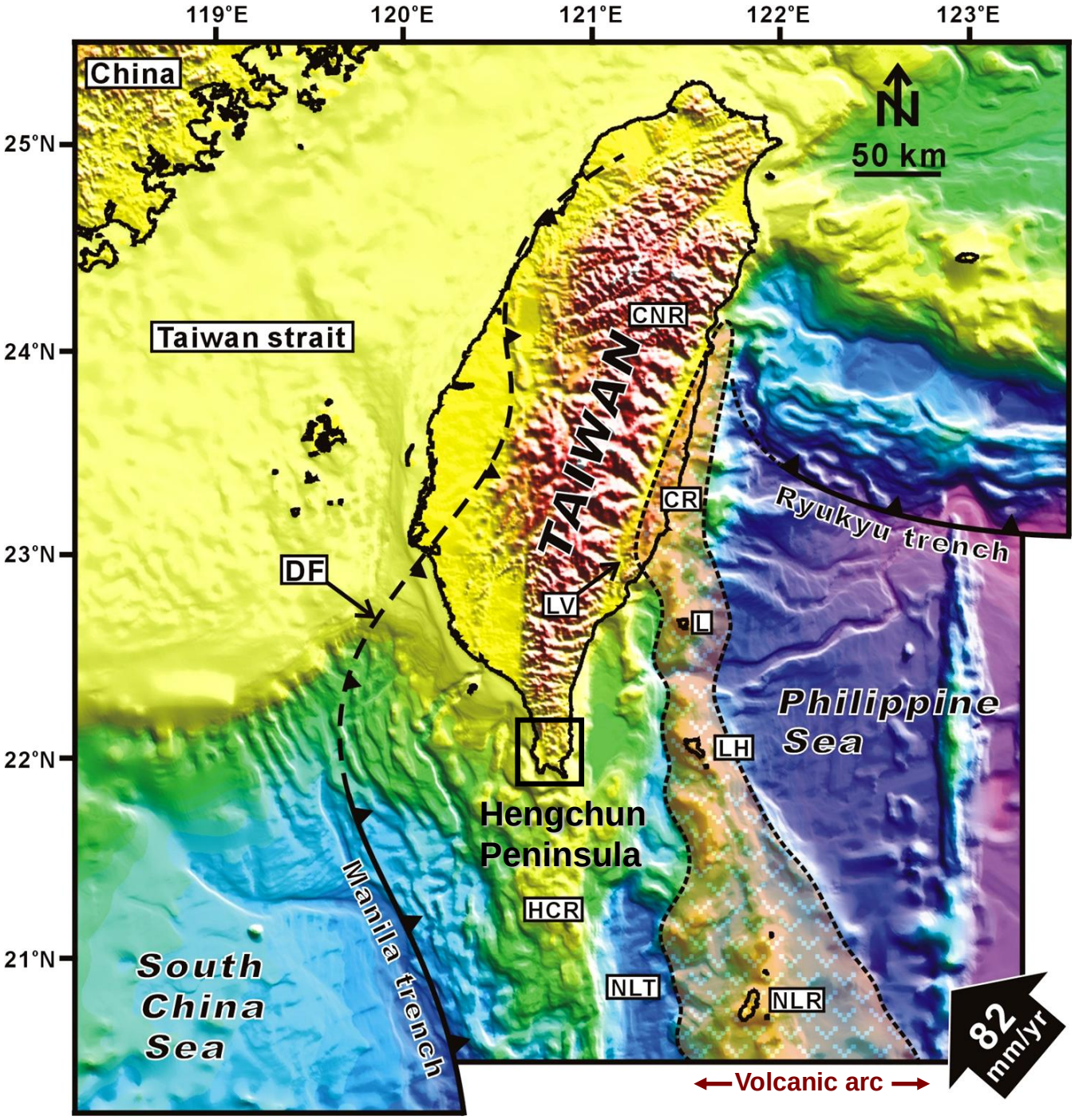
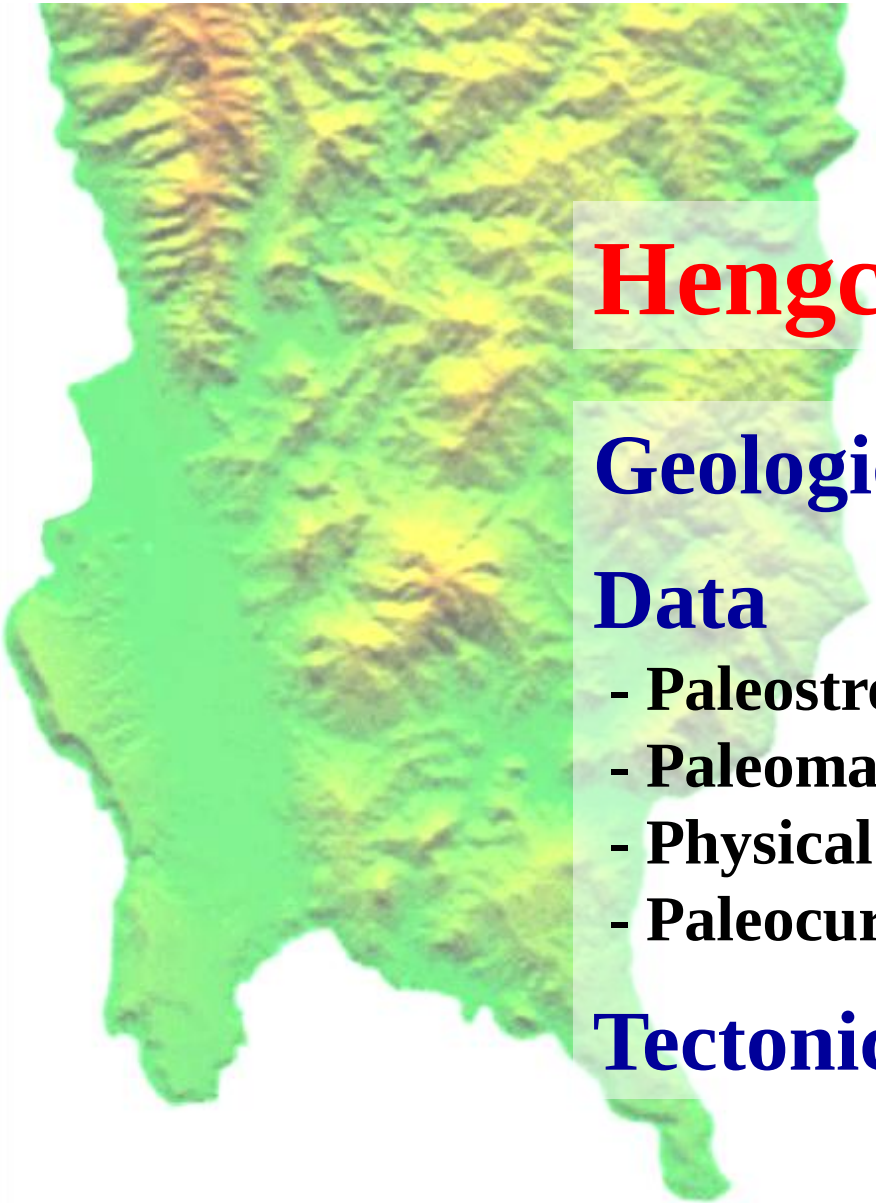

119°E
120°E
121°E
122°E
123°E
25°N
24°N
23°N
22°N
21°N
China
Taiwan strait
TAIWAN
CNR
CR
LV
DF
L
LH
Ryukyu trench
Philippine Sea
Hengchun Peninsula
HCR
NLT
NLR
Manila trench
South China Sea
N
50 km
82 mm/yr
Volcanic arc



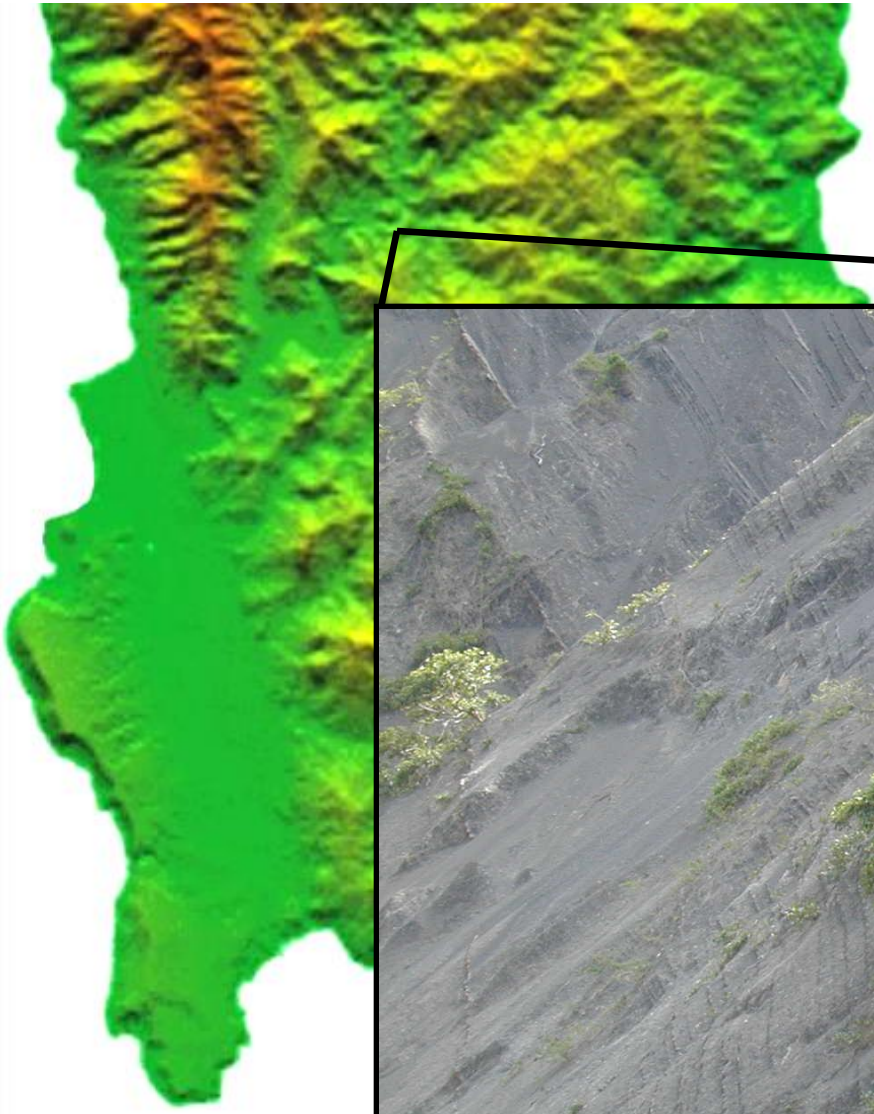
Hengchun Peninsula

Geological setting

Data

- Paleostress data（古應力）
- Paleomagnetic data（古地磁）
- Physical model experiment（物理模型）
- Paleocurrent data（古水流）

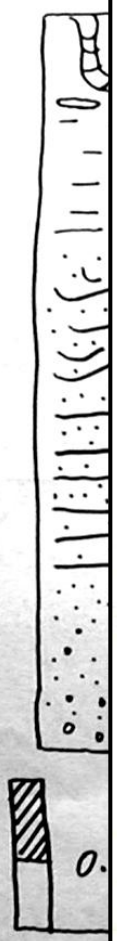
Tectonic evolution



Typical turbidite outcrop of the
Miocene Mutan Formation

Normal (deposition is directly from

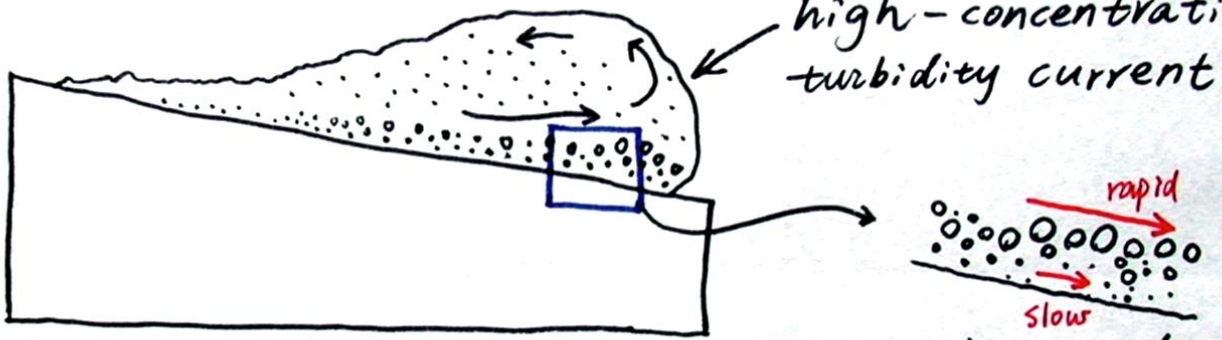
Bouma Sequence



Bou

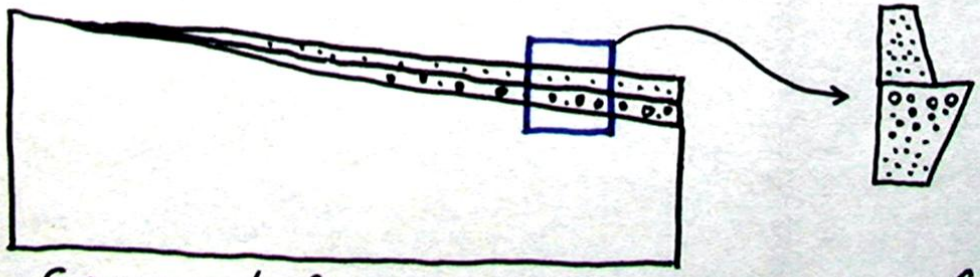
reverse (rapid deposition by " frictional freezing")

1.

