



台灣東部海岸山脈及西南部麓山帶第四紀磁生物地層剖析
The Quaternary Magnetobiostratigraphy of Taiwan :
A Profile from Eastern Coastal Range and
Southwestern Foothills Sections

謝凱旋 、 洪崇勝

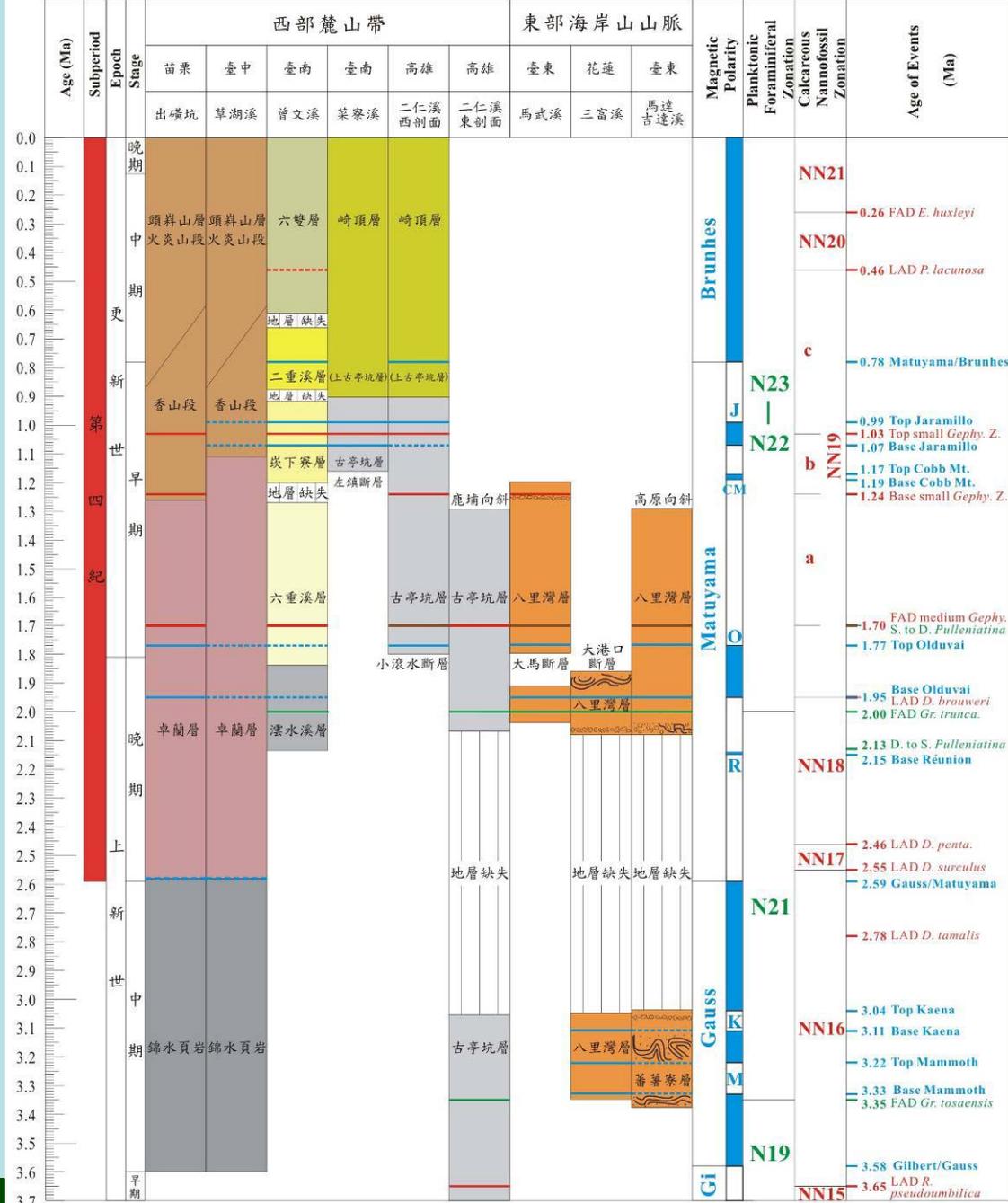
Kai-Shuan Shea and Chorng-Shern Horng

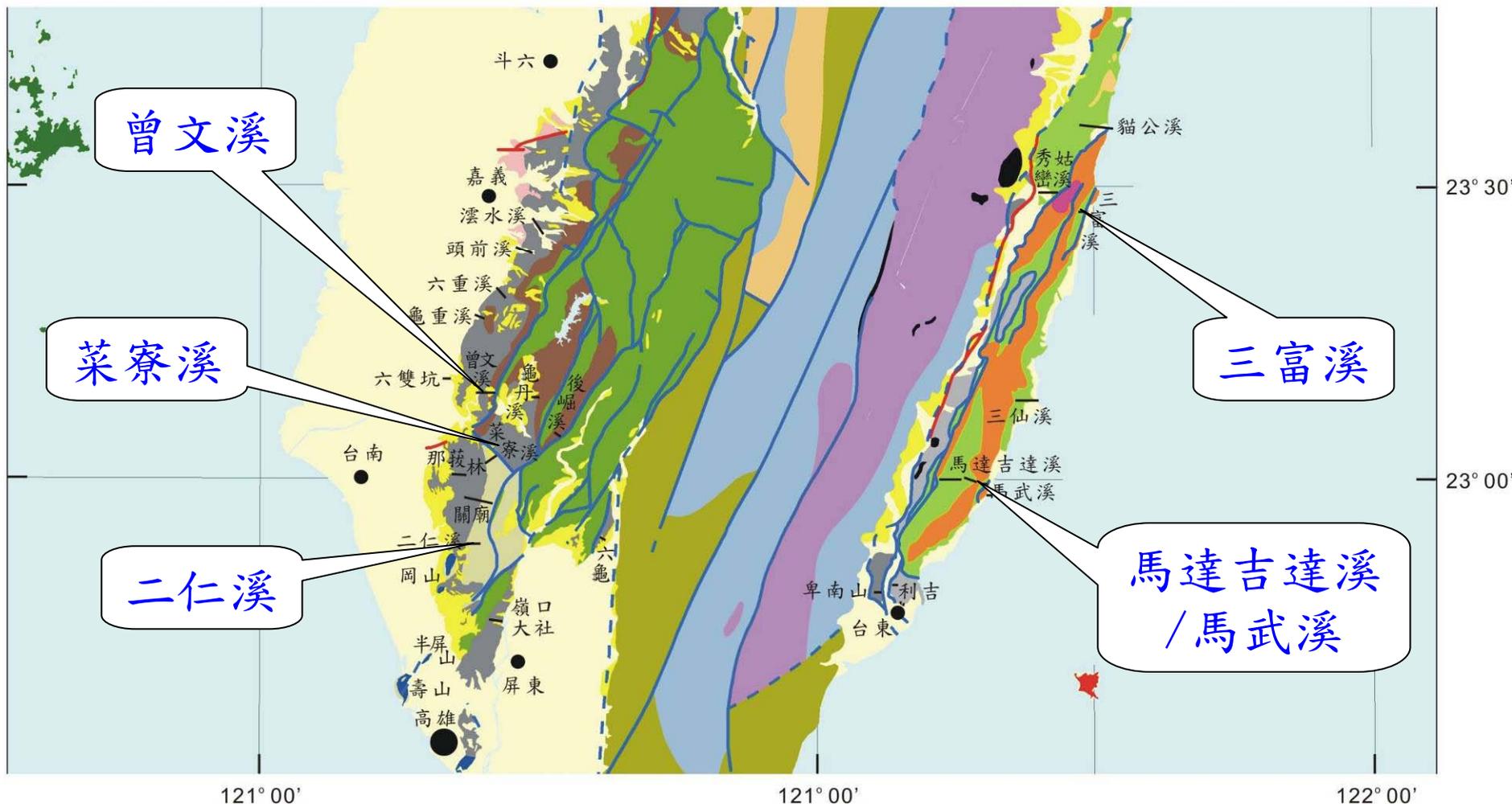
經濟部中央地質調查所 中央研究院地球科學研究所





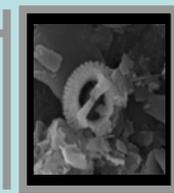
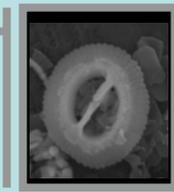
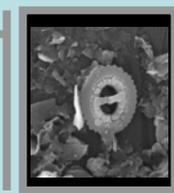
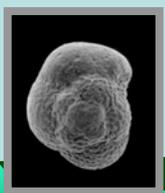
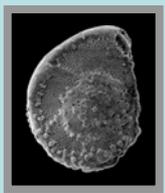
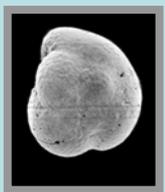
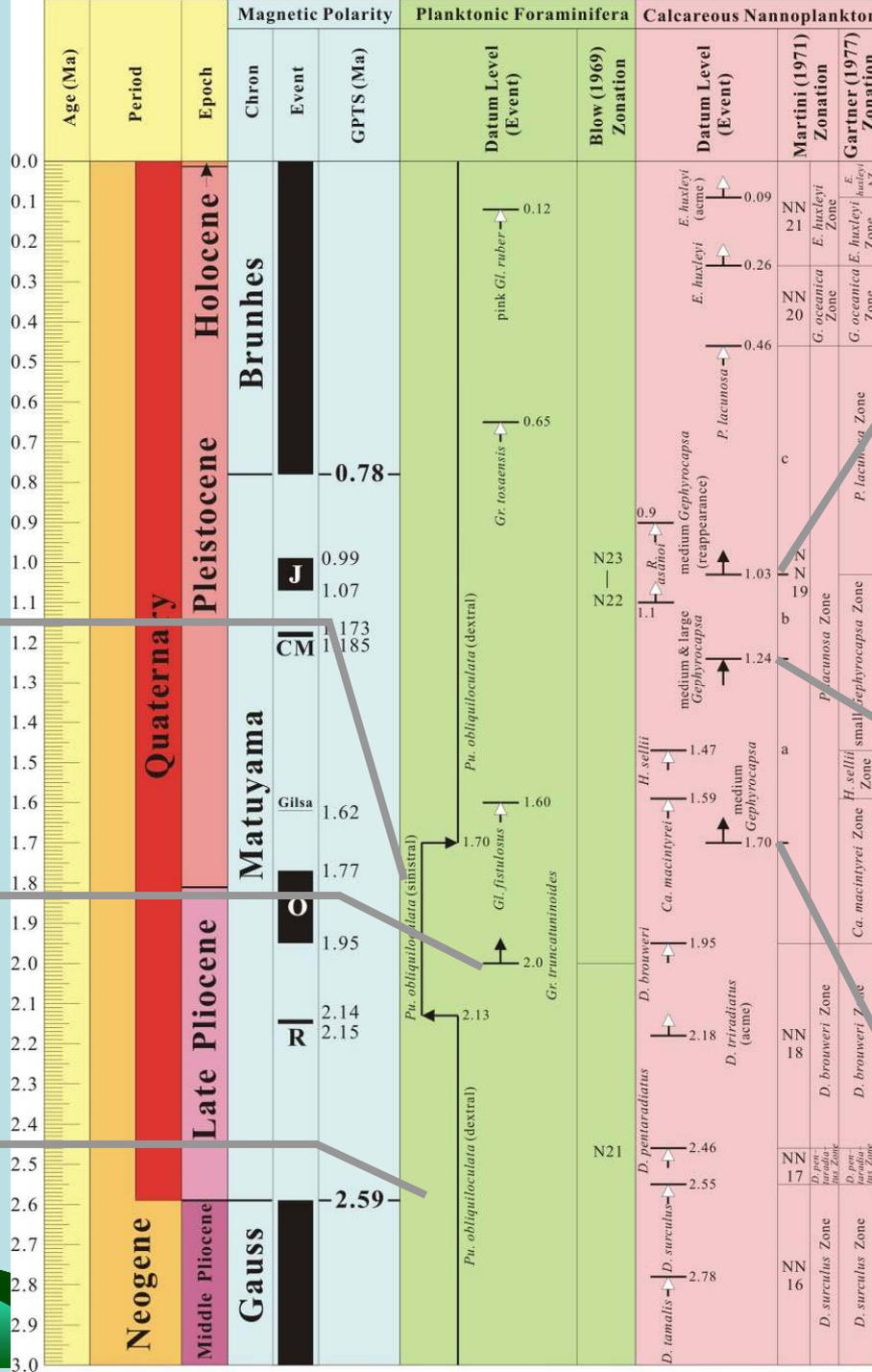
洪崇勝、謝凱旋 (2007)





本次報告主要資料來源：

- 洪崇勝、謝凱旋 (2007) 臺灣第四紀磁生物地層及蓬萊造山運動事件。地調所特刊第十八號，第51-83頁。
- Horng C. S. *et al.* (1999) 三富溪剖面
- 謝凱旋、洪崇勝 (1999) 二仁溪西剖面
- Horng *et al.* (1998) 菜寮溪剖面
- Horng C. S. and Shea K. S. (1997) 馬武溪剖面
- Horng C. S. and Shea K. S. (1996) 馬達吉達溪剖面
- Horng C. S. and Shea K. S. (1994) 二仁溪東剖面
- 洪崇勝 (1991) 曾文溪剖面和二仁溪剖面

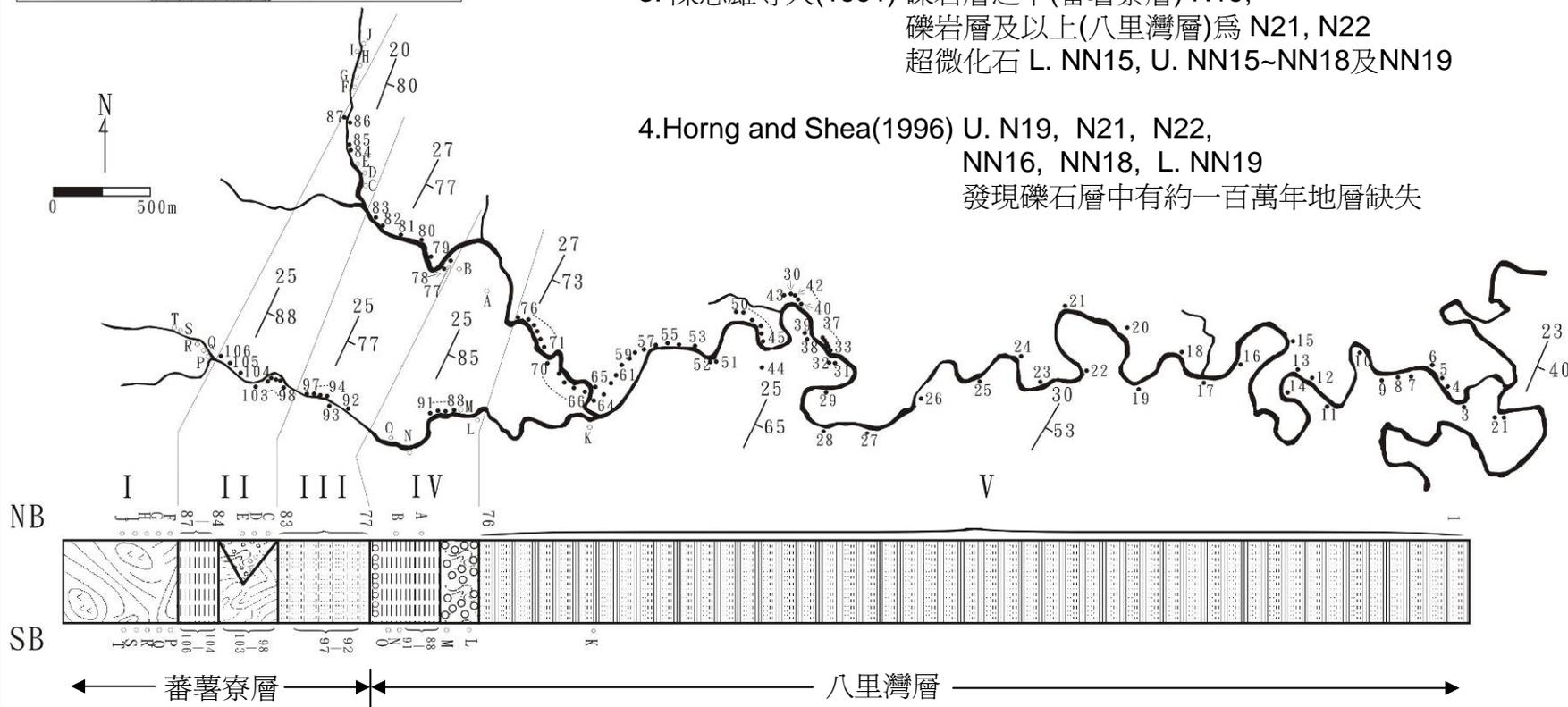
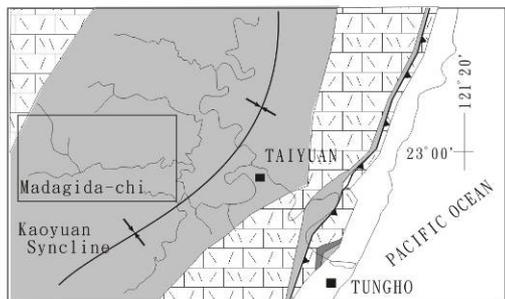






