4.6.4 Sand Drift

Two optical sand-surface meters (SPM-7) were installed at Stations No. 6 and 15 at Sichon (water depth : 2.5 – 3.0 m), Sakom and Thepha (depth : 1.0 – 1.5 m) areas as shown in Figures 4.6.2-1 to 4.6.2-3 for the period of about 15 days together with the wave/current observation. The meter is designed for precision measurement in the movement of seabed surface.

Results of the seabed movement at stations No. 6 and No. 15 in Sichon (water depth: 2.5–3.0 m), Sakom (depth: 1.0–1.5 m) and Thepha (depth: 1.0–1.5 m) areas are shown in Figures 4.6.4-1 and 4.6.4-2, Figures 4.6.4-3 and 4.6.4-4, and Figures 4.6.4-5 and 4.6.4-6, respectively.

The result of seabed movement is summarized in Table 4.6.4-1.

Table 4.6.4-1 Summary of Seabed Movement during February to April, 2001

Item	Sichon		Sakom		Thepha	
	No. 6 (south-side)	No. 15 (north-side)	No. 6 (east-side)	No. 15 (west-side)	No. 6 (east-side)	No. 15 (west-side)
Max. Amount of Change during Survey Period	5 cm (14 days)	6 cm (14 days)	17 cm (5 days)	12 cm (14 days)	17 cm (8 days)	30 cm (9 days)
Max. Amount of Change a day	3 cm (Apr.3-4)	4 cm (Apr. 2)	37 cm (Mar.10)	27 cm (Mar.11)	31 cm (Mar.3-4)	28 cm (Mar.5-6)
Trend of Change during Survey Period	Deposi-tion	_	_	Erosion	Deposi-tion	Erosion

