THE KOREAN JOURNAL OF QUATERNARY RESEARCH Vol. 18. No. 2(2004) 19-22

Seasonal Variation and Preservation Potential of Tidal-Flat Sediments on the Tidal Flat of Gomso Bay, West Coast of Korea

Jin-Ho Chang

Department of Marine Resources, Mokpo National University

Abstract : Seasonal changes of topography, sediment grain size and accumulation rate on the Gomso-Bay tidal flat(Fig. 1), west coast of Korea, have been studied in order to understand the seasonal accumulation pattern and preservation potential of tidal-flat sediments.

Seasonal levelings across the tidal flat show that the landward movement of both intertidal sand shoals and cheniers accelerates during the winter and typhoon period, but it almost stops in summer when mud deposition is instead predominant on the middle to upper tidal flat. Seasonal variations of mean grain size were largest on the upper part of middle tidal flat where summer mud layers were eroded during the winter and typhoon periods(Fig. 2). Measurements of accumulation depths from sea floor to basal plate reveal that accumulation rates were seasonally controlled according to the elevation of tidal-flat surface(Table 1): the upper flat, where the accumulation rate of summer was generally higher than that of winter, was characterized by a continuous deposition throughout the entire year, whereas on the middle flat, sediment accumulations were concentrated in winter relative to summer, and were intermittently eroded by typhoons. The lower tidal flat were deposited mostly in winter and eroded during summer typhoons. Cancores taken across the tidal flat reveal that sand-mud interlayers resulting from such seasonal changes of energy regime are preserved only in the upper part of the deposits and generally replaced by storm layers downcore(Fig. 3).

Based on above results, it is suggested that the storm deposits formed by winter storms and typhoons would consist of the major part of the Gomso-Bay deposits(Fig. 4).

Key Words : tidal flat, seasonal change, mean grain size, accumulation rate, preservation potential, storm deposits

References

Chang, J.H., Park, Y.A. and Han, S.J., 1996. Late Quaternary stratigraphy and sea-level change in the Gomso-Bay tidal flat, west coast of Korea. The sea- J. Korean Society of Oceanography, 1, 59-72.

Nelson, C.H., 1982. Modern shallow water graded sand layers from storm surges, Bering Shelf: a mimic of Bouma sequences and turbidite systems. J. Sediment. Petrol., 52, 537-545.