馬達吉達溪以往微化石生物地層研究：

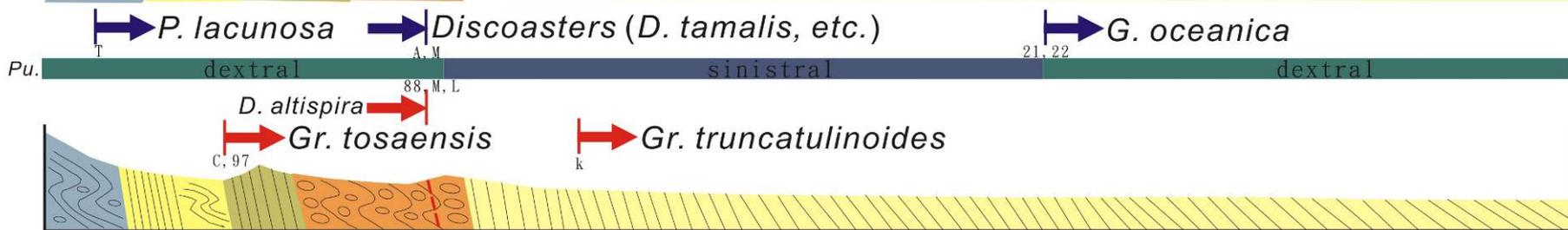
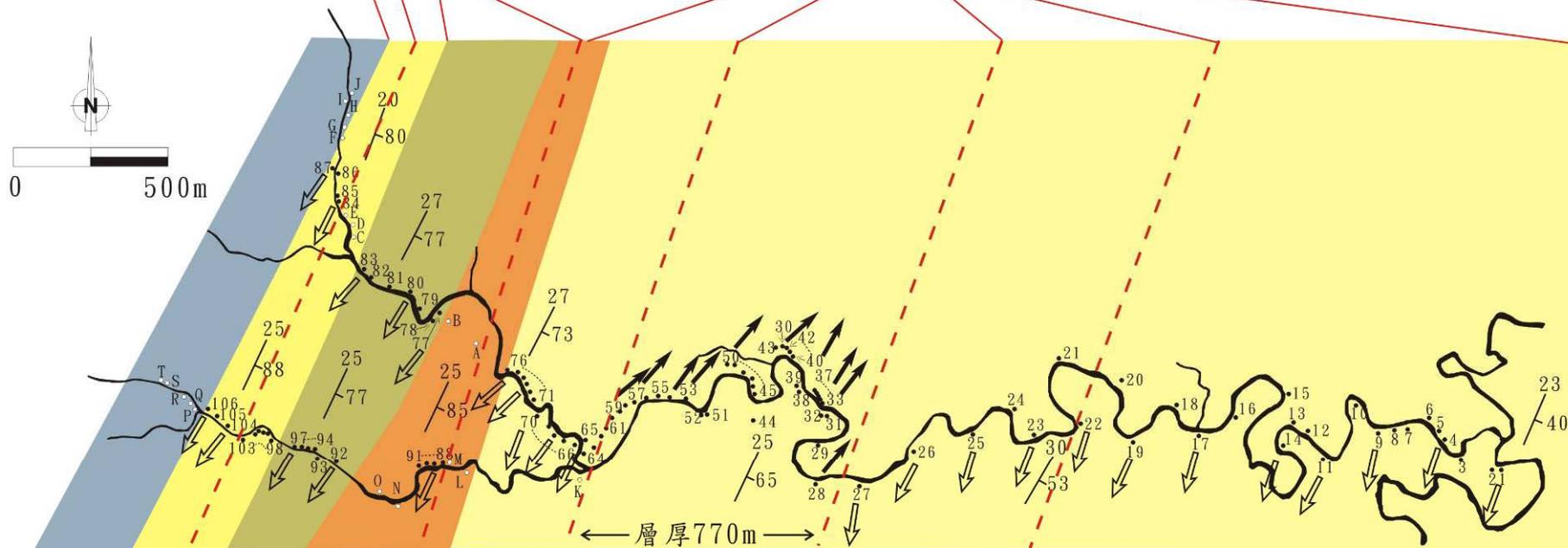
1. Chang, L, S.(1967) 浮游性有孔蟲 N19~N21
2. Chi *et al.*(1981) 超微化石 NN13~15, NN16~18, L. NN19
3. 陳志雄等人(1991) 礫岩層之下(蕃薯寮層) N19, 礫岩層及以上(八里灣層)為 N21, N22 超微化石 L. NN15, U. NN15~NN18及NN19
4. Horng and Shea(1996) U. N19, N21, N22, NN16, NN18, L. NN19 發現礫岩層中有約一百萬年地層缺失



地層劃分採用陳志雄(1991), 陳文山, 王源(1996).

馬達吉達溪剖面 Madagida-Chi Section

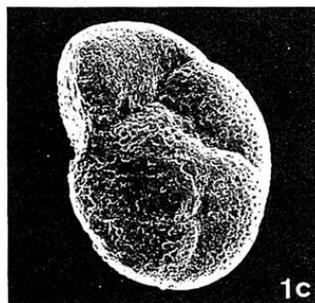
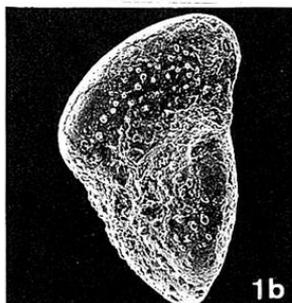
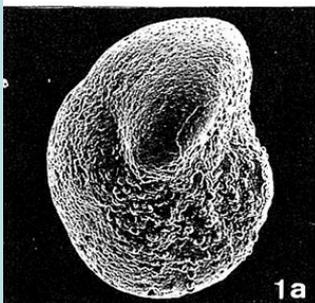
Gauss		Matuyama		Brunhes	
M	K	O	J		
3.58	3.33	2.59	1.95	1.77	Olduvai
	3.22		0.99	1.07	
	3.11		0.78		
	3.04				



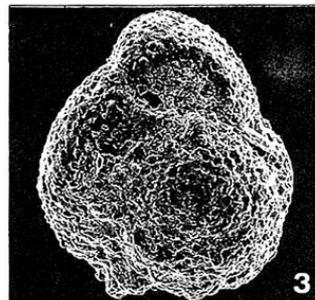
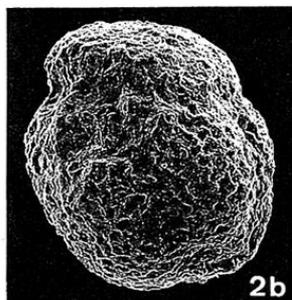
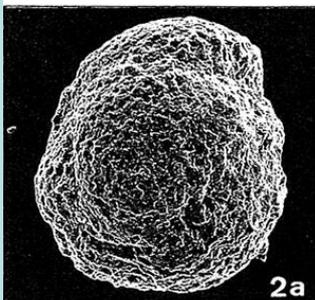


馬達吉達溪浮游性有孔蟲指準化石

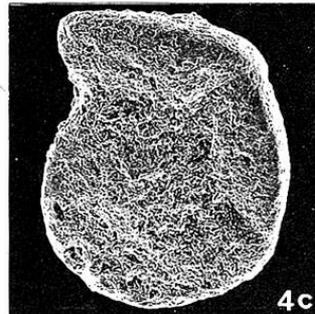
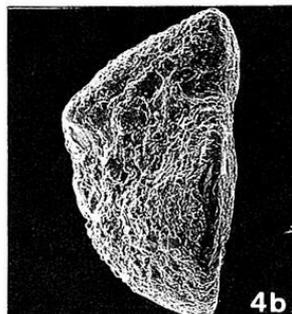
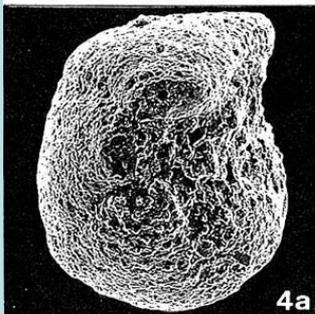
Site C



Site 91



Site 97



Site 97

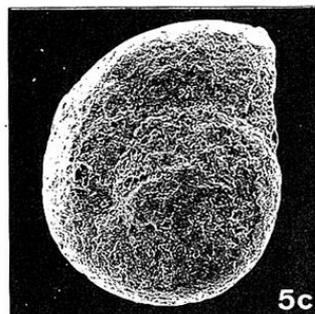
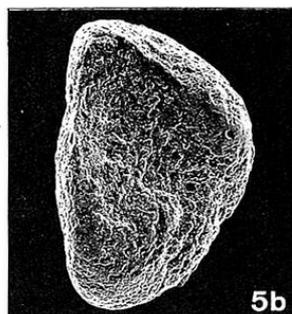
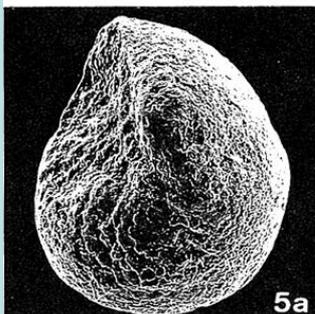
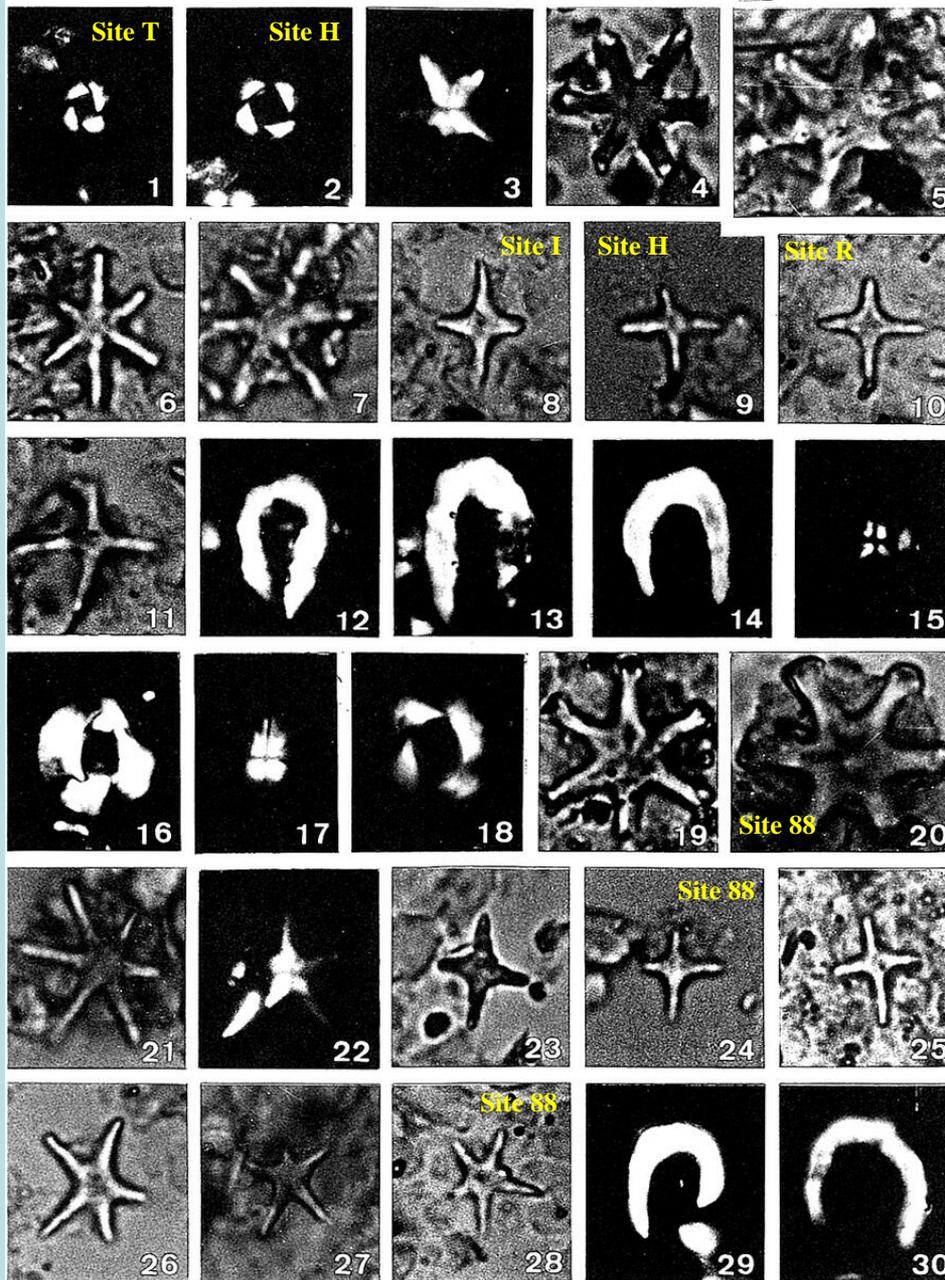