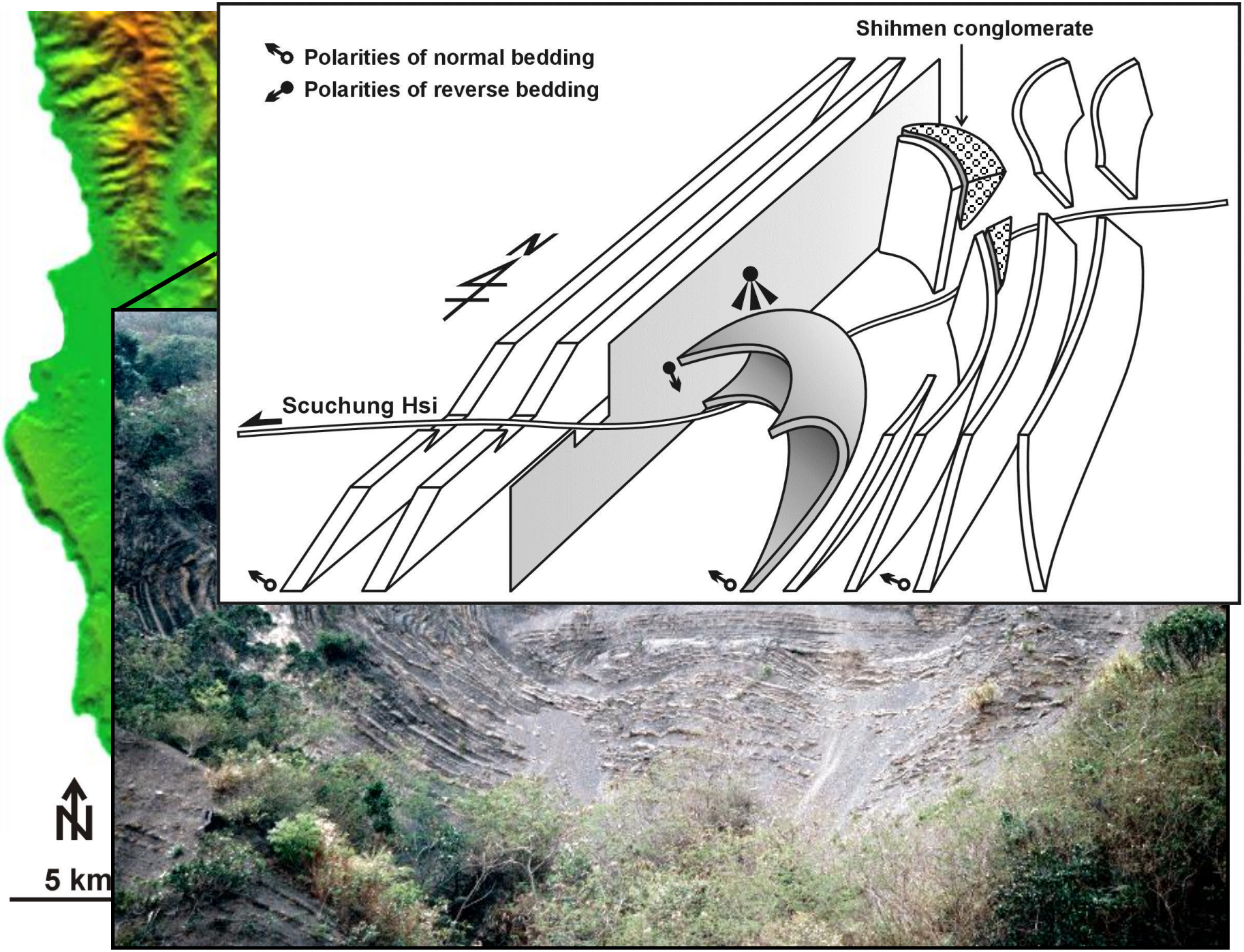


traction carpet: by grain interaction and pore fluid escape

2

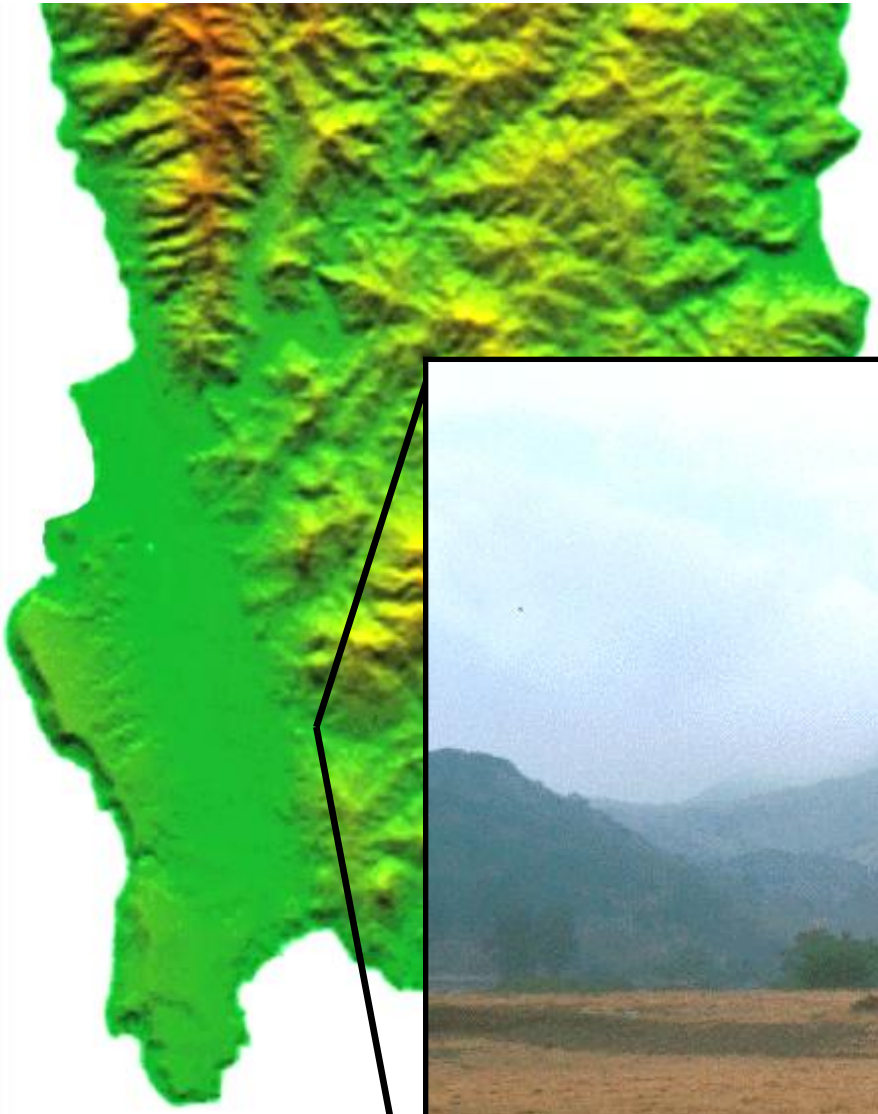


frictional freezing (inter-granular friction)


Polarities of normal bedding
Polarities of reverse bedding
Shihmen conglomerate
Scuchung Hsi
N
5 km

