Volcanoes in north Taiwan

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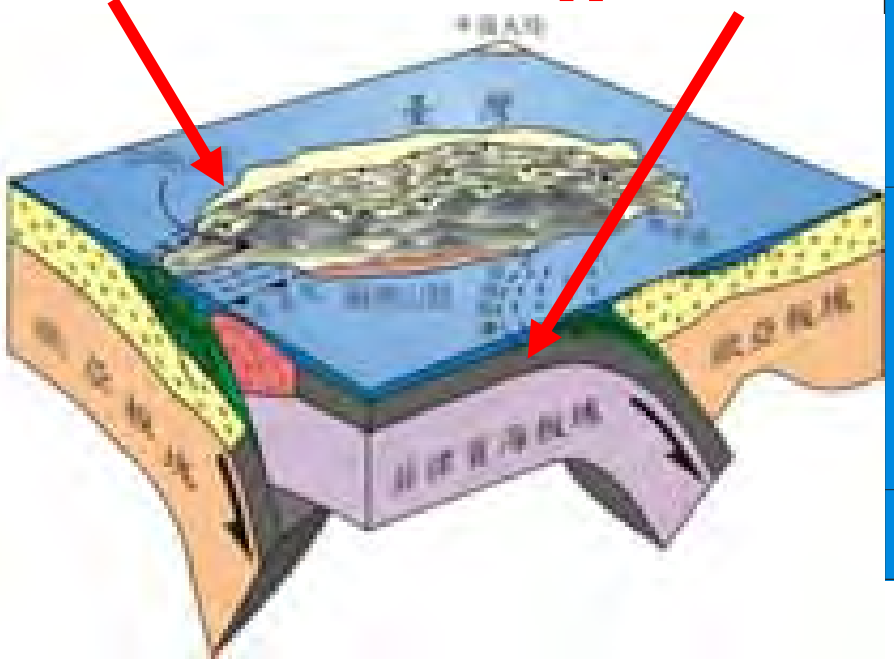
Volcanic Provenance of Taiwan

