

## Hourly Astronomical Tide Level at Ofunato port, Iwate Pref. in 2011 (unit: centimeter) Issued by JMA

Date	Moon	Time																								
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1-Jun	W	30	40	44	39	25	2	-25	-50	-70	-79	-77	-62	-39	-14	10	26	34	33	26	16	7	3	5	13	
2-Jun	Th	New Moon	26	38	46	47	37	17	-9	-38	-63	-80	-85	-77	-57	-31	-5	18	32	36	32	23	13	6	4	9
3-Jun	F		20	33	45	50	46	32	8	-21	-50	-73	-86	-85	-72	-49	-22	4	24	35	36	29	19	10	4	5
4-Jun	Sa		13	26	39	49	51	43	24	-2	-32	-59	-78	-86	-81	-64	-39	-12	12	28	35	33	25	15	7	3
5-Jun	Su		7	17	30	42	50	48	36	15	-12	-40	-63	-78	-82	-72	-53	-28	-2	18	31	34	30	20	10	3
6-Jun	M		2	8	18	31	42	46	42	28	7	-19	-44	-63	-73	-73	-61	-40	-16	6	23	32	32	25	15	6
7-Jun	Tu		0	0	6	17	28	37	39	33	20	0	-22	-43	-58	-64	-60	-47	-27	-6	14	27	32	29	21	10
8-Jun	W		1	-4	-4	2	11	21	28	29	24	13	-3	-21	-37	-48	-51	-45	-32	-14	5	21	30	32	27	17
9-Jun	Th	First Quarter	5	-5	-11	-11	-7	1	9	16	19	17	9	-3	-16	-27	-35	-36	-30	-18	-2	14	27	33	32	25
10-Jun	F		14	0	-11	-20	-22	-20	-13	-4	4	10	11	9	2	-6	-15	-20	-21	-16	-5	9	23	33	37	34
11-Jun	Sa		24	11	-5	-20	-31	-36	-35	-28	-18	-7	3	10	12	10	5	-2	-7	-8	-3	6	18	30	39	41
12-Jun	Su		36	24	7	-12	-30	-44	-51	-51	-43	-30	-14	0	12	18	19	15	9	4	2	6	15	26	37	44
13-Jun	M		45	38	24	4	-19	-41	-58	-66	-65	-55	-38	-18	1	16	26	28	24	17	11	9	12	21	32	43
14-Jun	Tu		50	50	41	23	-1	-27	-52	-70	-78	-75	-62	-41	-17	5	23	32	34	29	21	14	12	16	25	37
15-Jun	W		48	55	53	42	21	-6	-36	-62	-80	-86	-80	-63	-39	-12	12	29	37	37	30	21	14	12	17	27
16-Jun	Th	Full Moon	41	53	59	55	41	17	-13	-44	-69	-85	-88	-79	-58	-32	-4	19	34	40	37	28	18	11	10	17
17-Jun	F		29	44	56	61	55	37	11	-20	-50	-74	-86	-85	-72	-49	-21	5	26	37	39	33	23	13	7	8
18-Jun	Sa		16	31	46	57	59	50	30	3	-27	-55	-74	-82	-76	-59	-35	-8	15	32	39	37	28	16	6	2
19-Jun	Su		5	16	31	46	55	54	42	21	-6	-33	-56	-70	-73	-63	-44	-19	5	24	36	38	32	22	9	0
20-Jun	M		-2	4	16	31	43	49	46	32	11	-13	-37	-54	-63	-60	-47	-27	-4	17	31	38	36	27	15	3
21-Jun	Tu		-5	-5	2	14	27	37	41	35	22	2	-18	-36	-48	-51	-44	-29	-10	10	27	36	38	32	21	9
22-Jun	W		-2	-9	-8	-1	10	21	29	30	24	12	-4	-20	-32	-38	-37	-27	-13	5	21	33	38	36	28	16
23-Jun	Th	Last Quarter	3	-7	-12	-12	-6	4	13	19	20	15	6	-6	-16	-24	-26	-22	-12	2	17	29	37	38	33	24
24-Jun	F		11	-1	-11	-17	-17	-13	-5	4	10	12	9	4	-3	-9	-13	-13	-8	1	13	25	34	39	37	31
25-Jun	Sa		20	7	-6	-17	-24	-25	-21	-14	-5	2	7	8	6	3	0	-2	-1	3	11	20	30	37	39	36
26-Jun	Su		29	17	3	-12	-24	-32	-35	-31	-23	-12	-2	6	11	13	12	10	8	8	11	17	25	33	38	40
27-Jun	M		36	28	14	-2	-19	-34	-43	-45	-40	-30	-16	-2	10	18	21	21	18	15	14	16	21	29	36	41