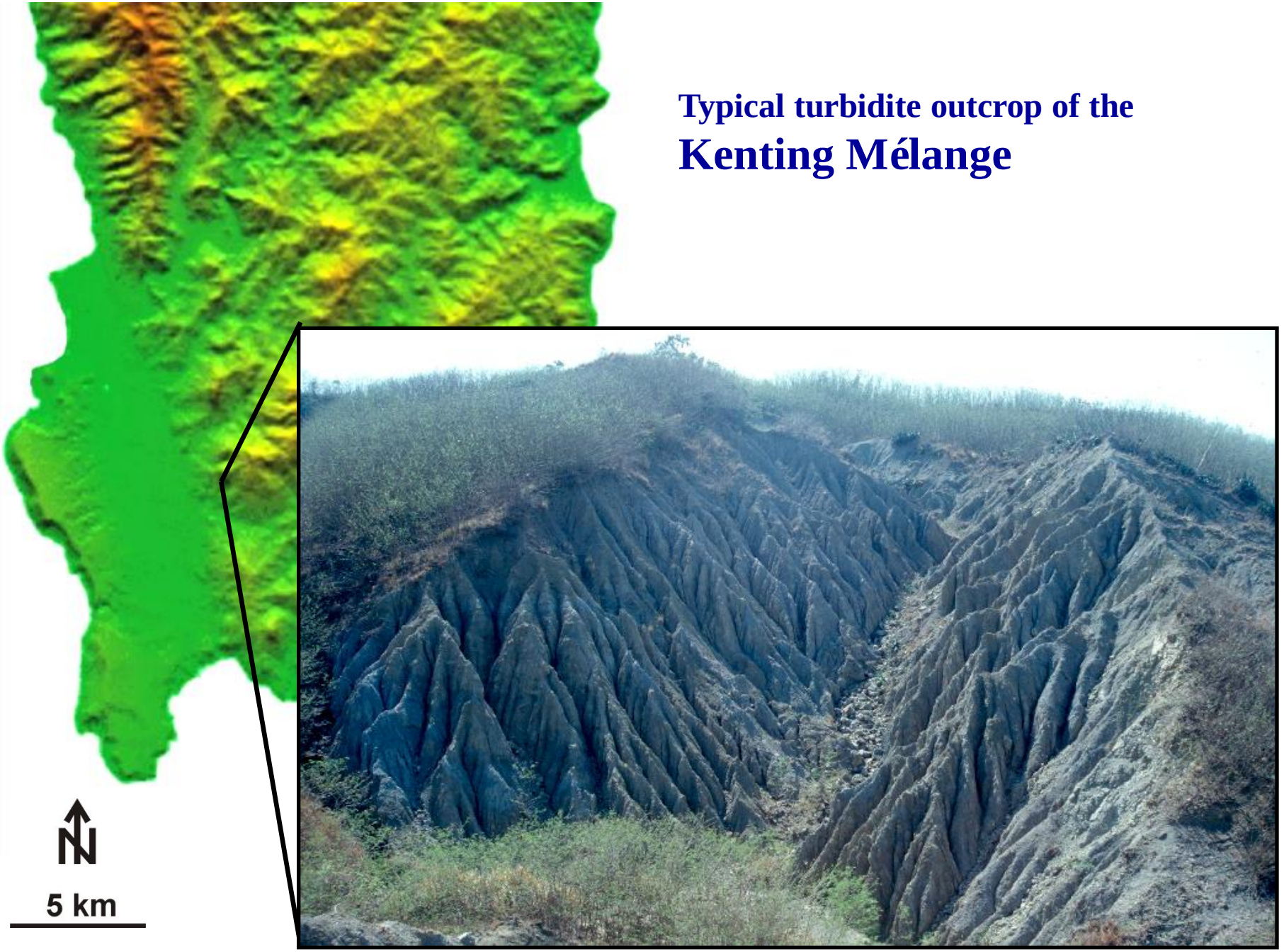
Typical turbidite outcrop of the

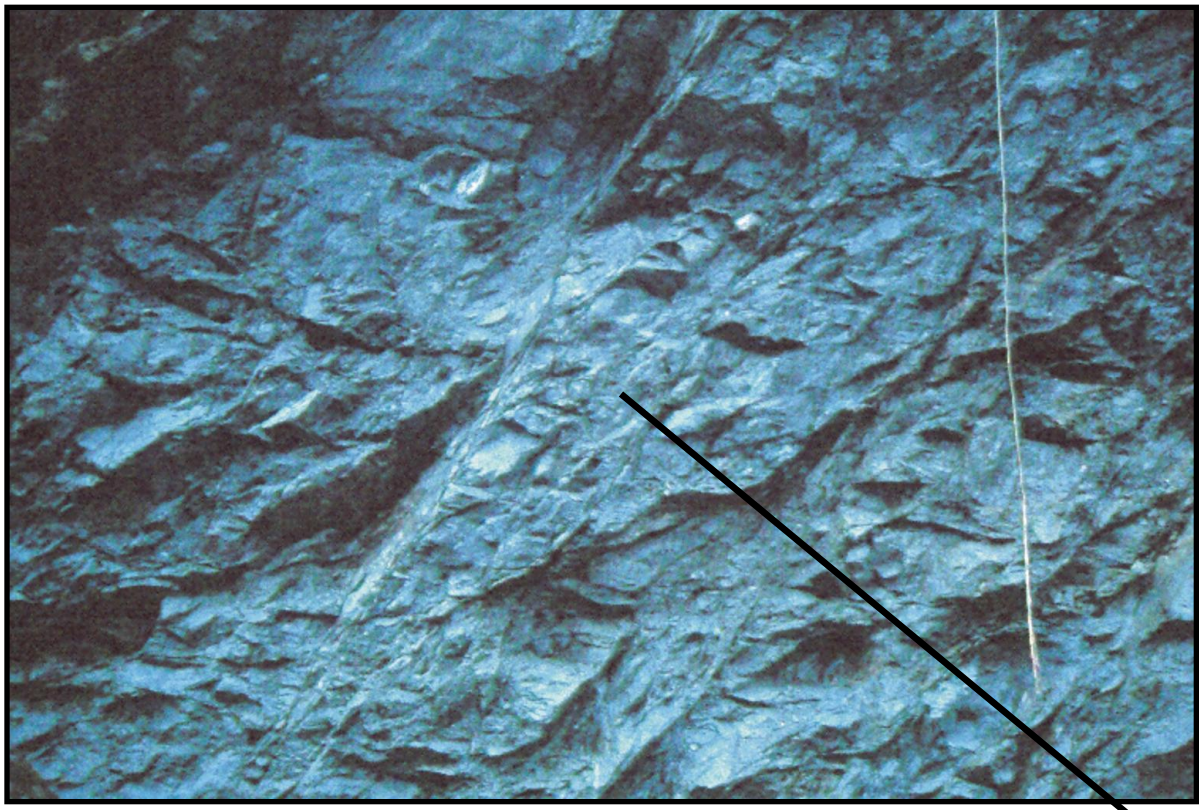
Kenting Mélange



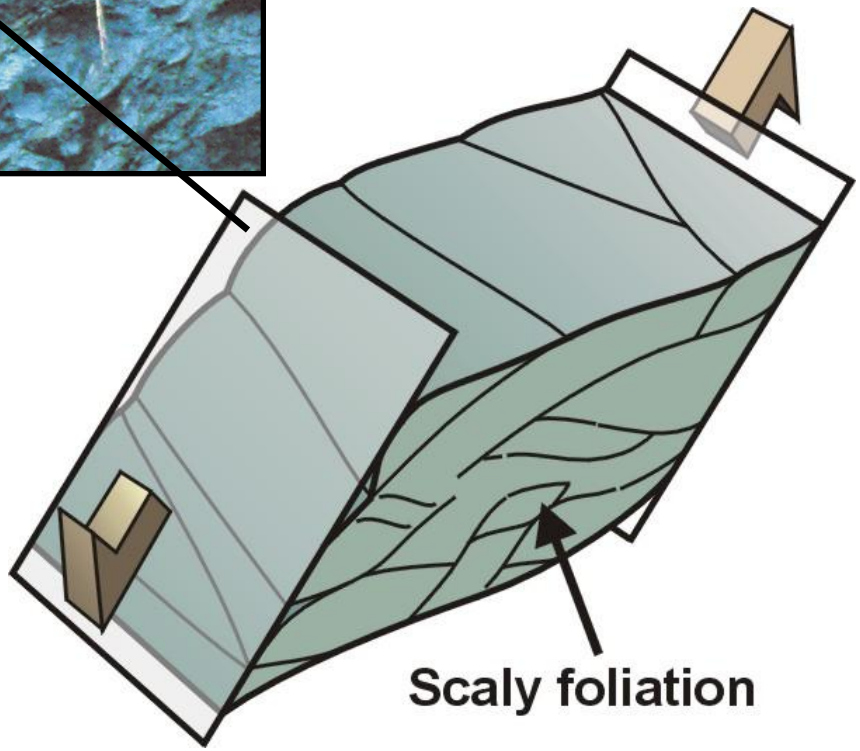
Typical turbidite outcrop of the

Kenting Mélange

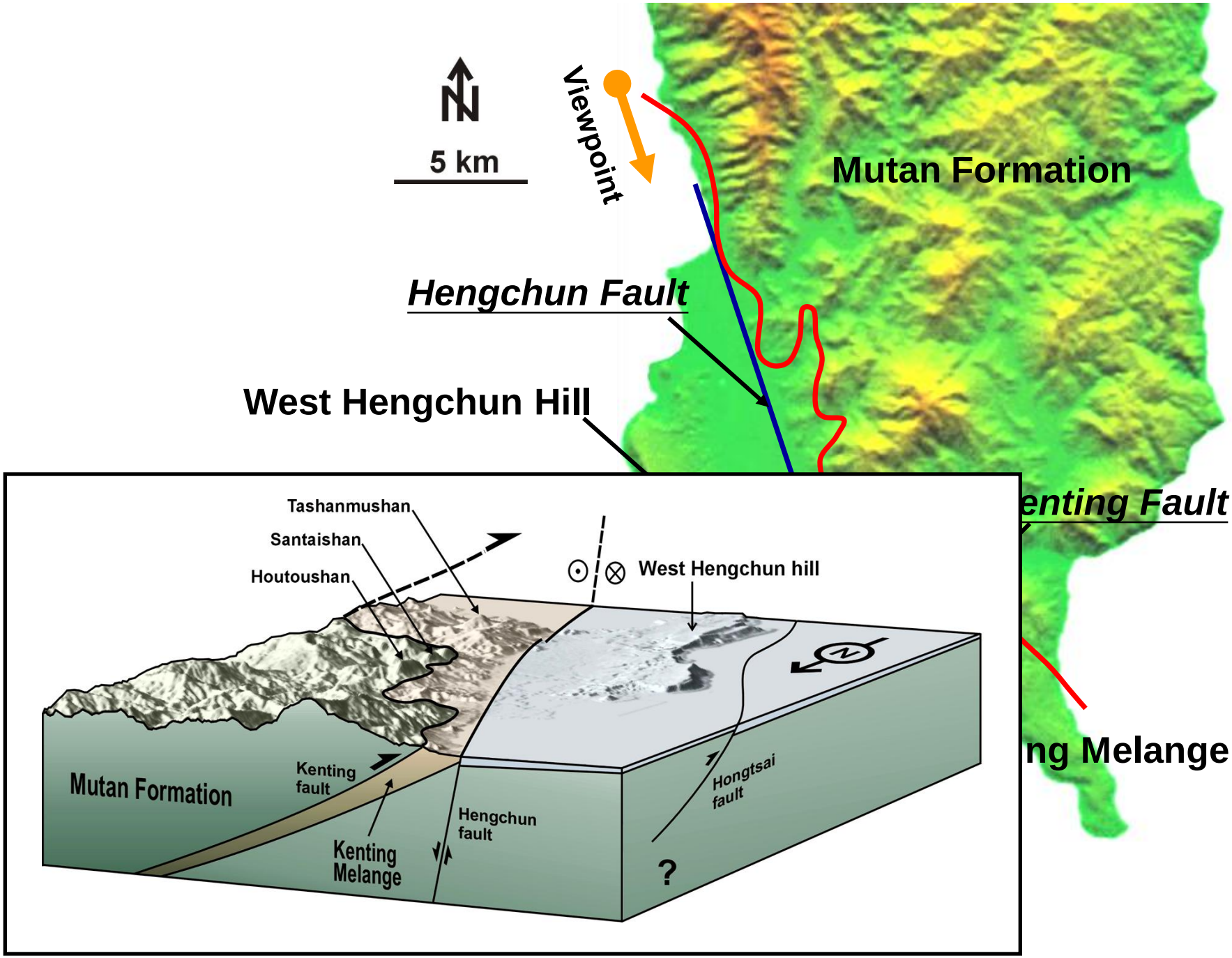


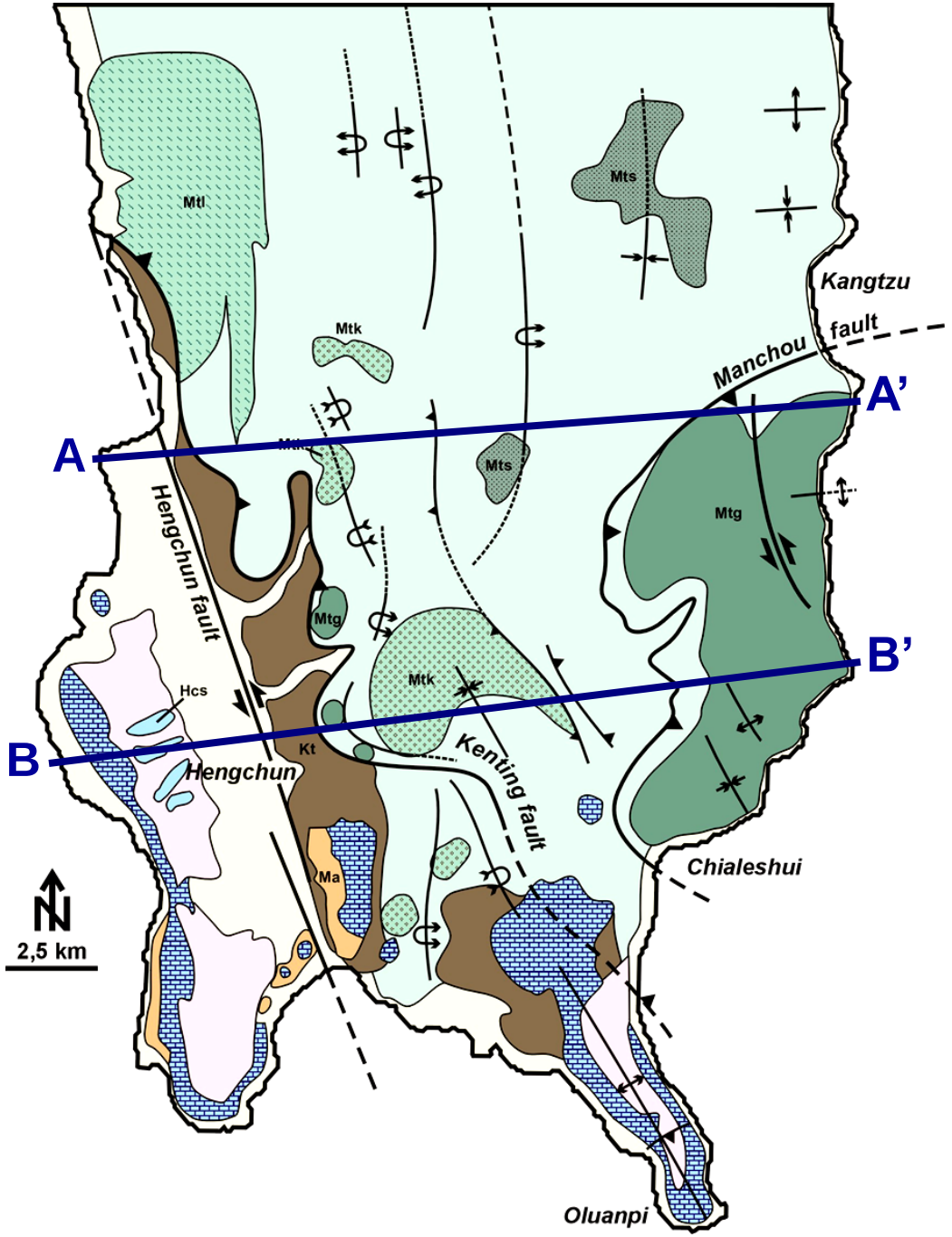


Scaly foliation associated with shear deformation in the argillaceous matrix



The sigmoid shape of the scaly foliation indicates the shear sense


N
5 km
Viewpoint
Mutan Formation
Hengchun Fault
West Hengchun Hill
enting Fault
ng Melange
Tashanmushan
Santaishan
Houtoushan
West Hengchun hill
Mutan Formation
Kenting fault
Kenting Melange
Hengchun fault
Hongtsai fault
?



HENGCHUN PENINSULA

LEGEND

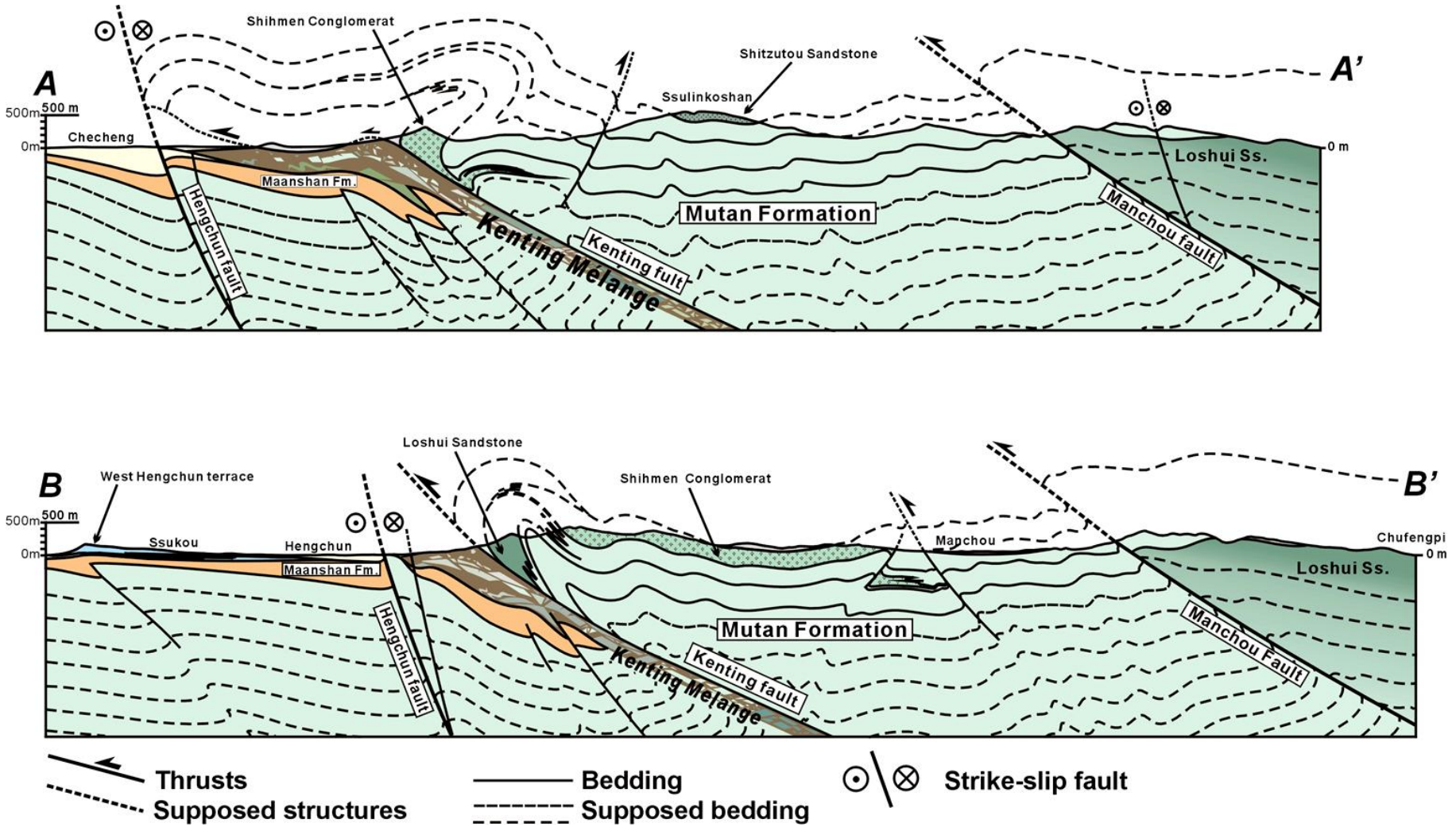
HOLOCENE
- Recent alluvium
- Oluanpi Formation

PLEISTOCENE
- Hengchun Limestone

PLIOCENE TO PLEISTOCENE
- Hcs — Siltstone and mudstone
- Limestone
- Ma — Maanshan Formation