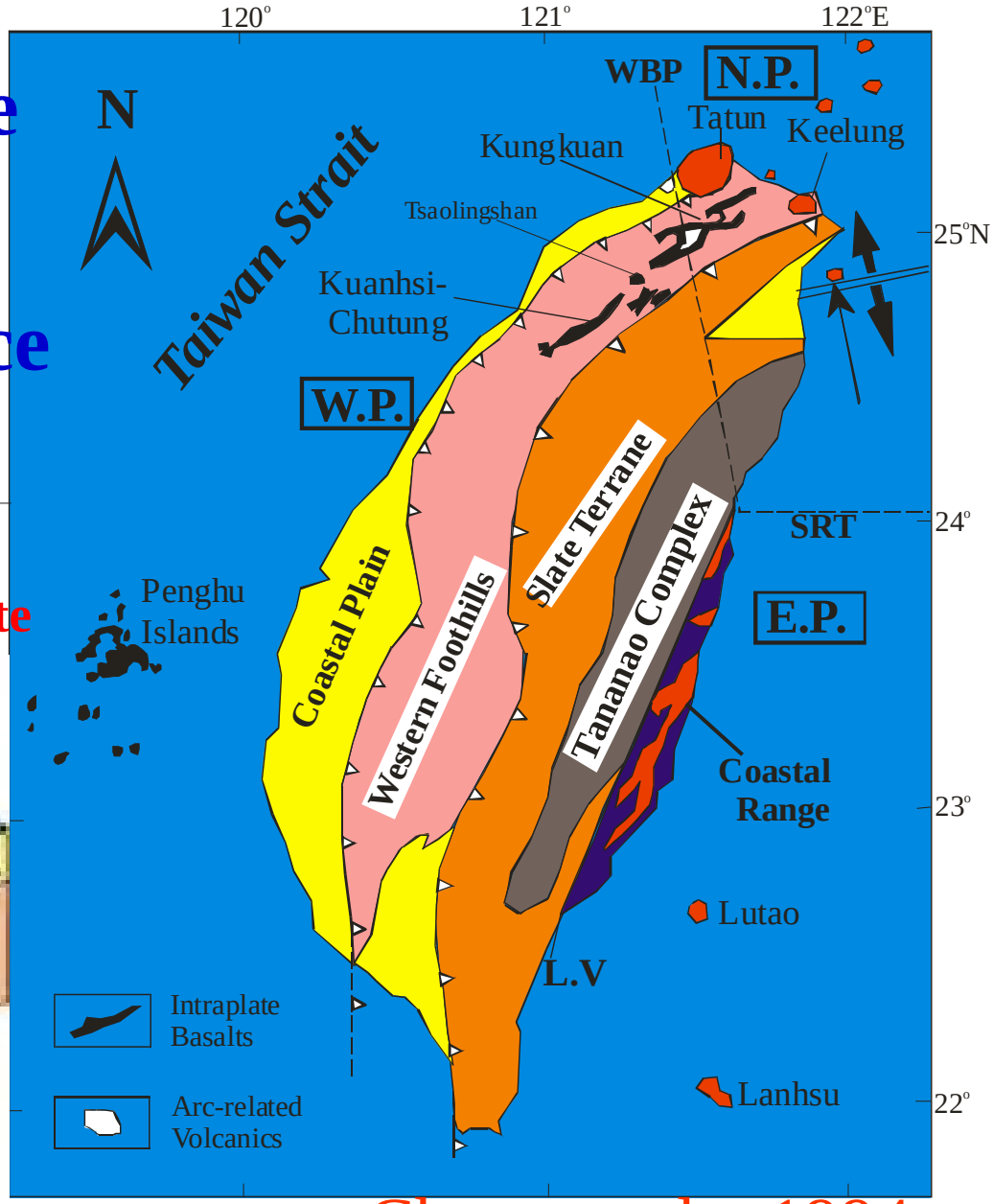
1、Western Provenance

2、Eastern Provenance

3、Northern Provenance

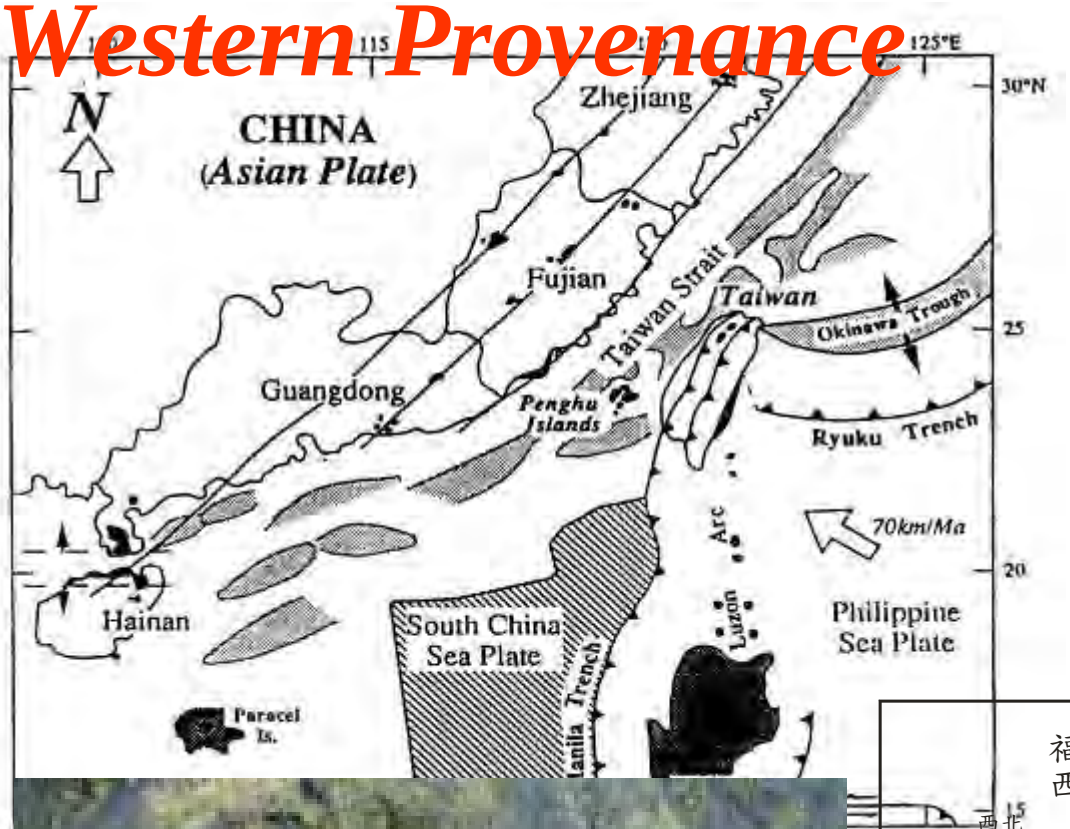
4 、Kueishantou

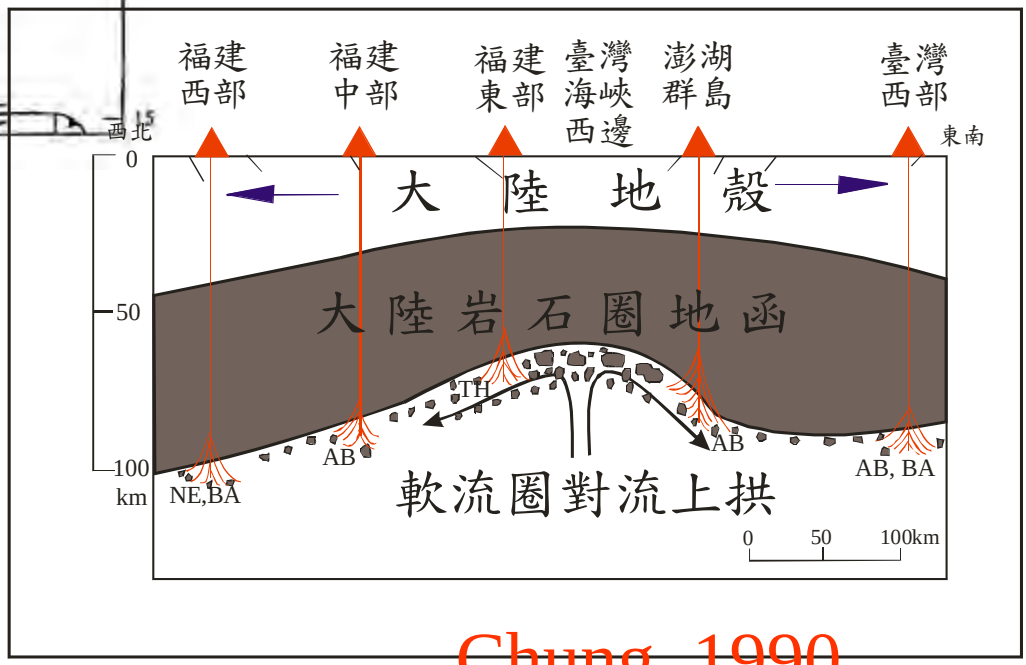




Chung et al.,, 1994

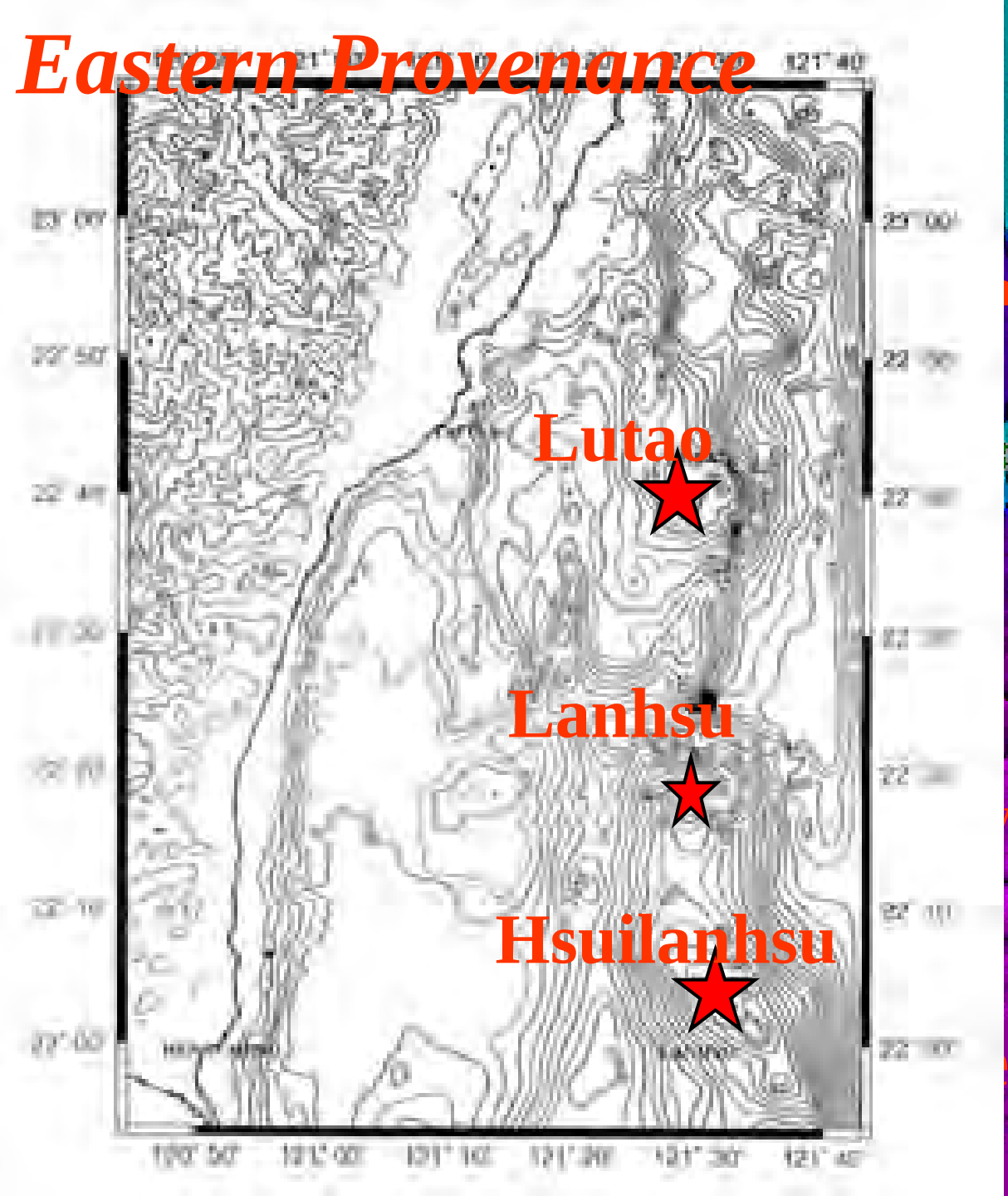
Western Provenance



