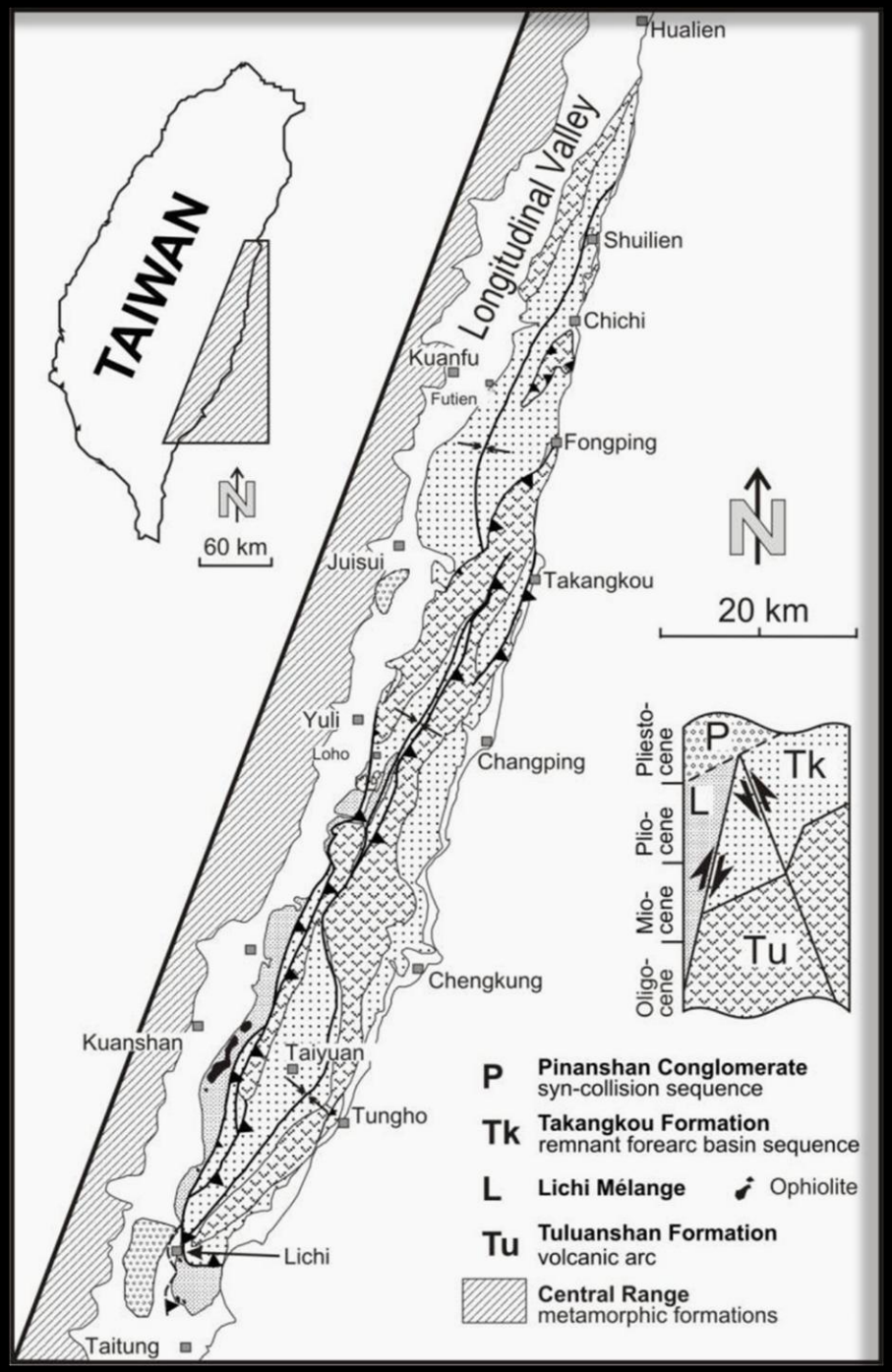
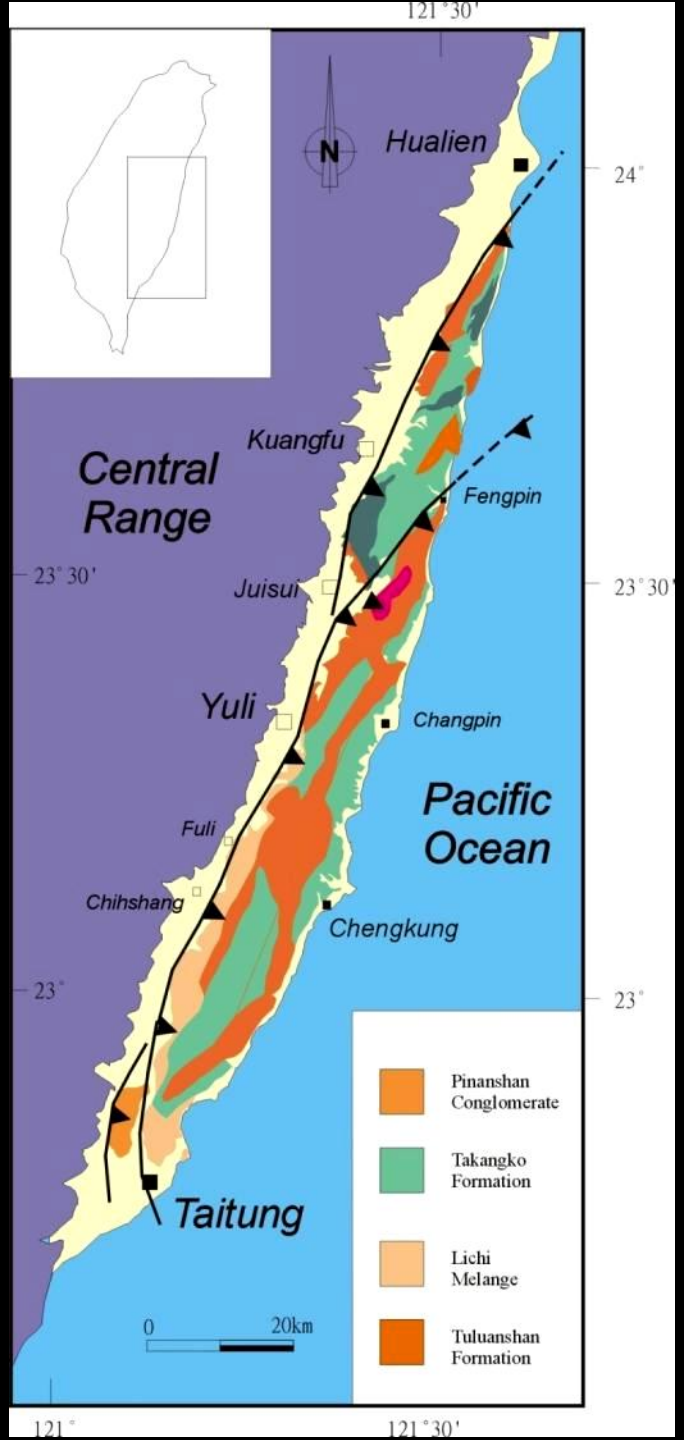
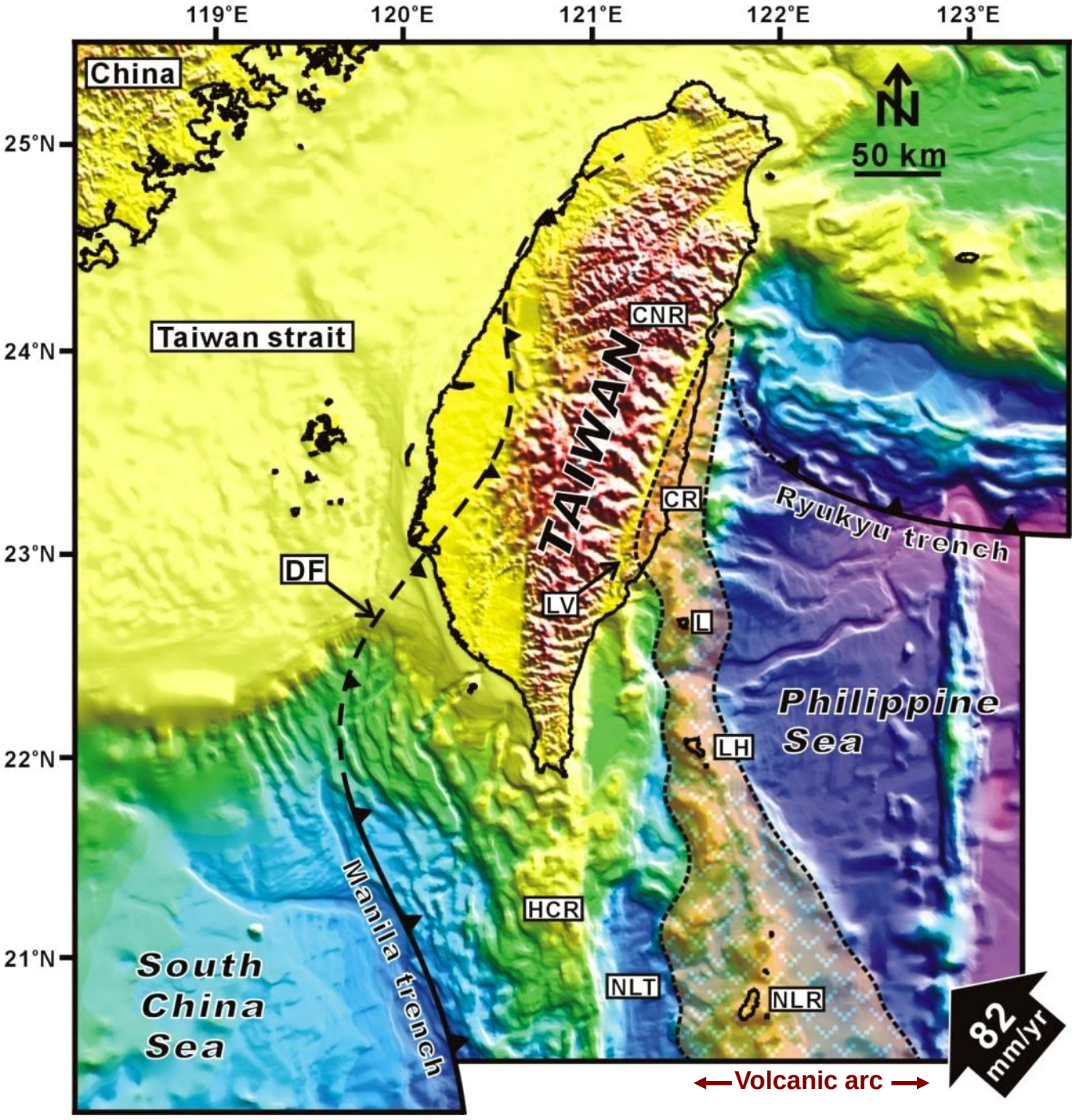
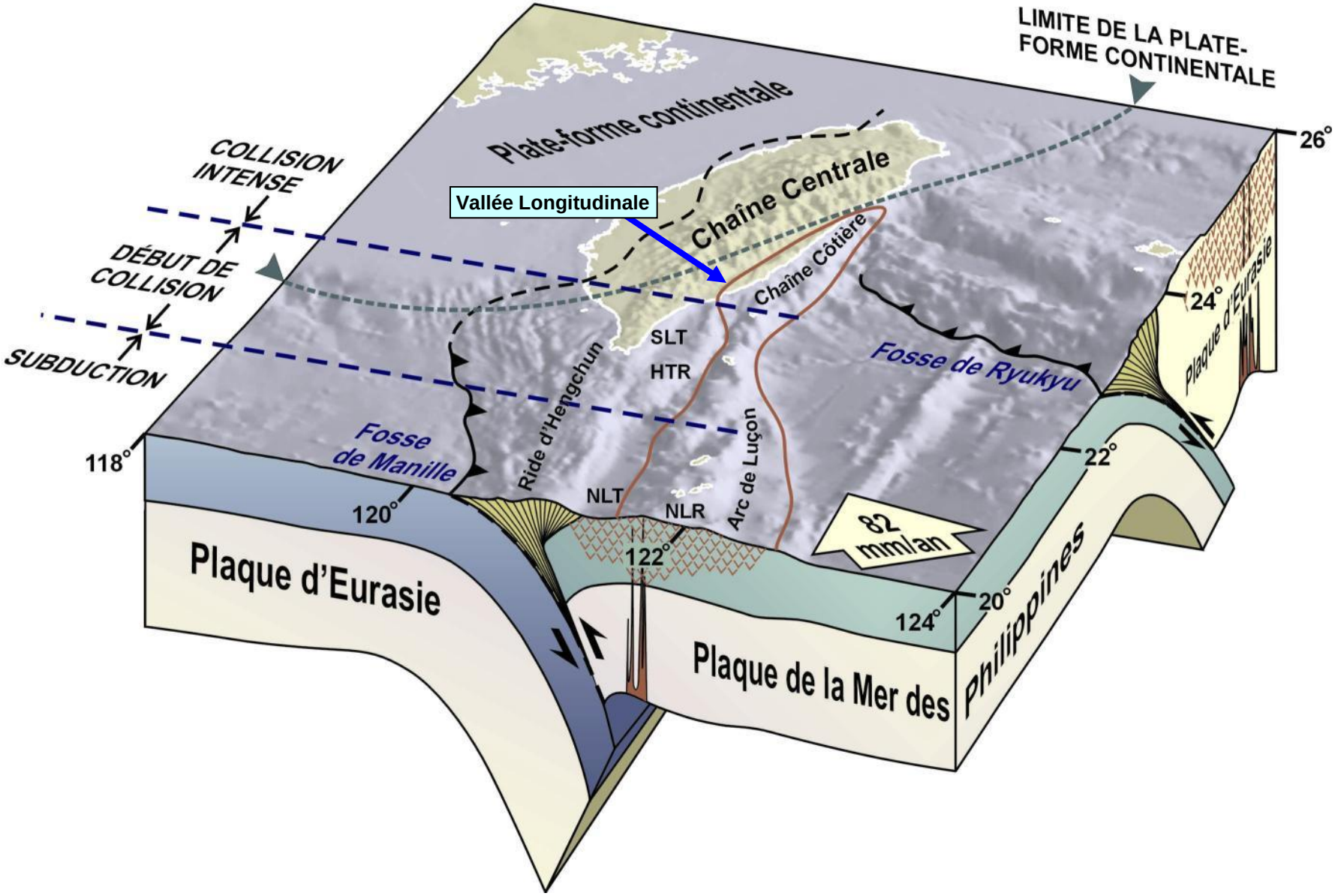
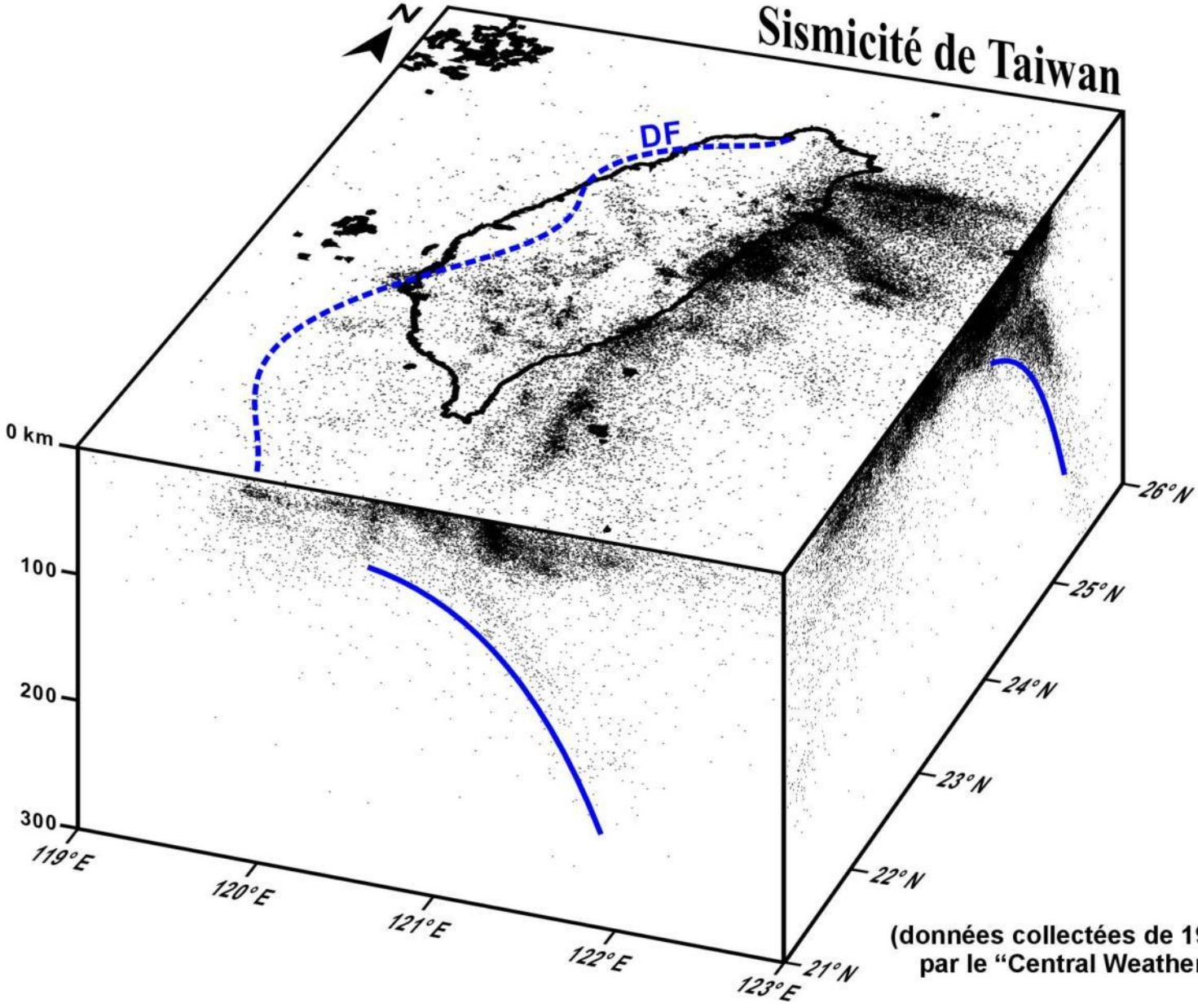