Plate VI

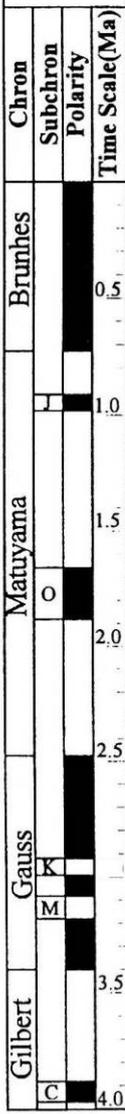


馬達吉達溪鈣質超微化石

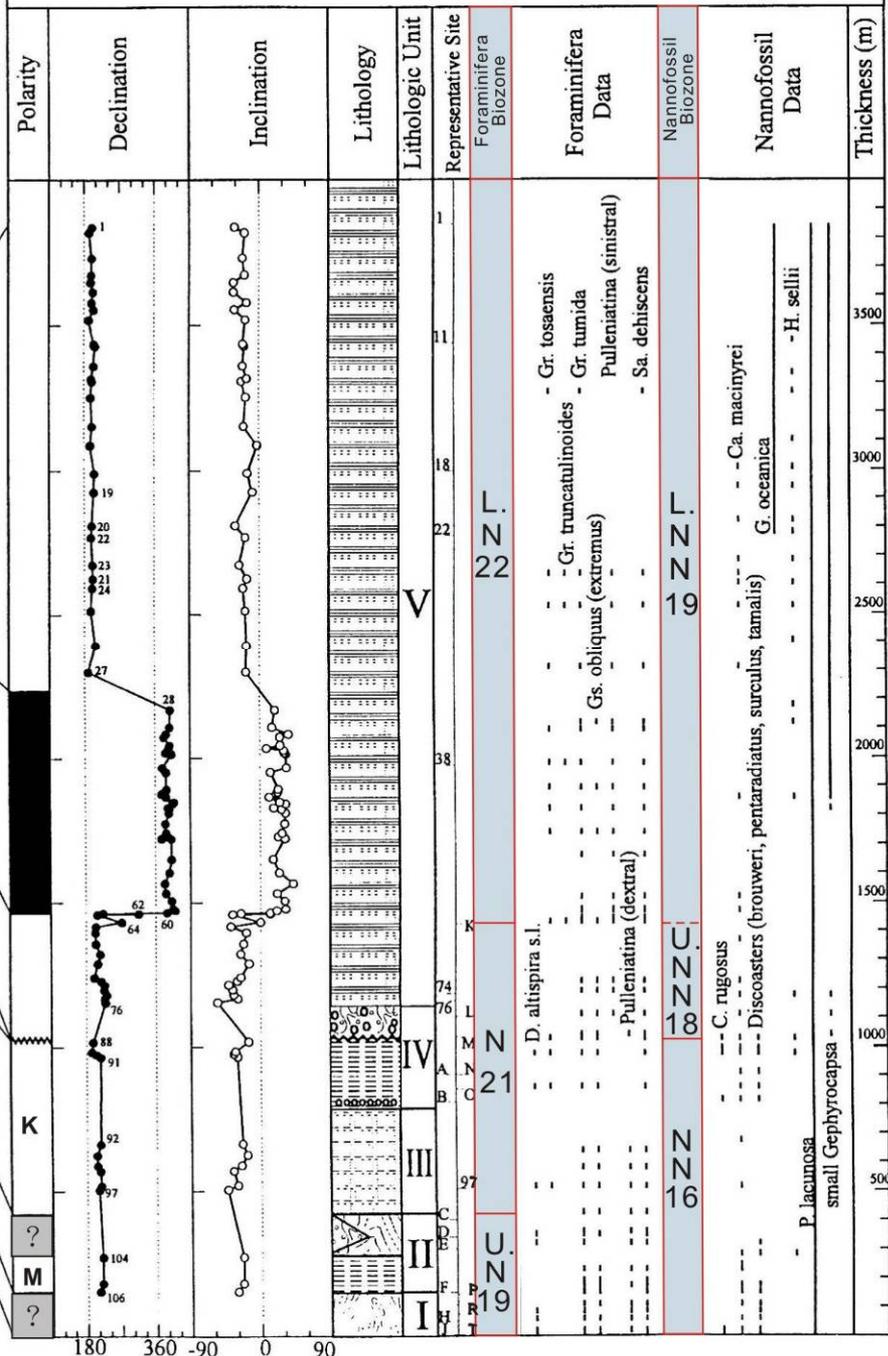




GPTS

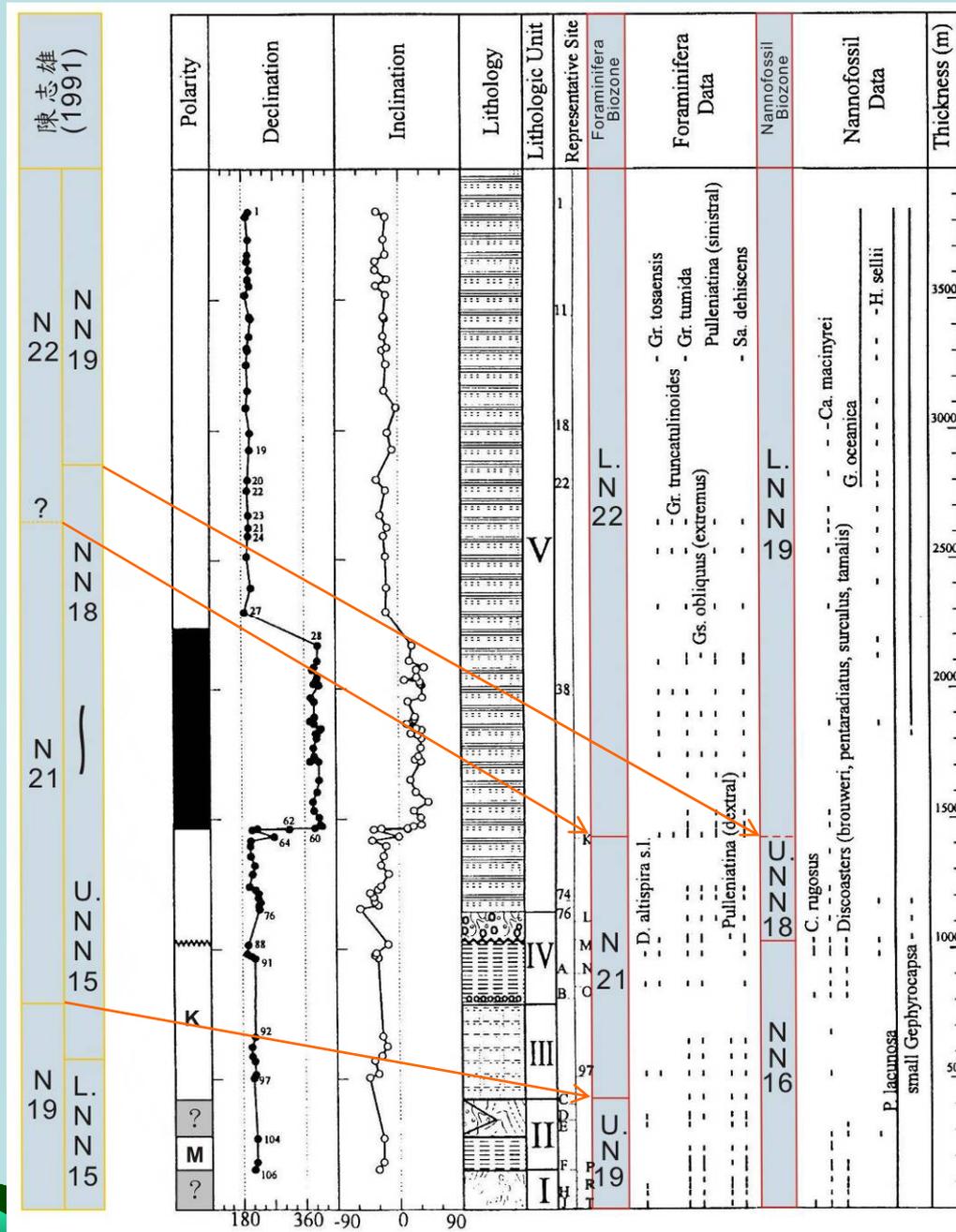


MADAGIDA - CHI SECTION



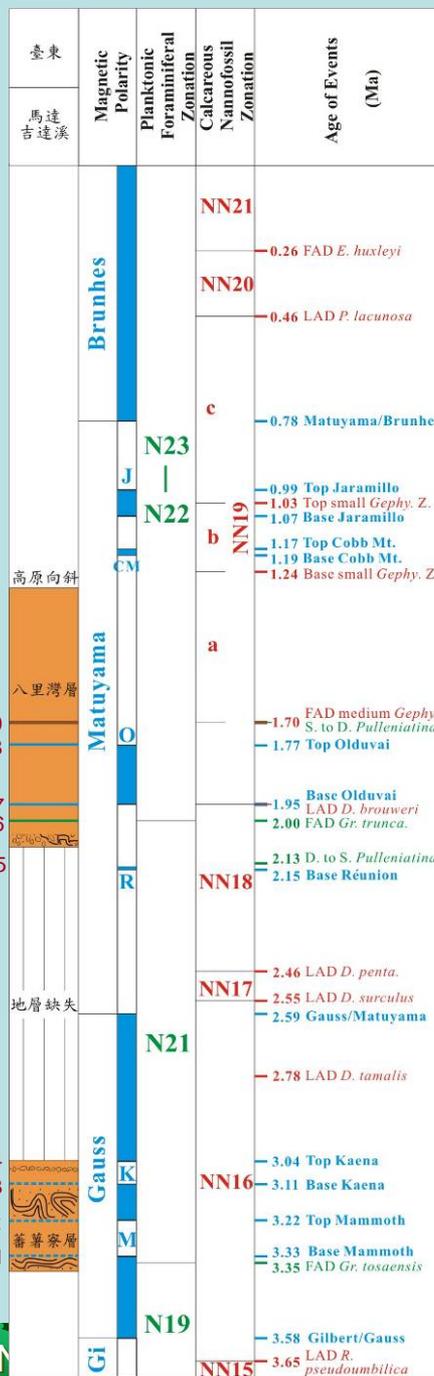
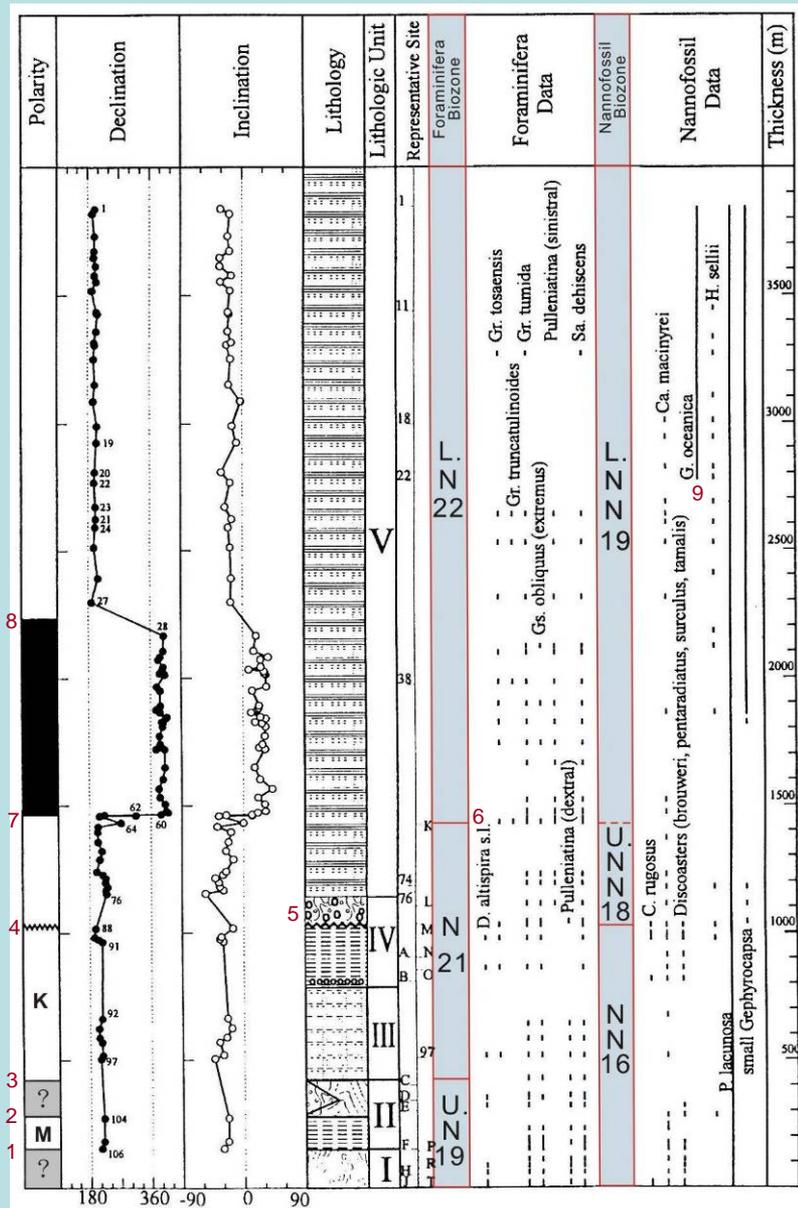
馬達吉達溪剖面





馬達吉達溪剖面

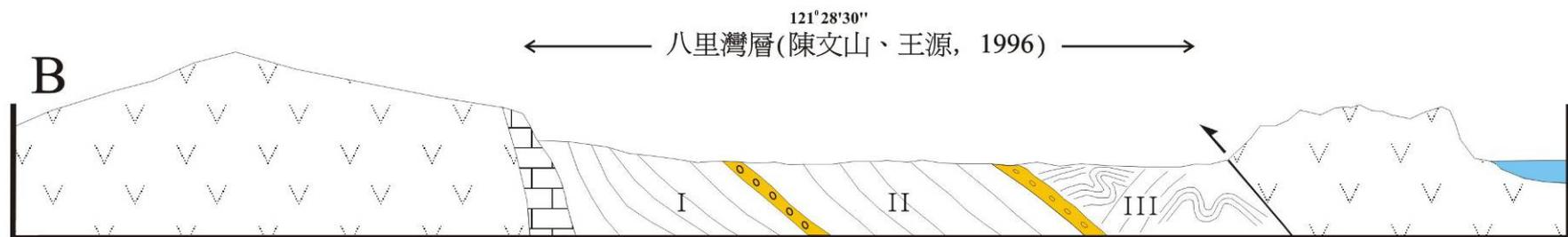
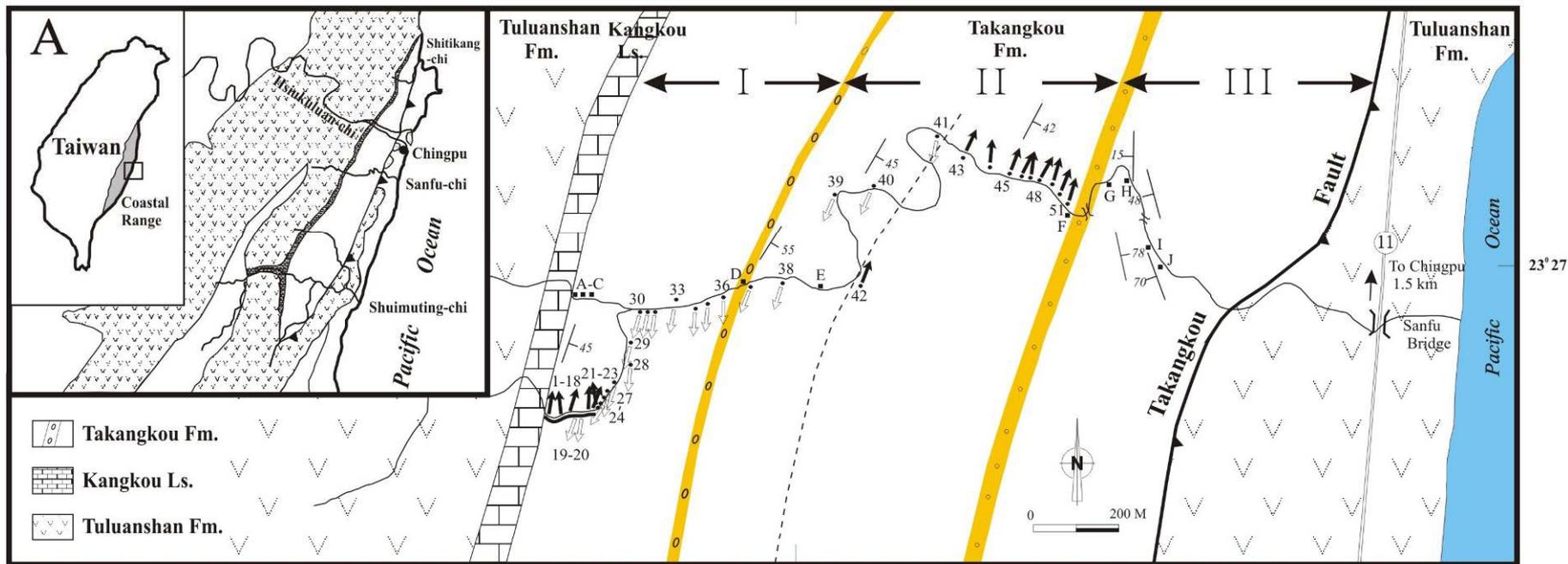


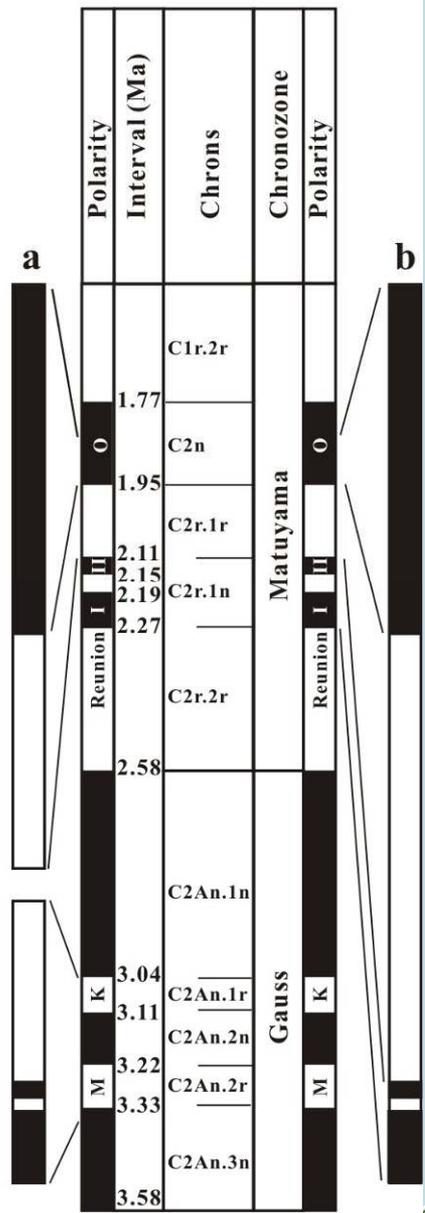
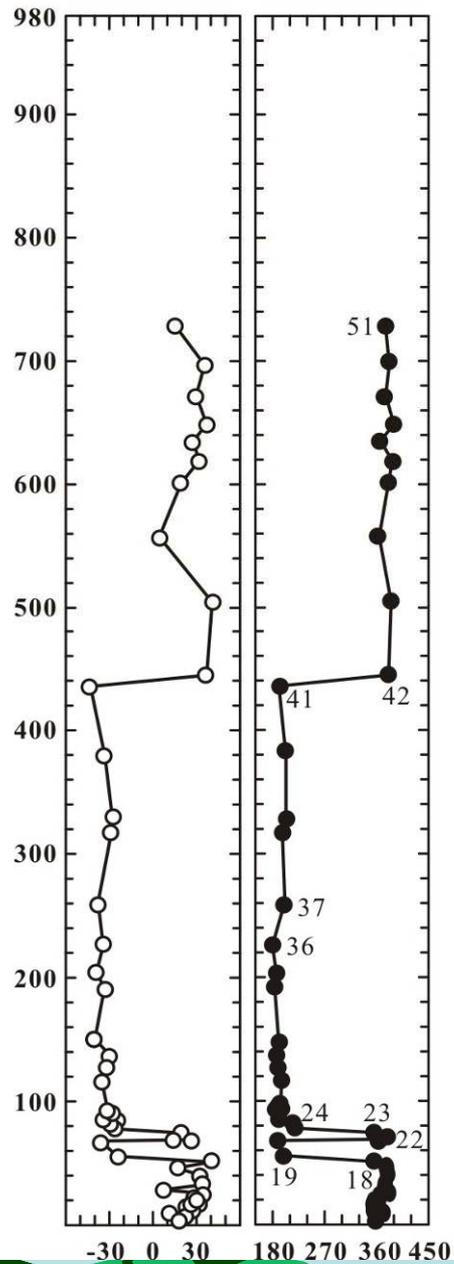
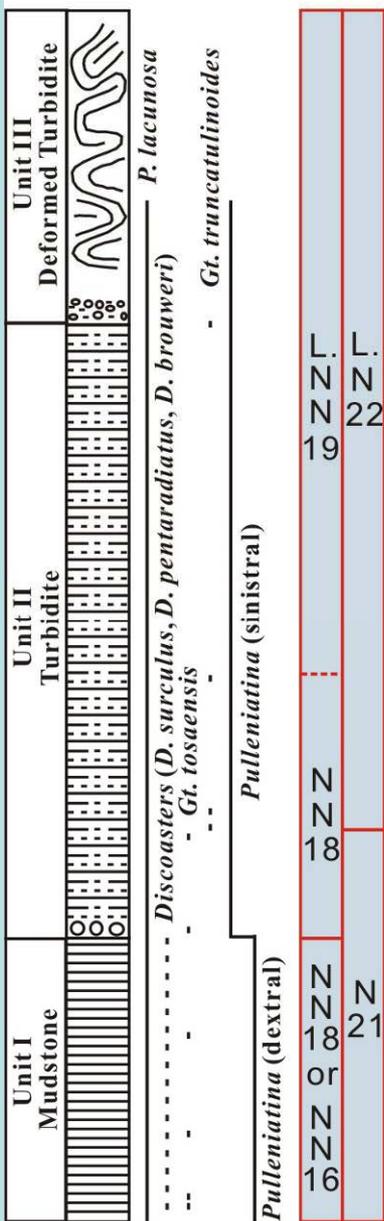