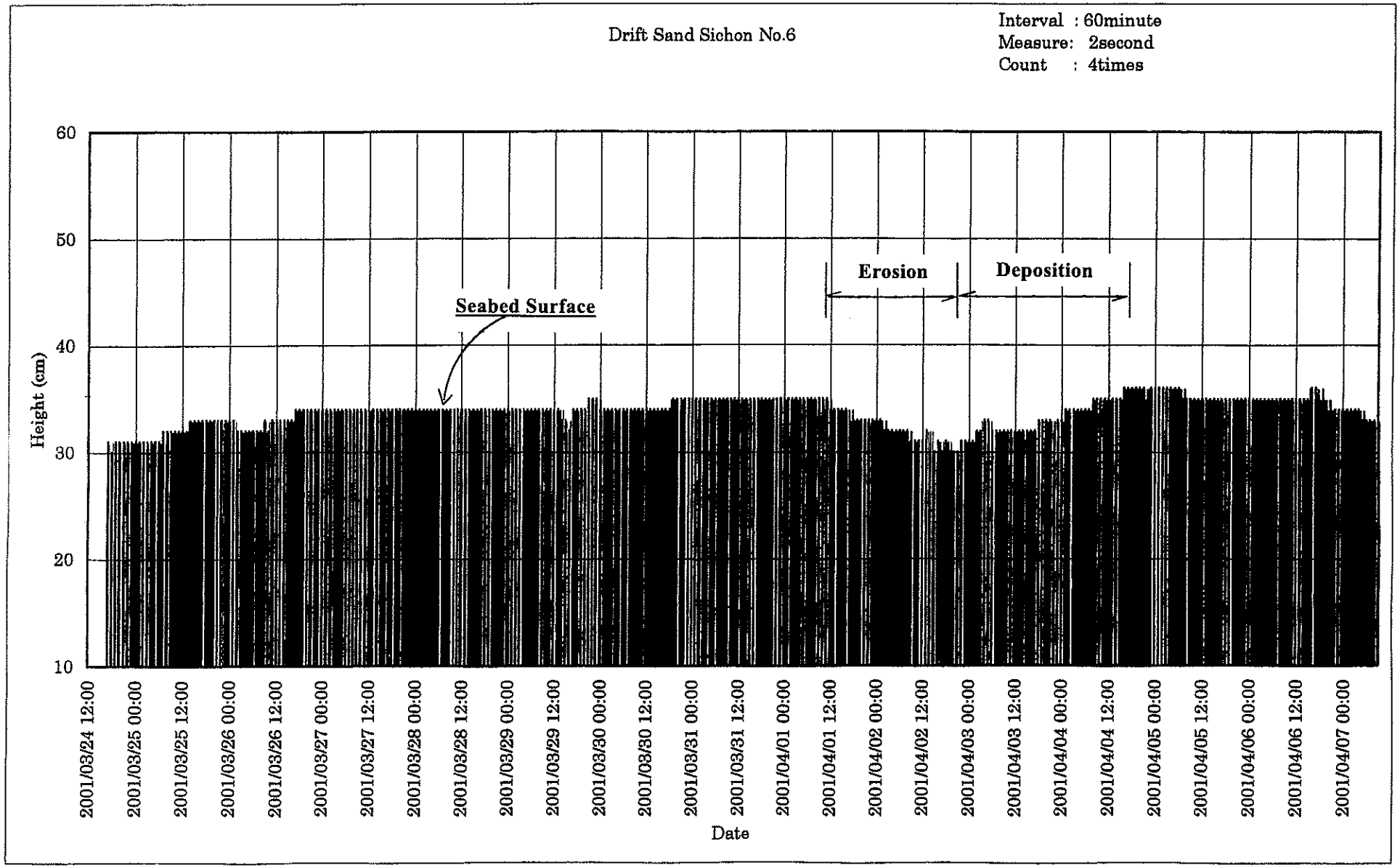

Figure 4.6.4-1 Change of Seabed in Sichon (Station No. 6)