TAIWAN
60 km
Longitudinal Valley
Hualien
Shuilien
Chichi
Kuanfu
Futien
Fongping
Juisui
Takangkou
20 km
Yuli
Loho
Changping
Chengkung
Kuanshan
Taiyuan
Tungho
Lichi
Taitung
Pliesto-cene
Plio-cene
Mio-cene
Oligo-cene
P
Tk
L
Tu
P Pinanshan Conglomerate syn-collision sequence
Tk Takangkou Formation remnant forearc basin sequence
L Lichi Mélange
Ophiolite
Tu Tuluanshan Formation volcanic arc
Central Range metamorphic formations


121°30'
N
Hualien
24°
Central Range
Kuangfu
Fengpin
23°30'
Juisui
Yuli
Changpin
Pacific Ocean
Fuli
Chihshang
Chengkung
23°
Taitung
0
20km
121°
121°30'
Pinanshan Conglomerate
Takangko Formation
Lichi Melange
Tuluanshan Formation

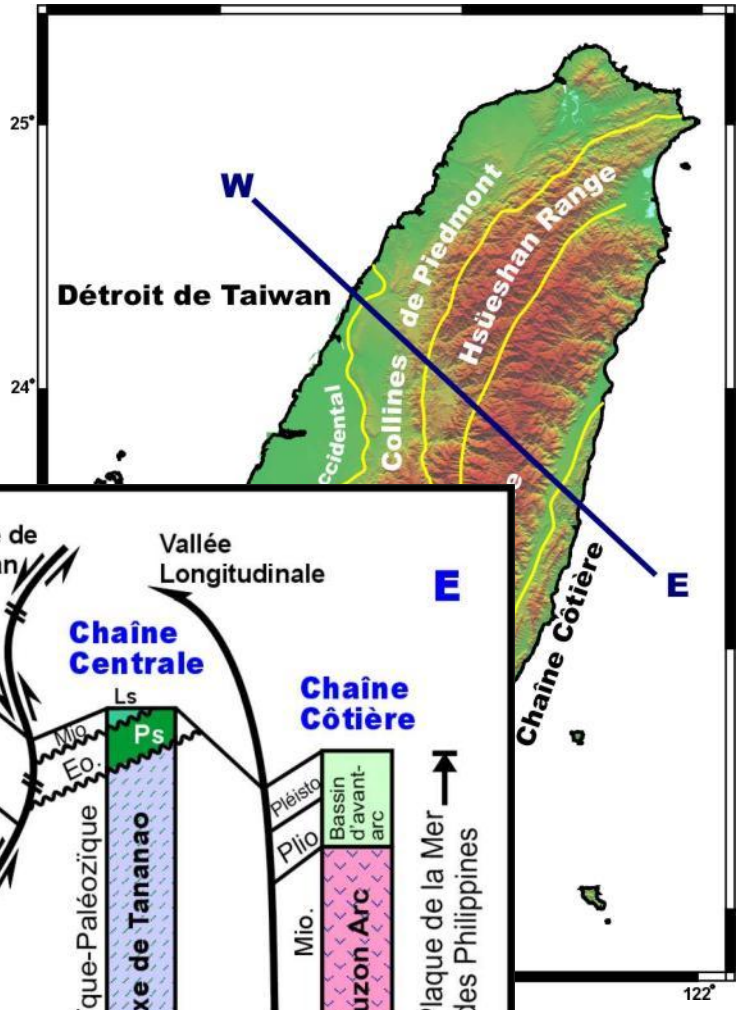

119°E
120°E
121°E
122°E
123°E
25°N
24°N
23°N
22°N
21°N
China
Taiwan strait
TAIWAN
CNR
CR
DF
LV
L
LH
HCR
NLT
NLR
Ryukyu trench
Philippine Sea
Manila trench
South China Sea
N
50 km
82 mm/yr
Volcanic arc


LIMITE DE LA PLATE-FORME CONTINENTALE
Plate-forme continentale
COLLISION INTENSE
DÉBUT DE COLLISION
SUBDUCTION
Vallée Longitudinale
Chaîne Centrale
Chaîne Côtière
SLT
HTR
Ride d'Hengchun
Fosse de Manille
Fosse de Ryukyu
Arc de Luçon
NLT
NLR
82 mm/an
Plaque d'Eurasie
Plaque de la Mer des Philippines
118°
120°
122°
124°
20°
22°
24°
26°

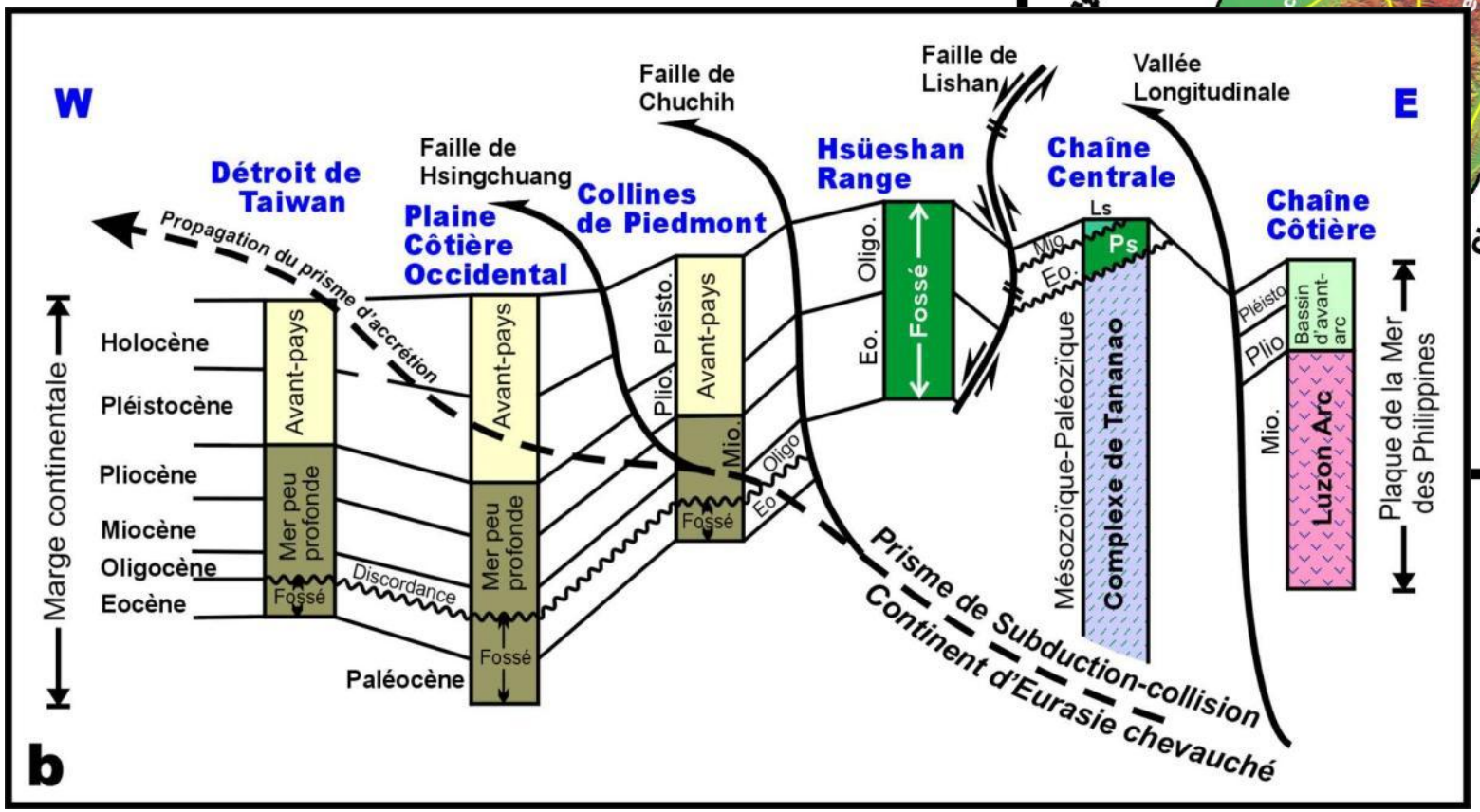


(données collectées de 1973 à 1998
par le "Central Weather Bureau")