馬達吉達溪剖面



三富溪剖面 Sanfu-chi Section



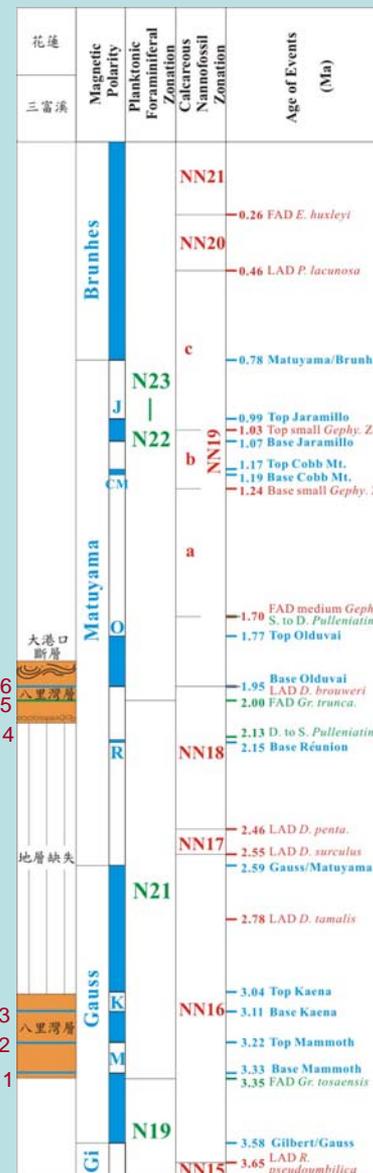
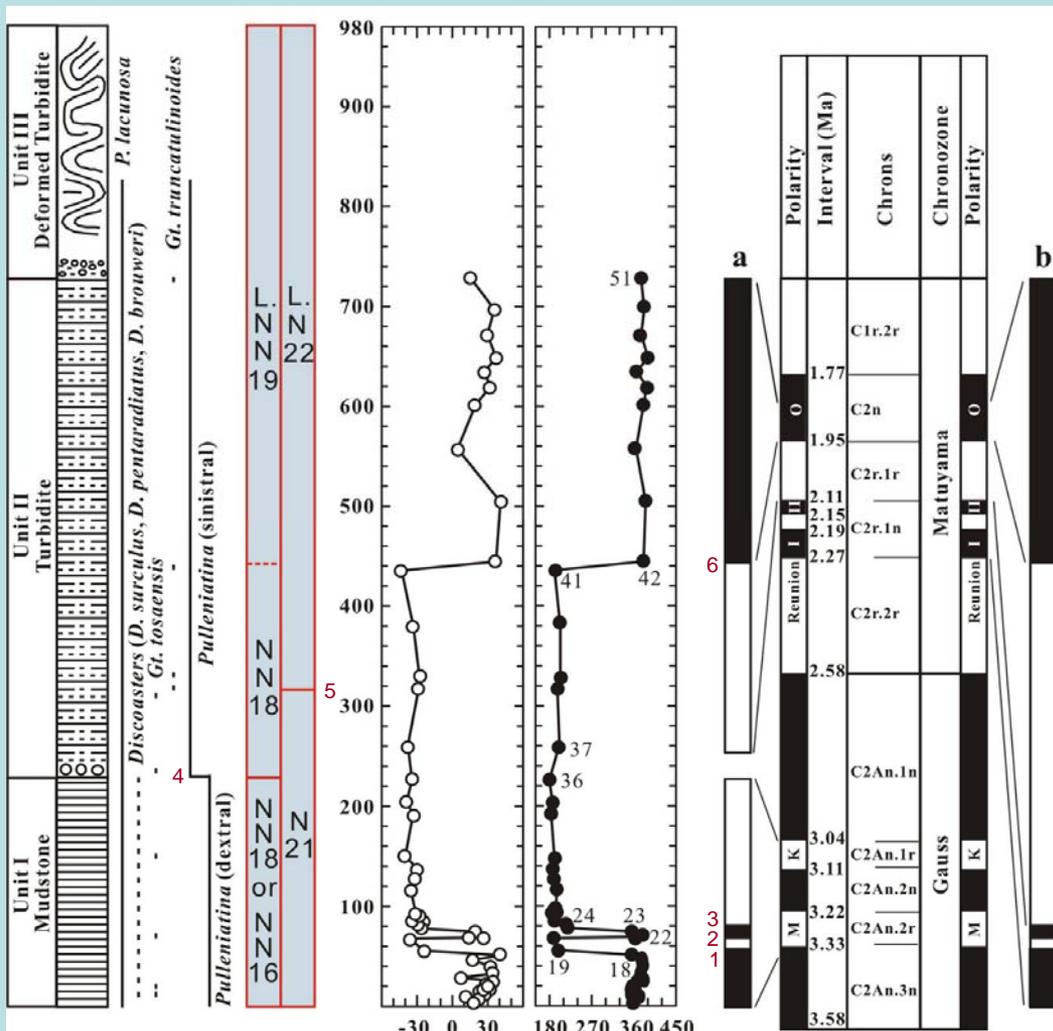


三富溪剖面



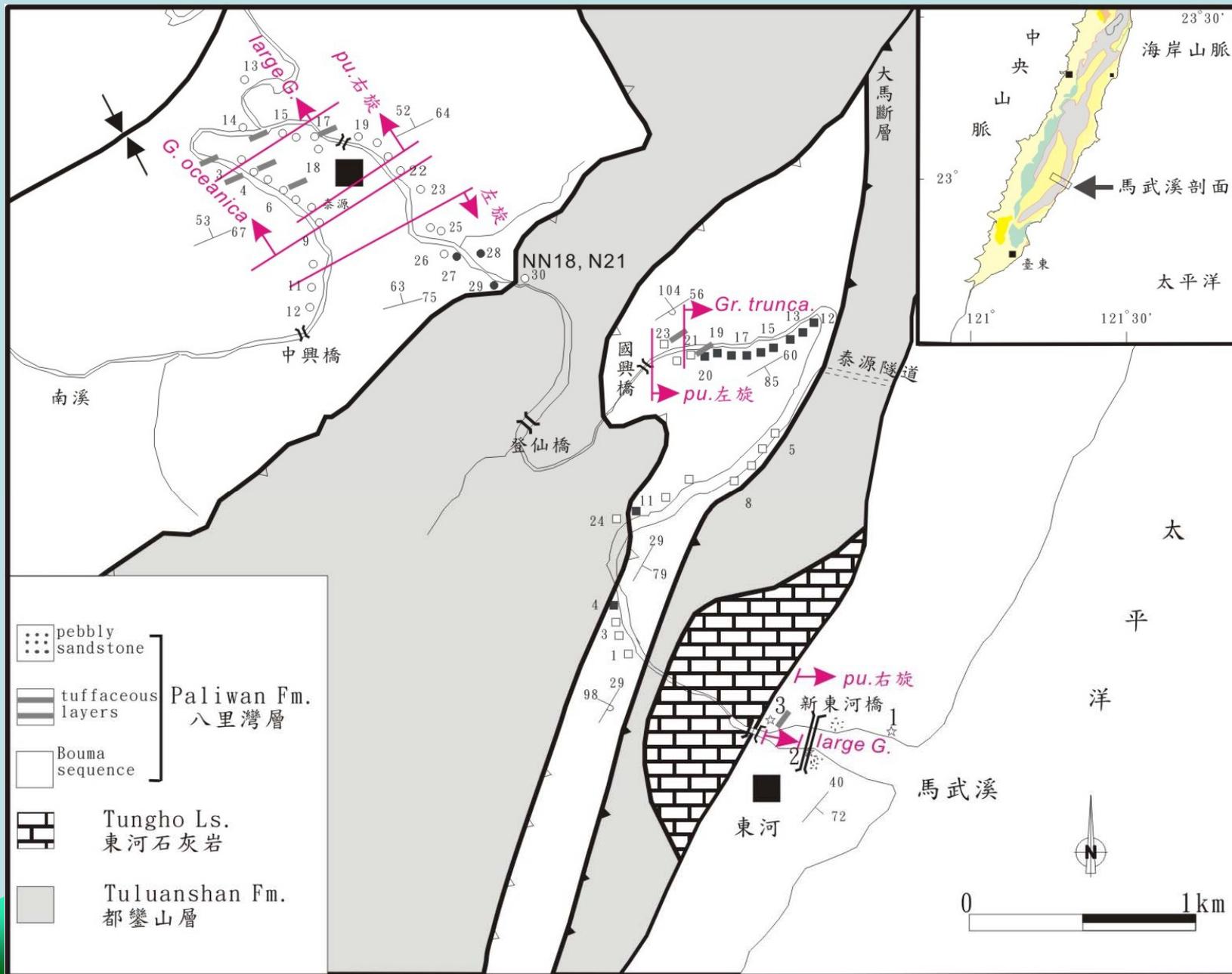


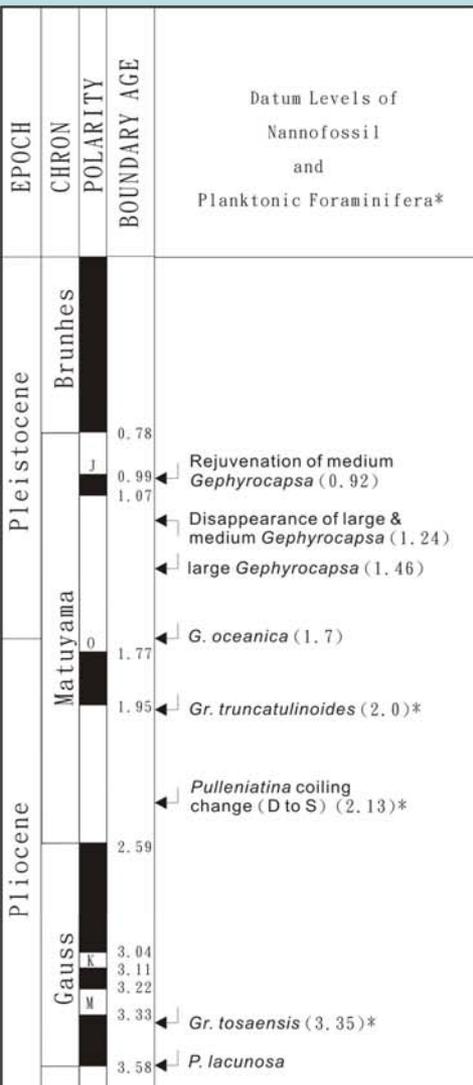
三富溪剖面



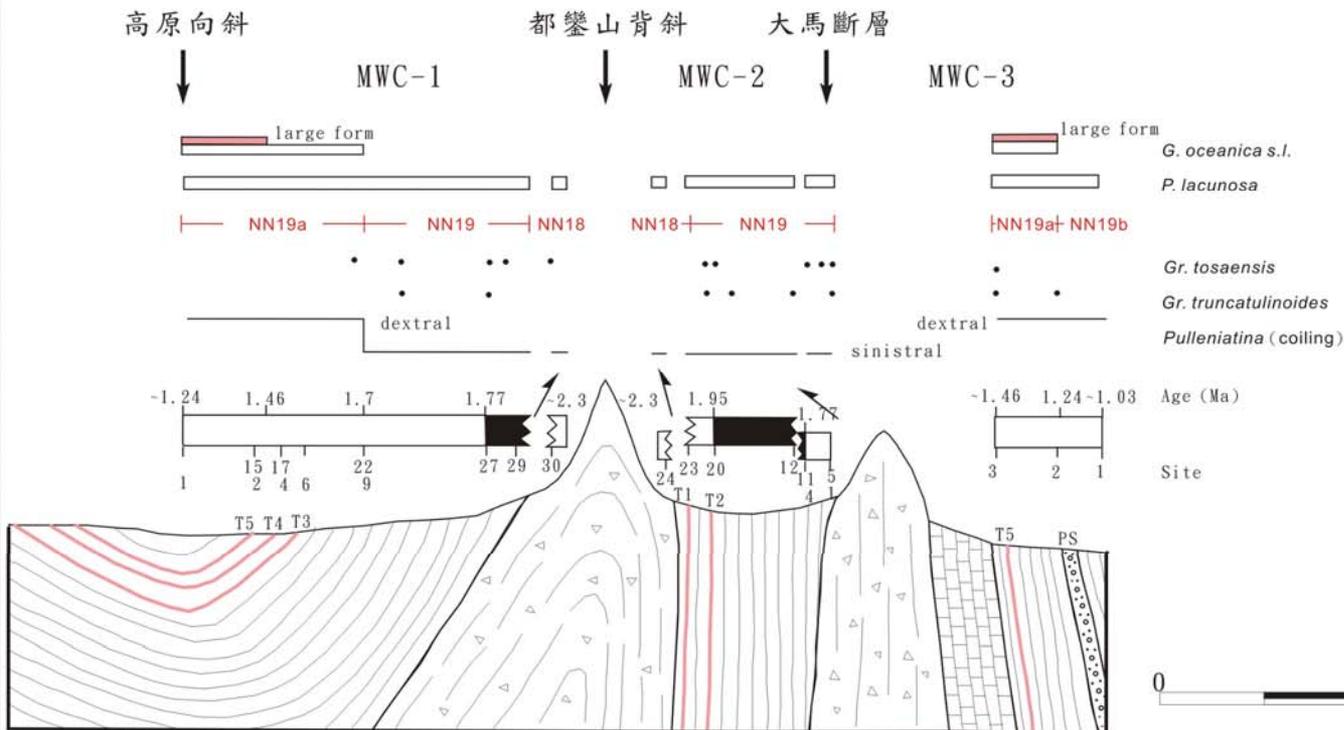


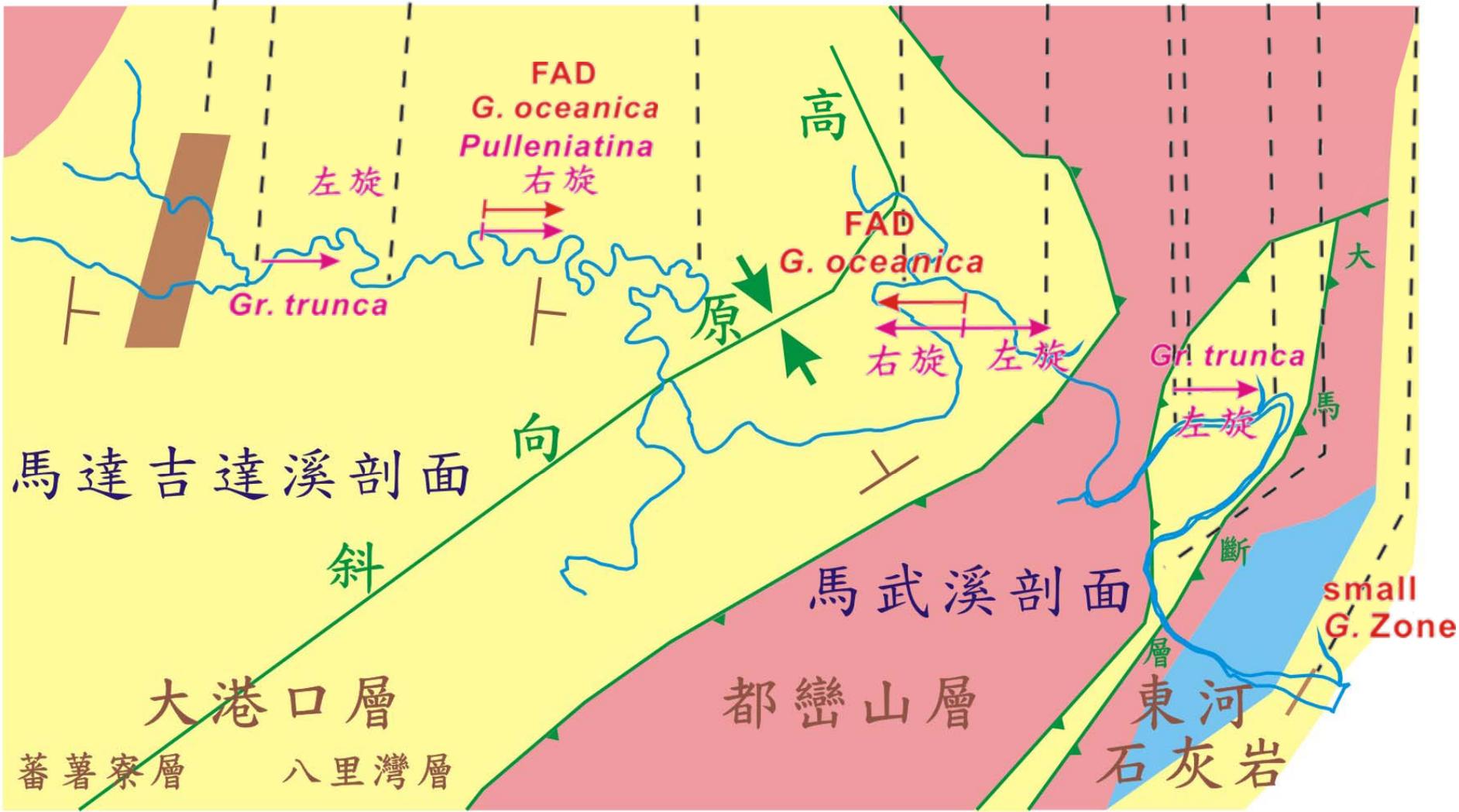
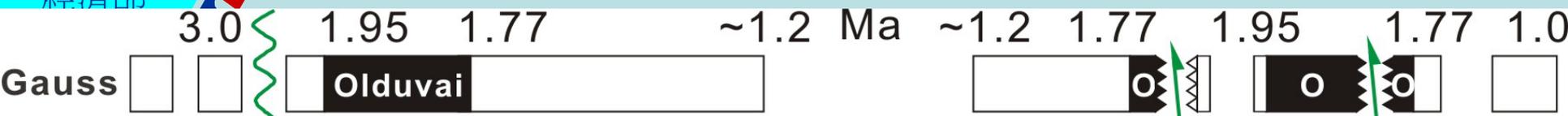
馬武溪剖面