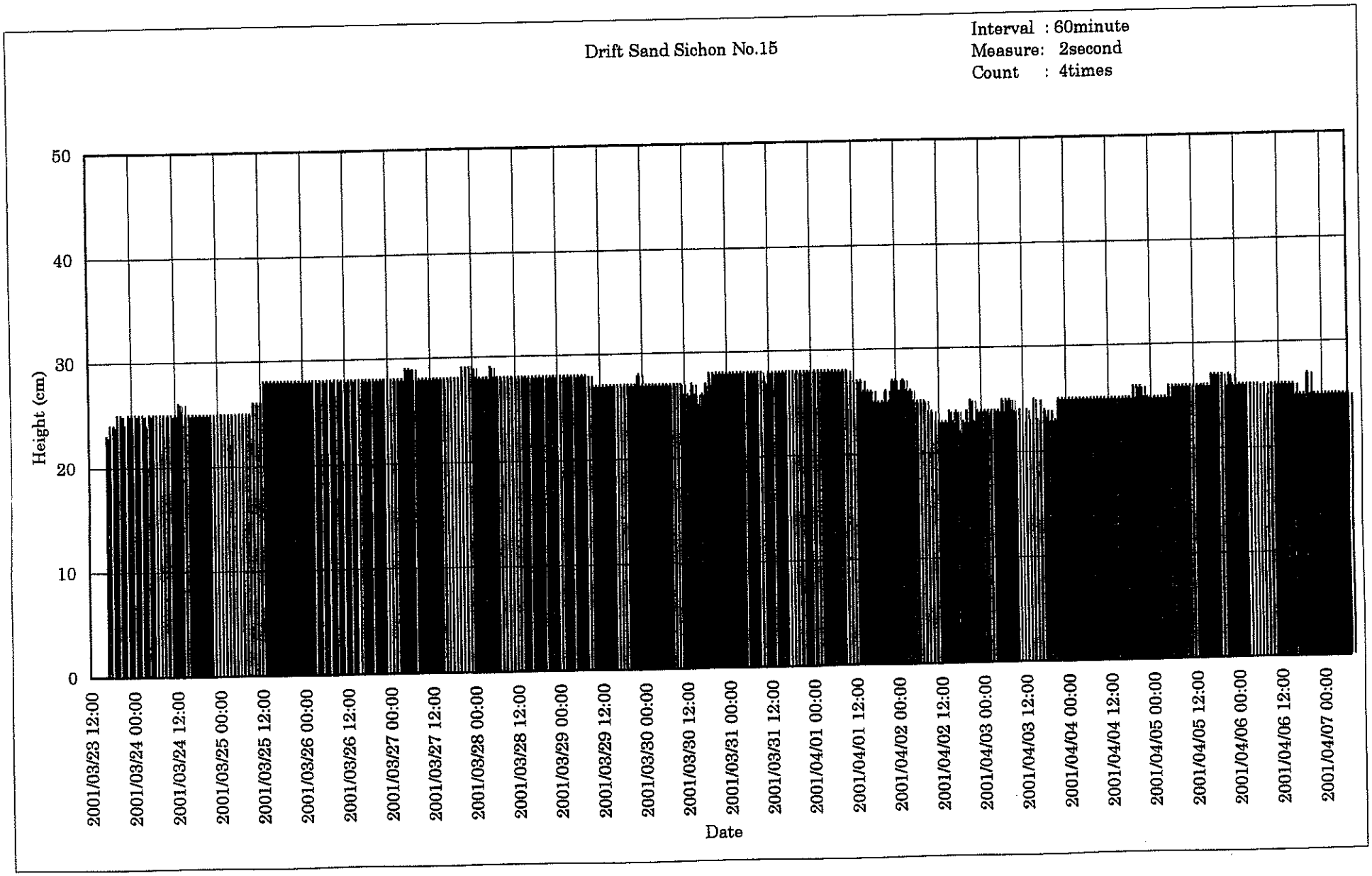

Figure 4.6.4-2 Change of Seabed in Sichon (Station No. 15)

