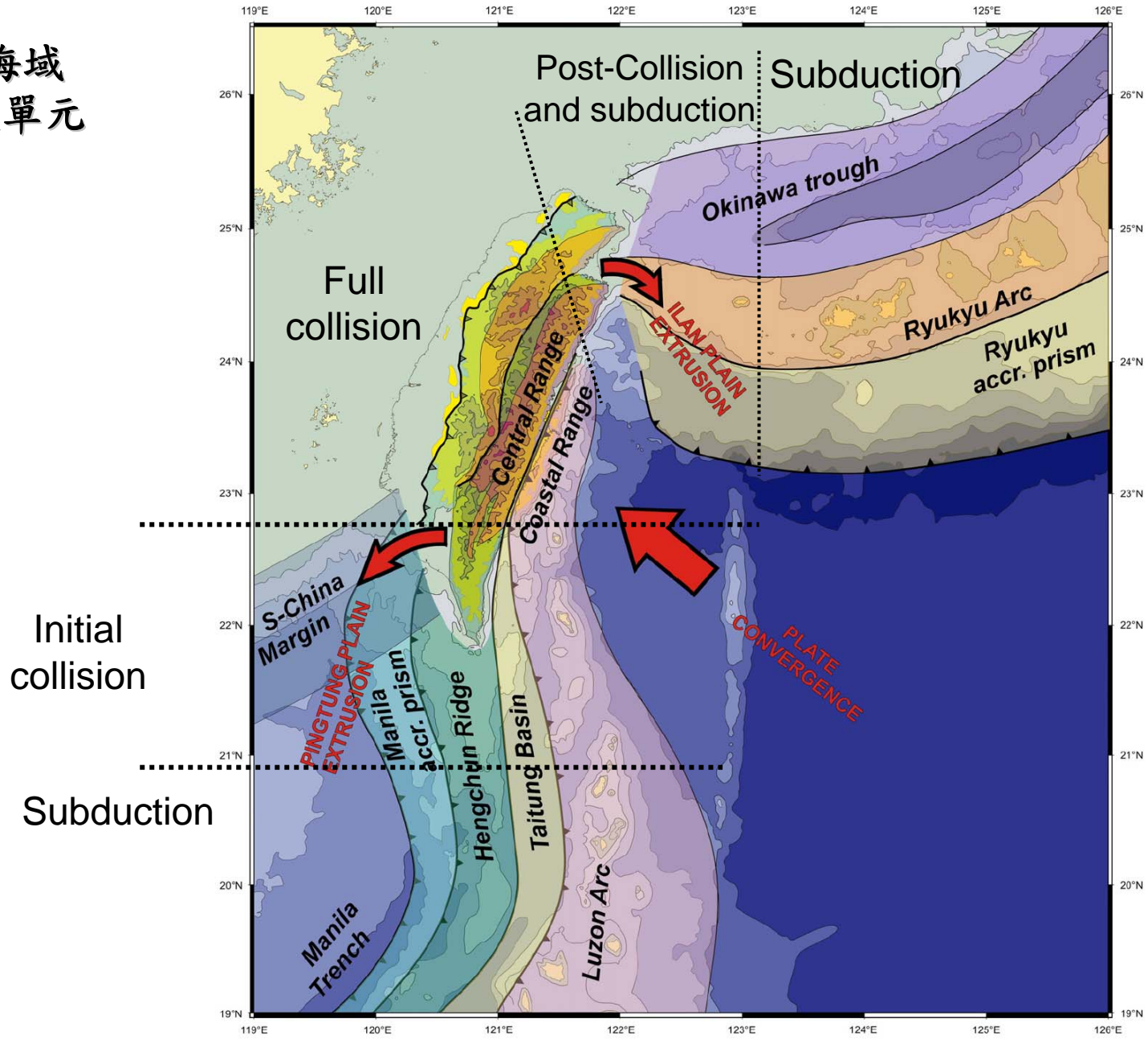


國立中央大學 地球科學系 台灣地質(GP4031) 課程內容簡介

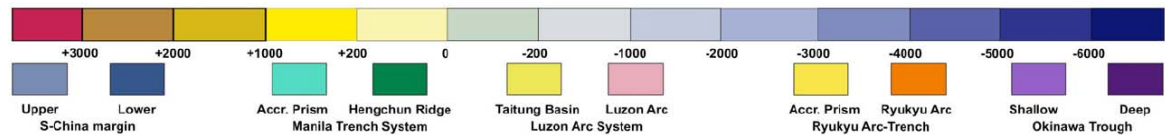
台灣地質授課內容及台灣陸海域地質主要研究範疇

- 台灣陸海域地體構造單元
- 台灣陸海域地質分區
- 台灣沈積岩的岩性地層、生物地層、磁性地層
- 台灣的變質岩
- 台灣的火成岩
- 台灣地區古生代至中生代地體構造演化
- 台灣地區新生代、弧陸碰撞前（中新世晚期以前）地體構造與盆地演化
- 台灣地區中新世晚期以後，弧陸碰撞所造成的造山過程、盆地演化
- 海岸山脈地體構造與盆地演化
- 脊樑山脈、西部麓山帶及台灣海峽的變形構造
- 台灣地區近期的地殼變形
- 台灣的活斷層
- 台灣陸海域地殼結構
- 台灣地震震源機制與地體構造關係
- 台灣島上升、侵蝕速率及提供沈積物量

台灣陸海域地體構造單元

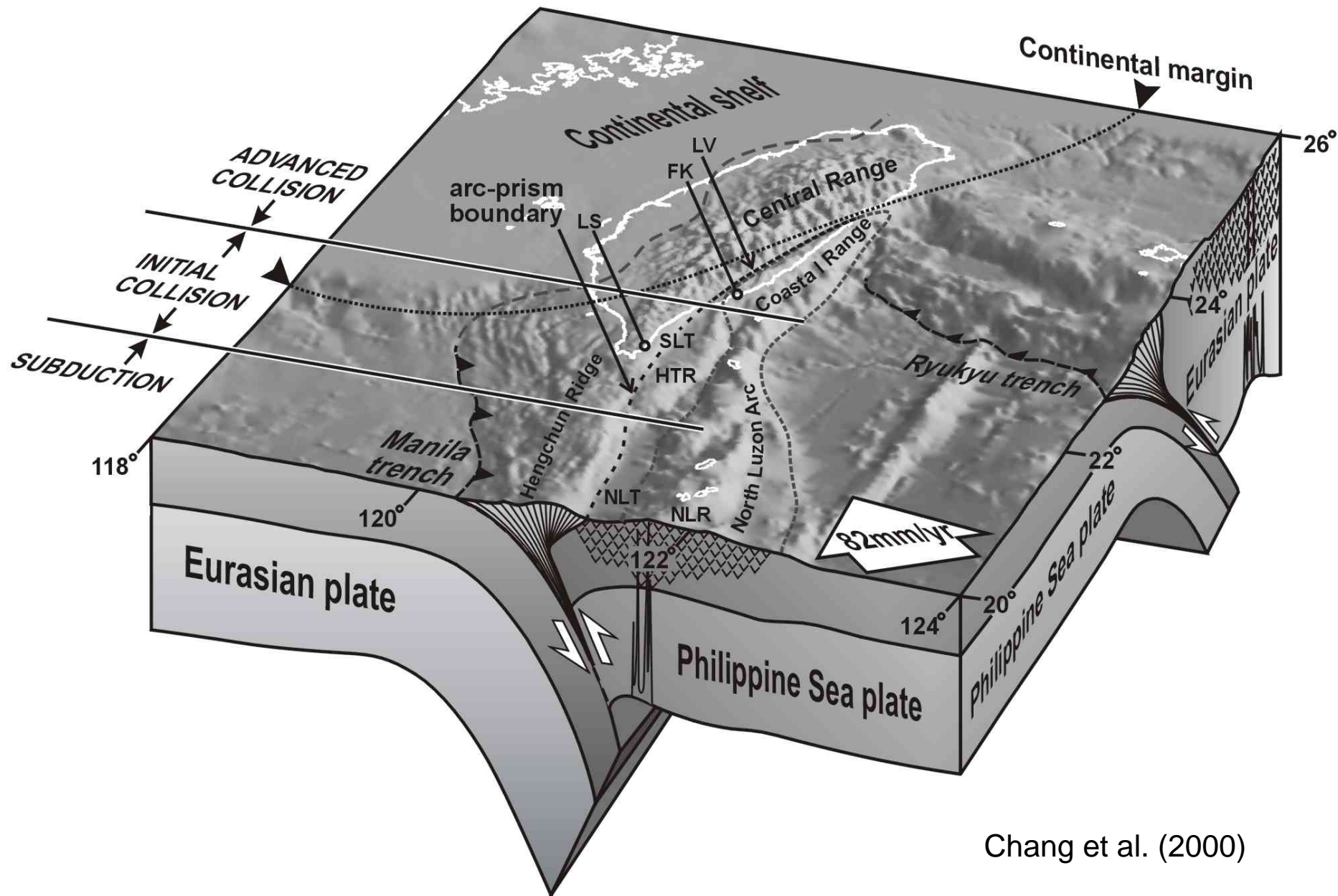


Angelier et al. (2008)