Principales provinces morphotectoniques de Taiwan



Stratigraphie générale de Taiwan



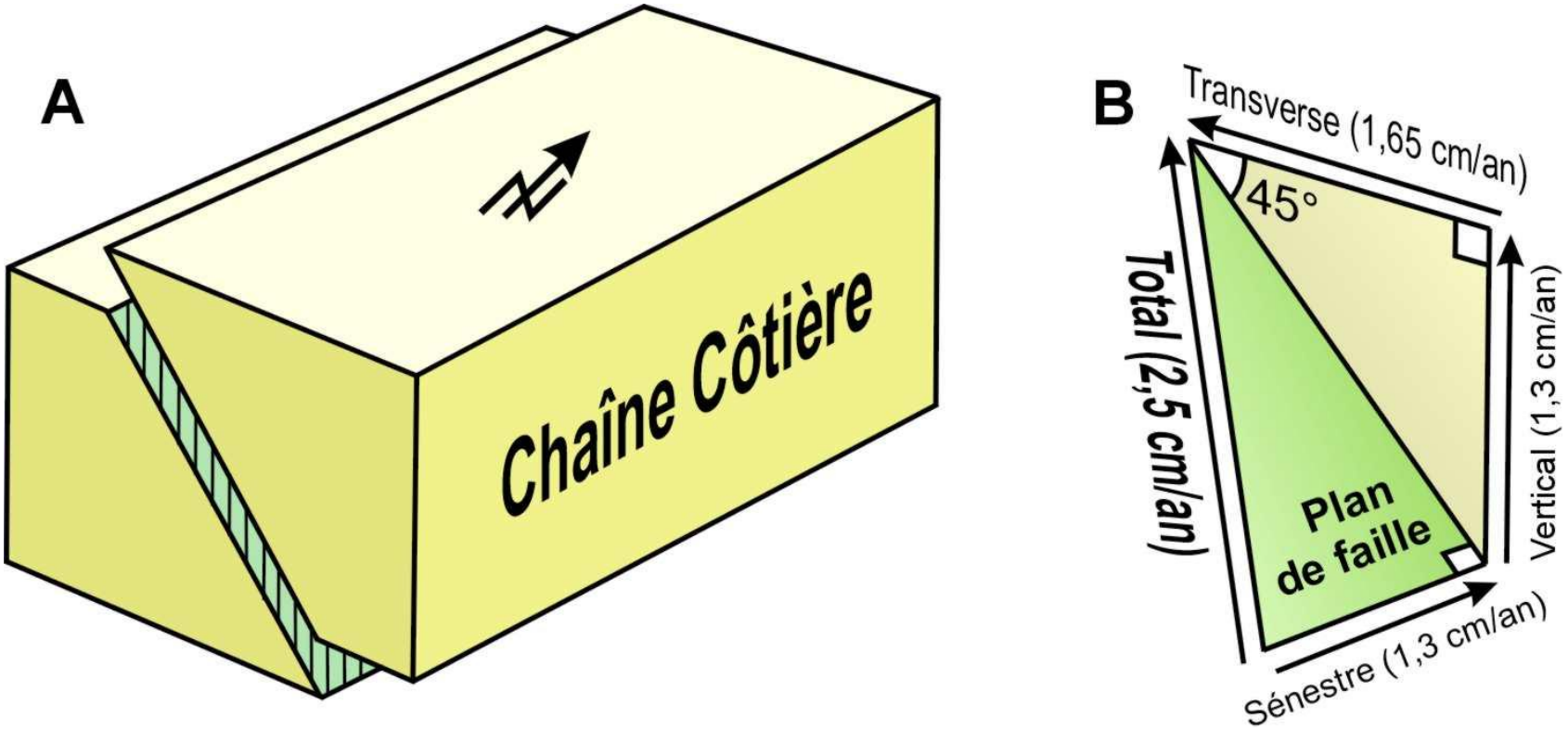
台東地質

海岸山脈

火山島弧 – 都巒山
弧前盆地 – 泰源盆地
構造混同層 – 利吉層
第四紀沖積層 – 卑南山

中央山脈

變質基盤雜岩
第三系大陸邊緣沉積物

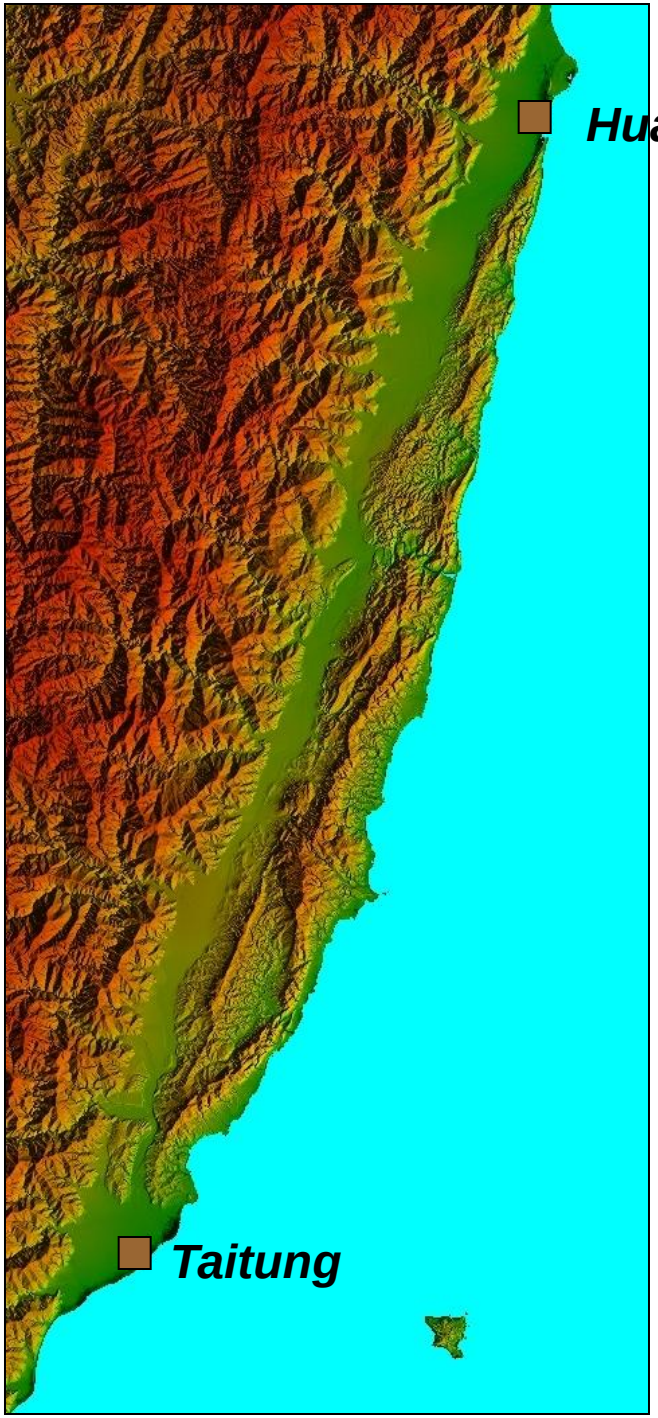


Mouvement oblique actuel de la faille de la Vallée Longitudinale

(d'après Angelier et al., 2000)

LV: Remarkable Linear Topographic Feature

- 150 km long
- 5-10 km wide

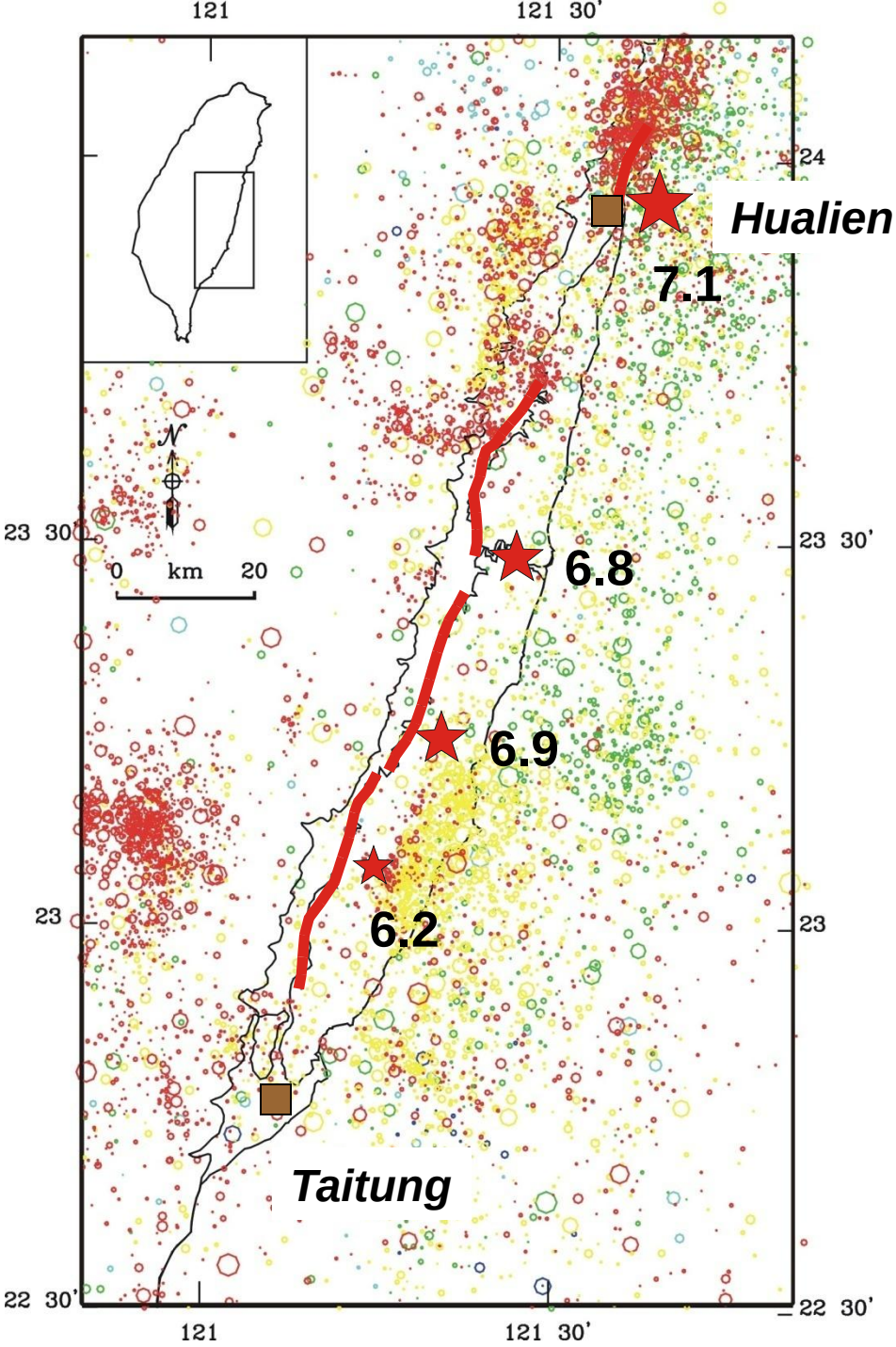


Recent Seisimicty (1991-1996)

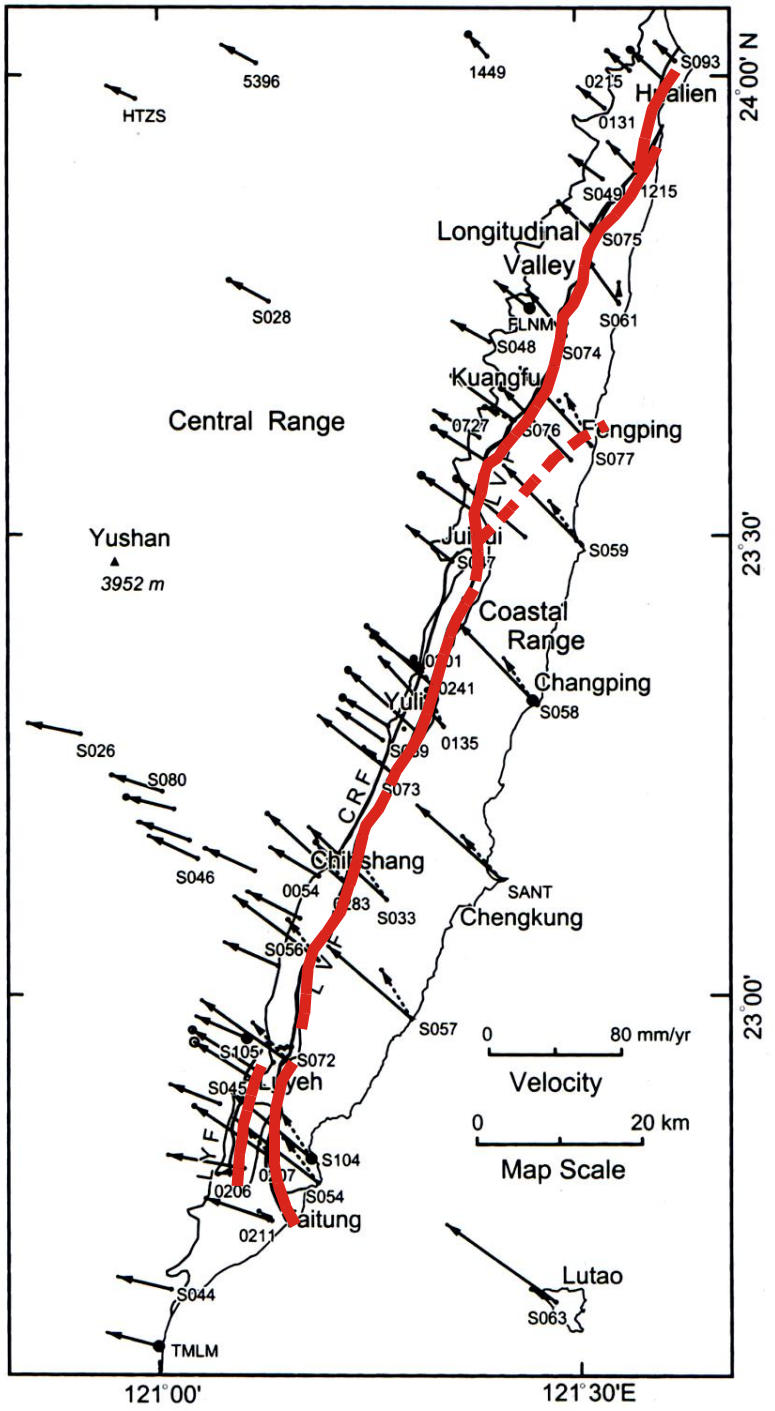
Historic Major Earthquakes (1951 and 1972)

1951 earthquake sequence

1972 M6.8 earthquake

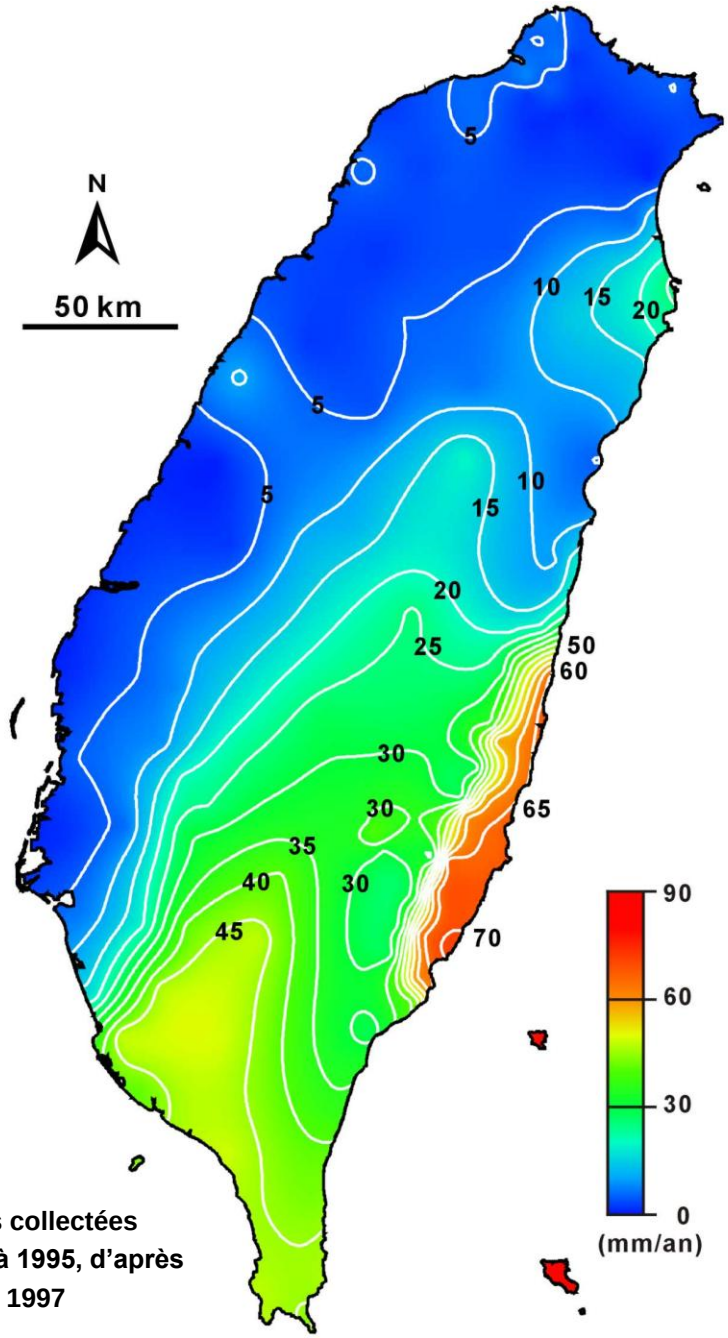


Recent GPS Measurement (1992-1999)