28-Jun	Tu		42	37	27	10	-9	-29	-45	-55	-56	-48	-33	-15	2	17	26	29	28	24	19	17	19	24	31	39
29-Jun	W		44	45	39	25	5	-18	-41	-58	-66	-64	-52	-33	-11	9	25	34	35	32	26	20	17	19	26	35
30-Jun	Th		44	49	49	39	21	-3	-29	-53	-69	-75	-68	-52	-28	-4	18	33	40	39	32	24	18	16	19	28

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Date	Moon	Time																								
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1-Jul	F	New Moon	39	49	54	51	38	16	-12	-40	-64	-78	-79	-68	-47	-20	6	27	40	43	38	29	20	14	13	20
2-Jul	Sa		31	44	55	58	52	35	9	-21	-50	-72	-82	-79	-63	-38	-10	16	35	44	43	35	24	14	9	11
3-Jul	Su		20	34	48	58	59	49	29	1	-30	-57	-75	-81	-73	-53	-25	3	26	41	45	40	29	16	6	3
4-Jul	M		8	20	35	49	57	56	43	21	-7	-36	-60	-73	-73	-61	-38	-10	16	35	45	44	34	21	7	-2
5-Jul	Tu		-3	4	18	34	47	53	49	35	13	-13	-38	-57	-65	-60	-44	-20	6	28	42	46	40	27	11	-2
6-Jul	W		-9	-9	0	14	29	41	45	40	27	7	-16	-36	-48	-51	-42	-24	-2	21	38	46	45	34	19	2
7-Jul	Th		-11	-17	-15	-6	7	21	31	35	30	19	3	-14	-28	-35	-33	-22	-5	15	34	45	48	42	28	11
8-Jul	F	First Quarter	-6	-18	-24	-22	-14	-2	10	19	23	21	14	3	-8	-16	-19	-14	-3	13	29	43	50	48	38	23
9-Jul	Sa		5	-11	-24	-31	-30	-24	-14	-2	7	13	15	12	7	1	-3	-3	3	13	26	39	48	51	47	36
10-Jul	Su		20	2	-15	-29	-38	-40	-35	-26	-15	-3	6	12	15	15	13	11	11	15	23	34	44	51	52	47
11-Jul	M		36	20	1	-18	-34	-45	-50	-47	-38	-25	-10	3	14	21	24	23	21	21	23	29	37	45	51	53
12-Jul	Tu		48	37	21	1	-21	-40	-53	-59	-57	-46	-31	-13	5	19	29	32	31	27	25	25	29	36	45	52
13-Jul	W		55	51	40	23	0	-25	-46	-61	-67	-63	-51	-31	-10	11	27	36	38	35	29	24	22	26	34	44
14-Jul	Th		53	58	55	43	23	-3	-30	-53	-68	-73	-66	-49	-26	-2	20	35	42	41	34	25	18	17	22	32
15-Jul	F	Full Moon	45	56	61	57	43	20	-8	-36	-59	-72	-73	-62	-42	-16	9	30	42	45	40	29	18	11	11	18
16-Jul	Sa		31	47	59	63	57	40	14	-15	-43	-63	-72	-69	-53	-29	-2	22	39	47	44	34	21	9	3	5
17-Jul	Su		16	32	49	60	62	53	33	6	-23	-48	-64	-67	-58	-38	-13	13	34	46	47	40	26	11	0	-4
18-Jul	M		2	16	33	50	59	57	45	23	-4	-30	-50	-59	-57	-43	-20	5	28	43	49	44	32	16	1	-8
19-Jul	Tu		-9	0	16	34	48	54	49	34	12	-12	-33	-47	-50	-41	-24	-1	22	40	49	48	38	23	6	-8
20-Jul	W		-14	-11	0	16	32	44	46	39	23	3	-17	-32	-39	-36	-23	-4	17	36	48	50	44	30	13	-3
21-Jul	Th		-14	-17	-12	0	15	28	36	36	28	13	-3	-17	-26	-27	-19	-4	14	32	45	51	48	37	21	5
22-Jul	F		-10	-18	-19	-13	-2	11	22	27	26	18	7	-4	-13	-16	-12	-2	12	28	41	49	49	42	29	14
23-Jul	Sa	Last Quarter	-2	-14	-21	-21	-15	-6	5	14	18	18	13	6	0	-4	-3	3	12	25	37	46	49	46	37	23
24-Jul	Su		9	-6	-17	-23	-24	-20	-12	-2	6	11	13	12	9	7	7	9	15	23	33	41	46	47	42	32
