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Supplement of

Ocean dynamic processes causing spatially heterogeneous distribution of sedimentary caesium-137 massively released from the Fukushima Dai-ichi Nuclear Power Plant

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1 Table S1. Evaluation of our model performance for seawater-surface ^{137}Cs at 10 TEPCO
 2 (2011) stations shown in Fig. 4j. Values of N indicate number of sampling data, except for
 3 non-detected. Statistical indexes FAn and FB are described in Appendix A. FB in the total
 4 row indicates an all-station average when weights W-1 and W-2 are half those of the other
 5 stations, because W-1 and W-2 are within same simulation grid.

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Stn	N	FB	$FA5$ (%)	$FA3$ (%)	$FA2$ (%)
W-1	188	-1.42	89.4	75.0	48.4
W-2	192	-1.19	92.7	86.5	67.7
W-3	125	-0.66	95.2	69.6	48.0
W-4	86	-0.98	89.5	79.1	48.8
W-5	18	-0.33	83.3	66.7	50.0
W-6	21	-0.09	90.5	76.2	57.1
W-7	23	-0.14	100.0	87.0	56.5
W-8	22	-0.89	81.8	59.1	50.0
W-9	22	-1.51	50.0	27.3	13.6
W-10	19	-1.34	57.9	26.3	15.8
Total	716	-0.81	89.2	74.6	52.2

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1 Table S2. Evaluation of our model performance for sediment-surface ^{137}Cs at 30 MEXT
 2 (2011) stations in Fig. 2b. Values of N indicate number of sampling data. Statistical indexes
 3 FAn and FB are described in Appendix A. FB in the total row indicates an all-station average.

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Stn.	N	FB	$FA5$ (%)	$FA3$ (%)	$FA2$ (%)
A1	9	1.26	44.4	33.3	22.2
A3	3	0.16	100.0	100.0	66.7
a1	3	1.28	66.7	0.0	0.0
B1	9	1.90	0.0	0.0	0.0
B3	3	-0.60	100.0	100.0	66.7
C1	9	1.94	0.0	0.0	0.0
C3	3	-0.68	100.0	100.0	66.7
D1	9	-0.82	77.8	66.7	66.7
D3	3	-0.27	100.0	100.0	100.0
E1	9	-0.68	88.9	77.8	22.2
E3	3	-0.45	100.0	100.0	100.0
E5	3	0.56	100.0	66.7	66.7
F1	9	-0.26	88.9	77.8	66.7
F3	3	-0.30	100.0	100.0	100.0
G0	3	0.09	100.0	100.0	100.0
G1	9	0.41	100.0	100.0	66.7
G3	3	0.58	100.0	100.0	33.3
G4	3	-0.60	100.0	100.0	33.3
H1	9	0.74	100.0	77.8	44.4
H3	3	0.24	100.0	100.0	100.0
I0	3	0.93	100.0	66.7	0.0
I1	9	1.07	55.6	44.4	33.3
I3	3	0.54	100.0	100.0	66.7
J1	9	0.83	66.7	44.4	11.1
J2	3	0.35	100.0	100.0	66.7
J3	3	-1.47	0.0	0.0	0.0
K1	9	1.23	66.7	33.3	11.1
K2	3	1.03	100.0	66.7	0.0
L1	9	0.56	88.9	77.8	55.6
L3	3	-0.96	33.3	33.3	33.3
Total	162	0.29	72.8	61.7	40.7

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1 Table S3. Evaluation of our model performance for sediment-surface ^{137}Cs at 25 TEPCO
 2 sampling stations in Fig. 2c. Values of N indicate number of sampling data. Statistical indexes
 3 FAn and FB are described in Appendix A. FB in the total row indicates an all-station average.