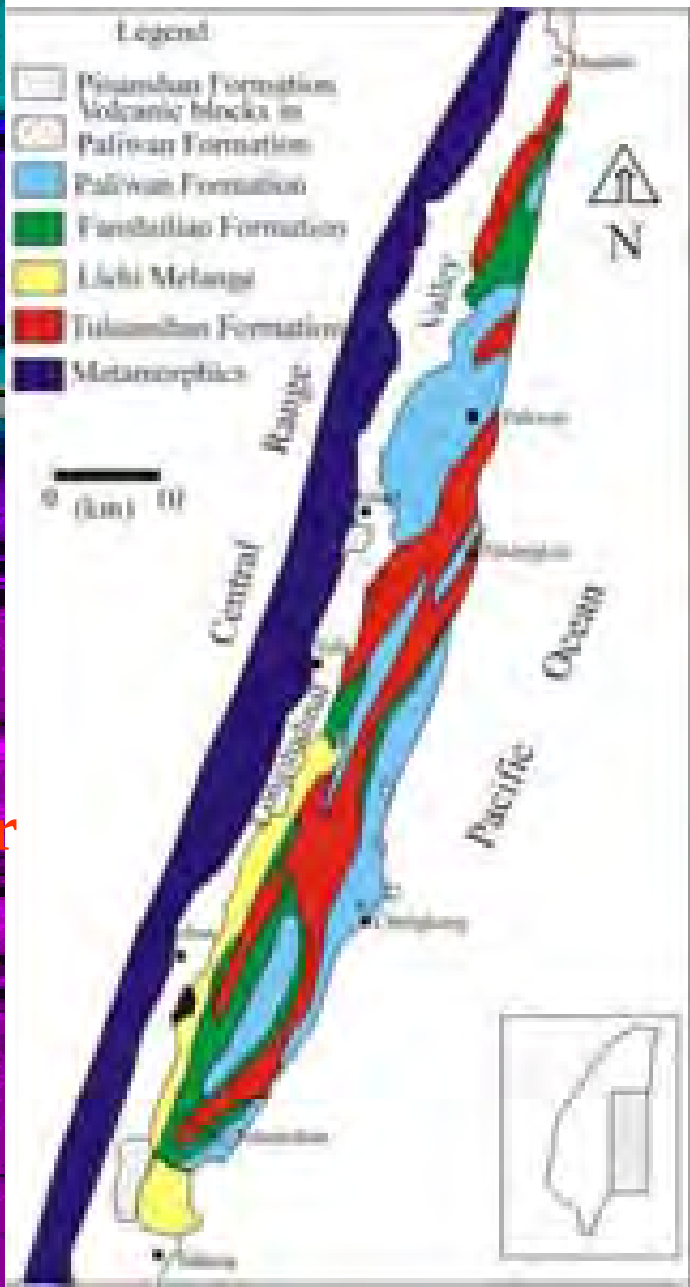


Chung, 1990

Eastern Provenance

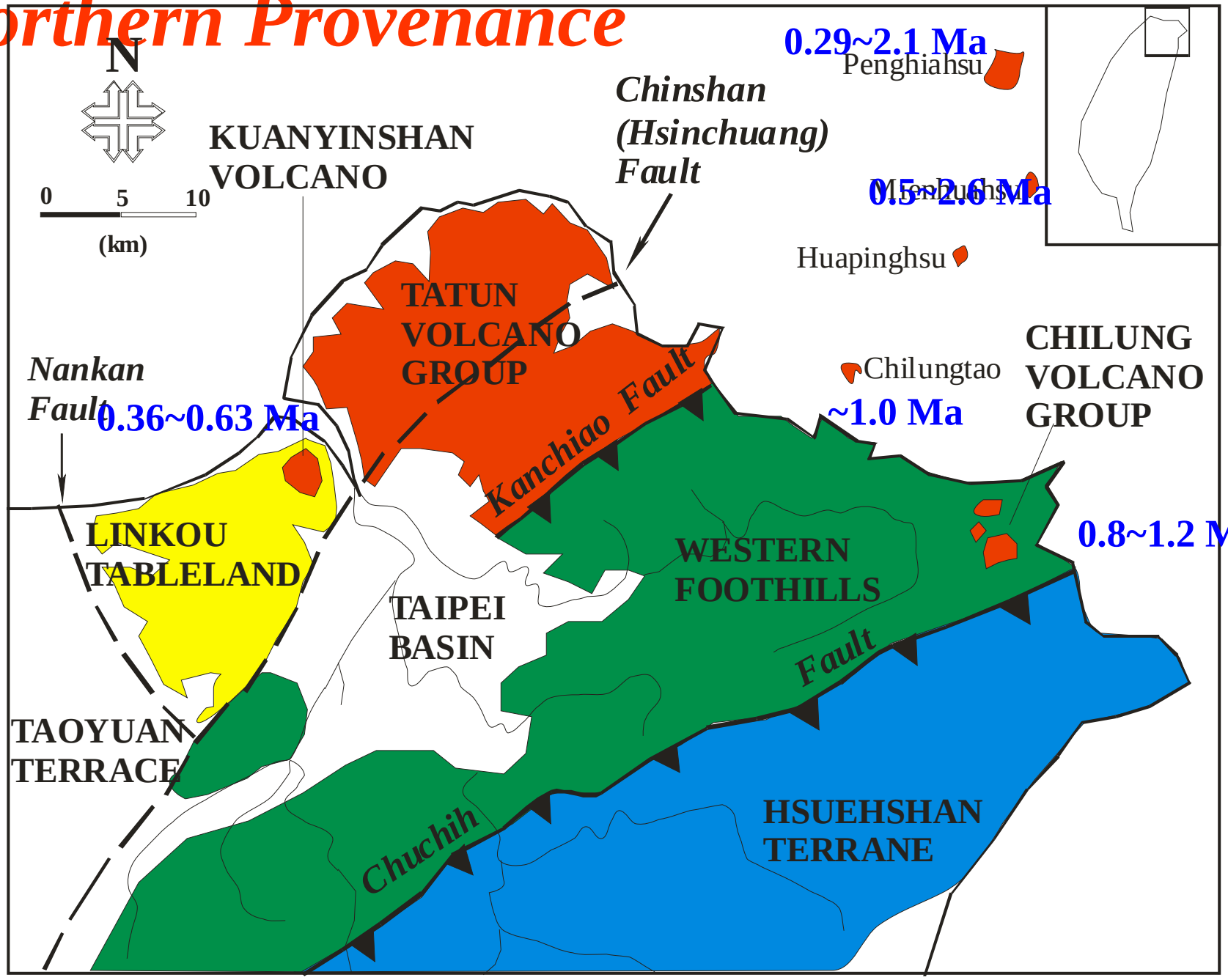


Coastal Range of east Taiwan

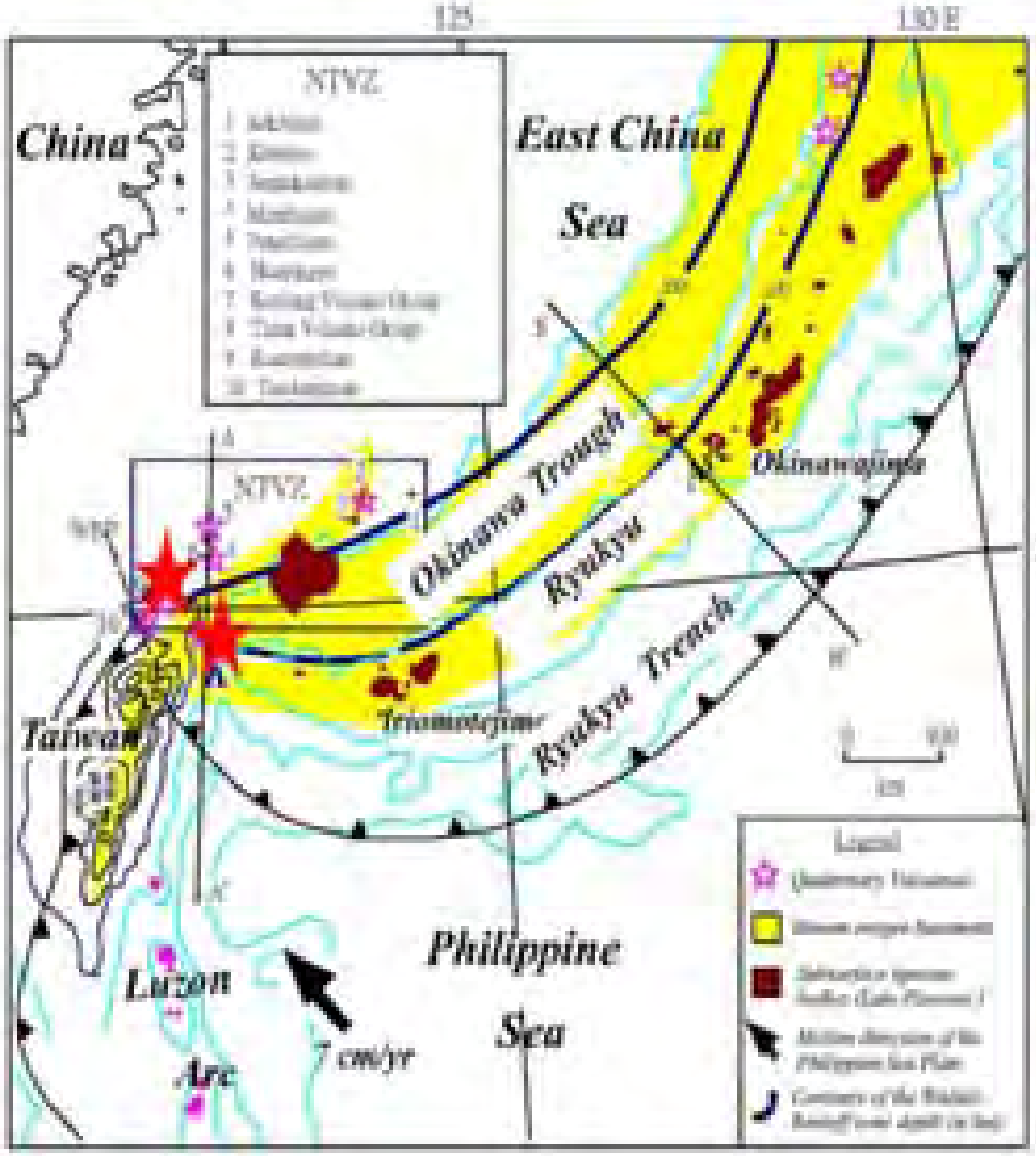



Hsiulanhsu
~1000-1300 BP

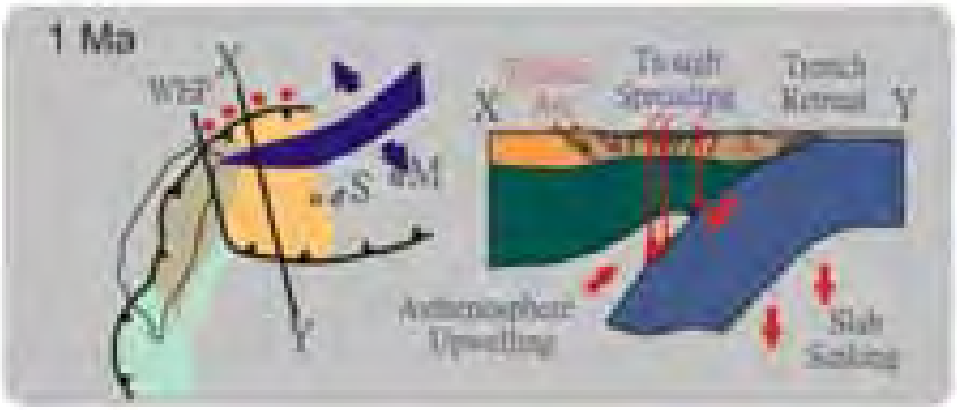
Northern Provenance

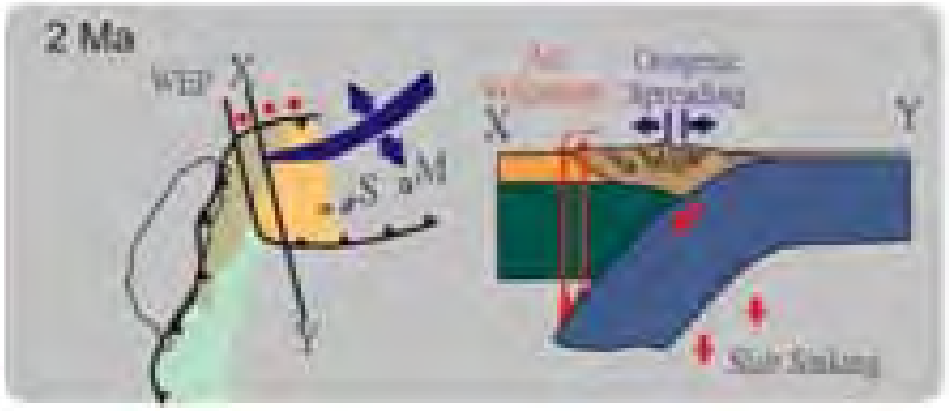