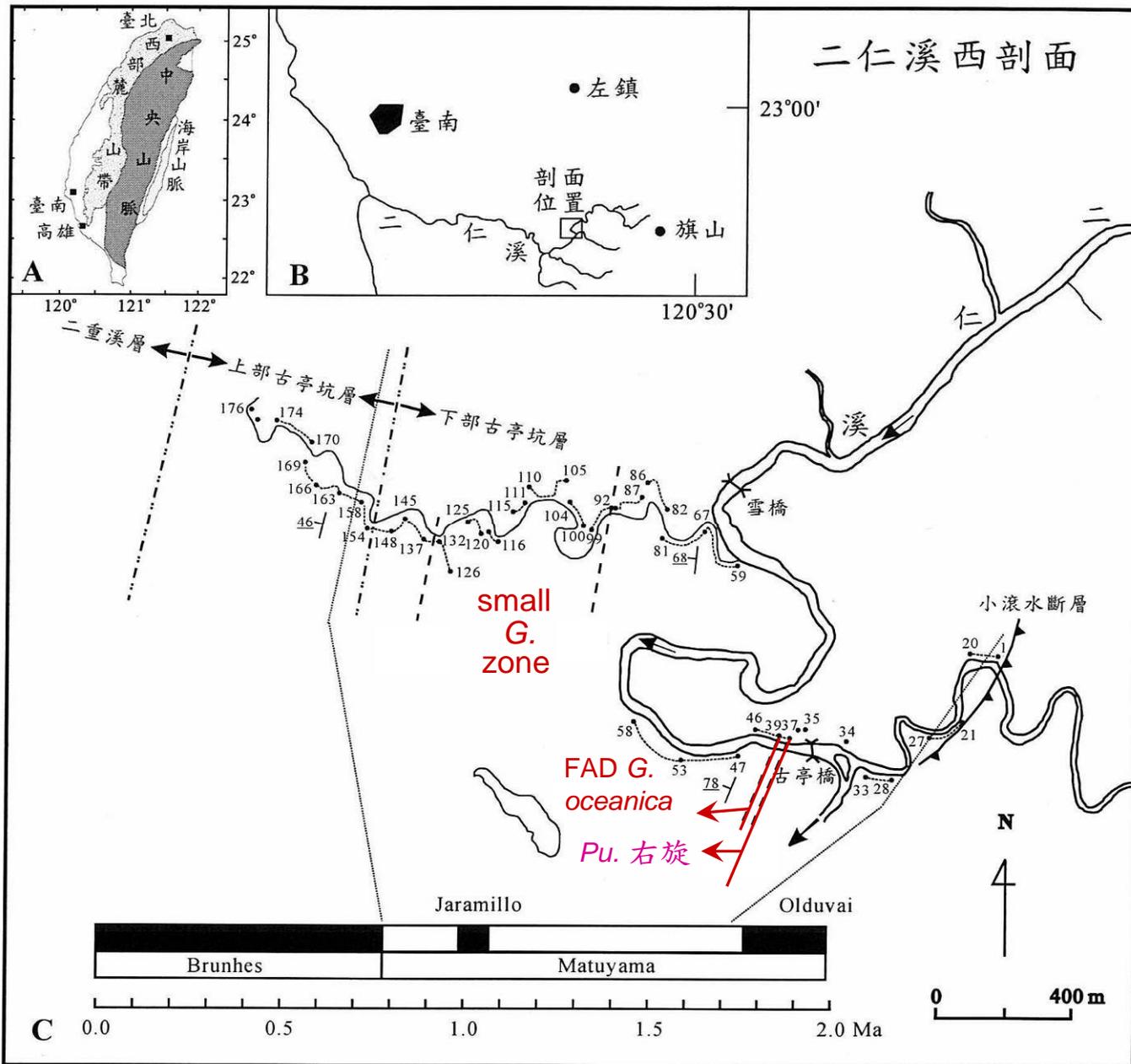


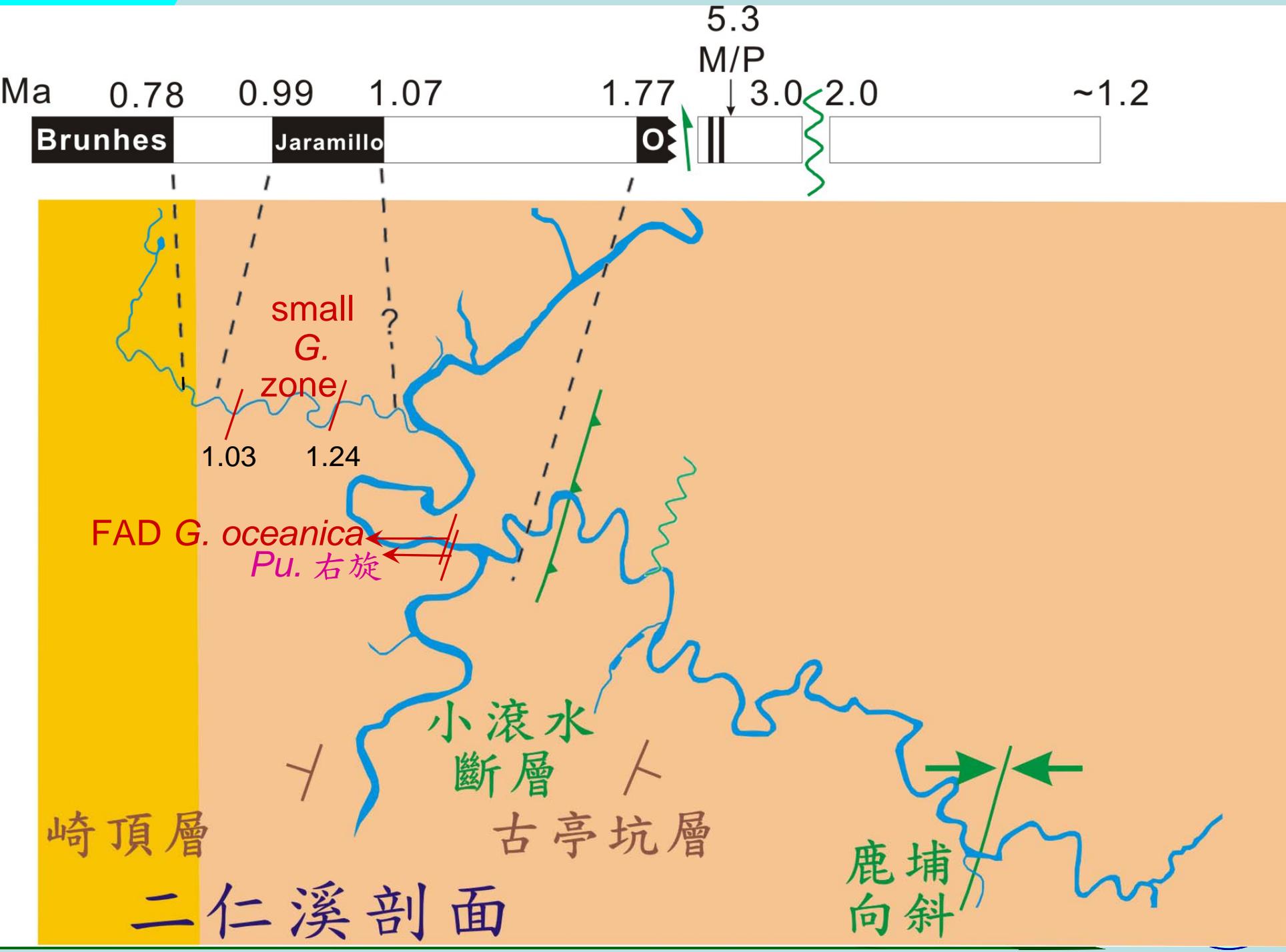


馬武溪剖面 MAWU-CHI SECTION

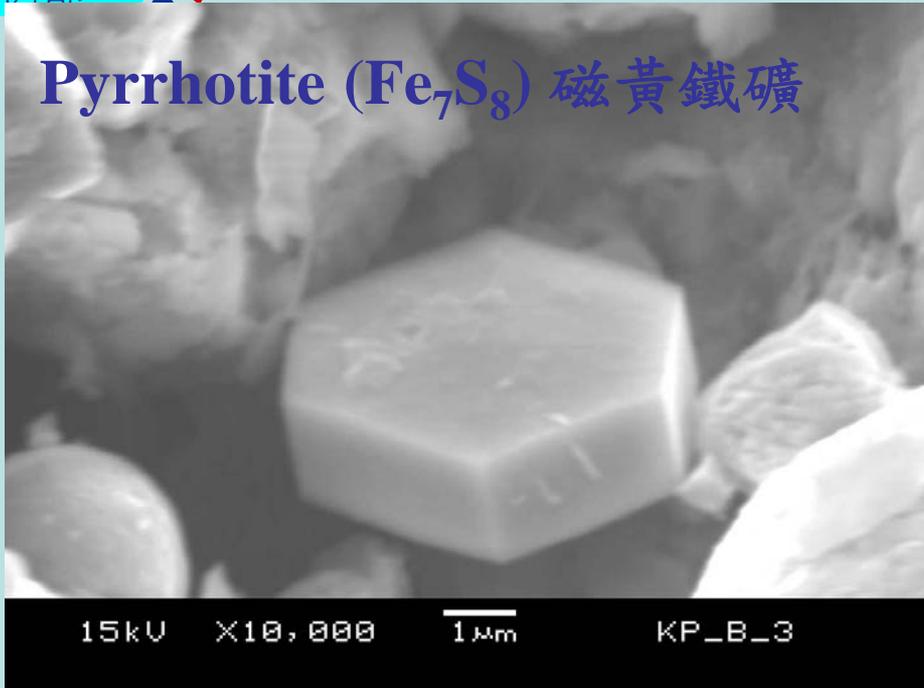




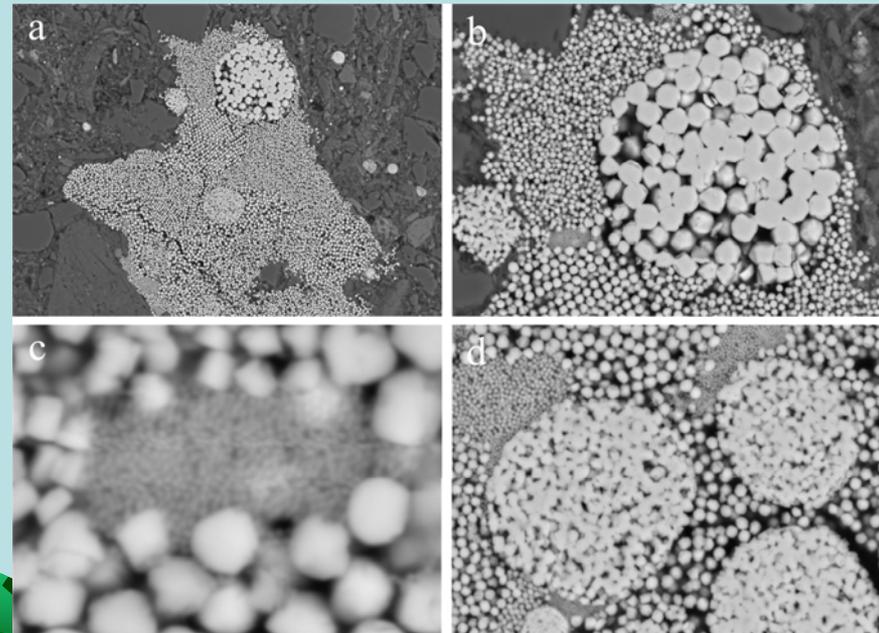


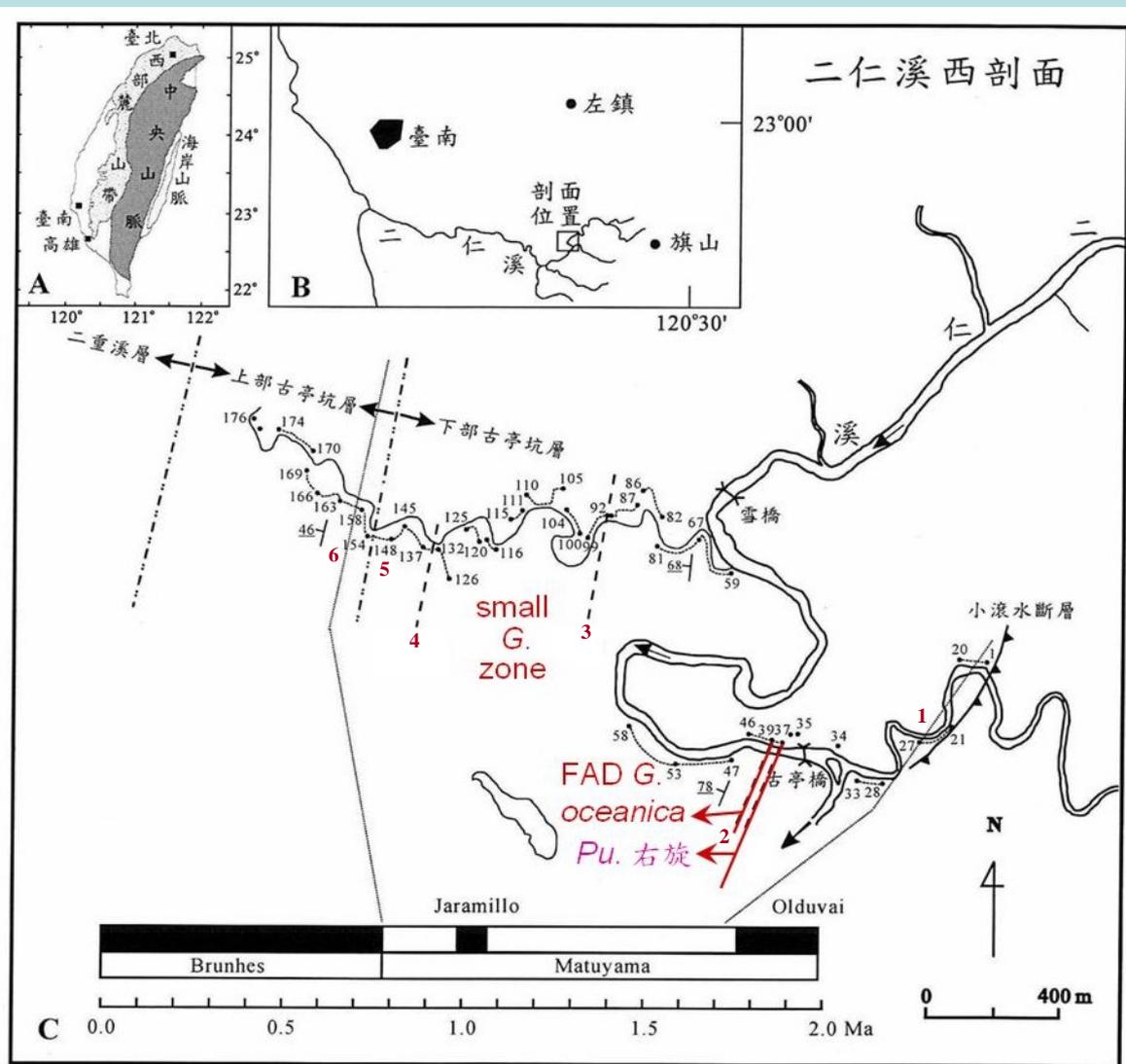


Pyrrhotite (Fe_7S_8) 磁黃鐵礦



Greigite (Fe_3S_4) 硫複鐵礦

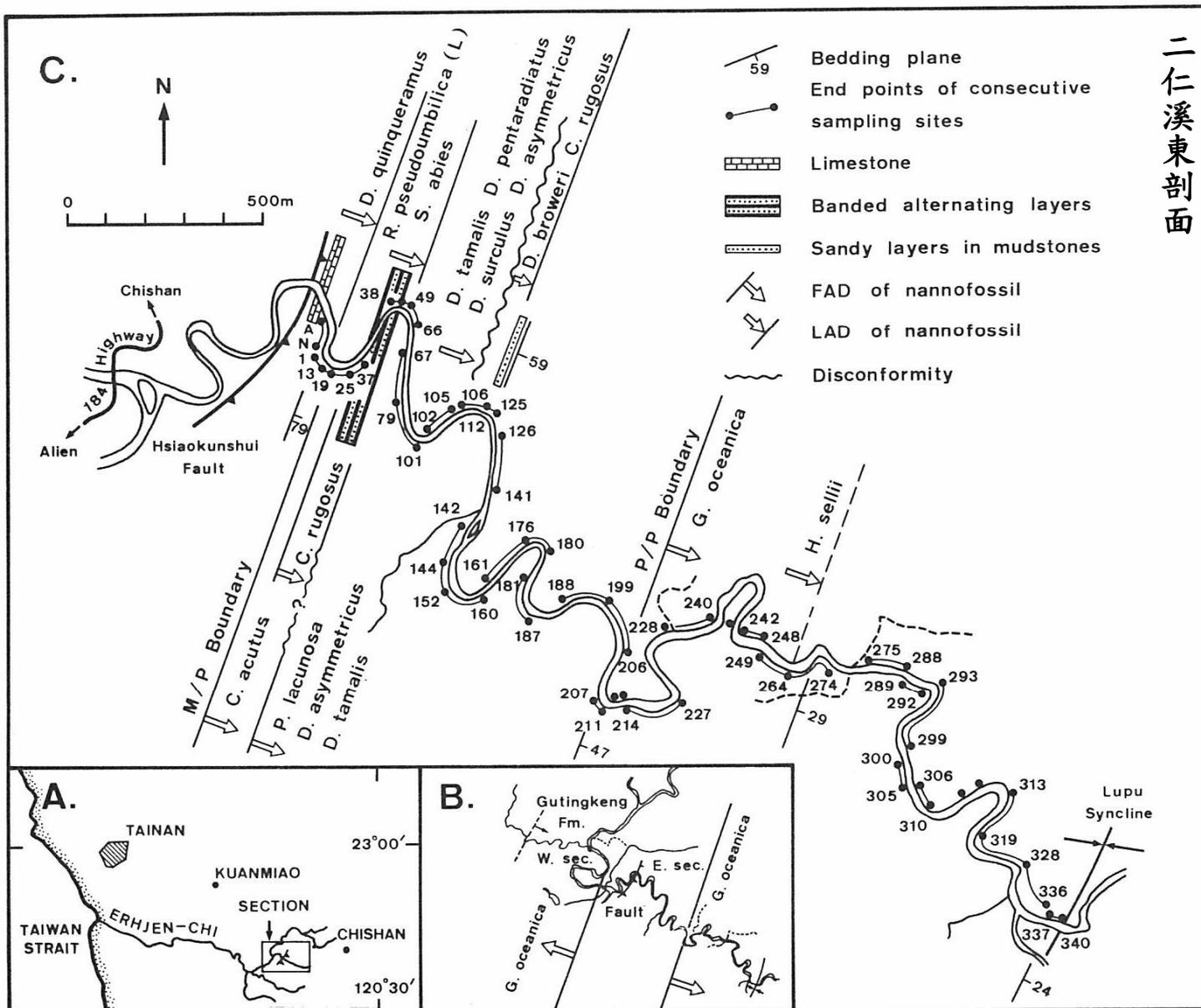


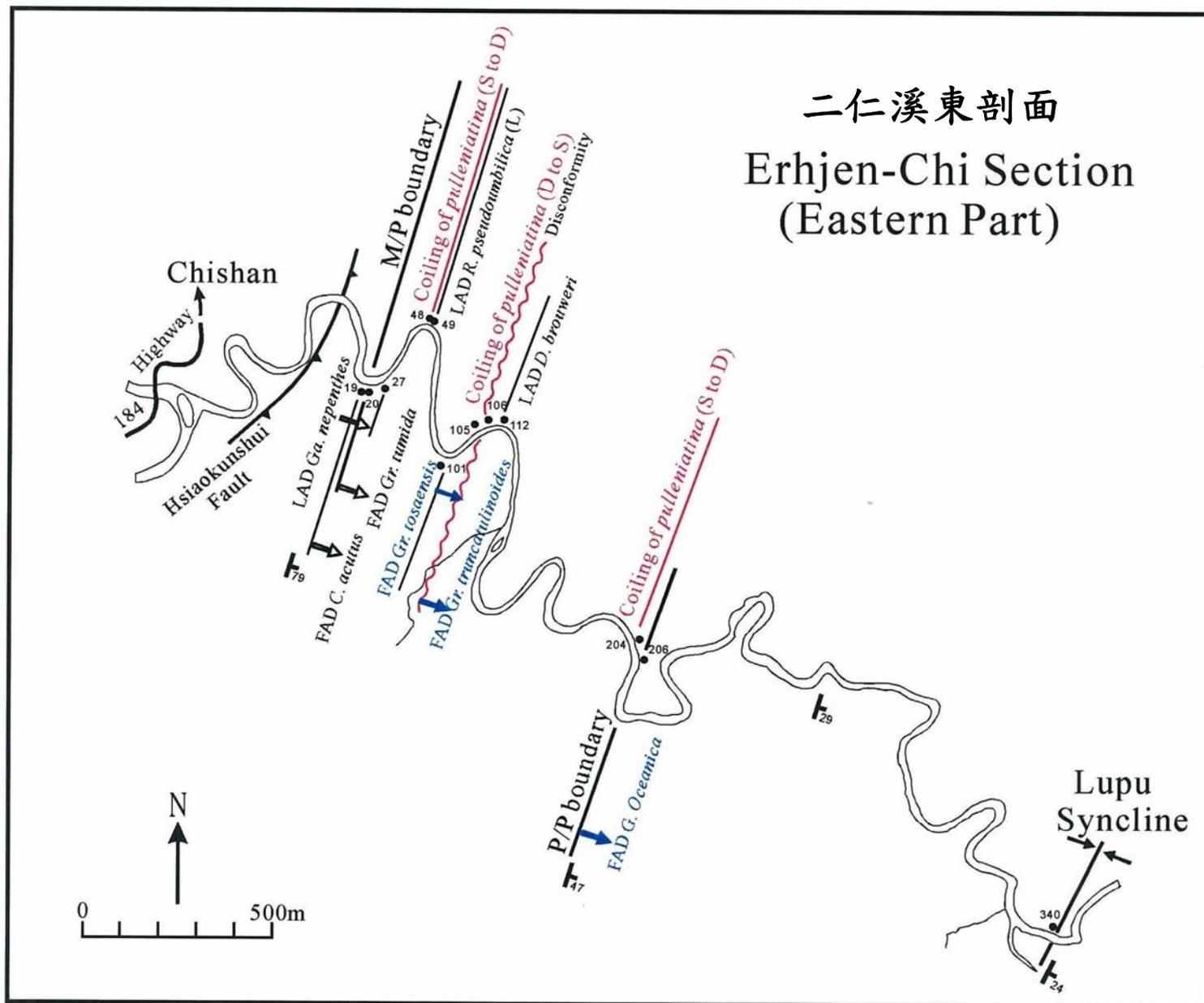


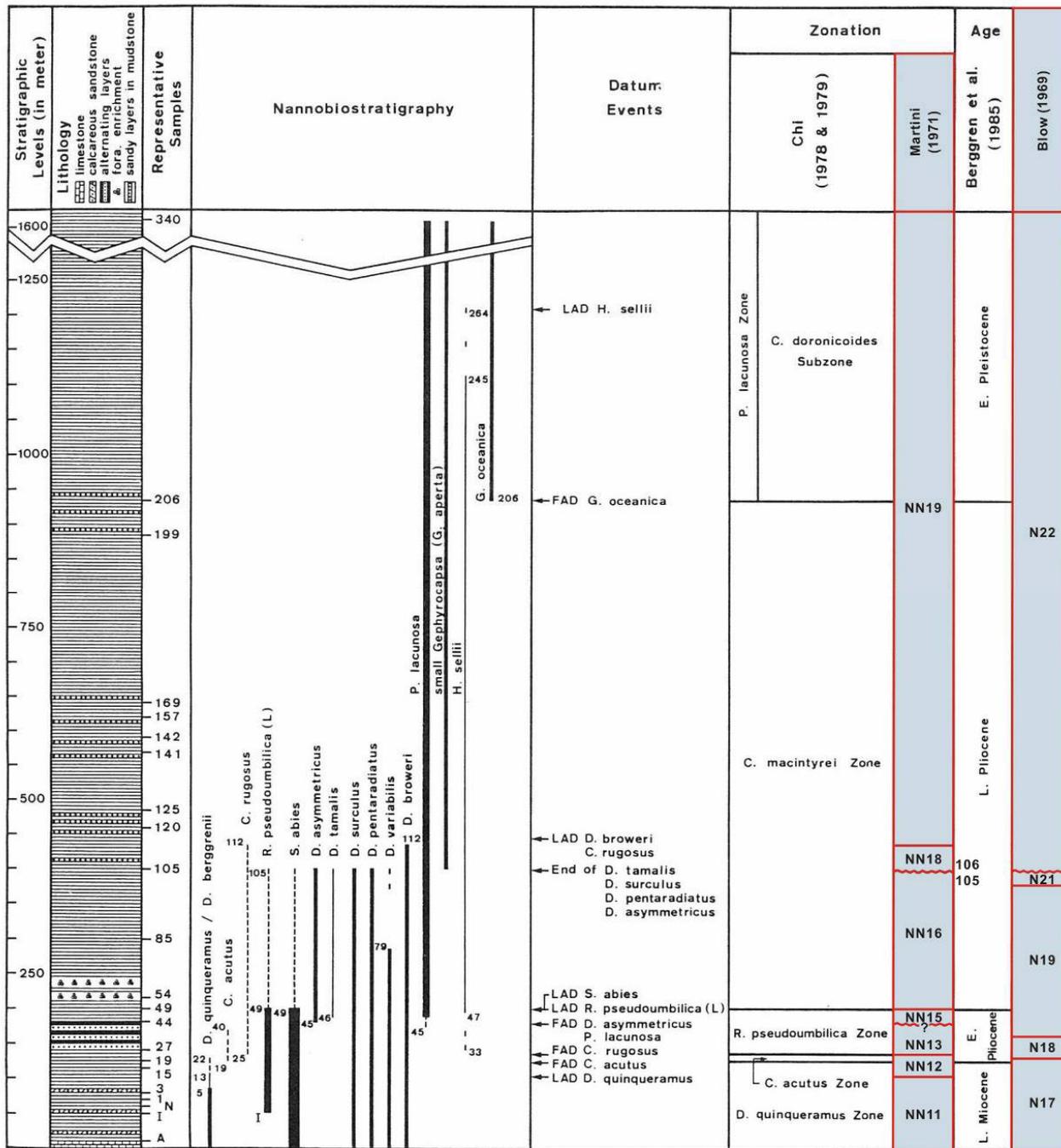
高雄	Magnetic Polarity	Planktonic Foraminiferal Zonation	Calcareous Nannofossil Zonation	Age of Events (Ma)
二仁溪西剖面				
崎頂層	Brunhes			NN21 -0.26 FAD <i>E. huxleyi</i>
				NN20 -0.46 LAD <i>P. lacunosa</i>
6 (上古亭坑層)				c -0.78 Matuyama/Brunhes
5	J	N23		-0.99 Top Jaramillo
4		N22		-1.03 Top small <i>Gephy. Z.</i>
				-1.07 Base Jaramillo
3	CM			b NN19 -1.17 Top Cobb Mt.