25-Jul	M		20	6	-8	-20	-28	-30	-27	-20	-10	-1	7	12	15	16	17	18	20	24	30	36	42	45	45	40
26-Jul	Tu		31	19	4	-11	-25	-34	-38	-36	-28	-17	-5	7	16	22	25	26	26	26	28	32	36	41	44	44
27-Jul	W		41	32	19	3	-15	-32	-44	-49	-45	-35	-21	-4	11	23	31	34	33	31	28	28	30	35	41	45
28-Jul	Th		47	44	35	20	-1	-22	-42	-55	-59	-53	-40	-20	0	19	32	39	40	36	31	26	25	27	34	42
29-Jul	F		49	52	49	38	19	-6	-31	-52	-65	-67	-57	-39	-15	9	29	41	45	42	34	26	20	19	23	33
30-Jul	Sa		45	54	58	54	39	16	-13	-40	-61	-72	-70	-56	-32	-5	20	39	48	47	39	28	17	11	12	20
31-Jul	Su	New Moon	33	48	60	63	56	37	10	-20	-48	-67	-74	-67	-47	-20	8	32	47	51	45	32	17	5	1	5

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Date	Moon	Time																								
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1-Aug	M	17	34	52	63	65	54	33	4	-27	-52	-67	-69	-56	-33	-4	24	44	53	50	38	21	4	-7	-10	
2-Aug	Tu	-2	14	34	52	63	62	49	26	-3	-31	-52	-61	-56	-39	-13	15	39	53	55	45	28	7	-10	-19	
3-Aug	W	-18	-7	12	33	50	58	55	41	18	-7	-30	-45	-48	-38	-17	8	33	51	58	52	37	15	-6	-22	
4-Aug	Th	-28	-24	-11	9	28	43	49	45	31	12	-9	-25	-33	-30	-16	5	28	48	59	58	46	27	4	-16	
5-Aug	F	-30	-34	-28	-14	4	21	33	37	33	23	8	-6	-15	-17	-9	6	25	44	57	61	55	39	18	-4	
6-Aug	Sa	First Quarter	-23	-34	-37	-31	-19	-3	11	21	25	23	17	8	1	-2	0	9	24	40	53	61	60	50	33	13
7-Aug	Su		-8	-24	-35	-38	-34	-24	-12	0	9	15	16	15	13	10	11	15	24	35	47	56	60	56	45	29
8-Aug	M		11	-7	-23	-34	-39	-38	-31	-21	-10	0	8	14	18	20	21	22	26	32	39	48	54	55	52	43
9-Aug	Tu		30	14	-3	-20	-33	-41	-43	-39	-30	-18	-5	7	17	25	28	29	29	30	33	37	43	49	51	50
10-Aug	W		44	33	18	0	-18	-34	-45	-49	-46	-36	-21	-5	11	24	33	36	35	31	28	28	31	37	43	49
11-Aug	Th		51	48	38	23	2	-19	-38	-51	-55	-50	-37	-19	1	20	34	41	40	35	27	21	19	23	30	41
12-Aug	F		50	55	53	42	24	1	-23	-44	-56	-58	-49	-32	-10	12	31	43	45	40	30	19	11	9	15	27
13-Aug	Sa		41	53	59	56	43	22	-4	-30	-49	-59	-56	-43	-22	3	26	42	49	46	35	20	7	0	1	11
14-Aug	Su	Full Moon	26	44	57	62	56	40	15	-12	-36	-52	-57	-49	-31	-6	19	39	50	50	41	25	8	-5	-10	-5
15-Aug	M		9	29	48	60	62	52	32	6	-20	-40	-51	-49	-36	-13	12	35	49	54	47	32	12	-5	-16	-17
16-Aug	Tu		-7	11	33	50	60	57	44	22	-3	-26	-40	-44	-36	-18	6	30	47	55	52	38	19	-1	-17	-24
17-Aug	W		-20	-5	15	36	51	56	49	33	12	-10	-27	-35	-32	-18	2	25	44	55	55	45	27	6	-14	-26
18-Aug	Th		-28	-19	-2	18	36	47	48	39	23	4	-13	-24	-25	-16	1	21	41	54	57	50	35	14	-6	-22
19-Aug	F		-30	-28	-16	1	20	34	41	39	29	14	-1	-12	-16	-11	1	19	37	51	57	54	42	24	3	-15
20-Aug	Sa		-27	-31	-26	-13	3	18	29	33	29	20	9	-1	-6	-4	4	18	33	47	55	55	47	32	14	-5