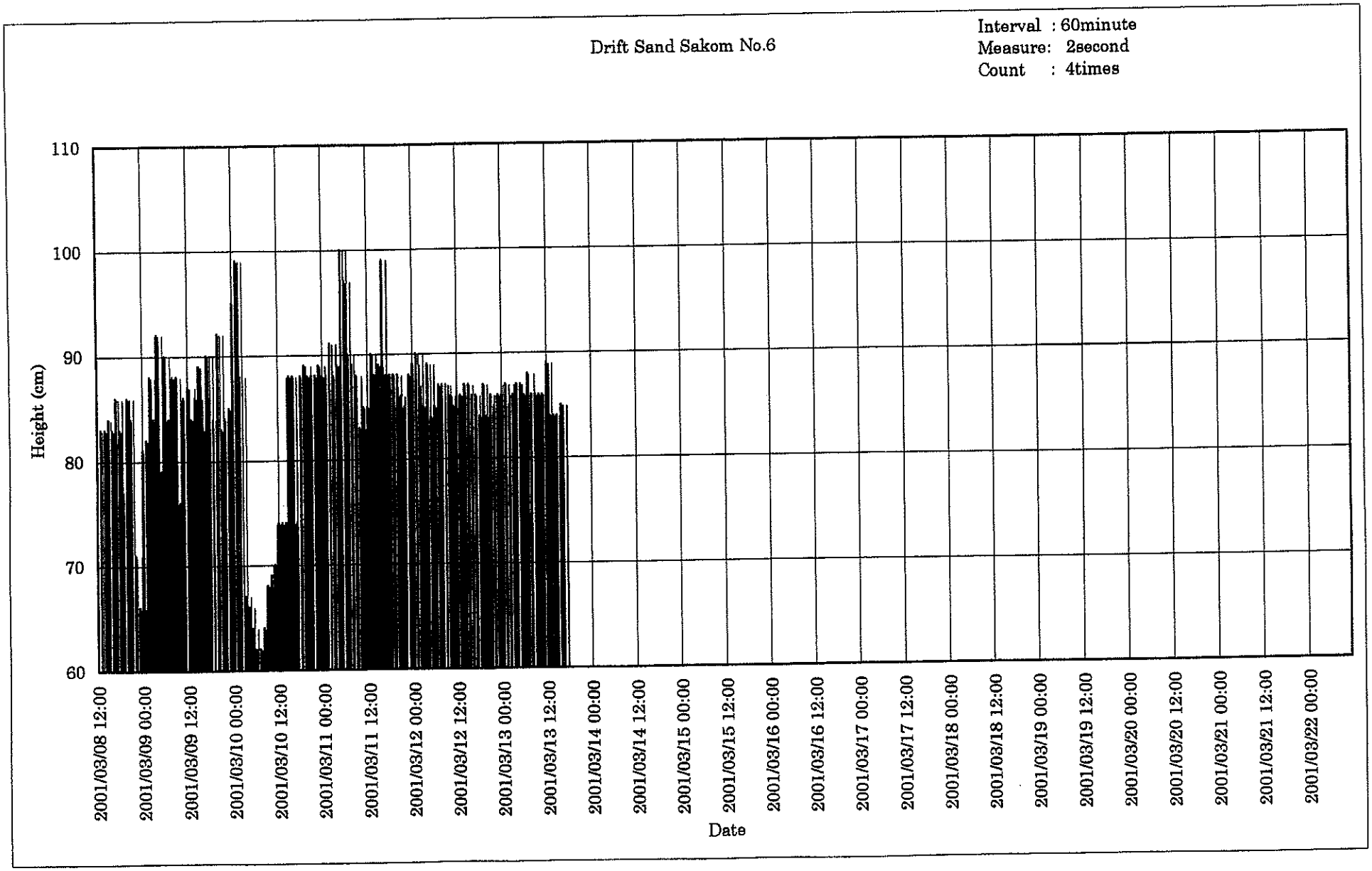

Figure 4.6.4 -3 Change of Seabed in Sakom (Station No. 6)

