BH2b in the Celtic Seas - Supplementary Material

2023-10-30

Contents

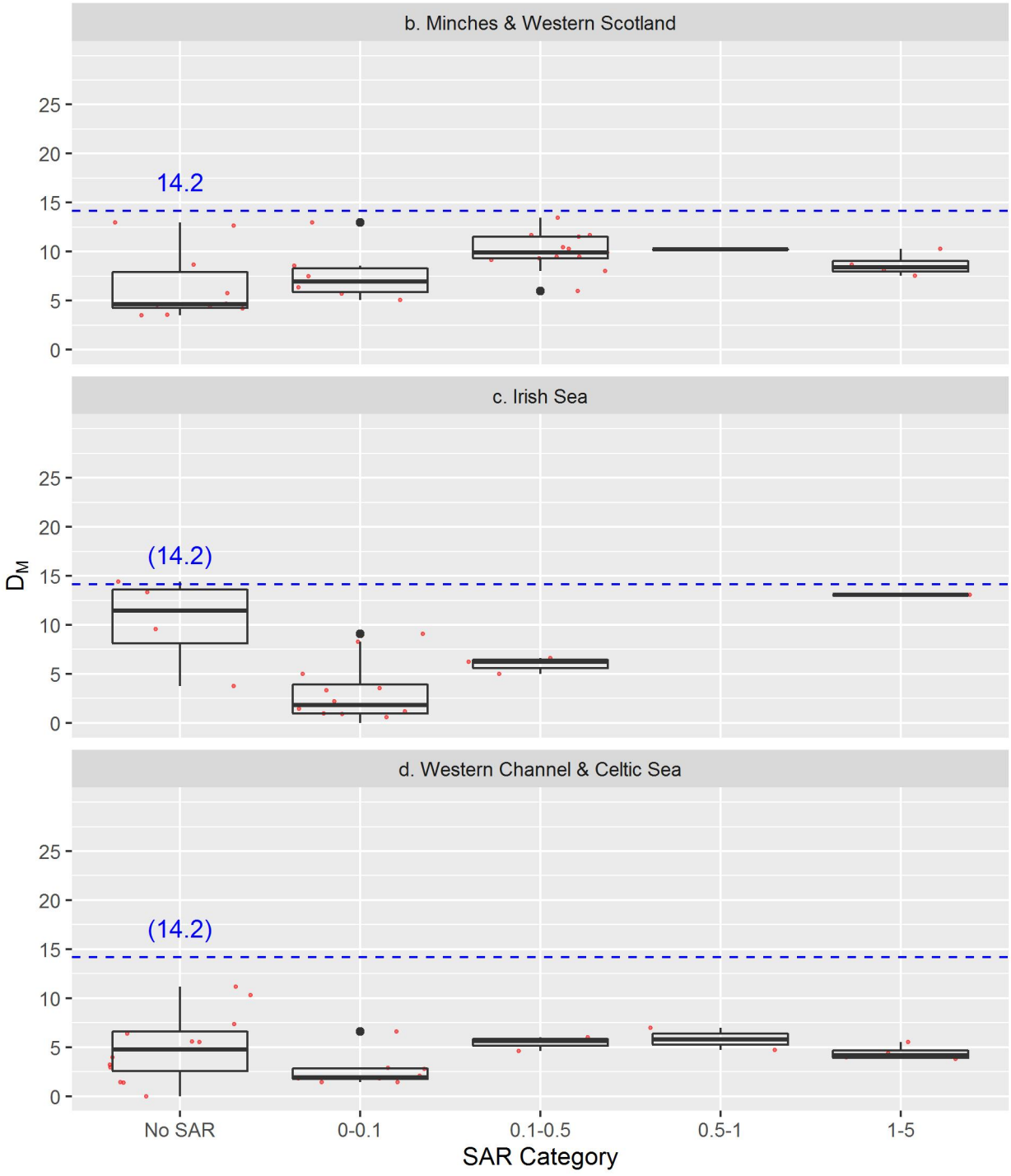
S1 - Margalef diversity and SAR 2009-2015 1
S2 - Margalef diversity and SAR 2016-2021 15
S3 - Relative Margalef diversity in the UKMS Celtic Seas sub-region 26
S4 - Significant differences between median relative Margalef diversity, 2009-2015 and 2016-2021 . 40
S5 - Spatial Analysis of Sample Coverage 42

S1 - Margalef diversity and SAR 2009-2015

Sample Margalef diversity (D_M) and estimated reference Margalef values (D_{ref}) in relation to the reported SAR values. Estimated reference Margalef values (blue) that are not case specific (calculated for the habitat and CP2 region) are given in parentheses. Sample point values (red) are displayed to emphasise the number of observations.

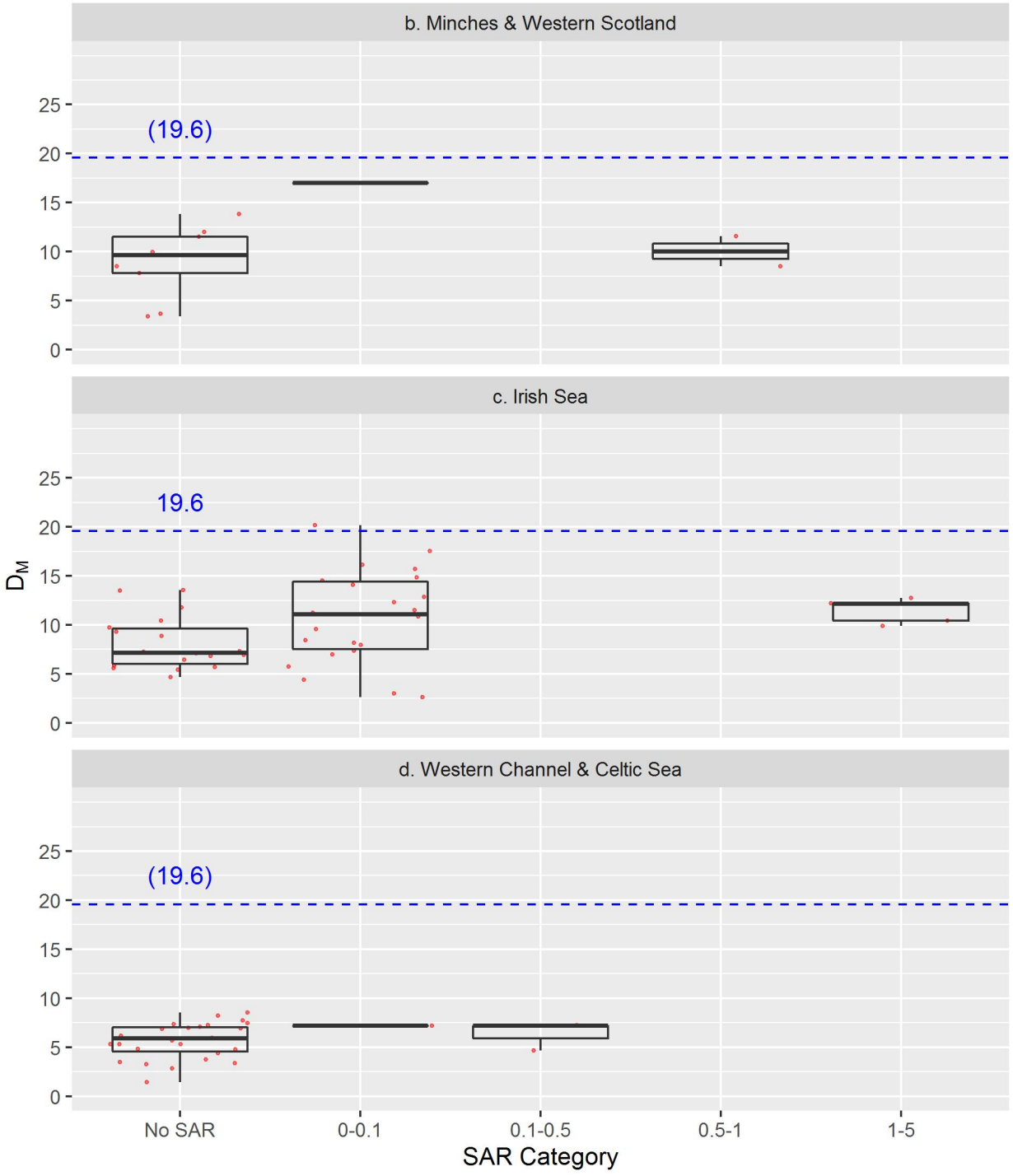
S1.1 Infralittoral coarse sediment

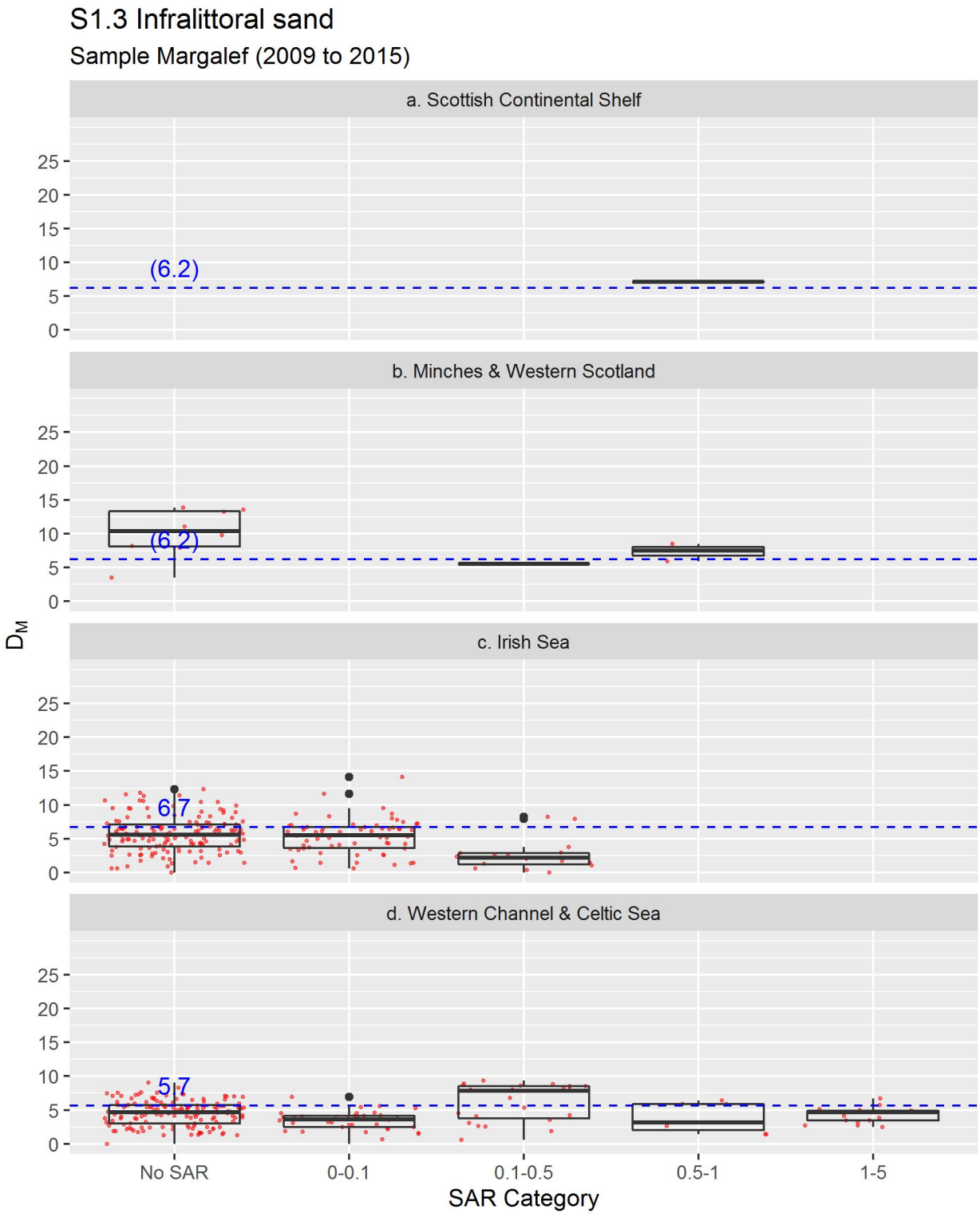
Sample Margalef (2009 to 2015)



S1.2 Infralittoral mixed sediment

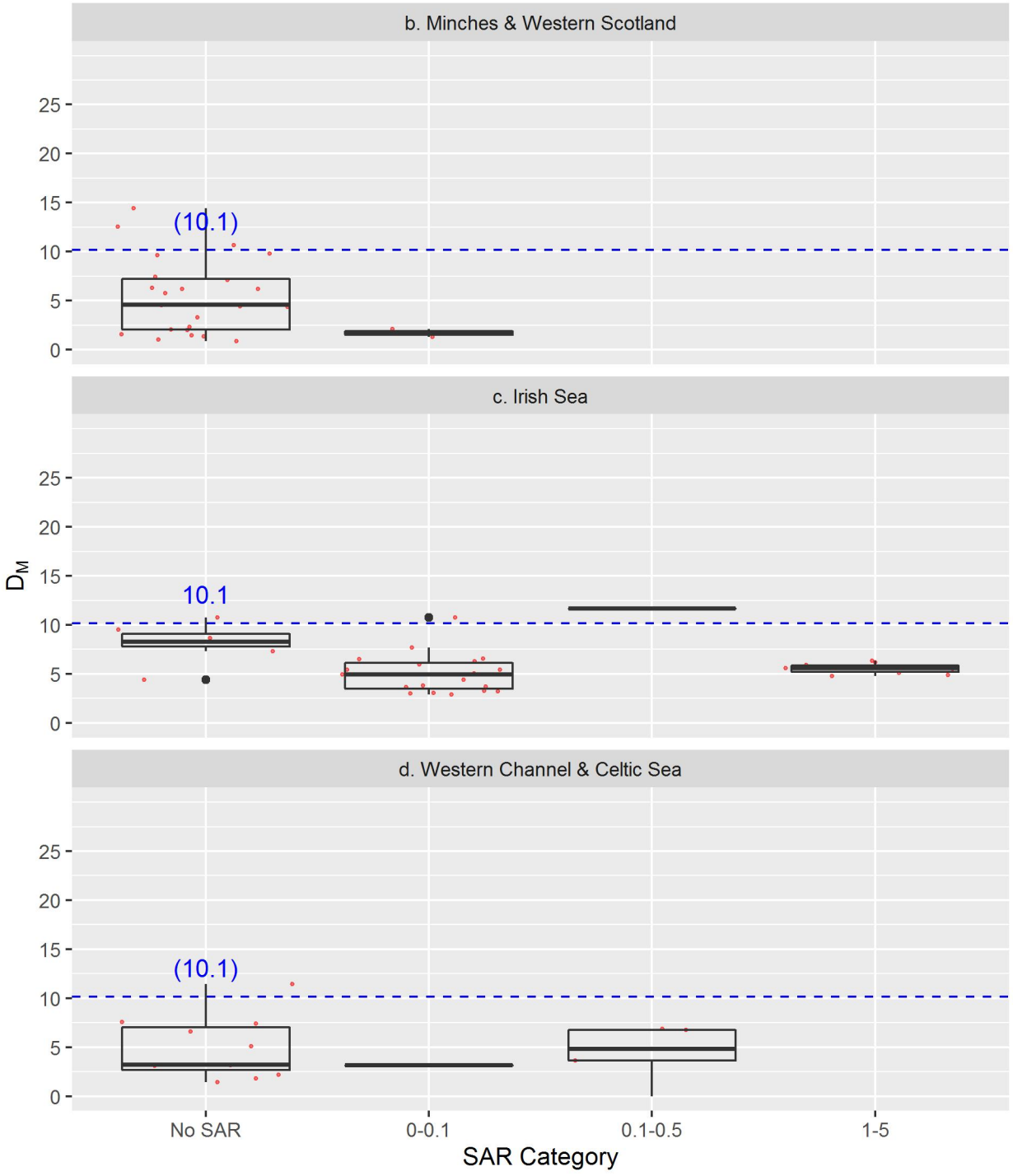
Sample Margalef (2009 to 2015)

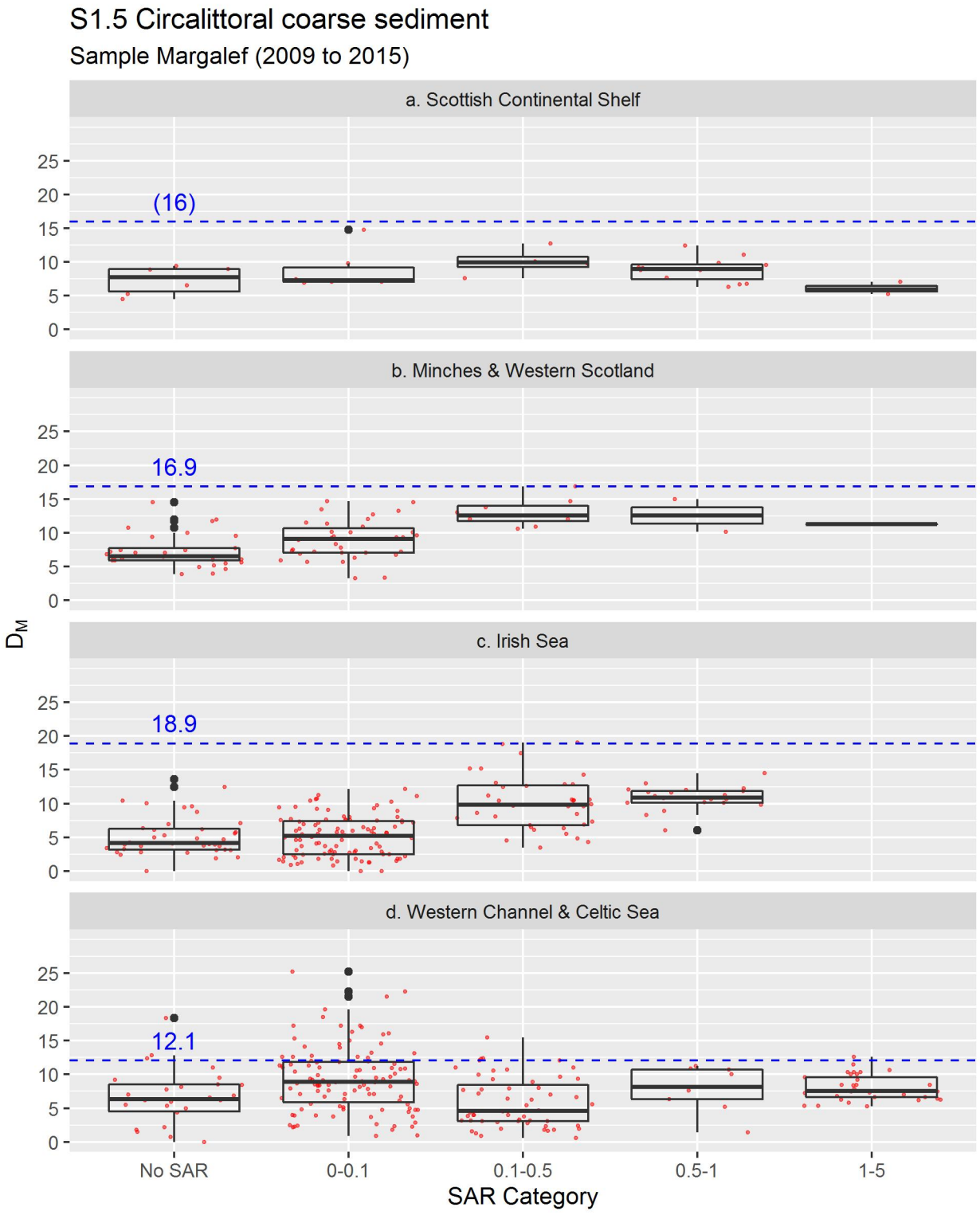



S1.3 Infralittoral sand
Sample Margalef (2009 to 2015)
a. Scottish Continental Shelf
b. Minches & Western Scotland
c. Irish Sea
d. Western Channel & Celtic Sea
(6.2)
(6.2)
6.7
5.7
D_M
No SAR
0-0.1
0.1-0.5
0.5-1
1-5
SAR Category

