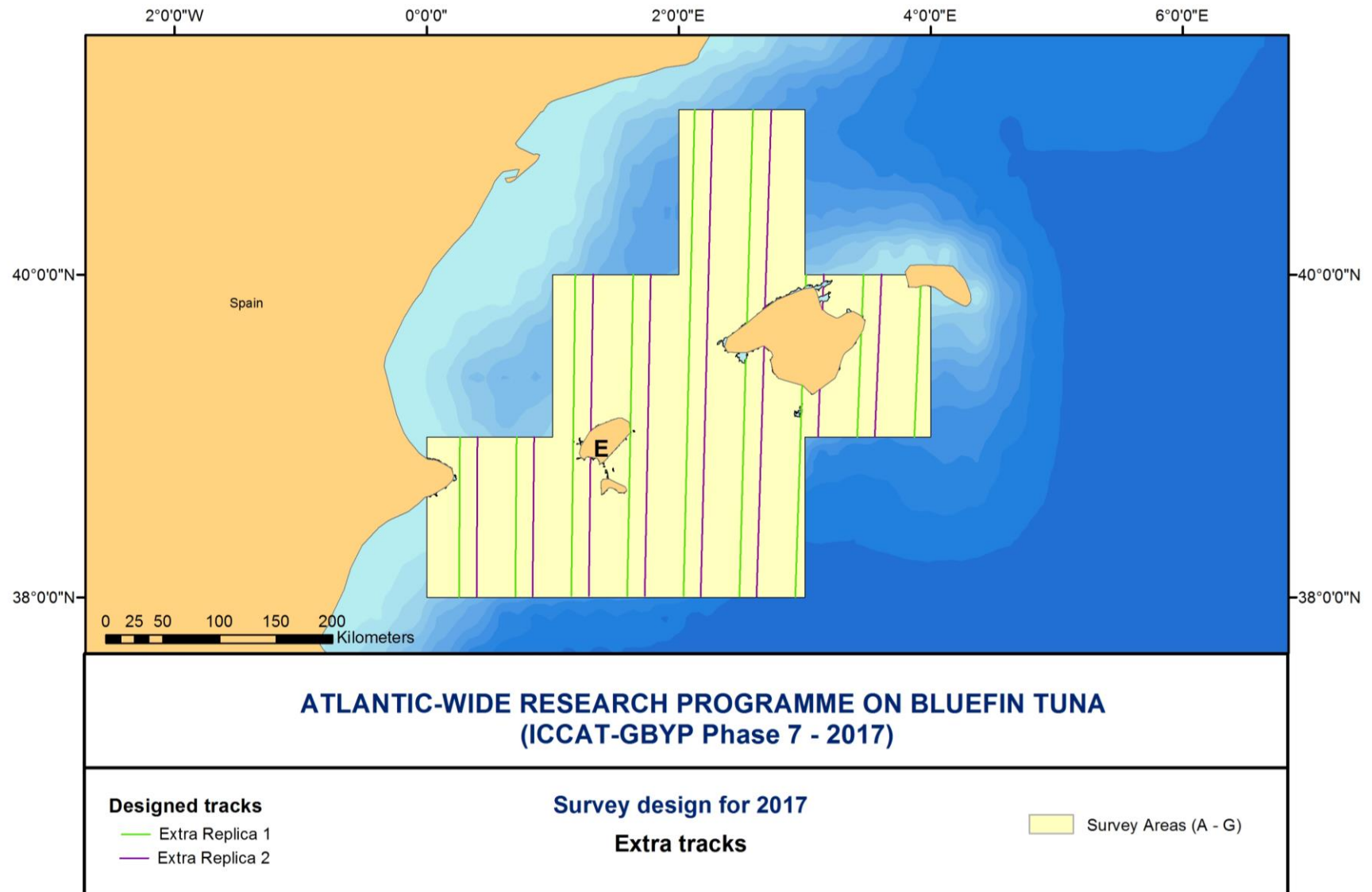


Figure 8. Extra Tracks for Area C

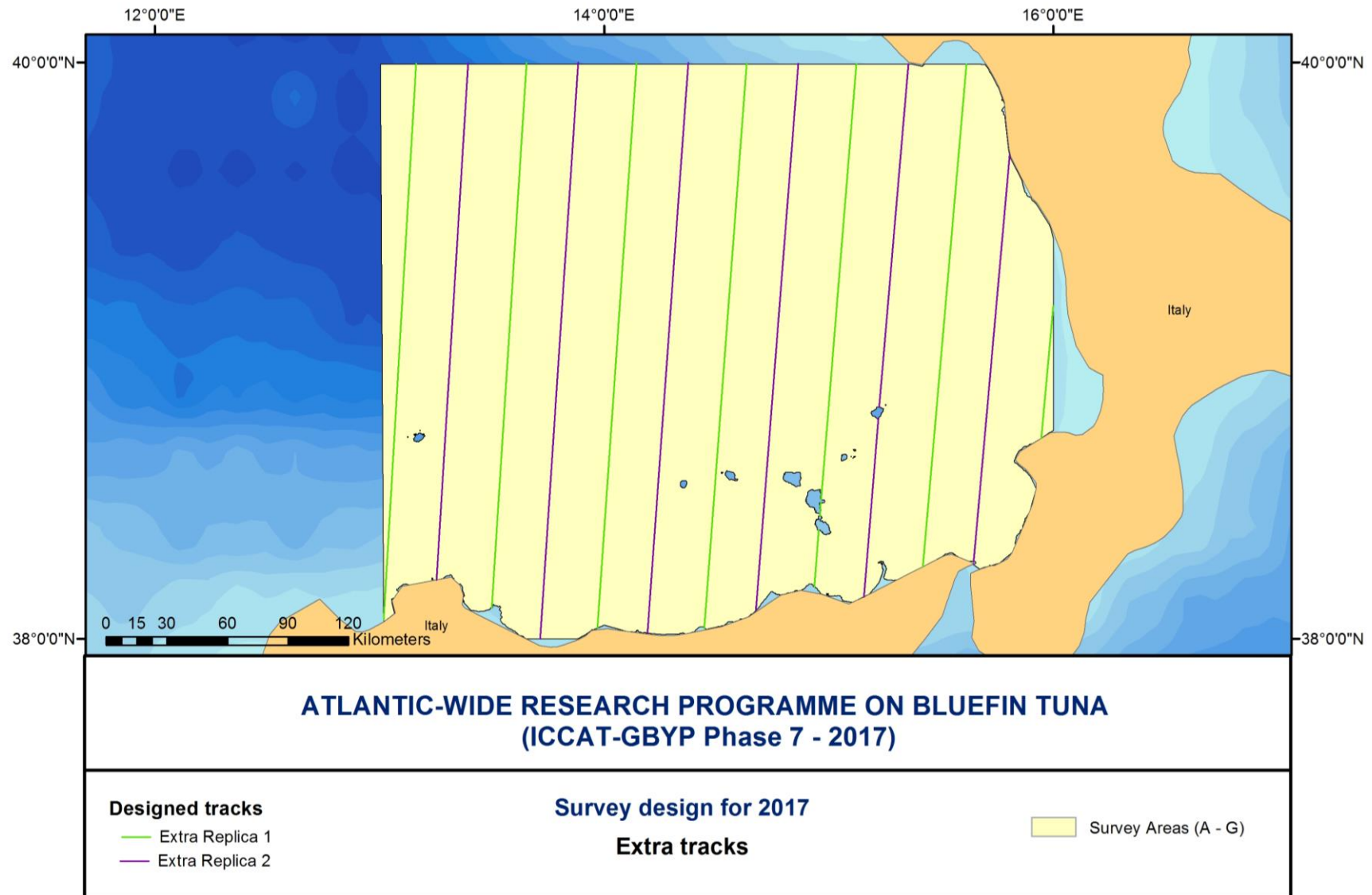


Figure 9. Extra Tracks for Area E

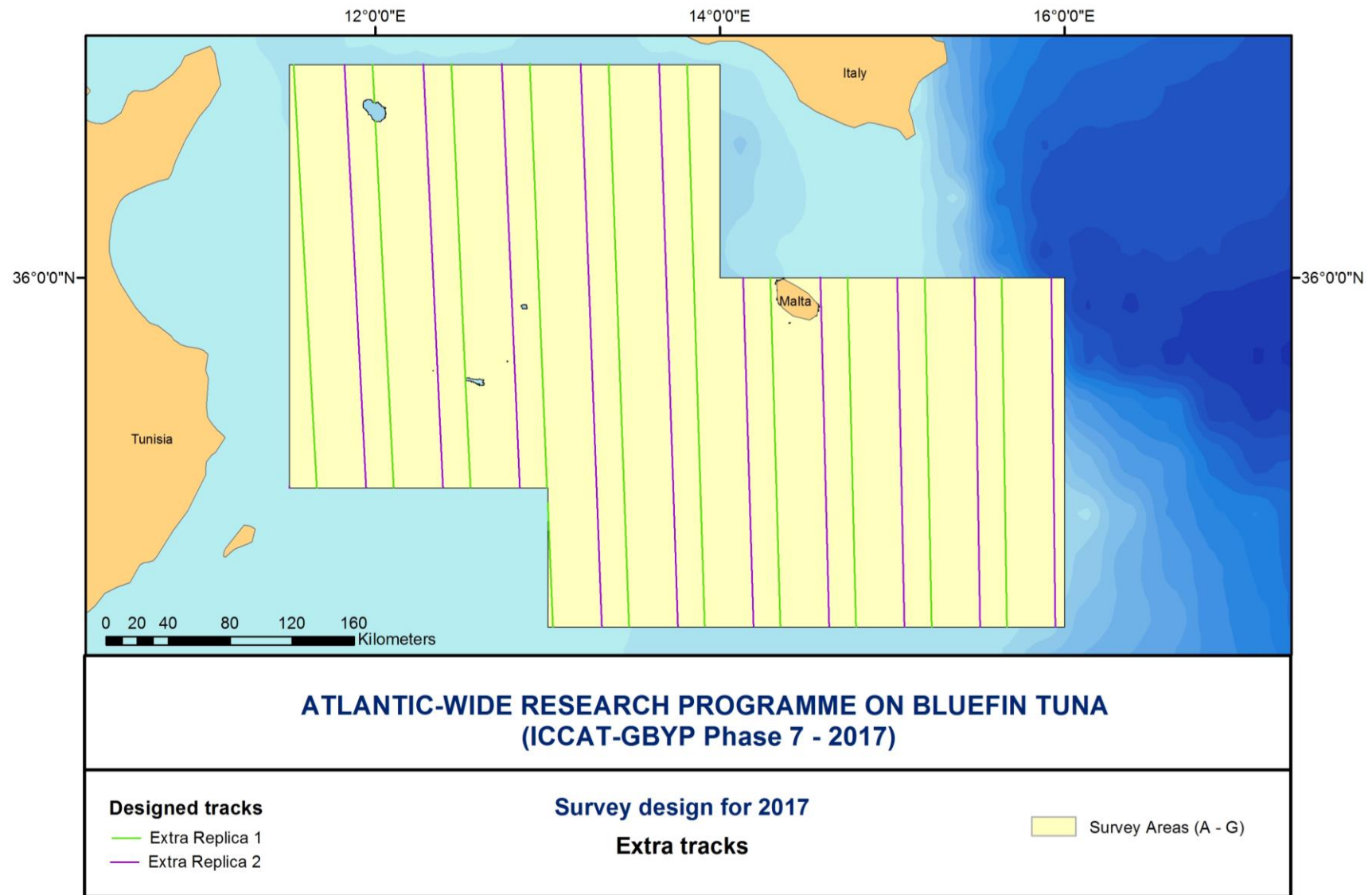
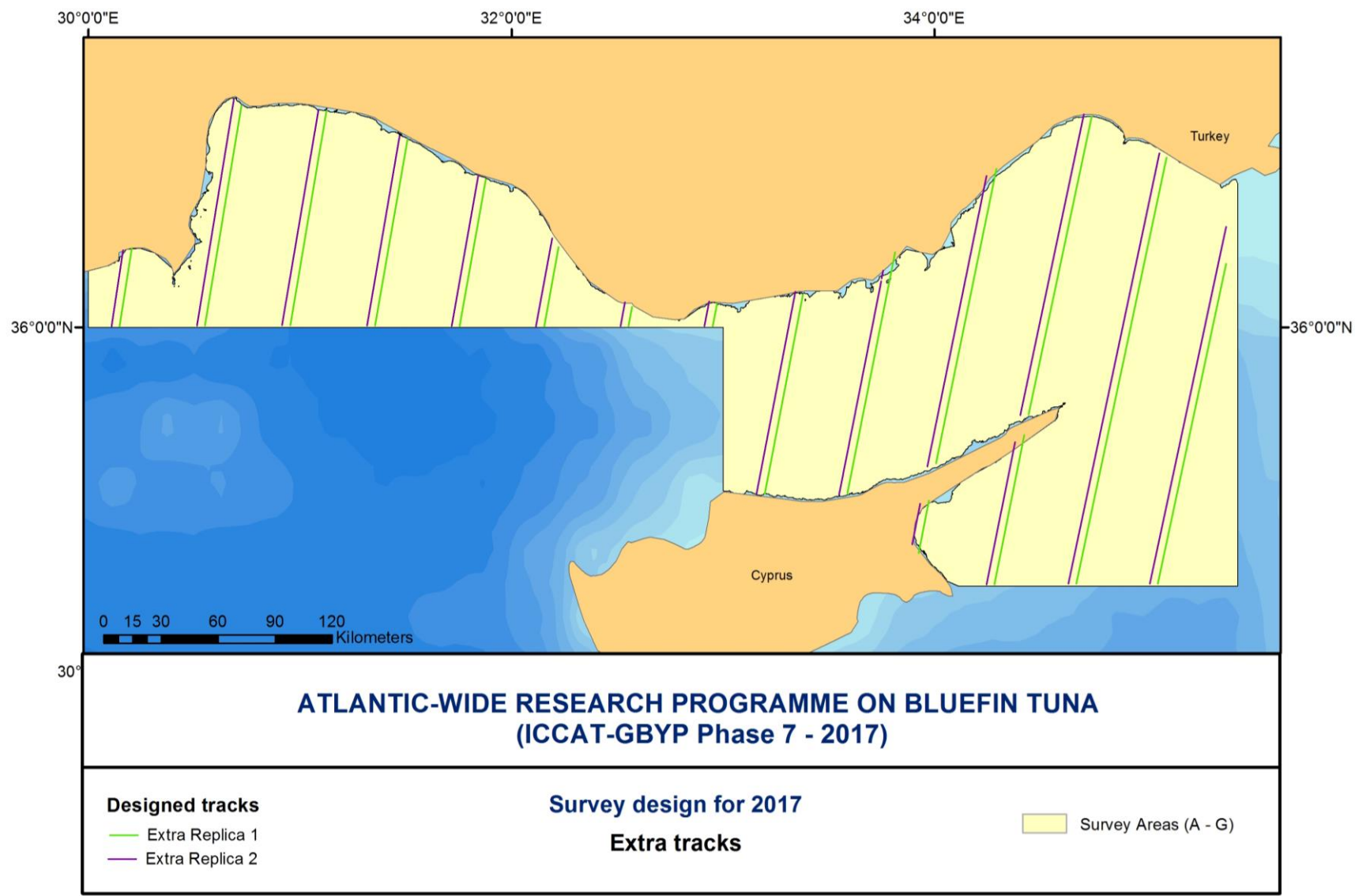