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Stn.	N	FB	$FA5$ (%)	$FA3$ (%)	$FA2$ (%)
24	5	1.27	80.0	40.0	20.0
23	5	0.50	60.0	40.0	40.0
22	5	-1.83	60.0	60.0	40.0
15	5	1.26	60.0	0.0	0.0
12	9	1.68	44.4	22.2	11.1
11	5	0.16	100.0	100.0	60.0
1	5	-0.81	80.0	40.0	20.0
2	5	-0.08	100.0	60.0	20.0
3	5	0.68	100.0	100.0	60.0
16	5	0.42	100.0	100.0	80.0
6	5	1.81	0.0	0.0	0.0
7	5	1.07	80.0	20.0	0.0
5	5	1.90	0.0	0.0	0.0
8	5	0.75	80.0	80.0	40.0
9	5	0.73	60.0	60.0	20.0
10	5	0.27	100.0	100.0	80.0
13	9	1.13	88.9	88.9	55.6
14	5	0.77	100.0	80.0	40.0
4	5	0.75	100.0	80.0	0.0
17	5	1.30	40.0	20.0	0.0
20	5	1.09	100.0	0.0	0.0
29	5	1.12	60.0	40.0	20.0
21	5	0.77	100.0	100.0	20.0
19	5	0.26	100.0	100.0	80.0
18	5	0.87	100.0	60.0	40.0
Total	134	0.71	75.2	55.6	30.1

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1 Table S4. Evaluation of our model performance for vertical ^{137}Cs activity profile in sediment
 2 at (a) eight Ootosaka and Kobayashi (2013) stations in Fig. 2c, and (b) four Ootosaka and Kato
 3 (2014) stations in Fig. 2b. Values of N indicate number of sampling data. Values of N indicate
 4 number of sampling data. Statistical indexes FA_n and FB are described in Appendix A.
 5 Values of FB in the total rows indicate all-layer averages.

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7 (a) Nearshore region (Ootosaka and Kobayashi, 2013)

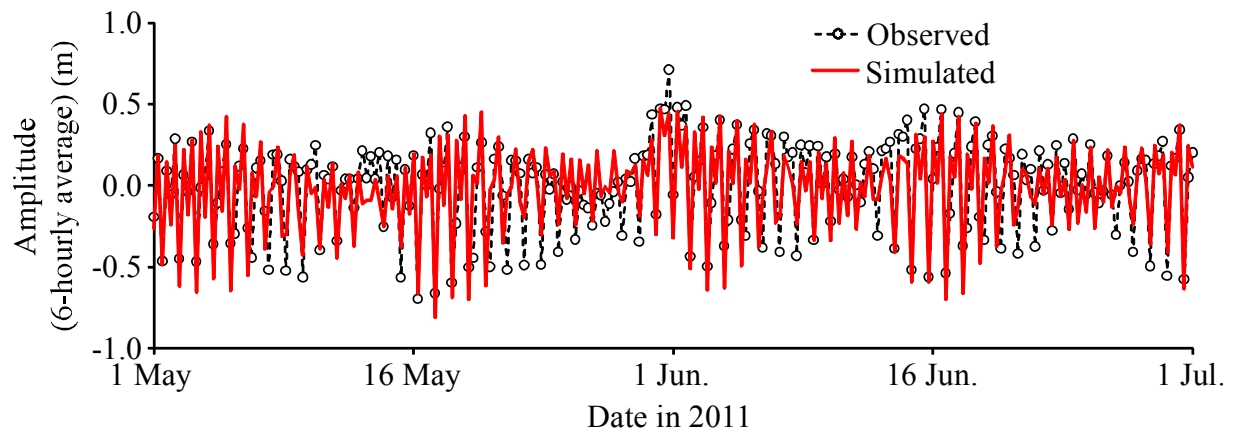
Layer	N	FB	$FA5$ (%)	$FA3$ (%)	$FA2$ (%)
0–3cm	20	0.72	95.0	55.0	35.0
3–10cm	17	0.39	94.1	70.6	47.1
Total	37	0.60	94.6	62.2	40.5

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9 (b) Offshore region (Ootosaka and Kato, 2014)

Layer	N	FB	$FA5$ (%)	$FA3$ (%)	$FA2$ (%)
0–1 cm	4	–0.56	100.0	100.0	75.0
1–2 cm	4	–0.30	100.0	100.0	75.0
2–3 cm	4	0.15	75.0	75.0	50.0
3–4 cm	4	0.76	100.0	100.0	50.0
4–5 cm	4	1.50	50.0	0.0	0.0
5–6 cm	3	1.40	33.3	0.0	0.0
6–7 cm	2	1.50	50.0	0.0	0.0
7–8 cm	2	1.64	50.0	0.0	0.0
9–10 cm	2	1.66	0.0	0.0	0.0
Total	29	0.86	69.0	51.7	34.5

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Figure S1. Comparison between observed and simulated tidal amplitude (6-hour average) at Choshi Fishing Port (140.87°E, 35.75°N). Observations were provided by JMA.

