

## Hourly Astronomical Tide Level at Hitachi port, Ibaraki 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		16	28	36	35	25	5	-21	-47	-70	-84	-86	-75	-55	-29	-4	16	28	30	24	14	3	-5	-7	-1
2-Jun	Th	New Moon	10	24	35	40	34	19	-5	-34	-61	-81	-91	-88	-72	-47	-20	5	23	32	31	22	11	0	-6	-5
3-Jun	F		4	17	31	40	41	31	11	-17	-46	-72	-88	-93	-85	-65	-38	-10	13	28	33	28	18	6	-3	-6
4-Jun	Sa		-2	9	24	36	42	38	24	1	-27	-56	-78	-91	-90	-78	-55	-27	-1	19	30	31	25	13	2	-5
5-Jun	Su		-5	1	14	28	38	40	33	16	-8	-36	-62	-80	-88	-83	-67	-43	-17	7	23	30	28	20	8	-2
6-Jun	M		-7	-5	3	15	28	35	35	25	7	-16	-41	-63	-77	-80	-72	-55	-31	-7	12	25	28	24	15	3
7-Jun	Tu		-5	-9	-7	2	13	23	29	27	17	0	-21	-42	-59	-69	-69	-59	-41	-20	1	17	26	27	20	10
8-Jun	W		-2	-10	-13	-11	-3	6	15	19	18	10	-4	-21	-38	-51	-57	-55	-45	-28	-9	9	21	27	25	17
9-Jun	Th	First Quarter	5	-7	-16	-20	-19	-13	-4	4	9	10	5	-4	-17	-29	-39	-43	-40	-31	-16	1	15	25	28	23
10-Jun	F		14	1	-13	-23	-30	-30	-26	-18	-9	-1	4	4	-1	-8	-18	-25	-29	-26	-18	-5	9	21	28	29
11-Jun	Sa		23	11	-4	-20	-33	-42	-45	-41	-32	-20	-8	1	6	6	2	-5	-12	-16	-14	-8	3	16	27	32
12-Jun	Su		31	23	9	-9	-28	-45	-56	-60	-56	-44	-29	-12	2	12	15	13	6	-1	-5	-5	0	10	22	32
13-Jun	M		37	34	24	7	-15	-38	-58	-71	-74	-68	-53	-33	-12	6	19	24	22	15	7	1	0	5	15	28
14-Jun	Tu		37	41	37	24	4	-22	-48	-70	-83	-85	-76	-57	-33	-9	12	26	31	28	19	10	3	3	8	20
15-Jun	W		33	43	46	39	23	-1	-30	-58	-80	-91	-91	-78	-55	-28	-2	19	32	35	30	19	9	3	3	10
16-Jun	Th	Full Moon	23	37	47	48	39	20	-7	-38	-66	-86	-95	-91	-74	-49	-20	6	25	36	36	28	16	5	0	2
17-Jun	F		12	27	41	50	48	36	14	-15	-45	-71	-88	-93	-85	-64	-37	-9	15	30	37	33	22	10	0	-4
18-Jun	Sa		1	14	30	43	49	45	30	7	-23	-51	-74	-86	-86	-73	-51	-24	2	22	33	35	28	15	2	-6
19-Jun	Su		-7	1	15	31	42	46	39	22	-2	-30	-55	-72	-79	-74	-58	-34	-9	13	28	34	31	21	7	-5
20-Jun	M		-11	-10	0	15	29	38	39	30	12	-11	-35	-55	-66	-68	-59	-40	-18	4	22	32	33	26	13	0
21-Jun	Tu		-11	-15	-11	-1	13	25	31	29	19	3	-18	-37	-51	-57	-54	-42	-23	-3	15	28	33	29	20	6
22-Jun	W		-7	-16	-18	-14	-4	8	17	22	19	10	-5	-20	-34	-43	-44	-38	-25	-8	9	23	31	31	25	14
23-Jun	Th	Last Quarter	1	-11	-19	-22	-17	-9	1	8	12	10	3	-8	-19	-28	-32	-31	-23	-10	4	18	27	31	29	21
24-Jun	F		9	-4	-16	-24	-26	-23	-16	-8	-1	3	3	0	-6	-13	-18	-20	-17	-10	1	12	22	29	31	26
25-Jun	Sa		17	5	-8	-21	-29	-33	-32	-25	-17	-8	-2	1	1	-1	-4	-7	-8	-6	0	8	17	25	30	30
26-Jun	Su		25	15	2	-13	-27	-37	-42	-41	-35	-24	-13	-3	4	7	7	5	3	1	2	6	12	20	27	31