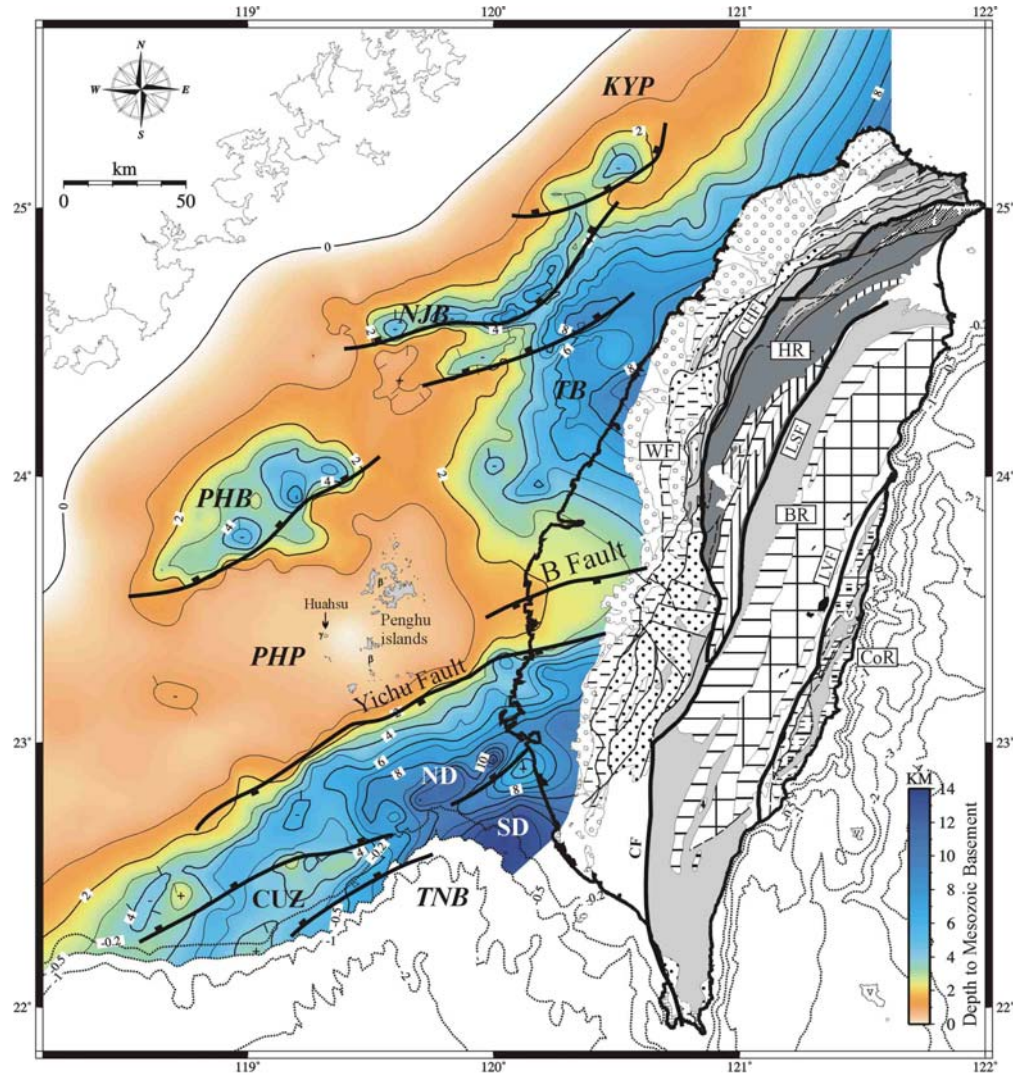
台灣陸海域地體構造單元

台灣地區板塊三維模型



Chang et al. (2000)

台灣陸海域地質分區

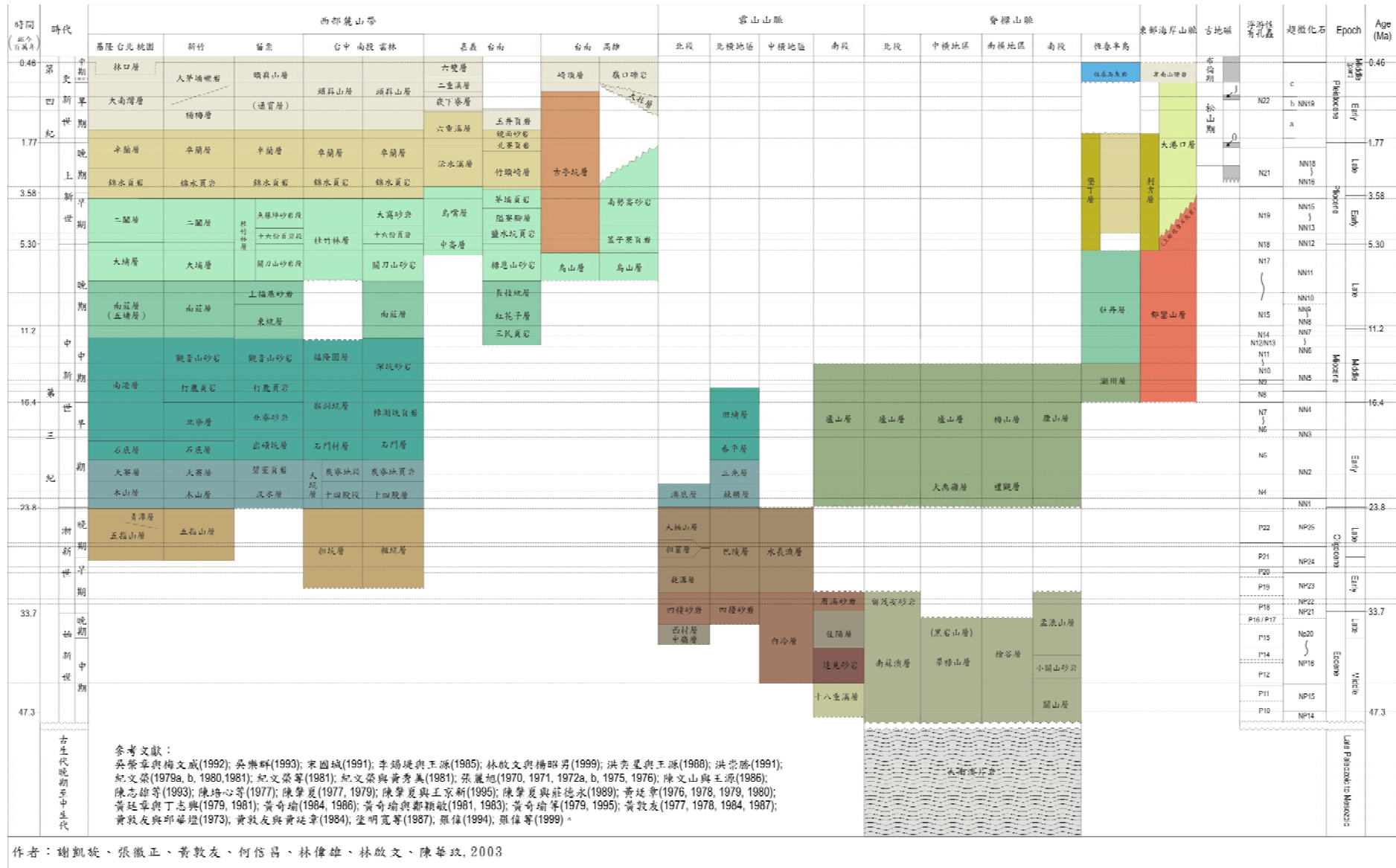


Lin et al. (2003)

KEY		EXPOSED GEOLOGY	
SUBSURFACE GEOLOGY		Geological Structures	
Depth Map of the Mesozoic Basement: Contour Interval 1 km		<ul style="list-style-type: none"> Lower Pliocene/Upper Miocene Series undifferentiated Miocene Series Lower Miocene/Upper Oligocene undifferentiated Oligocene Series Eocene/Oligocene Series undifferentiated Eocene Series 	
<ul style="list-style-type: none"> Normal fault 		<ul style="list-style-type: none"> Upper Palaeozoic and Mesozoic Erathem Pleistocene Andesite and Andesitic Pyroclastics Miocene Basalt Miocene/Pliocene Andesite and Andesitic Pyroclastics Early Palaeogene Porphyry Mafic Igneous Rocks (pre-Tertiary) 	
林殿順(2001)			

BR=脊梁山脈, CF=潮洲斷層, CHF=屈尺斷層, CoR=海岸山脈, CUZ=中央隆起帶, HR=雪山山脈, KYP=觀音地台, LSF=梨山斷層, LVF=花東縱谷斷層, ND=北部凹陷, NJB=南日島盆地, PHB=澎湖盆地, PHP=澎湖地台, SD=南部凹陷, TNB=台南盆地, TB=台西盆地, WF=西部麓山帶