S1.4 Infralittoral mud

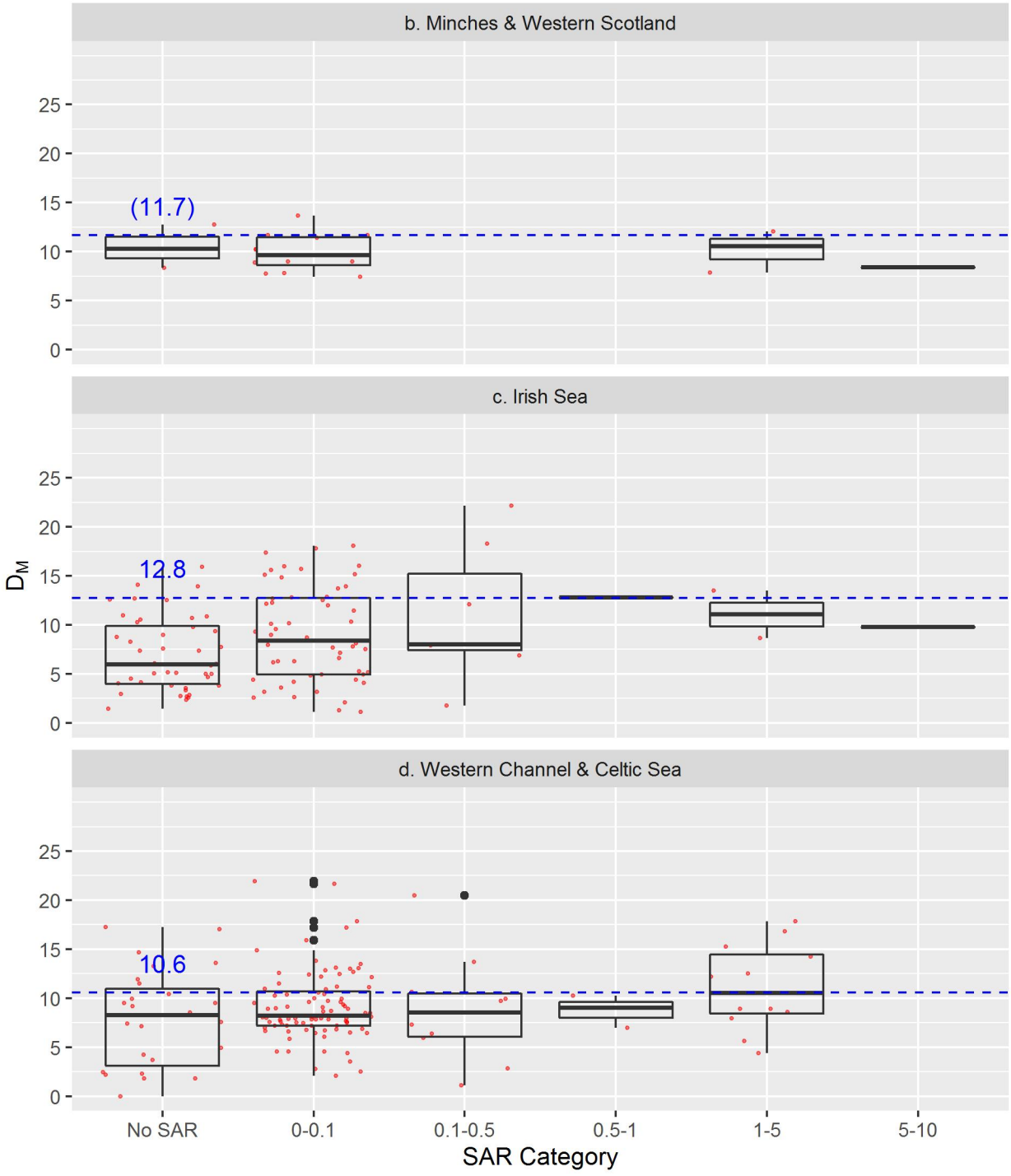
Sample Margalef (2009 to 2015)

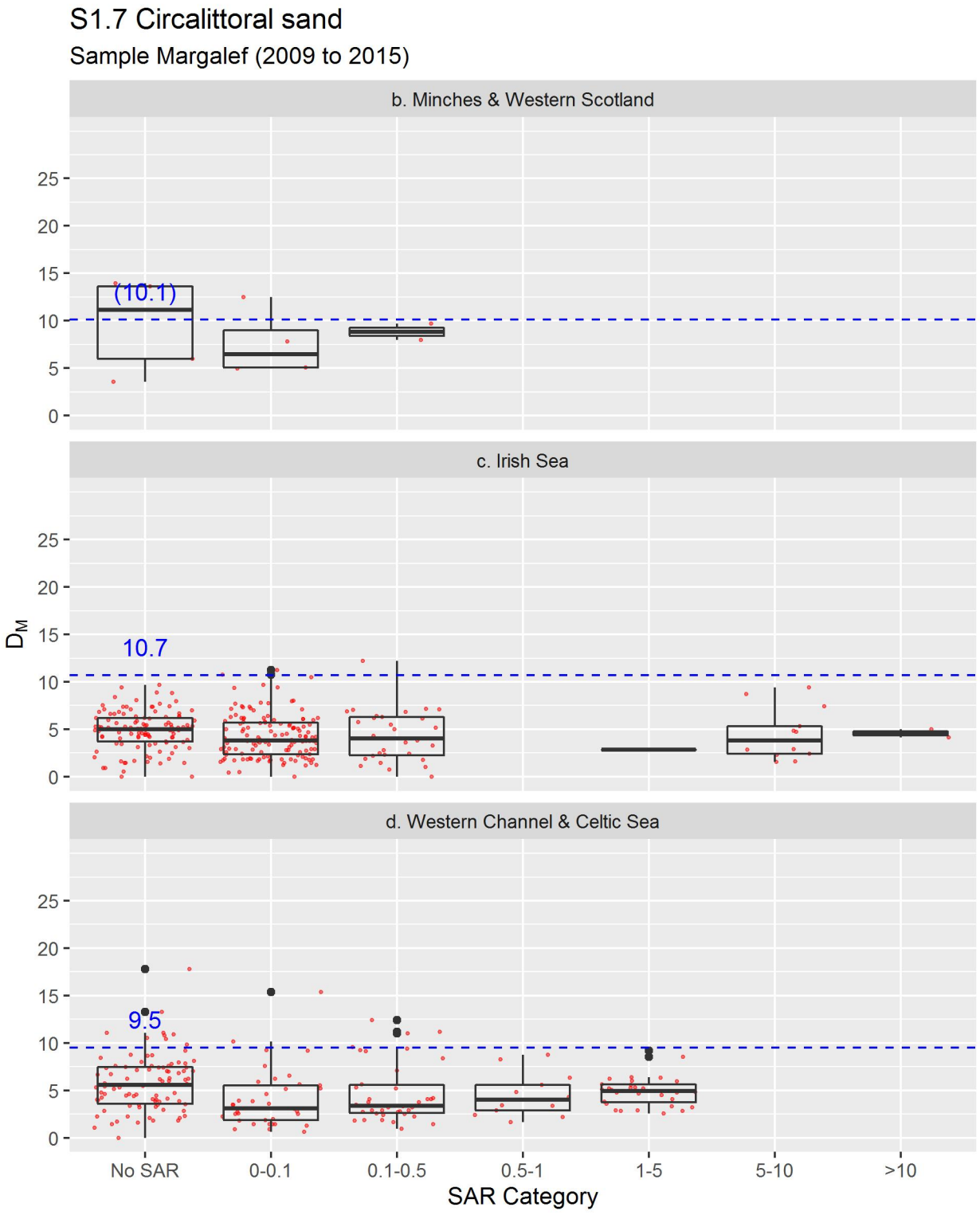


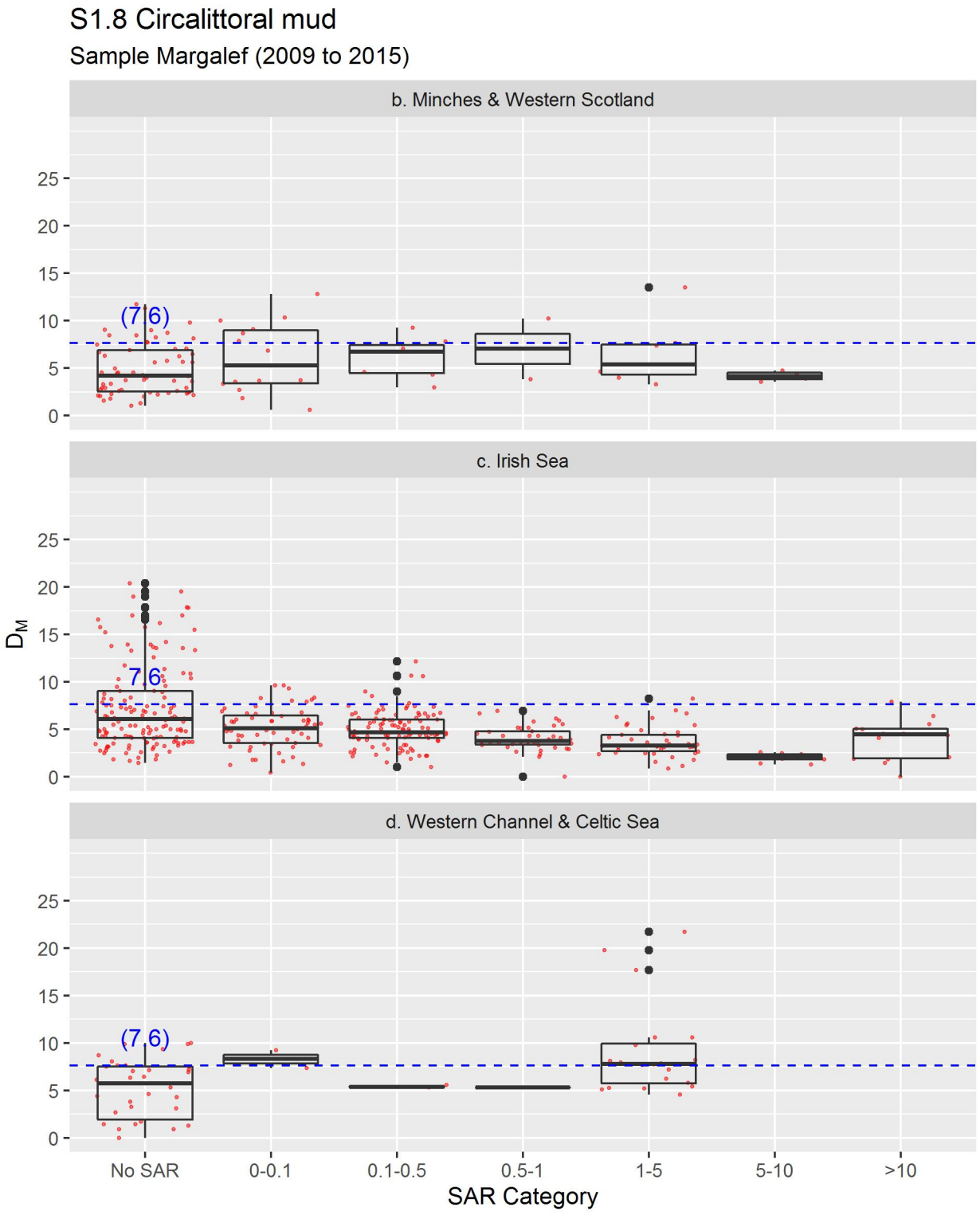

S1.5 Circalittoral coarse sediment
Sample Margalef (2009 to 2015)
a. Scottish Continental Shelf
(16)
b. Minches & Western Scotland
16.9
c. Irish Sea
18.9
d. Western Channel & Celtic Sea
12.1
25
20
15
10
5
0
D_M
No SAR
0-0.1
0.1-0.5
0.5-1
1-5
SAR Category

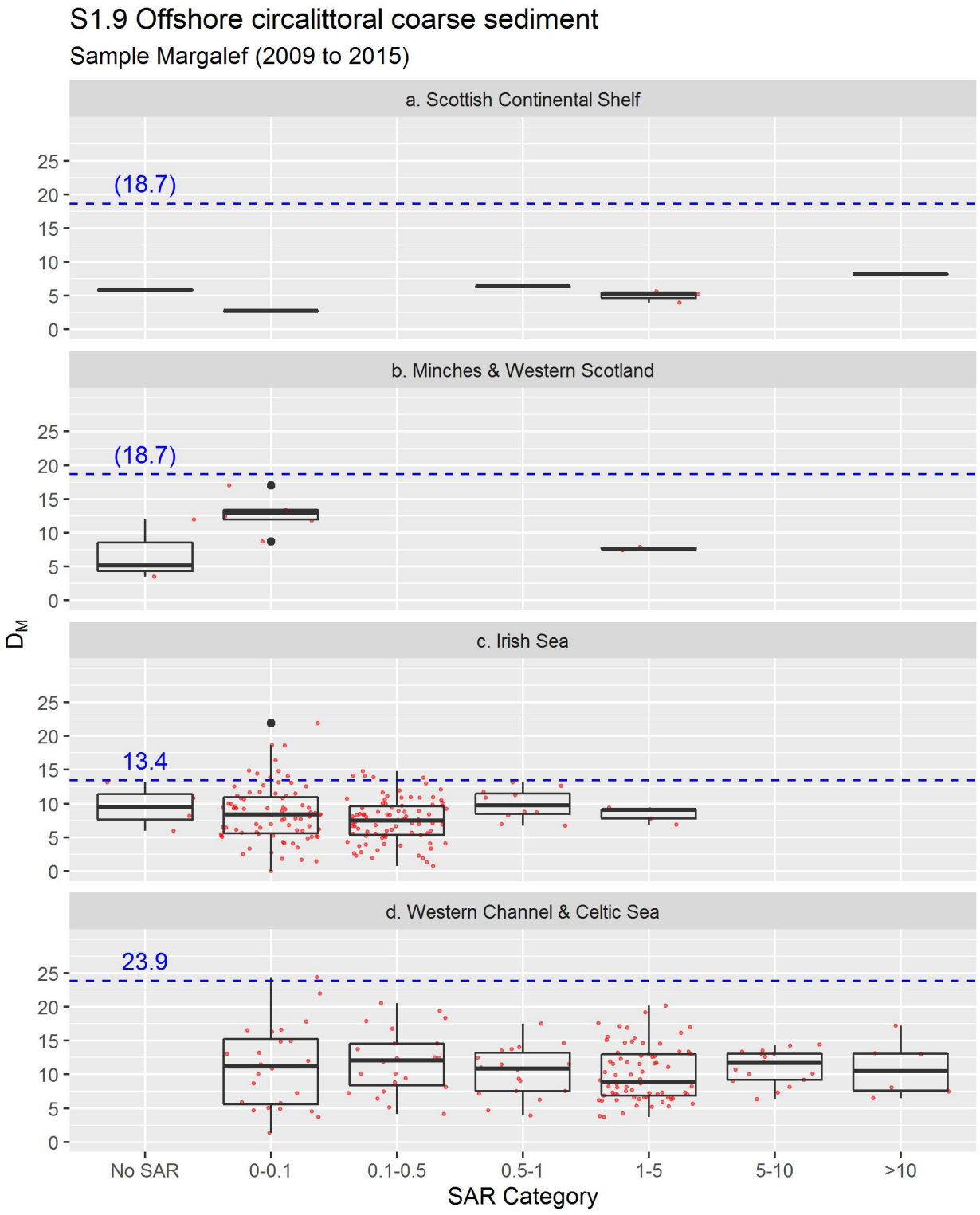
S1.6 Circalittoral mixed sediment

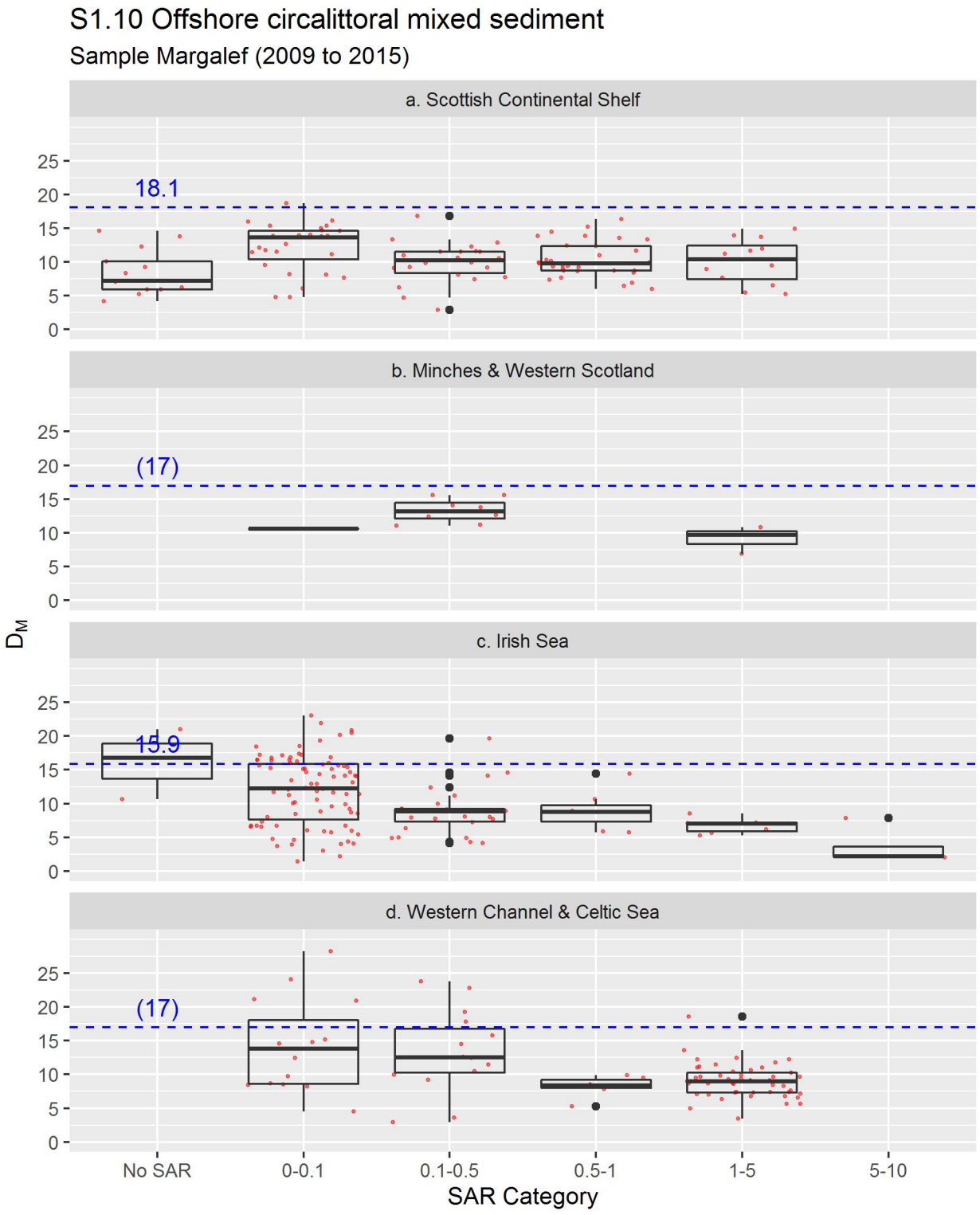
Sample Margalef (2009 to 2015)