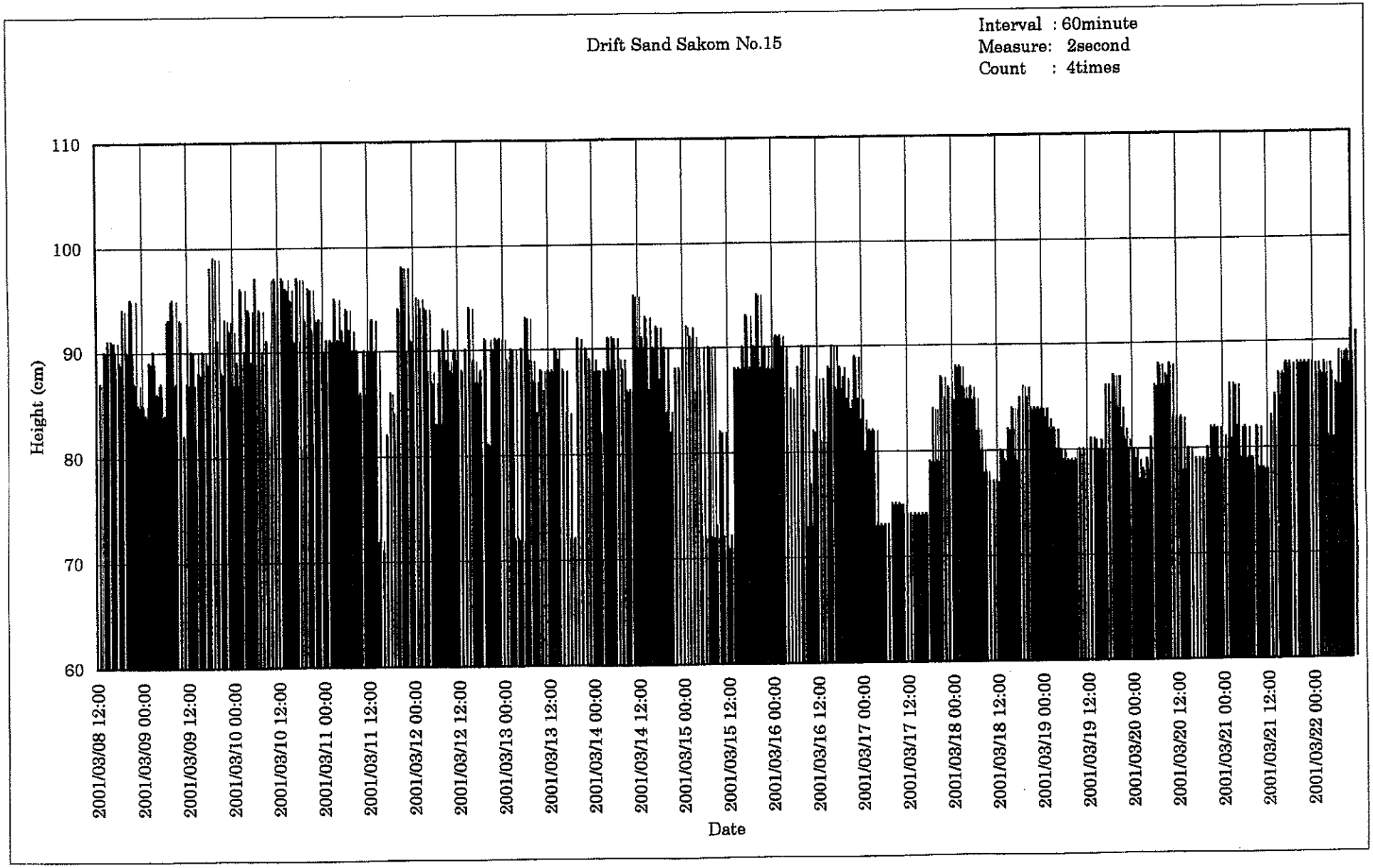

Figure 4.6.4-4 Change of Seabed in Sakom (Station No. 15)