27-Jun	M		30	24	13	-2	-20	-36	-48	-53	-51	-42	-29	-14	0	10	15	16	14	10	7	6	9	15	22	29
28-Jun	Tu		33	32	24	10	-8	-29	-47	-59	-64	-59	-47	-29	-10	6	18	24	24	20	14	9	7	10	16	25
29-Jun	W		33	37	34	24	6	-16	-39	-59	-71	-73	-64	-47	-26	-3	15	27	31	29	22	14	8	6	10	19
30-Jun	Th		30	38	41	36	22	0	-26	-51	-71	-81	-79	-66	-44	-18	5	24	34	35	30	20	11	5	5	12

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## Hourly Astronomical Tide Level at Hitachi port, Ibaraki 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-Jul	F	New Moon	23	35	44	45	36	18	-8	-36	-62	-80	-87	-80	-62	-36	-9	15	32	39	36	27	16	6	1	4
2-Jul	Sa		13	27	41	48	46	34	12	-17	-46	-71	-86	-88	-77	-54	-25	2	24	37	40	34	22	9	0	-3
3-Jul	Su		3	16	31	44	50	45	30	5	-25	-54	-76	-86	-83	-67	-42	-12	14	32	41	39	28	14	1	-6
4-Jul	M		-6	2	17	33	45	48	41	23	-3	-32	-58	-75	-81	-73	-53	-26	1	24	38	41	34	21	5	-7
5-Jul	Tu		-13	-10	1	17	32	42	43	34	15	-10	-36	-57	-69	-69	-58	-36	-10	15	32	40	38	27	11	-4
6-Jul	W		-15	-19	-14	-2	13	27	35	35	25	8	-14	-35	-51	-57	-53	-39	-17	6	26	38	40	34	19	2
7-Jul	Th		-13	-23	-25	-20	-8	7	19	25	25	17	3	-14	-29	-39	-41	-34	-19	0	20	34	41	38	28	12
8-Jul	F	First Quarter	-5	-20	-29	-31	-26	-16	-3	8	14	16	11	2	-9	-19	-25	-24	-16	-2	15	29	39	41	35	23
9-Jul	Sa		6	-11	-26	-35	-38	-35	-26	-15	-4	4	8	8	4	-1	-7	-9	-7	0	11	24	35	41	40	33
10-Jul	Su		20	3	-14	-30	-41	-46	-45	-38	-27	-15	-4	5	10	11	9	6	4	6	11	19	29	37	42	40
11-Jul	M		32	20	3	-16	-34	-48	-55	-56	-50	-38	-23	-8	5	15	19	19	17	14	14	16	22	30	38	42
12-Jul	Tu		41	34	21	3	-18	-38	-55	-65	-66	-59	-44	-26	-7	10	22	28	28	24	19	16	16	21	29	38
13-Jul	W		43	44	37	23	3	-21	-44	-62	-73	-73	-64	-46	-24	-1	18	30	35	33	26	18	13	13	18	28
14-Jul	Th		39	47	48	40	25	2	-25	-50	-69	-79	-77	-64	-42	-16	8	27	38	39	33	22	12	7	7	15
15-Jul	F	Full Moon	28	42	50	51	42	23	-3	-32	-57	-74	-81	-75	-57	-32	-5	19	35	42	39	28	15	4	-1	3
16-Jul	Sa		14	30	45	53	52	40	18	-10	-39	-62	-76	-78	-67	-45	-18	9	29	41	43	34	20	5	-5	-7
17-Jul	Su		0	15	33	47	54	49	34	10	-18	-45	-64	-73	-69	-53	-28	-1	22	38	44	39	26	9	-5	-13
18-Jul	M		-12	-1	17	35	48	51	43	25	0	-26	-49	-63	-65	-55	-35	-9	15	34	43	43	32	15	-2	-14
19-Jul	Tu		-19	-14	0	19	35	45	44	34	15	-9	-32	-48	-56	-52	-37	-15	9	29	41	44	37	22	5	-11
20-Jul	W		-21	-22	-14	2	19	33	39	36	23	5	-16	-33	-43	-44	-35	-17	4	24	38	44	41	29	12	-5
21-Jul	Th		-19	-25	-23	-13	2	17	27	30	25	13	-2	-18	-29	-33	-29	-17	1	19	34	43	43	35	20	3