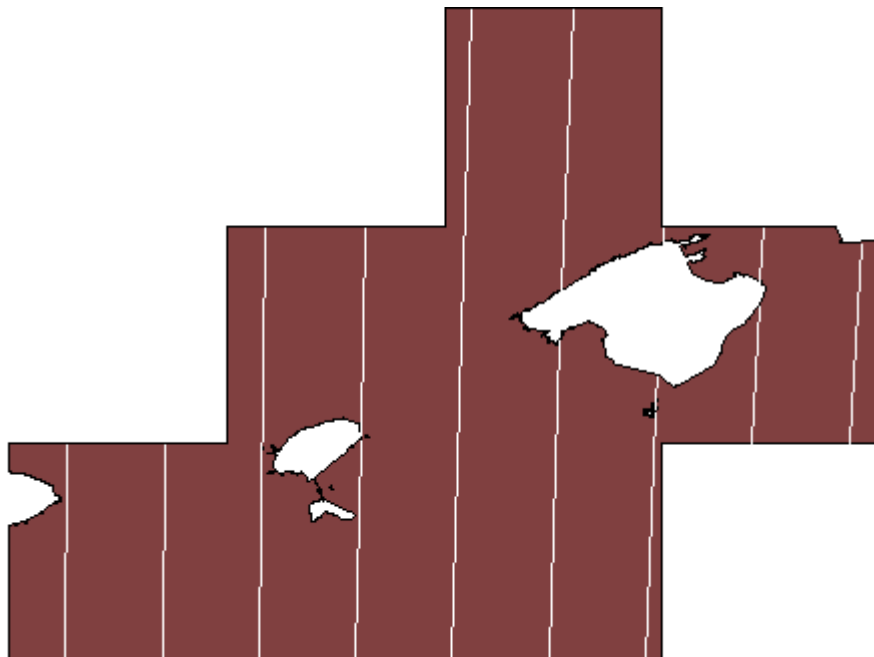
Figure 10. Extra Tracks for Area G



PRIMARY TRACKS

Area A – Balearic Sea

Replica 1



Sample layer name: 4 replicas - Replica 1

Type of sampler: Line

Number of samplers: 9

List of samplers:

x-coord y-coord

Sampler 1

0.2583678 38.00301

0.2619573 39.00083

--

Sampler 2

0.7029468 38.00687

0.7126764 39.00088

--

Sampler 3

1.147536 38.00904

1.180177 40.00064

--

Sampler 4

1.592098 38.00954

1.614641 39.02552

--

1.614902 39.03696

1.637388 40.001

--

Sampler 5

2.036596 38.00835

2.125908 41.00048

--

Sampler 6

2.480994 38.00548

2.532698 39.4832

--

2.540668 39.7016

2.589941 41.00105

--

Sampler 7

2.925253 38.00093

2.972318 39.15113

--

2.9726 39.15783

2.974146 39.1945

--

2.974319 39.1986

2.974356 39.19948

--

2.97443 39.20124

2.979456 39.31997

--

3.005592 39.92621

3.008829 40.00003

--

Sampler 8

3.416599 39.00105

3.447902 39.6408

--

3.45315 39.74607

3.465957 40.00068

--

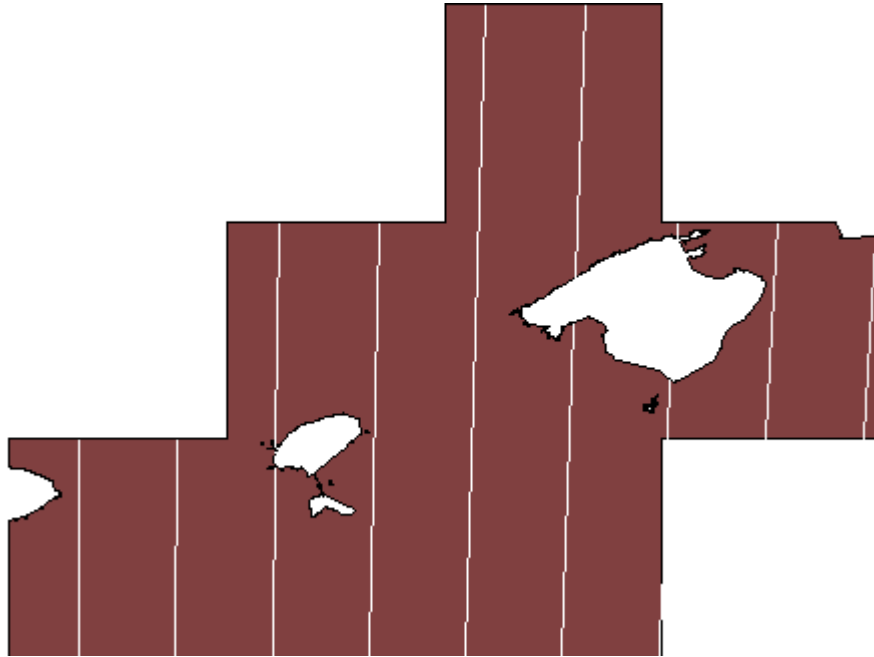
Sampler 9

3.867102 39.0005

3.918848 39.9278

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Replica 2



Sample layer name: 4 replicas - Replica 2

Type of sampler: Line

Number of samplers: 9

List of samplers:

x-coord y-coord

Sampler 1

0.3192211 38.00364

0.3236538 39.00094

--

Sampler 2

0.7638037 38.00727

0.7743702 39.00075

--

Sampler 3

1.208391 38.00921

1.222898 38.87397

--

1.223964 38.93608

1.22421 38.95042

--

1.224453 38.96451

1.242764 40.00079

--

Sampler 4

1.652947 38.00947

1.699968 40.00091

--

Sampler 5

2.097433 38.00805

2.189431 41.00067

--

Sampler 6

2.541814 38.00496

2.596893 39.53925

--

2.604521 39.74276

2.653452 41.00098

--

Sampler 7

2.986052 38.00018

2.999898 38.33849

--

3.027661 39.00011

3.039532 39.27648

--

3.068026 39.92466

3.071409 40.00023

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Sampler 8

3.478273 39.00107

3.52852 40.00063

--

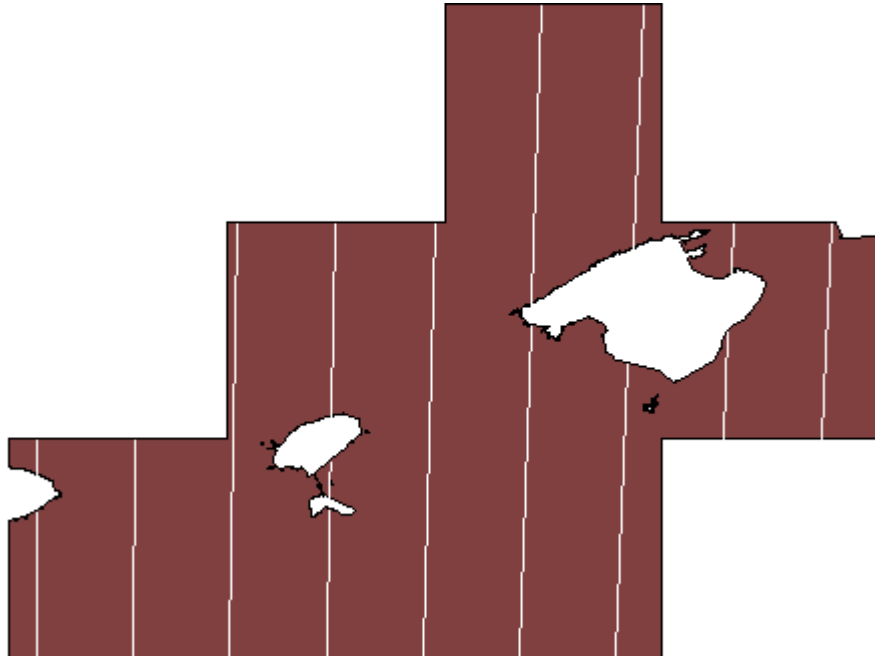
Sampler 9

3.928756 39.00029

3.981499 39.93052

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Replica 3



Sample layer name: 4 replicas - Replica 3

Type of sampler: Line

Number of samplers: 9

List of samplers:

x-coord y-coord

Sampler 1

0.1246234 38.00153

0.1257849 38.67635

--

0.1260677 38.83732

0.1263568 39.00047

--

Sampler 2

0.5691922 38.00589

0.5770795 39.00105

--

Sampler 3

1.013782 38.00856

1.042617 40.00018

--

Sampler 4

1.458356 38.00956

1.471916 38.68252

--

1.472894 38.73019

1.47441 38.80386

--

1.474414 38.80405

1.476507 38.90535

--

1.480716 39.10748
1.499841 40.00108

--

Sampler 5

1.902878 38.00888
1.957008 40.00018

--

Sampler 6

2.347309 38.00652
2.39758 39.52364

--

2.400975 39.62207
2.450345 41.00108

--

Sampler 7

2.791614 38.00248
2.844497 39.35005

--

2.86623 39.87859
2.914311 41.00034

--

Sampler 8

3.281039 39.00087
3.304404 39.49994

--

3.316715 39.75796
3.328442 40.00067

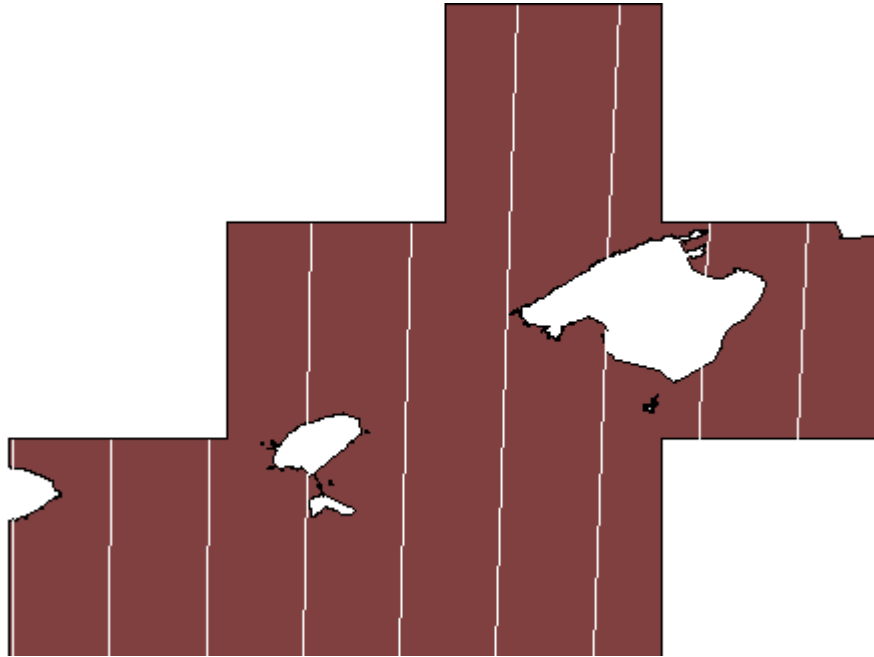
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Sampler 9

3.731583 39.00084
3.78548 40.00006

--

Replica 4



Sample layer name: 4 replicas - Replica 4

Type of sampler: Line

Number of samplers: 9

List of samplers:

x-coord y-coord

Sampler 1

1.624355E-02 38.00021

1.638515E-02 38.63213

--

1.643915E-02 38.86799

1.646967E-02 39.00007

--

Sampler 2

0.4608016 38.00498

0.4671927 39.00107

--

Sampler 3

0.9053898 38.00807

0.9178997 39.00032

--

Sampler 4

1.349971 38.00948

1.365741 38.85139

--

1.370041 39.075

1.388372 40.00103

--

Sampler 5

1.794509 38.0092

1.845557 40.00056

--

Sampler 6

2.238966 38.00725

2.337214 41.00097

--

Sampler 7

2.683305 38.00362

2.737633 39.44069

--

2.739741 39.49441

2.740482 39.51326

--

2.753089 39.83135

2.801205 41.00069

--

Sampler 8

3.171176 39.00061

3.186136 39.33261

--

3.205324 39.75056

3.215153 39.96131

--

3.215255 39.96348

3.216995 40.00055

--

Area C – Southern Tyrrhenian Sea

Replica 1



Sample layer name: 4 Replicas - Replica 1

Type of sampler: Line

Number of samplers: 6

List of samplers:

x-coord y-coord

Sampler 1

15.56295 38.29397

15.74683 39.92273

--

Sampler 2

15.07043 38.13248

15.26668 39.99473

--

Sampler 3

14.58809 38.06188

14.77776 39.9972

--

Sampler 4

14.1092 38.02568

14.28837 39.99945

--

Sampler 5

13.63199 38.01052

13.79836 39.99956

--

Sampler 6

13.16872 38.19486

13.30776 39.99752

Replica 2



Sample layer name: 4 Replicas - Replica 2
Type of sampler: Line
Number of samplers: 6

List of samplers:
x-coord y-coord

Sampler 1
15.47723 38.27763
15.66918 39.9937
--

Sampler 2
14.98852 38.15279
14.98889 38.15665
--
14.98918 38.15954
15.18048 39.99495
--

Sampler 3
14.50242 38.04186
14.55019 38.56379
--
14.55236 38.58696
14.69151 39.99775
--

Sampler 4
14.02666 38.04222
14.20201 39.99963
--

Sampler 5
13.55124 38.05276
13.71189 39.99936
--

Sampler 6
13.08227 38.16378
13.08255 38.16779
--
13.08311 38.17577
13.2212 39.99694
--

Replica 3



Sample layer name: 4 Replicas - Replica 3
Type of sampler: Line
Number of samplers: 6

List of samplers:
x-coord y-coord

Sampler 1
15.67952 38.24784
15.83609 39.62925
--

Sampler 2
15.19578 38.17209
15.39097 39.99034
--

Sampler 3
14.7167 38.1396
14.90256 39.99628
--

Sampler 4
14.22991 38.01733
14.41334 39.99908
--

Sampler 5
13.75268 38.00006
13.92348 39.99974
--

Sampler 6
13.29241 38.21873
13.43303 39.99825
--

Replica 4



Sample layer name: 4 Replicas - Replica 4
Type of sampler: Line
Number of samplers: 7

List of samplers:
x-coord y-coord

Sampler 1
15.88871 38.43923
15.90247 38.56153
--
15.917 38.68944
15.99869 39.38795
--

Sampler 2
15.39097 38.24304
15.58439 39.99395
--

Sampler 3
14.90957 38.19077
14.93554 38.45758
--
14.94182 38.52125
15.0956 39.99511
--

Sampler 4
14.41964 38.03928
14.6066 39.99823
--

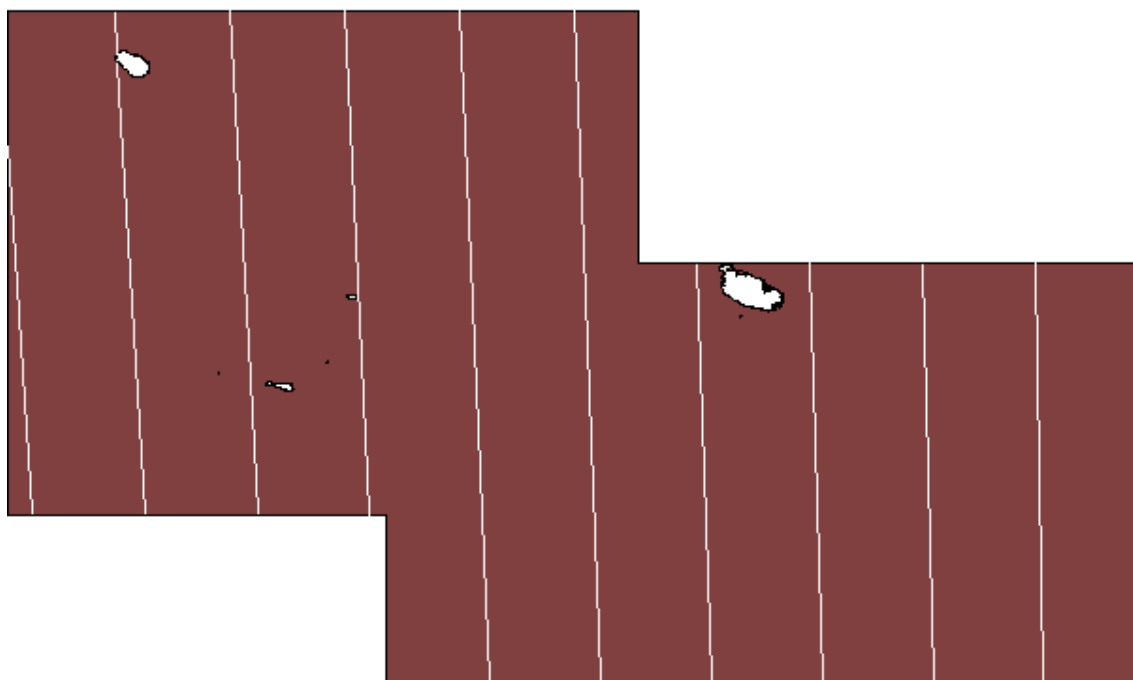
Sampler 5
13.94294 38.02884
14.11699 39.99973
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Sampler 6
13.47206 38.0997
13.62676 39.99909
--

Sampler 7
13.01553 38.39584
13.13598 39.9963
--

Area E - Central-Southern Mediterranean Sea

Replica 1



Sample layer name: 4 Replicas - Replica 1

Type of sampler: Line

Number of samplers: 10

List of samplers:

x-coord y-coord

Sampler 1

15.60554 34.33436

15.57477 36.00107

--

Sampler 2

15.16814 34.33393

15.12789 36.00049

--

Sampler 3

14.73004 34.33499

14.68035 36.00095

--

Sampler 4

14.29125 34.3369

14.23219 36.00078

--

Sampler 5

13.85187 34.33716

13.74642 37.00193

--

Sampler 6

13.41195 34.33578

13.29086 37.00399

--

Sampler 7

12.93558 35.0004

12.83476 37.00424

--

Sampler 8

12.49058 35.00215

12.37814 37.00267

--

Sampler 9

12.04506 35.00221

11.93318 36.79797

--

11.93143 36.82695

11.921 37.00014

--

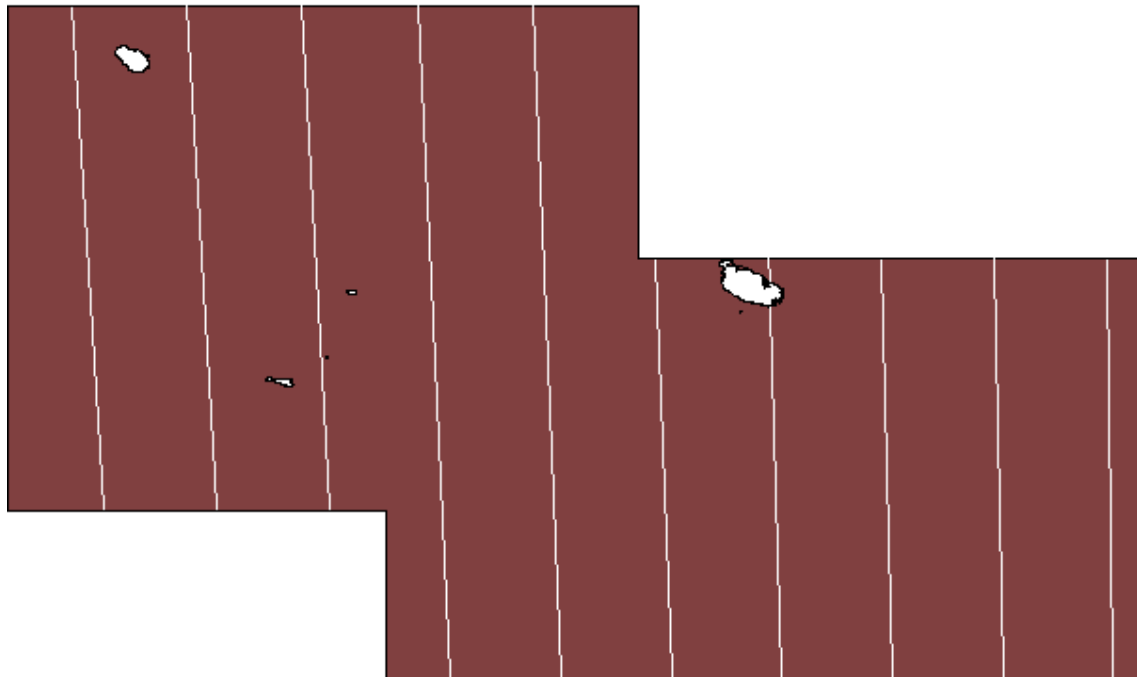
Sampler 10

11.59906 35.00059

11.49863 36.46776

--

Replica 2



Sample layer name: 4 Replicas - Replica 2

Type of sampler: Line

Number of samplers: 10

List of samplers:

x-coord y-coord

Sampler 1

15.88271 34.33377

15.85795 36.00054

--

Sampler 2

15.4457 34.33439

15.41146 36.00106

--

Sampler 3

15.00808 34.33337

14.96436 36.00015

--

Sampler 4

14.56969 34.33588

14.52223 35.80754

--

14.51996 35.88467

14.51989 35.88689

--

14.51972 35.89294

14.51956 35.89835

--

14.51956 35.89837

14.51949 35.90063

--

14.51939 35.90412

14.51657 36.00109

--

Sampler 5

14.13068 34.33718

14.0682 36.00028

--

Sampler 6

13.6911 34.33685

13.57994 37.0029

--

Sampler 7

13.25098 34.33487

13.12418 37.00429

--

Sampler 8

12.77295 35.00123

12.66788 37.00388

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Sampler 9

12.32776 35.00237

12.21108 37.00164

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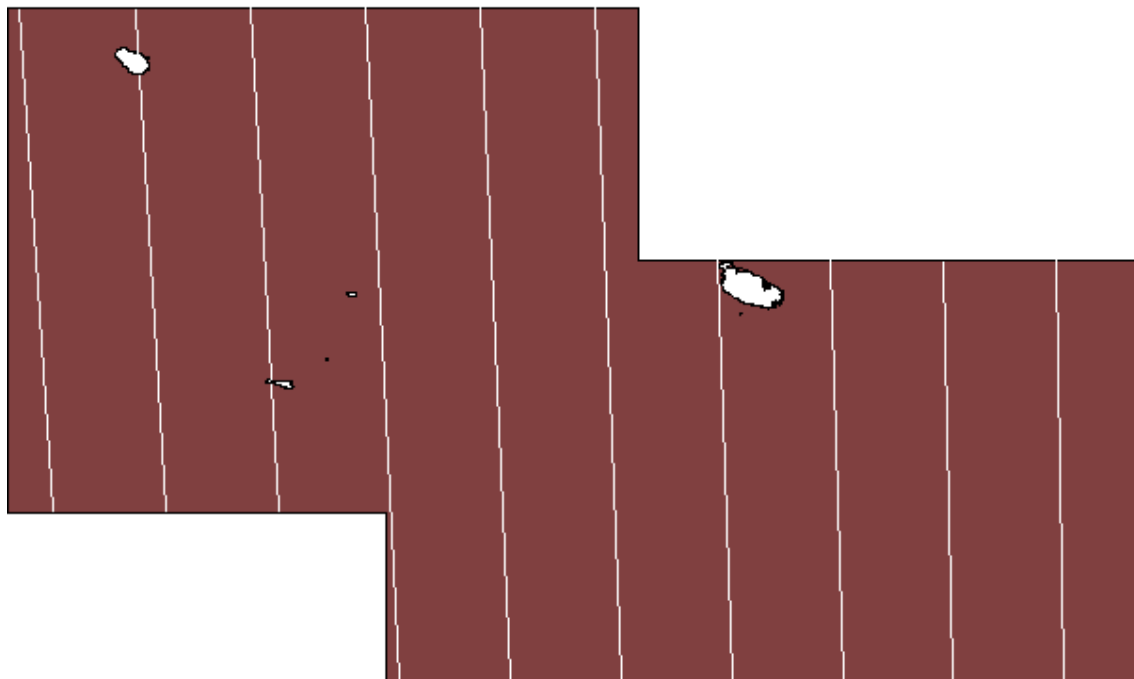
Sampler 10

11.88206 35.00182

11.75366 37.00027

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Replica 3



Sample layer name: 4 Replicas - Replica 3

Type of sampler: Line

Number of samplers: 10

List of samplers:

x-coord y-coord

Sampler 1

15.68524 34.33426

15.6562 36.00099

--

Sampler 2

15.24795 34.33413

15.20943 36.00073

--

Sampler 3

14.81 34.33447

14.76202 36.00079

--

Sampler 4

14.37132 34.33667

14.31396 36.00094

--

Sampler 5

13.93205 34.33724

13.82943 37.00136

--

Sampler 6

13.49222 34.33616

13.37398 37.00375

--

Sampler 7

13.05186 34.33343

12.91798 37.00433

--

Sampler 8

12.57177 35.00195

12.54275 35.51202

--

12.54199 35.52551

12.46145 37.00309

--

Sampler 9

12.12635 35.00233

12.02017 36.73443

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12.01481 36.82475

12.00444 37.00004

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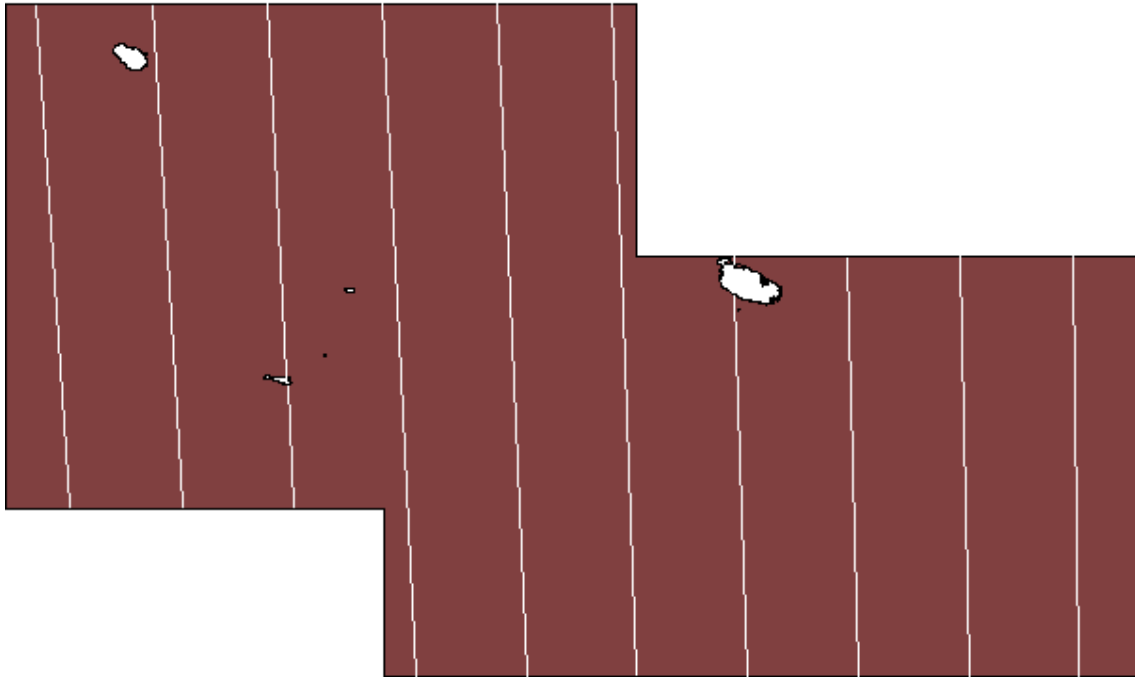
Sampler 10

11.68043 35.00101

11.54667 37.0001

--

Replica 4



Sample layer name: 4 Replicas - Replica 4

Type of sampler: Line

Number of samplers: 10

List of samplers:

x-coord y-coord

Sampler 1

15.75626 34.33412

15.72875 36.00087

--

Sampler 2

15.31907 34.33426

15.28209 36.00089

--

Sampler 3

14.88124 34.33395

14.83479 36.0006

--

Sampler 4

14.44266 34.33643

14.39164 35.84527

--

14.38848 35.94706

14.38836 35.95109

--

14.3878 35.96936

14.38683 36.00103

--

Sampler 5

14.00348 34.33726
13.9034 37.0008

--

Sampler 6

13.56374 34.33644
13.44805 37.00348

--

Sampler 7

13.12347 34.33399
12.99213 37.00436

--

Sampler 8

12.64412 35.00173
12.6168 35.48963

--

12.61528 35.51701
12.53569 37.00342

--

Sampler 9

12.19878 35.00238
12.07875 37.00066

--

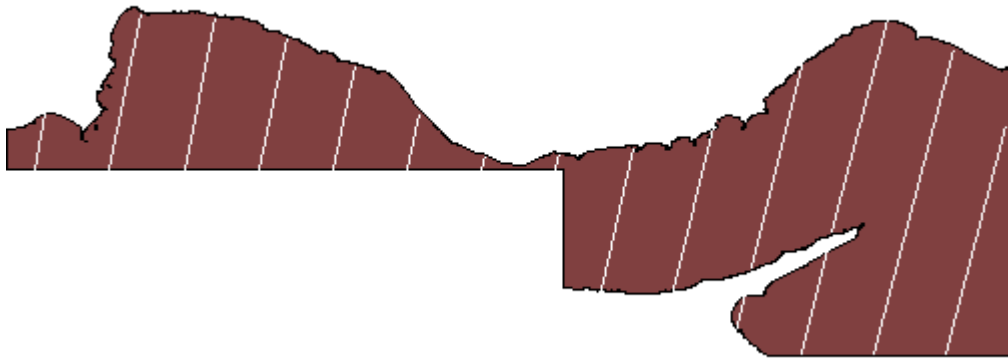
Sampler 10

11.75294 35.00134
11.62111 37.0002

--

Area G – Levantine Sea

Replica 1



Sample layer name: 4 Replicas - Replica 1

Type of sampler: Line

Number of samplers: 14

List of samplers:

x-coord y-coord

Sampler 1

35.05316 35.00917

35.37697 36.24421

--

Sampler 2

34.66825 35.00879

35.09456 36.64785

--

Sampler 3

34.28172 35.0069

34.42344 35.58513

--

34.44342 35.66479

34.74203 36.80703

--

Sampler 4

33.92308 35.12846

33.92338 35.12973

--

33.92375 35.13132

33.92389 35.13189

--

33.9243 35.13366

33.97153 35.33182

--

34.0065 35.4768

34.29107 36.60554

--

Sampler 5

33.58805 35.36087
33.81268 36.28726

--

Sampler 6

33.19571 35.35756
33.37624 36.12525

--

Sampler 7

32.95057 36.00384
32.97098 36.09099

--

Sampler 8

32.5532 36.00448
32.57022 36.07914

--

Sampler 9

32.15446 36.00352
32.22258 36.30787

--

Sampler 10

31.75516 36.00447
31.87862 36.56627

--

Sampler 11

31.35513 36.00646
31.50788 36.71762

--

Sampler 12

30.95384 36.00686
31.12549 36.82646

--

Sampler 13

30.55134 36.00563
30.72244 36.84702

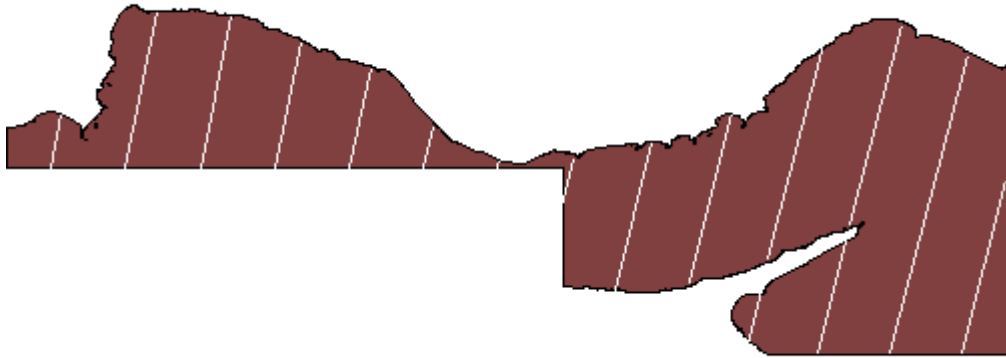
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Sampler 14