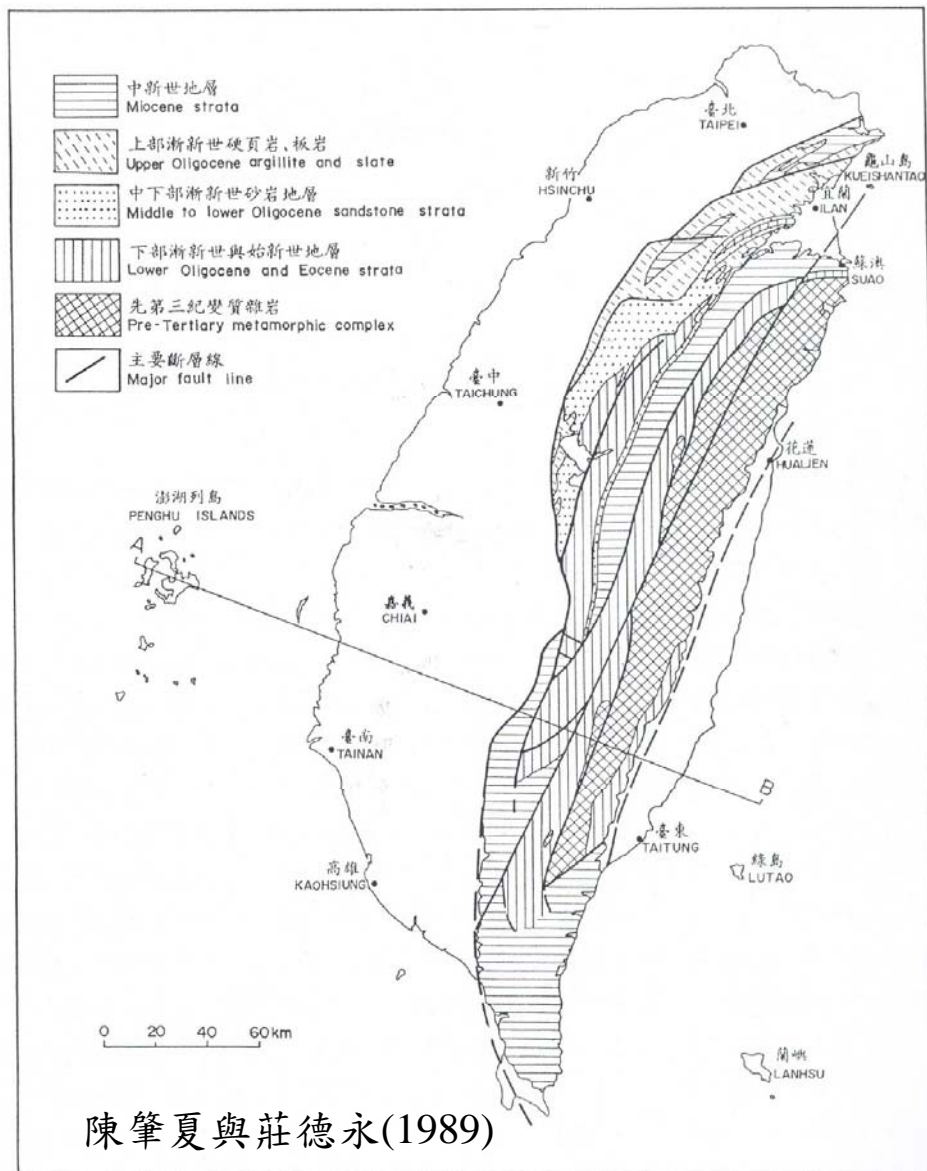
台灣的地層



謝凱旋及黃敦友(2003) 台灣第三系的地層層序，台灣礦業。

台灣的變質岩

雪山山脈與中央山脈地質



台灣變質相分布



台灣的火成岩

岩區	火成岩分佈地點		主要岩性
北部岩區	大屯火山羣		凝灰岩、高鋁玄武岩、輝石安山岩及角閃石安山岩
	基隆火山羣		石英安山岩
	觀音山和黃尾嶼		鹼長基玄武岩及輝石安山岩
	草嶺山		白榴基玄武岩
	彭佳嶼、棉花嶼和花瓶嶼		高鋁玄武岩及輝石安山岩
	龜山島		輝石安山岩
東部岩區	安山岩類	樂合溪剖面	凝灰岩、枕狀熔岩、玄武質角礫岩及安山質角礫岩
		奇美—豐濱地區	輝石安山岩、角閃石安山岩、角礫岩及白色凝灰岩和中酸凝灰岩
		烏石鼻和三仙台	輝石安山岩
	綠島和小蘭嶼	集塊岩及黑雲母角閃石安山岩	
蘭嶼	集塊岩、凝灰岩及角閃石安山岩		
蛇綠岩系	關山火成雜岩	玻璃質玄武岩(台灣岩)、粗粒玄武岩、基性和超基性深成岩	
	利吉火成岩塊	玻璃質玄武岩、粗粒玄武岩、基性和超基性深成岩	
西部岩區	澎湖羣島		鹼性玄武岩及矽質玄武岩
	關西—竹東和角板山地區		鹼性玄武岩及矽質玄武岩
	公館附近地區		鹼性玄武岩及矽質玄武岩