22-Jul	F		-12	-23	-27	-24	-14	0	12	19	21	16	6	-5	-15	-21	-20	-13	0	15	29	39	43	38	28	13
23-Jul	Sa	Last Quarter	-3	-17	-26	-29	-25	-16	-5	5	11	13	10	4	-3	-8	-10	-6	2	13	25	35	40	39	33	21
24-Jul	Su		7	-7	-20	-28	-31	-29	-22	-12	-3	4	7	8	6	3	2	2	6	13	21	29	36	38	36	29
25-Jul	M		18	4	-9	-22	-31	-36	-35	-29	-20	-10	-1	6	10	12	12	12	13	15	19	24	30	34	36	34
26-Jul	Tu		27	17	4	-11	-26	-37	-44	-44	-38	-28	-15	-2	8	16	20	22	21	20	19	20	24	28	33	35
27-Jul	W		34	29	18	3	-14	-32	-46	-54	-54	-46	-33	-16	1	15	25	29	29	26	22	19	18	21	27	33
28-Jul	Th		38	38	33	20	2	-19	-40	-56	-64	-63	-52	-34	-12	8	24	34	37	33	27	19	14	14	18	27
29-Jul	F		36	43	44	37	21	-1	-27	-50	-67	-73	-68	-52	-29	-4	18	34	41	40	33	22	13	8	9	16
30-Jul	Sa		29	42	50	49	39	20	-7	-35	-60	-75	-78	-68	-47	-20	7	29	42	46	39	27	13	3	-1	4
31-Jul	Su	New Moon	16	32	47	55	53	40	16	-14	-43	-66	-78	-77	-61	-36	-6	20	39	48	45	33	17	1	-8	-9

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

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

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## Hourly Astronomical Tide Level at Hitachi port, Ibaraki 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	-72	-63	-42	-16	11	32	43	45	37	24	10	0	-2	5	20	39	55	64	62	48	24	-4	-32	-54	
2-Oct	Su	-66	-66	-55	-36	-13	9	25	34	35	29	20	11	6	9	18	32	47	58	61	54	37	15	-10	-33	
3-Oct	M	-50	-58	-57	-46	-30	-12	5	18	25	26	24	19	14	13	17	26	37	47	53	52	43	28	9	-11	
4-Oct	Tu	First Quarter	-29	-41	-47	-46	-39	-27	-12	1	12	19	22	22	20	18	18	21	27	34	40	43	41	34	22	8
5-Oct	W		-7	-20	-31	-37	-37	-33	-25	-14	-3	8	16	22	24	24	22	20	20	22	25	29	31	31	27	21
6-Oct	Th		12	1	-10	-21	-28	-32	-31	-25	-15	-4	8	19	26	29	27	23	18	14	12	13	16	20	23	25
7-Oct	F		23	18	10	-2	-14	-24	-30	-31	-25	-14	-1	13	25	32	33	29	20	10	2	-2	-1	4	13	21
8-Oct	Sa		27	29	26	17	3	-12	-24	-31	-30	-23	-10	7	22	34	39	36	26	12	-2	-13	-17	-13	-3	11
9-Oct	Su		24	33	37	32	20	4	-12	-25	-31	-28	-17	-1	17	33	42	42	34	17	-1	-18	-28	-29	-21	-5
10-Oct	M		14	30	41	43	35	20	2	-15	-26	-29	-22	-8	12	30	43	47	41	25	4	-18	-34	-41	-37	-23
11-Oct	Tu		-1	21	38	47	46	35	17	-2	-18	-26	-24	-12	6	26	41	49	47	33	12	-13	-35	-48	-50	-39
12-Oct	W	Full Moon	-19	6	29	45	51	45	31	12	-6	-18	-22	-15	1	21	39	50	51	41	21	-5	-31	-50	-58	-53
13-Oct	Th		-36	-11	16	37	49	50	41	24	6	-9	-16	-14	-2	16	35	49	54	47	30	4	-23	-46	-60	-61
14-Oct	F		-50	-27	-1	24	42	50	46	34	17	1	-9	-11	-3	12	31	46	54	52	38	15	-12	-38	-56	-64