LATE MIOCENE TO PLEISTOCENE
- Kt — Kenting Melange
- Mt — Mutan Formation

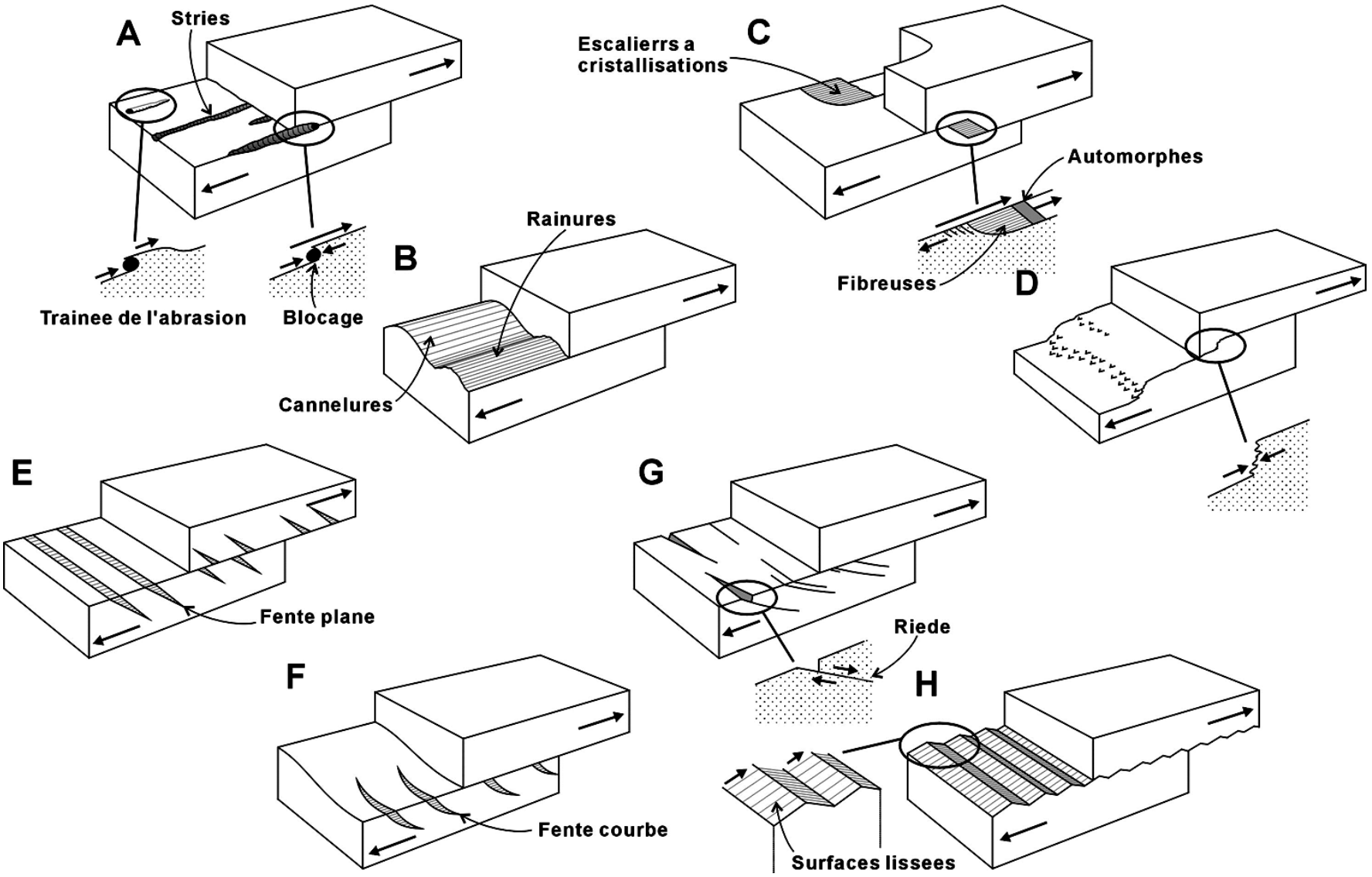
MIDDLE MIOCENE TO LATE MIOCENE
- Mtl — Lilongshan Sandstone
- Mts — Shitzutou Sandstone
- Mtg — Loshui Sandstone
- Mtk — Shihmen Conglomerate



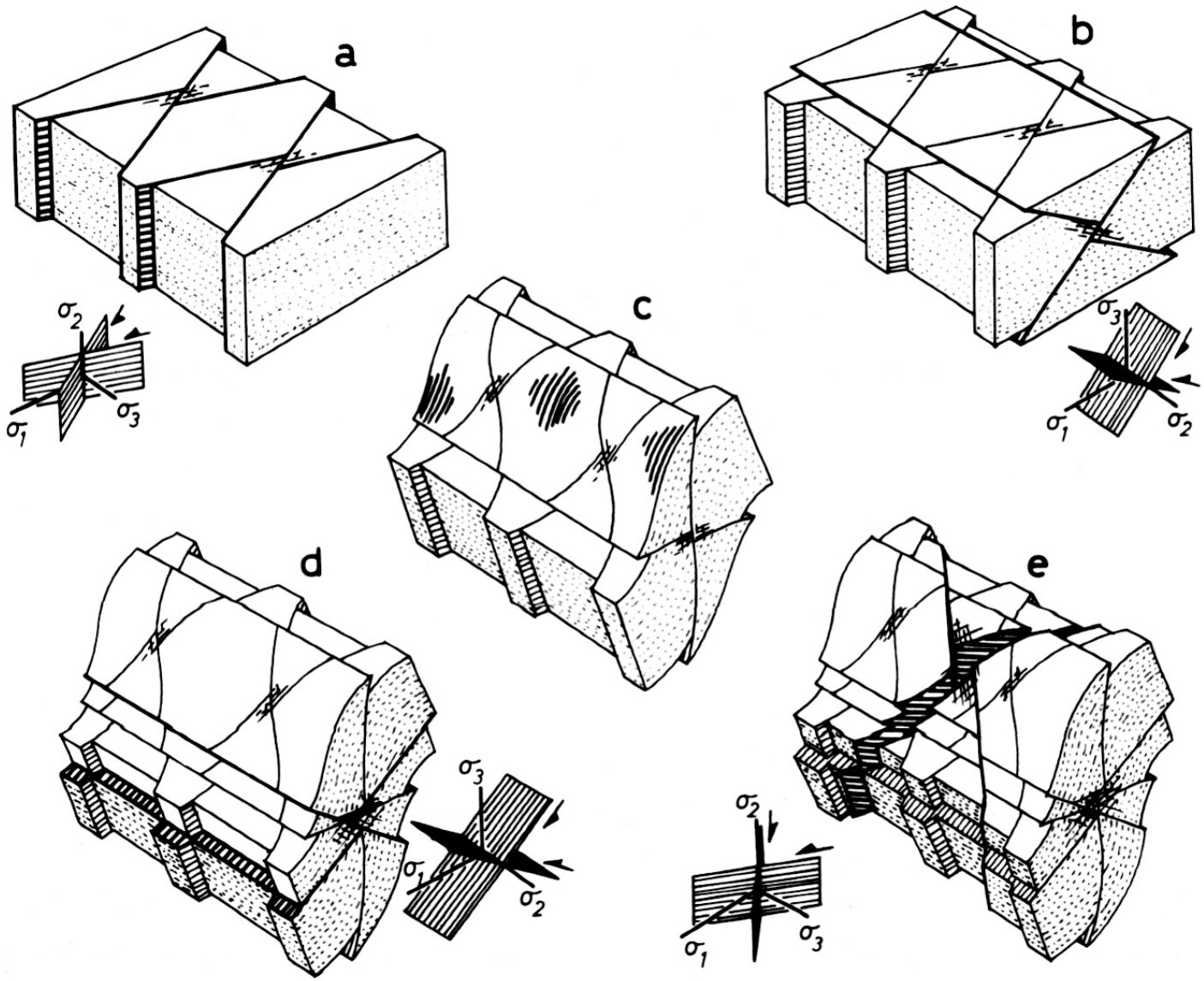
Structural profile of the Hengchun Peninsula


Paleostress data

Fault surfaces displaying the direction of slip lineation

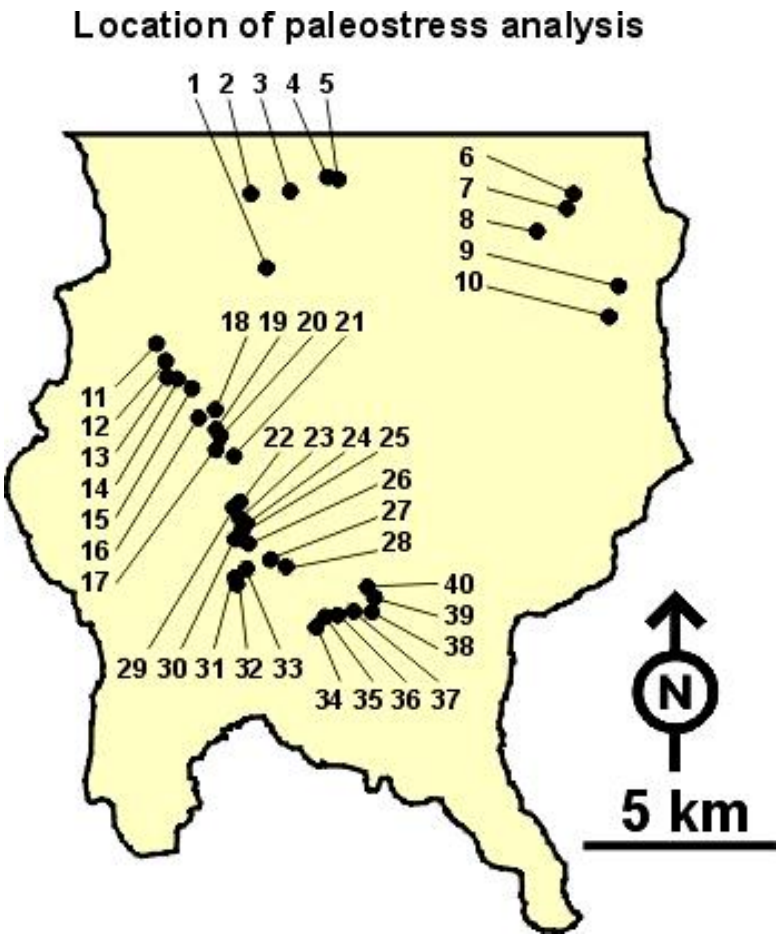


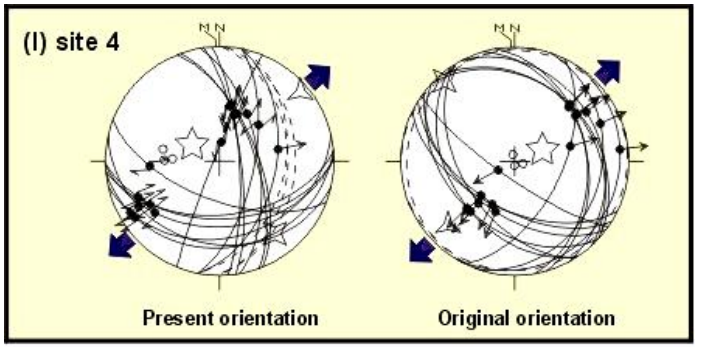
Paleostress records in folded mountain belt and polyphase deformation

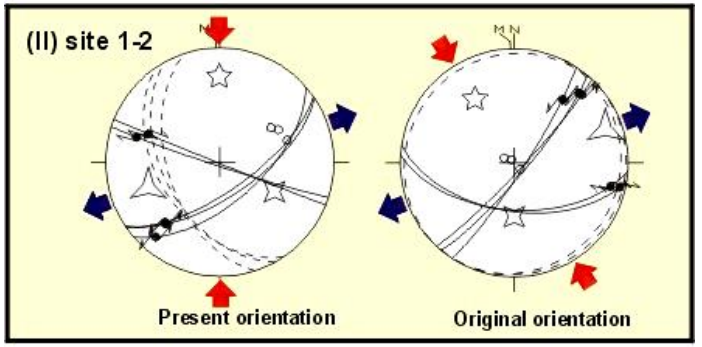


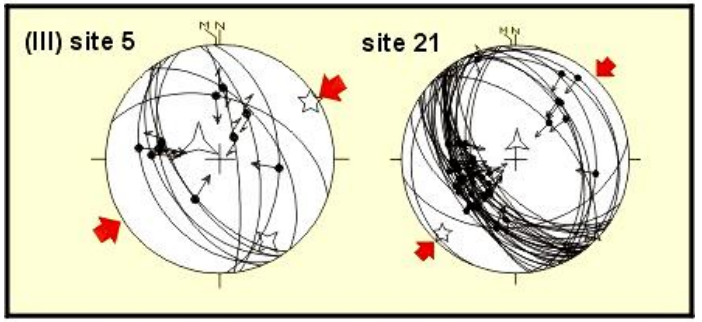
Designed by Dr. J. Angelier

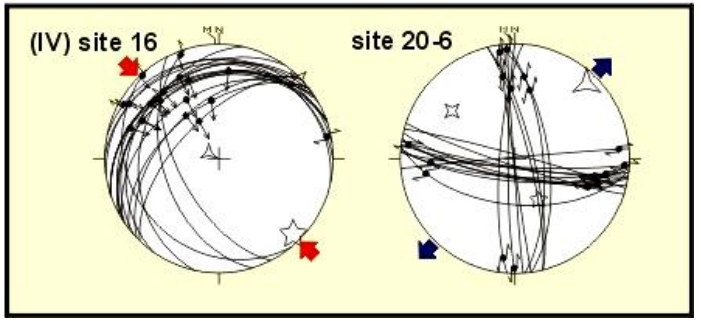
Locations of paleostress analysis site and examples of paleostress reconstructions in stereoplots