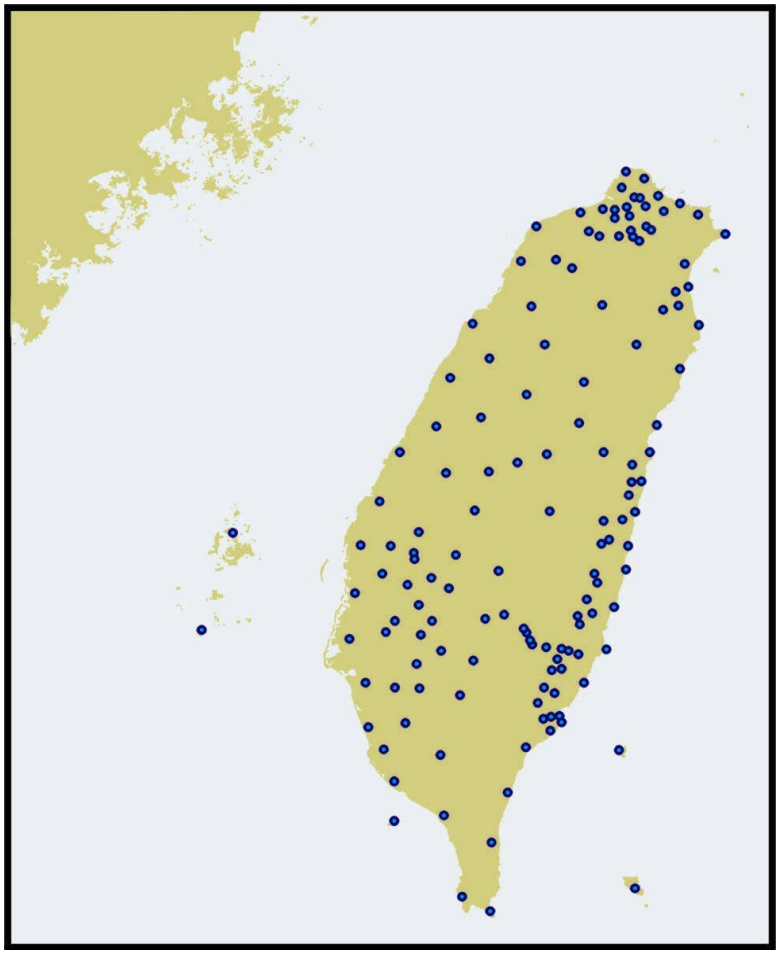
(Yu and Kuo, 2001)