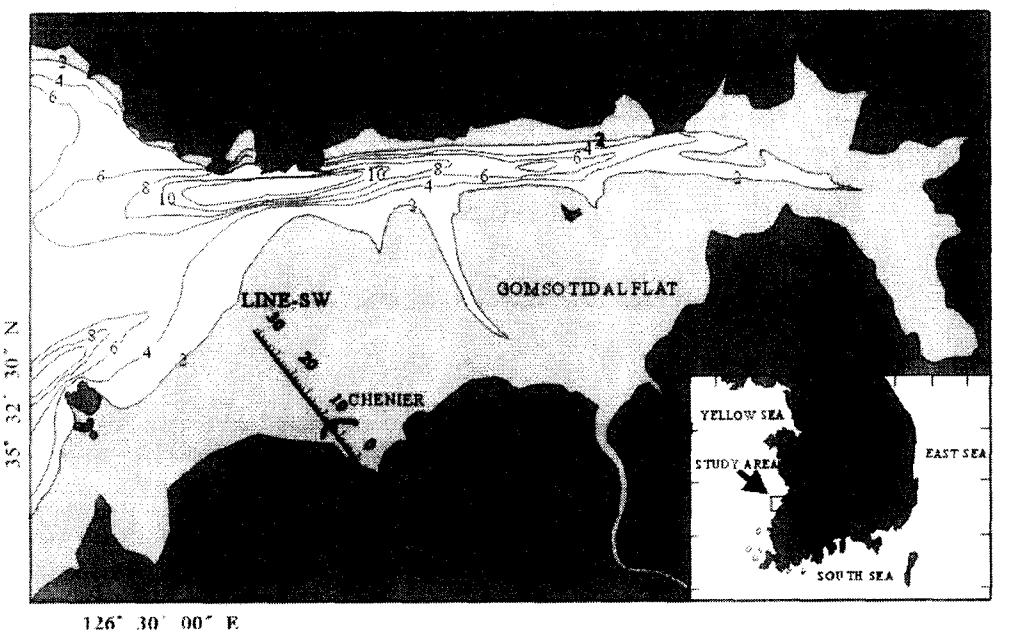

Fig. 1. Outline map of Gomso Bay with the tidal flat defined by a 2-meter isobath. Precise leveling and sediment sampling were conducted at 100 m intervals along the Line SW.

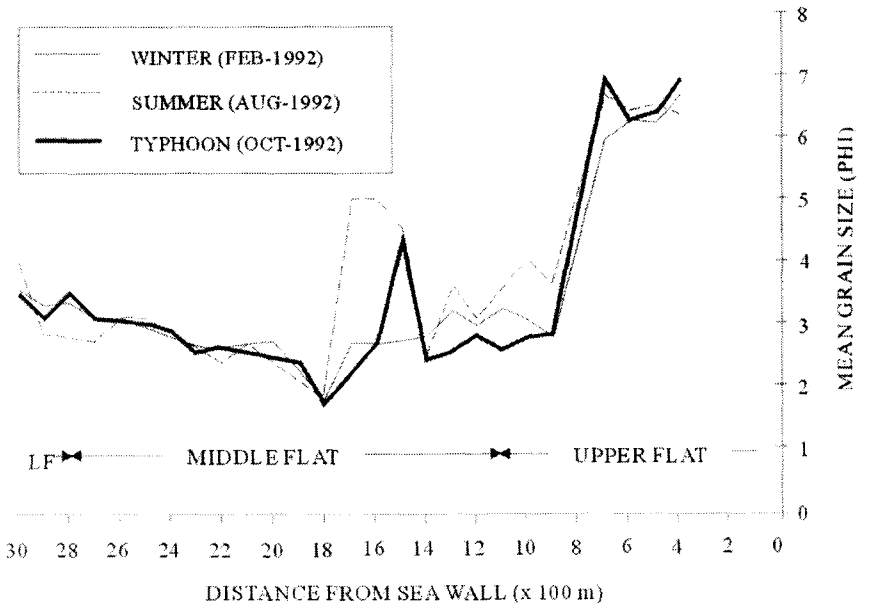

Fig. 2. Seasonal variation of mean grain size along the Line SW. Note the significant seasonal changes in mean grain size on the upper middle to lower upper tidal flat.

Table 1. Seasonal and annual rates of sediment accumulation along Line-SW.

Environment	Station no.	Seasonal accumulation rate (mm/mon)				Duration	Depth difference	Annual accumulation rate
		Spring	Summer	Autumn*	Winter			
		(Feb.-Jun. '92)	(Jun.-Aug. '92)	(Aug.-Dec. '92)	(Dec. '92-Mar. '93)	(dates)	(mm)	(mm/yr)
Upper flat	SW-2	-	5.3	2.1	0.5	277	22.0	29.0
	SW-6	1.0	7.5	-	-	395	31.9	29.5
	Average	1.0	6.4	2.1	0.5	336	27.0	29.3
Middle flat	SW-11	1.5	11.5	-3.2	3.6	395	28.7	26.5
	SW-13	2.4	8.5	-13.1	9.6	395	2.9	2.7
	SW-15	0.8	-0.7	5.9	32.6	395	120.1	111.0
	SW-17	3.7	0.1	6.4	-3.5	395	31.1	28.7
	SW-25	13.9	2.7	-3.4	6.9	395	67.8	62.7
	Average	4.5	4.4	-1.5	9.8	395	50.1	46.3
Lower flat	SW-31	14.9	-0.6	-15.1	18.7	395	50.3	46.5

* Note that typhoon Ted has passed during the period.