S1.7 Circalittoral sand
Sample Margalef (2009 to 2015)
b. Minches & Western Scotland
c. Irish Sea
d. Western Channel & Celtic Sea
(10.1)
10.7
9.5
D_M
0
5
10
15
20
25
No SAR
0-0.1
0.1-0.5
0.5-1
1-5
5-10
>10
SAR Category

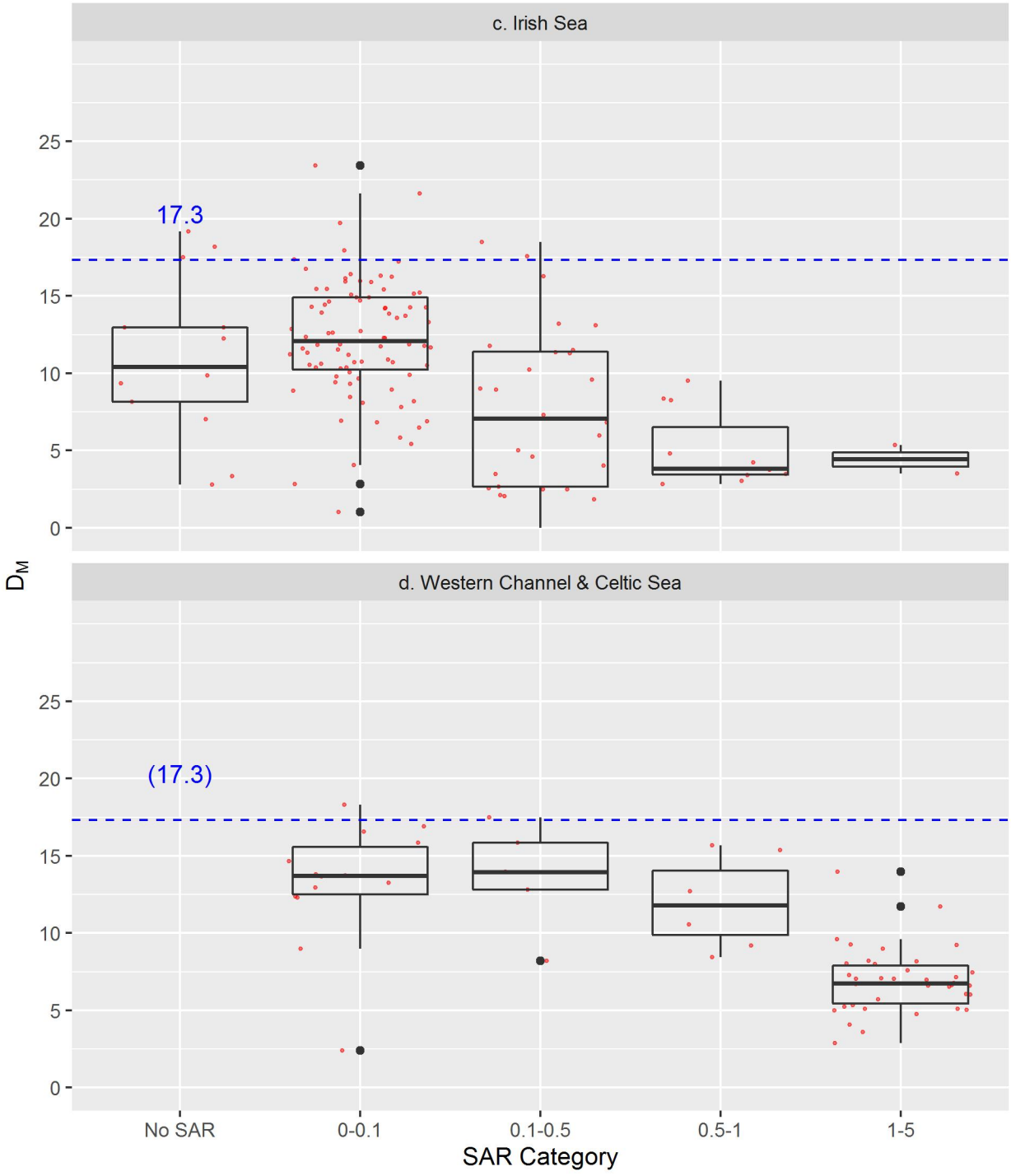

S1.8 Circalittoral mud
Sample Margalef (2009 to 2015)
b. Minches & Western Scotland
c. Irish Sea
d. Western Channel & Celtic Sea
(7.6)
7.6
(7.6)
D_M
0
5
10
15
20
25
No SAR
0-0.1
0.1-0.5
0.5-1
1-5
5-10
>10
SAR Category

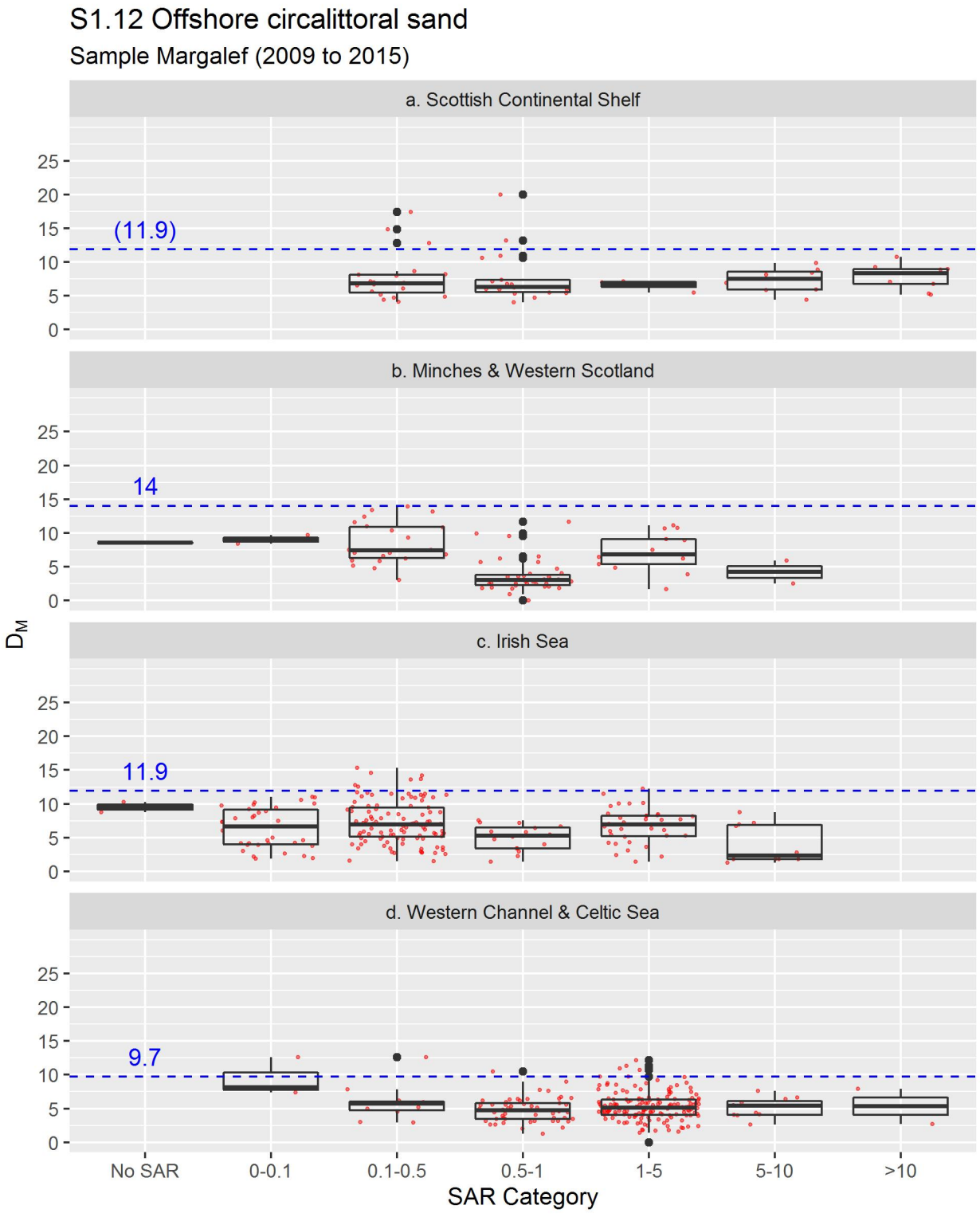

S1.9 Offshore circalittoral coarse sediment
Sample Margalef (2009 to 2015)
a. Scottish Continental Shelf
b. Minches & Western Scotland
c. Irish Sea
d. Western Channel & Celtic Sea
(18.7)
(18.7)
13.4
23.9
D_M
No SAR
0-0.1
0.1-0.5
0.5-1
1-5
5-10
>10
SAR Category

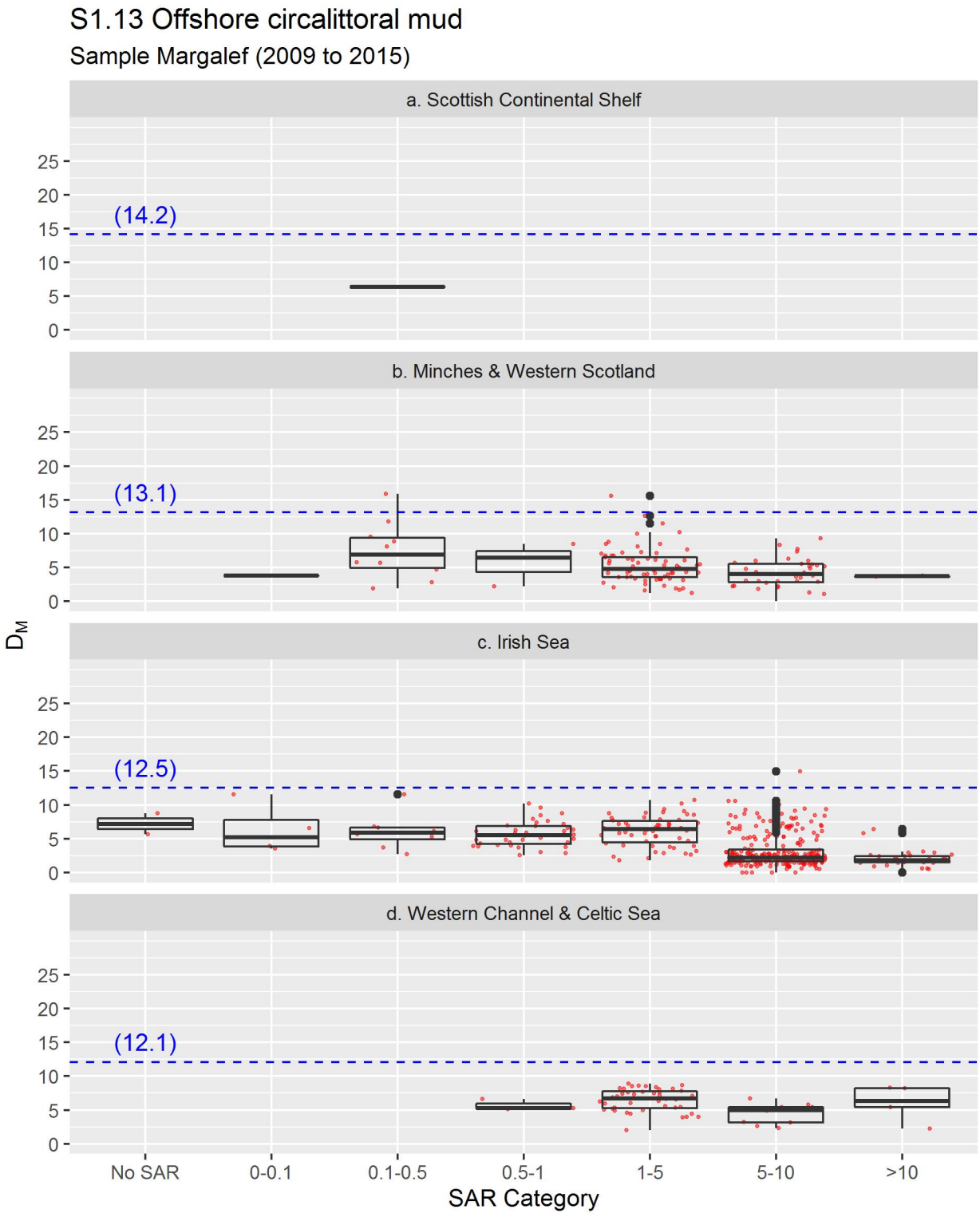

S1.10 Offshore circalittoral mixed sediment
Sample Margalef (2009 to 2015)
a. Scottish Continental Shelf
18.1
b. Minches & Western Scotland
(17)
c. Irish Sea
15.9
d. Western Channel & Celtic Sea
(17)
D_M
No SAR
0-0.1
0.1-0.5
0.5-1
1-5
5-10
SAR Category

S1.11 Offshore circalittoral coarse and/or mixed sediment

Sample Margalef (2009 to 2015)




S1.12 Offshore circalittoral sand
Sample Margalef (2009 to 2015)
a. Scottish Continental Shelf
(11.9)
b. Minches & Western Scotland
14
c. Irish Sea
11.9
d. Western Channel & Celtic Sea
9.7
D_M
No SAR
0-0.1
0.1-0.5
0.5-1
1-5
5-10
>10
SAR Category

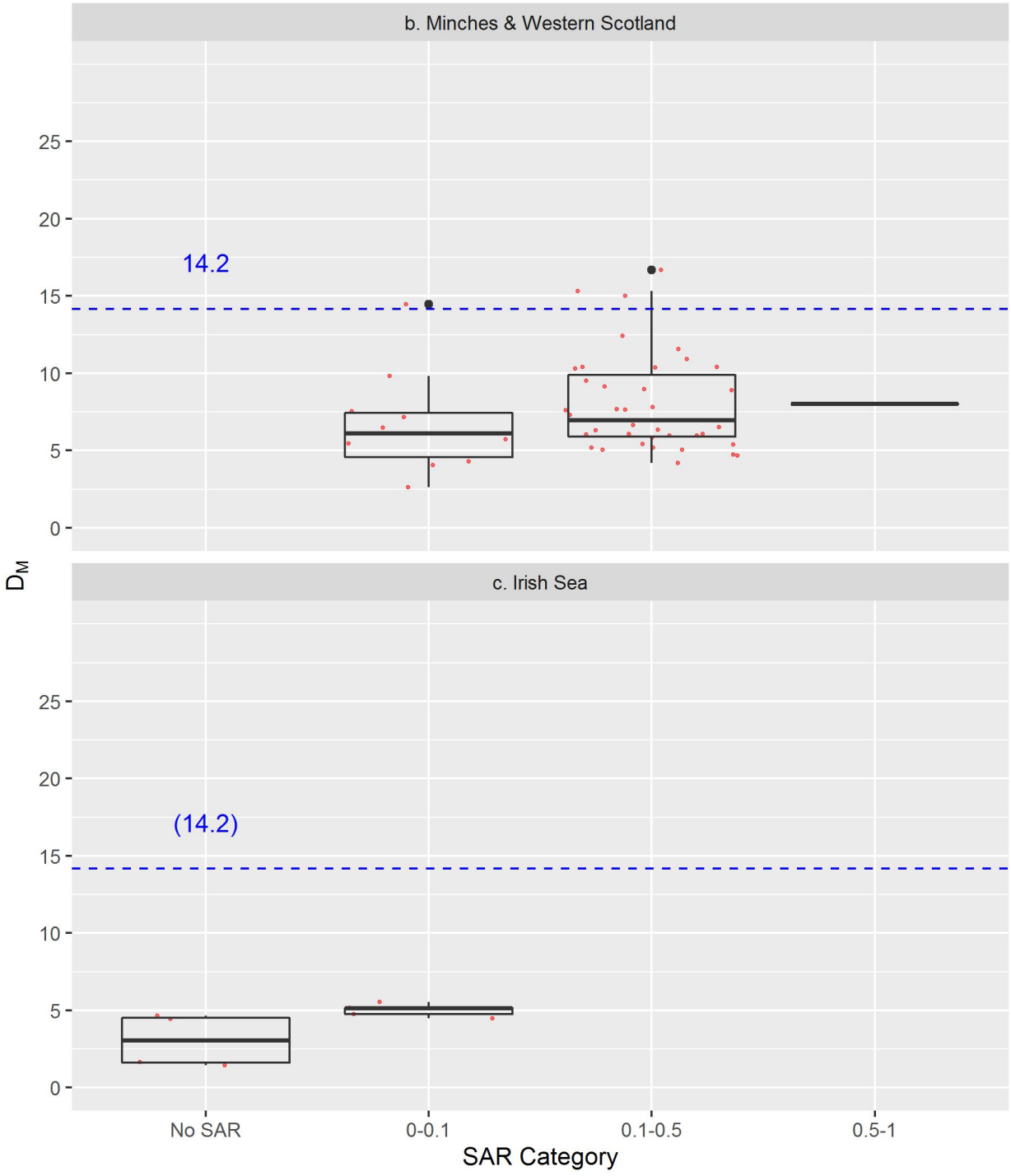

S1.13 Offshore circalittoral mud
Sample Margalef (2009 to 2015)
a. Scottish Continental Shelf
b. Minches & Western Scotland
c. Irish Sea
d. Western Channel & Celtic Sea
(14.2)
(13.1)
(12.5)
(12.1)
D_M
No SAR
0-0.1
0.1-0.5
0.5-1
1-5
5-10
>10
SAR Category

S2 - Margalef diversity and SAR 2016-2021

Sample Margalef diversity (D_M) and estimated reference Margalef values (D_{ref}) in relation to the reported SAR values. Estimated reference Margalef values (blue) that are not case specific (calculated for the habitat and CP2 region) are given in parentheses. Sample point values (red) are displayed to emphasise the number of observations.