Vitesse horizontale de stations GPS



Données collectées
de 1990 à 1995, d'après
Yu et al., 1997

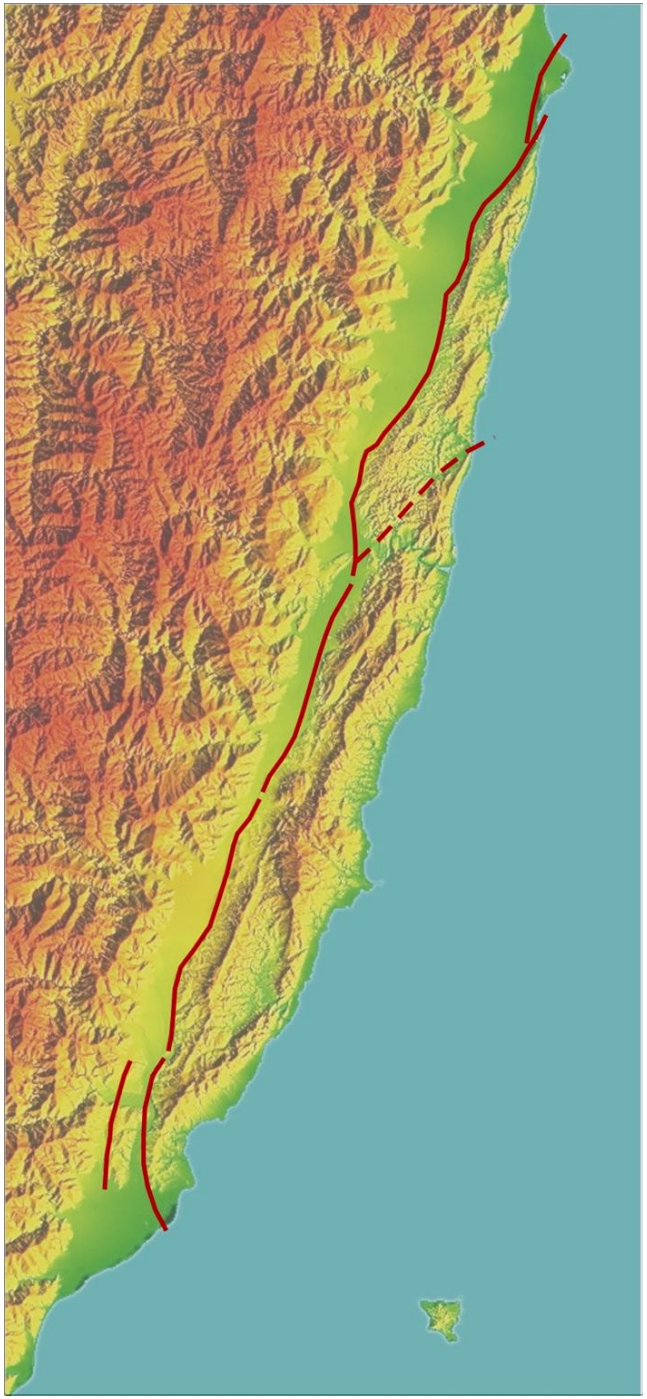
Réseau de stations GPS à Taiwan



Source of Active Deformation:
Kinematics, Dynamics, Evolution

Where

Geometry



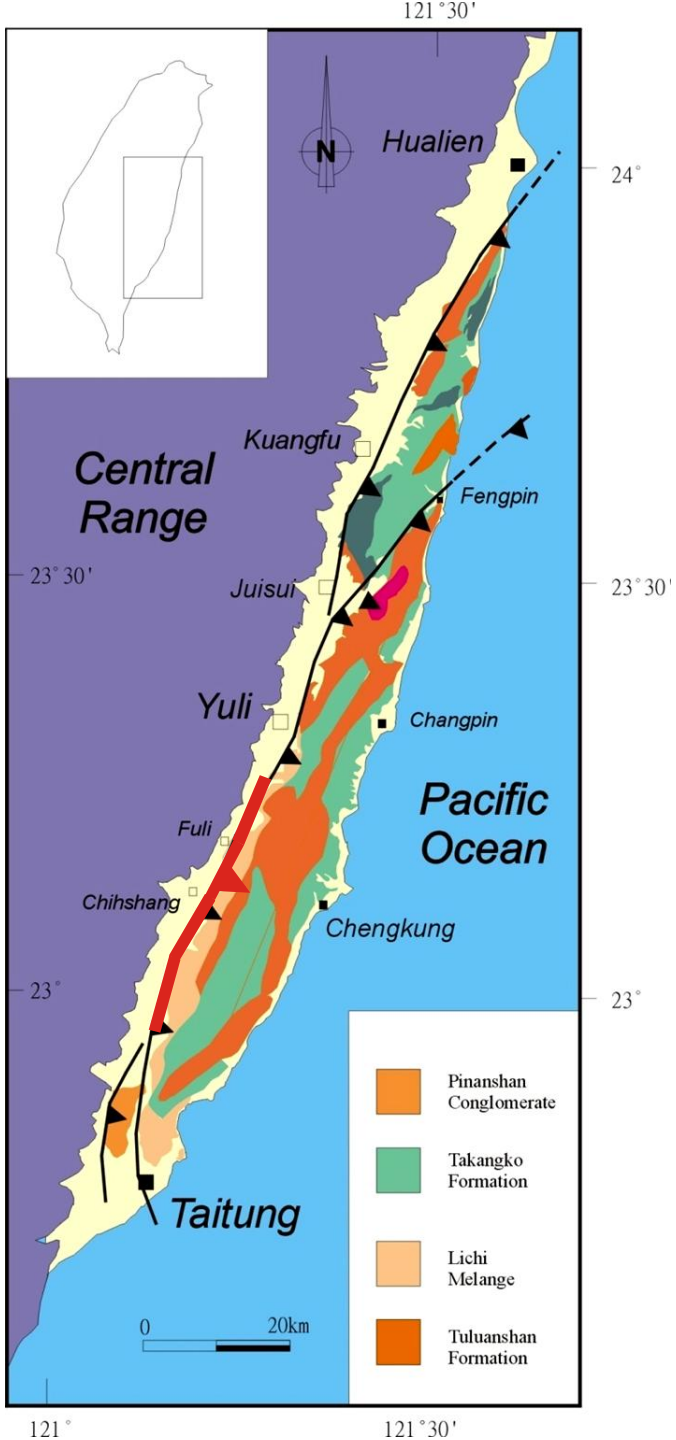
When

Rate

Short-term Slip rate

Long-term Slip rate

The Chihshang fault: the most active segment of the LVF

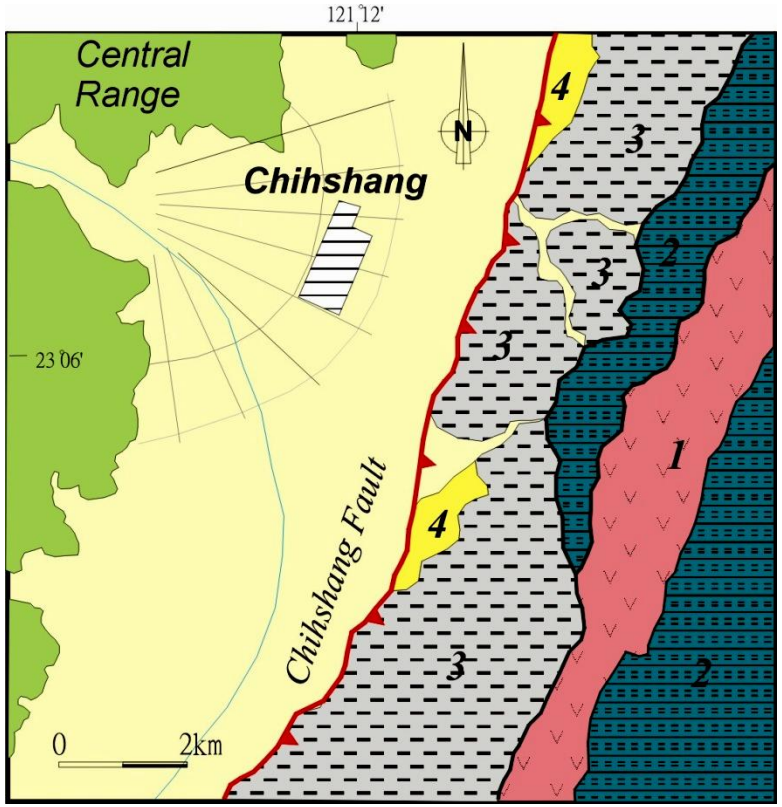


Studies on the Active Chihshang Fault

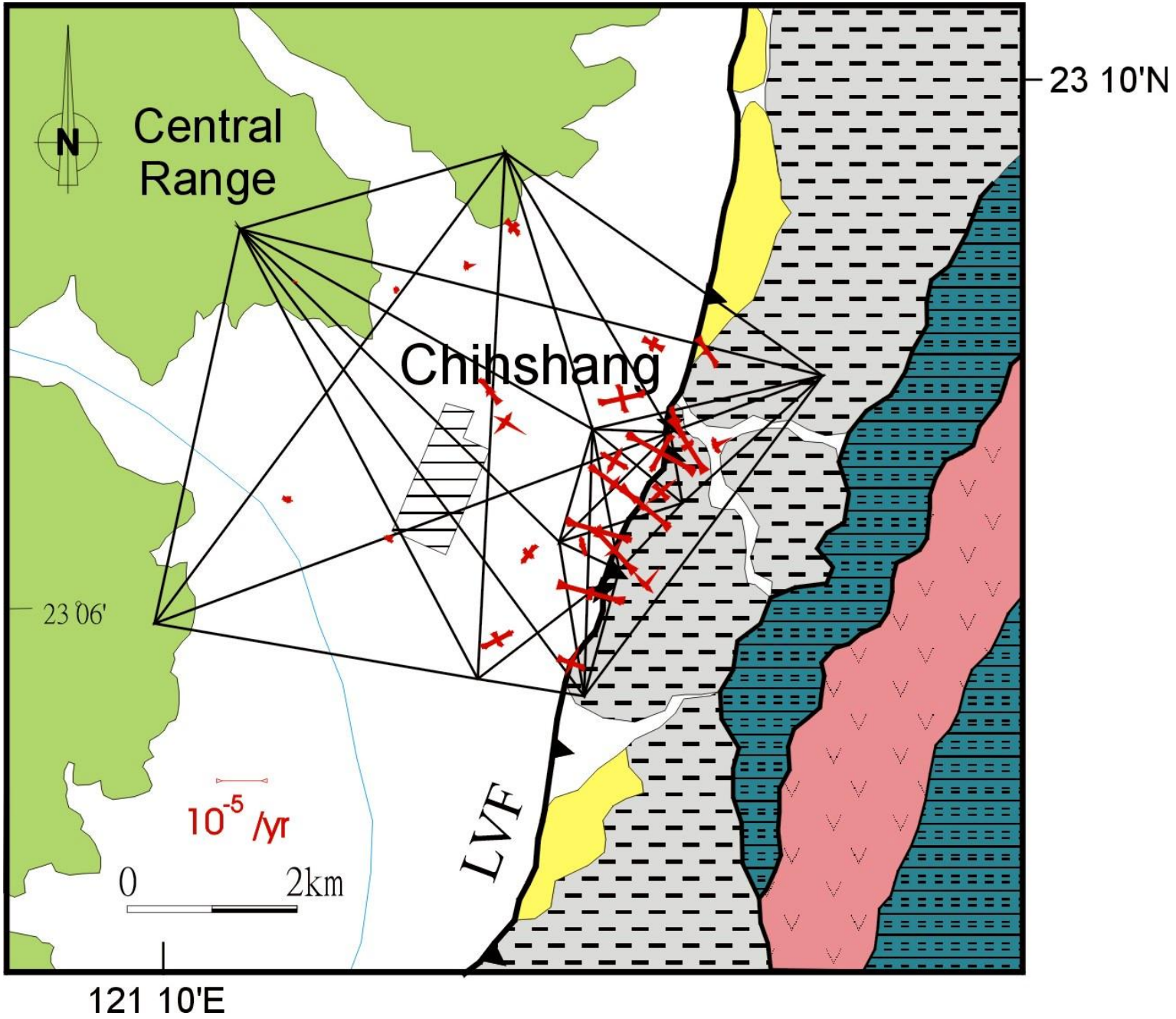
Geodetic measurement

Creepmeter

GPS

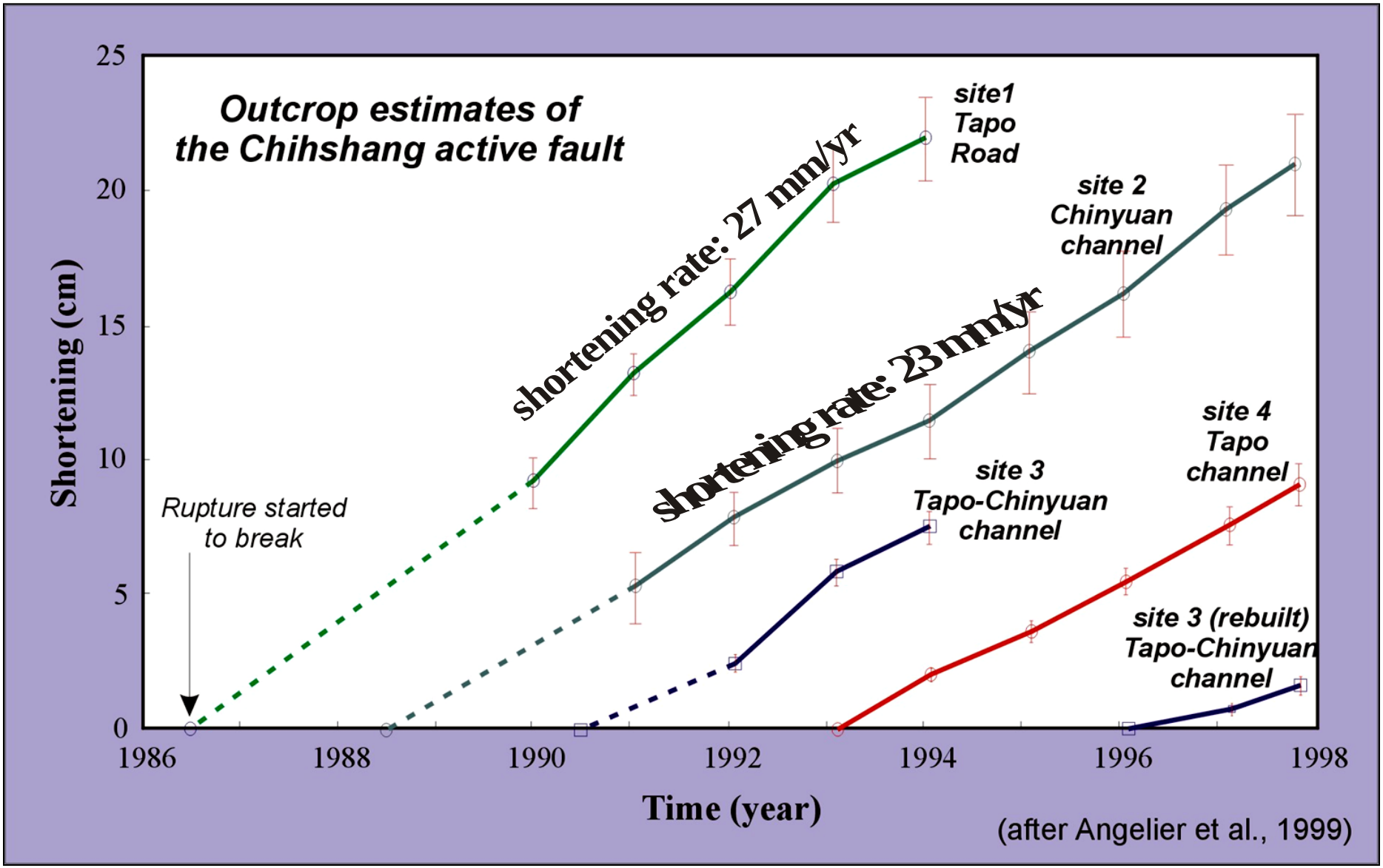


Trilateration Distance Measurement (1983-1985)

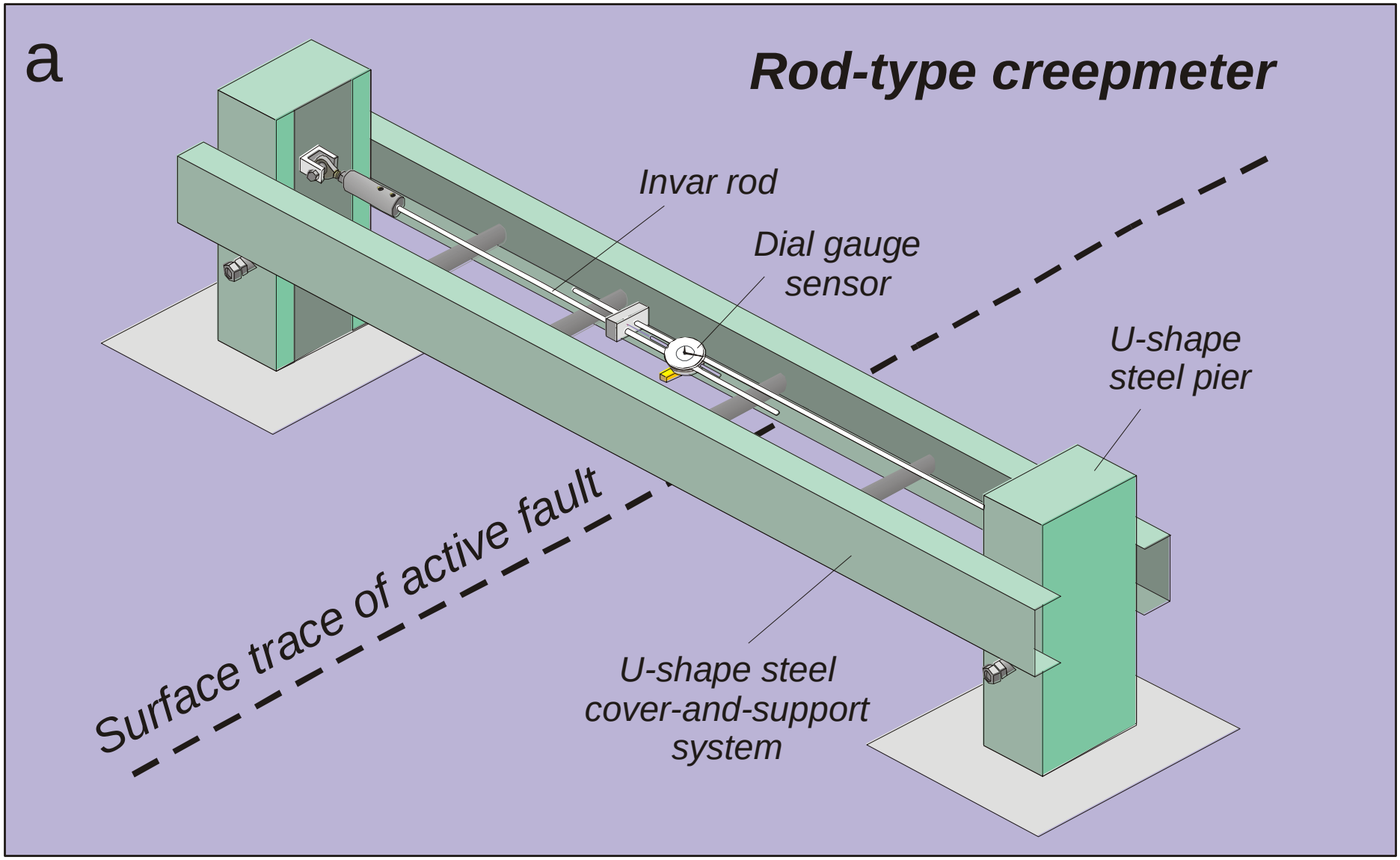


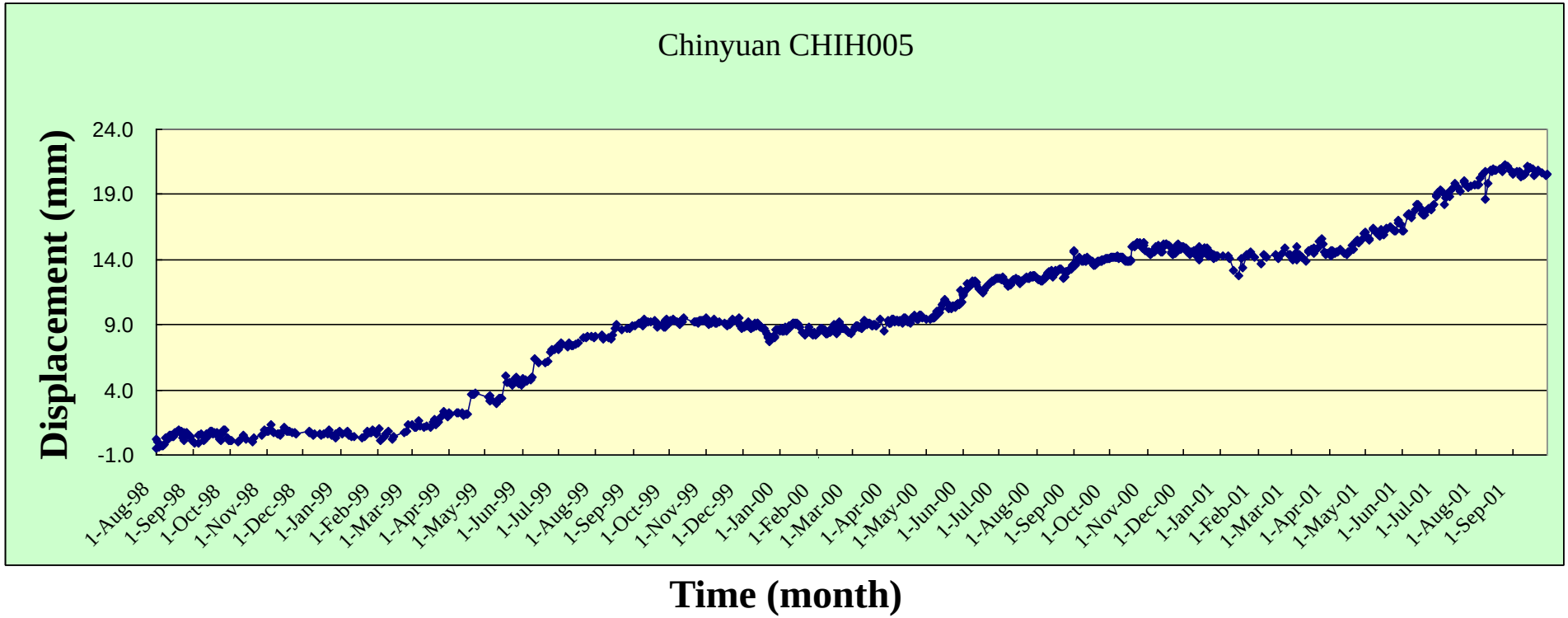
Surface Ruptures and Cultural Feature Measurement

Slip Rate from Cultural Feature Measurement

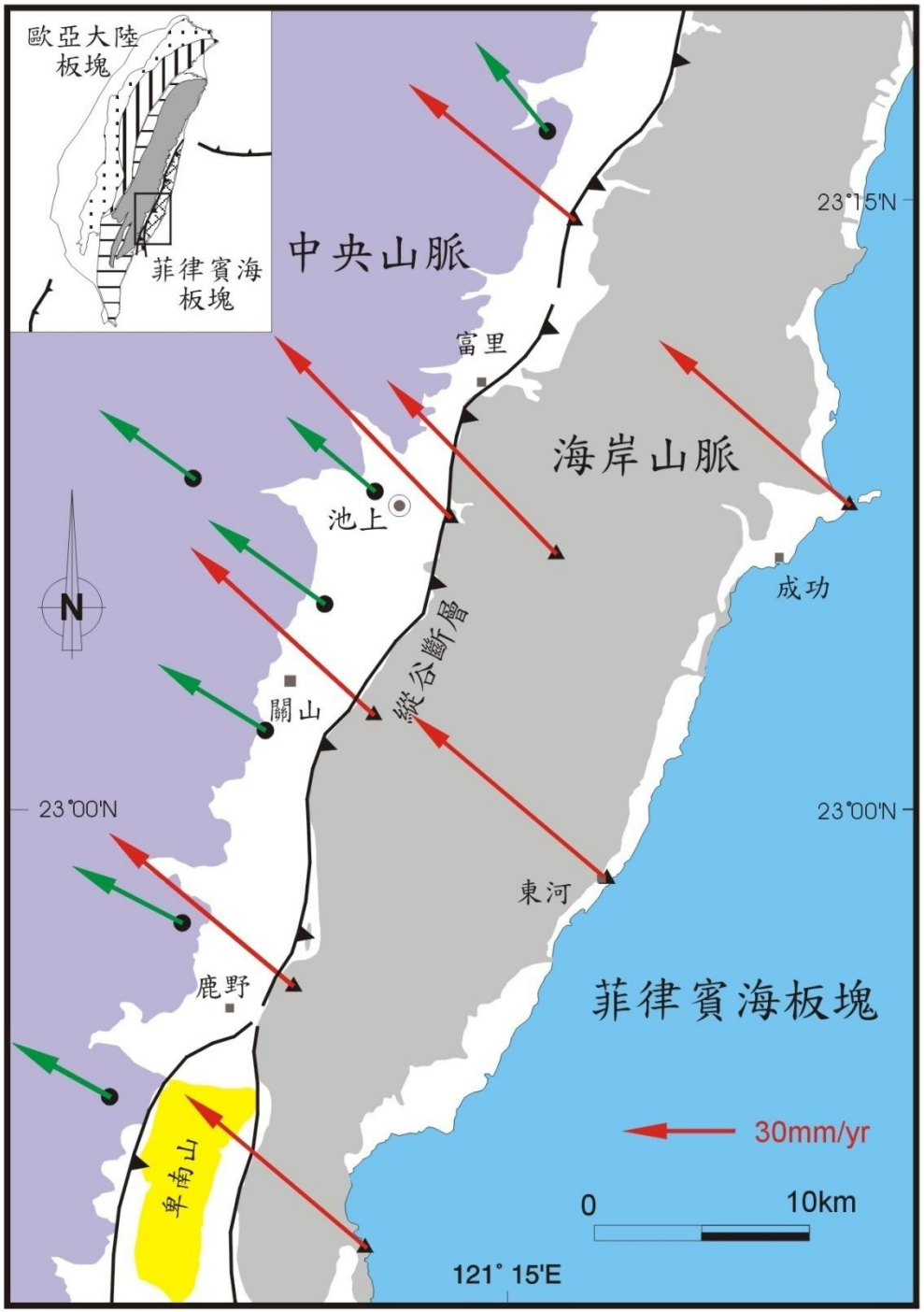


Creepmeter Record


a
Rod-type creepmeter
Invar rod
Dial gauge sensor
U-shape steel pier
Surface trace of active fault
U-shape steel cover-and-support system