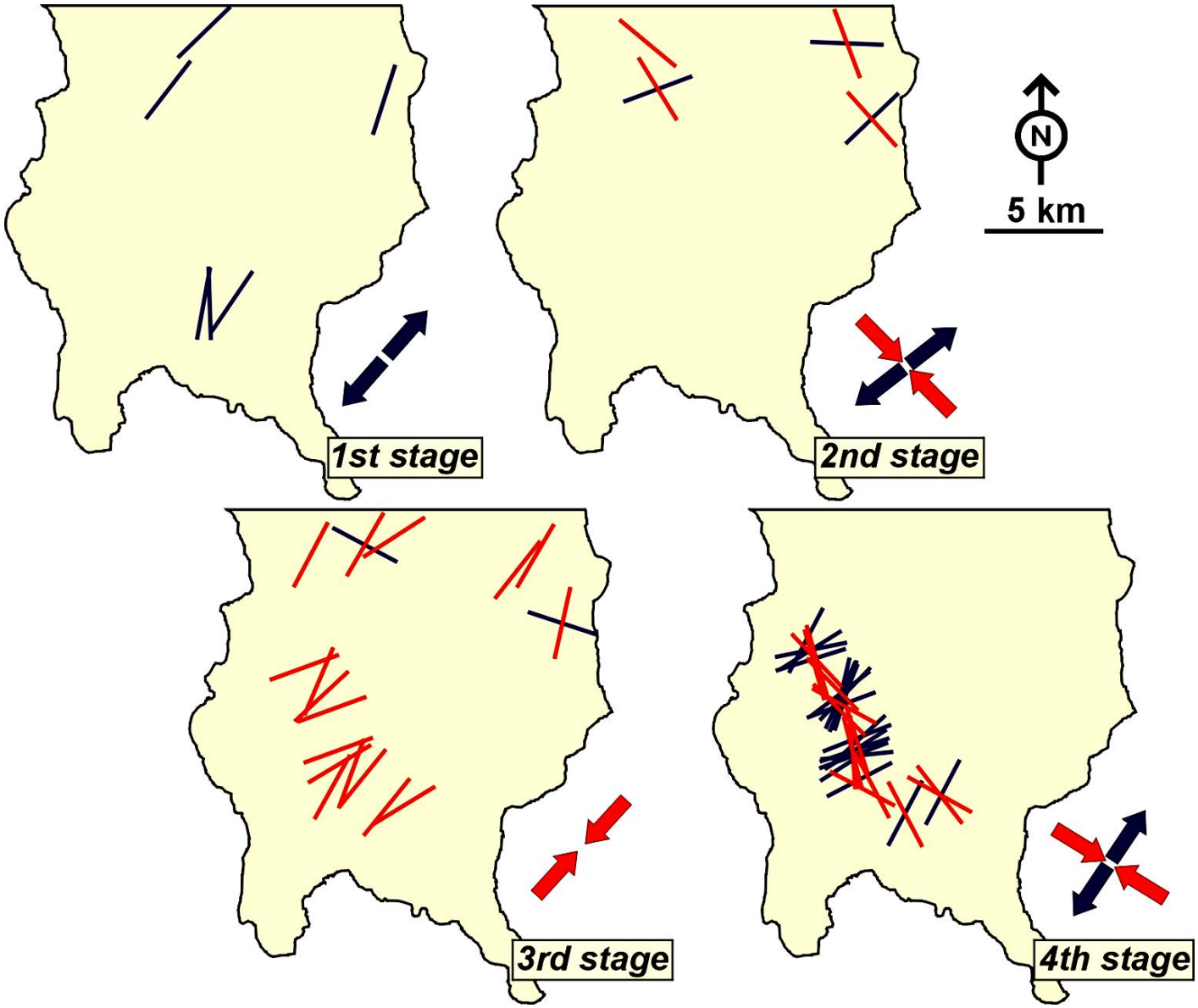




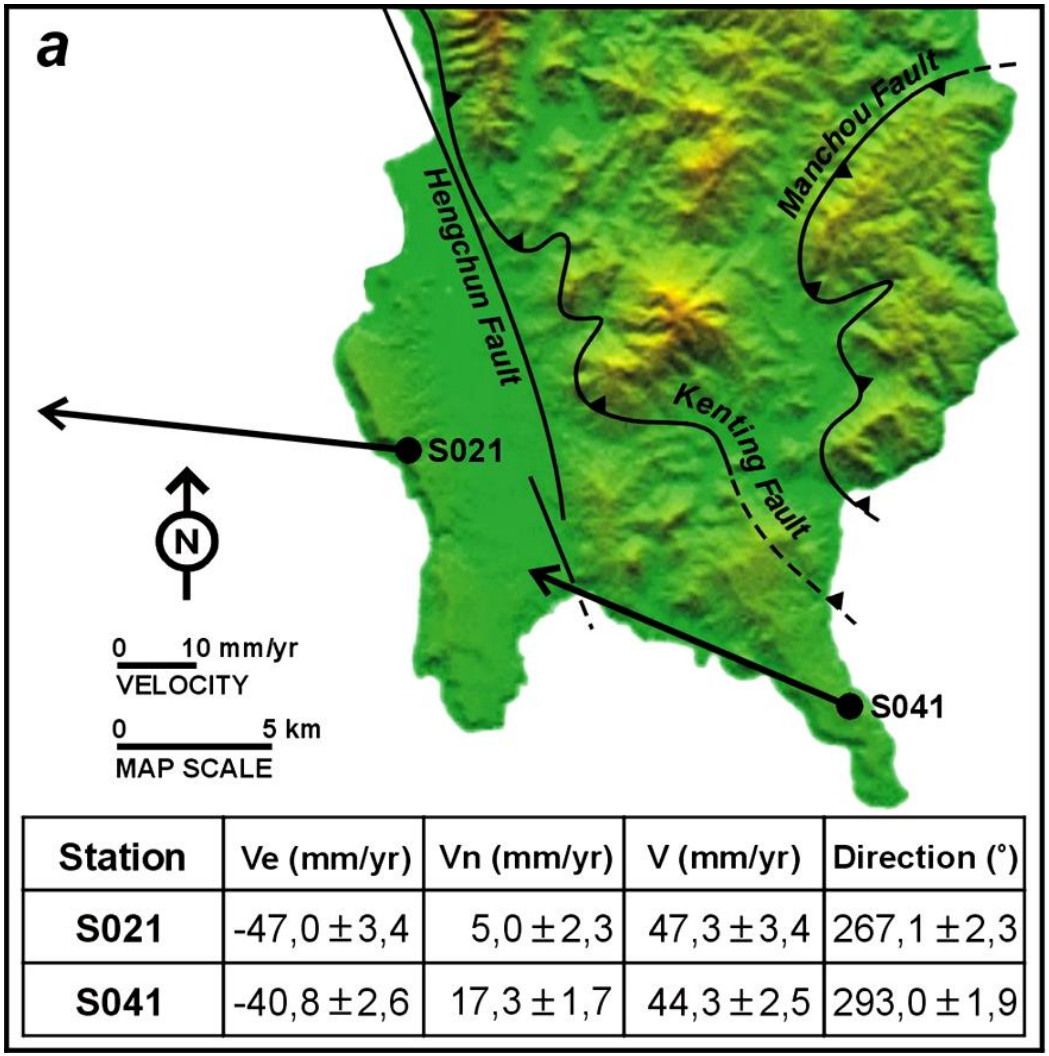




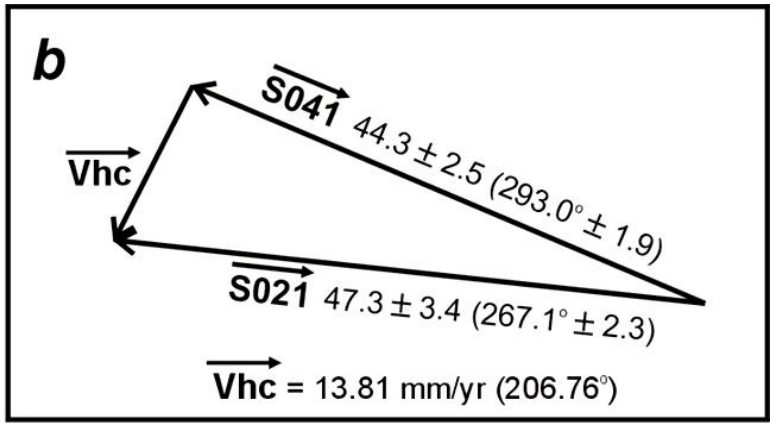
Distribution of paleostress axes reconstructucted in the Hengchun Peninsula

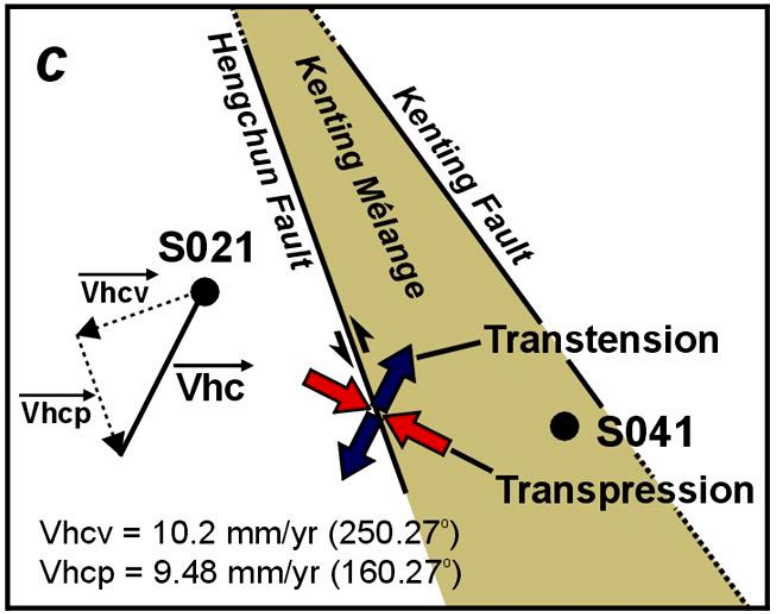


Geodesic data on two GPS stations



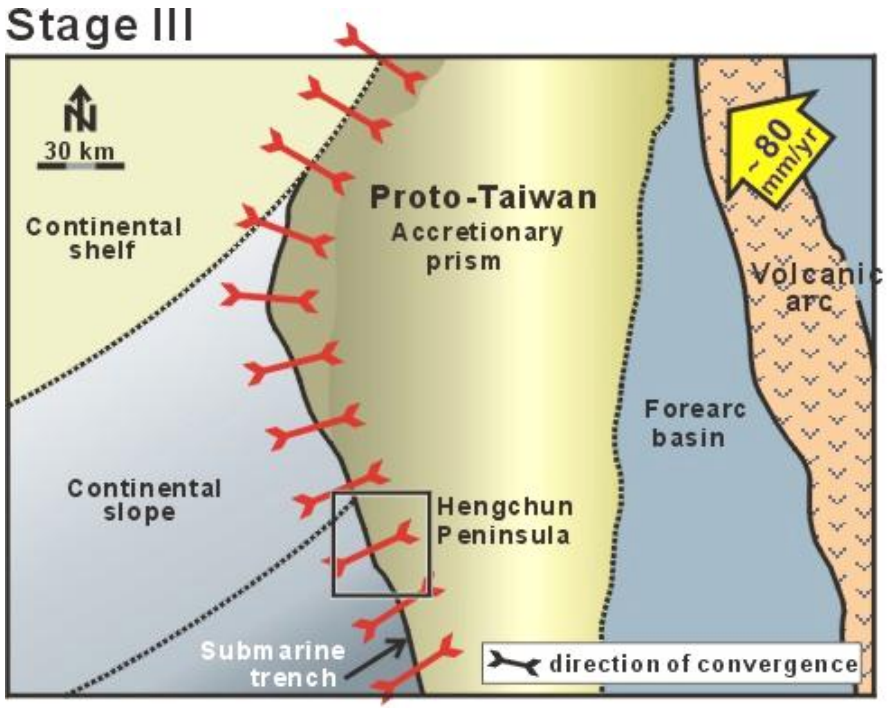
Station	Ve (mm/yr)	Vn (mm/yr)	V (mm/yr)	Direction (°)
S021	-47,0 ± 3,4	5,0 ± 2,3	47,3 ± 3,4	267,1 ± 2,3
S041	-40,8 ± 2,6	17,3 ± 1,7	44,3 ± 2,5	293,0 ± 1,9

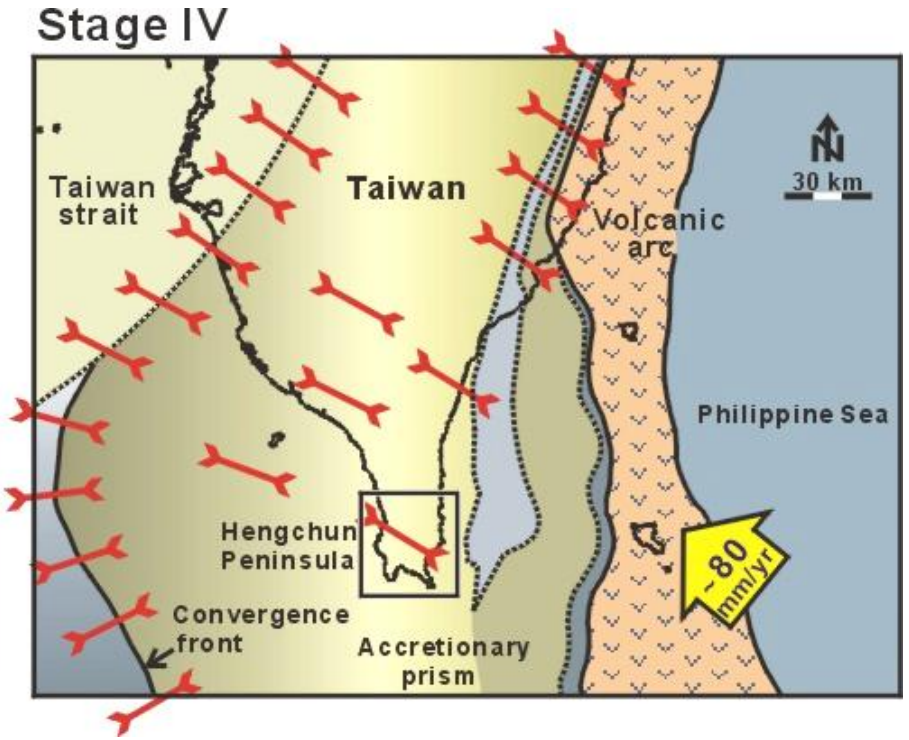




(data after Yu *et al.*, 1997)

Change in tectonic regime induced by the southwestward propagation of the accretionary prism.

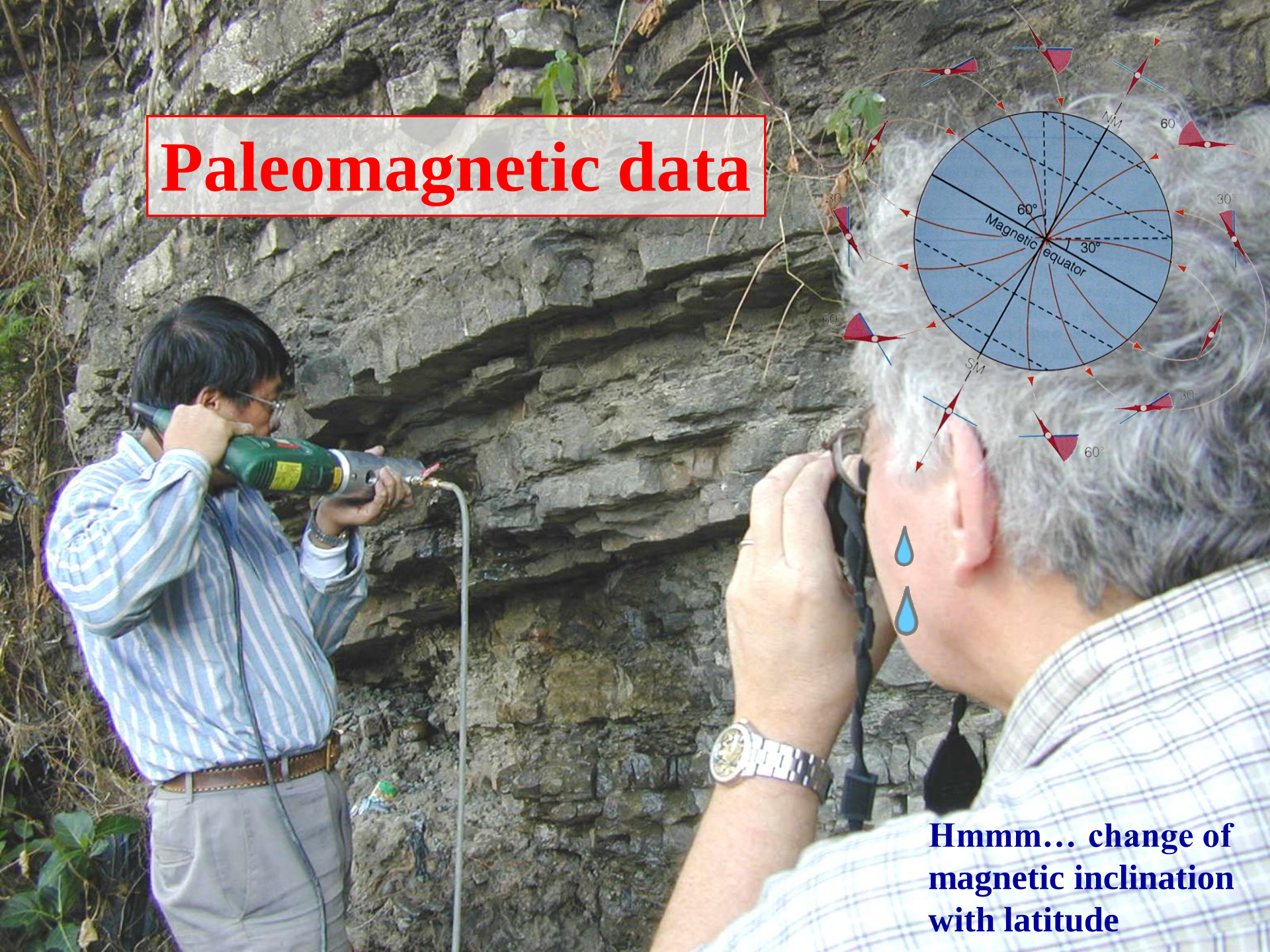




The Hengchun peninsula was located at the front of the propagating accretionary prism.