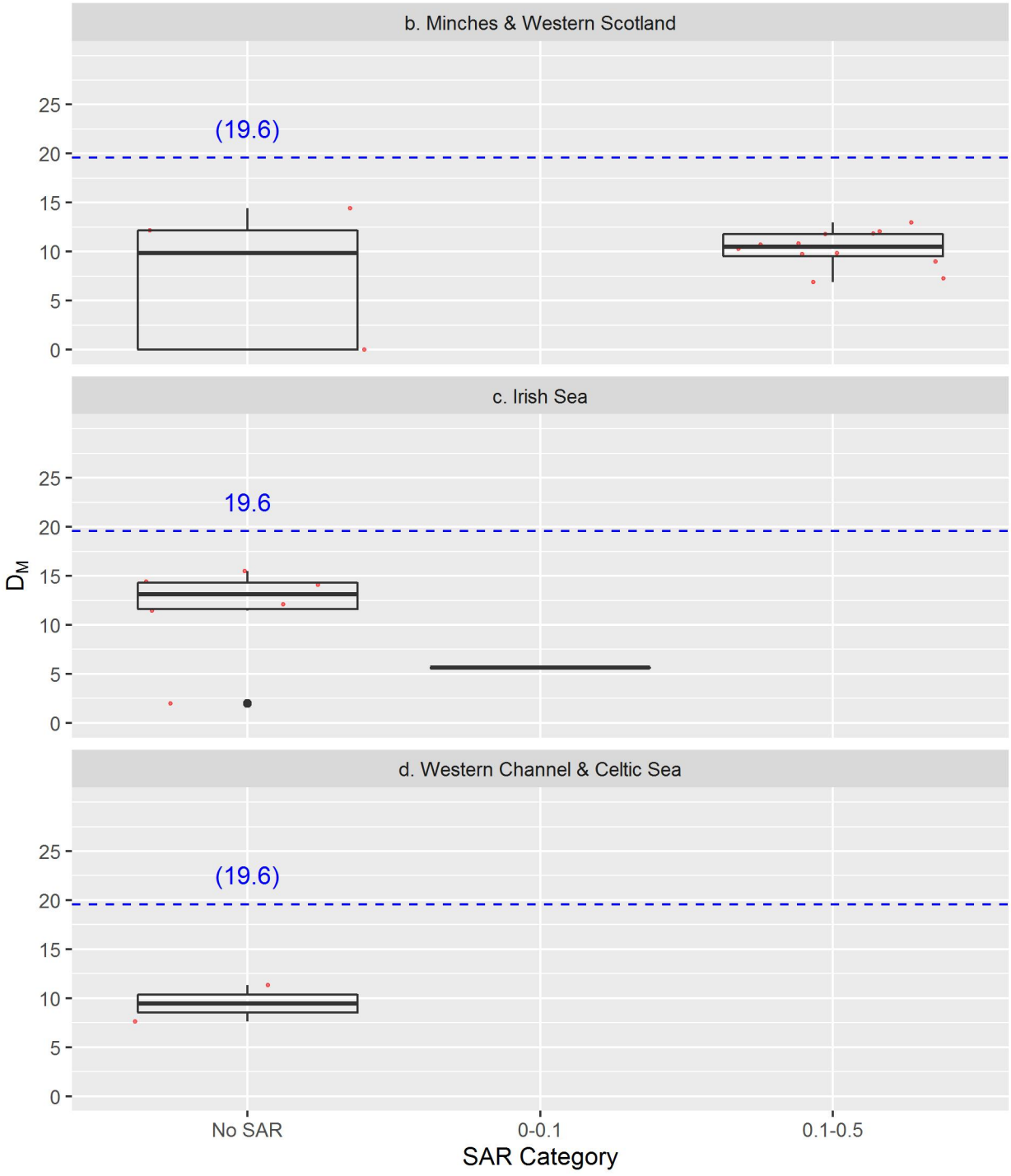
S2.1 Infralittoral coarse sediment

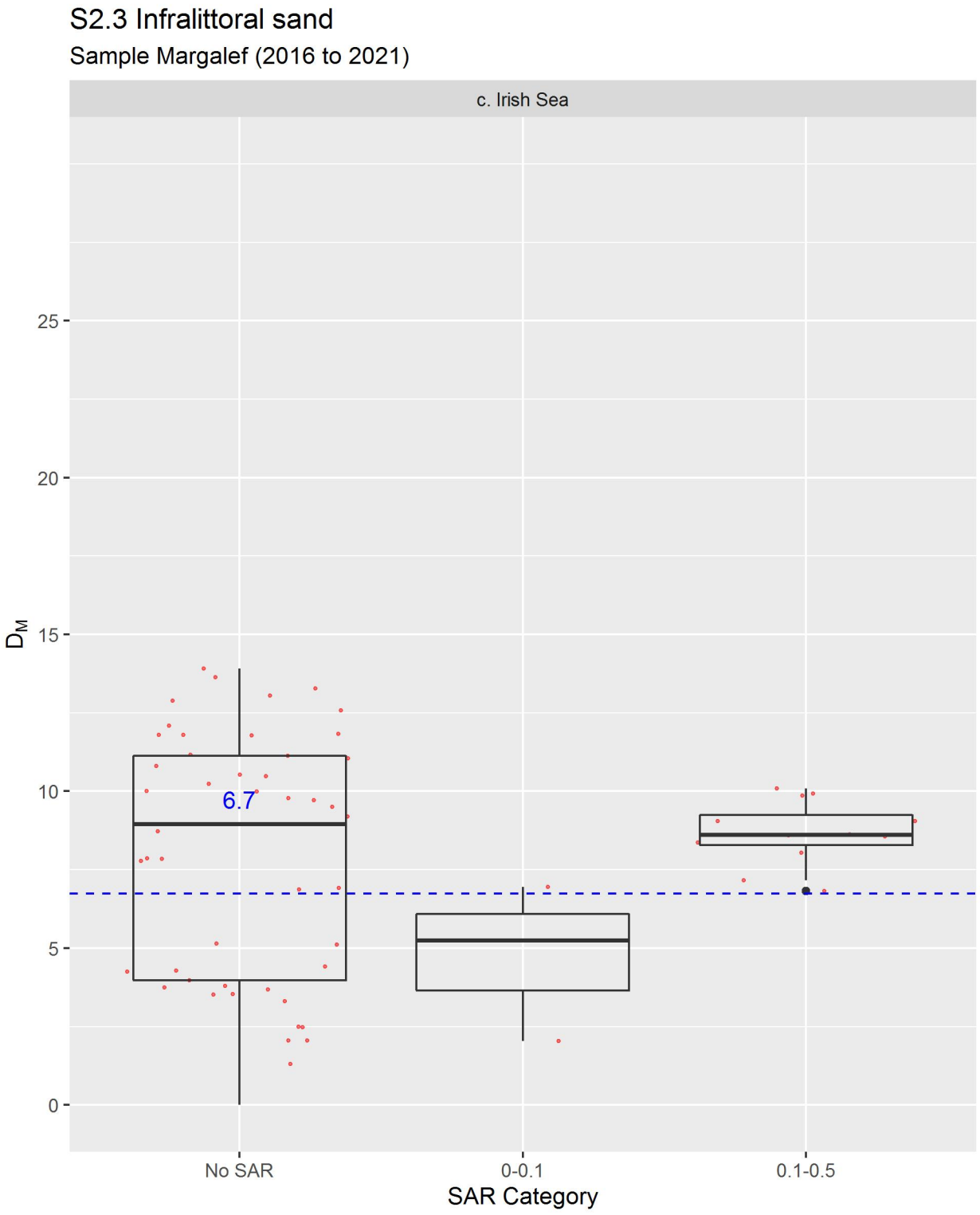
Sample Margalef (2016 to 2021)

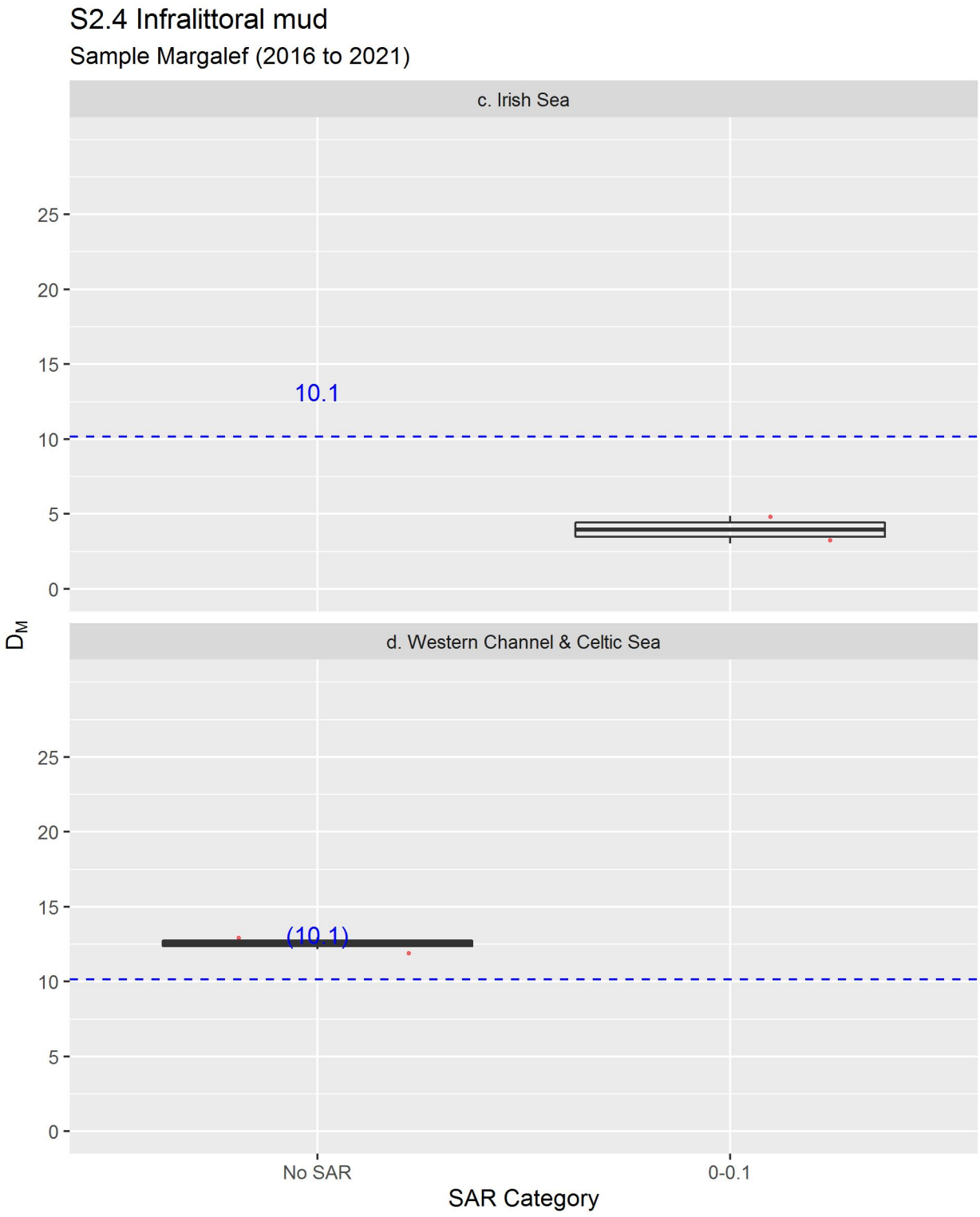


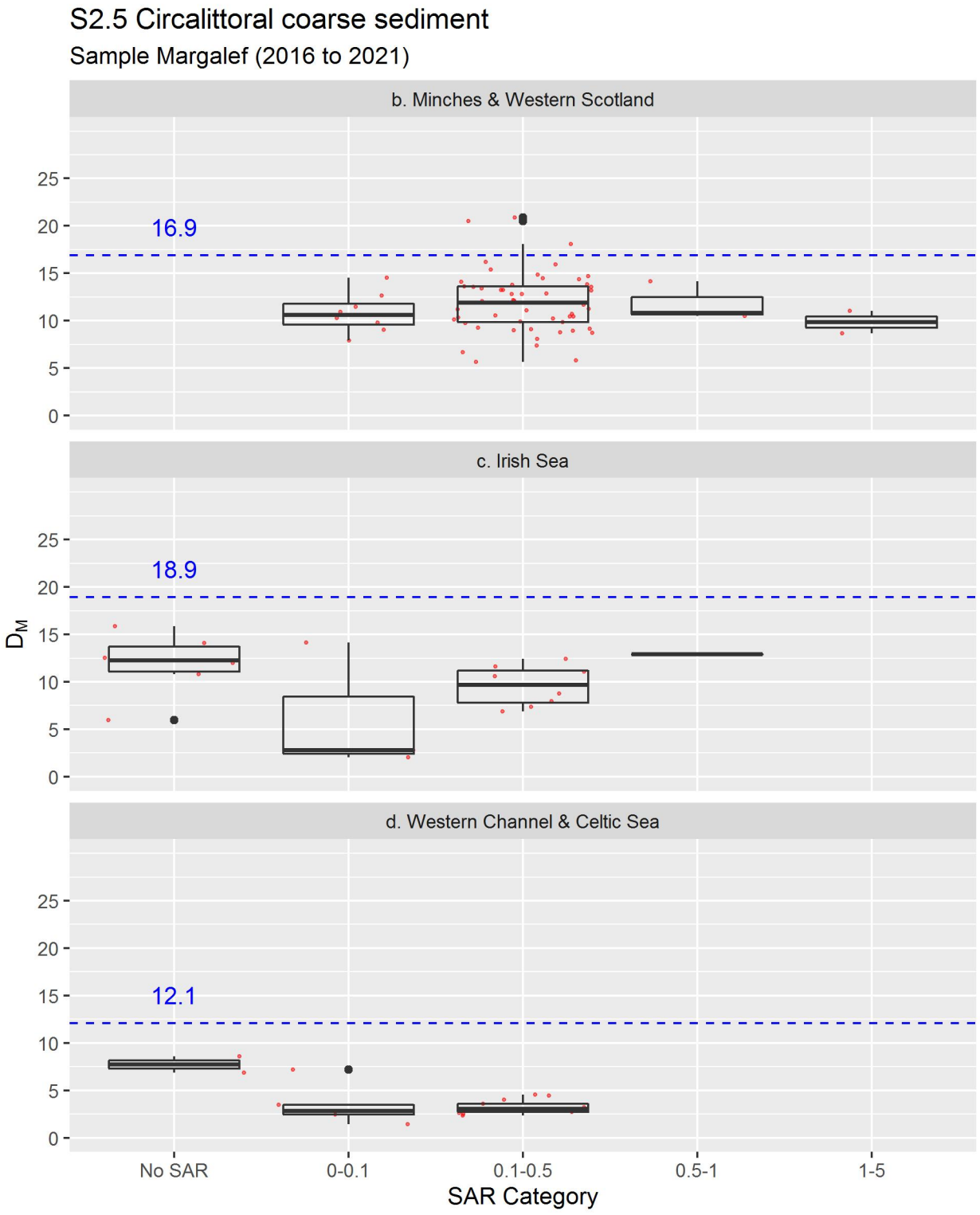
S2.2 Infralittoral mixed sediment

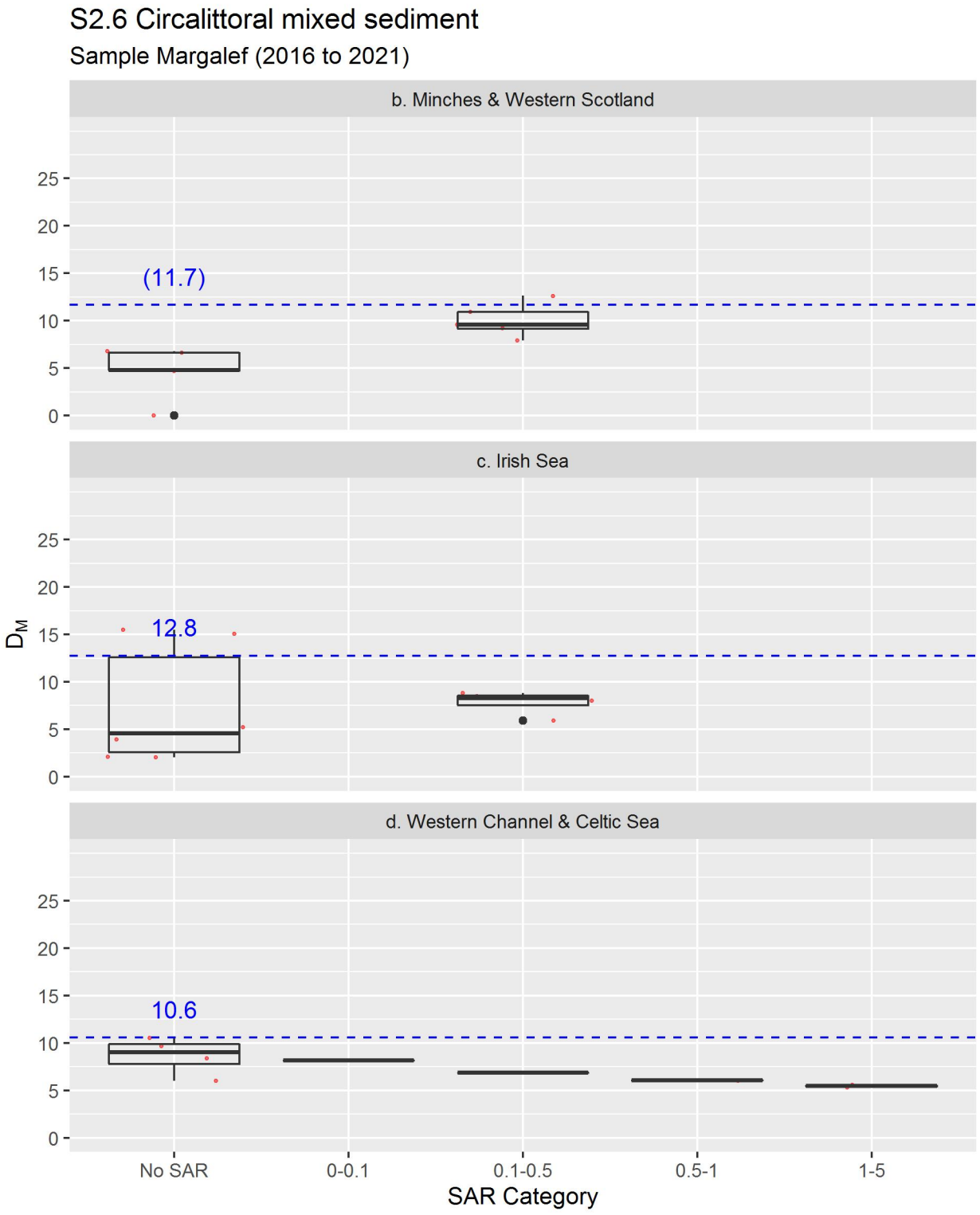
Sample Margalef (2016 to 2021)