21-Aug	Su		-19	-28	-29	-23	-12	2	14	22	24	21	15	8	4	4	9	18	30	42	51	54	50	39	24	7
22-Aug	M	Last Quarter	-8	-20	-27	-28	-23	-14	-3	7	14	17	17	15	13	12	15	20	28	37	45	50	49	43	33	19
23-Aug	Tu		5	-9	-20	-27	-29	-26	-19	-10	0	8	14	17	19	20	22	25	29	34	40	44	46	45	39	31
24-Aug	W		19	6	-7	-19	-29	-33	-33	-27	-18	-6	5	14	22	26	29	30	31	32	34	37	40	42	42	39
25-Aug	Th		33	23	9	-6	-21	-34	-41	-42	-36	-24	-9	6	19	29	35	36	35	32	29	29	31	35	39	43
26-Aug	F		43	38	28	13	-6	-26	-42	-50	-51	-42	-26	-7	12	28	38	42	40	33	26	21	20	24	31	39
27-Aug	Sa		47	50	46	34	14	-9	-32	-50	-58	-56	-43	-23	1	23	39	46	45	37	26	15	9	9	16	28
28-Aug	Su		42	53	58	52	37	13	-14	-39	-56	-62	-55	-37	-12	14	35	48	50	43	28	13	0	-6	-2	10
29-Aug	M	New Moon	28	46	59	64	56	37	10	-19	-43	-57	-59	-46	-24	4	30	48	55	49	34	14	-5	-17	-20	-12
30-Aug	Tu		6	28	49	63	66	55	33	5	-22	-43	-53	-48	-31	-5	23	45	57	56	43	21	-2	-22	-33	-32
31-Aug	W		-18	4	29	51	63	63	50	28	1	-23	-38	-41	-31	-9	17	42	58	62	53	32	6	-19	-38	-45

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Date	Moon	Time																								
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1-Sep	Th	-39	-22	3	28	48	58	55	42	21	-1	-19	-28	-24	-9	13	38	57	66	61	45	20	-8	-32	-48	
2-Sep	F	-51	-42	-22	2	25	42	49	45	32	16	-1	-12	-14	-5	12	33	53	66	67	56	35	8	-19	-40	
3-Sep	Sa	-51	-51	-40	-22	0	19	32	37	33	24	13	3	-2	2	13	30	48	62	68	63	48	26	0	-23	
4-Sep	Su	-41	-49	-47	-37	-21	-4	11	21	25	24	19	13	9	10	16	27	41	55	63	64	56	40	19	-2	
5-Sep	M	First Quarter	-22	-36	-43	-42	-34	-23	-9	3	11	16	18	17	17	20	26	35	45	53	58	56	48	34	18	
6-Sep	Tu		0	-16	-28	-35	-37	-33	-26	-16	-5	4	12	18	22	24	25	27	30	35	41	46	49	48	42	33
7-Sep	W		21	7	-8	-21	-30	-35	-35	-30	-21	-9	3	14	22	28	30	30	28	28	29	32	36	40	42	41
8-Sep	Th		36	27	14	-1	-16	-29	-37	-38	-33	-23	-9	6	20	30	35	35	30	24	20	18	21	26	33	40
9-Sep	F		43	41	33	20	2	-16	-31	-40	-41	-34	-20	-3	15	30	39	41	35	25	15	8	6	10	19	31
10-Sep	Sa		42	48	47	38	22	1	-19	-35	-43	-41	-30	-12	9	27	41	46	42	30	15	2	-6	-6	2	16
11-Sep	Su		33	46	53	51	39	19	-4	-24	-38	-43	-36	-20	1	23	40	49	48	37	20	1	-13	-19	-14	-1
12-Sep	M	Full Moon	18	38	52	57	51	35	13	-10	-29	-39	-38	-26	-6	17	38	50	52	44	26	5	-14	-27	-28	-18
13-Sep	Tu		1	23	44	56	58	48	29	6	-16	-30	-34	-27	-10	12	34	50	56	50	34	12	-11	-29	-37	-33
14-Sep	W		-17	6	30	48	57	54	40	20	-1	-19	-27	-25	-12	8	30	48	57	55	42	20	-4	-26	-40	-42
15-Sep	Th		-32	-12	13	35	50	54	47	31	12	-6	-18	-20	-11	5	26	44	57	58	48	29	5	-19	-38	-46
16-Sep	F		-42	-27	-5	19	38	48	48	38	22	6	-7	-12	-8	4	22	41	54	59	54	38	15	-9	-30	-44