安山岩
凝灰岩
角礫岩

安山岩
凝灰岩
角礫岩

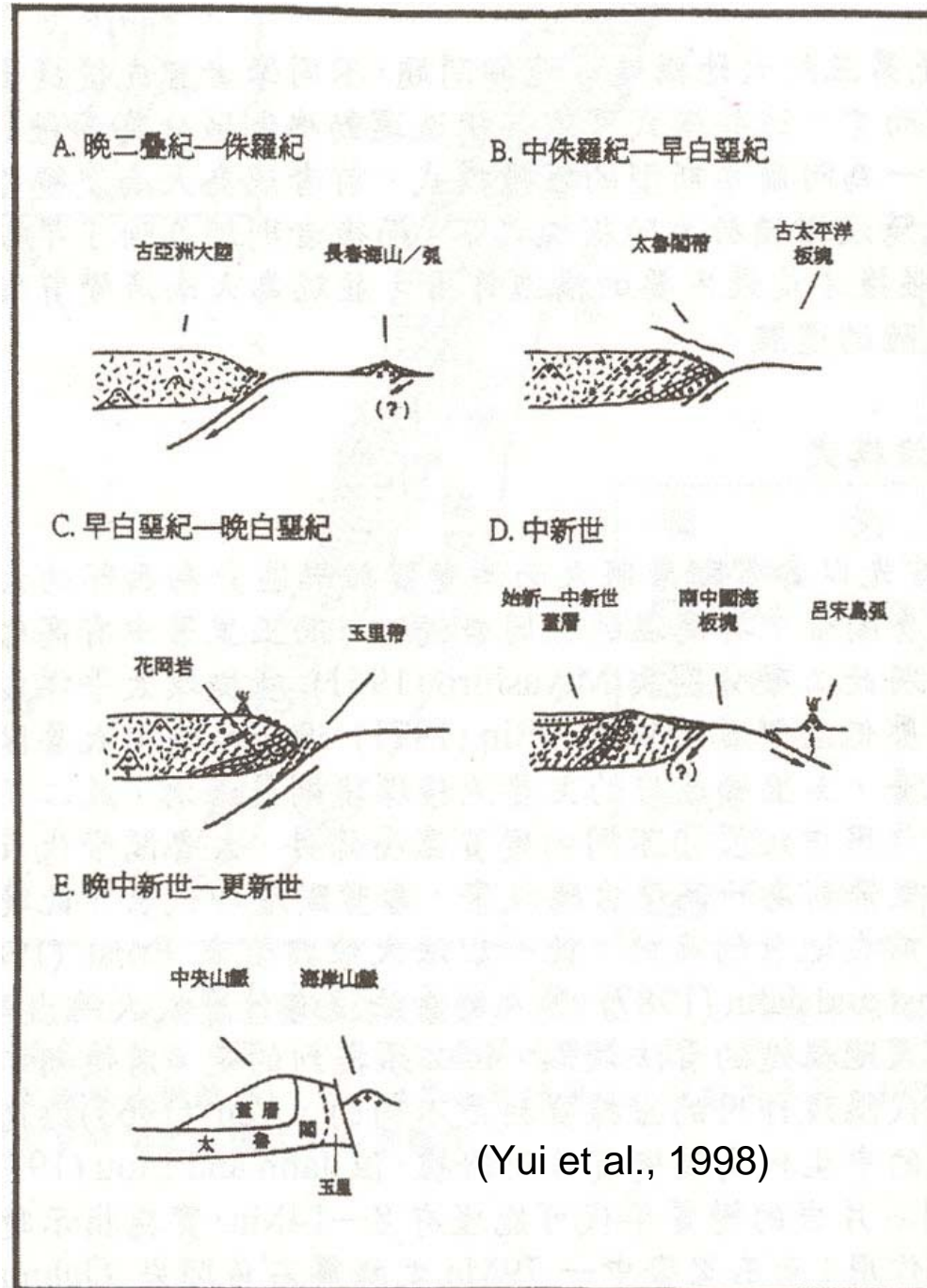
玄武岩、橄欖岩

玄武岩
凝灰岩

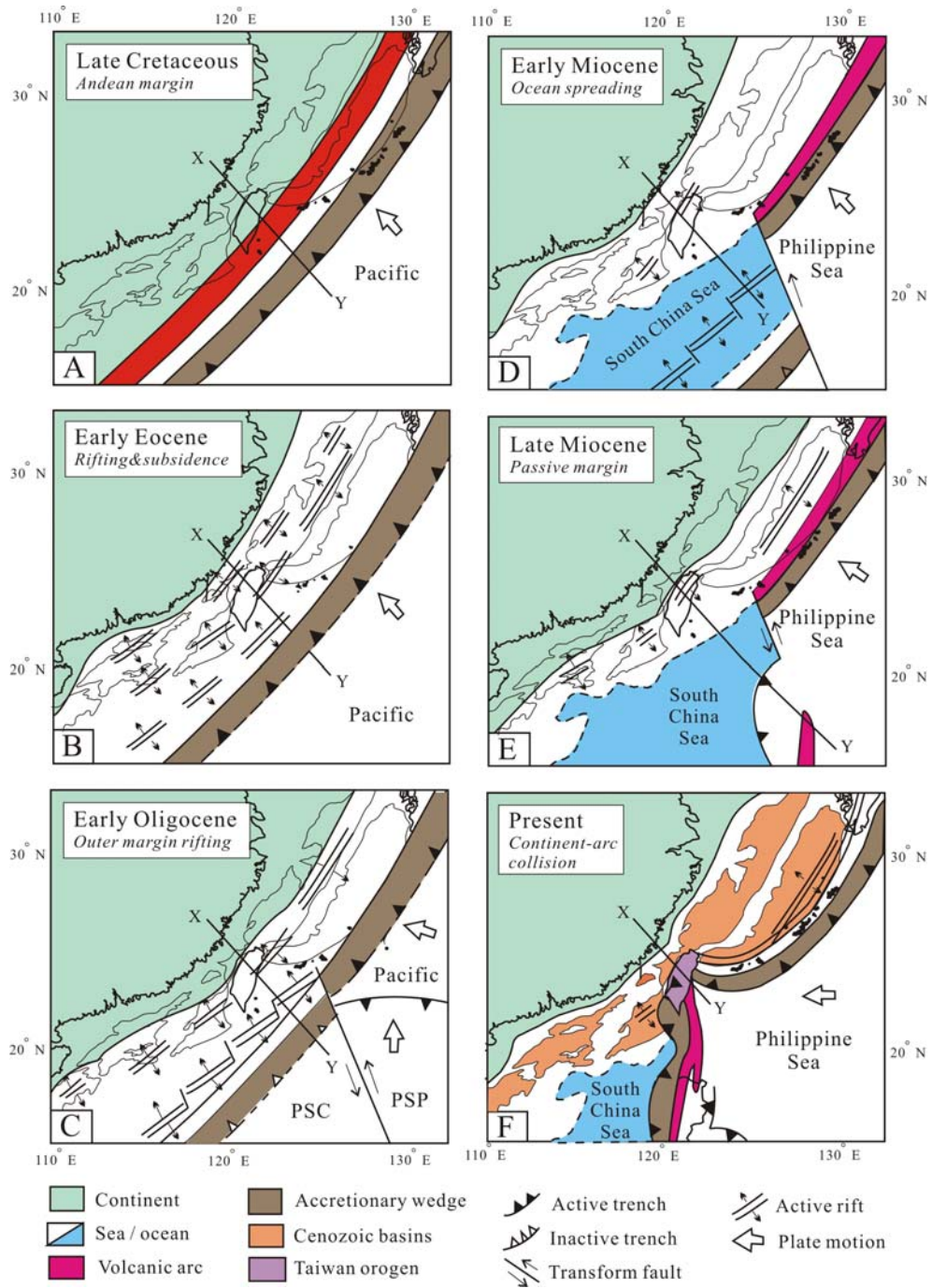
註：鹼性玄武岩包括似碧玄岩、鹼性橄欖玄武岩及方沸石煌綠岩

陳正宏(1990)

台灣地區古生代至中生代地體構造演化 (右圖 A-C)

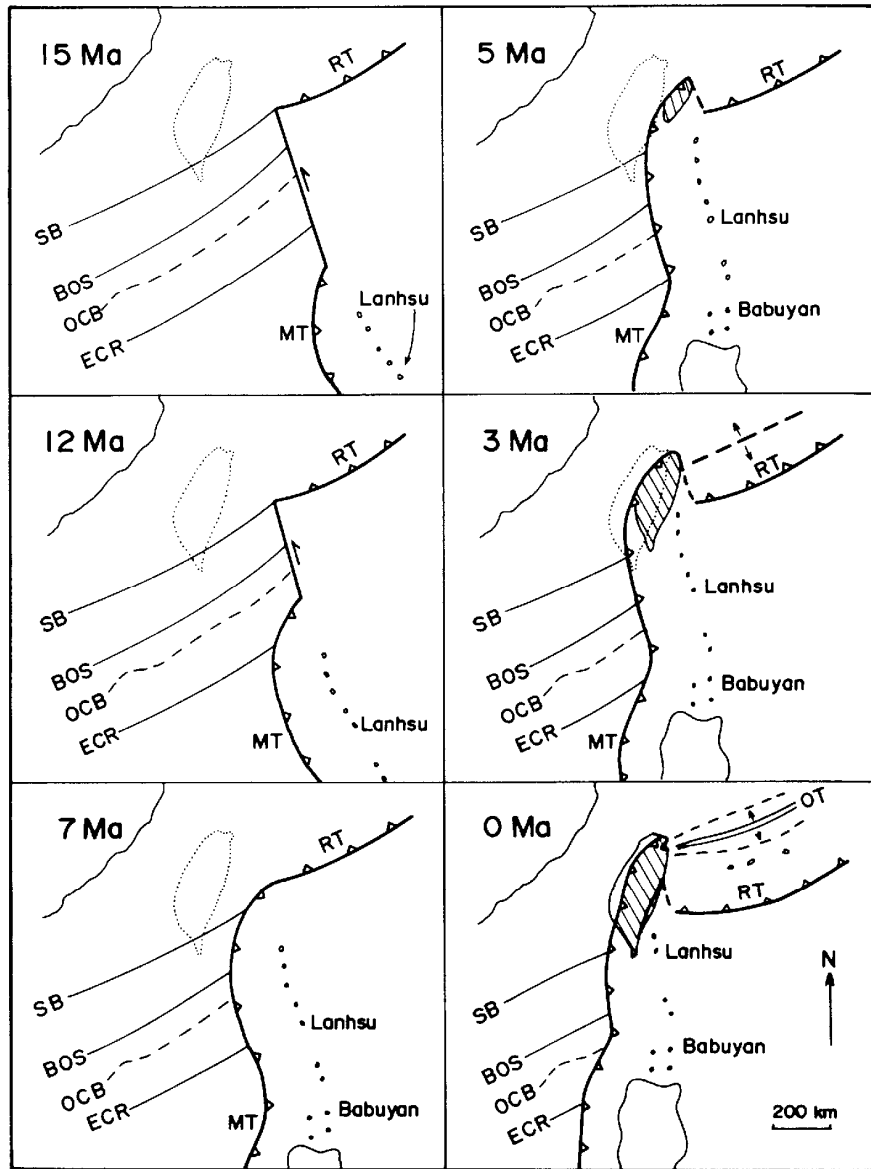


台灣地區新生代地體構造與盆地演化

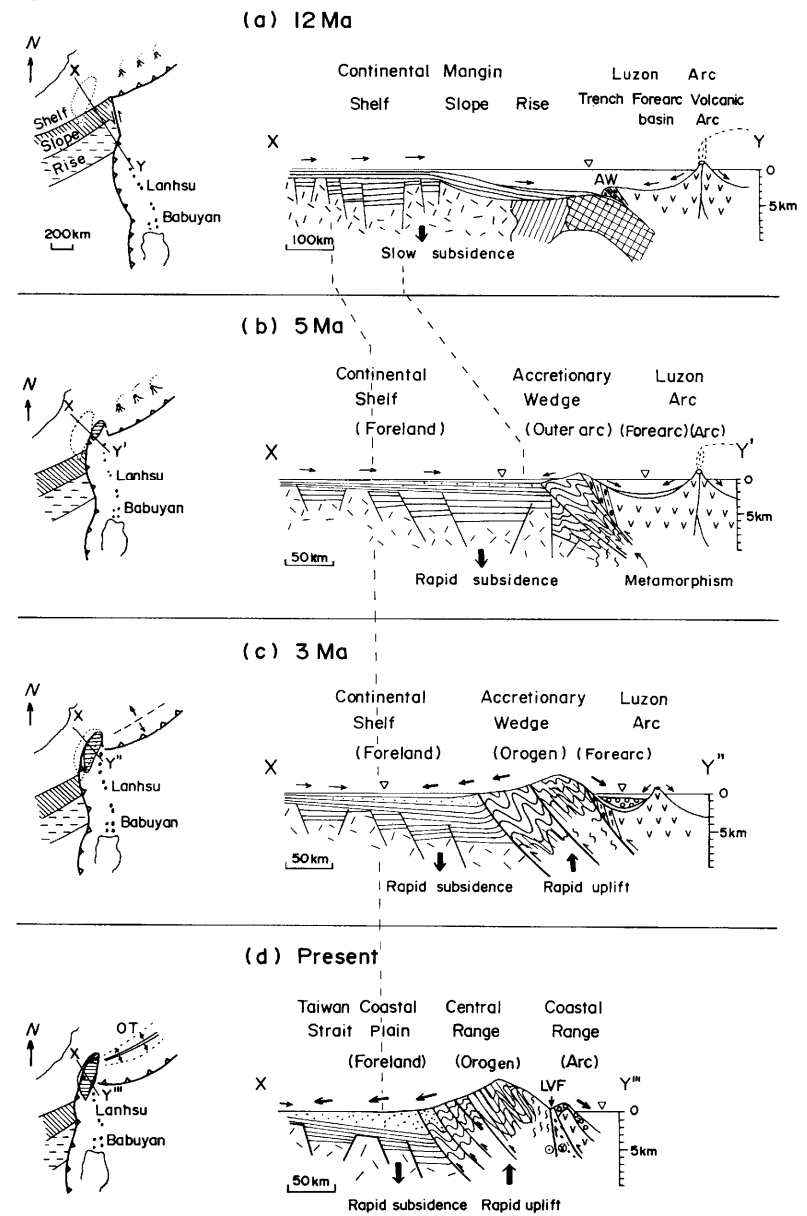


Teng and Lin (2004)

台灣弧陸碰撞演化史

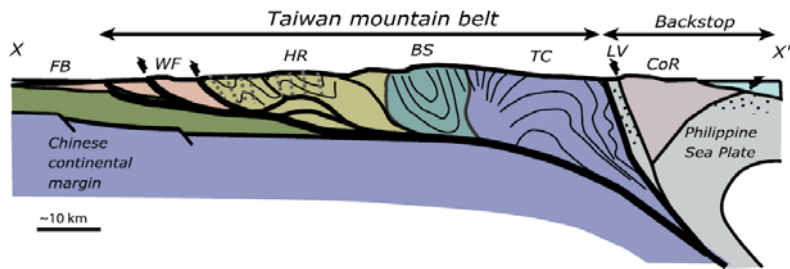


Teng (1990)