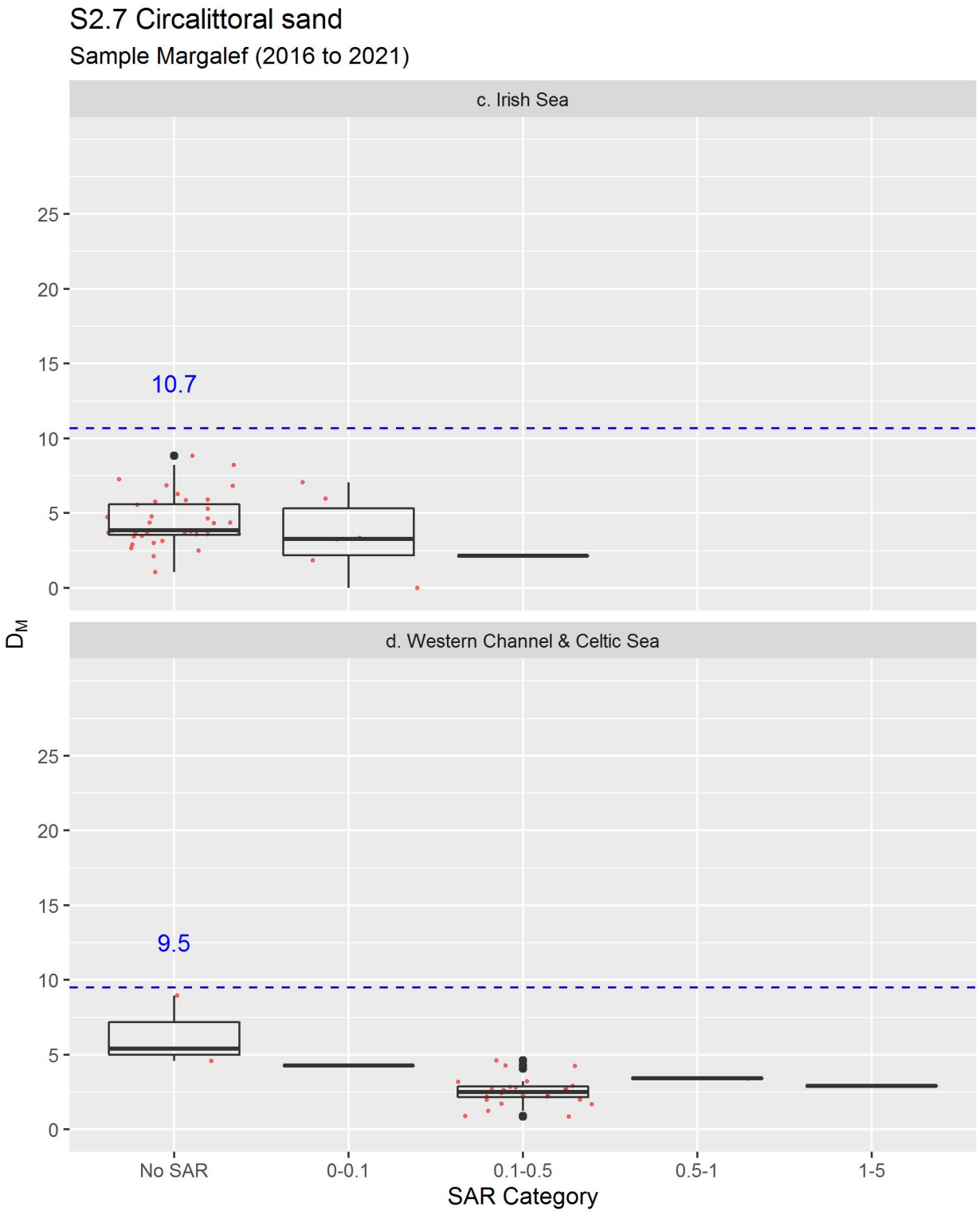


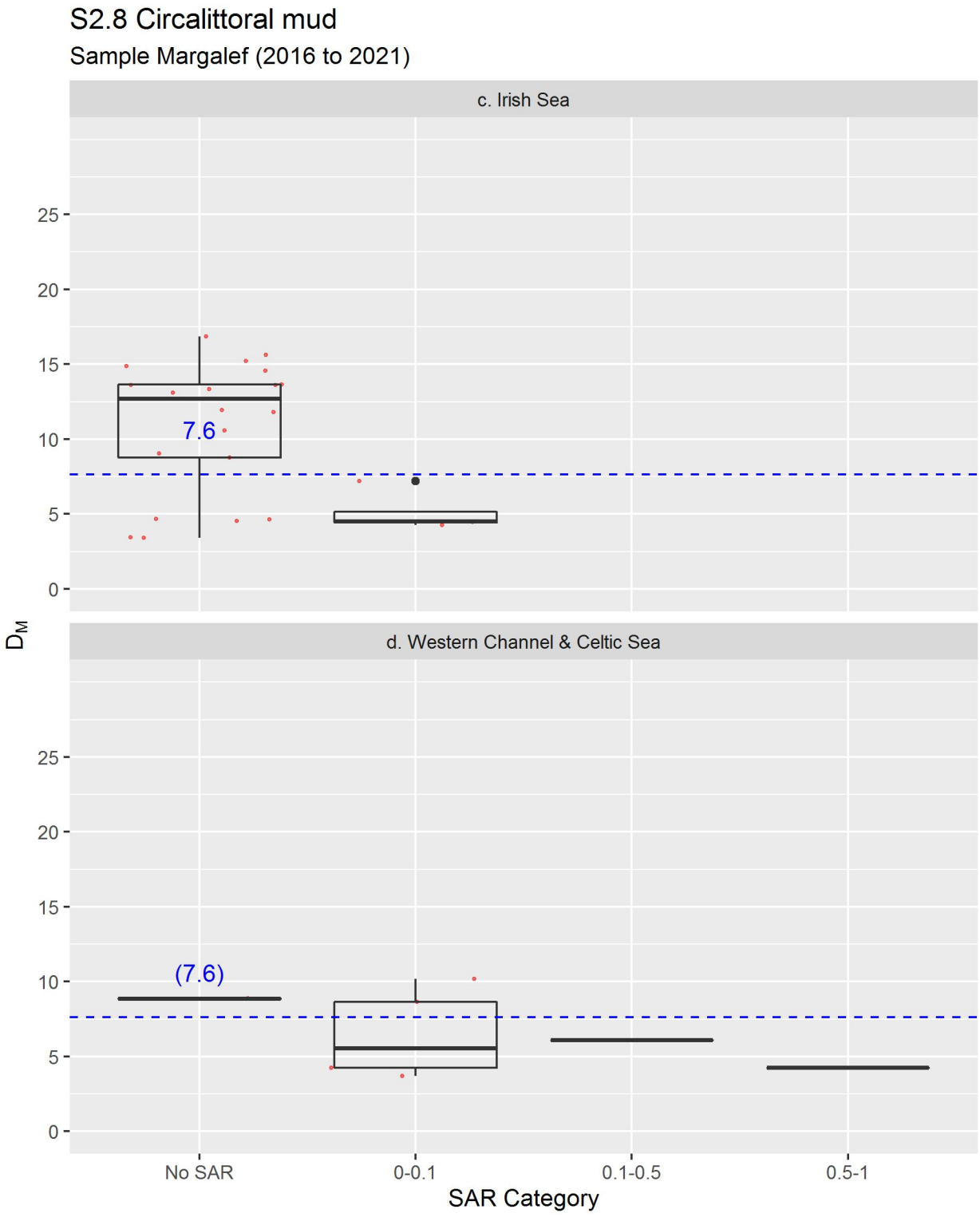

S2.3 Infralittoral sand
Sample Margalef (2016 to 2021)
c. Irish Sea
25
20
15
10
5
0
D_M
6.7
No SAR
0-0.1
0.1-0.5
SAR Category

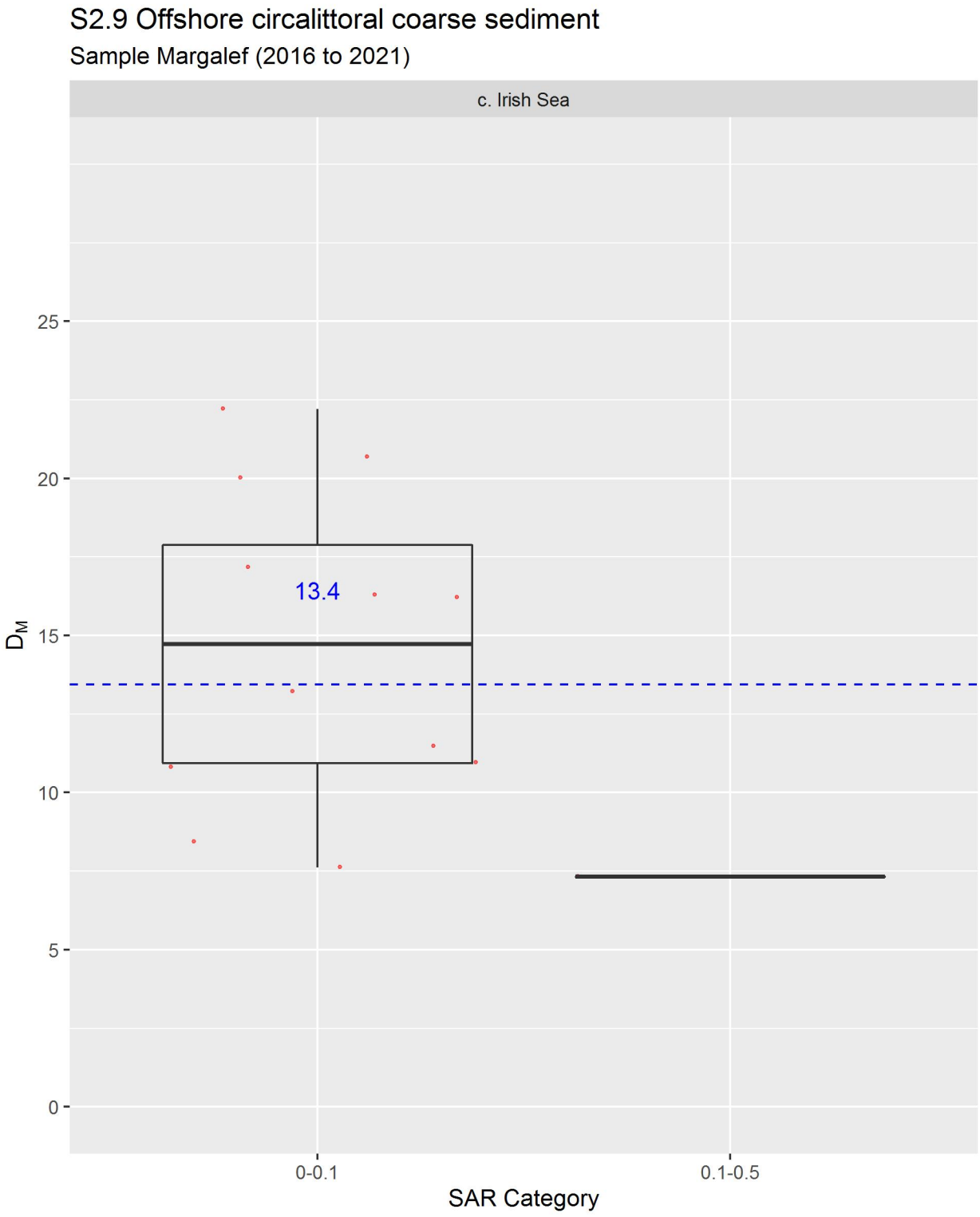

S2.4 Infralittoral mud
Sample Margalef (2016 to 2021)
c. Irish Sea
d. Western Channel & Celtic Sea
10.1
(10.1)
25
20
15
10
5
0
D_M
No SAR
0-0.1
SAR Category

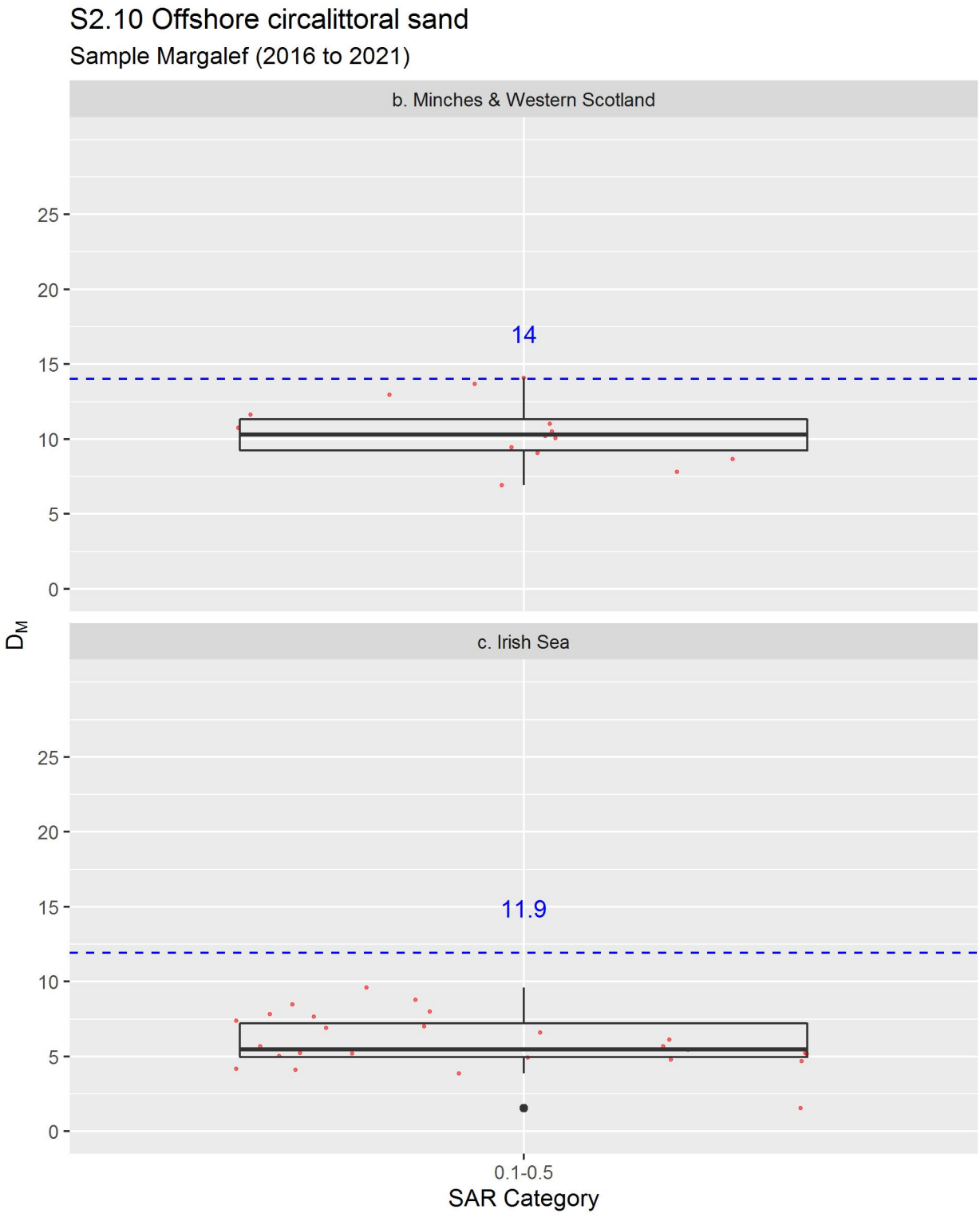

S2.5 Circalittoral coarse sediment
Sample Margalef (2016 to 2021)
b. Minches & Western Scotland
16.9
c. Irish Sea
18.9
d. Western Channel & Celtic Sea
12.1
D_M
0
5
10
15
20
25
No SAR
0-0.1
0.1-0.5
0.5-1
1-5
SAR Category


S2.6 Circalittoral mixed sediment
Sample Margalef (2016 to 2021)
b. Minches & Western Scotland
c. Irish Sea
d. Western Channel & Celtic Sea
(11.7)
12.8
10.6
D_M
0
5
10
15
20
25
No SAR
0-0.1
0.1-0.5
0.5-1
1-5
SAR Category


S2.7 Circalittoral sand
Sample Margalef (2016 to 2021)
c. Irish Sea
d. Western Channel & Celtic Sea
10.7
9.5
D_M
25
20
15
10
5
0
No SAR
0-0.1
0.1-0.5
0.5-1
1-5
SAR Category


S2.8 Circalittoral mud
Sample Margalef (2016 to 2021)
c. Irish Sea
d. Western Channel & Celtic Sea
7.6
(7.6)
25
20
15
10
5
0
D_M
No SAR
0-0.1
0.1-0.5
0.5-1
SAR Category