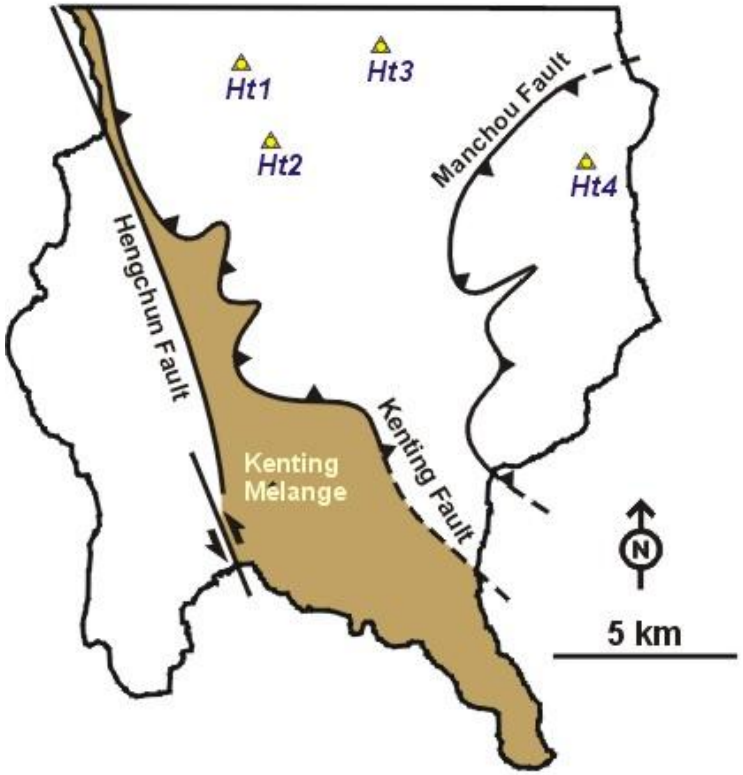
The convergence front has jumped west of the Hengchun peninsula.

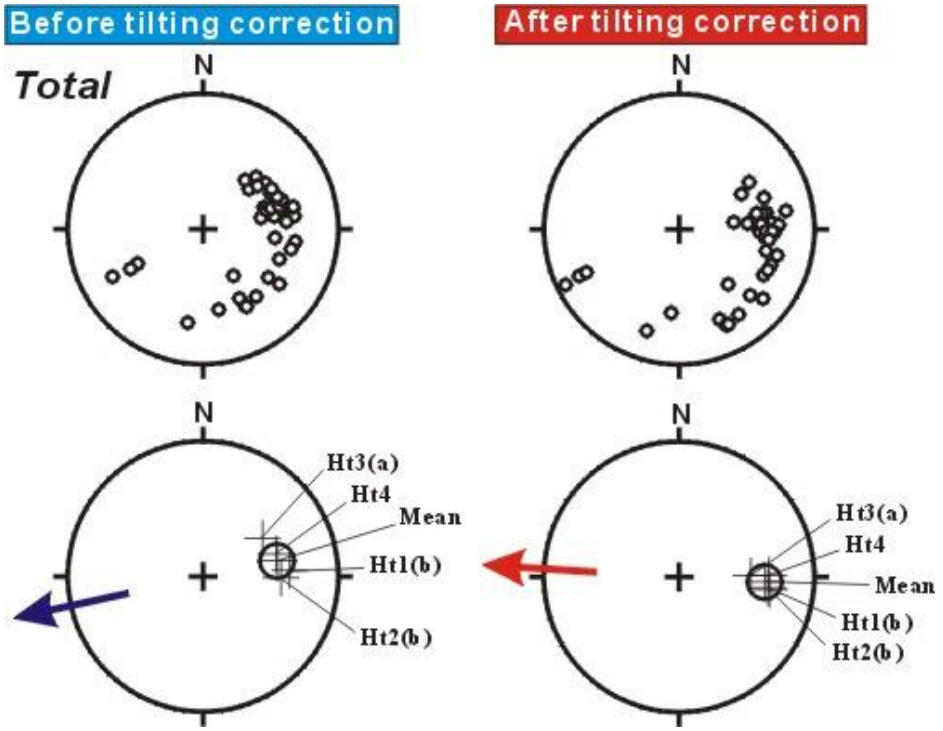
Paleomagnetic data



Hmmm… change of magnetic inclination with latitude

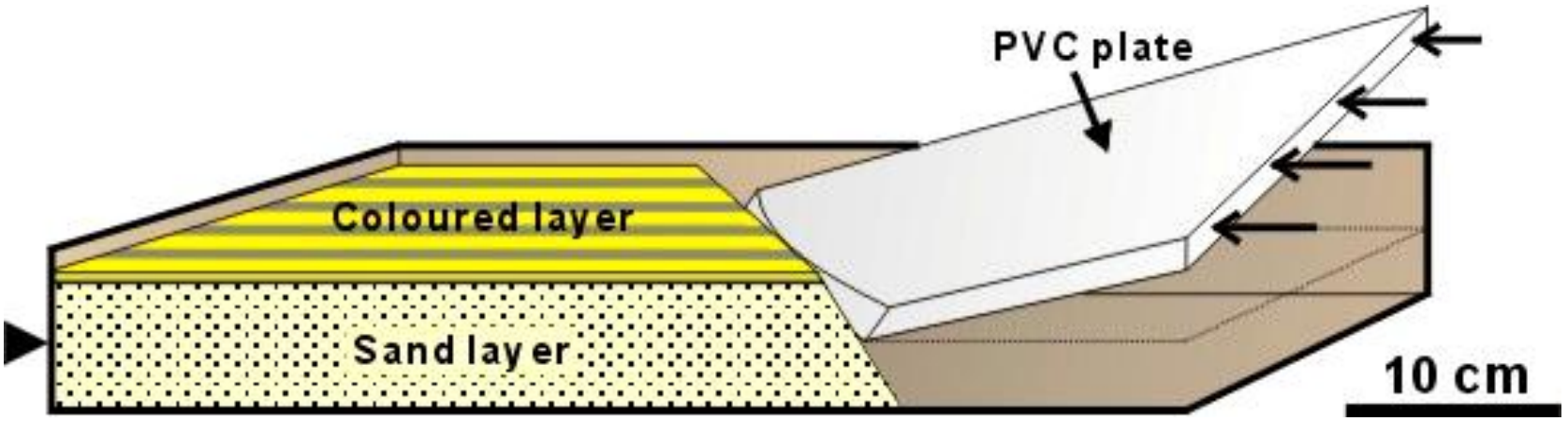
Paleomagntic data of the Hengchun Peninsula



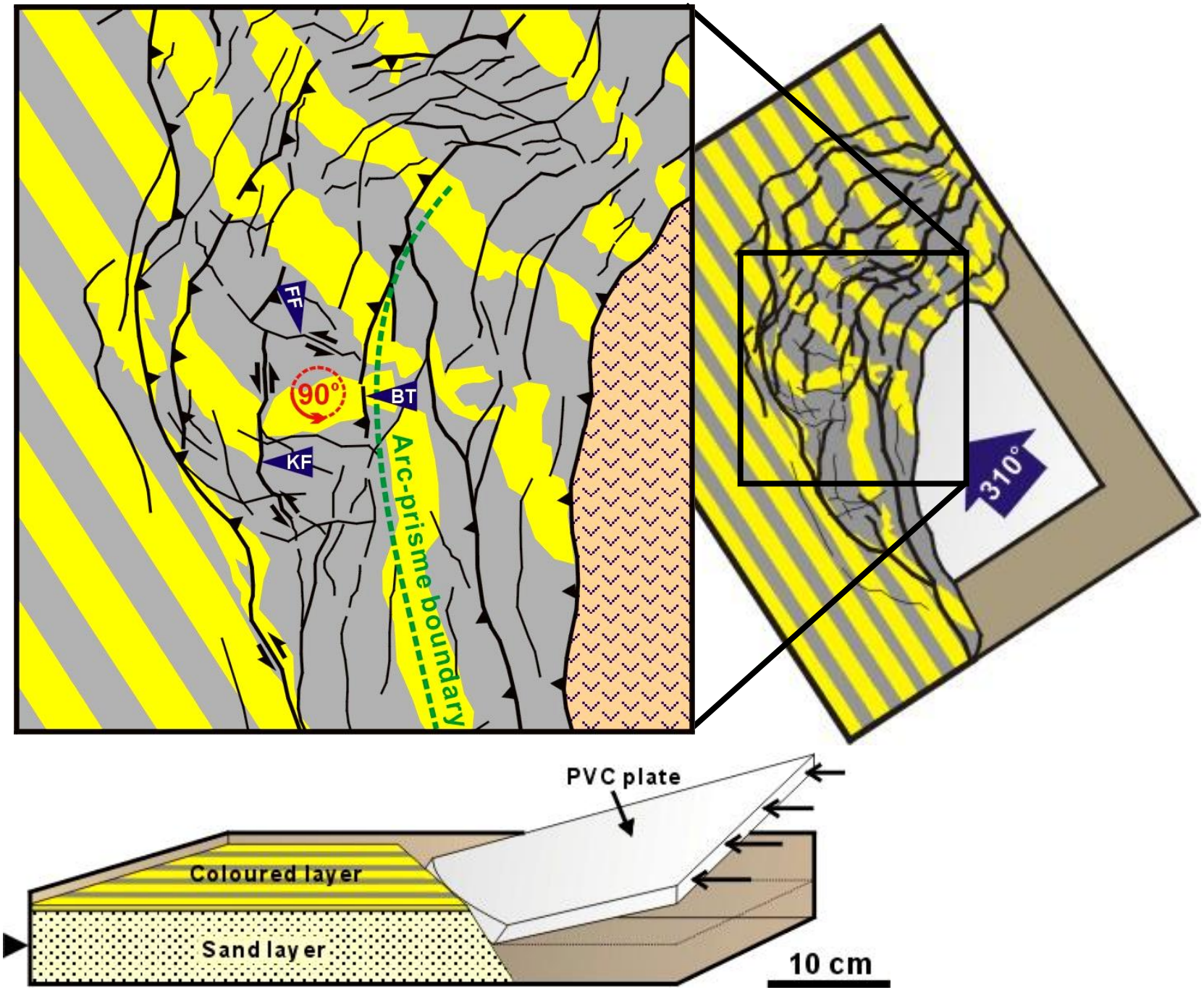


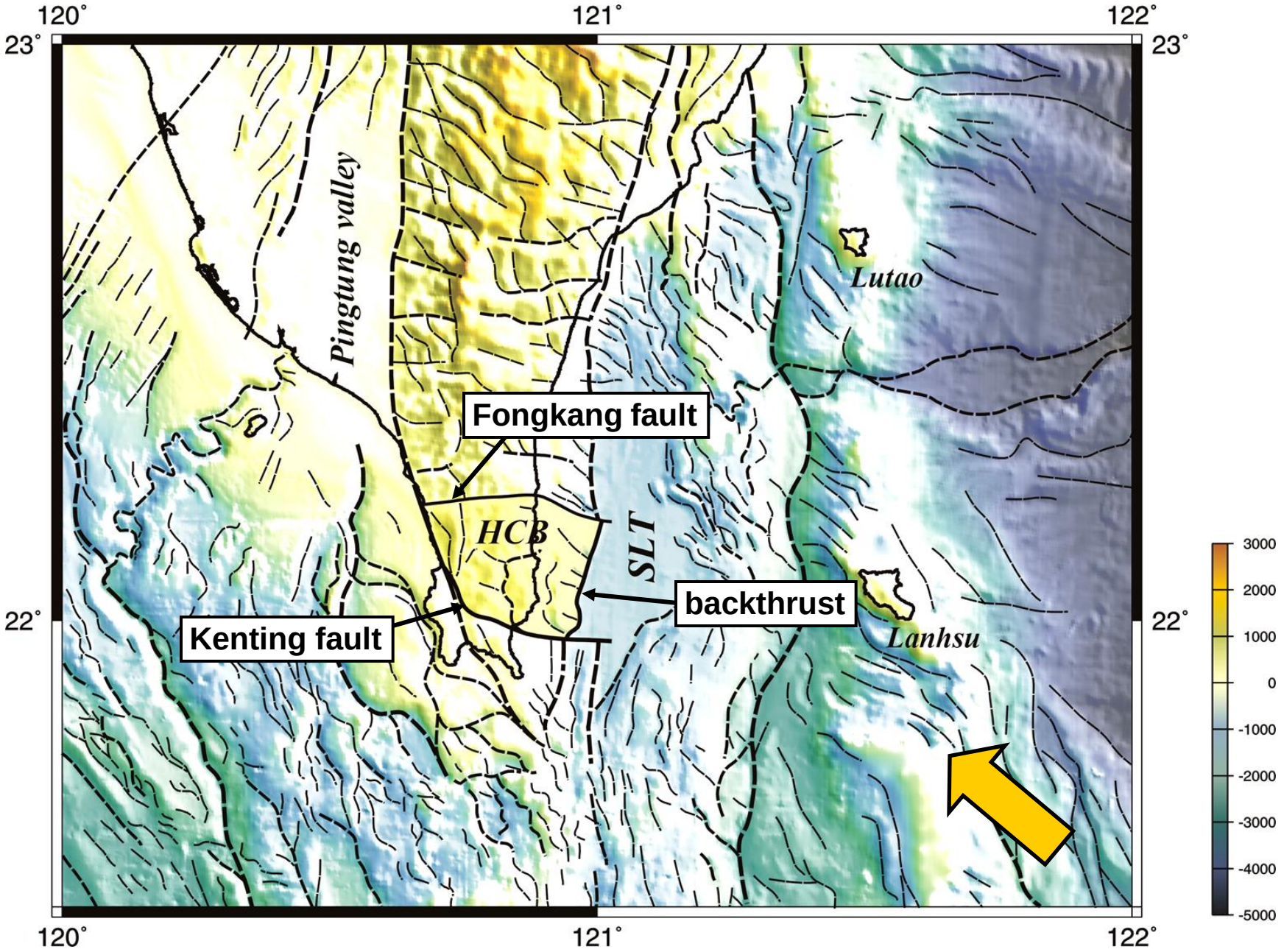
- Site location
- Remanence direction of sample
- Site mean direction
- Mean direction of all sites
- Correspondent polarity of mean direction