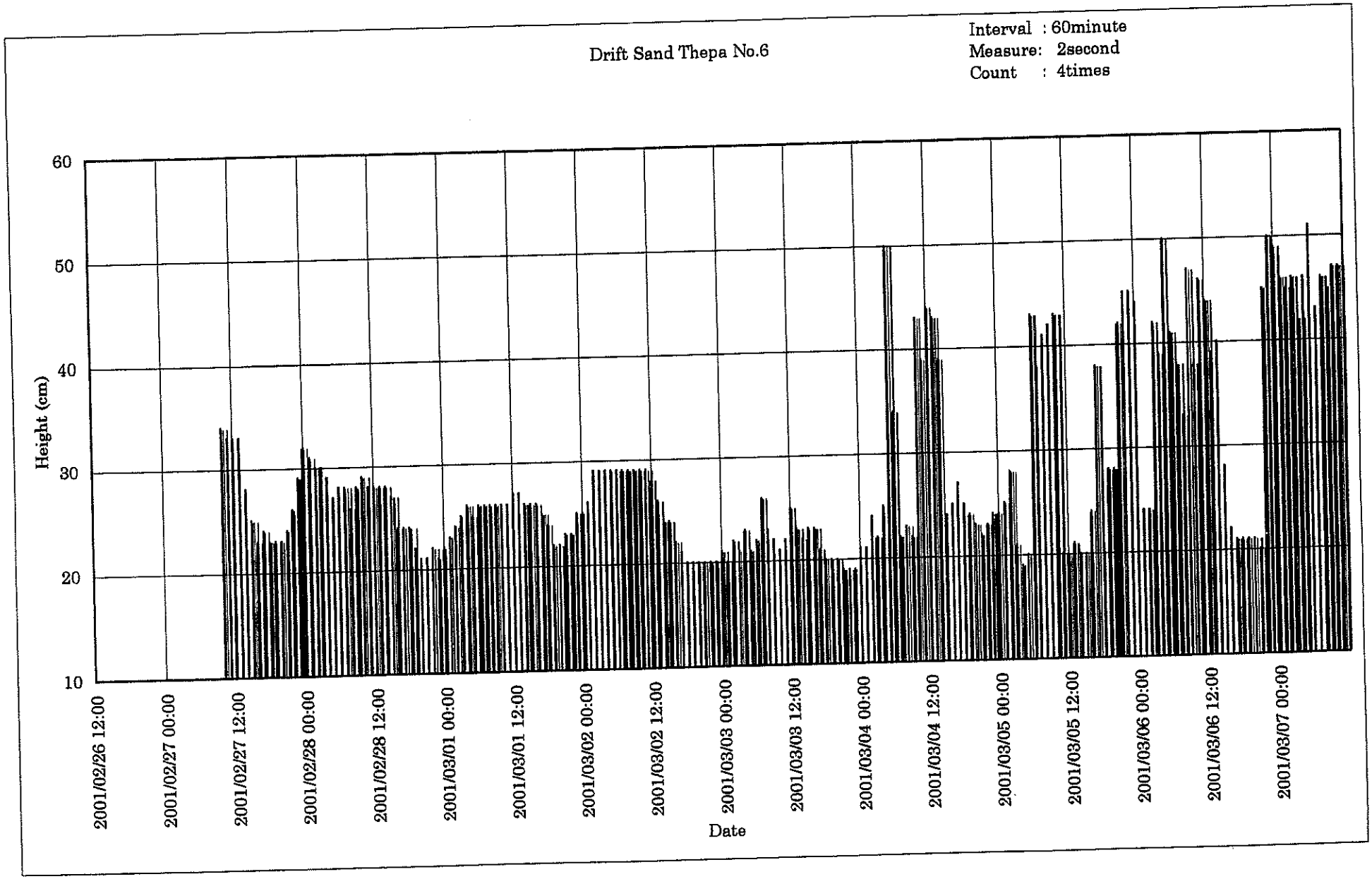

Figure 4.6.4-5 Change of Seabed in Thepha (Station No. 6)