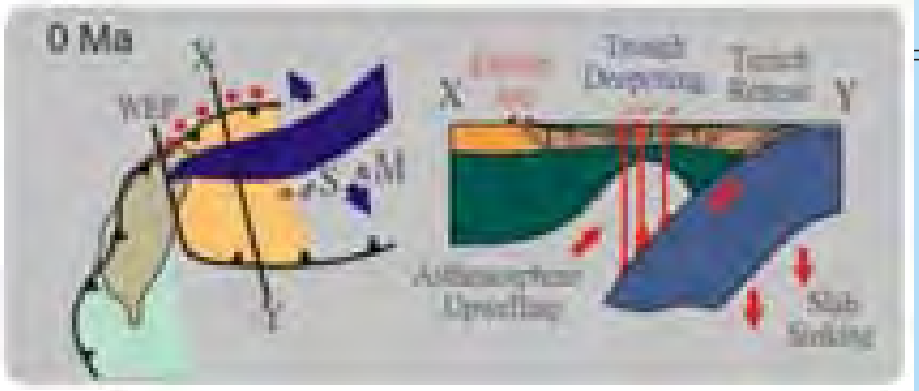
Active volcanoes in Taiwan

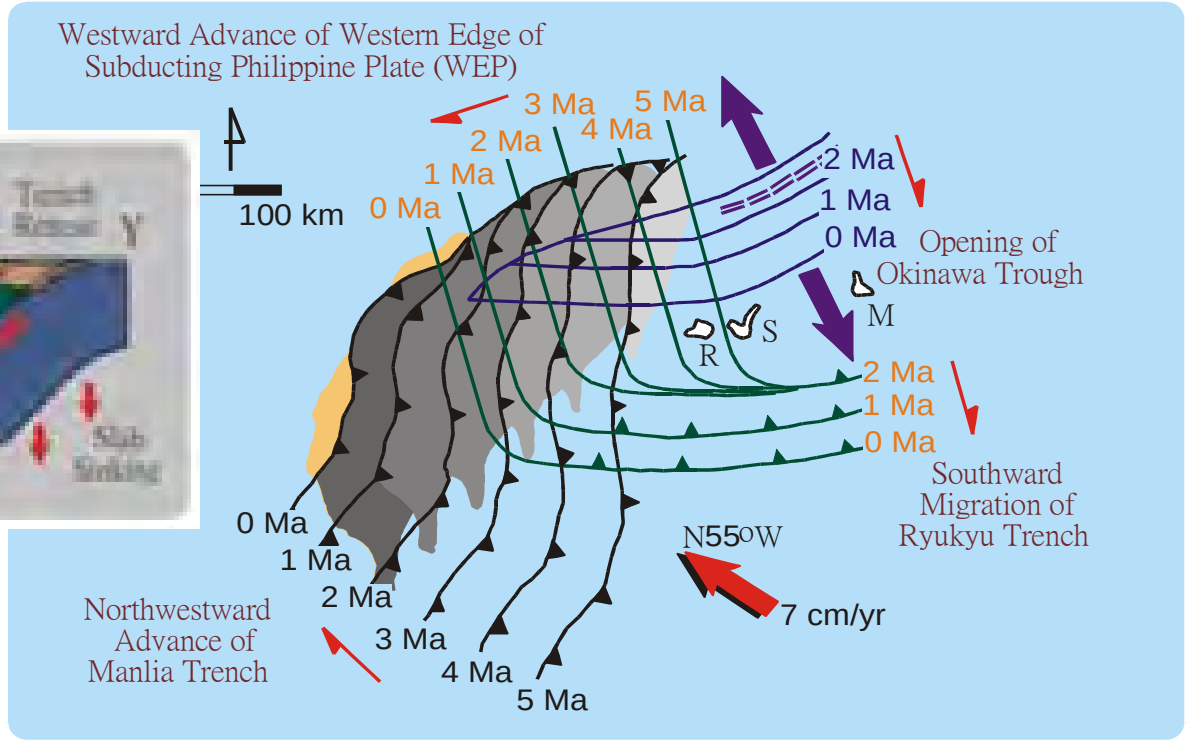


Evolution of volcanism in northern Taiwan

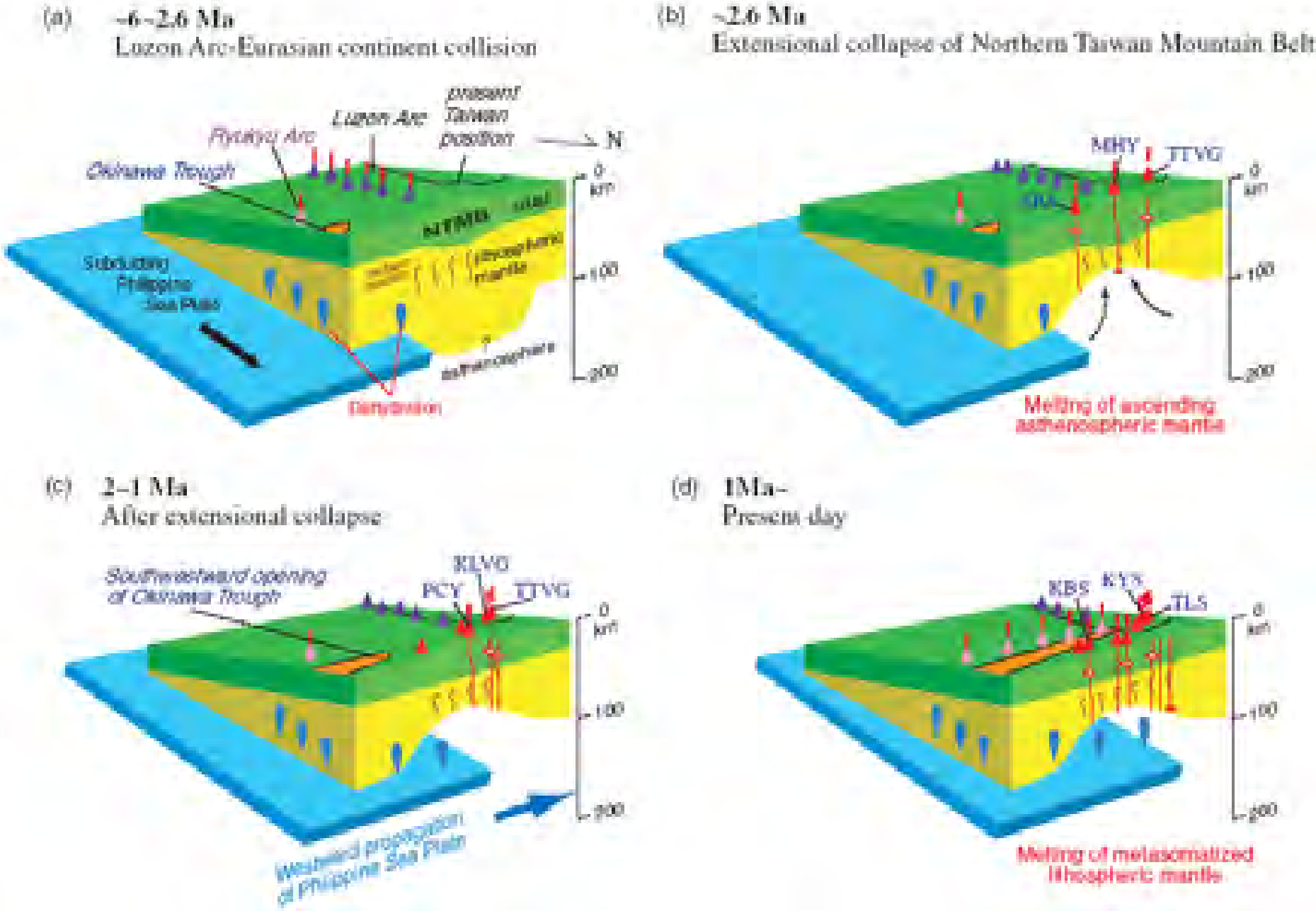






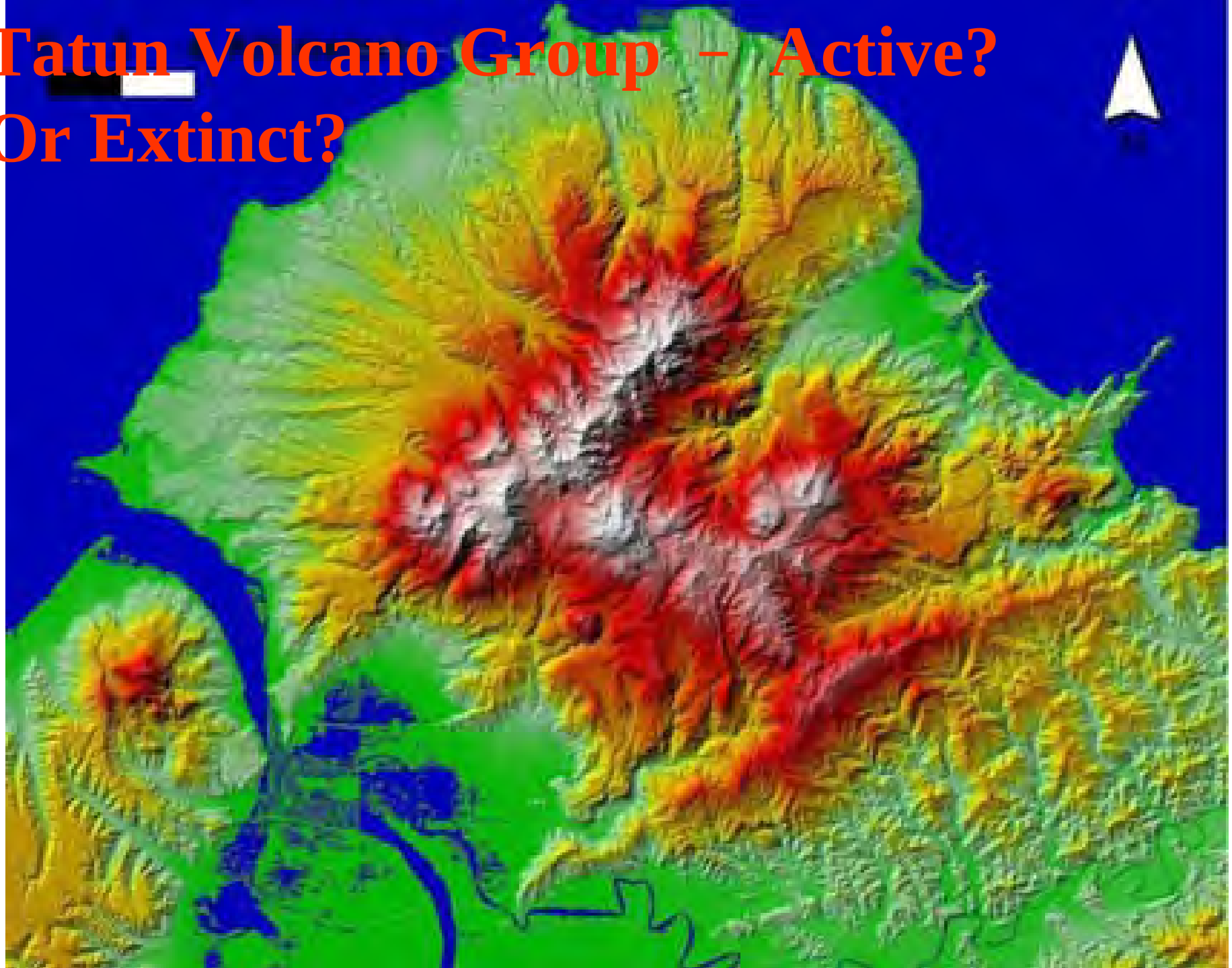


Teng (1996)



Wang et al., 2004

Tatun Volcano Group – Active? Or Extinct?