Physical model



Physical model experiment simulating oblique convergence between the Philippine Sea plate and southeastern continental margin sediments

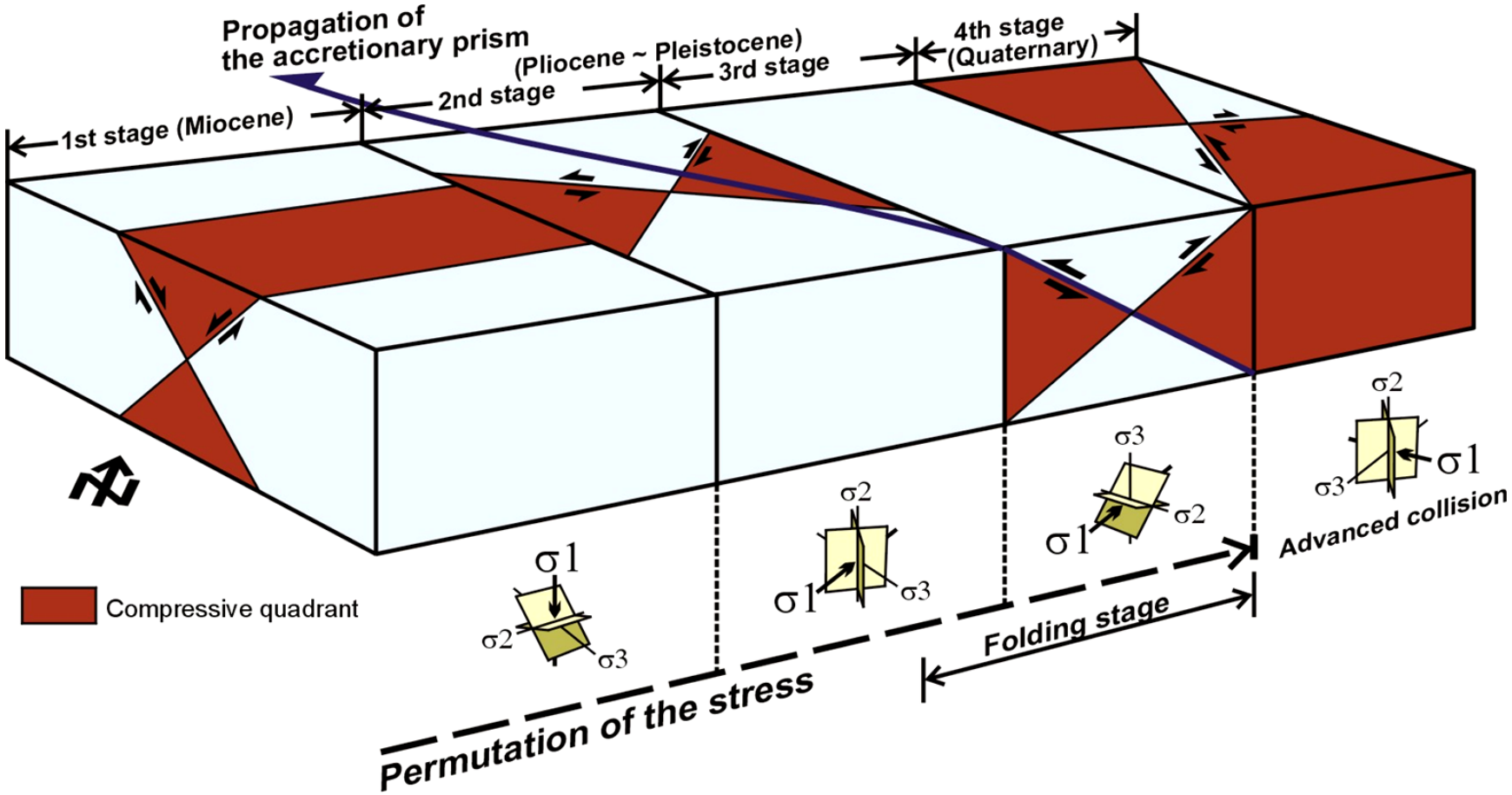

FF
90°
BT
KF
Arc-prisme boundary
310°
PVC plate
Coloured layer
Sand layer
10 cm


120°
121°
122°
23°
22°
Pingtung valley
Lutao
Fongkang fault
HCB
SLT
backthrust
Kenting fault
Lanhsu
3000
2000
1000
0
-1000
-2000
-3000
-4000
-5000

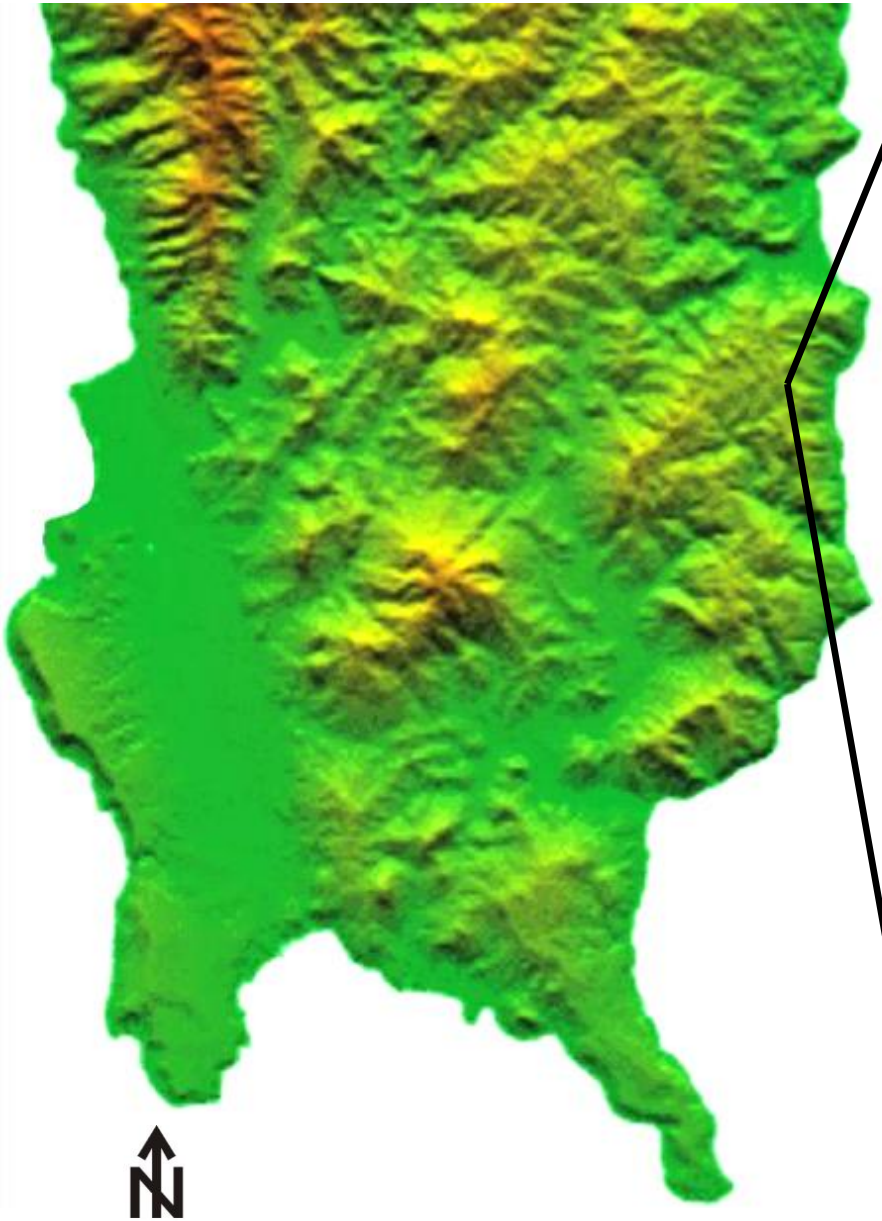
Orientations of the paleostress measured in the Hengchun Peninsula

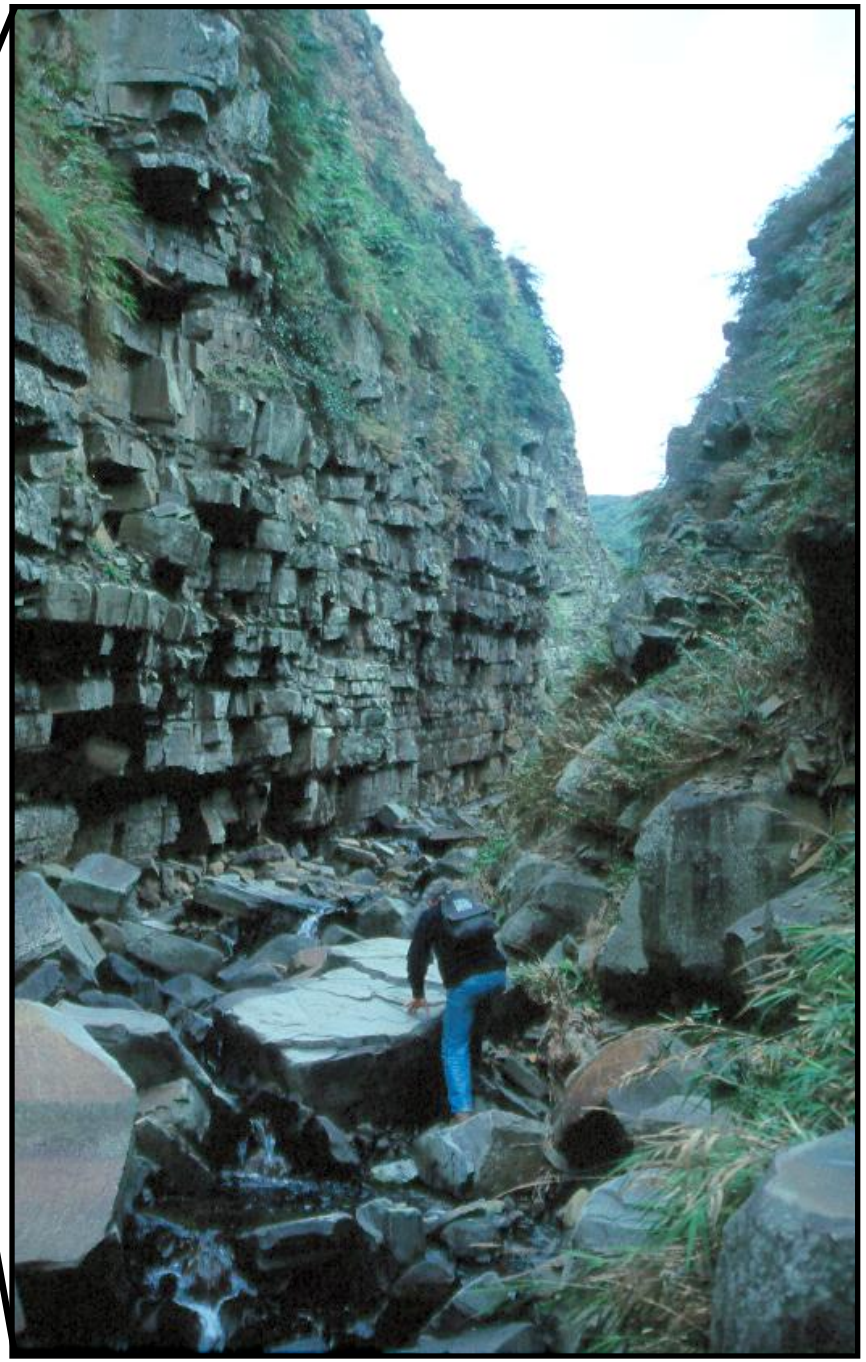
	1st stage	2nd stage	3rd stage	4th stage
Present-day trend				
Original trend				