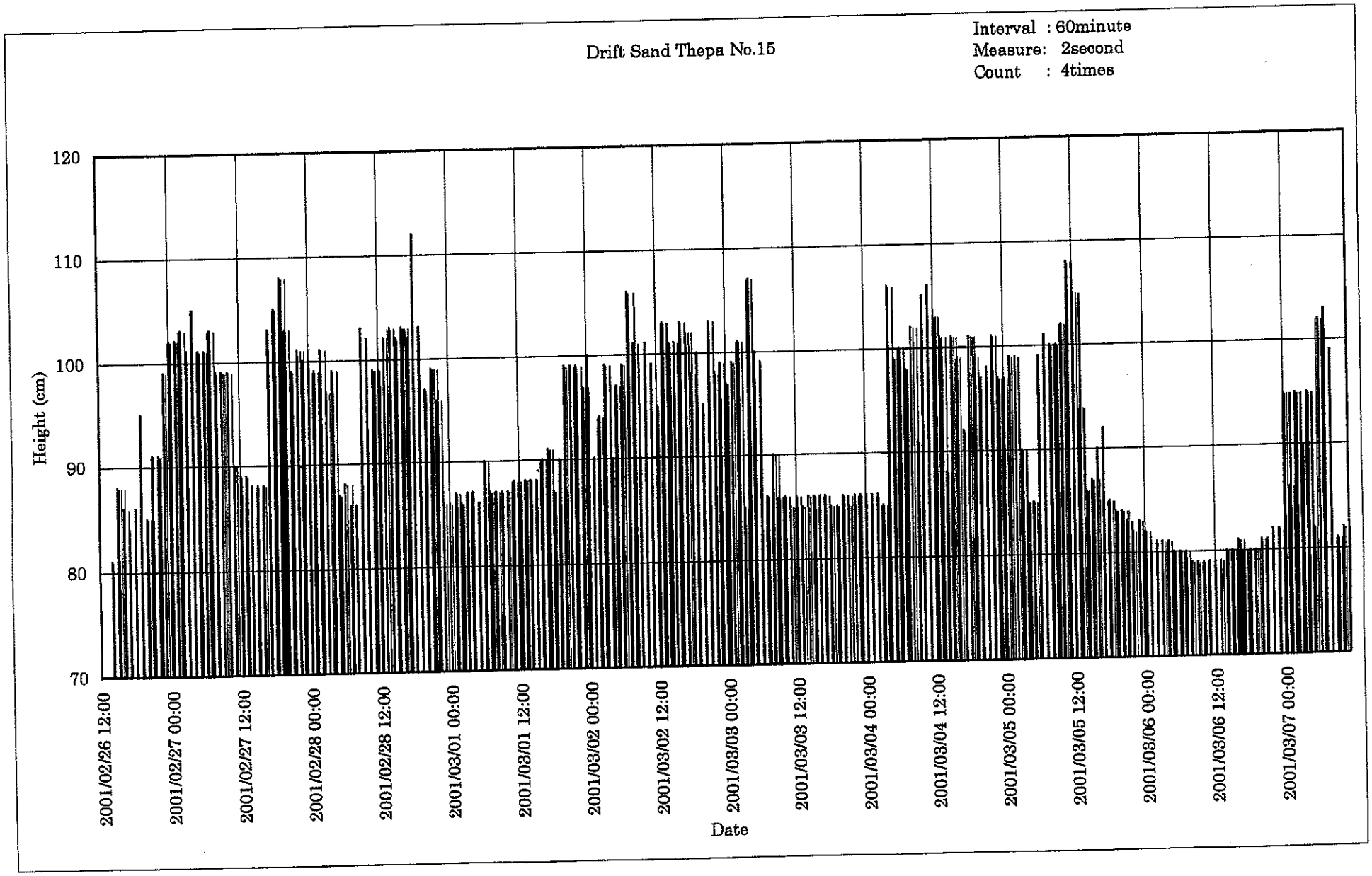

Figure 4.6.4-6 Change of Seabed in Thepha (Station No. 15)

4.6.5 Water Quality

1) Salinity, Water Temperature, Turbidity

Observation of salinity, turbidity and water temperature was performed every one hour at stations No. 1, No. 6 and No. 8 in Sichon, Sakom and Thepha areas for the period of about 15 days using a portable water quality meter as shown in Figures 4.6.2-1 to 4.6.2-3.

The observation was carried out at two layers (middle and bottom) at each station in Sichon, while it was done at two layers at No. 1 and one layer (bottom) at No. 6 and No. 8 in Sakom and Thepha.

The summary of water quality is shown in Table 4.6.5-1.

Table 4.6.5-1 Summary of Water Quality Observation during February to April, 2001

Parameter	Station						Remarks
	No. 1		No. 6		No. 8		
Sichon	Middle Layer	Bottom Layer	Middle Layer	Bottom Layer	Middle Layer	Bottom Layer	
Salinity (ppt)	0 – 33	7 – 33	24 – 35	17 – 35	25 – 35	25 – 35	Mar.23 – Apr. 7
Turbidity(ppm)	110(max)	173(max)	34(max)	178(max)	65(max)	115(max)	
Temp. (℃)	26.7-32.6	27.6-32.3	27.9-32.2	28.0-32.0	27.8-31.8	27.6-31.6	
Sakom	Middle Layer	Bottom Layer	Bottom Layer		Bottom Layer		
Salinity (ppt)	6 – 30	15 – 33	26 – 35		27 – 34		Mar. 8 – Mar.22
Turbidity(ppm)	137(max)	200(max)	212 (max)		152 (max)		
Temp. (℃)	27.0-30.0	27.1-30.0	27.1-31.3		27.3-30.3		
Thepha	Middle Layer	Bottom Layer	Bottom Layer		Bottom Layer		
Salinity (ppt)	8 – 35	8 – 35	25 – 36		27 – 37		Feb.21 – Mar. 7
Turbidity(ppm)	106(max)	148(max)	161 (max)		276 (max)		
Temp. (℃)	27.5-30.7	27.8-30.8	27.3-31.2		27.1-30.2		

2) Suspended Solids

Analysis for suspended solids was performed using water samples at stations No.7, 3 and 5 points in Pak Phanang, Pak Nakhon and Pattani channels respectively as shown in Figure 4.6.2-4. Sampling of seawater from three layers (surface, middle and bottom layers) was performed at each point.