15-Oct	Sa		-59	-42	-17	9	30	43	46	39	26	11	-1	-6	-3	9	25	42	52	54	45	26	0	-26	-48	-61
16-Oct	Su		-63	-52	-32	-8	15	33	41	40	31	19	7	0	0	7	20	36	48	53	48	34	12	-13	-36	-53
17-Oct	M		-60	-57	-44	-23	-1	18	31	36	33	24	15	7	4	7	17	29	41	49	48	39	22	1	-21	-40
18-Oct	Tu		-52	-55	-49	-35	-17	2	18	27	30	27	20	14	10	10	15	23	33	41	44	40	29	13	-6	-25
19-Oct	W		-39	-48	-49	-42	-30	-14	2	14	22	25	23	20	16	14	15	19	26	32	36	36	31	21	7	-8
20-Oct	Th	Last Quarter	-23	-34	-41	-42	-38	-28	-15	-1	11	19	23	24	22	20	18	17	19	22	25	27	27	23	16	7
21-Oct	F		-4	-16	-27	-35	-38	-35	-28	-16	-3	9	19	25	27	26	22	18	14	12	12	13	16	19	19	17
22-Oct	Sa		12	4	-7	-19	-29	-35	-35	-29	-17	-3	11	23	30	32	28	21	12	4	-2	-3	-1	6	13	20
23-Oct	Su		23	21	14	2	-12	-26	-34	-35	-28	-15	1	18	30	36	35	27	14	0	-13	-20	-21	-14	-2	12
24-Oct	M		25	32	32	24	10	-8	-23	-32	-33	-24	-8	11	28	39	42	36	21	2	-18	-33	-40	-38	-25	-6
25-Oct	Tu		15	32	42	42	33	15	-4	-20	-29	-27	-16	3	23	40	48	46	32	10	-16	-39	-54	-59	-51	-32
26-Oct	W		-6	19	39	50	49	37	18	-2	-17	-23	-18	-3	18	38	51	54	44	23	-5	-35	-58	-72	-72	-58
27-Oct	Th	New Moon	-33	-4	24	45	54	51	37	18	0	-12	-15	-6	12	33	51	59	56	39	12	-21	-51	-74	-84	-79
28-Oct	F		-60	-31	0	28	47	54	49	35	17	2	-7	-5	8	27	46	60	63	52	30	-1	-35	-63	-82	-87
29-Oct	Sa		-78	-56	-26	4	29	45	49	43	30	15	4	0	6	20	39	55	63	60	45	19	-13	-44	-69	-83
30-Oct	Su		-84	-71	-48	-20	7	28	40	43	36	25	13	6	6	14	29	45	58	61	53	35	9	-21	-48	-68
31-Oct	M		-77	-74	-60	-38	-13	9	26	34	35	29	20	12	8	11	20	33	46	54	54	43	25	1	-24	-46

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## Hourly Astronomical Tide Level at Hitachi port, Ibaraki 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	-61	-66	-61	-48	-29	-8	10	22	29	29	24	17	11	10	13	21	32	41	46	43	32	16	-4	-23	
2-Nov	W	-40	-50	-53	-48	-36	-21	-4	10	20	25	25	22	16	12	10	12	18	25	31	34	31	22	10	-4	
3-Nov	Th	First Quarter	-18	-30	-38	-40	-36	-27	-15	-1	11	19	24	25	22	16	11	7	7	9	14	18	21	20	16	9
4-Nov	F	0	-11	-20	-27	-29	-27	-20	-10	1	13	21	26	27	23	16	8	1	-3	-3	0	5	10	13	14	
5-Nov	Sa	11	6	-2	-11	-18	-22	-21	-16	-6	5	17	26	30	29	23	13	1	-9	-16	-17	-13	-5	4	12	
6-Nov	Su	17	17	14	6	-4	-13	-18	-18	-12	-2	11	23	31	35	31	21	6	-10	-23	-30	-30	-23	-11	2	
7-Nov	M	15	23	25	21	12	0	-10	-15	-15	-8	4	18	30	37	38	30	14	-5	-24	-38	-44	-41	-29	-12	
8-Nov	Tu	6	21	30	32	26	14	2	-9	-13	-11	-1	12	27	38	42	37	24	3	-20	-40	-53	-55	-47	-29	
9-Nov	W	-7	14	30	38	37	27	14	1	-8	-11	-5	7	22	36	44	43	33	13	-12	-37	-56	-65	-61	-46	