17-Sep	Sa		-46	-37	-20	2	23	37	43	39	28	15	3	-4	-4	5	20	36	50	58	56	45	25	2	-20	-37
18-Sep	Su		-45	-42	-31	-13	7	23	33	36	30	21	11	4	3	7	18	32	46	54	56	49	34	14	-7	-26
19-Sep	M		-38	-41	-37	-25	-9	7	20	27	28	24	17	12	9	11	18	29	40	49	53	50	40	24	6	-12
20-Sep	Tu	Last Quarter	-26	-35	-37	-32	-22	-9	4	14	20	22	20	18	16	17	21	27	35	43	47	48	42	32	18	3
21-Sep	W		-12	-23	-31	-33	-30	-23	-13	-2	8	15	19	21	22	23	24	27	31	36	40	42	41	36	28	17
22-Sep	Th		5	-7	-19	-28	-33	-33	-28	-19	-8	4	14	21	26	29	29	29	29	29	30	32	34	34	33	29
23-Sep	F		22	11	-1	-15	-27	-35	-38	-34	-24	-11	4	17	27	33	35	32	28	23	20	20	22	26	31	34
24-Sep	Sa		34	30	20	5	-12	-28	-39	-43	-38	-26	-9	9	25	36	40	37	30	20	11	6	6	11	20	31
25-Sep	Su		40	43	39	27	9	-12	-31	-43	-46	-38	-22	-1	20	36	44	44	35	20	5	-7	-12	-9	2	18
26-Sep	M		34	47	52	47	33	11	-13	-33	-44	-43	-31	-11	13	34	47	50	42	26	5	-15	-27	-30	-22	-5
27-Sep	Tu	New Moon	17	39	54	59	52	34	10	-14	-32	-39	-34	-18	6	30	48	56	52	35	11	-15	-35	-47	-45	-31
28-Sep	W		-8	19	43	59	62	52	33	8	-13	-27	-30	-20	0	25	47	60	61	48	24	-6	-34	-54	-61	-55
29-Sep	Th		-35	-8	21	45	58	59	48	28	7	-11	-19	-16	-1	21	44	61	67	60	39	10	-22	-49	-66	-69
30-Sep	F		-58	-35	-6	22	43	54	52	41	23	6	-6	-8	0	17	39	58	69	68	53	28	-4	-34	-59	-71

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## Hourly Astronomical Tide Level at Ofunato port, Iwate Pref. in 2011 (unit: centimeter) Issued by JMA

Date	Moon	Time																								
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1-Oct	Sa	-69	-55	-31	-4	21	38	45	43	33	19	7	1	4	16	33	52	66	71	63	44	17	-13	-41	-60	
2-Oct	Su	-68	-63	-48	-26	-2	18	31	36	33	26	17	10	9	15	28	43	58	67	66	55	34	9	-18	-40	
3-Oct	M	-55	-59	-53	-40	-21	-3	13	23	26	26	22	17	15	16	23	34	46	56	61	57	44	26	4	-16	
4-Oct	Tu	First Quarter	-34	-44	-47	-43	-32	-19	-5	7	16	21	22	21	20	19	21	27	34	42	48	50	45	35	21	5
5-Oct	W		-11	-24	-33	-37	-35	-28	-18	-7	4	13	19	23	24	24	22	22	24	28	33	36	38	36	30	21
6-Oct	Th		10	-2	-14	-23	-29	-30	-26	-18	-7	4	14	22	27	29	27	23	19	16	17	20	24	28	30	29
7-Oct	F		24	17	6	-6	-17	-25	-28	-25	-17	-5	8	20	29	34	33	27	18	10	4	3	6	13	21	28
8-Oct	Sa		32	31	24	13	-1	-15	-24	-27	-24	-14	1	16	29	37	39	33	22	8	-4	-11	-11	-4	7	20
9-Oct	Su		31	38	37	29	16	-1	-15	-25	-26	-20	-7	10	27	39	44	41	29	12	-6	-19	-25	-22	-11	6
10-Oct	M		24	37	44	42	31	15	-3	-17	-24	-22	-12	4	23	38	47	47	37	19	-3	-22	-35	-37	-29	-11
11-Oct	Tu		10	30	44	49	44	30	12	-6	-18	-21	-15	-1	18	36	48	52	44	27	4	-20	-39	-48	-44	-30
12-Oct	W	Full Moon	-7	17	38	50	51	42	26	7	-8	-16	-14	-4	13	32	48	55	51	36	13	-14	-37	-52	-55	-46
