Results of Distance Sampling and Spatial Capture Recapture Integration

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1 Distance Sampling

Load results without plotting the posterior distribution.

```
print(outputDS)
```

Abundance of bottlenose dolphins estimated via the point process.

```
## [1] 90000     7
```

```
##            EN Ntot    alpha0    alpha1     alpha2
## [1,] 8071.570 2633 -8.269235 0.6455697 0.08875981 0.[illegible]
## [2,] 7298.361 2548 -7.760064 0.5996129 0.18291590 0.4277579 0.4144233
## [3,] 9660.461 3250 -8.067746 0.6087669 0.07284574 0.7252146 0.3723751
## [4,] 8880.706 3008 -8.348667 0.6394080 0.08010980 0.6435484 0.3658292
## [5,] 9336.861 3099 -7.847976 0.5912082 0.17914948 0.7332164 0.2390006
## [6,] 7670.311 2577 -8.093646 0.6332298 0.10240350 0.[illegible] 0.2641272
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    6444    8023    8462    8479    8926   10832
```

2 Spatial Capture Recapture

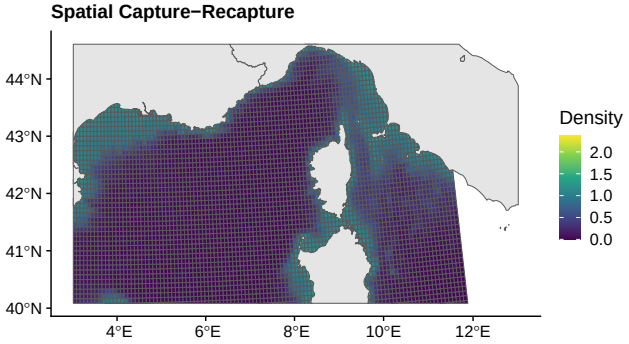
Load results without posterior distribution

Abundance predicted via the point process $lambda$

```
## [1] 39000 10008
```

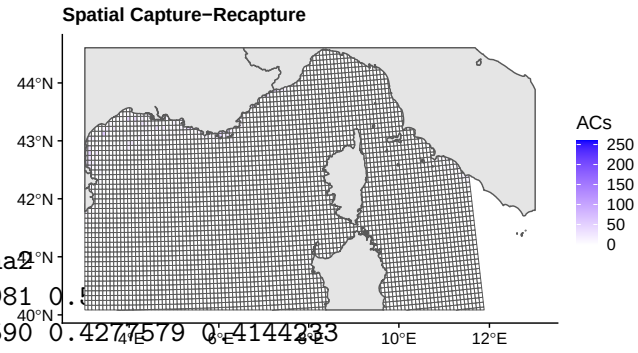
```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    1308    1454    1485    1487    1520    1688
```

Map of the density surface λ.



Map of Activity Centers

```
## [1] 13000  5000
```



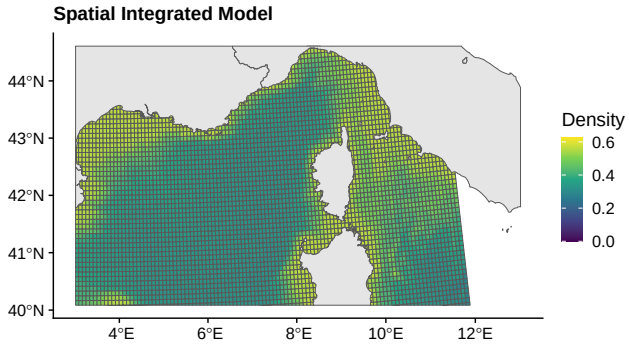
3 Spatial Integrated Pop. Model

Load results without postierior distribution

Abundance predicted via the point process λ

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    1643    1791    1823    1824    1858    2021
```

Map of the density of bottlenose dolphins.

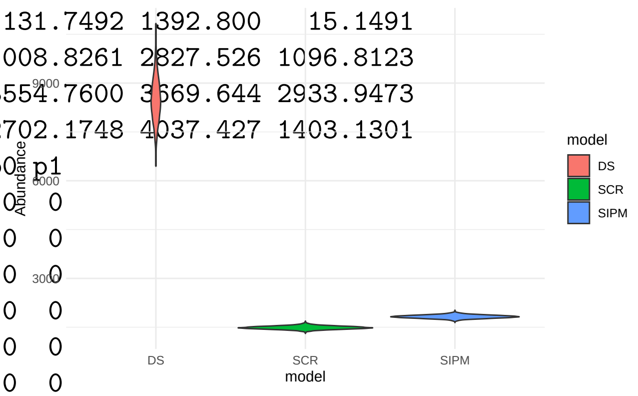


Map of Activity Centers