				-1.19 Base Cobb Mt.
				-1.24 Base small <i>Gephy. Z.</i>
古亭坑層	Matuyama			a
2	O			-1.70 FAD medium <i>Gephy. S. to D. Pulleniatina</i>
1				-1.77 Top Olduvai
小滾水斷層				
	R			NN18 -1.95 Base Olduvai
				-2.00 FAD <i>Gr. truncu.</i>
				-2.13 D. to S. <i>Pulleniatina</i>
				-2.15 Base Réunion
				NN17 -2.46 LAD <i>D. penta.</i>
				-2.55 LAD <i>D. surculus</i>
				-2.59 Gauss/Matuyama
				N21 -2.78 LAD <i>D. tamalis</i>
				NN16 -3.04 Top Kaena
				-3.11 Base Kaena
				-3.22 Top Mammoth
				-3.33 Base Mammoth
				-3.35 FAD <i>Gr. tosaensis</i>
				N19 -3.58 Gilbert/Gauss
				-3.65 LAD <i>R. pseudonumbilica</i>
				NN15



二仁溪東剖面

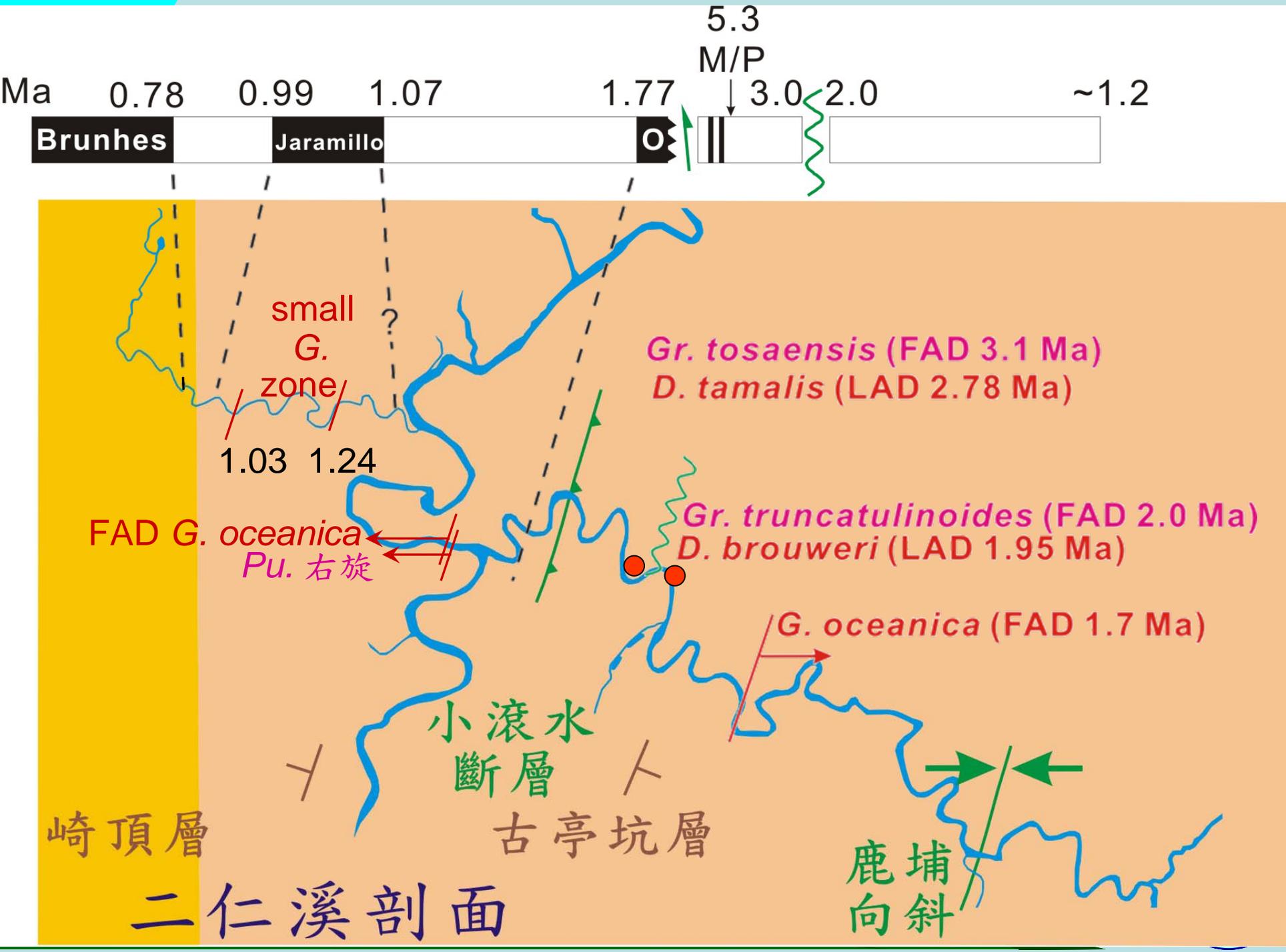


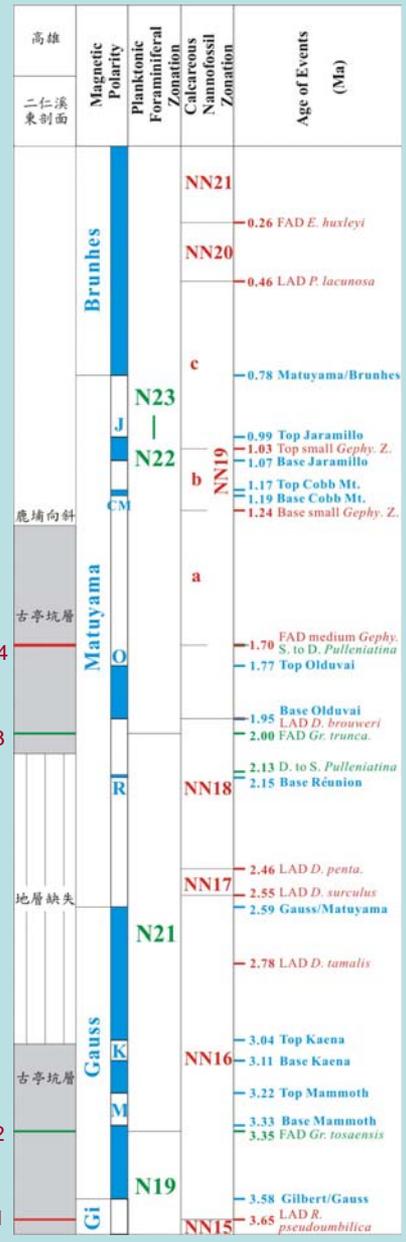
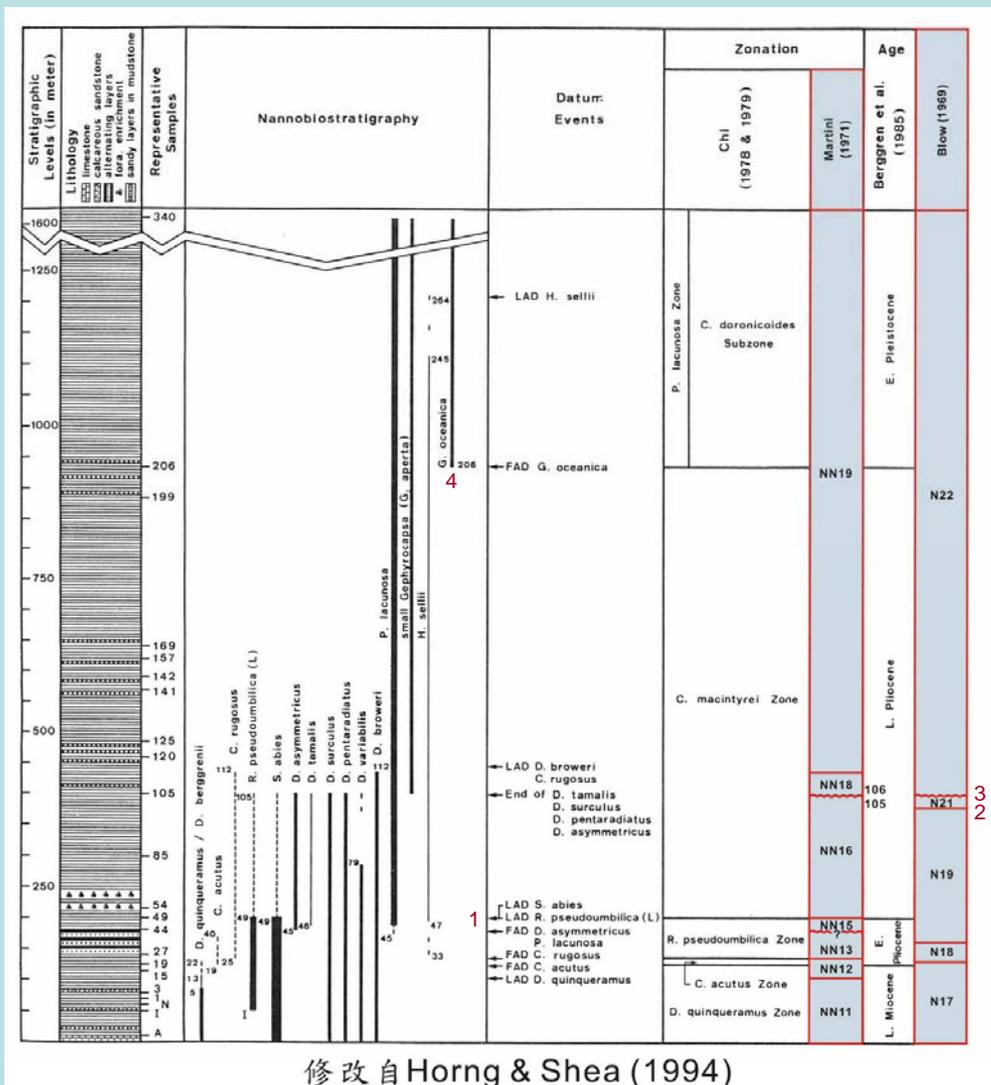