13-Oct	Th		-25	1	26	44	52	49	37	20	3	-8	-11	-5	10	28	45	56	56	44	23	-4	-30	-51	-60	-57
14-Oct	F		-41	-17	10	33	47	51	44	30	14	1	-6	-3	8	24	41	54	58	51	33	8	-20	-44	-59	-62
15-Oct	Sa		-53	-33	-7	18	37	47	46	36	23	9	1	0	7	20	37	51	58	55	42	20	-7	-33	-52	-62
16-Oct	Su		-59	-45	-23	2	24	38	43	39	29	17	8	4	7	17	32	46	55	57	48	30	6	-19	-41	-55
17-Oct	M		-59	-52	-35	-14	8	25	35	37	32	23	14	9	9	16	27	40	50	54	50	38	18	-5	-27	-44
18-Oct	Tu		-53	-53	-43	-27	-8	10	24	31	31	26	20	15	13	16	23	33	43	49	49	42	27	9	-11	-29
19-Oct	W		-42	-48	-45	-36	-22	-5	9	20	26	27	24	20	18	18	21	28	35	41	43	41	33	20	4	-12
20-Oct	Th	Last Quarter	-26	-36	-41	-39	-32	-20	-6	7	17	23	25	25	23	21	21	23	26	30	33	34	32	26	16	5
21-Oct	F		-8	-20	-29	-35	-35	-30	-20	-8	5	16	24	28	28	26	23	20	18	18	19	22	24	25	23	18
22-Oct	Sa		11	1	-11	-22	-30	-33	-29	-21	-8	7	19	28	33	32	27	20	12	6	4	5	9	15	21	25
23-Oct	Su		25	20	11	-2	-16	-26	-31	-28	-18	-4	12	26	36	38	34	24	11	-2	-11	-15	-12	-3	9	21
24-Oct	M		31	35	31	20	5	-11	-23	-28	-24	-12	5	22	37	44	42	32	15	-5	-22	-33	-35	-28	-13	6
25-Oct	Tu		25	39	44	40	28	10	-7	-19	-23	-16	-2	17	36	48	51	43	25	1	-24	-44	-54	-53	-40	-18
26-Oct	W		7	30	46	51	46	32	13	-4	-14	-15	-5	13	33	50	58	55	39	14	-16	-44	-64	-71	-65	-47
27-Oct	Th	New Moon	-20	10	35	50	55	47	32	14	-1	-7	-4	9	28	48	62	64	54	32	1	-33	-61	-78	-82	-71
28-Oct	F		-47	-17	13	37	51	53	45	30	14	3	0	8	23	43	60	69	66	49	21	-13	-46	-72	-86	-85
29-Oct	Sa		-69	-43	-13	16	38	48	48	39	26	14	7	8	19	35	54	68	71	62	41	11	-23	-54	-76	-85
30-Oct	Su		-79	-62	-36	-7	18	35	43	41	33	22	13	10	15	27	44	59	68	67	54	31	1	-30	-56	-72
31-Oct	M		-77	-69	-51	-27	-2	18	31	36	34	27	19	13	13	20	32	46	58	63	58	44	21	-5	-31	-52

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## Hourly Astronomical Tide Level at Ofunato port, Iwate Pref. in 2011 (unit: centimeter) Issued by JMA

Date	Moon	Time																								
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1-Nov	Tu	-63	-64	-55	-39	-18	2	18	27	31	29	23	17	14	15	22	32	43	51	53	47	33	13	-8	-28	
2-Nov	W	-43	-51	-50	-42	-28	-11	5	17	25	27	26	22	17	14	15	20	27	35	40	40	35	24	9	-7	
3-Nov	Th	First Quarter	-22	-33	-38	-37	-30	-19	-6	7	18	25	27	26	22	17	13	12	13	17	22	27	28	25	18	9
4-Nov	F	-2	-13	-21	-26	-26	-21	-12	-1	11	20	27	30	28	23	16	9	4	3	5	9	14	18	19	17	
5-Nov	Sa	12	5	-4	-12	-17	-19	-15	-7	4	15	25	32	34	31	23	12	1	-7	-11	-10	-4	4	12	18	
6-Nov	Su	20	18	13	4	-5	-11	-14	-10	-2	9	21	32	37	37	31	19	4	-11	-21	-25	-23	-14	-1	11	
7-Nov	M	21	26	26	19	10	0	-8	-10	-6	4	17	29	39	42	39	27	10	-9	-26	-37	-39	-32	-18	-1	