10-Nov	Th	-24	1	23	37	42	38	26	11	-1	-8	-7	3	17	33	44	48	41	23	-2	-29	-53	-68	-71	-62	
11-Nov	F	Full Moon	-41	-15	11	31	43	44	35	22	8	-2	-6	0	12	28	42	49	47	33	11	-17	-45	-65	-76	-73
12-Nov	Sa	-57	-32	-4	20	37	44	41	30	16	4	-3	-2	8	22	38	49	51	42	23	-4	-32	-57	-73	-78	
13-Nov	Su	-68	-48	-21	6	27	40	42	36	24	11	2	-1	4	16	31	45	51	47	33	10	-18	-45	-65	-76	
14-Nov	M	-74	-60	-37	-11	13	31	39	38	30	18	8	2	3	11	24	38	47	49	40	22	-2	-29	-52	-68	
15-Nov	Tu	-74	-67	-50	-27	-2	18	31	36	33	24	14	6	3	7	16	29	40	45	42	30	11	-12	-36	-55	
16-Nov	W	-66	-67	-58	-40	-18	3	20	30	32	28	20	12	6	6	10	19	29	37	39	33	20	2	-19	-38	
17-Nov	Th	-53	-60	-58	-48	-31	-12	7	20	28	29	25	18	11	6	6	10	17	24	29	29	23	12	-3	-20	
18-Nov	F	-35	-46	-51	-49	-39	-24	-7	9	21	27	27	23	16	10	5	3	5	9	15	19	19	16	8	-3	
19-Nov	Sa	Last Quarter	-15	-28	-37	-41	-39	-31	-18	-3	11	22	27	27	23	15	7	0	-5	-6	-3	2	7	11	12	9
20-Nov	Su	2	-7	-17	-26	-31	-31	-24	-13	1	15	25	30	29	23	12	0	-11	-19	-22	-19	-13	-4	5	11	
21-Nov	M	14	11	4	-6	-15	-22	-23	-18	-7	7	21	31	34	31	22	7	-10	-26	-36	-40	-37	-26	-12	3	
22-Nov	Tu	15	22	22	16	5	-6	-14	-16	-11	0	15	29	38	39	33	18	-2	-25	-44	-56	-59	-52	-36	-16	
23-Nov	W	5	21	31	32	25	13	1	-8	-10	-4	9	24	38	45	44	32	12	-14	-41	-62	-74	-75	-63	-42	
24-Nov	Th	-16	9	28	39	40	31	18	5	-3	-4	4	18	34	47	52	46	29	3	-27	-56	-78	-88	-85	-68	
25-Nov	F	New Moon	-43	-13	14	34	44	43	33	19	7	0	1	11	27	43	54	56	45	24	-7	-40	-69	-88	-95	-88
26-Nov	Sa	-67	-39	-8	19	38	45	42	32	18	7	2	6	18	35	51	59	56	41	16	-17	-49	-77	-93	-96	
27-Nov	Su	-84	-61	-31	-1	23	39	44	39	27	14	5	3	10	24	41	54	59	52	34	7	-25	-56	-79	-91	
28-Nov	M	-89	-75	-50	-21	6	26	38	39	32	21	9	2	3	12	27	43	53	55	45	25	-2	-32	-58	-76	
29-Nov	Tu	-83	-78	-61	-37	-11	12	28	35	34	26	14	4	0	3	13	27	40	48	46	35	15	-10	-35	-56	
30-Nov	W	-69	-71	-63	-46	-23	-1	17	29	32	28	19	8	0	-3	1	11	23	34	38	35	24	6	-15	-35	

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## Hourly Astronomical Tide Level at Hitachi port, Ibaraki 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-Dec	Th	-50	-58	-57	-47	-30	-11	7	21	29	29	24	14	4	-3	-6	-2	6	16	24	27	23	13	-1	-17	
2-Dec	F	First Quarter	-31	-41	-45	-42	-32	-17	-1	14	24	29	27	20	10	1	-7	-10	-8	-2	6	12	14	12	6	-4
3-Dec	Sa		-14	-24	-30	-32	-28	-19	-6	7	19	26	29	26	18	8	-3	-12	-16	-16	-12	-6	0	4	5	3
4-Dec	Su		-2	-8	-15	-19	-20	-17	-9	1	12	22	28	29	25	16	5	-8	-19	-26	-28	-24	-18	-10	-2	3