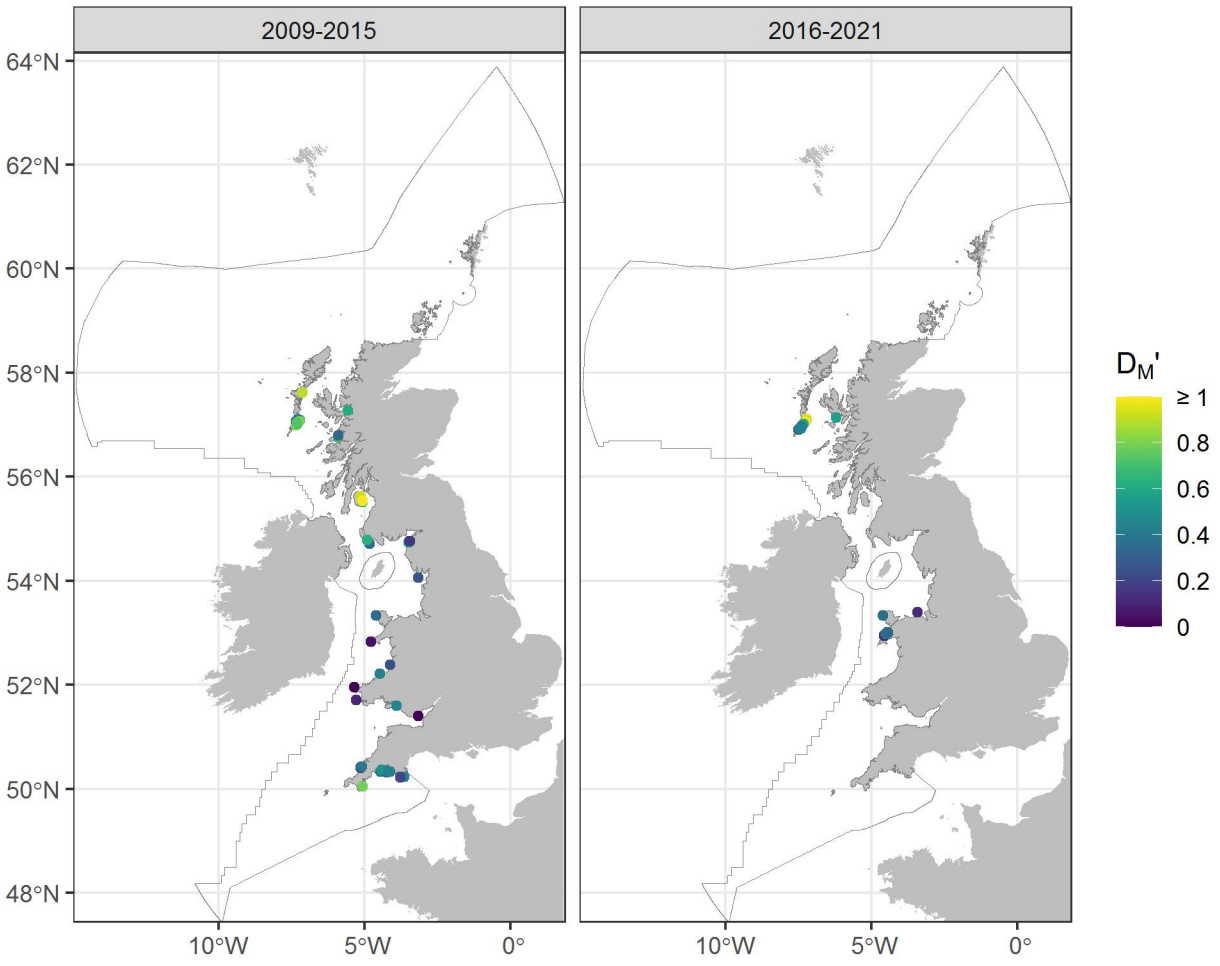

S2.9 Offshore circalittoral coarse sediment
Sample Margalef (2016 to 2021)
c. Irish Sea
25
20
15
10
5
0
D_M
13.4
0-0.1
0.1-0.5
SAR Category

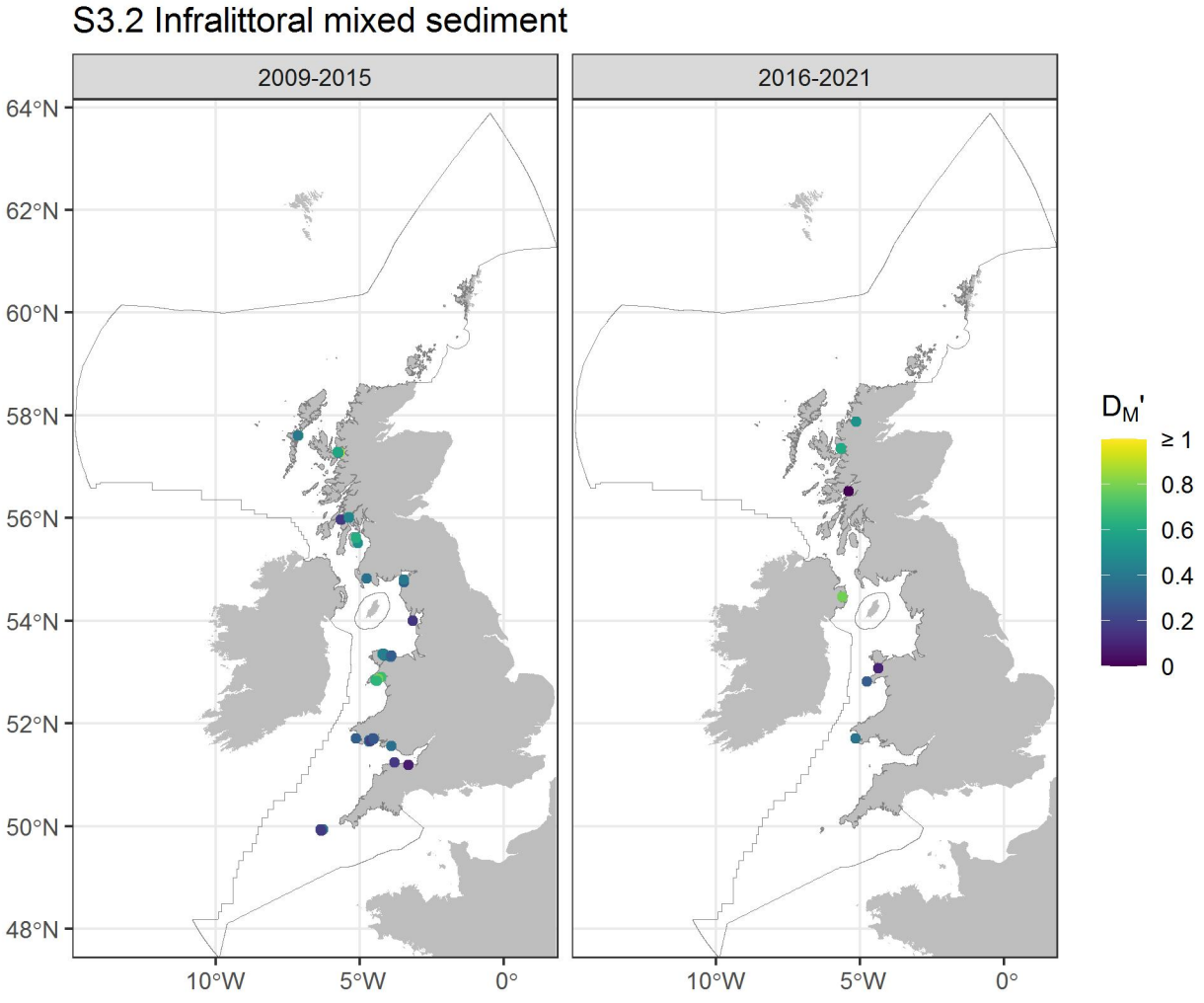

S2.10 Offshore circalittoral sand
Sample Margalef (2016 to 2021)
b. Minches & Western Scotland
c. Irish Sea
14
11.9
25
20
15
10
5
0
D_M
0.1-0.5
SAR Category

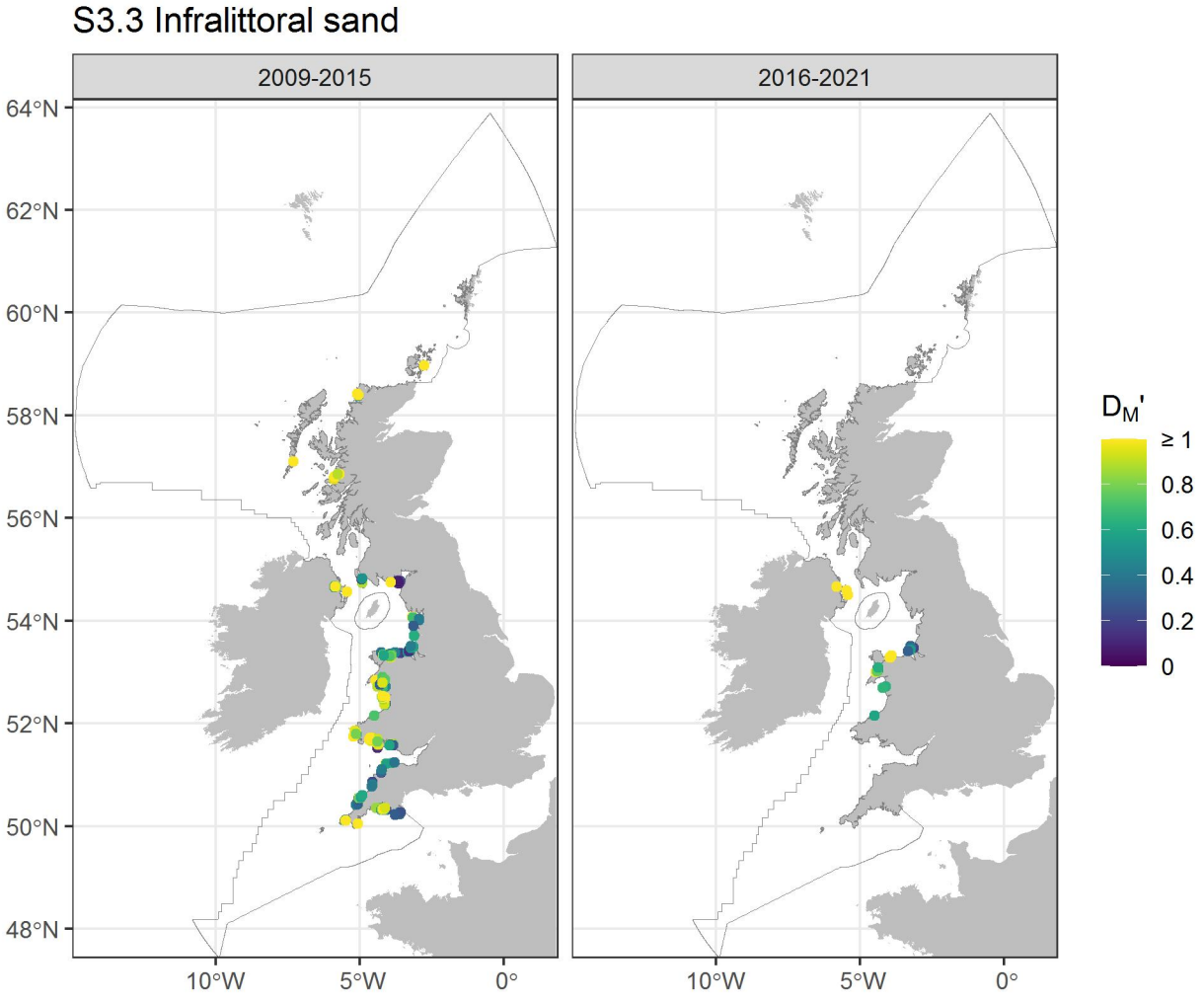
S3 - Relative Margalef diversity in the UKMS Celtic Seas sub-region

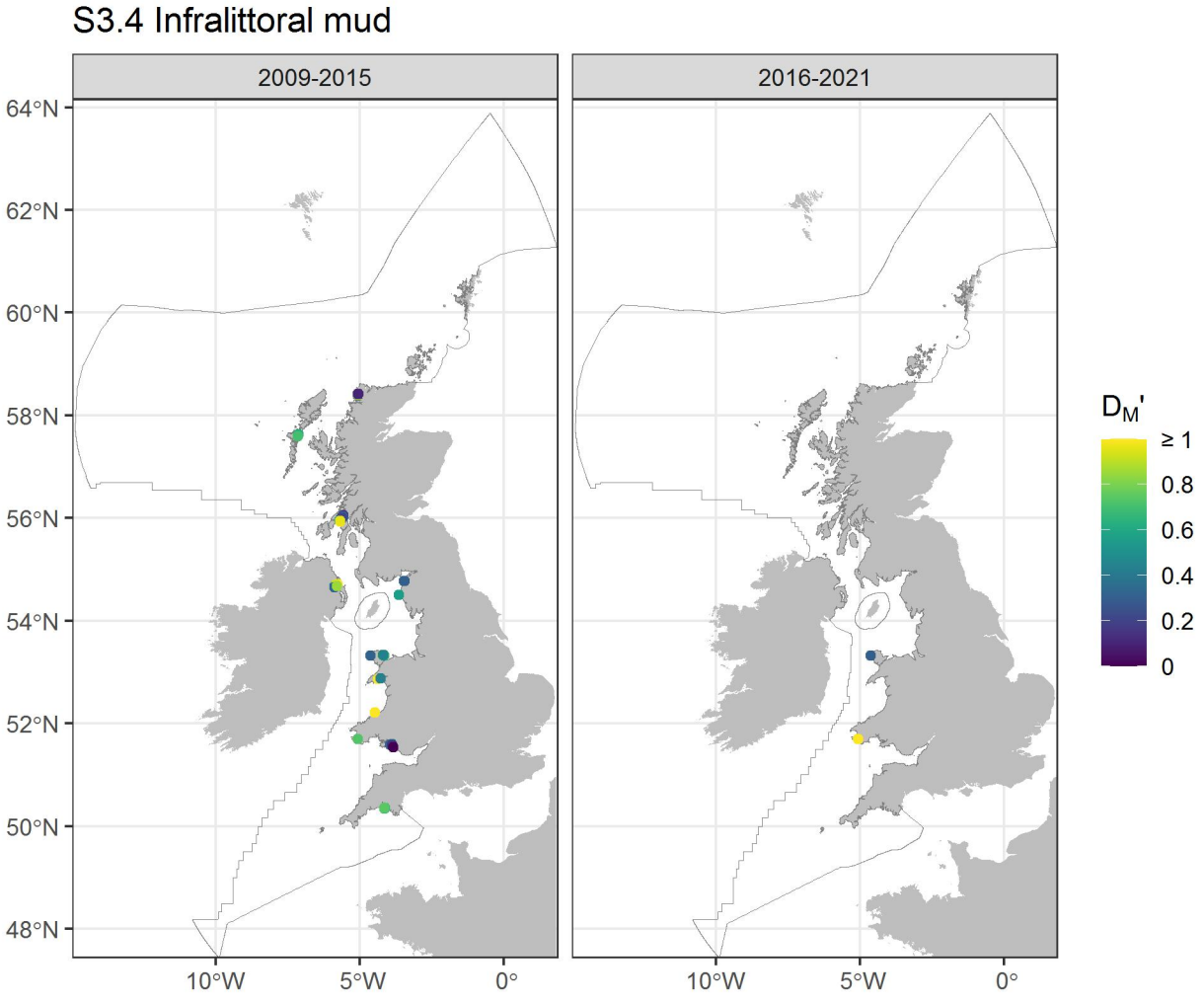
Relative Margalef diversity (D_M‘) and sample locations in the UKMS Celtic Seas sub-region. plots are divided between assessment periods and only included where data is available for the period. Note; due to the clustered nature of samples, colours may overlap and might not represent the variations in D_M’ present at a smaller-scale.