30.14769 36.0028
30.20556 36.3025

--

Replica 2



Sample layer name: 4 Replicas - Replica 2

Type of sampler: Line

Number of samplers: 14

List of samplers:

x-coord y-coord

Sampler 1

35.13599 35.00906

35.37698 35.93366

--

Sampler 2

34.75145 35.009

35.16971 36.61148

--

Sampler 3

34.36526 35.00744

34.52257 35.64472

--

34.53654 35.69999

34.81858 36.77356

--

Sampler 4

33.9908 35.06064

34.06932 35.38859

--

34.10029 35.51591

34.39447 36.67266

--

Sampler 5

33.68011 35.39349

33.89952 36.2925

--

Sampler 6

33.27823 35.34858

33.46629 36.14368

--

Sampler 7

32.9762 35.74593
33.05005 36.06268

--

Sampler 8

32.63906 36.00447
32.64783 36.04276

--

Sampler 9

32.24061 36.00387
32.29159 36.23092

--

Sampler 10

31.84131 36.00383
31.96098 36.54552

--

Sampler 11

31.44156 36.00617
31.58732 36.68148

--

Sampler 12

31.04053 36.0069
31.21206 36.82088

--

Sampler 13

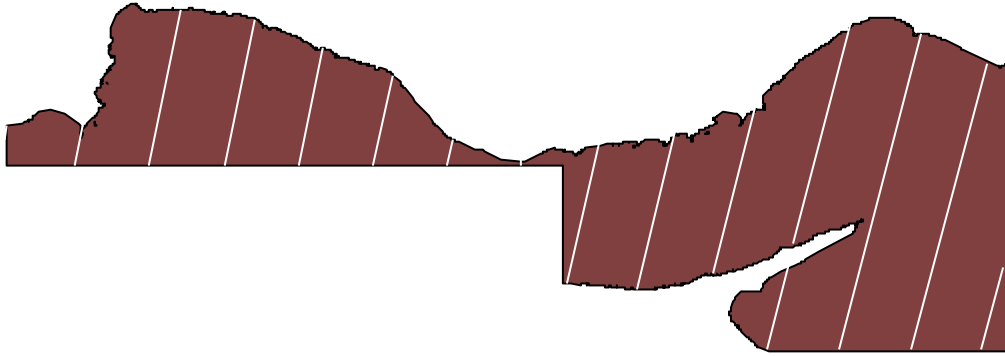
30.63829 36.00603
30.80977 36.84385

--

Sampler 14

30.23489 36.00355
30.29039 36.28917

Replica 3



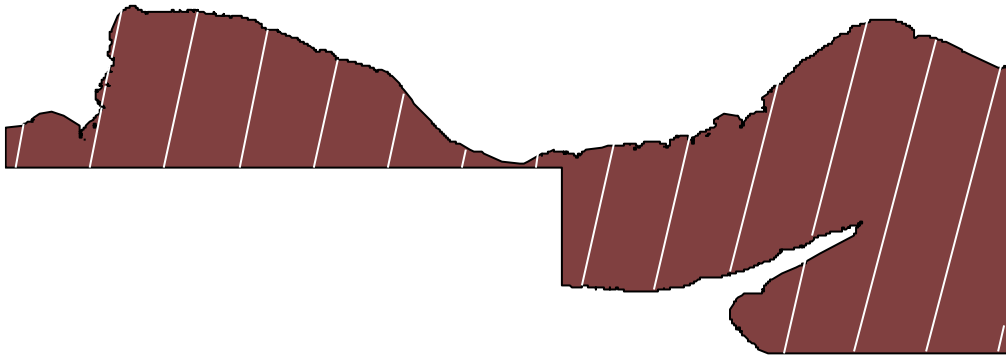
Sample layer name: 4 Replicas - Replica 3
Type of sampler: Line
Number of samplers: 15

List of samplers:

	x-coord	y-coord
Sampler 1		
	35.26317	35.00875
	35.37892	35.45692
--		
Sampler 2		
	34.87918	35.00919
	35.28562	36.55796
--		
Sampler 3		
	34.49353	35.00813
	34.93468	36.71732
--		
Sampler 4		
	34.10629	35.00555
	34.2187	35.47093
--		
	34.24687	35.58524
	34.55478	36.77953
--		
Sampler 5		
	33.81573	35.41866
	34.03621	36.31337
--		
	34.04812	36.3602
	34.05749	36.3969
--		
Sampler 6		
	33.40586	35.33878
	33.60731	36.18263
--		
Sampler 7		
	33.0204	35.36744
	33.19521	36.11928
--		
Sampler 8		
	32.77092	36.00433
	32.77779	36.03408
--		
Sampler 9		
	32.37292	36.00425
	32.40396	36.14169
--		
Sampler 10		
	31.97361	36.00271
	32.08069	36.48403
--		
Sampler 11		

```
31.5743 36.00557
31.71149 36.63624
--
Sampler 12
31.17369 36.00684
31.34104 36.79406
--
Sampler 13
30.77185 36.0065
30.94604 36.84893
--
Sampler 14
30.36882 36.00455
30.41012 36.21549
--
Sampler 15
29.99123 36.1415
30.00638 36.22092
--
```

Replica 4



Sample layer name: 4 Replicas - Replica 4
Type of sampler: Line
Number of samplers: 15

List of samplers:
x-coord y-coord

Sampler 1
35.34324 35.00848
35.38133 35.1568
--

Sampler 2
34.95961 35.00922
35.37122 36.56998
--

Sampler 3
34.5743 35.00847
35.01014 36.69075
--

Sampler 4
34.18739 35.00621
34.31225 35.51972
--
34.34185 35.63884
34.64579 36.80881
--

Sampler 5
33.90287 35.44141
34.1669 36.49981
--

Sampler 6
33.4896 35.34703
33.68898 36.17778
--

Sampler 7
33.10287 35.36916
33.28091 36.13049
--

Sampler 8
32.85397 36.00414
32.87177 36.08063
--

Sampler 9
32.45626 36.00439
32.47879 36.10376
--

Sampler 10
32.05719 36.00305
32.14682 36.40476
--

Sampler 11
31.6579 36.0051
31.78565 36.58989
--

Sampler 12
31.25756 36.0067
31.41586 36.74811
--

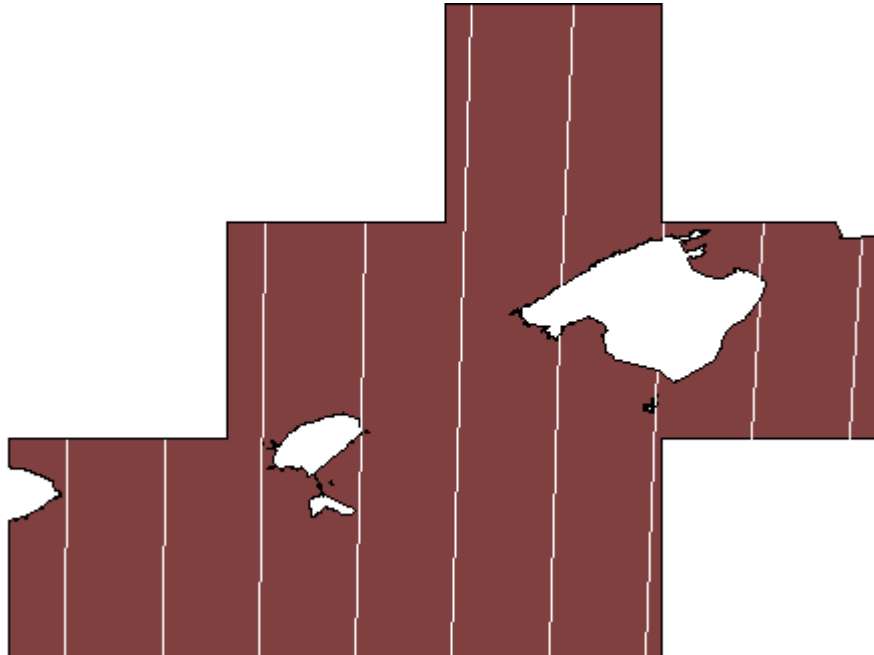
Sampler 13
30.85597 36.00671
31.03123 36.84898
--

Sampler 14
30.45319 36.00509
30.51665 36.32576
--
30.51822 36.33355
30.54153 36.44939
--
30.5422 36.45267
30.56296 36.55495
--
30.57085 36.59365
30.62535 36.85777
--

Sampler 15
30.04926 36.00186
30.09511 36.24174
--

EXTRA REPLICAS
Area A – Balearic Sea

Replica 1



Sample layer name: 4 replicas - Replica 1

Type of sampler: Line

Number of samplers: 9

List of samplers:

x-coord y-coord

Sampler 1

0.2583678 38.00301

0.2619573 39.00083

--

Sampler 2

0.7029468 38.00687

0.7126764 39.00088

--

Sampler 3

1.147536 38.00904

1.180177 40.00064

--

Sampler 4

1.592098 38.00954

1.614641 39.02552

--

1.614902 39.03696

1.637388 40.001

--

Sampler 5

2.036596 38.00835

2.125908 41.00048

--

Sampler 6

2.480994 38.00548

2.532698 39.4832

--

2.540668 39.7016

2.589941 41.00105

--

Sampler 7

2.925253 38.00093

2.972318 39.15113

--

2.9726 39.15783

2.974146 39.1945

--

2.974319 39.1986

2.974356 39.19948

--

2.97443 39.20124

2.979456 39.31997

--

3.005592 39.92621

3.008829 40.00003

--

Sampler 8

3.416599 39.00105

3.447902 39.6408

--

3.45315 39.74607

3.465957 40.00068

--

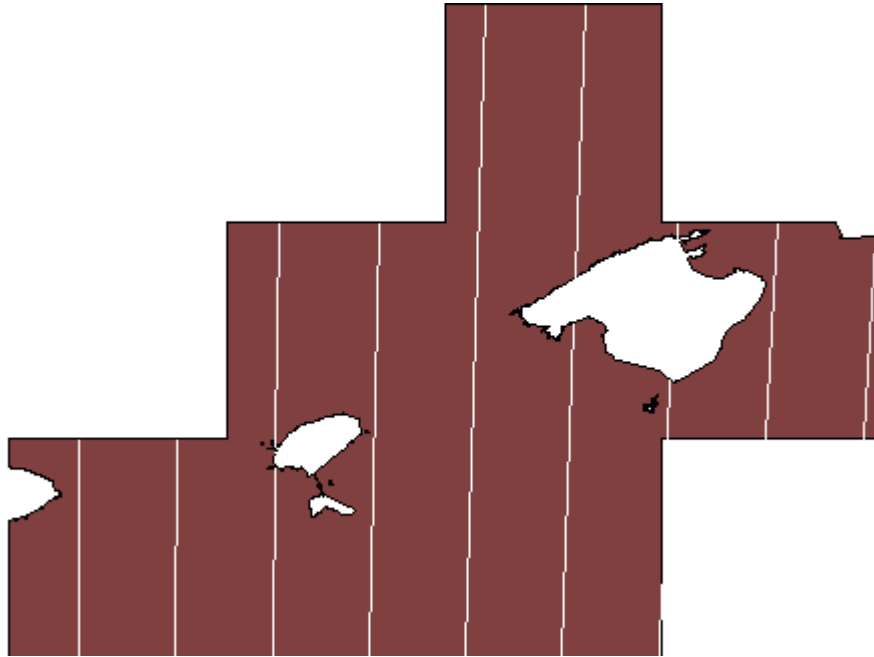
Sampler 9

3.867102 39.0005

3.918848 39.9278

--

Replica 2



Sample layer name: 4 replicas - Replica 2

Type of sampler: Line

Number of samplers: 9

List of samplers:

x-coord y-coord

Sampler 1

0.3192211 38.00364

0.3236538 39.00094

--

Sampler 2

0.7638037 38.00727

0.7743702 39.00075

--

Sampler 3

1.208391 38.00921

1.222898 38.87397

--

1.223964 38.93608

1.22421 38.95042

--

1.224453 38.96451

1.242764 40.00079

--

Sampler 4

1.652947 38.00947

1.699968 40.00091

--

Sampler 5

2.097433 38.00805

2.189431 41.00067

--

Sampler 6

2.541814 38.00496

2.596893 39.53925

--

2.604521 39.74276

2.653452 41.00098

--

Sampler 7

2.986052 38.00018

2.999898 38.33849

--

3.027661 39.00011

3.039532 39.27648

--

3.068026 39.92466

3.071409 40.00023

--

Sampler 8

3.478273 39.00107

3.52852 40.00063

--

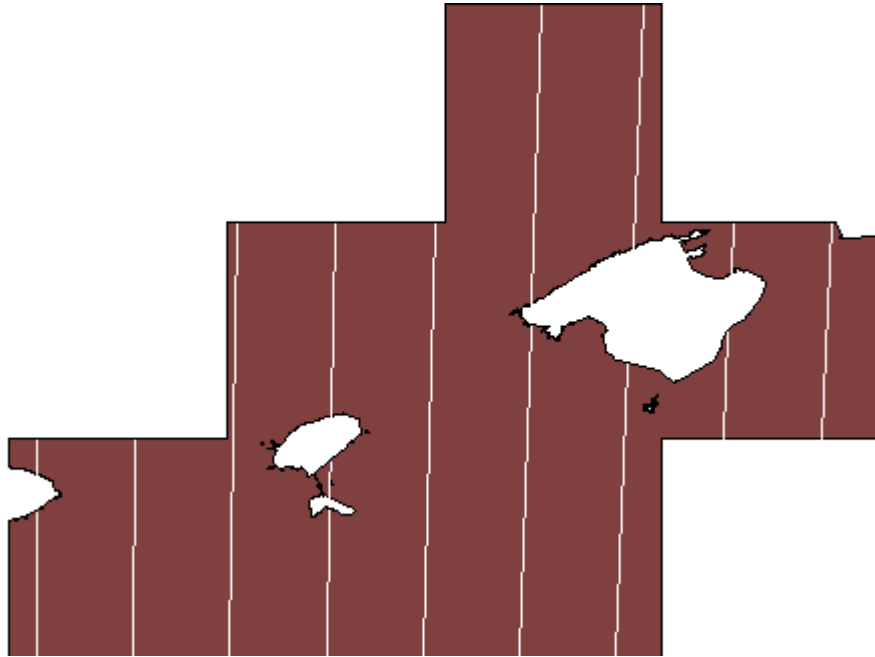
Sampler 9

3.928756 39.00029

3.981499 39.93052

--

Replica 3



Sample layer name: 4 replicas - Replica 3

Type of sampler: Line

Number of samplers: 9

List of samplers:

x-coord y-coord

Sampler 1

0.1246234 38.00153

0.1257849 38.67635

--

0.1260677 38.83732

0.1263568 39.00047

--

Sampler 2

0.5691922 38.00589

0.5770795 39.00105

--

Sampler 3

1.013782 38.00856

1.042617 40.00018

--

Sampler 4

1.458356 38.00956

1.471916 38.68252

--

1.472894 38.73019

1.47441 38.80386

--

1.474414 38.80405

1.476507 38.90535

--

1.480716 39.10748
1.499841 40.00108

--

Sampler 5

1.902878 38.00888
1.957008 40.00018

--

Sampler 6

2.347309 38.00652
2.39758 39.52364

--

2.400975 39.62207
2.450345 41.00108

--

Sampler 7

2.791614 38.00248
2.844497 39.35005

--

2.86623 39.87859
2.914311 41.00034

--

Sampler 8

3.281039 39.00087
3.304404 39.49994

--

3.316715 39.75796
3.328442 40.00067

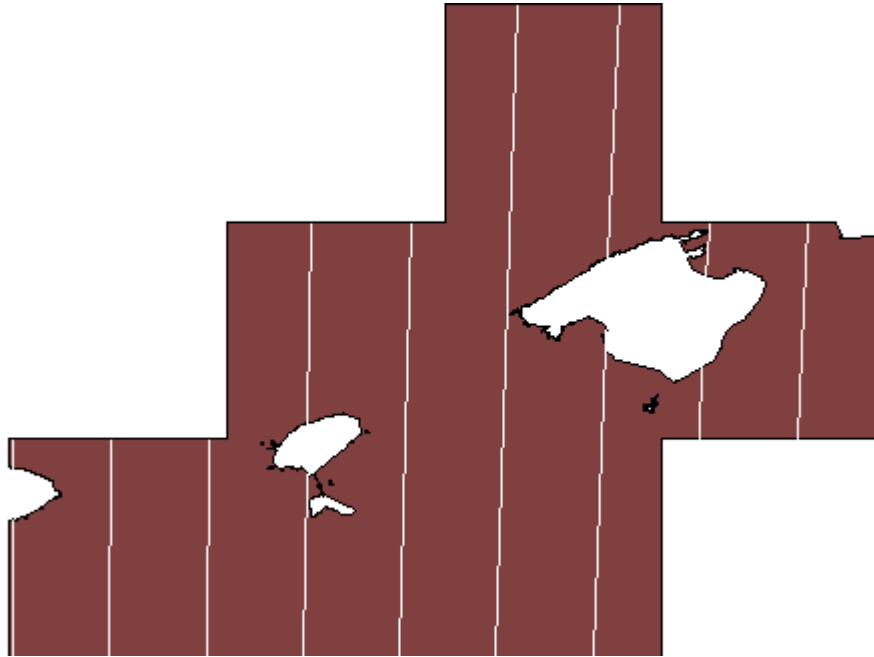
--

Sampler 9

3.731583 39.00084
3.78548 40.00006

--

Replica 4



Sample layer name: 4 replicas - Replica 4

Type of sampler: Line

Number of samplers: 9

List of samplers:

x-coord y-coord

Sampler 1

1.624355E-02 38.00021

1.638515E-02 38.63213

--

1.643915E-02 38.86799

1.646967E-02 39.00007

--

Sampler 2

0.4608016 38.00498

0.4671927 39.00107

--

Sampler 3

0.9053898 38.00807

0.9178997 39.00032

--

Sampler 4

1.349971 38.00948

1.365741 38.85139

--

1.370041 39.075

1.388372 40.00103

--

Sampler 5

1.794509 38.0092

1.845557 40.00056

--

Sampler 6

2.238966 38.00725

2.337214 41.00097

--

Sampler 7

2.683305 38.00362

2.737633 39.44069

--

2.739741 39.49441

2.740482 39.51326

--

2.753089 39.83135

2.801205 41.00069

--

Sampler 8

3.171176 39.00061

3.186136 39.33261

--

3.205324 39.75056

3.215153 39.96131

--

3.215255 39.96348

3.216995 40.00055

--

Area C – Southern Tyrrhenian Sea

Replica 1



Sample layer name: 4 Replicas - Replica 1

Type of sampler: Line

Number of samplers: 6

List of samplers:

x-coord y-coord

Sampler 1

15.56295 38.29397

15.74683 39.92273

--

Sampler 2

15.07043 38.13248

15.26668 39.99473

--

Sampler 3

14.58809 38.06188

14.77776 39.9972

--

Sampler 4

14.1092 38.02568

14.28837 39.99945

--

Sampler 5

13.63199 38.01052

13.79836 39.99956

--

Sampler 6

13.16872 38.19486

13.30776 39.99752

Replica 2



Sample layer name: 4 Replicas - Replica 2
Type of sampler: Line
Number of samplers: 6

List of samplers:

x-coord y-coord

Sampler 1

15.47723 38.27763
15.66918 39.9937
--

Sampler 2

14.98852 38.15279
14.98889 38.15665
--
14.98918 38.15954
15.18048 39.99495
--

Sampler 3

14.50242 38.04186
14.55019 38.56379
--
14.55236 38.58696
14.69151 39.99775
--

Sampler 4

14.02666 38.04222
14.20201 39.99963
--

Sampler 5

13.55124 38.05276
13.71189 39.99936
--

Sampler 6

13.08227 38.16378
13.08255 38.16779
--
13.08311 38.17577
13.2212 39.99694
--

Replica 3



Sample layer name: 4 Replicas - Replica 3
Type of sampler: Line
Number of samplers: 6

List of samplers:
x-coord y-coord

Sampler 1
15.67952 38.24784
15.83609 39.62925
--

Sampler 2
15.19578 38.17209
15.39097 39.99034
--

Sampler 3
14.7167 38.1396
14.90256 39.99628
--

Sampler 4
14.22991 38.01733
14.41334 39.99908
--

Sampler 5
13.75268 38.00006
13.92348 39.99974
--

Sampler 6
13.29241 38.21873
13.43303 39.99825
--

Replica 4



Sample layer name: 4 Replicas - Replica 4
Type of sampler: Line
Number of samplers: 7

List of samplers:
x-coord y-coord

Sampler 1
15.88871 38.43923
15.90247 38.56153
--
15.917 38.68944
15.99869 39.38795
--

Sampler 2
15.39097 38.24304
15.58439 39.99395
--

Sampler 3
14.90957 38.19077
14.93554 38.45758
--
14.94182 38.52125
15.0956 39.99511
--