```
## [1] 10000  5012
```

```
##       id[4992]  id[4993]  id[4994]   id[4995]  id[
## [1,] 3132.2264 3561.2460 2969.1853 2391.44795 1864
## [2,]  234.6664  214.4663 2816.3623   91.10765 3042
```

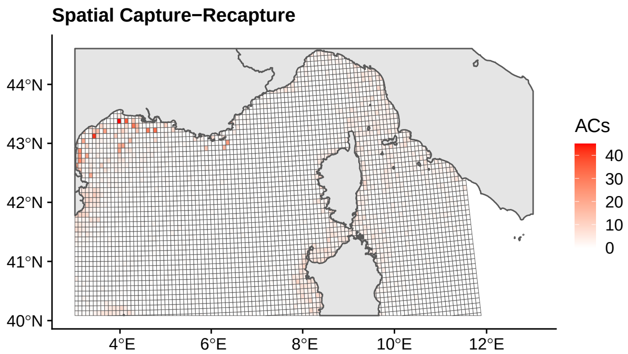
```
## [3,] 2740.7712 2573.8183 2823.7608 2245.31958  131.7492 1392.800   15.1491
## [4,]  479.7413 3472.8422  544.9243 3739.35937 1008.8261 2827.526 1096.8123
## [5,] 4029.7666 2135.0854 2427.5573 2629.15991 3554.7600 3669.644 2933.9473
## [6,] 1663.2350  162.4378 3375.8398 2788.65451 2702.1748 4037.427 1403.1301
##        id[4999]  id[5000]        mu0       mu1 p0 p1
## [1,]  726.9237  104.4092 -0.8899651 0.1703946  0  0
## [2,]  271.4767 2847.3194 -0.8850759 0.2019680  0  0
## [3,] 2866.6124 3022.7862 -0.8921357 0.2270194  0  0
## [4,]  319.3529 1325.0135 -0.9312715 0.1844255  0  0
## [5,] 3331.4340 1797.1414 -0.8683721 0.2357487  0  0
## [6,] 1844.8385 4221.6813 -0.9371495 0.2356325  0  0
```




```
##            EN NtotDS NtotSCR    alpha0    alpha1    alpha2      beta0     beta1
## [1,] 1815.498    682    1731 -6.143953 0.6285671 0.9562125 -0.2865216 0.9256039
## [2,] 1835.431    676    1729 -4.990560 0.50728[illegible] 0.7831457 0.4[illegible]56282 0.8086911
## [3,] 1832.616    714    1724 -5.212337 0.52188[illegible]3 0.9042299 1.4[illegible] 0.72[illegible]774
## [4,] 1746.485    676    1733 -5.153924 0.55080[illegible]7 1.1567269 0.69[illegible]993 0.86[illegible]746
## [5,] 1880.592    727    1761 -5.417408 0.53959[illegible]3 0.7445414 -1.29[illegible]3 0.9[illegible]495
## [6,] 1755.548    697    1719 -4.859171 0.48078[illegible]4 0.7134999 -0.953[illegible]076 0.97[illegible]891
##          id[1]    id[2]
## [1,]  512.2013 101.6425
## [2,] 3380.9390 102.0502
## [3,]  140.7827 102.4733
## [4,] 1595.5428 102.3482
## [5,] 3154.7955 101.8235
## [6,]  840.1652 102.2968

## [1] 10000  5000

## [1] 4356
```



4 Comparison between DS, SCR, and integrated model

4.1 About population size

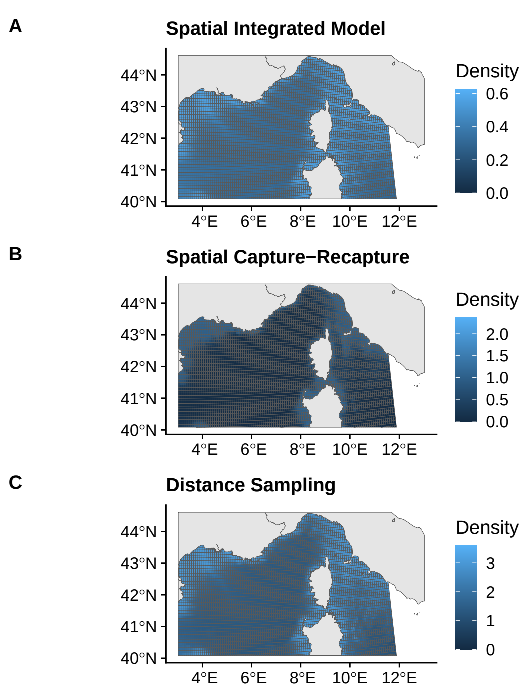
Posterior distributions of population size calculated as the integration of the point process: $\sum \lambda$

4.2 Models estimates

```
## # A tibble: 10 x 5
##    Description Parameter SIM                   SCR
##    <chr>       <chr>     <chr>                 <chr>
##  1 ""          "E(N)"    1824 (1761:1888)      1487 (
##  2 ""          "_0"      -0.89 (-0.93:-0.8~   -2.04
##  3 ""          " _1"     0.21 (0.16:0.27)     1.44 (
##  4 ""          "beta0"   -0.28 (-1.46:0.8)    -0.65
##  5 ""          "beta1"   0.9 (0.79:1.03)      0.92 (
##  6 ""          " p0"     0 (0:0)              0 (0:0
##  7 ""          "p1"      0 (0:0)              0 (0:0
##  8 ""          "alpha0"  -5.2 (-6.21:-4.24)   <NA>
##  9 ""          "alpha1"  0.51 (0.42:0.61)     <NA>
## 10 ""          "alpha2"  0.77 (0.48:1.04)     <NA>
```

4.3 Maps

Density maps are from the point process λ derived from the estimated parameters `mu0` and `mu1`.



Comparaison zone par zone

```
## [1] 1315.387
```

```
## [1] 435.764
```

```
## [1] 376.3915
```

```
## [1] 488.3953
```

```
## [1] 248.3848
```

```
## [1] 7163.966
```

```
## [1] 1051.484
```

```
## [1] 1575.971
```

```
##       5%      95%
## 7403.564 9594.235
```

```
## # A tibble: 3 x 4
##   Waters     DS   SCR   SIM
##   <chr>   <dbl> <dbl> <dbl>
## 1 Coastal  1315   436   248
## 2 Pelagic  7164  1051  1576
## 3 Total    8479  1487  1824
```