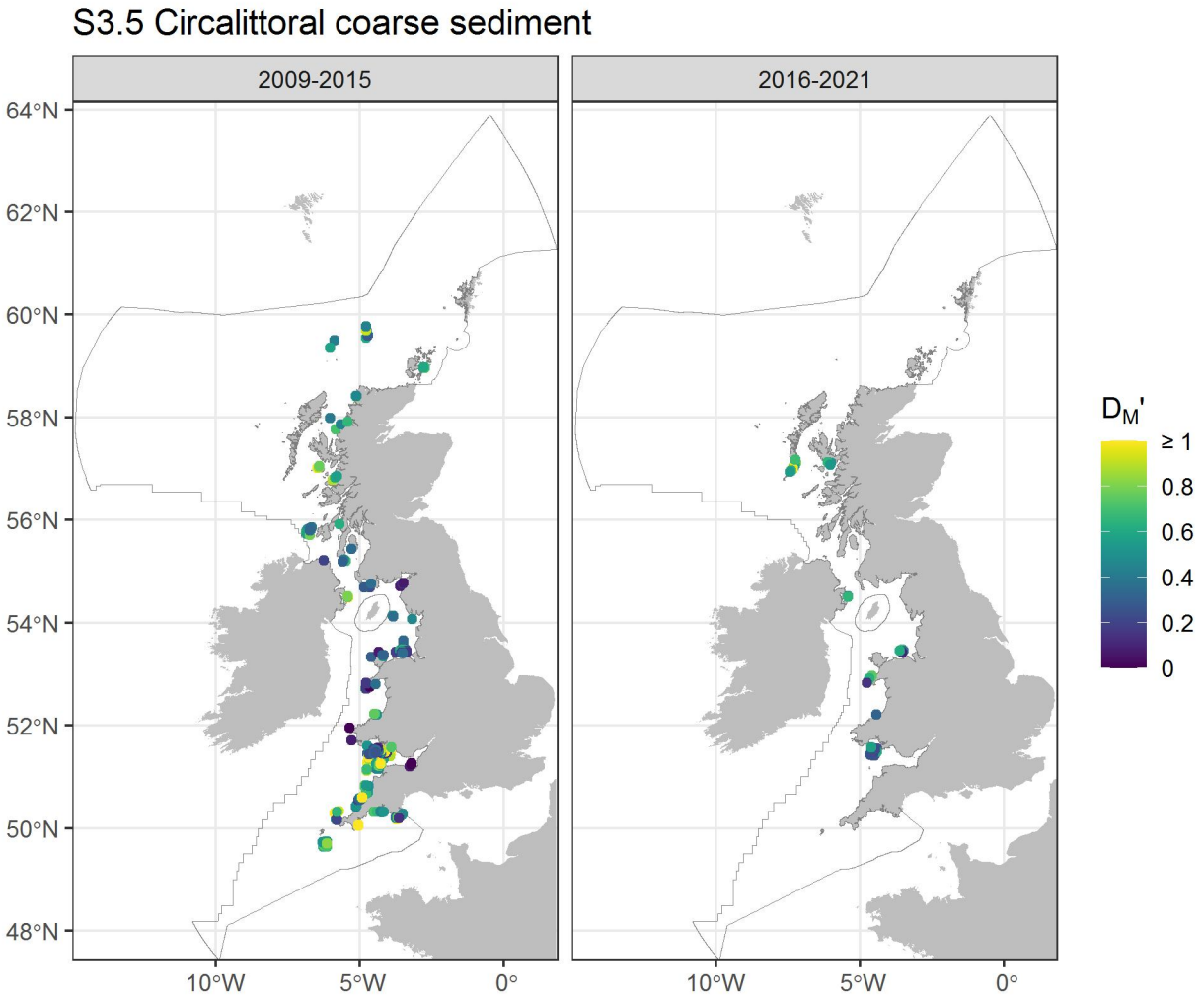
S3.1 Infralittoral coarse sediment

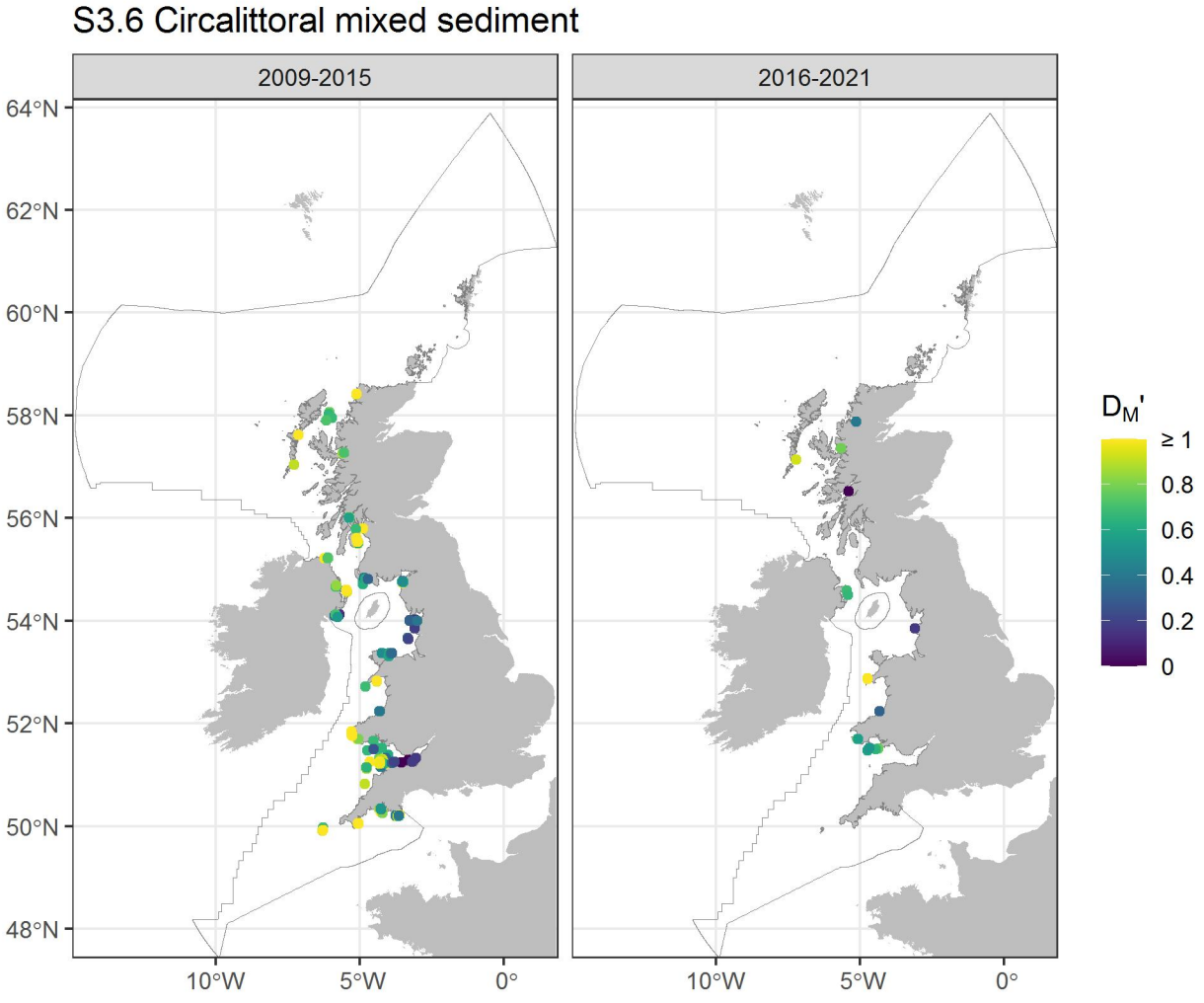


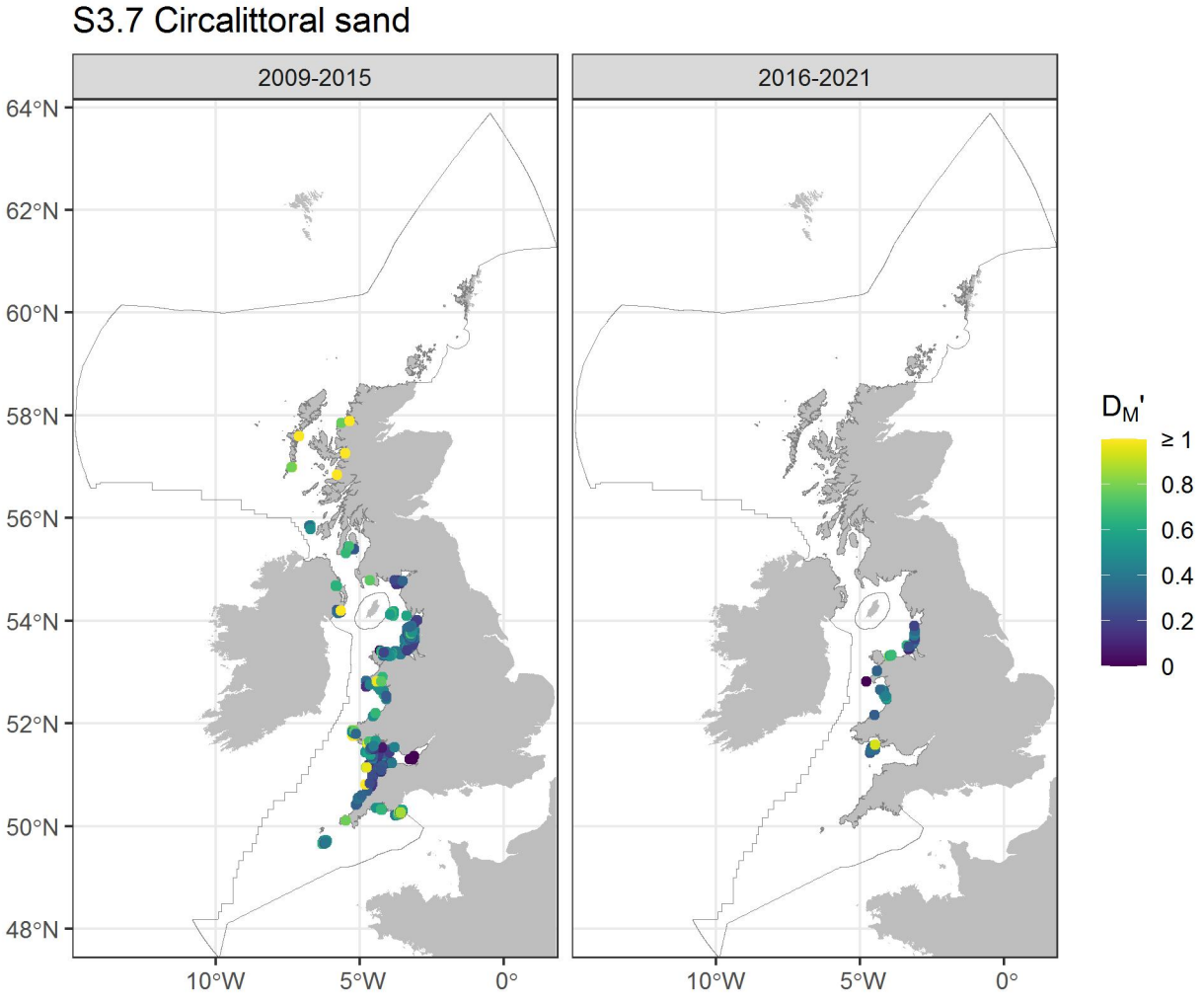

S3.2 Infralittoral mixed sediment
2009-2015
2016-2021
64°N
62°N
60°N
58°N
56°N
54°N
52°N
50°N
48°N
10°W
5°W
0°
D_M'
≥ 1
0.8
0.6
0.4
0.2
0

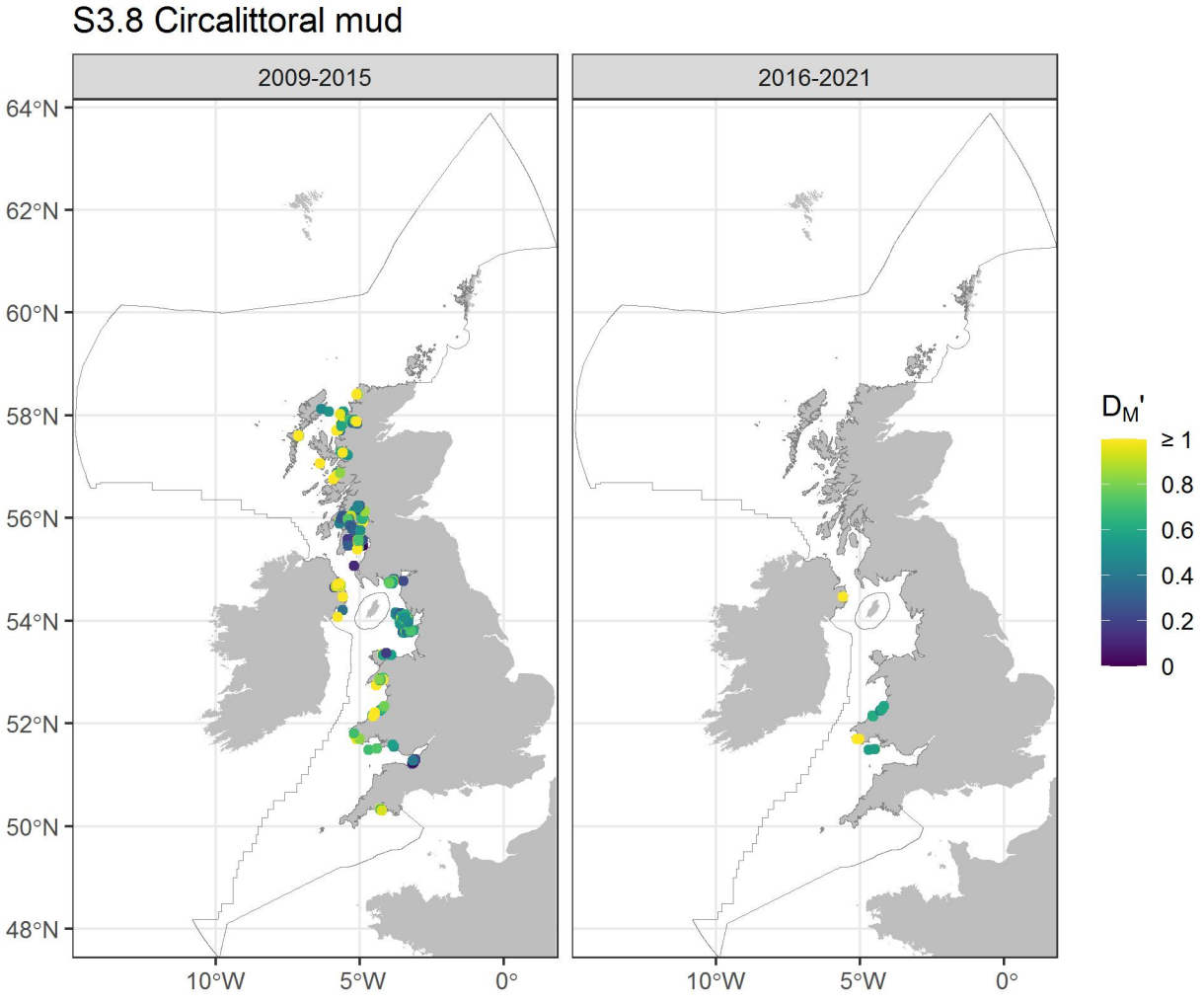

S3.3 Infralittoral sand
2009-2015
2016-2021
64°N
62°N
60°N
58°N
56°N
54°N
52°N
50°N
48°N
10°W
5°W
0°
D_M'
≥ 1
0.8
0.6
0.4
0.2
0

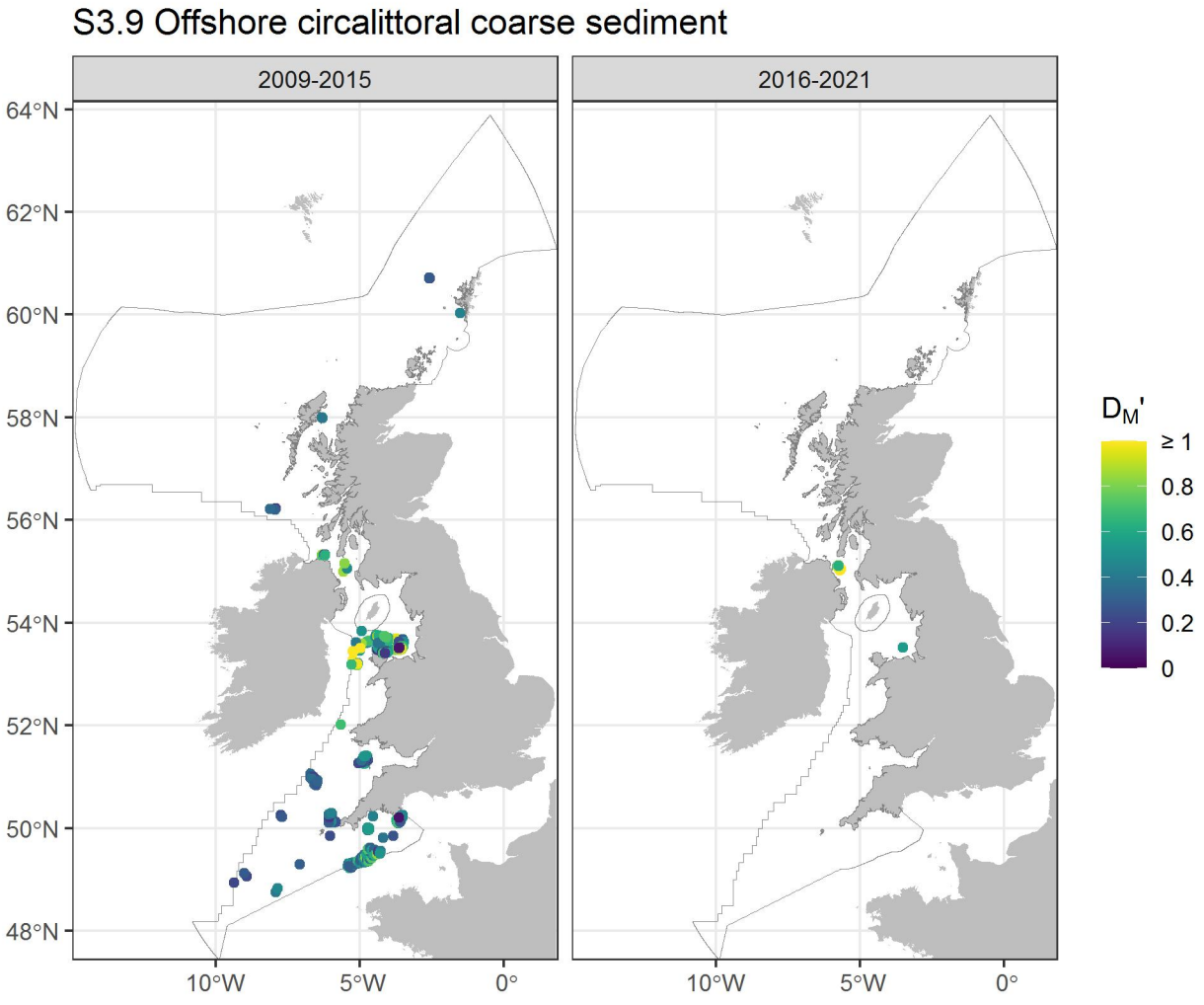

S3.4 Infralittoral mud
2009-2015
2016-2021
64°N
62°N
60°N
58°N
56°N
54°N
52°N
50°N
48°N
10°W
5°W
0°
D_M'
≥ 1
0.8
0.6
0.4
0.2
0

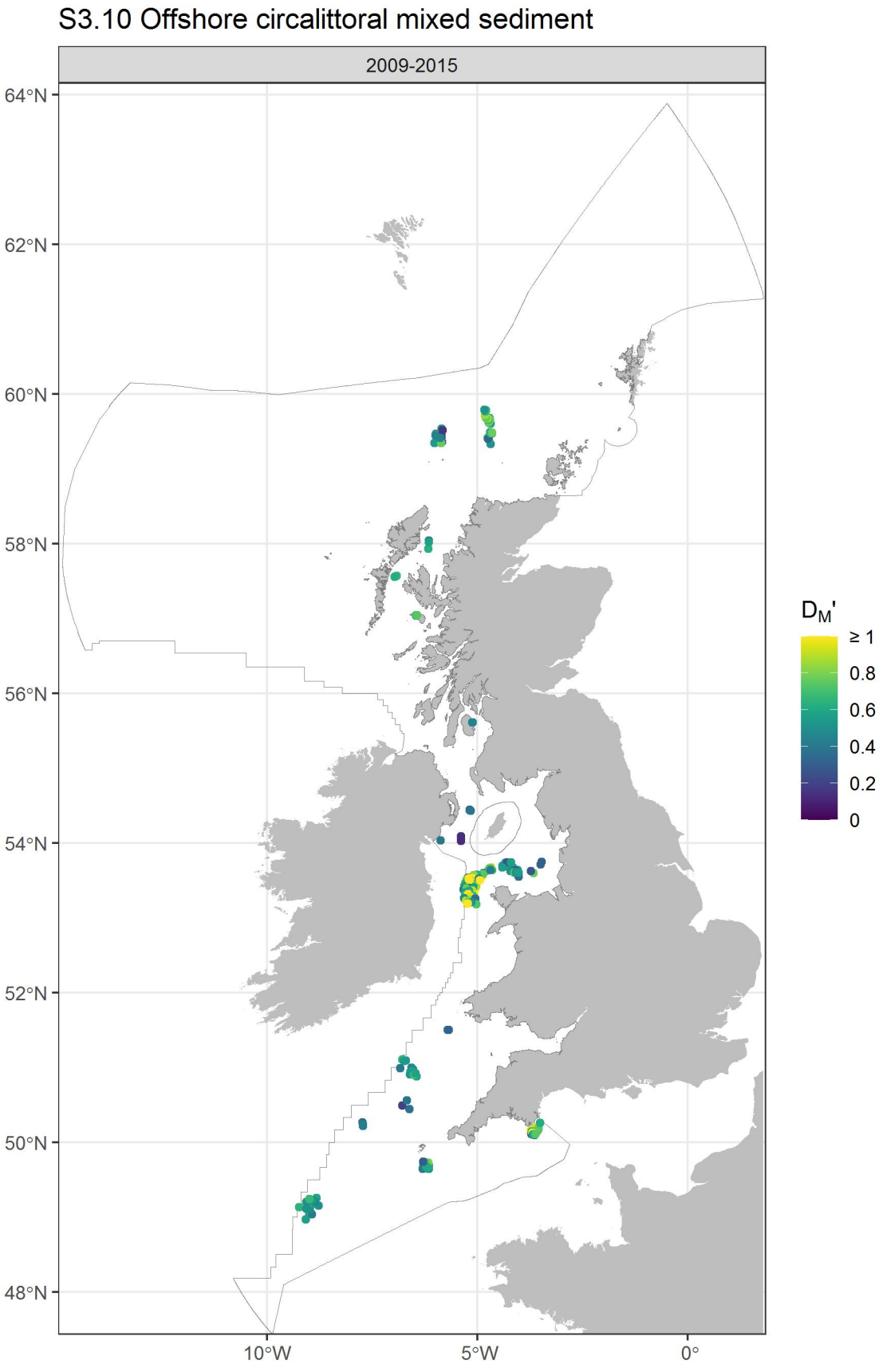

S3.5 Circalittoral coarse sediment
2009-2015
2016-2021
64°N
62°N
60°N
58°N
56°N
54°N
52°N
50°N
48°N
10°W
5°W
0°
D_M'
≥ 1
0.8
0.6
0.4
0.2
0