二仁溪東剖面

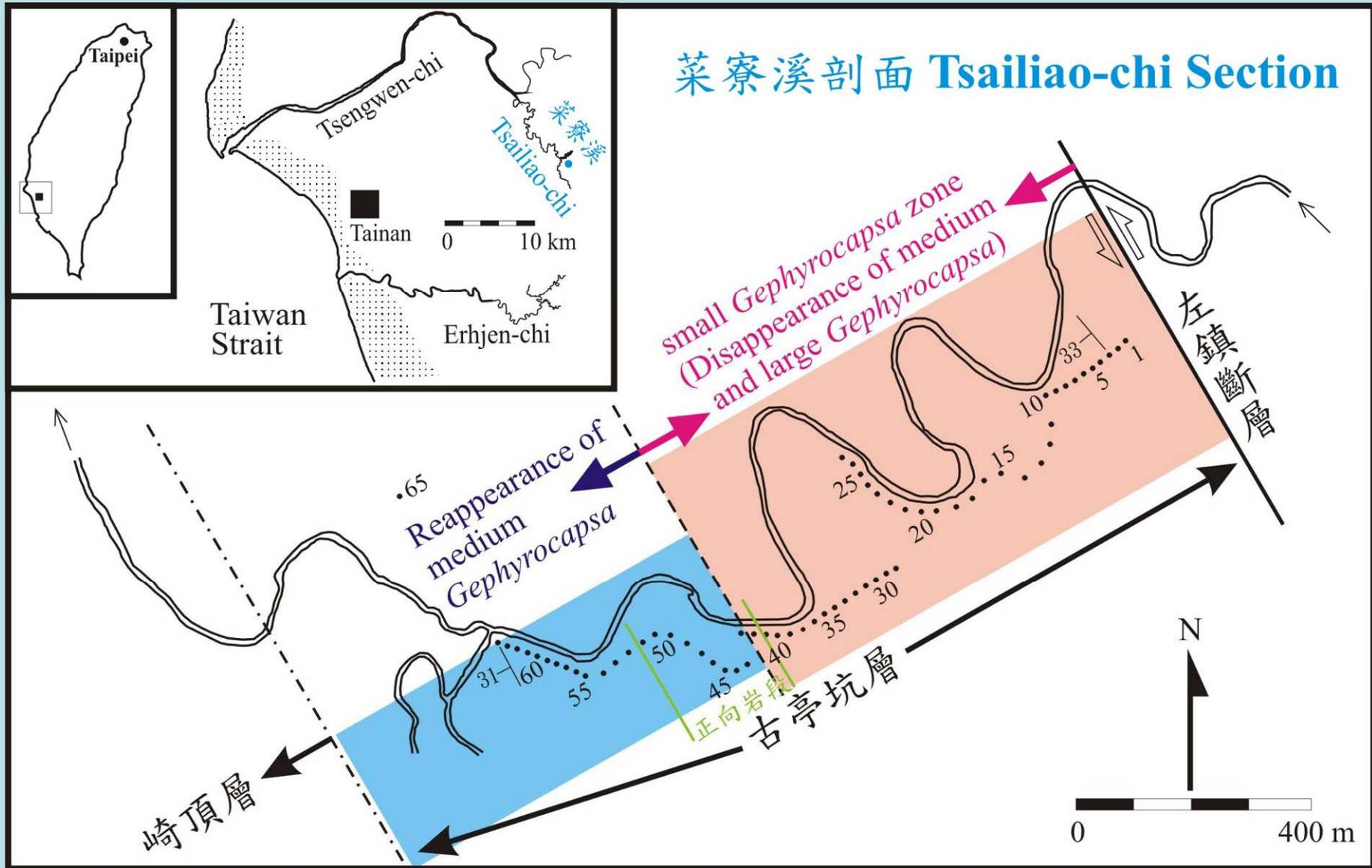
修改自 Horng & Shea (1994)





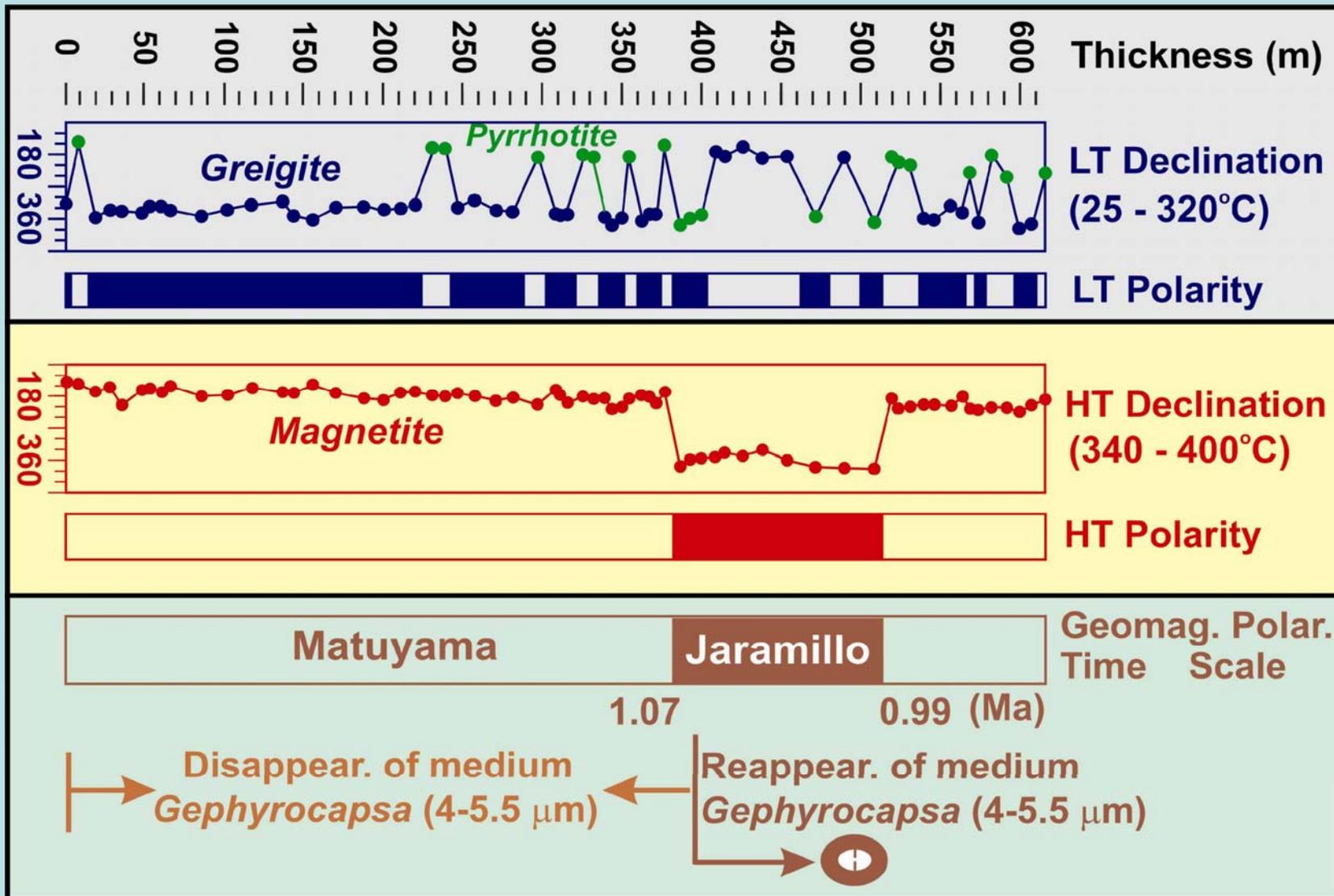
二仁溪東剖面







菜寮溪剖面

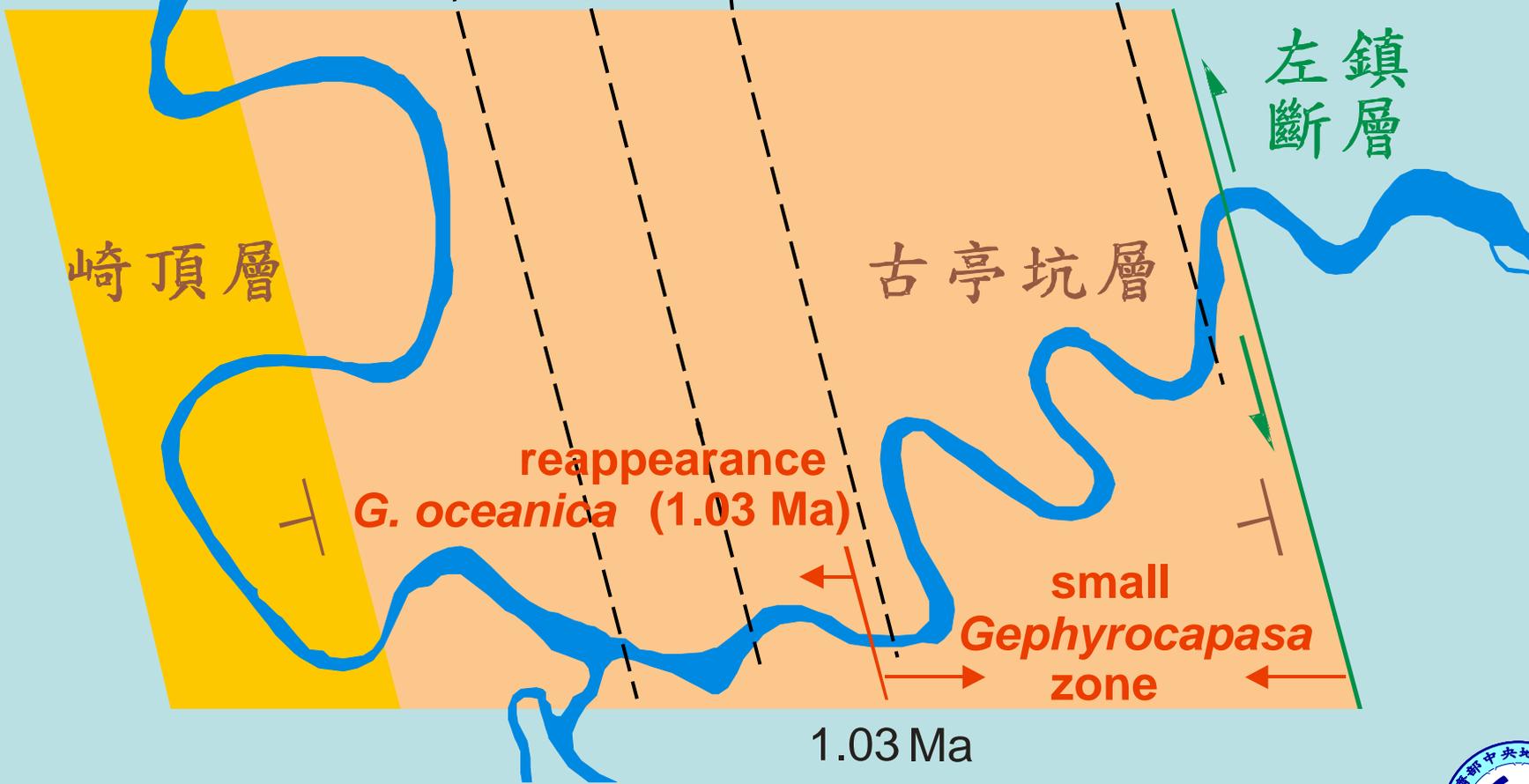




>0.78 0.99 1.07 <1.24 Ma

Jaramillo

菜寮溪剖面



崎頂層

古亭坑層

左鎮層

reappearance
G. oceanica (1.03 Ma)

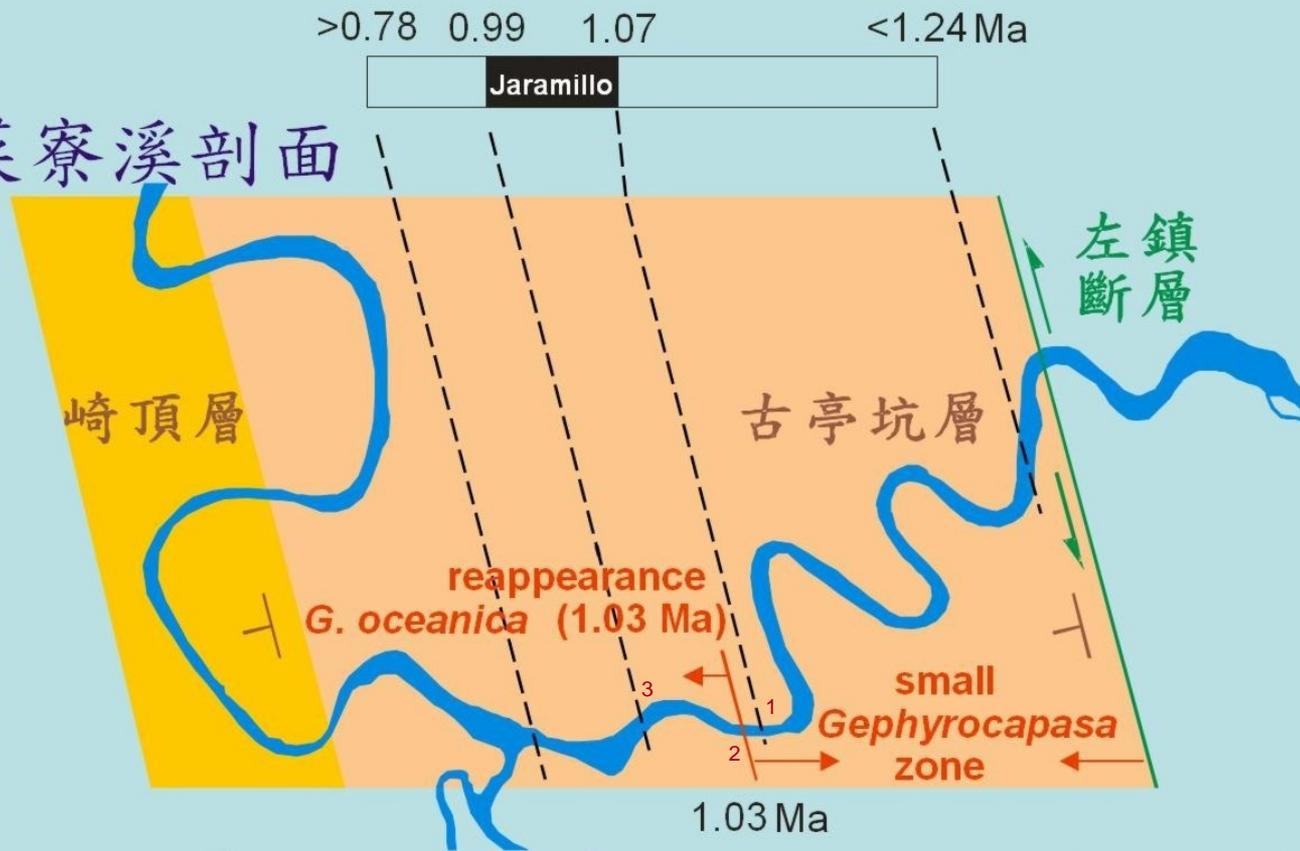
small
Gephyrocapsa
zone

1.03 Ma





菜寮溪剖面



臺南	Magnetic Polarity	Planktonic Foraminiferal Zonation	Calcareous Nannofossil Zonation	Age of Events (Ma)
菜寮溪				
崎頂層	Brunhes		NN21	0.26 FAD <i>E. huxleyi</i>
			NN20	0.46 LAD <i>P. lacunosa</i>
左鎮層			c	0.78 Matuyama/Brunhes
古亭坑層	J	N23		0.99 Top Jaramillo
左鎮層	J	N22		1.03 Top small <i>Gephy. Z.</i>
			b	1.07 Base Jaramillo
			NN19	1.17 Top Cobb Mt.
				1.19 Base Cobb Mt.
				1.24 Base small <i>Gephy. Z.</i>
			a	
				FAD medium <i>Gephy.</i>
				1.70 S. to D. <i>Pulleniatina</i>
				1.77 Top Olduvai
				Base Olduvai
				1.95 LAD <i>D. brouweri</i>
				2.00 FAD <i>Gr. trunca.</i>
			NN18	2.13 D. to S. <i>Pulleniatina</i>
				2.15 Base Réunion
			NN17	2.46 LAD <i>D. penta.</i>
				2.55 LAD <i>D. surculus</i>
				2.59 Gauss/Matuyama
			N21	
				2.78 LAD <i>D. tamalis</i>
			NN16	3.04 Top Kaena
				3.11 Base Kaena
				3.22 Top Mammoth
				3.33 Base Mammoth
				3.35 FAD <i>Gr. tosaensis</i>
			N19	
				3.58 Gilbert/Gauss
			NN15	3.65 LAD <i>R. pseudumbilica</i>



