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The Geomorphic Development and Tectonic Movement at the Yangnam Coast of the Southeast Korea

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1. Introduction

This study investigated the geomorphological development of coastal terraces and active fault movement deformed them in the southeast coast of Gyeongju city. The previous research have been discussed the existence or non-exixtence of Higher surface above 90m, active fault movement and security problems at the area standing neuclear power plant. This study also investigated the existence and chronology of much higher marine terraces and active faults, the magnitude of movement, vertical displacement rate of fault (Fig. 1).

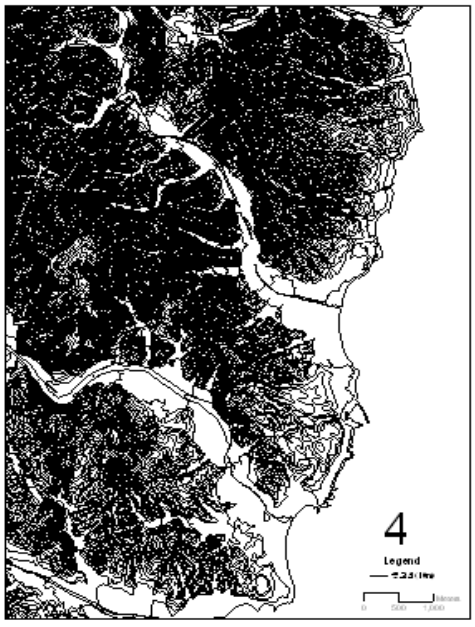

Fig. 1. Study area.

2. Results and Discussion

1. The Correlation and Chronology of marine terraces in the East Coast of the study area show on the table with special reference to above 90m.a.s.l.

HH1(140m)	MIS 15 (630-560ka BP)
HHEupcheon(155-160m)	MIS 17 (720-690ka BP)
HH2(110-115m)	MIS 13 (510-480ka BP)
H1(90m)	MIS 11 (430-350ka BP)
H2(75-80m)	MIS 9 (340-300ka BP)
M(50m)	MIS 7 (250-190ka BP)
L1(25m)	MIS 5e (130-80ka BP)

2. Tectonic deformation magnitudes, rates, and ages along Obalsan, Suryum and Eupcheon Active fault lines on the Middle surfaces(50 m.a.s.l.) constructed during MIS 7 (250-190 BP) are as follows : Obalsan fault has 3.3m vertical displaced by 0.015mm/year, Suryum fault, 1.0m by 0.005mm/year and Eupcheon fault, 6.0m by 0.027mm/year (Fig. 2).

3. Presumed Fault Line along Obalsan and Eupcheon Active fault lines pass on the way Wolseong Neuclear Power Station. Obalsan and Eupcheon Active fault lines are expected to be extented from the outcrops of the field to 2.5 km northwards.But its rate of deformation is presumed to C class($0.01 \leq$average rate≤ 0.1).

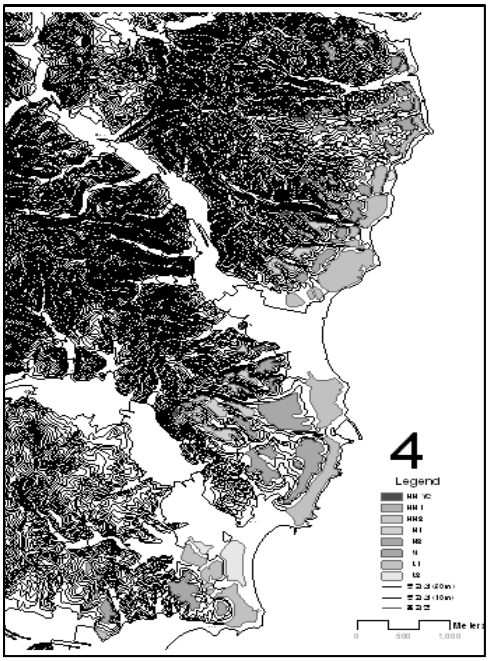

Fig. 2. The classification map of marine terraces.

4. Active Fault Type : The active fault type on study area is similar to the other areas of southeastern Korea during the Quaternary. It has NE or NNE to SW or SSW strikes with dips to ESE and SE in common. Reverse Fault movement is causd by the compressive stress from the East Sea Plate, which has had effect on the Korea Peninsula since 5-3.5 Ma or early in the Quaternary (Figs. 3, 4).