Sampler 4
14.41964 38.03928
14.6066 39.99823
--

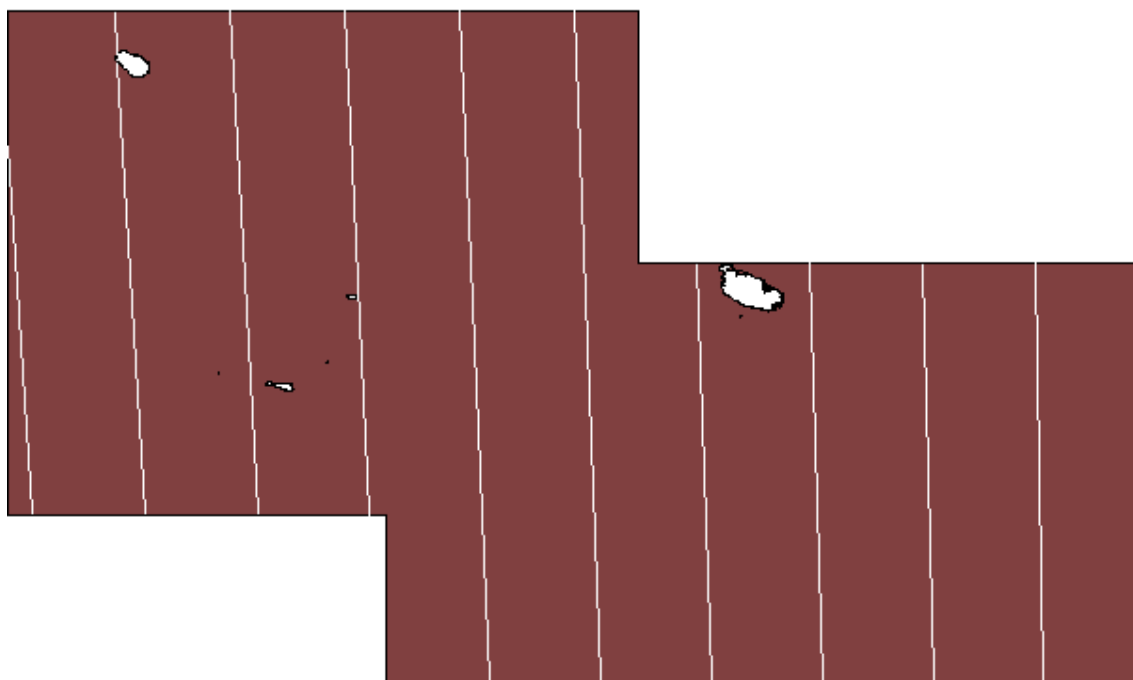
Sampler 5
13.94294 38.02884
14.11699 39.99973
--

Sampler 6
13.47206 38.0997
13.62676 39.99909
--

Sampler 7
13.01553 38.39584
13.13598 39.9963
--

Area E - Central-Southern Mediterranean Sea

Replica 1



Sample layer name: 4 Replicas - Replica 1

Type of sampler: Line

Number of samplers: 10

List of samplers:

x-coord y-coord

Sampler 1

15.60554 34.33436

15.57477 36.00107

--

Sampler 2

15.16814 34.33393

15.12789 36.00049

--

Sampler 3

14.73004 34.33499

14.68035 36.00095

--

Sampler 4

14.29125 34.3369

14.23219 36.00078

--

Sampler 5

13.85187 34.33716

13.74642 37.00193

--

Sampler 6

13.41195 34.33578

13.29086 37.00399

--

Sampler 7

12.93558 35.0004

12.83476 37.00424

--

Sampler 8

12.49058 35.00215

12.37814 37.00267

--

Sampler 9

12.04506 35.00221

11.93318 36.79797

--

11.93143 36.82695

11.921 37.00014

--

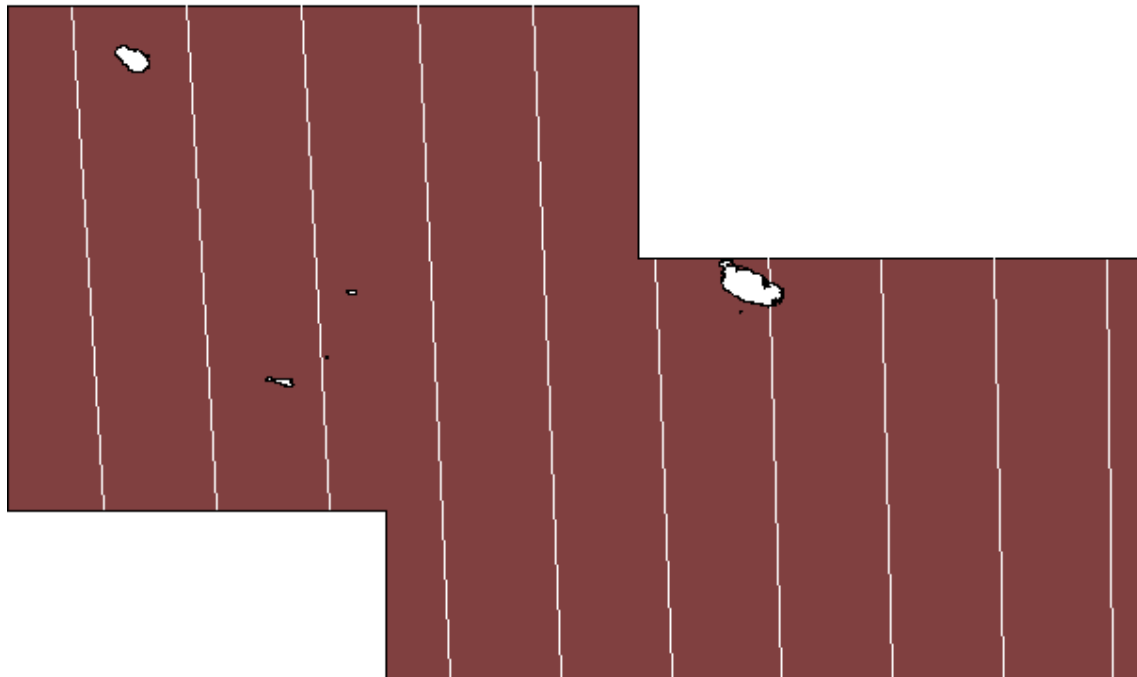
Sampler 10

11.59906 35.00059

11.49863 36.46776

--

Replica 2



Sample layer name: 4 Replicas - Replica 2

Type of sampler: Line

Number of samplers: 10

List of samplers:

x-coord y-coord

Sampler 1

15.88271 34.33377

15.85795 36.00054

--

Sampler 2

15.4457 34.33439

15.41146 36.00106

--

Sampler 3

15.00808 34.33337

14.96436 36.00015

--

Sampler 4

14.56969 34.33588

14.52223 35.80754

--

14.51996 35.88467

14.51989 35.88689

--

14.51972 35.89294

14.51956 35.89835

--

14.51956 35.89837

14.51949 35.90063

--

14.51939 35.90412

14.51657 36.00109

--

Sampler 5

14.13068 34.33718

14.0682 36.00028

--

Sampler 6

13.6911 34.33685

13.57994 37.0029

--

Sampler 7

13.25098 34.33487

13.12418 37.00429

--

Sampler 8

12.77295 35.00123

12.66788 37.00388

--

Sampler 9

12.32776 35.00237

12.21108 37.00164

--

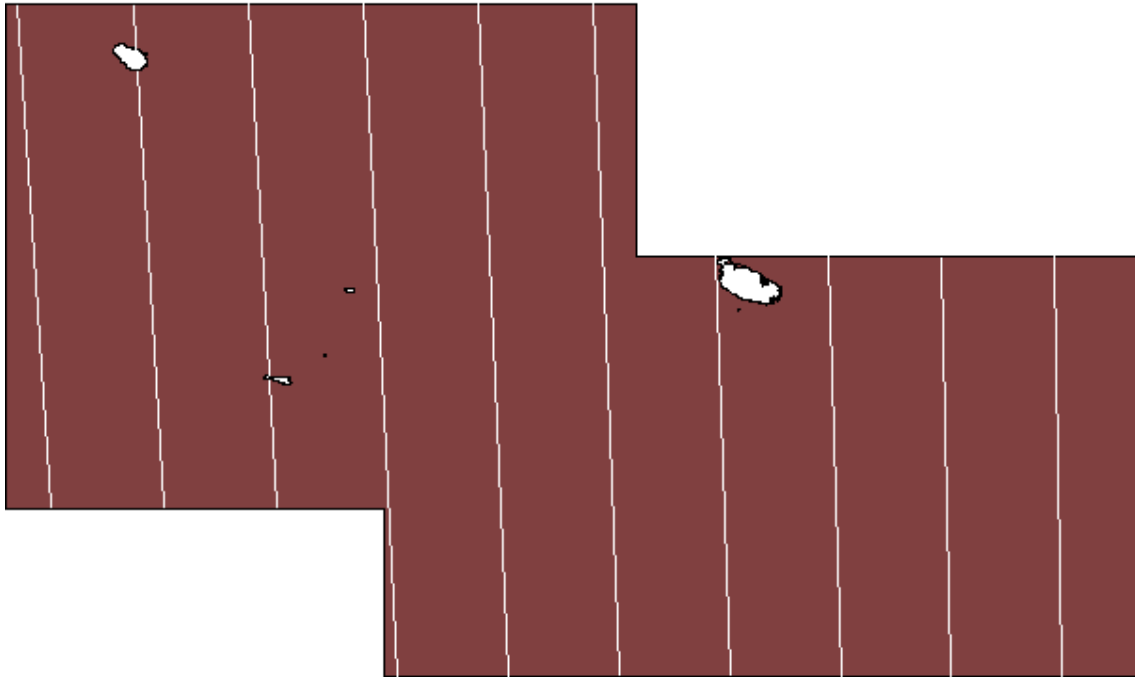
Sampler 10

11.88206 35.00182

11.75366 37.00027

--

Replica 3



Sample layer name: 4 Replicas - Replica 3

Type of sampler: Line

Number of samplers: 10

List of samplers:

x-coord y-coord

Sampler 1

15.68524 34.33426

15.6562 36.00099

--

Sampler 2

15.24795 34.33413

15.20943 36.00073

--

Sampler 3

14.81 34.33447

14.76202 36.00079

--

Sampler 4

14.37132 34.33667

14.31396 36.00094

--

Sampler 5

13.93205 34.33724

13.82943 37.00136

--

Sampler 6

13.49222 34.33616

13.37398 37.00375

--

Sampler 7

13.05186 34.33343

12.91798 37.00433

--

Sampler 8

12.57177 35.00195

12.54275 35.51202

--

12.54199 35.52551

12.46145 37.00309

--

Sampler 9

12.12635 35.00233

12.02017 36.73443

--

12.01481 36.82475

12.00444 37.00004

--

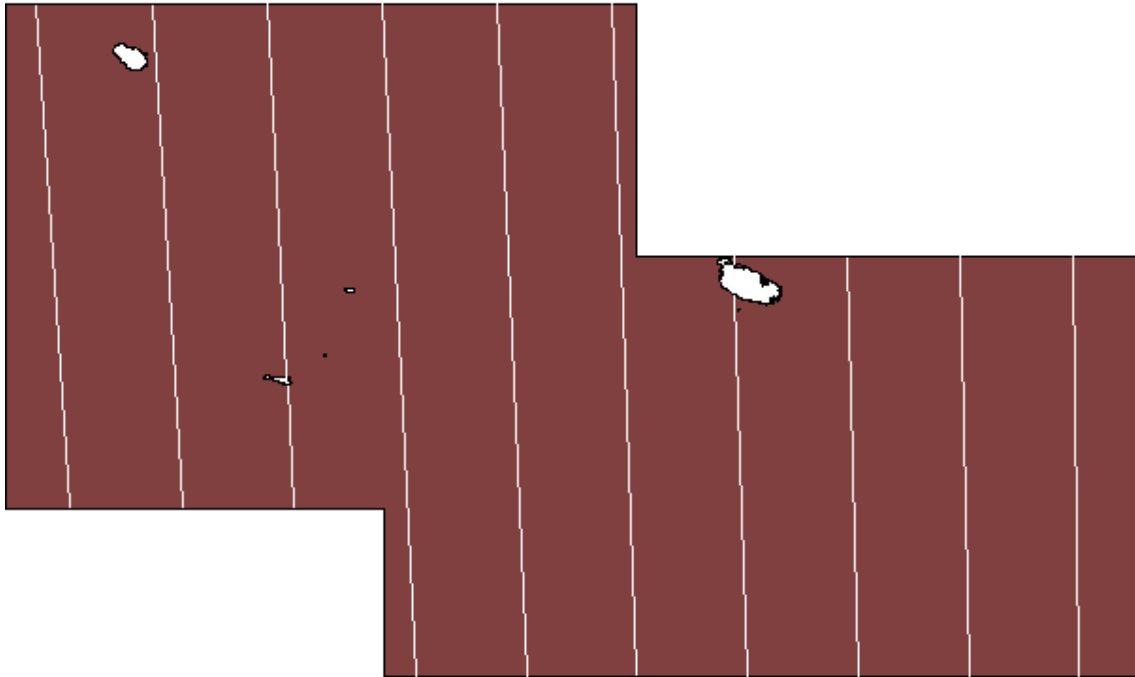
Sampler 10

11.68043 35.00101

11.54667 37.0001

--

Replica 4



Sample layer name: 4 Replicas - Replica 4

Type of sampler: Line

Number of samplers: 10

List of samplers:

x-coord y-coord

Sampler 1

15.75626 34.33412

15.72875 36.00087

--

Sampler 2

15.31907 34.33426

15.28209 36.00089

--

Sampler 3

14.88124 34.33395

14.83479 36.0006

--

Sampler 4

14.44266 34.33643

14.39164 35.84527

--

14.38848 35.94706

14.38836 35.95109

--

14.3878 35.96936

14.38683 36.00103

--

Sampler 5

14.00348 34.33726

13.9034 37.0008

--

Sampler 6

13.56374 34.33644

13.44805 37.00348

--

Sampler 7

13.12347 34.33399

12.99213 37.00436

--

Sampler 8

12.64412 35.00173

12.6168 35.48963

--

12.61528 35.51701

12.53569 37.00342

--

Sampler 9

12.19878 35.00238

12.07875 37.00066

--

Sampler 10

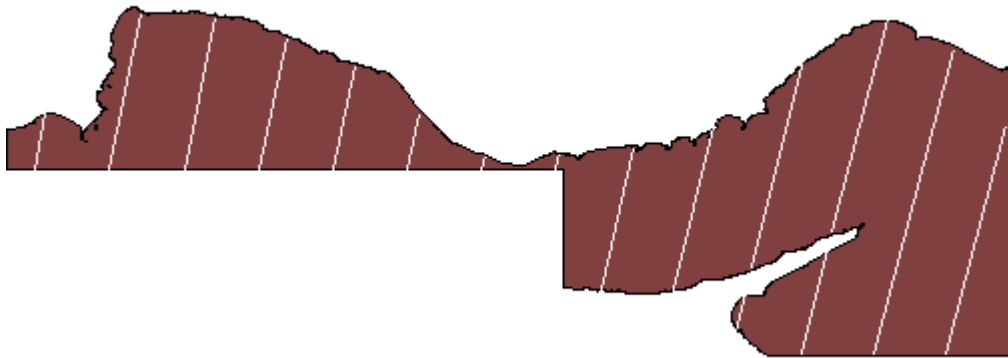
11.75294 35.00134

11.62111 37.0002

--

Area G – Levantine Sea

Replica 1



Sample layer name: 4 Replicas - Replica 1

Type of sampler: Line

Number of samplers: 14

List of samplers:

x-coord y-coord

Sampler 1

35.05316 35.00917

35.37697 36.24421

--

Sampler 2

34.66825 35.00879

35.09456 36.64785

--

Sampler 3

34.28172 35.0069

34.42344 35.58513

--

34.44342 35.66479

34.74203 36.80703

--

Sampler 4

33.92308 35.12846

33.92338 35.12973

--

33.92375 35.13132

33.92389 35.13189

--

33.9243 35.13366

33.97153 35.33182

--

34.0065 35.4768

34.29107 36.60554

--

Sampler 5

33.58805 35.36087
33.81268 36.28726

--

Sampler 6

33.19571 35.35756
33.37624 36.12525

--

Sampler 7

32.95057 36.00384
32.97098 36.09099

--

Sampler 8

32.5532 36.00448
32.57022 36.07914

--

Sampler 9

32.15446 36.00352
32.22258 36.30787

--

Sampler 10

31.75516 36.00447
31.87862 36.56627

--

Sampler 11

31.35513 36.00646
31.50788 36.71762

--

Sampler 12

30.95384 36.00686
31.12549 36.82646

--

Sampler 13

30.55134 36.00563
30.72244 36.84702

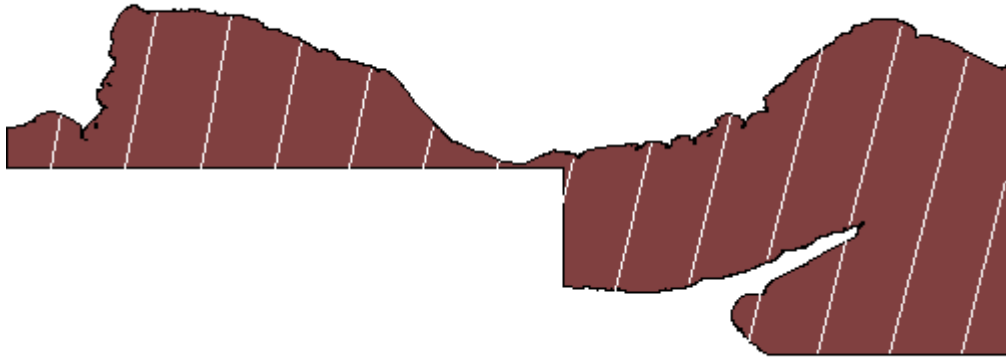
--

Sampler 14

30.14769 36.0028
30.20556 36.3025

--

Replica 2



Sample layer name: 4 Replicas - Replica 2

Type of sampler: Line

Number of samplers: 14

List of samplers:

x-coord y-coord

Sampler 1

35.13599 35.00906

35.37698 35.93366

--

Sampler 2

34.75145 35.009

35.16971 36.61148

--

Sampler 3

34.36526 35.00744

34.52257 35.64472

--

34.53654 35.69999

34.81858 36.77356

--

Sampler 4

33.9908 35.06064

34.06932 35.38859

--

34.10029 35.51591

34.39447 36.67266

--

Sampler 5

33.68011 35.39349

33.89952 36.2925

--

Sampler 6

33.27823 35.34858

33.46629 36.14368

--

Sampler 7

32.9762 35.74593
33.05005 36.06268

--

Sampler 8

32.63906 36.00447
32.64783 36.04276

--

Sampler 9

32.24061 36.00387
32.29159 36.23092

--

Sampler 10

31.84131 36.00383
31.96098 36.54552

--

Sampler 11

31.44156 36.00617
31.58732 36.68148

--

Sampler 12

31.04053 36.0069
31.21206 36.82088

--

Sampler 13

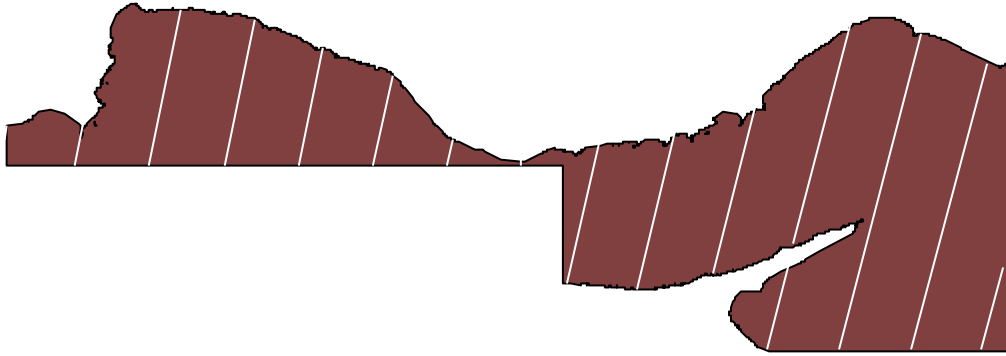
30.63829 36.00603
30.80977 36.84385

--

Sampler 14

30.23489 36.00355
30.29039 36.28917

Replica 3



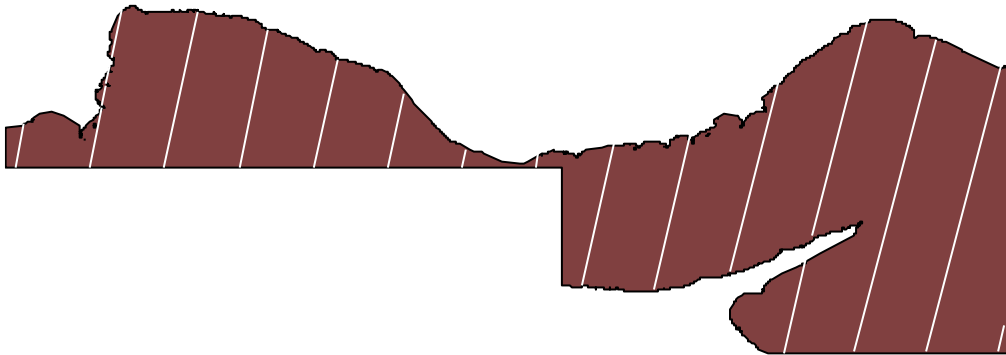
Sample layer name: 4 Replicas - Replica 3
Type of sampler: Line
Number of samplers: 15

List of samplers:

	x-coord	y-coord
Sampler 1		
	35.26317	35.00875
	35.37892	35.45692
--		
Sampler 2		
	34.87918	35.00919
	35.28562	36.55796
--		
Sampler 3		
	34.49353	35.00813
	34.93468	36.71732
--		
Sampler 4		
	34.10629	35.00555
	34.2187	35.47093
--		
	34.24687	35.58524
	34.55478	36.77953
--		
Sampler 5		
	33.81573	35.41866
	34.03621	36.31337
--		
	34.04812	36.3602
	34.05749	36.3969
--		
Sampler 6		
	33.40586	35.33878
	33.60731	36.18263
--		
Sampler 7		
	33.0204	35.36744
	33.19521	36.11928
--		
Sampler 8		
	32.77092	36.00433
	32.77779	36.03408
--		
Sampler 9		
	32.37292	36.00425
	32.40396	36.14169
--		
Sampler 10		
	31.97361	36.00271
	32.08069	36.48403
--		
Sampler 11		

```
31.5743 36.00557
31.71149 36.63624
--
Sampler 12
31.17369 36.00684
31.34104 36.79406
--
Sampler 13
30.77185 36.0065
30.94604 36.84893
--
Sampler 14
30.36882 36.00455
30.41012 36.21549
--
Sampler 15
29.99123 36.1415
30.00638 36.22092
--
```

Replica 4



Sample layer name: 4 Replicas - Replica 4
Type of sampler: Line
Number of samplers: 15

List of samplers:
x-coord y-coord

Sampler 1
35.34324 35.00848
35.38133 35.1568
--

Sampler 2
34.95961 35.00922
35.37122 36.56998
--

Sampler 3
34.5743 35.00847
35.01014 36.69075
--

Sampler 4
34.18739 35.00621
34.31225 35.51972
--
34.34185 35.63884
34.64579 36.80881
--

Sampler 5
33.90287 35.44141
34.1669 36.49981
--

Sampler 6
33.4896 35.34703
33.68898 36.17778
--

Sampler 7
33.10287 35.36916
33.28091 36.13049
--

Sampler 8
32.85397 36.00414
32.87177 36.08063
--

Sampler 9
32.45626 36.00439
32.47879 36.10376
--

Sampler 10
32.05719 36.00305
32.14682 36.40476
--

Sampler 11
31.6579 36.0051
31.78565 36.58989
--

Sampler 12
31.25756 36.0067
31.41586 36.74811
--

Sampler 13
30.85597 36.00671
31.03123 36.84898
--

Sampler 14
30.45319 36.00509
30.51665 36.32576
--
30.51822 36.33355
30.54153 36.44939
--
30.5422 36.45267
30.56296 36.55495
--
30.57085 36.59365
30.62535 36.85777
--

Sampler 15
30.04926 36.00186
30.09511 36.24174
--