5-Dec	M		5	4	0	-5	-9	-11	-8	-2	6	16	25	30	30	25	14	0	-15	-29	-37	-40	-36	-27	-15	-4
6-Dec	Tu		5	11	12	9	4	-1	-4	-3	2	10	20	28	32	31	24	10	-7	-26	-41	-50	-52	-45	-32	-16
7-Dec	W		0	12	19	20	16	10	3	-1	0	5	14	24	32	35	32	21	3	-18	-39	-55	-63	-61	-50	-32
8-Dec	Th		-12	7	20	27	26	21	12	4	0	2	8	19	30	37	38	31	15	-7	-31	-53	-68	-73	-66	-49
9-Dec	F		-27	-4	16	29	33	30	21	11	3	0	4	13	25	36	42	39	27	6	-20	-46	-67	-79	-78	-66
10-Dec	Sa	Full Moon	-45	-19	6	25	35	36	29	19	8	1	1	7	19	32	42	45	37	20	-5	-33	-60	-78	-85	-79
11-Dec	Su		-62	-36	-8	15	32	38	35	26	14	4	-1	2	12	26	39	46	45	33	11	-18	-47	-71	-85	-87
12-Dec	M		-75	-53	-25	2	23	36	38	32	21	9	0	-1	5	17	32	44	48	41	25	0	-30	-58	-78	-87
13-Dec	Tu		-83	-67	-42	-13	12	29	37	36	27	14	3	-3	-1	8	22	36	45	45	35	15	-12	-40	-65	-80
14-Dec	W		-84	-75	-55	-29	-2	19	33	36	31	20	8	-2	-5	-1	10	24	36	42	38	26	5	-21	-47	-67
15-Dec	Th		-77	-76	-63	-42	-16	8	25	34	33	26	13	2	-6	-7	-1	10	22	32	35	29	16	-4	-27	-48
16-Dec	F		-63	-69	-64	-49	-28	-4	16	29	33	30	20	7	-4	-10	-10	-5	6	16	24	25	20	8	-10	-28
17-Dec	Sa		-45	-55	-56	-49	-34	-14	6	22	31	32	25	14	1	-9	-16	-16	-11	-3	6	13	15	11	2	-10
18-Dec	Su	Last Quarter	-24	-36	-42	-42	-34	-20	-2	14	26	32	30	21	9	-4	-16	-23	-25	-22	-15	-7	1	5	5	1
19-Dec	M		-7	-15	-23	-28	-26	-19	-7	7	20	30	32	29	19	5	-10	-23	-33	-38	-36	-30	-21	-11	-2	3
20-Dec	Tu		4	1	-4	-10	-13	-13	-7	2	14	25	33	34	29	18	2	-16	-33	-46	-53	-52	-46	-34	-20	-6
21-Dec	W		4	11	12	8	3	-1	-2	1	9	19	29	36	37	31	18	-1	-23	-43	-59	-68	-68	-59	-44	-25
22-Dec	Th		-6	9	19	22	19	13	7	4	6	13	23	34	40	41	33	17	-5	-30	-54	-73	-82	-81	-69	-49
23-Dec	F		-25	-2	16	27	30	26	18	10	6	7	15	27	38	45	45	35	16	-10	-39	-65	-84	-92	-88	-72
24-Dec	Sa		-48	-21	4	24	34	35	28	18	8	4	7	16	30	43	50	48	36	13	-16	-47	-74	-92	-98	-90
25-Dec	Su	New Moon	-70	-42	-13	12	30	38	35	25	13	4	0	5	17	33	47	53	49	33	8	-24	-55	-81	-95	-97
26-Dec	M		-84	-61	-31	-3	21	35	38	32	19	6	-3	-4	4	19	36	49	53	46	28	0	-32	-61	-83	-93
27-Dec	Tu		-89	-73	-47	-18	9	28	37	35	25	10	-3	-10	-8	3	20	37	48	49	39	19	-9	-39	-65	-81
28-Dec	W		-85	-76	-56	-30	-3	19	32	36	29	16	0	-11	-16	-11	2	20	35	43	41	29	8	-18	-44	-64
29-Dec	Th		-74	-72	-59	-37	-12	11	27	34	32	21	6	-8	-18	-20	-13	1	17	30	34	30	17	-3	-25	-45
30-Dec	F		-59	-62	-56	-40	-18	4	21	32	33	26	13	-2	-15	-23	-22	-14	-1	12	21	23	18	6	-11	-29
31-Dec	Sa		-42	-49	-48	-38	-21	-2	16	28	33	30	21	7	-8	-20	-26	-25	-18	-7	4	10	12	7	-3	-16

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