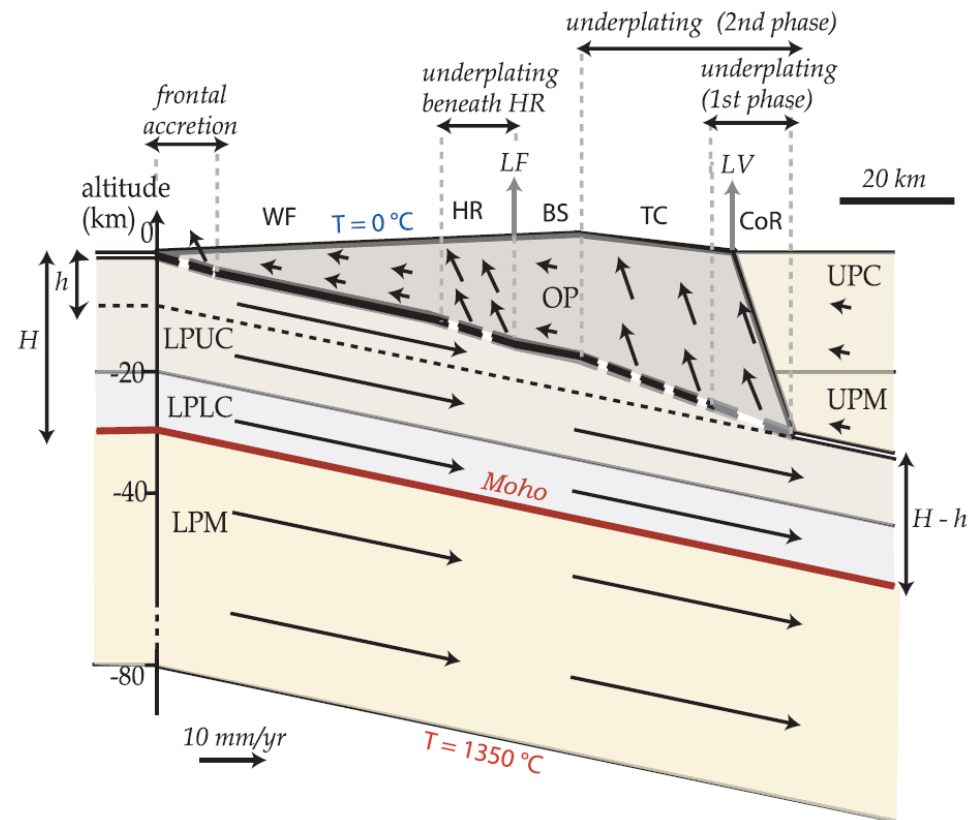
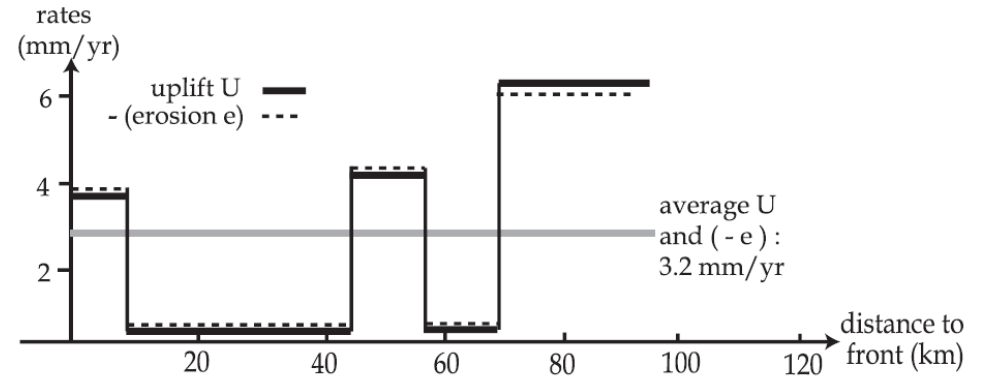
10
Teng (1990)

台灣造山帶演化 模擬

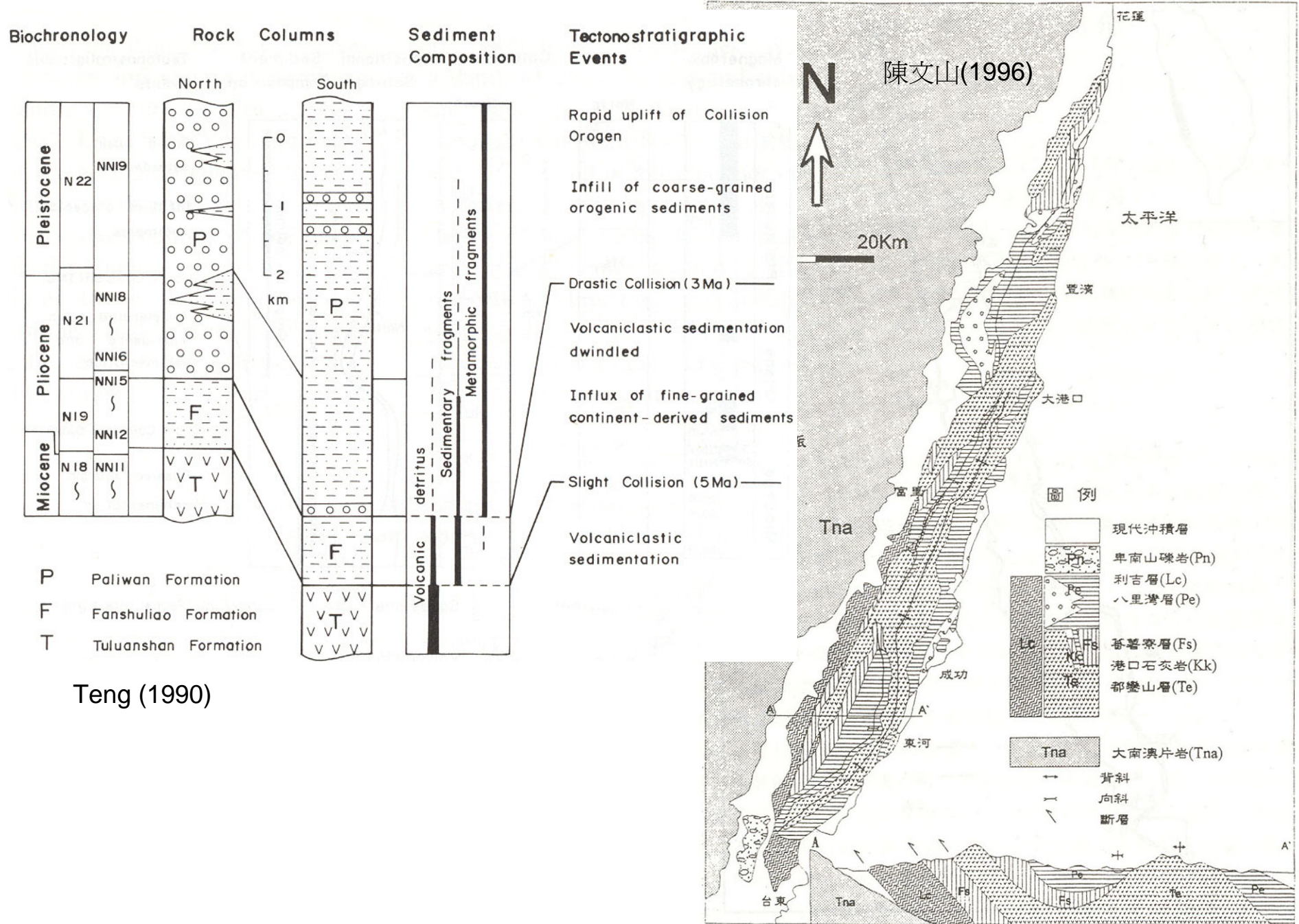


(bottom) Geometry of our preferred thermokinematic model, with the different domains of homogeneous thermal and kinematic properties: lower plate mantle (LPM), lower plate lower crust (LPLC), lower plate upper crust (LPUC), orogenic wedge (OP), upper plate mantle (UPM) and upper plate crust (UPC). The shear zone is represented by a thicker line, which is dashed where the different underplating windows are located. The velocity field, as derived since 1.5 Ma after widening of the underplating window below the TC, is shown. The main tectonostratigraphic units are represented. The Lishan Fault (LF) is modeled as a vertical shear zone accommodating the differential uplift between the HR and the BS units. Our model predicts that the contact between the orogenic wedge and the backstop (LV and CoR) is a kinematic normal fault. Note that the vertical axis is not scaled for depths greater than 55 km.

(top) Predicted uplift and erosion rates over the Taiwan mountain belt, U and e , respectively.