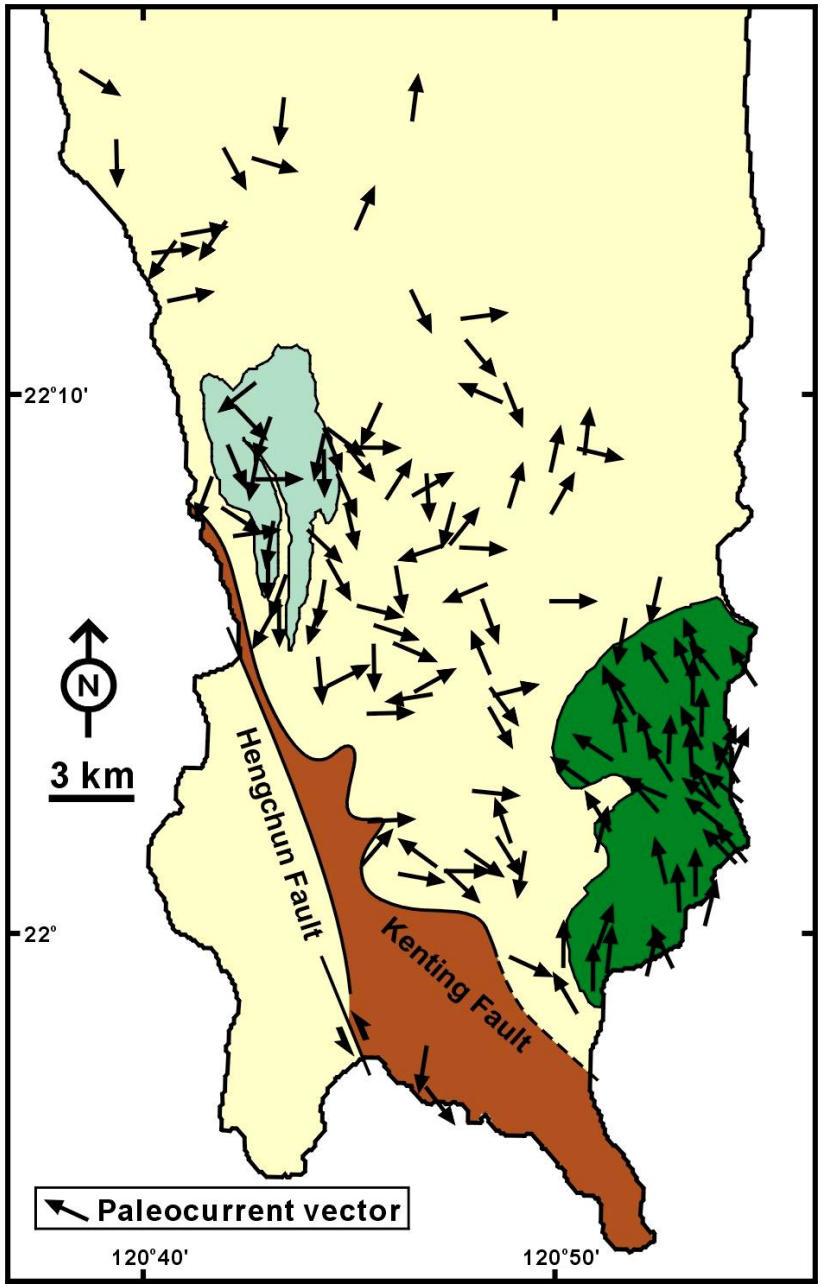
Evolution of paleostress




Paleocurrent data


N
5 km





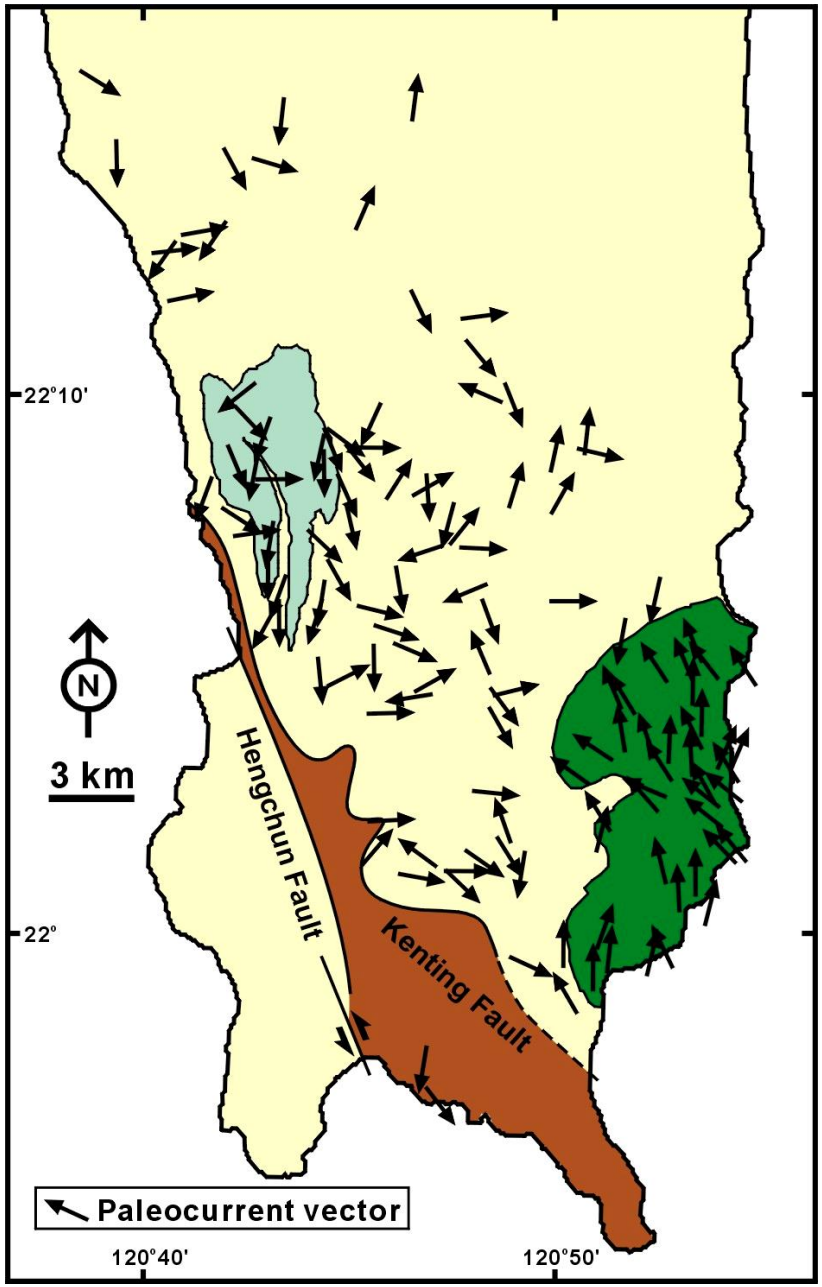
(data compiled after Cheng et al., 1984)

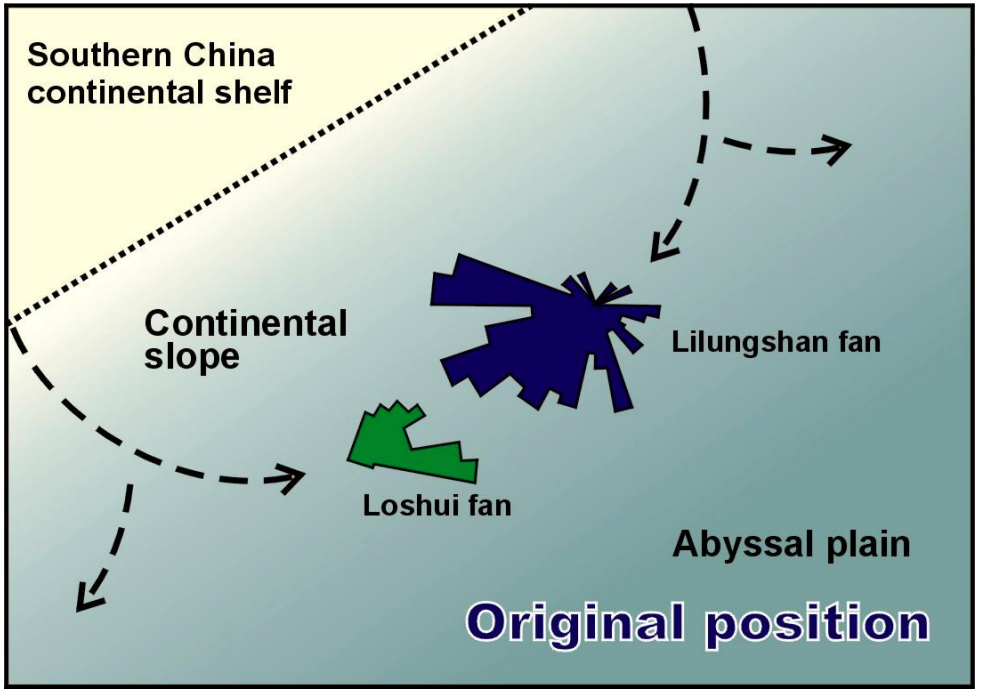
Paleocurrents recorded in the Hengchun Peninsula

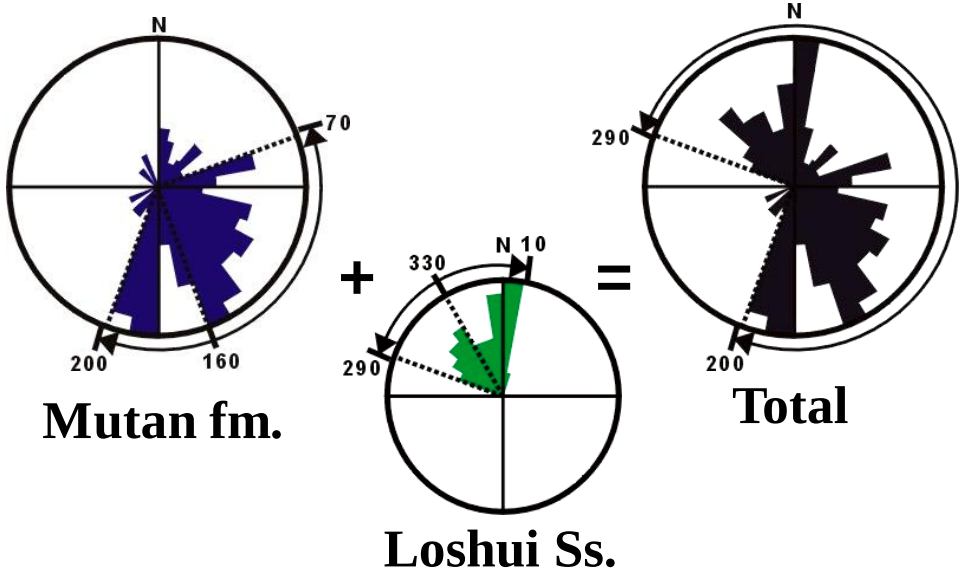
(a) A disappeared morphological high to the south (a forearc high or a micro-continent) ?

(b) A small pull-apart basin provide a temporary site of deposition ?

(c) tectonic rotation following the process of sedimentation ?

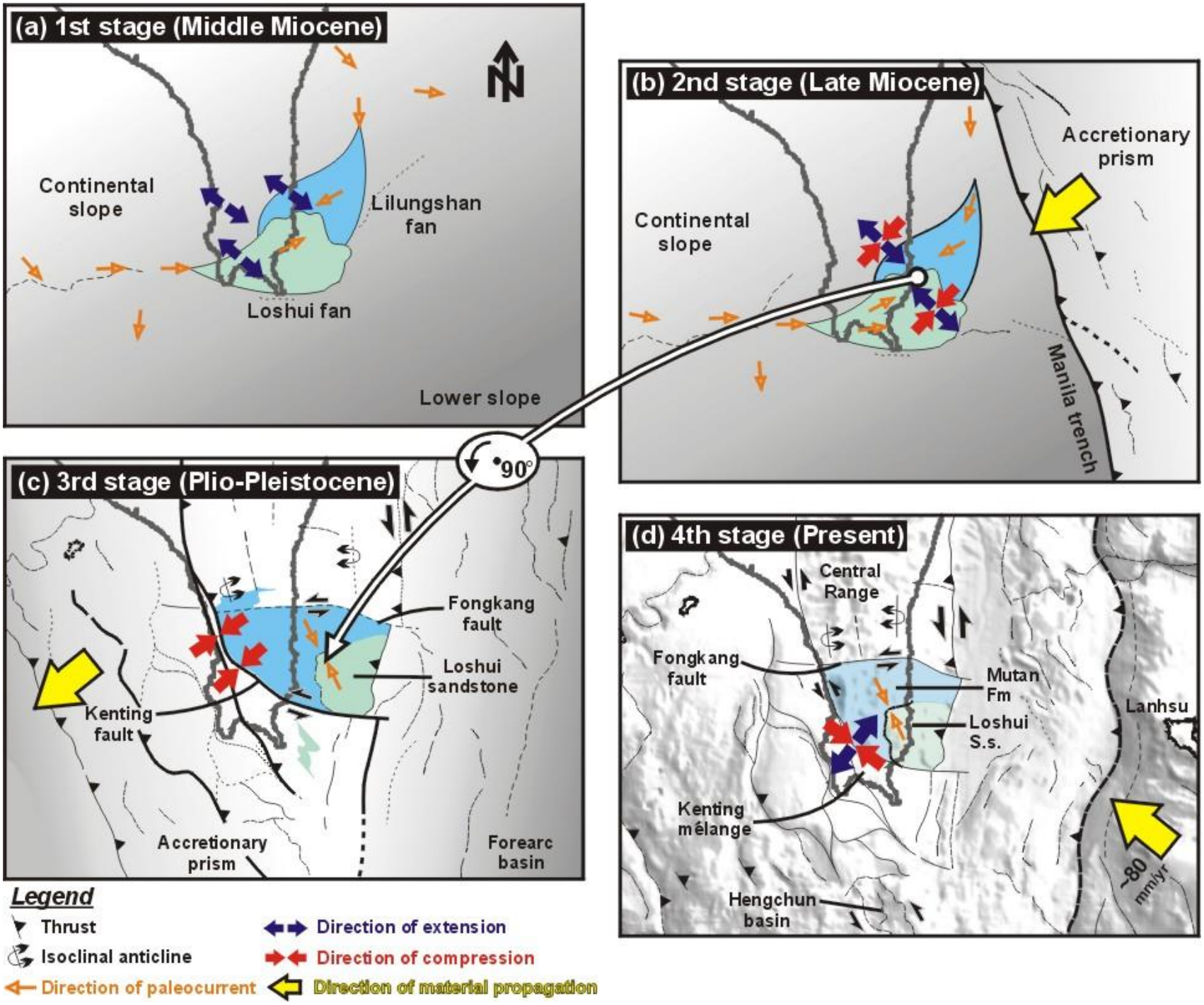






(data compiled after Cheng et al., 1984)


Tectonic evolution


(a) 1st stage (Middle Miocene)
Continental slope
Lilungshan fan
Loshui fan
Lower slope
(b) 2nd stage (Late Miocene)
Accretionary prism
Continental slope
Manila trench
90°
(c) 3rd stage (Plio-Pleistocene)
Fongkang fault
Loshui sandstone
Kenting fault
Accretionary prism
Forearc basin
(d) 4th stage (Present)
Central Range
Fongkang fault
Mutan Fm
Loshui S.s.
Lanhsu
Kenting mélange
Hengchun basin
~80 mm/yr
Legend
Thrust
Isoclinal anticline
Direction of paleocurrent
Direction of extension
Direction of compression
Direction of material propagation

Conclusion

1. **Four stages of paleostress have been recognized after an analysis of brittle tectonics.**

2. **Hengchun peninsula terrane has undergone not only a tectonic tilting but also a counterclockwise rotation of about 90º.**

3. **After a operation of back-tilting and back-rotating, these four stages of paleostress correspond to the tectonic regime of a continental margin basin, from its opening to its intense deforming in the accretionary prism.**