8-Nov	Tu	16	28	34	32	24	13	2	-5	-6	0	11	25	38	45	45	36	19	-3	-25	-42	-51	-49	-36	-17	
9-Nov	W	4	23	36	40	36	26	13	2	-3	-1	7	21	35	46	50	45	29	7	-19	-42	-57	-61	-53	-35	
10-Nov	Th	-11	13	32	43	44	37	24	12	2	0	5	16	31	45	53	51	39	18	-8	-35	-57	-68	-66	-52	
11-Nov	F	Full Moon	-29	-2	22	39	47	44	34	21	10	3	4	13	26	41	52	56	48	30	4	-24	-50	-68	-73	-65
12-Nov	Sa	-46	-20	8	30	44	47	41	29	17	8	5	10	22	36	50	57	54	41	18	-11	-39	-61	-74	-73	
13-Nov	Su	-59	-36	-9	17	36	44	43	35	24	14	8	9	17	31	45	55	57	49	30	4	-24	-50	-68	-74	
14-Nov	M	-68	-50	-25	1	23	38	42	39	29	19	12	9	14	24	38	50	56	53	40	18	-8	-35	-56	-69	
15-Nov	Tu	-70	-59	-39	-15	9	27	37	39	33	25	16	11	12	19	30	42	50	52	45	29	7	-18	-41	-57	
16-Nov	W	-65	-62	-49	-29	-6	14	28	35	35	29	21	15	12	15	22	32	41	46	45	35	19	-1	-23	-41	
17-Nov	Th	-54	-57	-52	-38	-20	0	17	28	33	32	26	19	14	13	15	22	29	36	38	35	26	12	-5	-23	
18-Nov	F	-37	-46	-48	-42	-29	-13	4	19	28	32	30	25	18	13	11	12	16	21	25	27	26	19	9	-4	
19-Nov	Sa	Last Quarter	-17	-29	-36	-37	-32	-21	-7	9	22	30	33	30	24	16	9	4	2	4	7	12	16	18	16	10
20-Nov	Su	2	-8	-18	-24	-27	-23	-14	0	14	26	33	35	31	23	12	1	-8	-13	-13	-9	-2	6	13	17	
21-Nov	M	16	12	4	-6	-13	-17	-14	-6	7	21	32	39	39	32	20	4	-12	-25	-32	-32	-26	-14	0	12	
22-Nov	Tu	22	25	23	15	5	-4	-8	-6	2	15	30	41	46	43	32	14	-8	-29	-45	-53	-51	-40	-23	-3	
23-Nov	W	15	28	35	33	24	13	4	-1	2	11	25	40	50	53	46	29	6	-22	-46	-64	-71	-66	-51	-28	
24-Nov	Th	-3	20	36	42	40	30	18	9	5	9	21	36	50	59	58	47	24	-5	-36	-63	-80	-84	-75	-55	
25-Nov	F	New Moon	-28	1	25	41	47	42	32	20	12	10	16	29	45	59	66	61	44	17	-16	-49	-75	-90	-91	-77
26-Nov	Sa	-53	-23	6	30	44	47	41	31	19	12	13	22	37	53	66	69	60	39	9	-26	-58	-82	-93	-90	
27-Nov	Su	-73	-46	-16	12	33	44	45	37	27	17	12	15	26	42	58	68	68	55	31	0	-34	-63	-83	-89	
28-Nov	M	-82	-62	-35	-7	18	35	42	40	32	21	13	11	16	28	44	58	65	62	47	22	-8	-39	-63	-78	
29-Nov	Tu	-80	-69	-48	-23	3	23	35	39	35	26	16	9	9	16	28	43	54	58	52	36	12	-15	-40	-59	
30-Nov	W	-68	-66	-53	-33	-10	11	27	35	35	30	21	11	6	7	14	25	37	46	47	40	24	4	-18	-38	

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## Hourly Astronomical Tide Level at Ofunato port, Iwate Pref. in 2011 (unit: centimeter) Issued by JMA

Date	Day	Moon	Time																							
			0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1-Dec	Th		-51	-55	-50	-36	-18	2	19	30	35	33	26	16	8	3	4	10	19	28	34	34	27	14	-2	-18
2-Dec	F	First Quarter	-32	-40	-41	-34	-21	-5	11	25	33	34	31	23	13	5	-1	-1	3	10	17	21	22	17	8	-3
3-Dec	Sa		-14	-23	-27	-26	-19	-8	6	19	29	35	34	29	21	11	1	-6	-9	-7	-2	4	9	12	10	6