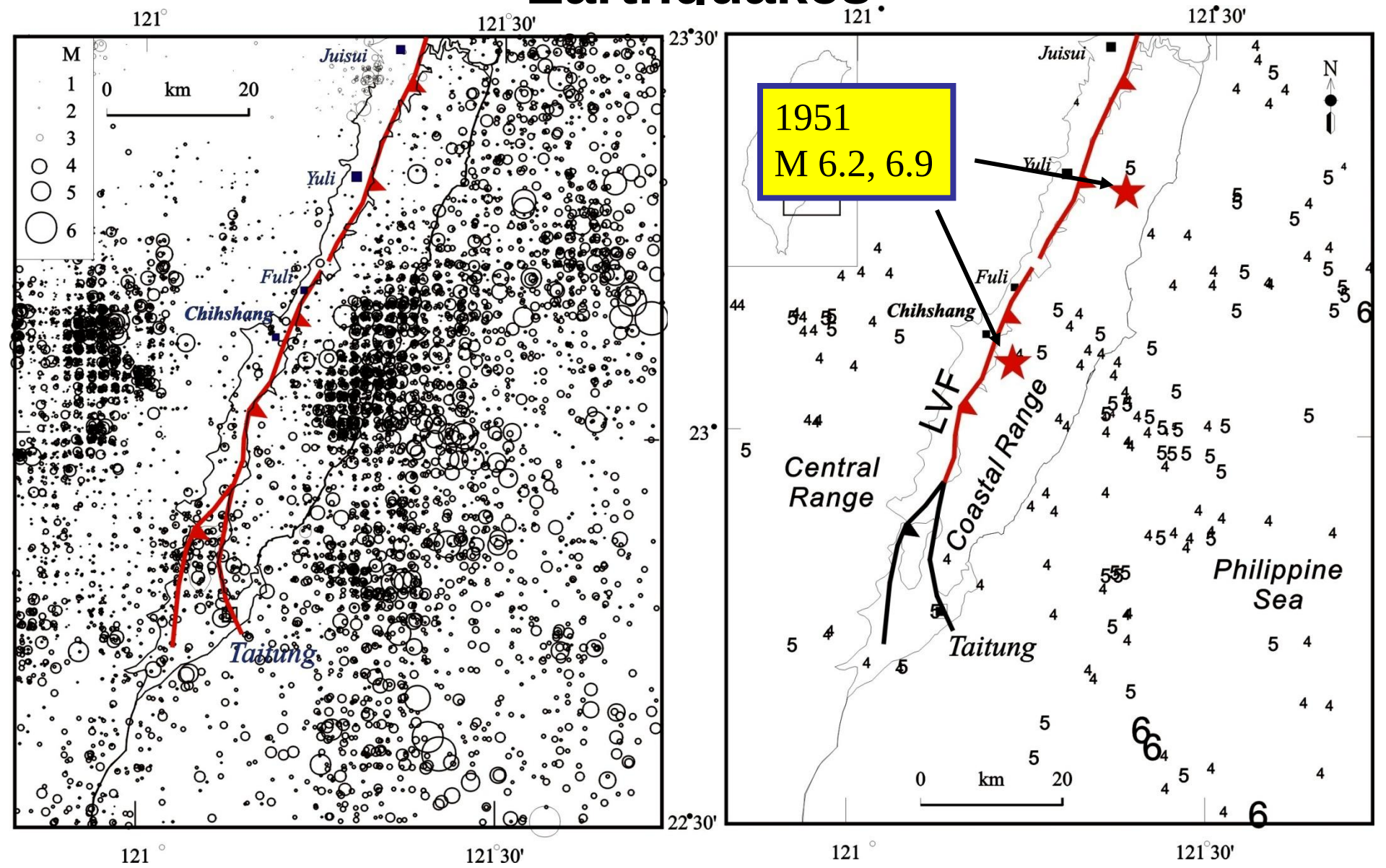

Chinyuan CHIH005
Displacement (mm)
24.0
19.0
14.0
9.0
4.0
-1.0
1-Aug-98
1-Sep-98
1-Oct-98
1-Nov-98
1-Dec-98
1-Jan-99
1-Feb-99
1-Mar-99
1-Apr-99
1-May-99
1-Jun-99
1-Jul-99
1-Aug-99
1-Sep-99
1-Oct-99
1-Nov-99
1-Dec-99
1-Jan-00
1-Feb-00
1-Mar-00
1-Apr-00
1-May-00
1-Jun-00
1-Jul-00
1-Aug-00
1-Sep-00
1-Oct-00
1-Nov-00
1-Dec-00
1-Jan-01
1-Feb-01
1-Mar-01
1-Apr-01
1-May-01
1-Jun-01
1-Jul-01
1-Aug-01
1-Sep-01
Time (month)

Recent GPS measurement (1991-1996)

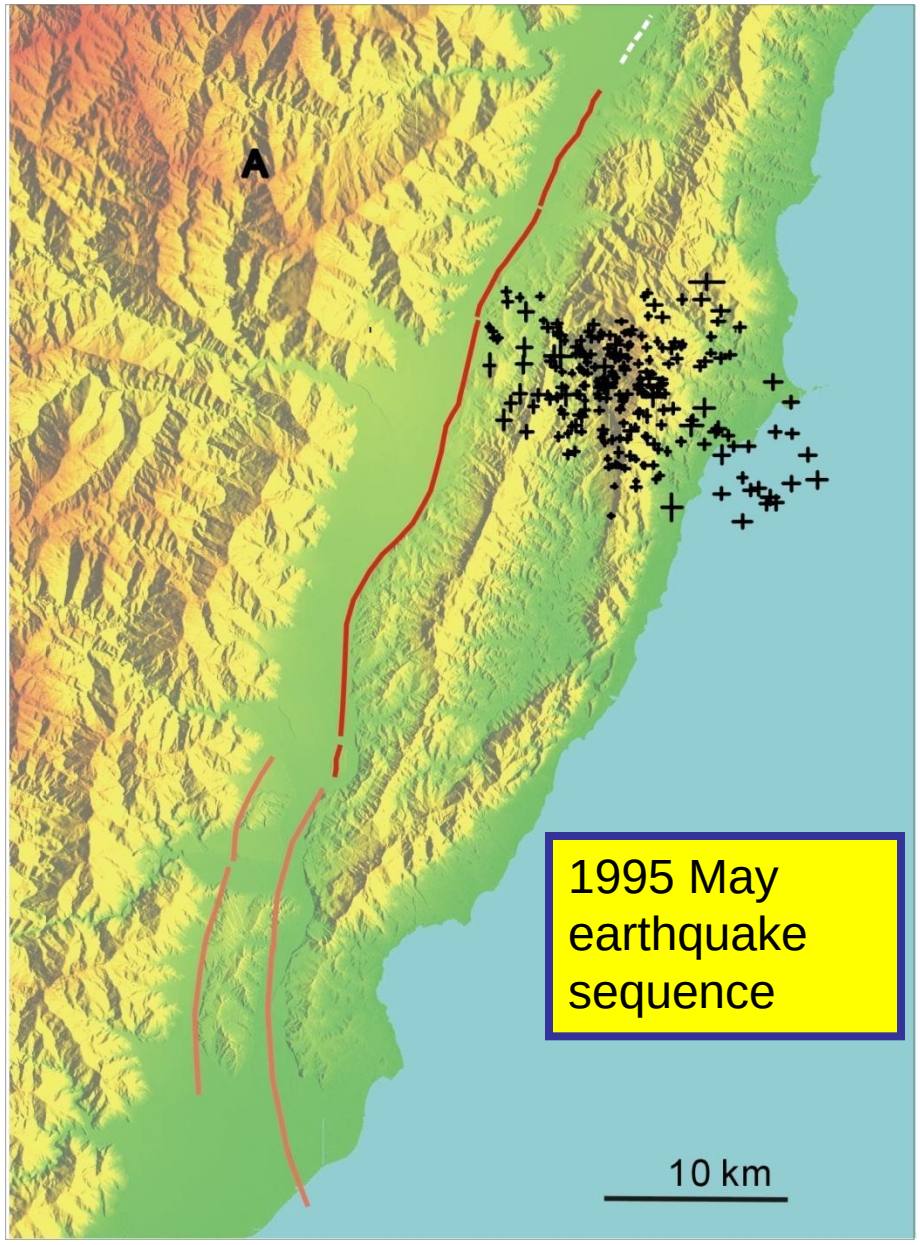


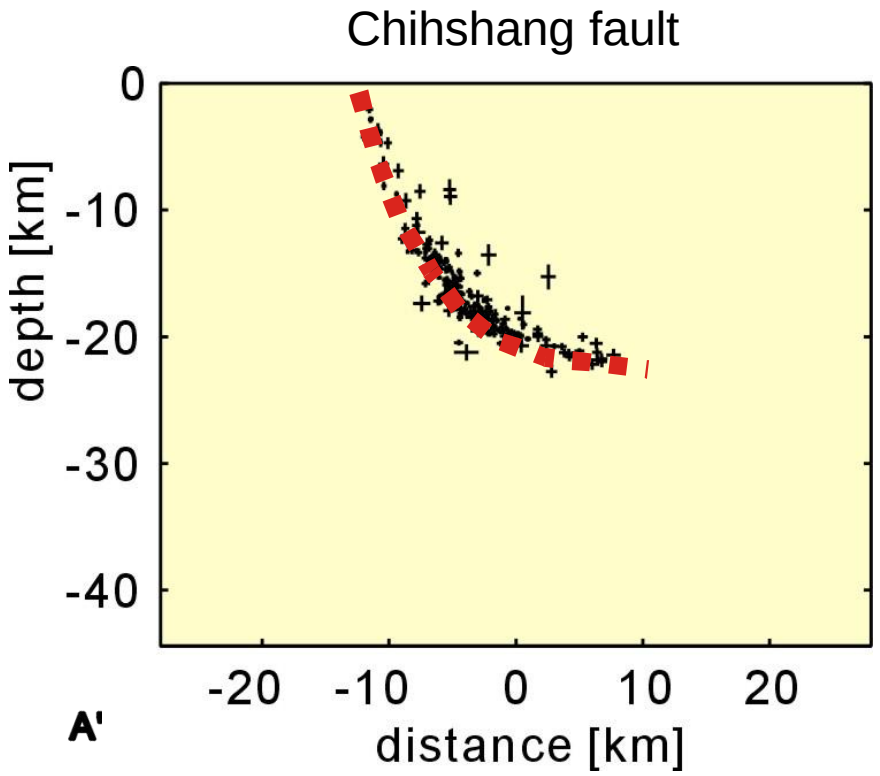
(after Yu et al., 1997)

Recent Seismicty and Historic Earthquakes



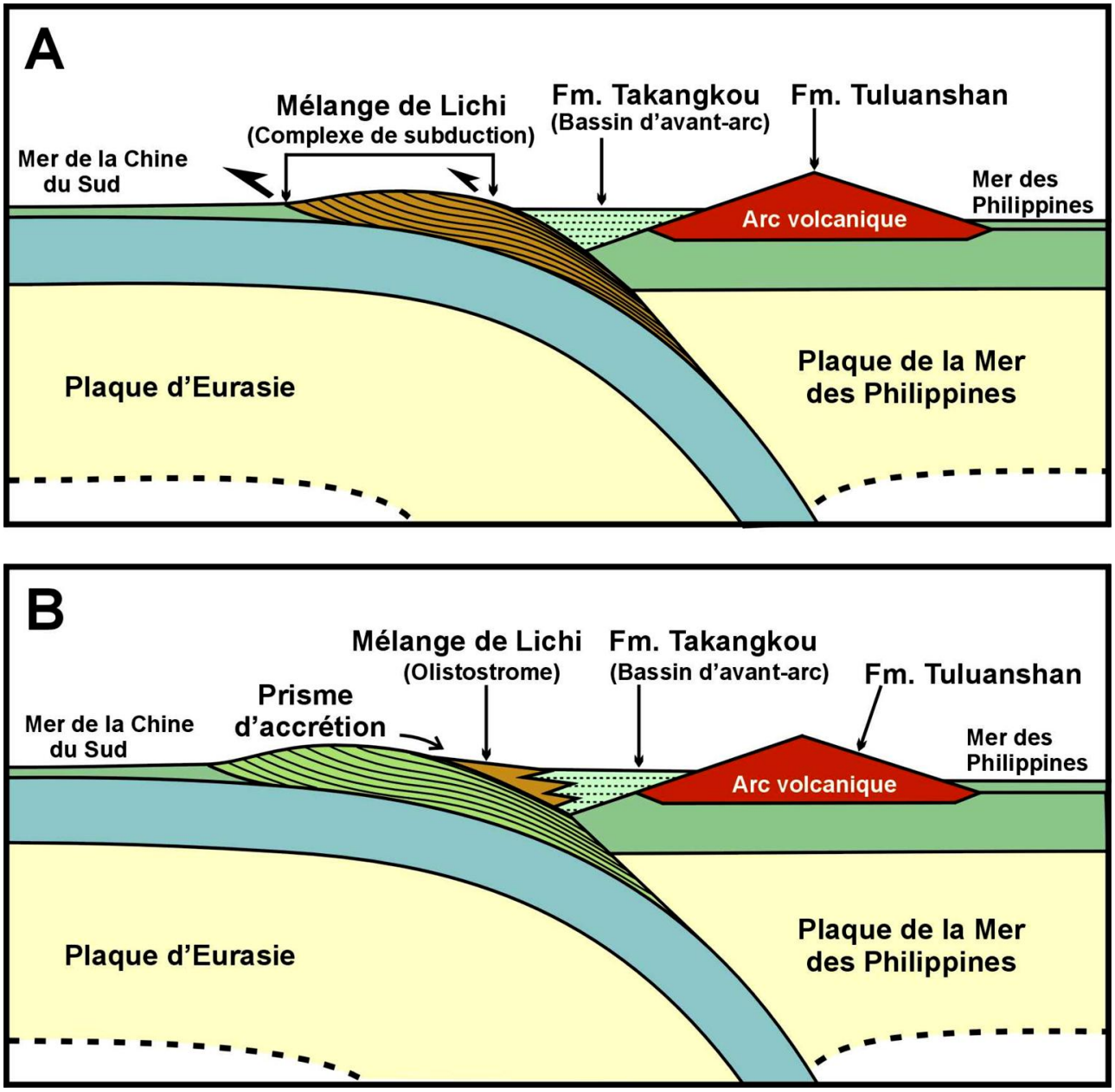
The Chihshang fault and Micro-earthquakes