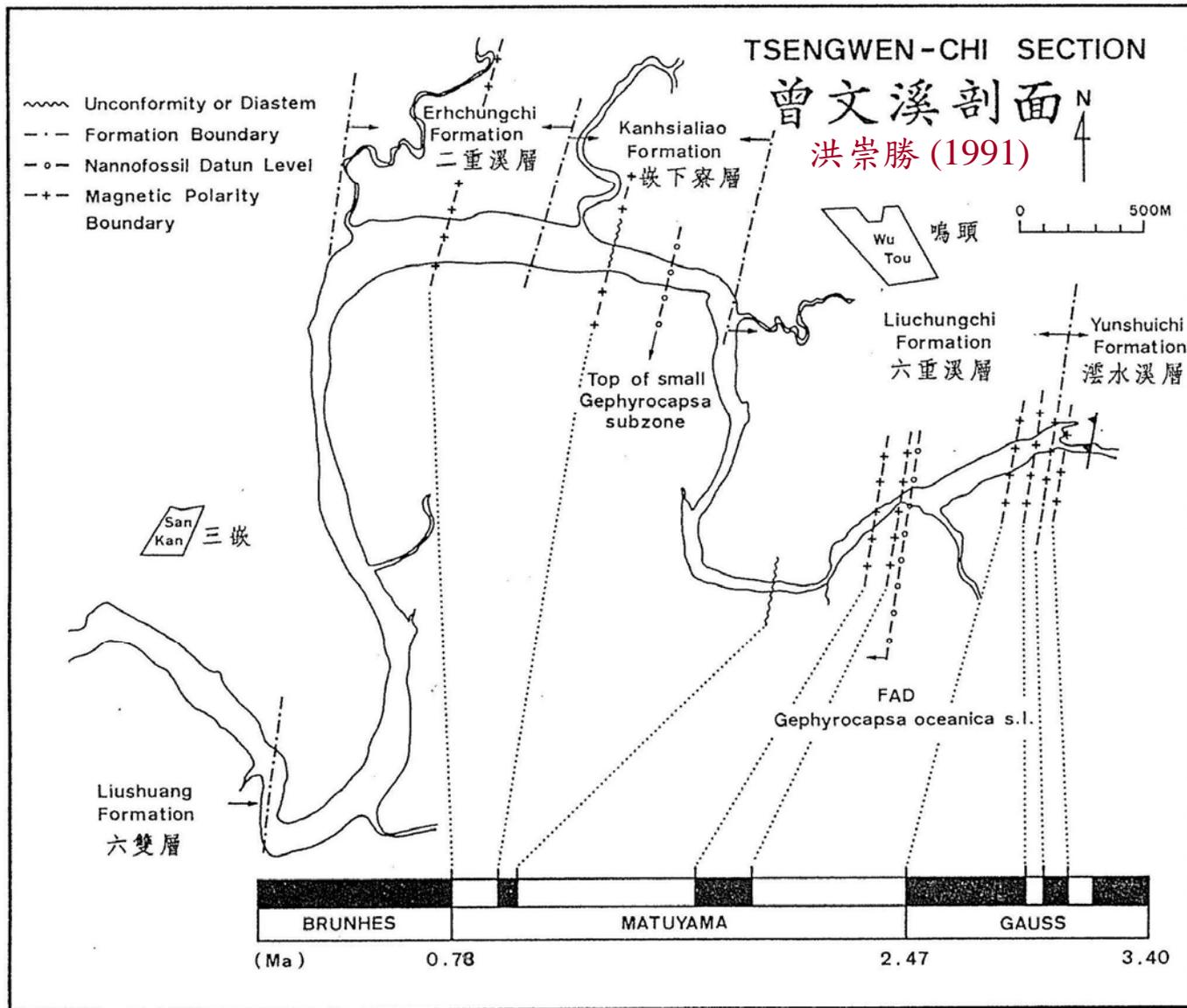
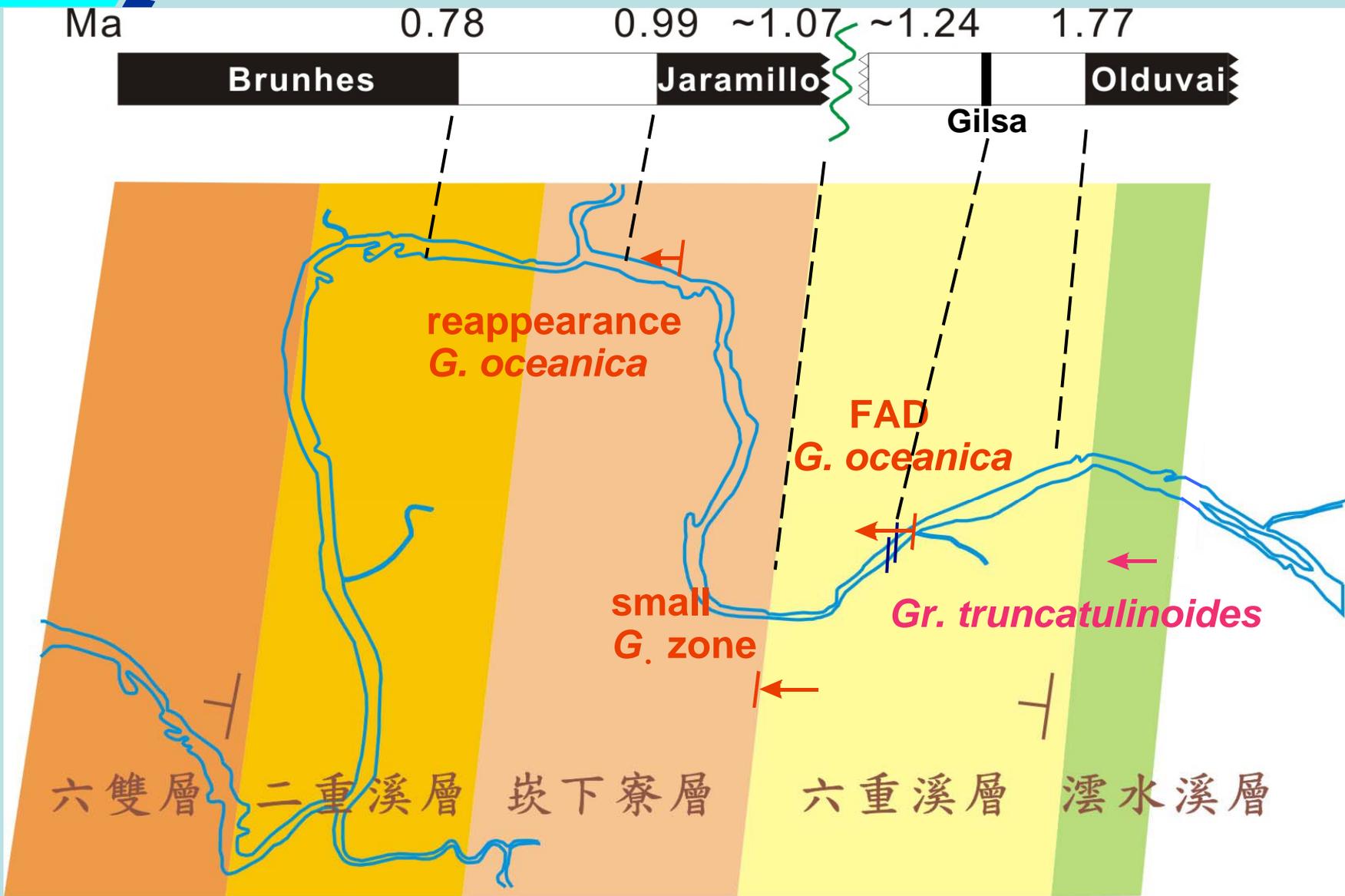
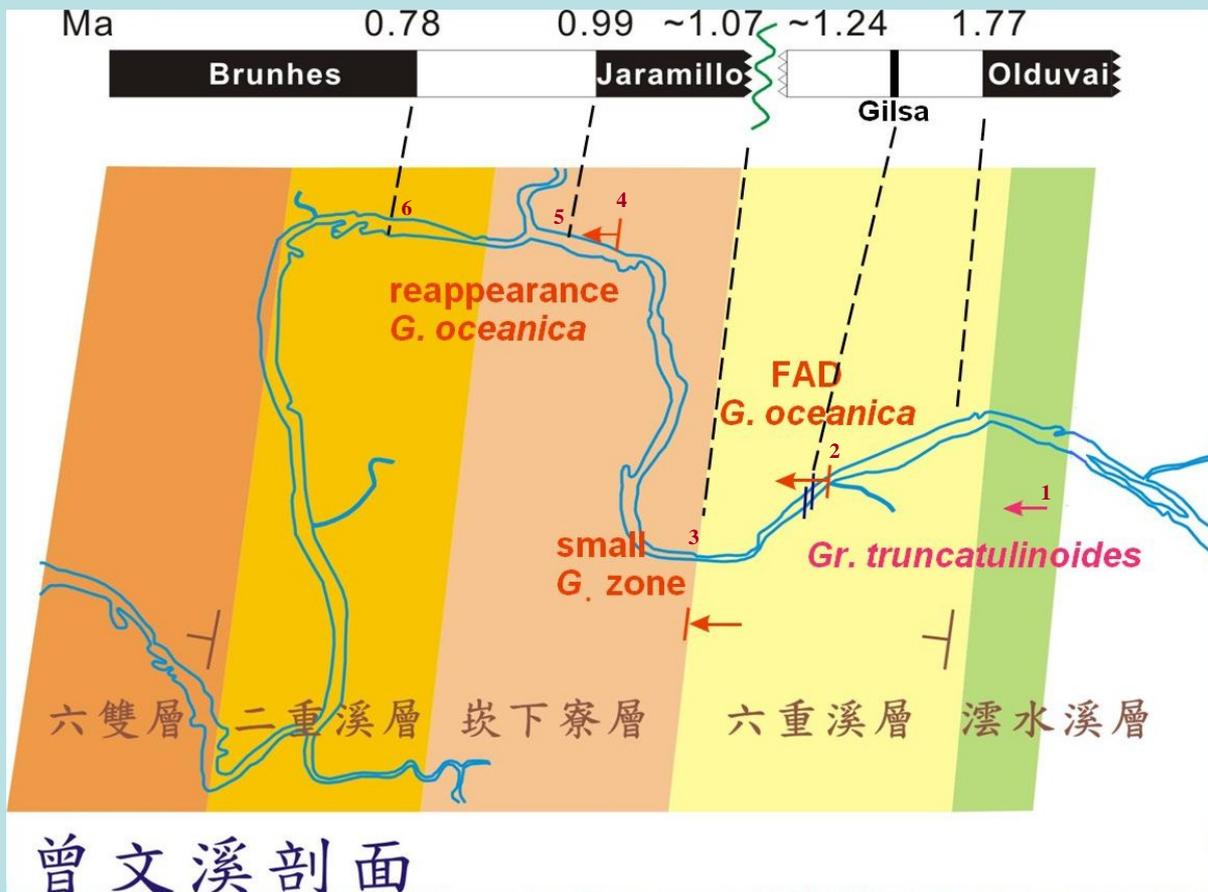


圖4-2 曾文溪剖面岩石地層、超微化石生物地層、磁地層各界面與不整合(或沉積間斷)的地理位置。其中哈拉米諾最上部的磁極過渡帶(約30公尺厚)劃入哈拉米諾事件之中



曾文溪剖面





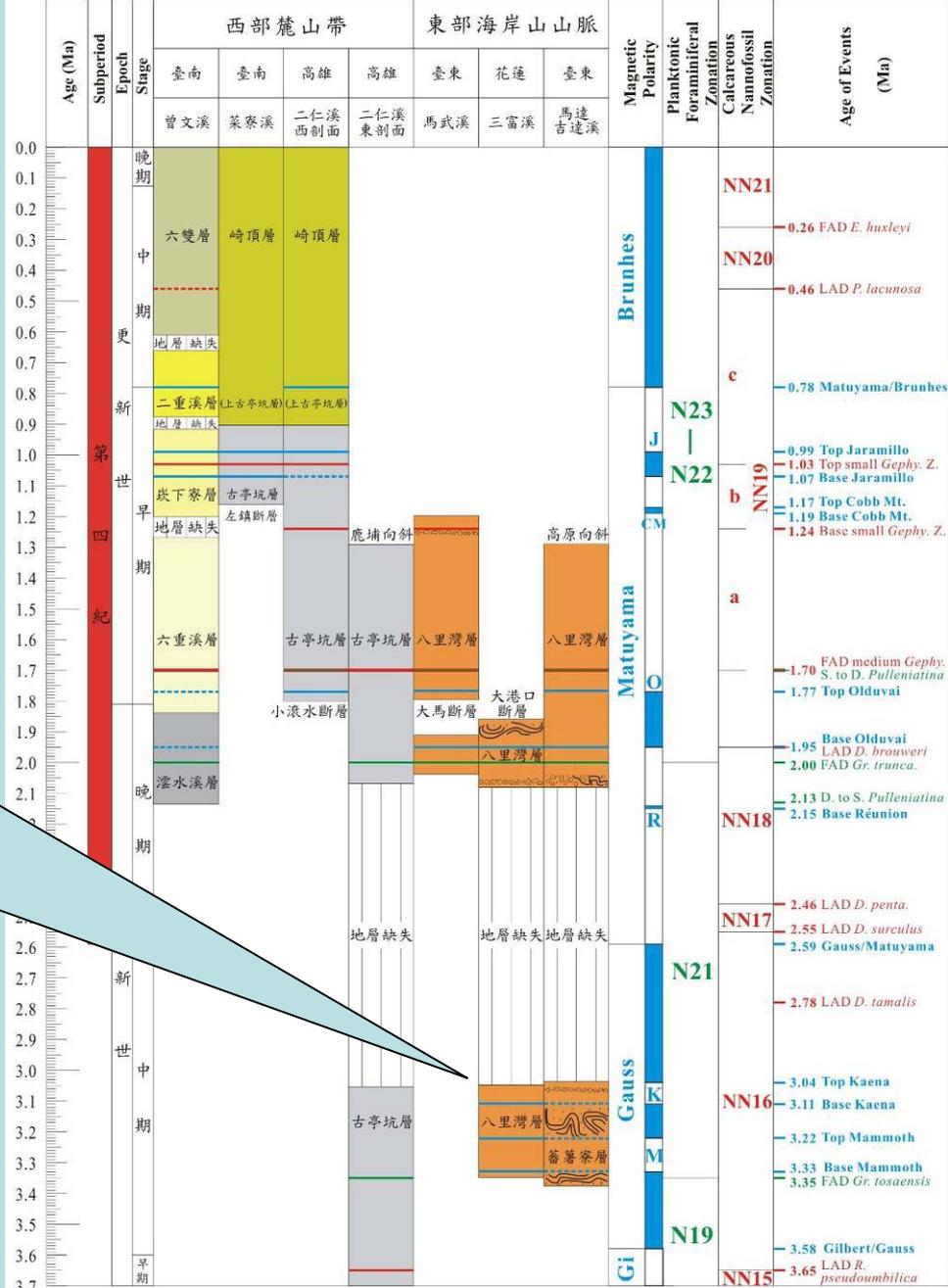
臺南	Magnetic Polarity	Planktonic Foraminiferal Zonation	Calcareous Nannofossil Zonation	Age of Events (Ma)
曾文溪				
六雙層	Brunhes		NN21	0.26 FAD <i>E. huxleyi</i>
地層缺失			NN20	0.46 LAD <i>P. lacunosa</i>
6 二重溪層		N23	c	0.78 Matuyama/Brunhes
地層缺失		J		0.99 Top Jaramillo
5 崁下寮層		N22	b	1.03 Top small <i>Gephy. Z.</i>
地層缺失		CM	NN19	1.07 Base Jaramillo
六重溪層	Matuyama		a	1.17 Top Cobb Mt.
2 澗水溪層		O		1.19 Base Cobb Mt.
1		R	NN18	1.24 Base small <i>Gephy. Z.</i>
				1.70 FAD medium <i>Gephy. S. to D. Pulleniatina</i>
			NN17	1.77 Top Olduvai
				1.95 Base Olduvai
				LAD <i>D. braueri</i>
				2.00 FAD <i>Gr. trunc.</i>
				2.13 D. to S. <i>Pulleniatina</i>
				2.15 Base Réunion
				2.46 LAD <i>D. penta.</i>
				2.55 LAD <i>D. surculus</i>
				2.59 Gauss/Matuyama
			N21	2.78 LAD <i>D. tamalis</i>
				3.04 Top Kaena
				3.11 Base Kaena
				3.22 Top Mammoth
				3.33 Base Mammoth
				3.35 FAD <i>Gr. tosaensis</i>
			N19	3.58 Gilbert/Gauss
				LAD R
				3.65 <i>pseudumbilica</i>





結論：

若依據前人之地層劃分，三富溪剖面礫岩之下的岩段歸為八里灣層，而馬達吉達溪剖面礫岩之下的岩段則歸為蕃薯寮層，顯然兩者的劃分並不一致。



結 論

- 位於馬達吉達溪和三富溪剖面覆蓋於都巒山層之上的沈積岩層，其底部年代皆屬「上新世晚期 (NN16)」，此一結果較以往所認定的「上新世早期 (NN13-15)」來得年輕。
- 馬達吉達溪和三富溪剖面巨厚沈積岩層內所夾之礫岩雖分屬不同盆地，但年代一致，皆代表3至2 Ma時期的一段地層缺失。
- 在馬達吉達溪剖面，礫岩以下岩段一般稱為蕃薯寮層，礫岩及其以上之濁流岩層稱八里灣層，但在三富溪剖面同期礫岩之下岩段卻歸為八里灣層，地層之分層值得再檢討。
- 位於左鎮斷層以南出露的地層，如出露於二仁溪剖面的「上部古亭坑層」應對比至曾文溪剖面之「二重溪層」，而二仁溪剖面的「二重溪層」和「六雙層」則應對比至曾文溪剖面之「六雙層」。為避免兩個剖面二重溪層和六雙層名稱之混淆，地調所已將左鎮斷層以南地層回復為古亭坑層和崎頂層，崎頂層由下至上再分為岡子林段、過嶺段和大坑尾段，對應於此區域舊有地層名稱之上部古亭坑層、二重溪層和六雙層。