4-Dec	Su		0	-7	-13	-15	-14	-8	2	14	25	33	36	35	29	19	7	-5	-14	-19	-19	-15	-7	0	6	9
5-Dec	M		9	6	2	-2	-4	-4	1	9	19	29	36	38	36	28	16	1	-14	-26	-32	-32	-26	-16	-5	5
6-Dec	Tu		12	16	15	12	7	4	3	7	15	24	33	39	40	36	26	10	-8	-26	-39	-45	-43	-34	-20	-4
7-Dec	W		10	19	24	23	19	13	9	8	12	19	29	37	43	43	35	21	1	-21	-40	-53	-57	-51	-37	-19
8-Dec	Th		1	17	28	32	30	23	16	11	11	15	24	34	43	47	44	33	13	-10	-35	-55	-66	-66	-55	-36
9-Dec	F		-13	9	26	36	37	32	24	16	12	12	19	29	40	48	50	43	27	3	-24	-49	-67	-75	-70	-54
10-Dec	Sa	Full Moon	-30	-4	18	34	41	39	32	22	15	11	15	23	35	47	53	52	40	18	-9	-38	-62	-77	-79	-69
11-Dec	Su		-48	-21	6	27	40	43	38	28	19	12	12	18	29	42	53	56	50	33	7	-23	-51	-72	-82	-79
12-Dec	M		-63	-38	-10	16	34	42	42	34	23	14	10	12	21	34	48	56	56	44	23	-5	-35	-61	-78	-82
13-Dec	Tu		-73	-53	-26	2	24	38	43	38	29	18	10	8	14	25	39	50	56	51	36	12	-16	-44	-66	-78
14-Dec	W		-77	-63	-40	-13	12	31	40	40	33	22	12	7	7	15	27	40	49	51	43	26	2	-25	-49	-66
15-Dec	Th		-73	-67	-50	-26	-1	21	35	40	37	28	16	7	3	6	14	26	37	44	43	33	16	-7	-30	-49
16-Dec	F		-61	-62	-53	-35	-12	10	28	38	39	32	22	10	2	-1	2	10	21	30	35	33	23	8	-11	-29
17-Dec	Sa		-43	-50	-48	-37	-20	1	20	33	39	37	28	16	4	-4	-7	-5	2	11	19	23	22	15	4	-10
18-Dec	Su	Last Quarter	-23	-33	-36	-32	-21	-5	12	28	37	40	34	24	11	-2	-11	-16	-15	-10	-2	6	11	13	10	4
19-Dec	M		-5	-13	-19	-20	-16	-6	8	22	34	41	40	33	21	6	-9	-21	-28	-29	-26	-18	-8	0	6	9
20-Dec	Tu		8	5	0	-4	-6	-2	6	18	30	40	44	42	33	19	1	-16	-32	-42	-45	-42	-33	-21	-7	4
21-Dec	W		12	16	16	12	8	6	9	15	25	36	45	48	45	34	18	-3	-25	-44	-57	-62	-58	-46	-29	-11
22-Dec	Th		6	18	25	26	23	18	14	15	21	30	41	49	53	48	36	16	-9	-35	-57	-71	-76	-70	-54	-33
23-Dec	F		-10	10	26	33	34	29	22	18	18	23	33	45	54	58	52	37	14	-15	-44	-68	-83	-86	-76	-57
24-Dec	Sa		-32	-5	17	33	39	37	30	22	17	17	24	35	49	59	62	55	37	9	-22	-53	-77	-90	-90	-76
25-Dec	Su	New Moon	-53	-25	3	25	38	42	37	27	18	13	14	23	37	52	63	64	54	33	3	-30	-61	-82	-92	-87
26-Dec	M		-70	-43	-14	13	32	41	41	33	21	11	7	11	22	38	54	64	63	50	26	-5	-38	-65	-83	-87
27-Dec	Tu		-78	-57	-29	-1	22	37	42	37	26	13	4	1	8	21	39	54	61	57	41	16	-14	-43	-66	-78
28-Dec	W		-77	-63	-40	-13	12	31	40	39	31	17	4	-3	-3	5	20	37	50	54	47	30	5	-22	-46	-63
29-Dec	Th		-68	-62	-45	-21	4	24	37	41	35	23	9	-3	-9	-7	3	18	33	42	43	35	17	-5	-27	-45
30-Dec	F		-55	-54	-43	-25	-3	18	34	41	39	29	16	1	-9	-13	-10	0	14	25	32	31	22	7	-11	-28
31-Dec	Sa		-40	-43	-38	-25	-6	13	29	39	41	35	24	10	-4	-13	-16	-13	-4	6	16	20	18	11	-1	-14

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