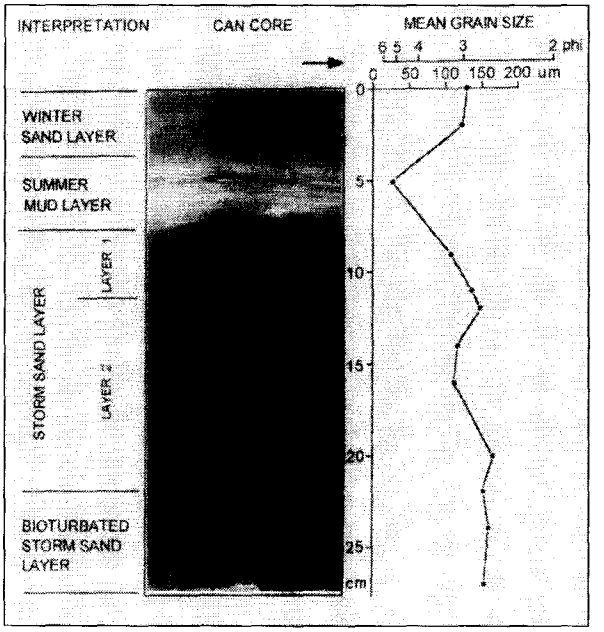

Fig. 3. X-ray radiograph the showing preservation style of tidal-flat sediments. Arrow indicates landward direction. Sand-mud interlayers resulting from the seasonal changes of energy regime are shown at the upper part of core, but they are not preserved at the lower part. Storm sand layer shows sharp erosional contact, normal grading, and the transition of sedimentary structures from low-angle cross-lamination (hummock cross-strata) to small-scale ripple cross-laminaton.

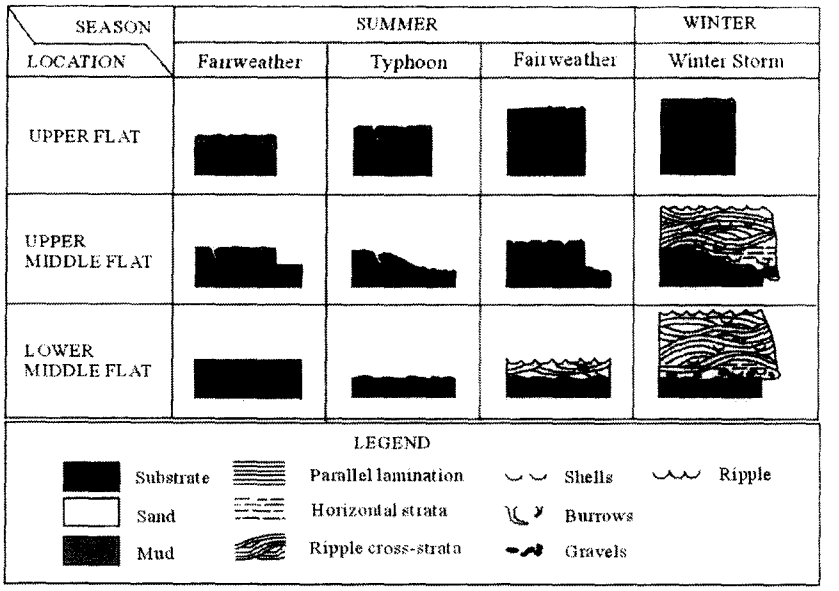

Fig. 4. A conceptual model showing the seasonal variation of tidal-flat strata. The upper flat is characterized by a continuous mud deposition throughout the year. The upper middle flat experiences the alternation of mud deposition in summer and sand deposition in winter. The lower middle to lower flat is characterized by a sand deposition which is insignificant in summer but becomes overwhelming in winter, but the sand layers are eroded by next typhoons.