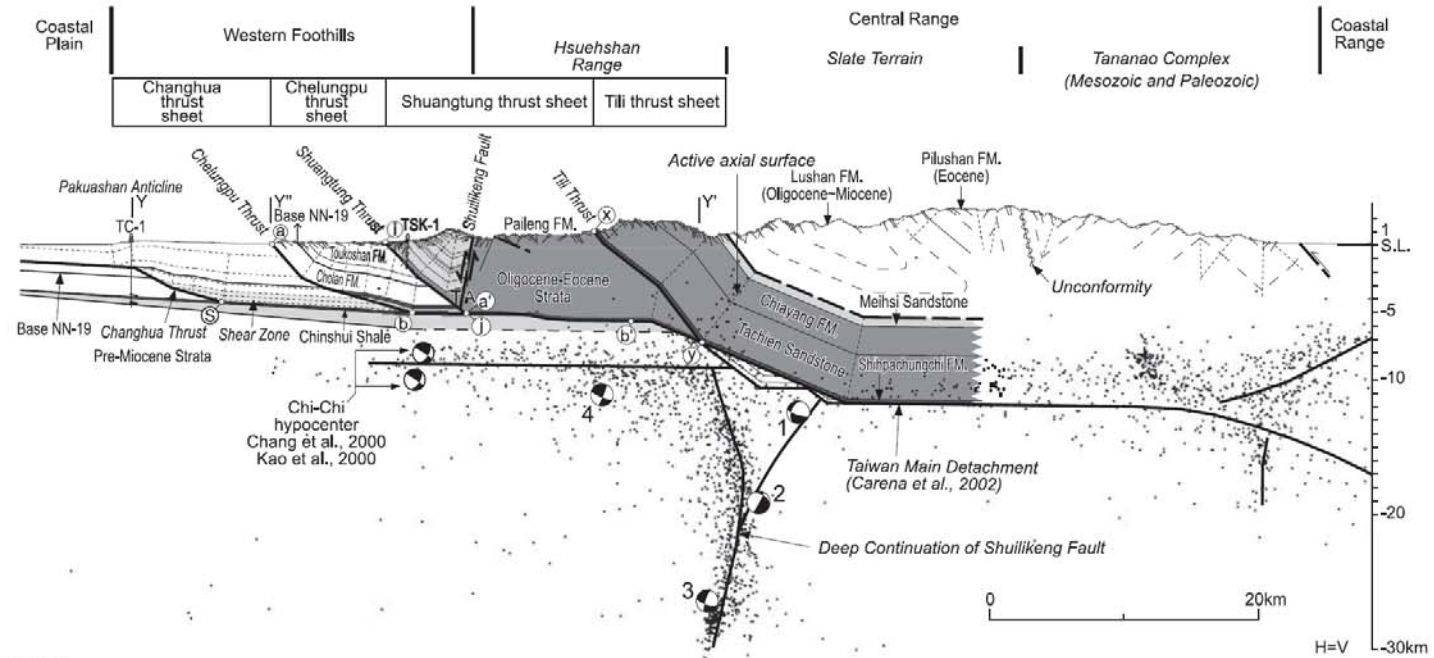


海岸山脈地體構造與盆地演化

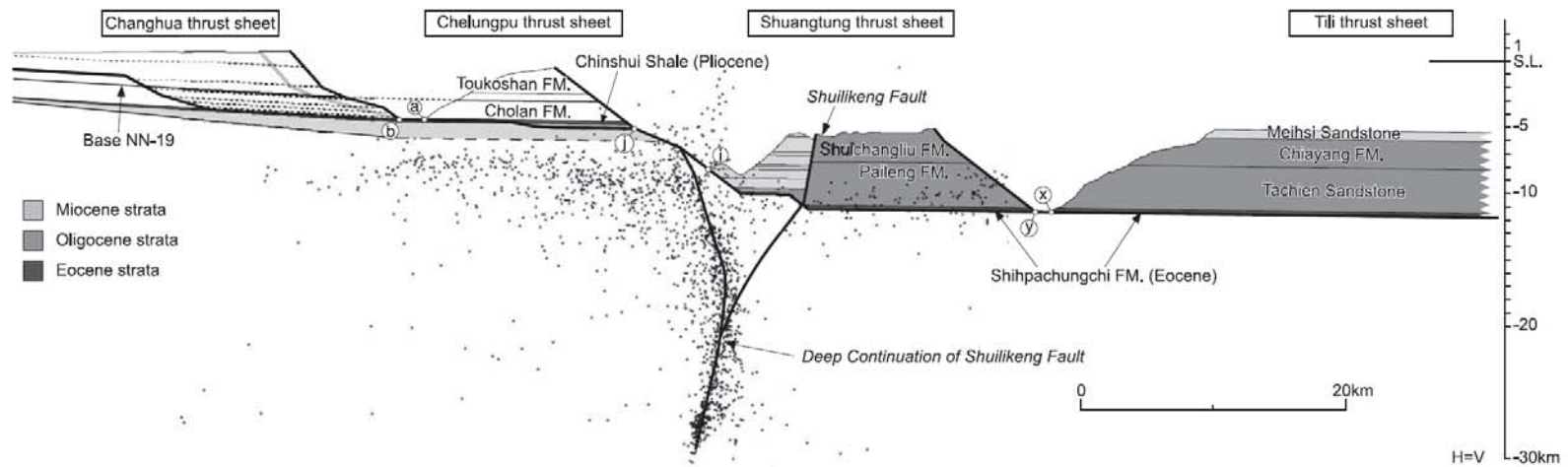


脊樑山脈、西部麓山帶及台灣海峽的變形構造

A Cross Section

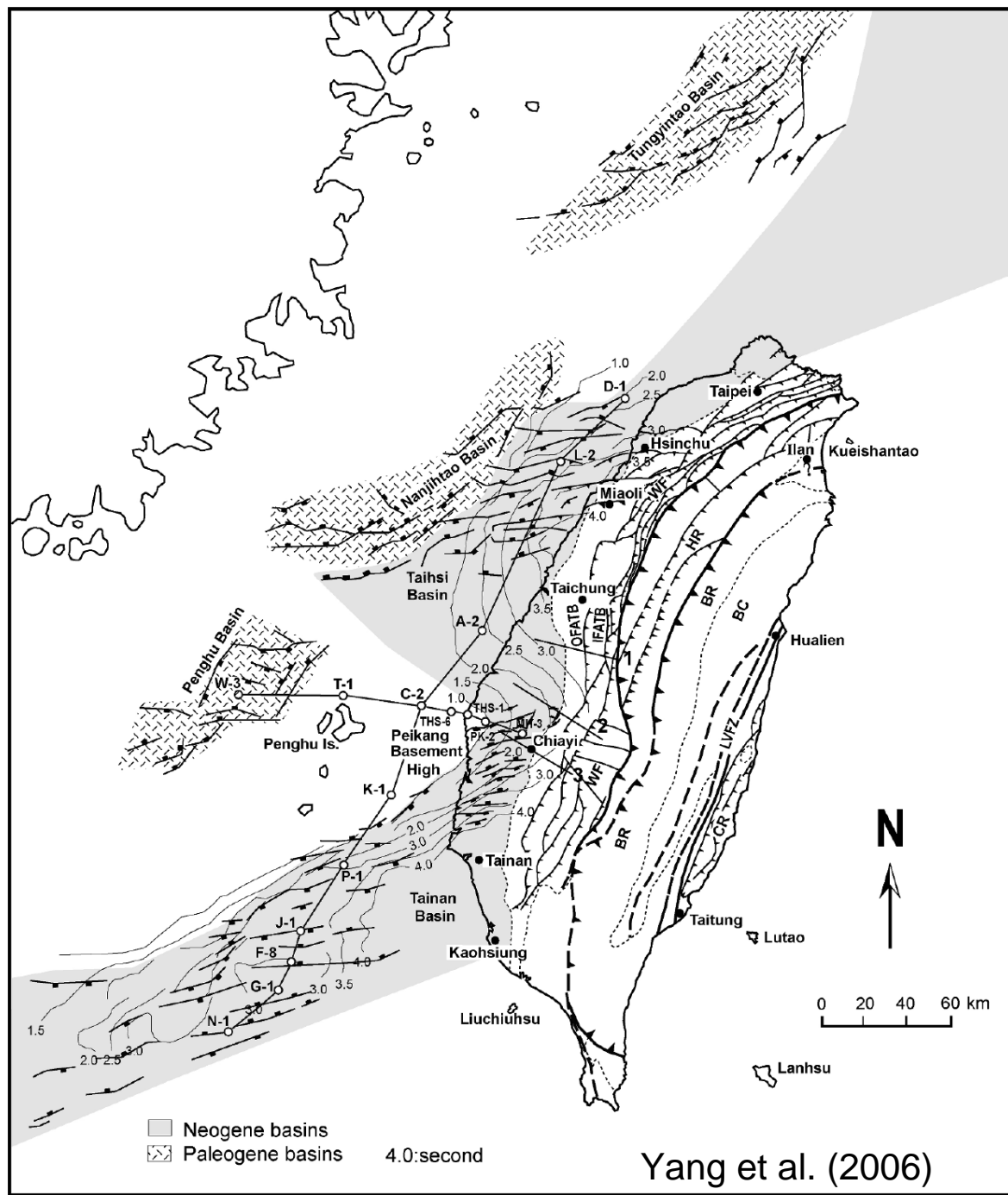


B Restored Section

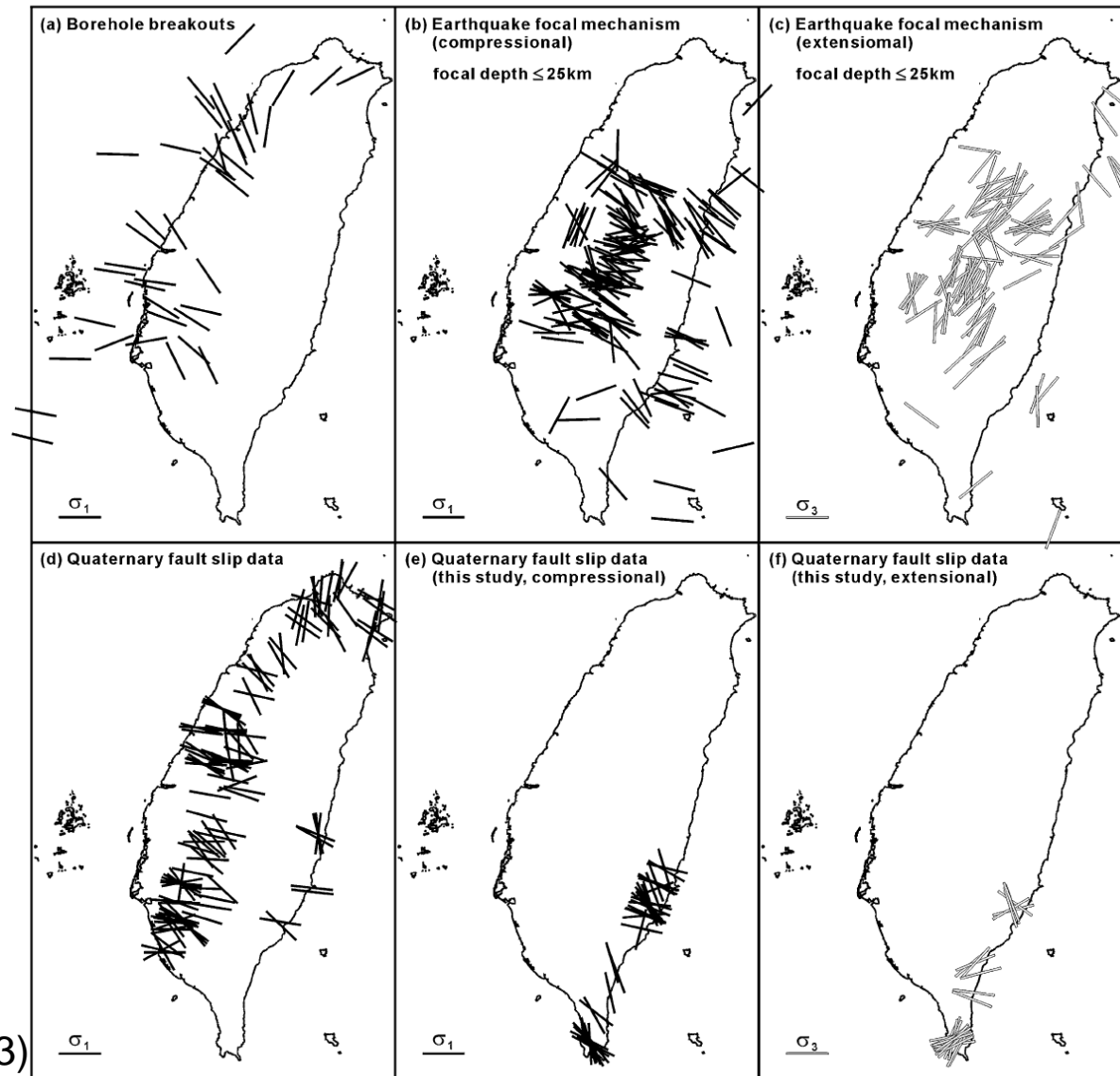


Yue et al. (2005)

脊樑山脈、西部麓山帶及台灣海峽的變形構造



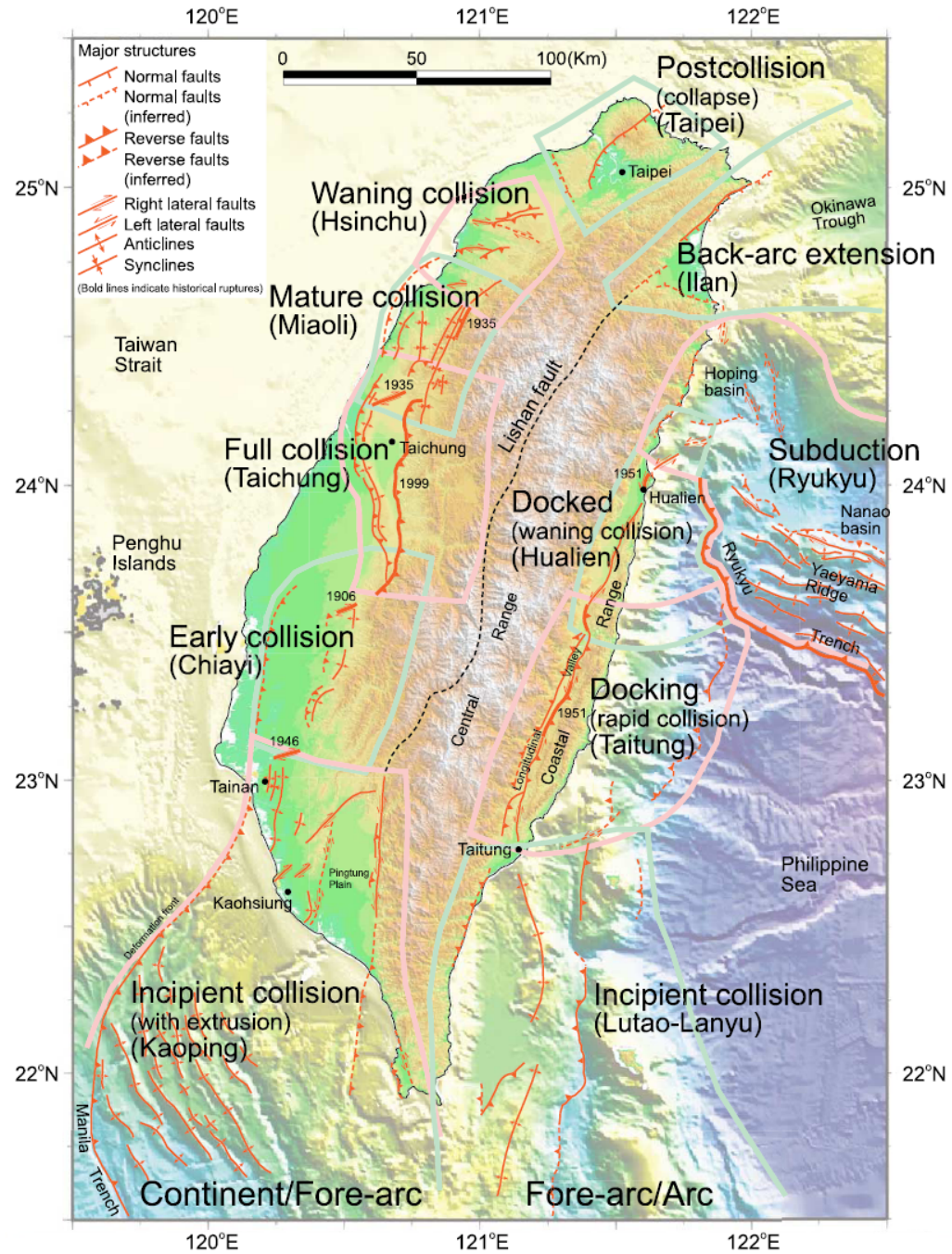
台灣地區大地應力



Chang et al. (2003)

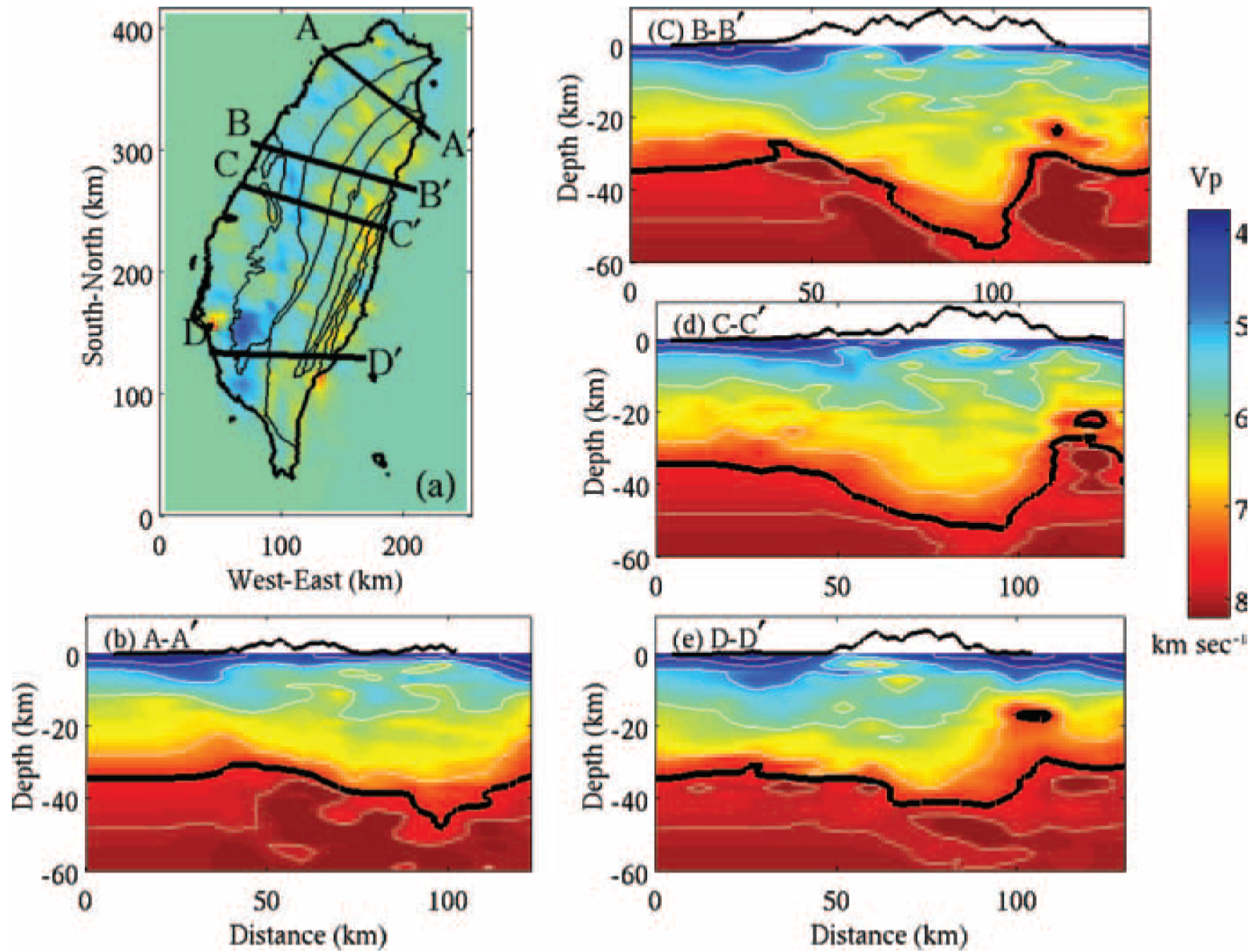
Stress axes compiled from various tectonic sources. (a) Maximum horizontal stress orientation (chmax) from borehole breakout data (b,c) P and T axes derived from the BATS/CMT focal mechanism solutions, earthquakes detected from 1995 to 2000. (d) Compressive paleostress related to Quaternary collision (reconstructed from fault slip data in Quaternary formations. (e,f) Quaternary paleostress reconstructed from fault slip data in southeastern Taiwan.