S3.6 Circalittoral mixed sediment
2009-2015
2016-2021
64°N
62°N
60°N
58°N
56°N
54°N
52°N
50°N
48°N
10°W
5°W
0°
D_M'
≥ 1
0.8
0.6
0.4
0.2
0

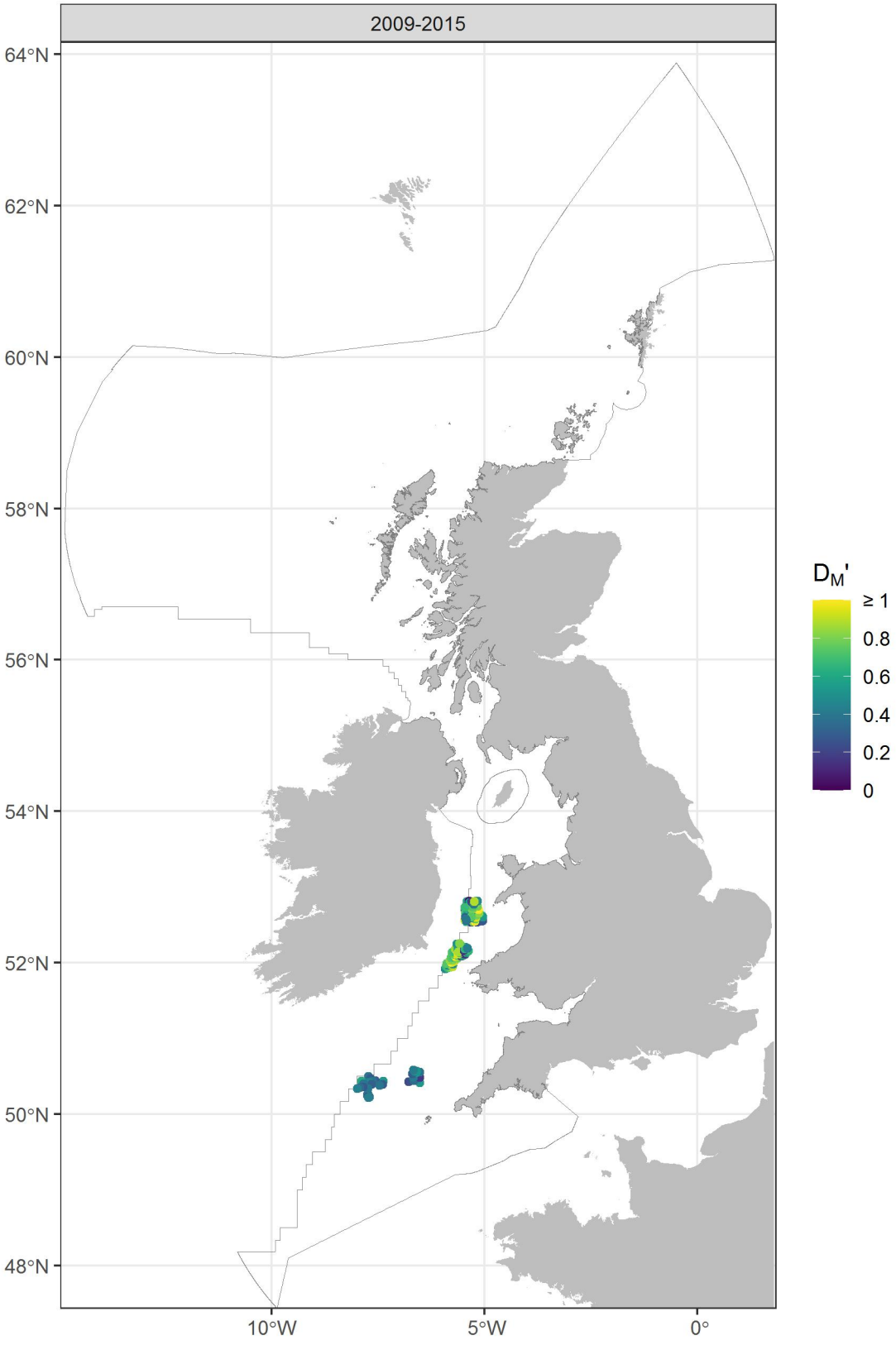

S3.7 Circalittoral sand
2009-2015
2016-2021
64°N
62°N
60°N
58°N
56°N
54°N
52°N
50°N
48°N
10°W
5°W
0°
D_M'
≥ 1
0.8
0.6
0.4
0.2
0

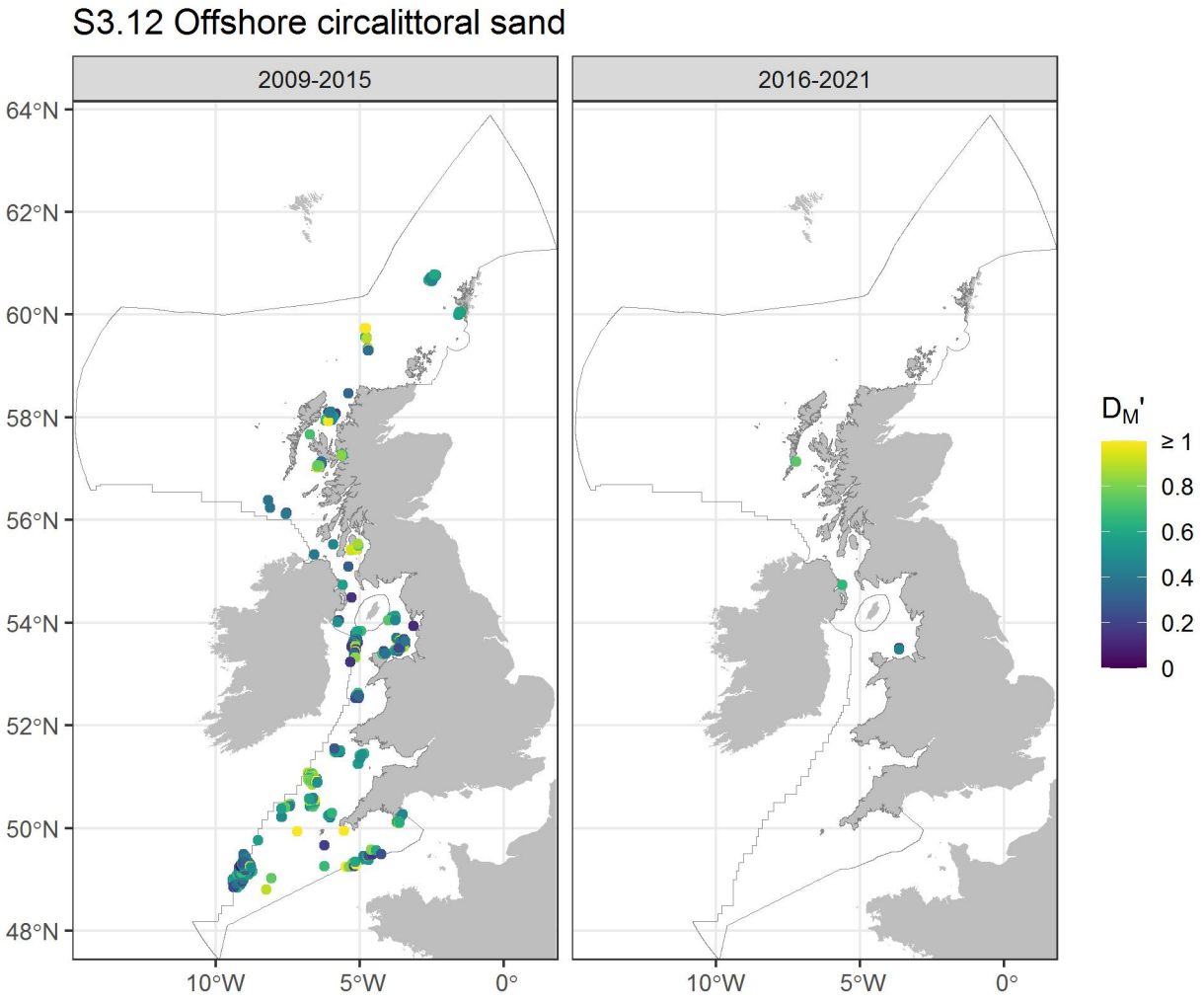

S3.8 Circalittoral mud
2009-2015
2016-2021
64°N
62°N
60°N
58°N
56°N
54°N
52°N
50°N
48°N
10°W
5°W
0°
D_M'
≥ 1
0.8
0.6
0.4
0.2
0

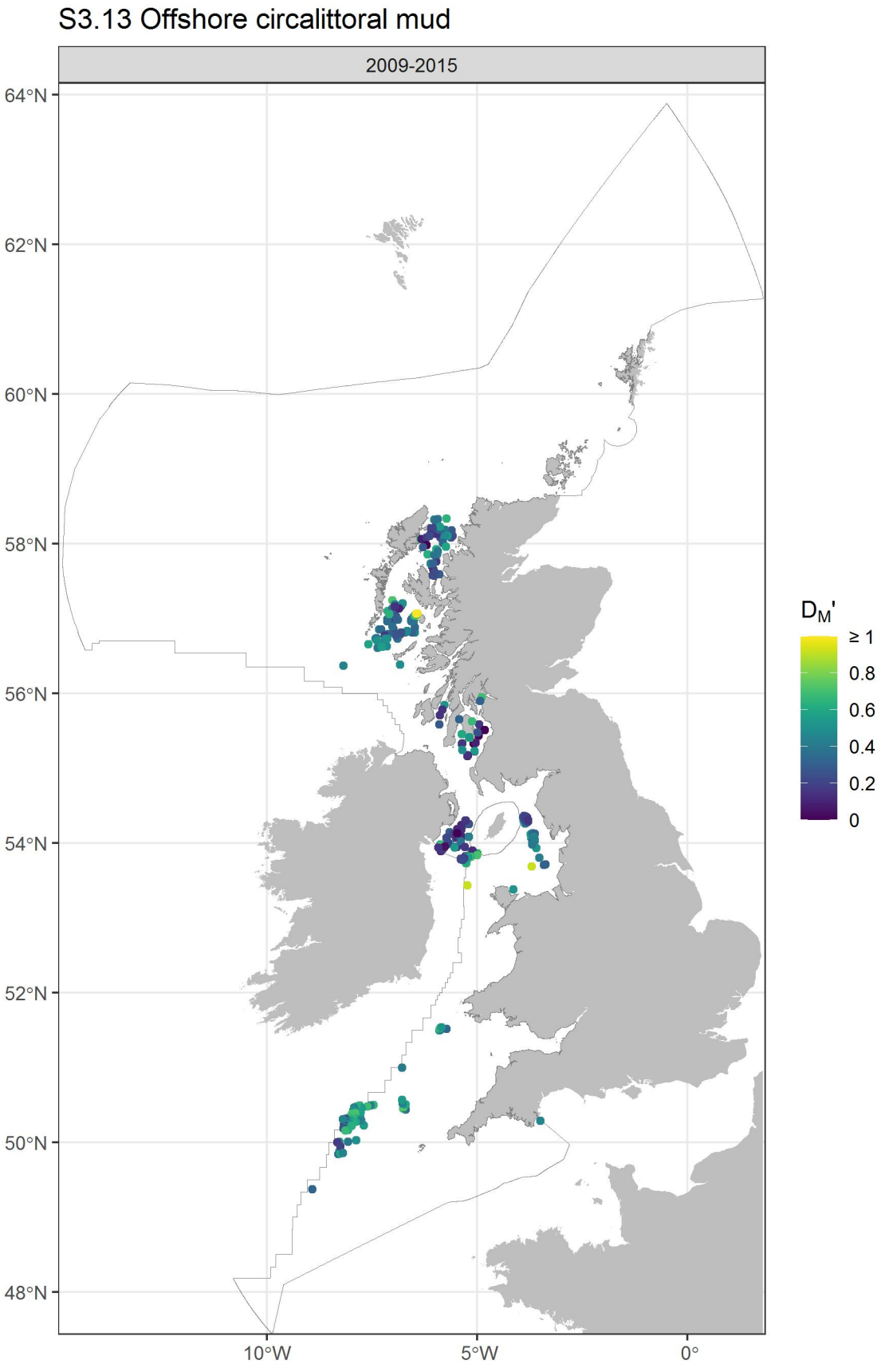

S3.9 Offshore circalittoral coarse sediment
2009-2015
2016-2021
64°N
62°N
60°N
58°N
56°N
54°N
52°N
50°N
48°N
10°W
5°W
0°
D_M'
≥ 1
0.8
0.6
0.4
0.2
0


S3.10 Offshore circalittoral mixed sediment
2009-2015
64°N
62°N
60°N
58°N
56°N
54°N
52°N
50°N
48°N
10°W
5°W
0°
D_M'
≥ 1
0.8
0.6
0.4
0.2
0

S3.11 Offshore circalittoral coarse sediment and/ or Offshore circalittoral mixed sediment




S3.12 Offshore circalittoral sand
2009-2015
2016-2021
64°N
62°N
60°N
58°N
56°N
54°N
52°N
50°N
48°N
10°W
5°W
0°
D_M'
≥ 1
0.8
0.6
0.4
0.2
0


S3.13 Offshore circalittoral mud
2009-2015
64°N
62°N
60°N
58°N
56°N
54°N
52°N
50°N
48°N
10°W
5°W
0°
D_M'
≥ 1
0.8
0.6
0.4
0.2
0

S4 - Significant differences between median relative Margalef diversity, 2009-2015 and 2016-2021

Significant differences between broad-scale habitat median relative Margalef diversity (D_M') per CP2 region, for the assessment periods 2009-2015 and 2016-2021 (Wilcoxon rank-sum test, $p < 0.05$).

Region	Broad-scale habitat	statistic	p	Relative D 2009-2015 & 2016-2021 (n)
Irish Sea	Circalittoral coarse sediment	910.5	0.000855	0.33 (193) - 0.58 (18)
Irish Sea	Infralittoral sand	3200.5	0.003782	0.76 (207) - 1.03 (43)
Irish Sea	Offshore circalittoral coarse sediment	341.0	0.000055	0.58 (161) - 0.99 (13)
Minches & Western Scotland	Circalittoral coarse sediment	1271.0	0.000001	0.48 (74) - 0.66 (66)
Minches & Western Scotland	Offshore circalittoral sand	151.0	0.000502	0.48 (50) - 0.74 (15)
Western Channel & Celtic Sea	Circalittoral coarse sediment	3623.5	0.000008	0.63 (226) - 0.25 (20)
Western Channel & Celtic Sea	Circalittoral sand	5267.0	0.000018	0.47 (207) - 0.28 (35)
Western Channel & Celtic Sea	Infralittoral mixed sediment	3.0	0.022727	0.3 (31) - 0.48 (2)
Western Channel & Celtic Sea	Infralittoral mud	0.0	0.028318	0.36 (17) - 1.24 (2)

S5 - Spatial Analysis of Sample Coverage

Estimates of spatial coverage using a 2 km^2 buffer around sample locations for each broad-scale habitat, CP2 region, and assessment period. Percentage estimates were calculated from the total broad-scale habitat mapped area in the assessment region. Given the inherent assumptions and limitations associated, the employed methodology should not be considered an exact estimation of the habitat area covered by the monitoring data. The method however, permitted a broad evaluation of the spatial representativeness of the sample data, and is provided here as additional information to interpret the overall confidence of assessment results.

Broad-scale habitat	Scottish Continental Shelf 2009-2015	Minches & Western Scotland 2009-2015	Minches & Western Scotland 2016-2021	Irish Sea 2009-2015	Irish Sea 2016-2021	Western Channel & Celtic Sea 2009-2015	Western Channel & Celtic Sea 2016-2021
Circalittoral coarse sediment	5.6%	8.2%	3.9%	16.5%	3.5%	31.4%	3.5%
Infralittoral sand	24.4%	34.2%	-	71.4%	26.0%	>100%	-
Offshore circalittoral coarse sediment	0.2%	1.5%	-	10.1%	0.9%	4.4%	-
Offshore circalittoral mixed sediment	53.5%	6.2%	-	32.4%	-	46.2%	-
Offshore circalittoral mud	0.7%	16.8%	-	22.2%	-	8.2%	-
Offshore circalittoral sand	0.9%	6.5%	0.3%	27.1%	1.0%	6.5%	-
Circalittoral mixed sediment	-	36.2%	12.3%	49.8%	6.9%	>100%	25.1%
Circalittoral mud	-	22.2%	-	52.9%	2.4%	>100%	26.4%
Circalittoral sand	-	4.6%	-	50.5%	11.7%	41.5%	5.5%
Infralittoral coarse sediment	-	49.7%	47.5%	43.9%	20.4%	>100%	-
Infralittoral mixed sediment	-	74.8%	54.4%	>100%	31.9%	>100%	55.5%
Infralittoral mud	-	52.3%	-	>100%	13.2%	>100%	16.5%
Offshore circalittoral coarse sediment and/or Offshore circalittoral mixed sediment	-	-	-	99.2%	-	74.4%	-