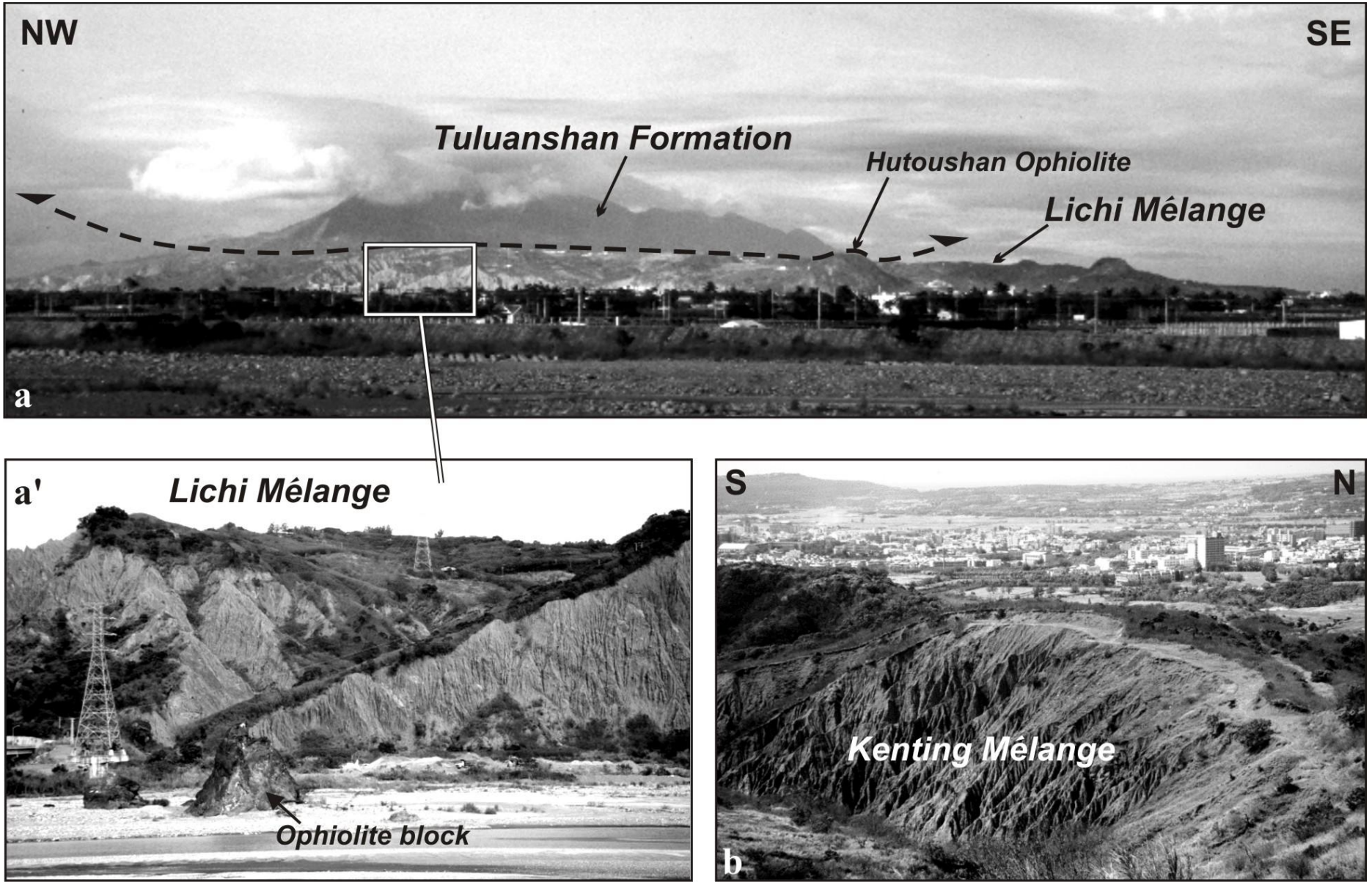


(Rau et al., person. comm.)

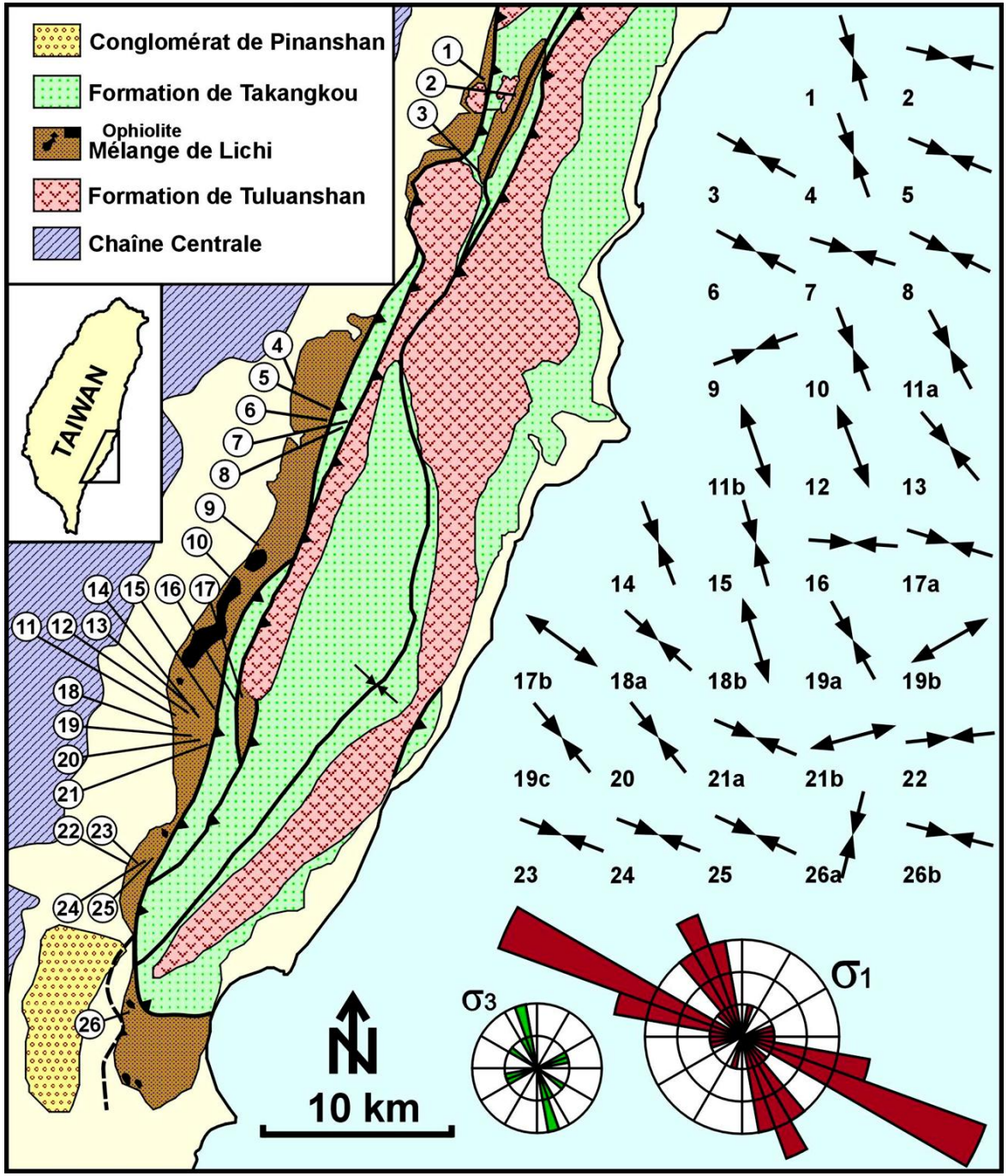
Origin of the Lichi Melange



Chang et al., 2001

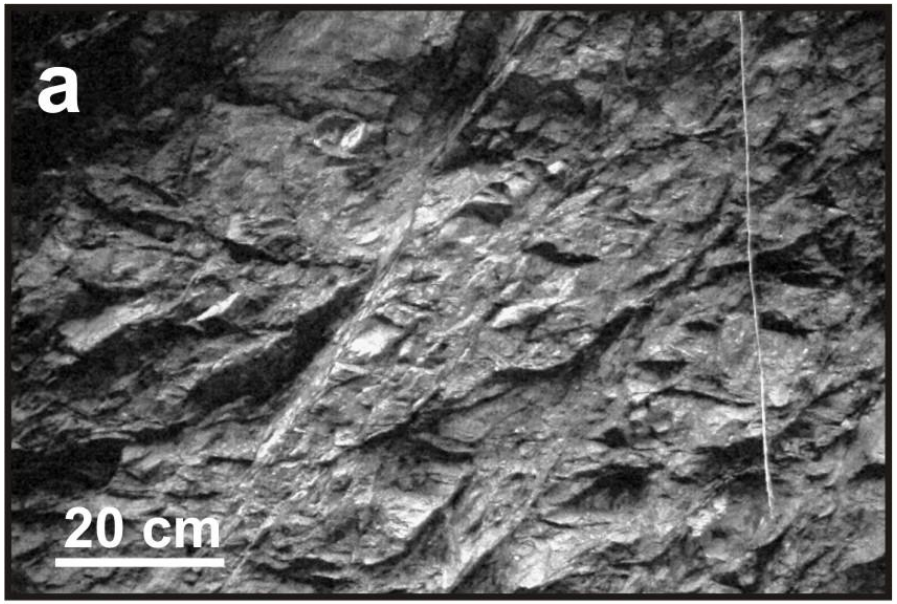


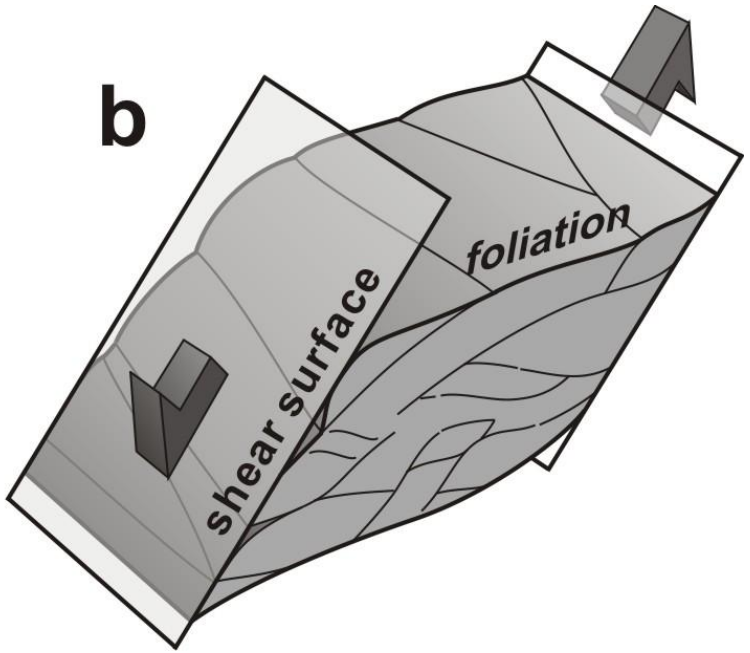
Typical outcrops of the Lichi (a and a') and Kenting Mélanges (b).