Two definitions of active volcano

Empirical Definition

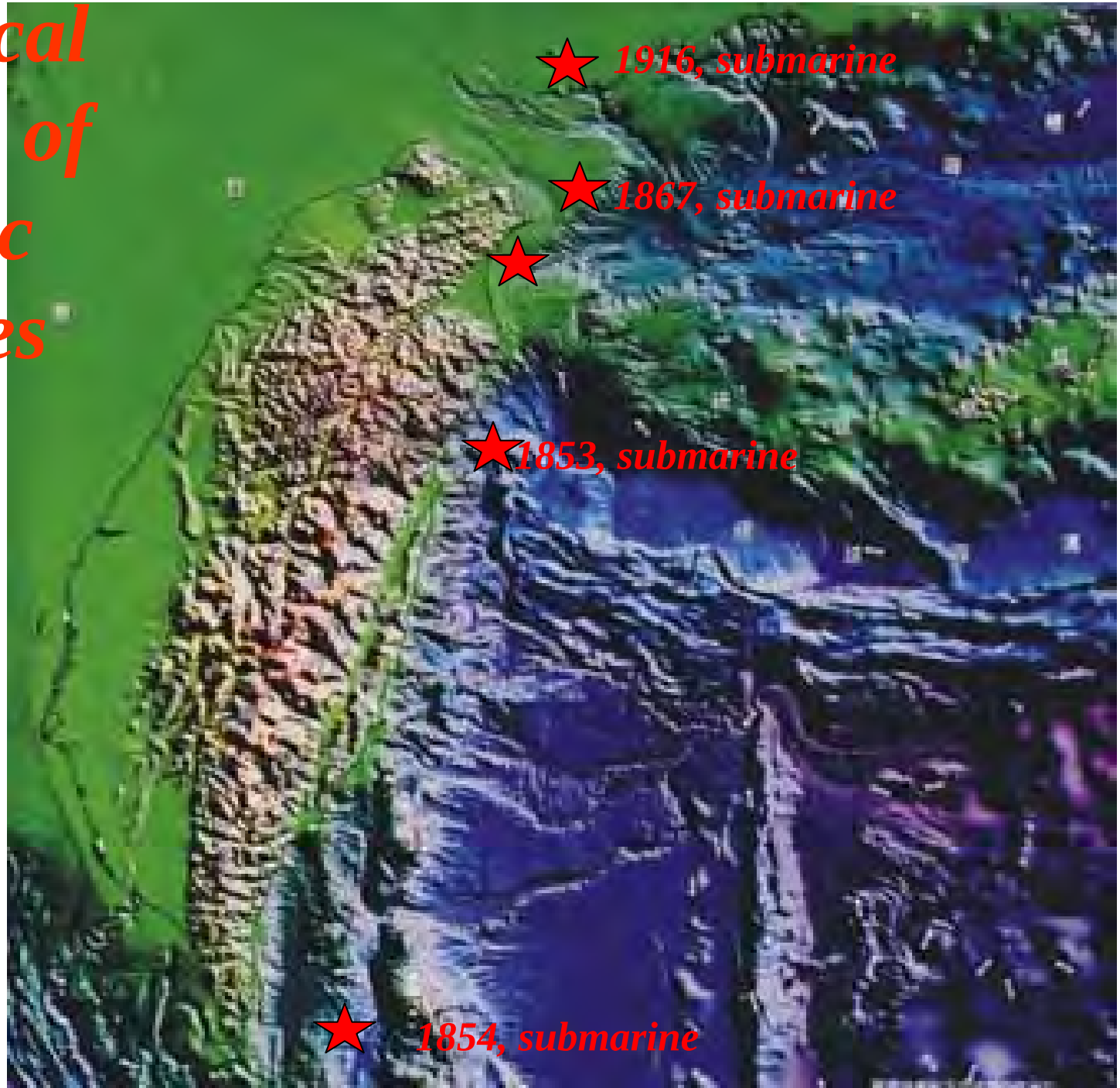
1. historical documented eruptions
   (Smithsonian Institution, 1989)

2 . A volcano is termed active if it has erupted at least once during the last 10000 or, alternatively, 5000 or 2000 years as demonstrated by any scientific method (Szakacs, 1994)

3. A set of time conditions according to volcano topology (Szakacs, 1994)

4. A quantitative ad-hoc rule: a thorough statistical study of the long-term eruptive patterns of volcanoes and a good knowledge of the eruptive history of individual volcanoes (Szakacs, 1994).