Results of analysis for suspended solids are shown in Table 4.6.5-2.

Table 4.6.5-2 Results of Water Quality Analysis (Suspended Solids)

Name of Channel	Layer			Date of Sampling
	Surface	Middle	Bottom	
Pak Phanang				
No. 1	13 mg/l	25 mg/l	18 mg/l	Mar. 10, 2001
No. 2	30	86	565	
No. 3	109	830	1,440	
No. 4	7	115	47	Mar. 28, 2001
No. 5	9	20	9	
No. 6	8	28	19	
No. 7	6	20	50	
Pak Nakhon				Mar. 10, 2001
No. 1	387 mg/l	418 mg/l	556 mg/l	
No. 2	131	915	1,405	
No. 3	193	508	666	
Pattani				Mar. 5, 2001
No. 1	24 mg/l	32 mg/l	508 mg/l	
No. 2	28	107	20,935	
No. 3	13	39	3,403	
No. 4	18	54	61	
No. 5	9	72	73	

Note: Surveyed by JICA Study Team

4.6.6 River Flow

Observation of river flow was performed every 30 minutes at stations No. 1 in the river-mouth of Sichon, Sakom and Thepha areas as shown in Figures 4.6.2-1 to 4.6.2-3 for the period of about 15 days using an electromagnetic current meter. The observation was carried out at the middle layer at No. 1 in each area.

The maximum flow rates of outflow and inflow at each river-mouth is shown in Table 4.6.6-1.

Table 4.6.6-1 Summary of River Flow Measurement during February to April, 2001

Date	Time	River Flow				Water Level (m)	Cross Section (m^2)	Max. Flow Rate (m^3/sec)
		Speed (m/sec)	Direction (degree)	North C. (m/sec)	East C. (m/sec)			
Sichon								
Mar. 23	14:30	0.28	152.2	–0.25	0.13	0.78	400.29	+112.48
Mar. 28	20:30	0.19	294.3	0.08	–0.17	0.59	378.67	– 71.19
Sakom								
Mar. 11	00:00	0.51	31.0	0.44	0.26	1.15	254.94	+130.53
Mar. 12	09:00	0.23	191.1	–0.22	–0.04	1.11	251.18	– 56.77
Thepha								
Feb. 24	03:00	0.46	5.1	0.46	0.04	0.75	404.16	–187.53
Feb. 27	09:00	0.40	193.9	–0.39	–0.10	1.29	474.82	+188.50

Note : North C. : North Component, East C. : East Component
Water Level : meters above Lowest Low Water
Max. Flow Rate : plus (+) means Outflow Rate, minus (–) means Inflow Rate

4.6.7 Tidal Observation

Tidal observation was performed at the river-mouth of Sichon, Sakom and Thepha areas for the period of about 15 days using an automatic recording tidal gauge (Zeba Hydrometer). The level of the gauge was referred to the existing benchmark.

The summary of tidal observation is shown in Table 4.6.7-1.

Table 4.6.7-1 Summary of Tidal Observation during February to April, 2001

unit : meter

Item	Sichon	Sakom	Thepha
Highest Water Level : HWL	1.70	1.47	1.59
Mean High Water Level : MHWL	1.16	1.15	1.40
Mean Low Water Level : MLWL	0.64	0.70	1.00
Lowest Water Level :LWL	0.48	0.54	0.72
Mean Range of MHWL & MLWL	0.52	0.45	0.40
Maximum Range	1.22	0.93	0.87

Note : All levels are referred to the Lowest Low Water Level.