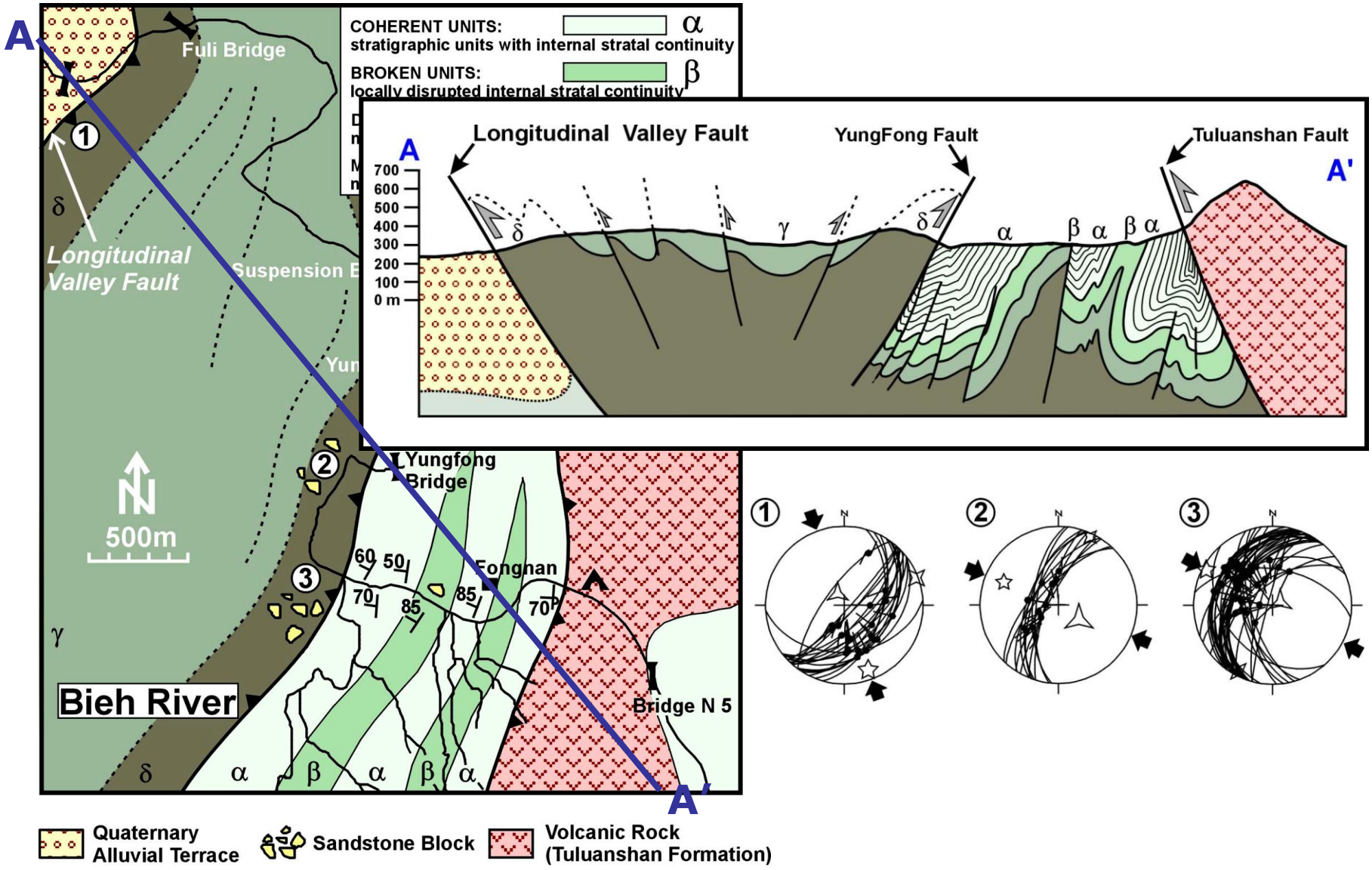
Distribution of paleostress axes reconstructed in the Lichi Melange

Chang et al., 2000



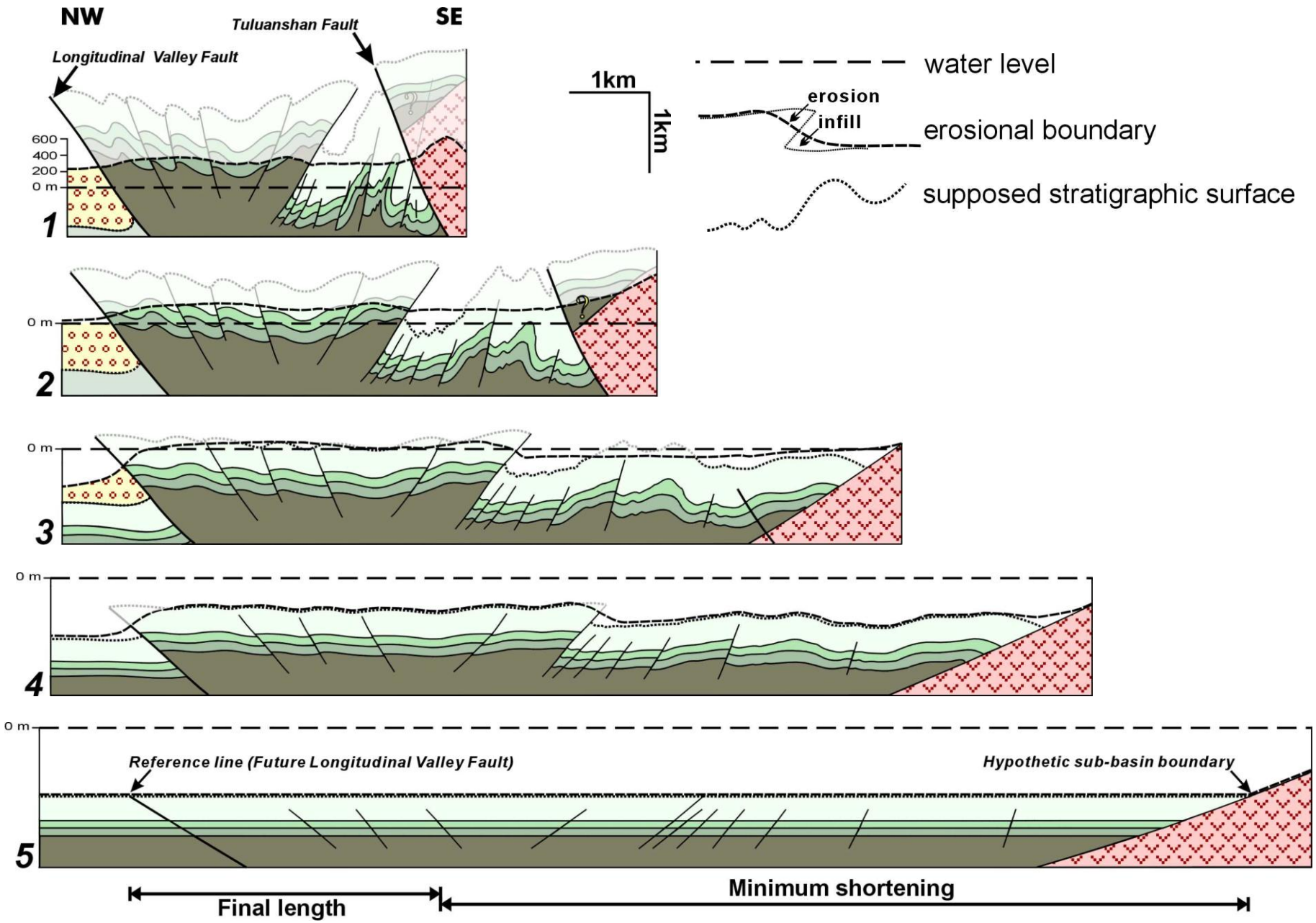


(a) Scaly foliation associated with shear deformation in the argillaceous matrix of mélange. Note the presence of two main structural orientations that correspond to shear surfaces and foliation. (b) The sigmoid shape of scaly foliation indicates the sense of motion on the shear surfaces.



Detail geologic map of the Biehhsi valley area and geologic cross-section

Chang et al., 2000

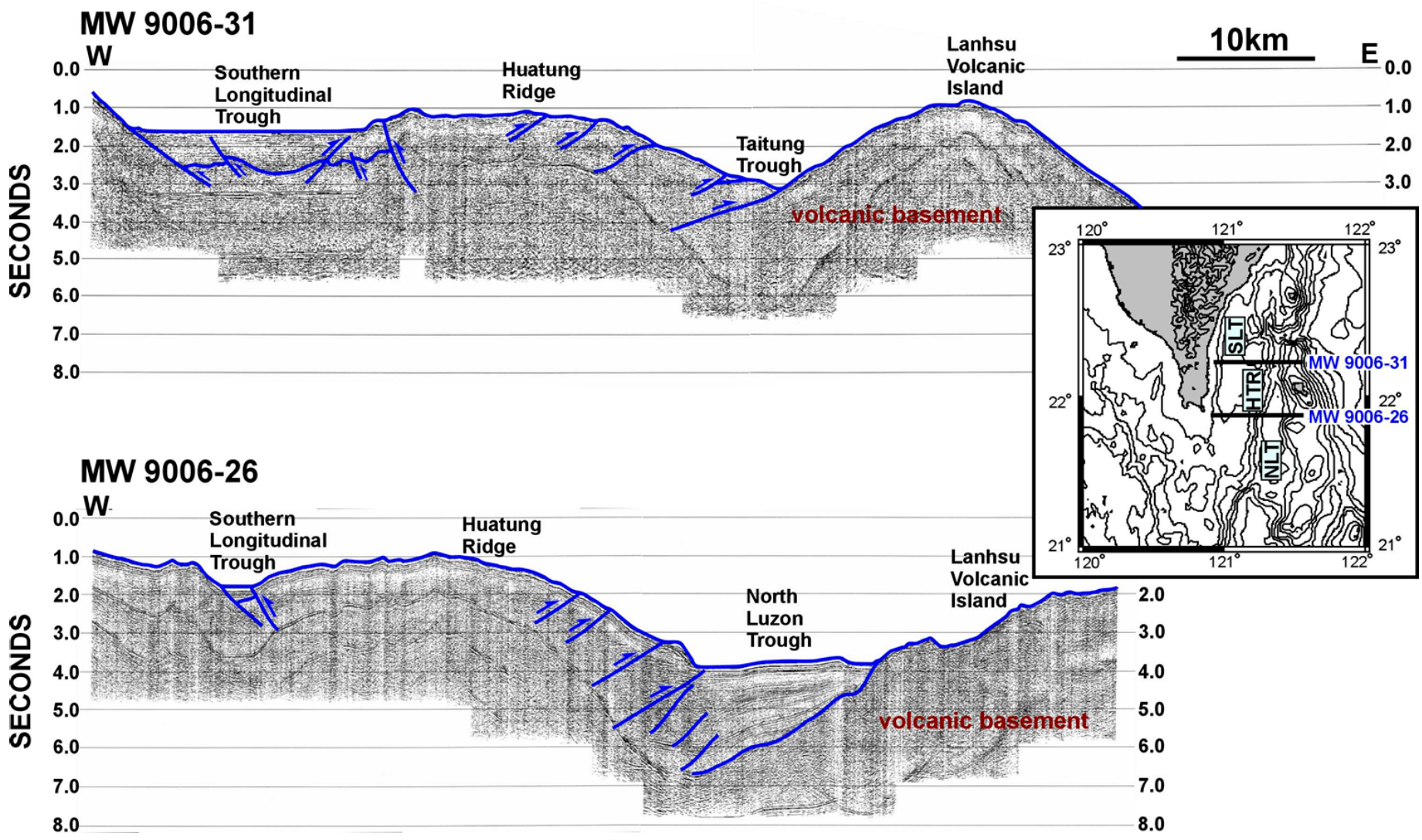


Structural evolution of the Biehhsi profile

Chang et al., 2000

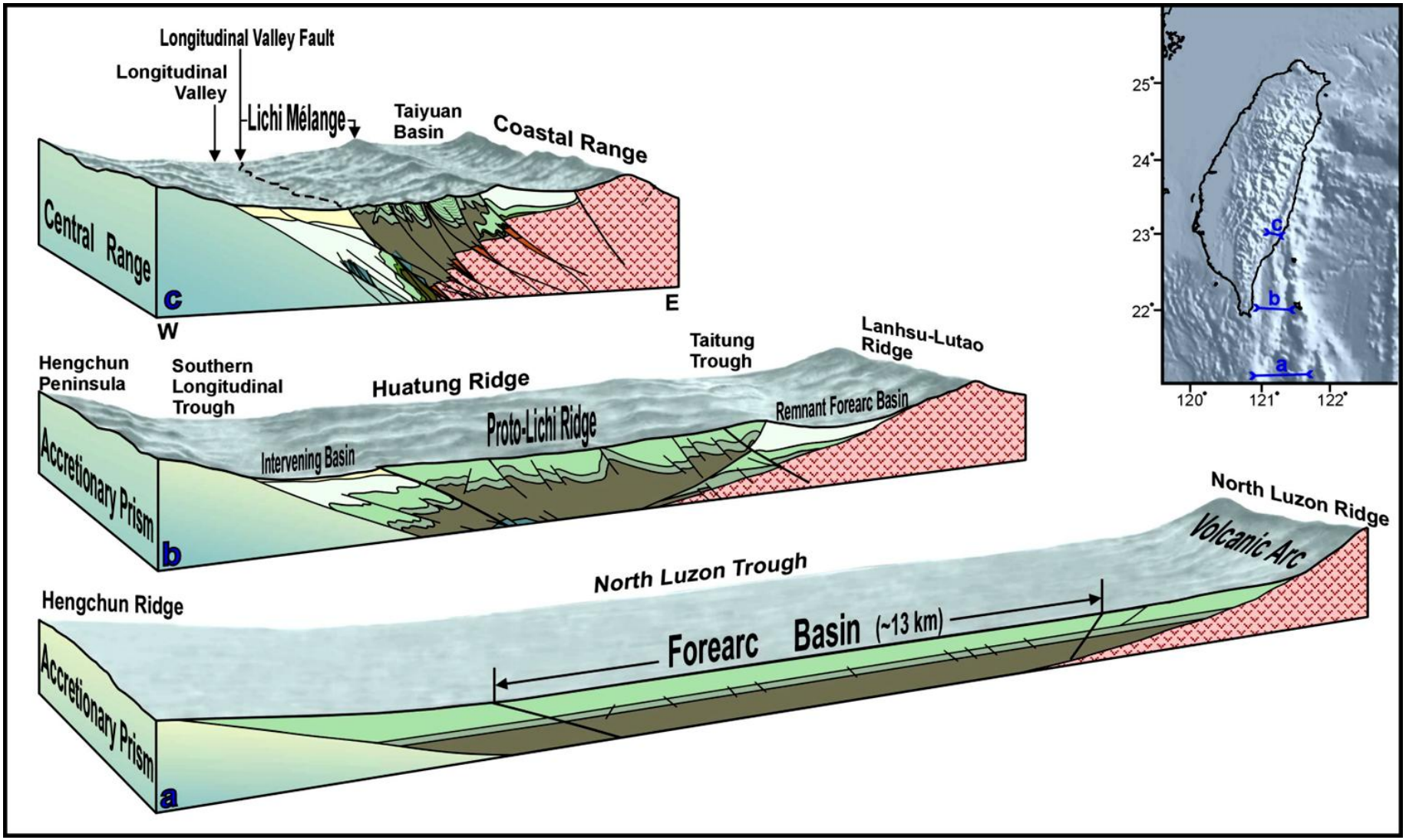
Seismic profiles over the Huatung Ridge

(data collected from cruise MW9006 of the R/V Moana Wave in 1990)



Chang et al., 2001

Structural evolution of the Lichi Melange and the Longitudianl Valley Fault



Chang et al., 2000