台灣的活動層



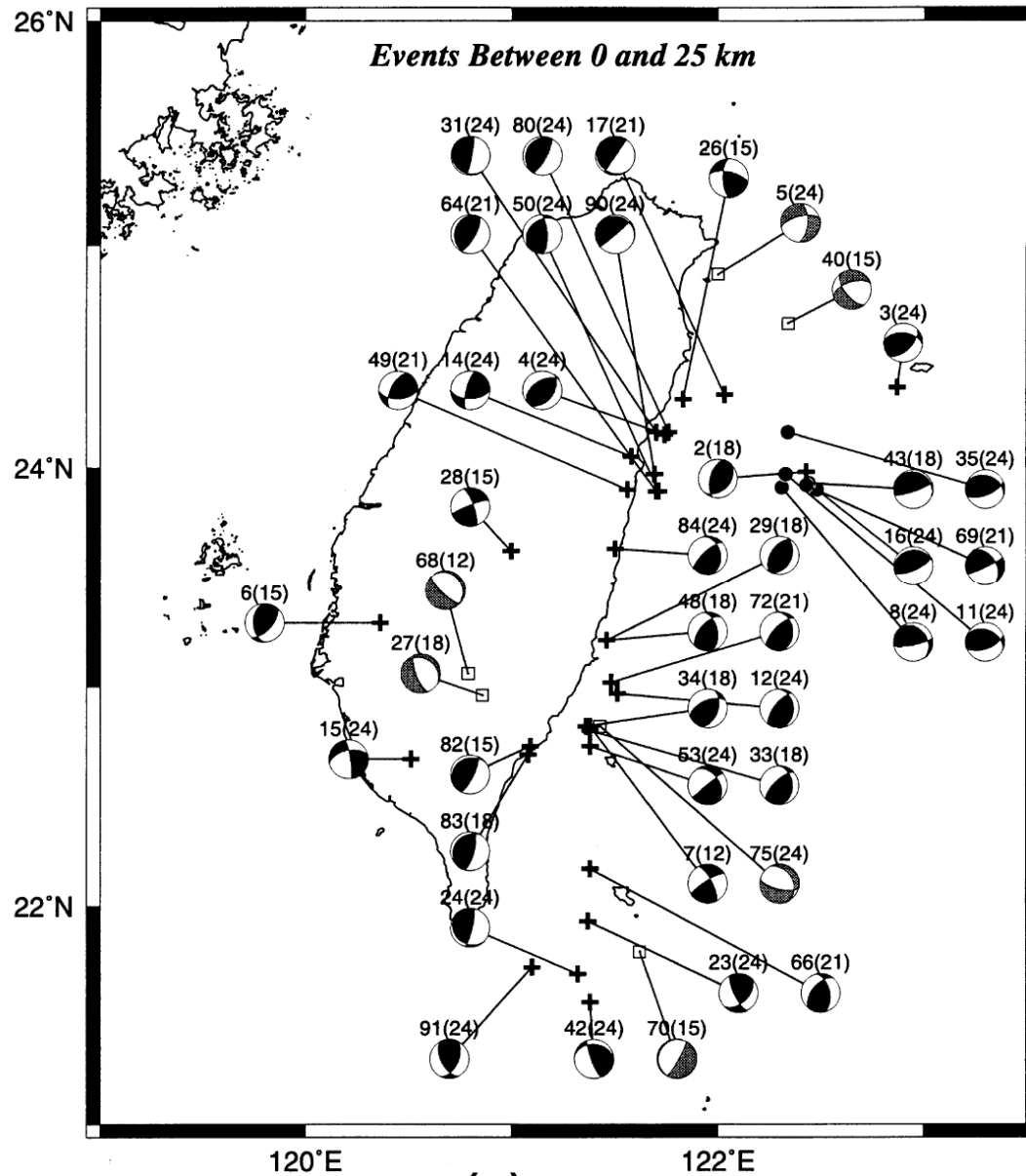
Shyu et al. (2005)

台灣陸海域地殼結構



Kim et al. (2005)

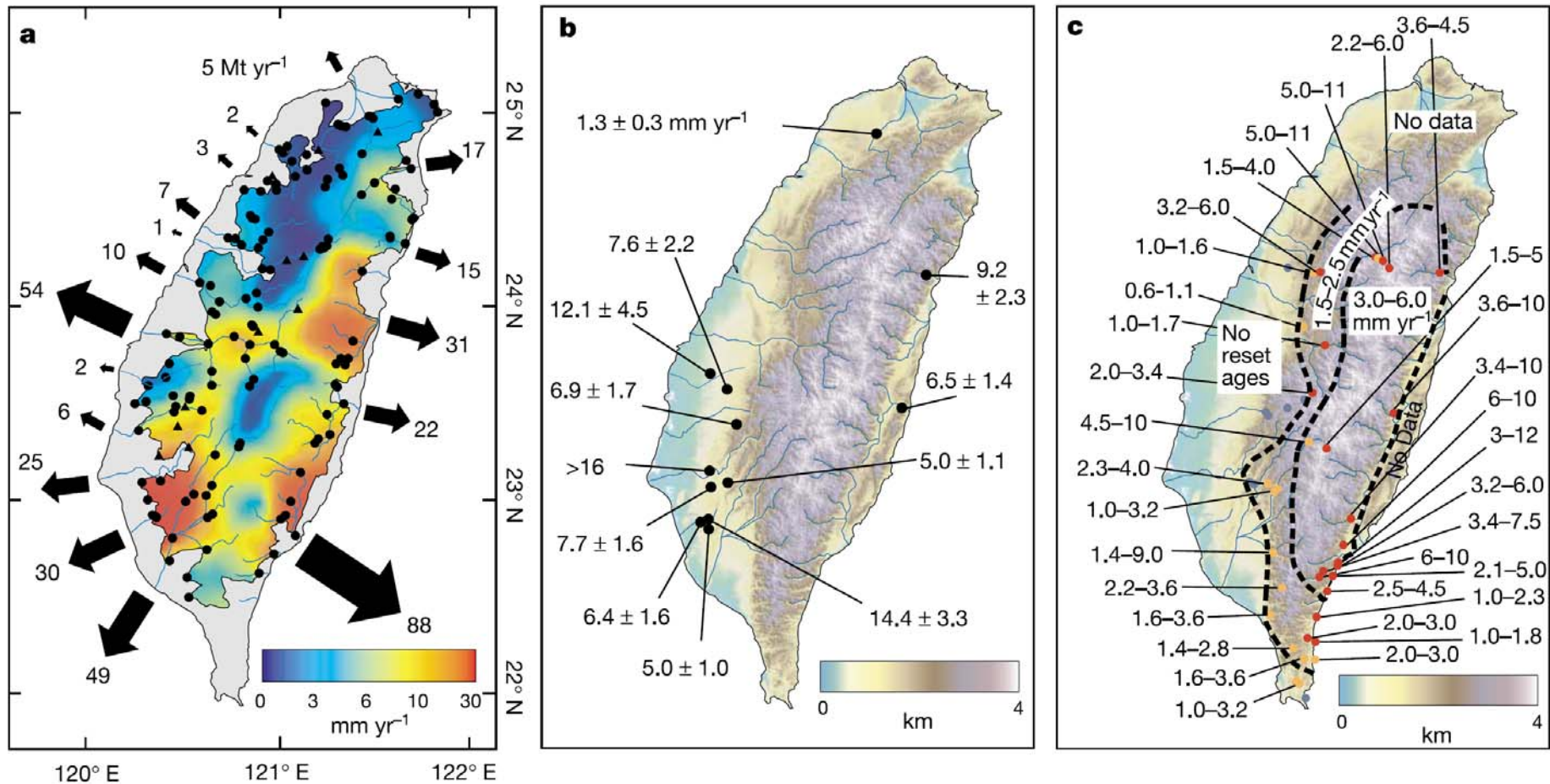
台灣地震震源機制與地體構造關係



Kao & Jian (2001)
19

台灣島上升、侵蝕速率及提供沈積物量

Erosion rates in Taiwan across multiple timescales



a, Calculated from fluvial suspended sediment observations. Black arrows indicate mean annual coastal suspended sediment flux from rivers draining areas greater than 400 km².

b, Bedrock strath incision rates (all in mmyr⁻¹). Values for each locality represent mean incision rate for all terraces measured at that locality.

c, Exhumation rates (all in mmyr⁻¹) calculated from apatite fission-track ages: red, reset; orange, partially reset; blue, unreset.