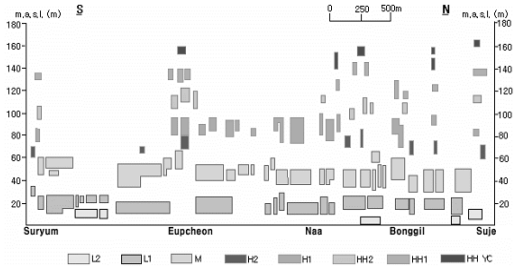

Fig. 3. The vertical profile of marine terraces on study area.

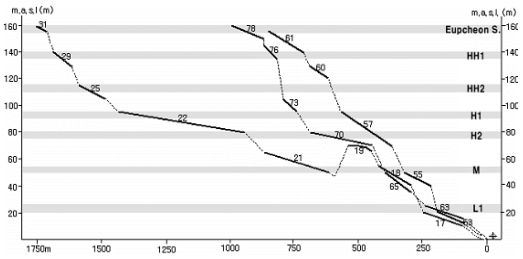

Fig. 4. The longitudinal profile of marine terraces on study area.

3. Conclusion

This study investigated geomorphological development of coastal terraces and active fault displacing coastal terrace surfaces in area of the southeast coast of Gyeongju city.

1. The eight surfaces are classified on the coastal terraces between Eupcheon- and Bongil areas of the southeast coast of Gyeongju city. HH EC-surface on the 155-160m a.s.l. is the highest at study area. Below this surface, there are HHⅠ at 140m and HHⅡ at 115-110m and HⅠ at 90m and HⅡ at 80-75m and M at 50m and LⅠ at 25m and LⅡ at 10m and Holocene surface at 6-5m.

2. Based on LⅠ-surface identified as MIS 5e(80～130ka BP), the formation period is presumed to HH EC-surface during MIS 17(720～690ka BP), HHⅠ-surface during MIS 15(630～560ka BP), HHⅡ-surface during MIS 13(510～480ka BP, HⅠ-surface during MIS 11(430～350ka BP), HⅡ-surface during MIS 9(340～300ka BP), M -surface during MIS 7(250～190ka BP), LⅠ-surface during MIS 5e(80～130ka BP) and LⅡ-surface during MIS 5c or 5a.

3. From the outcrops covered with Quaternary deposits, tectonic displacements were identified at three places. They were confirmed as reverse faults with NE-SW to NNE-SSW strikes and dips to ESE and SE.

Table 1. The correlation of marine terraces in the East Coast.

Yoon et al.(2003)			Hwang et al.(2003)			Choi et al.(2003a)			this study		
Jeongdongjin, Daejin			Gyeongju, Ulsan			Eupcheon			Suryum, Eupcheon, Bonggil		
surface name	m.a.s.l	chronology	surface name	m.a.s.l	chronology	surface name	m.a.s.l	chronology	surface name	m.a.s.l	chronology
·	·	·	HH Jigyeong S.	195	MIS 17	Eupcheon S. 1	160	·	Eupcheon	155-160	MIS 17
HH1	140	MIS 15	HH1	140	MIS 15	Eupcheon S. 2	140	·	HH1	140	MIS 15
HH2	110	MIS 13	HH2	115	MIS 13	Eupcheon S. 3	120	·	HH2	110-115	MIS 13
H1	90	MIS 11	H1	90	MIS 11	Eupcheon S. 4	100	·	H1	90	MIS 11
H2	70	MIS 9	H2	70	MIS 9				H2	75-80	MIS 9
M	40	MIS 7							M	50	MIS 7
L1	25	MIS 5e	L1	25	MIS 5				L1	25	MIS 5e
L2	10								L2	10	
Holocene S.	5-6		Holocene S.	5-6					Holocene S.	5-6	

4. Eupcheon active fault runs to the direction NNE-SSW strike and at the North direction, presumed to be extented toward the Wolseong nuclear power station.

5. Vertical displacement were estimated on the M-surface of the Eupchon, Obalsan and Suryum fault, 6m, 3.3m and 1m respectively. The vertical slip rates are 0.027mm/year, 0.015mm/year and 0.005mm/year. The rate on the Eupcheon-Ri is C grade(0.1≤S(mm/year)≤ 0.01) in the correlation with the standard in Japan.

6. The two principal factors deformed the coastal terraces at the Southeast district in Korea Peninsula are the eustasy sea-level chang and the continuous uplift. The upheaval has occurred by accumulated compressive forces in the direction of E-W, influenced on Korea Peninsula since 5-3.5 Ma or early in the Quaternary.