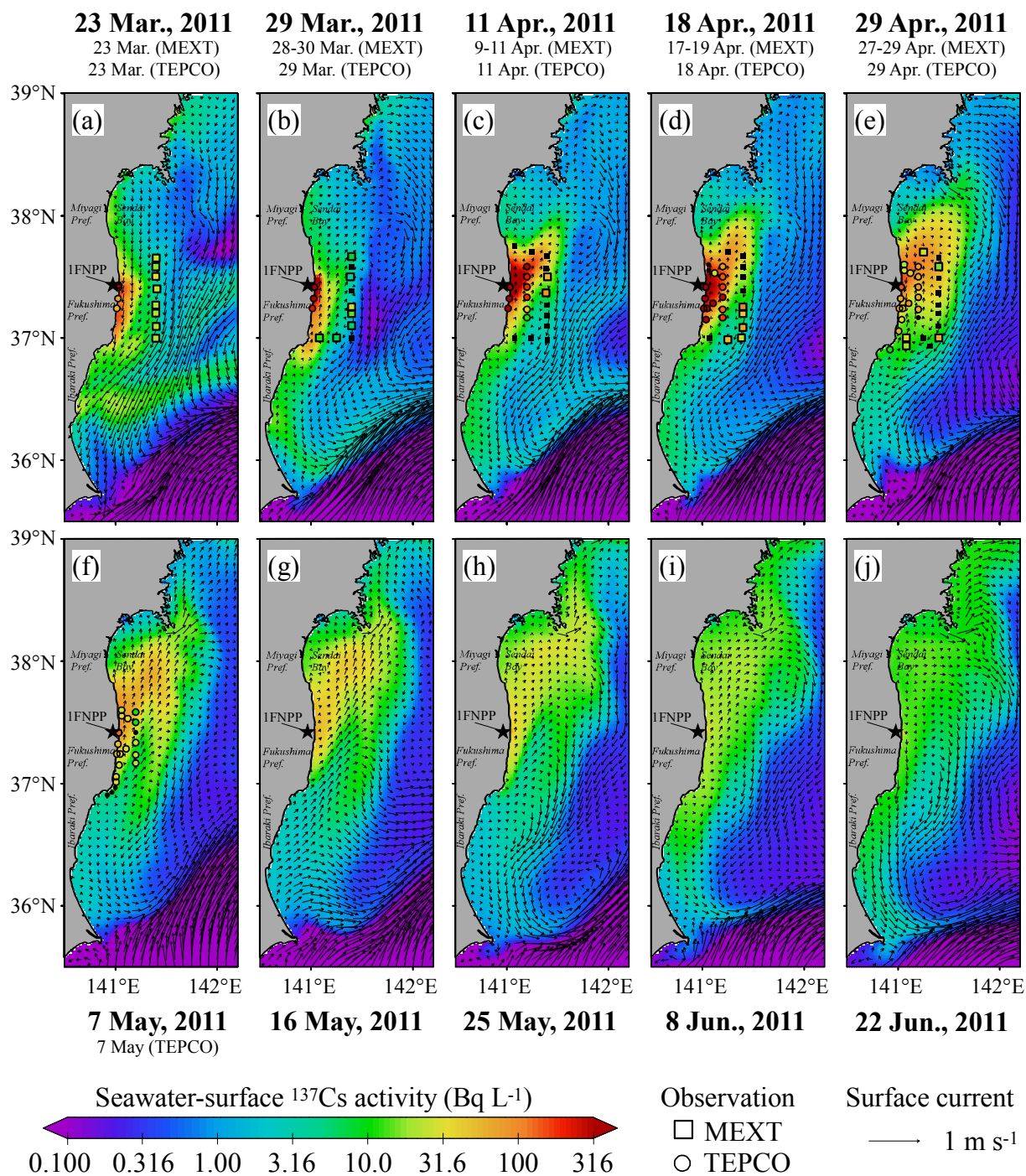


Figure S2. Spatial distributions of observed (colour plots of circles and squares) and simulated (colour shading) seawater-surface ^{137}Cs . Dates of simulated/observed results are denoted by bold/normal characters. Line contours show water depth (m) according to JTOPO30 (MIRC). Black star indicates location of 1FNPP. Observations are from MEXT (2011) and TEPCO (2011). Observations of MEXT (2011) (f–j) and TEPCO (2011) (g–j) were omitted because most indicated non-detected.