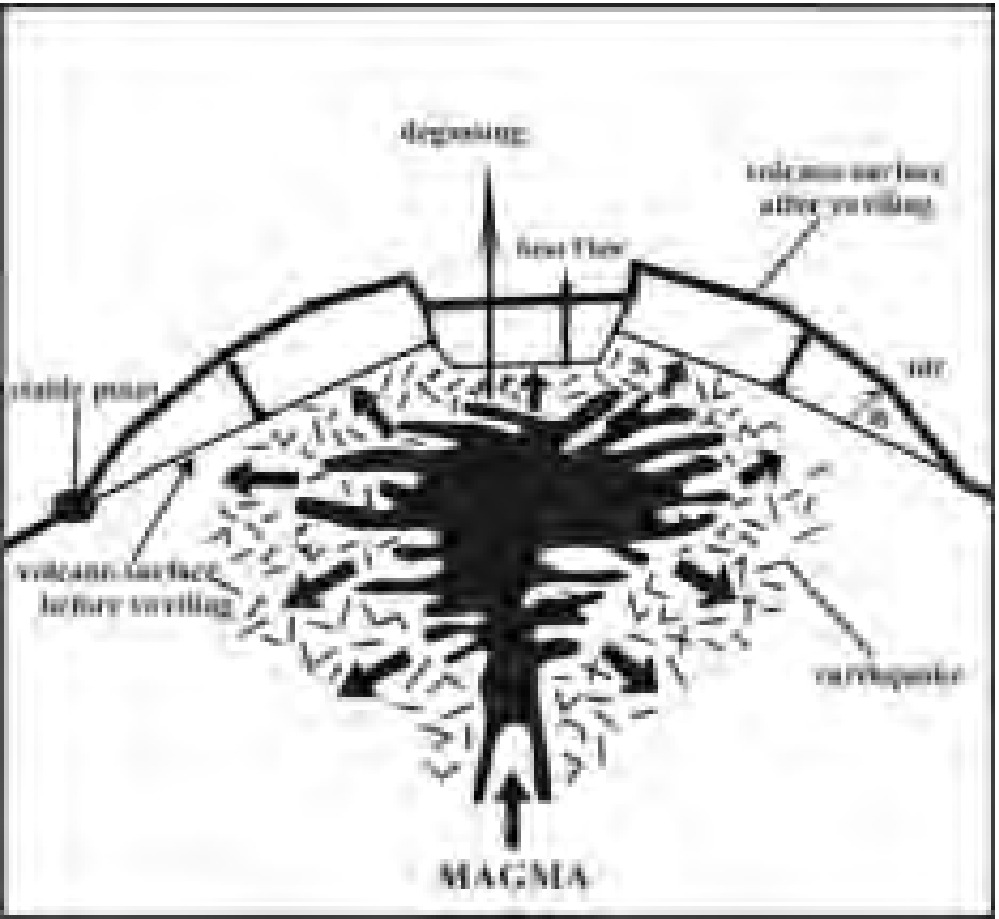
Historical records of volcanic activities



Phenomenological Definition

A volcano should be considered active

if its magmatic plumbing system is still working:

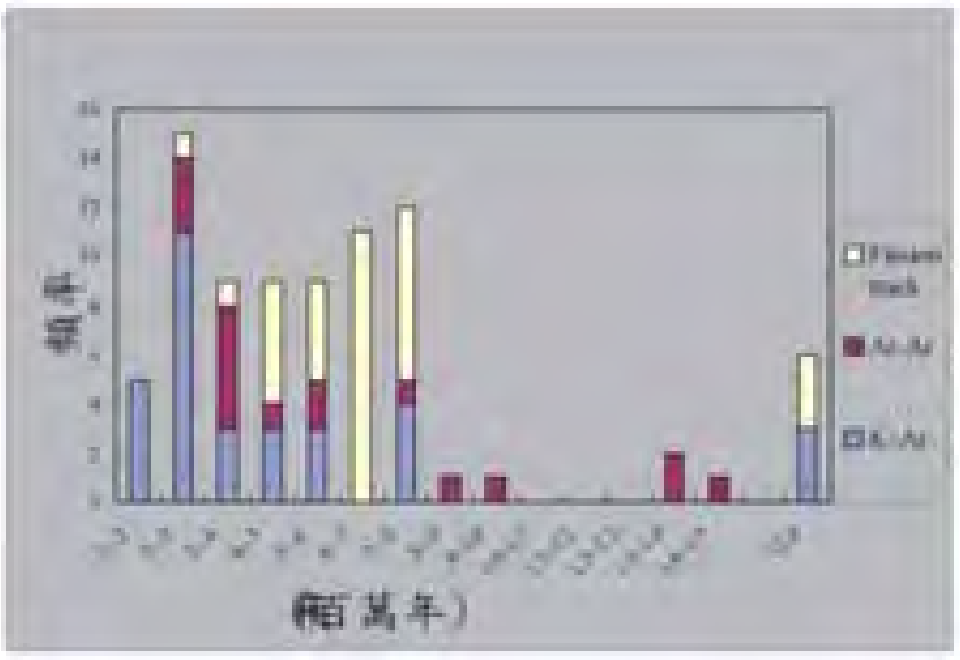


volcano-monitoring networks

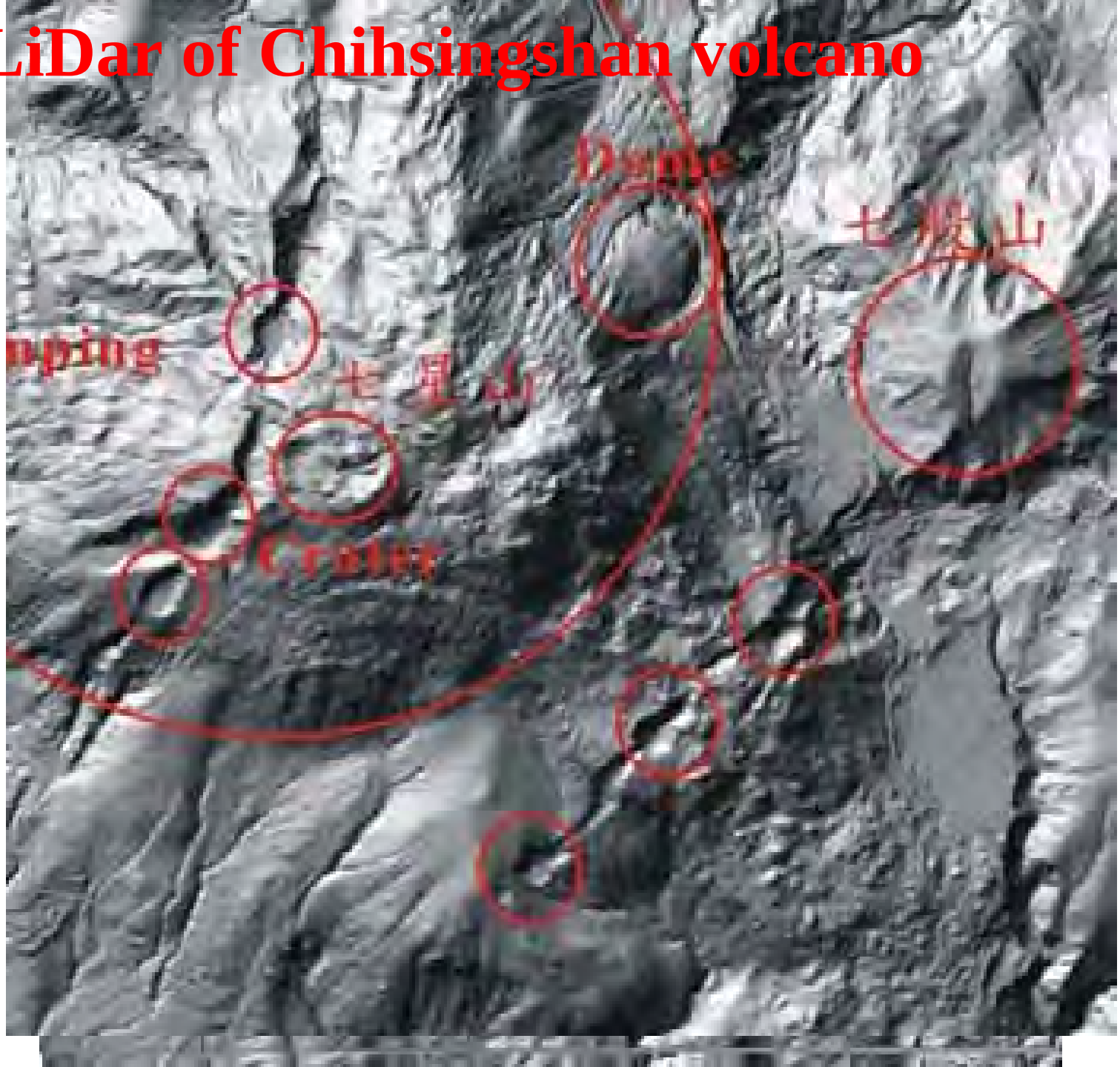
→ the existence of possible

“active “ magma chamber

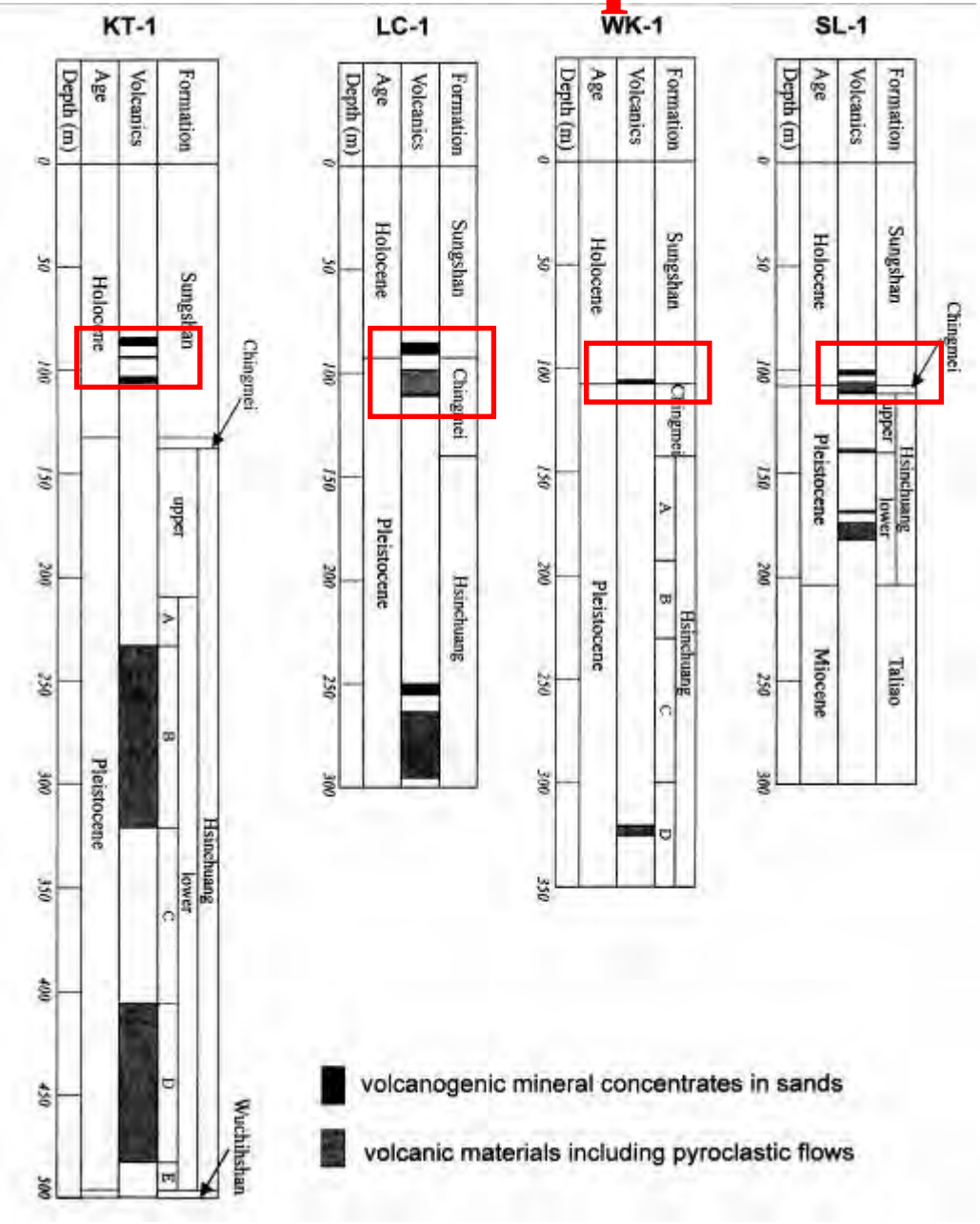
Volcanic landforms

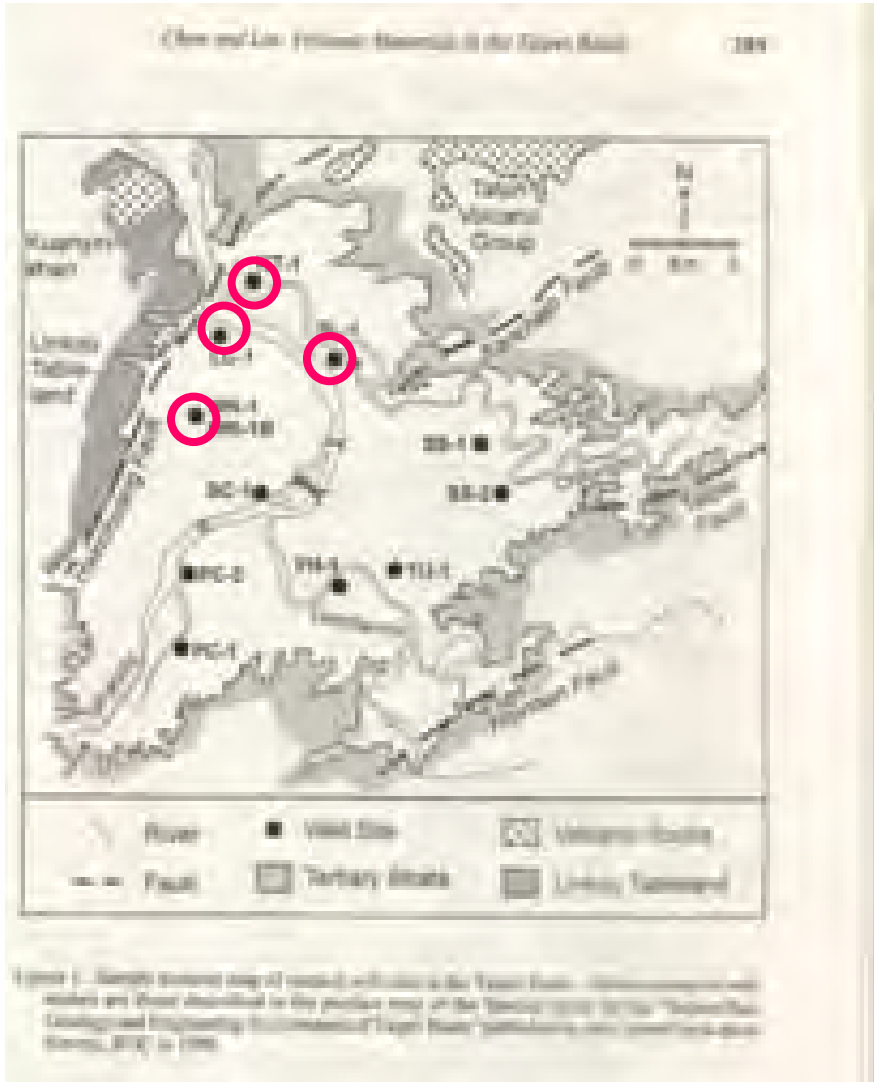


2 m LiDar of Chihsingshan volcano

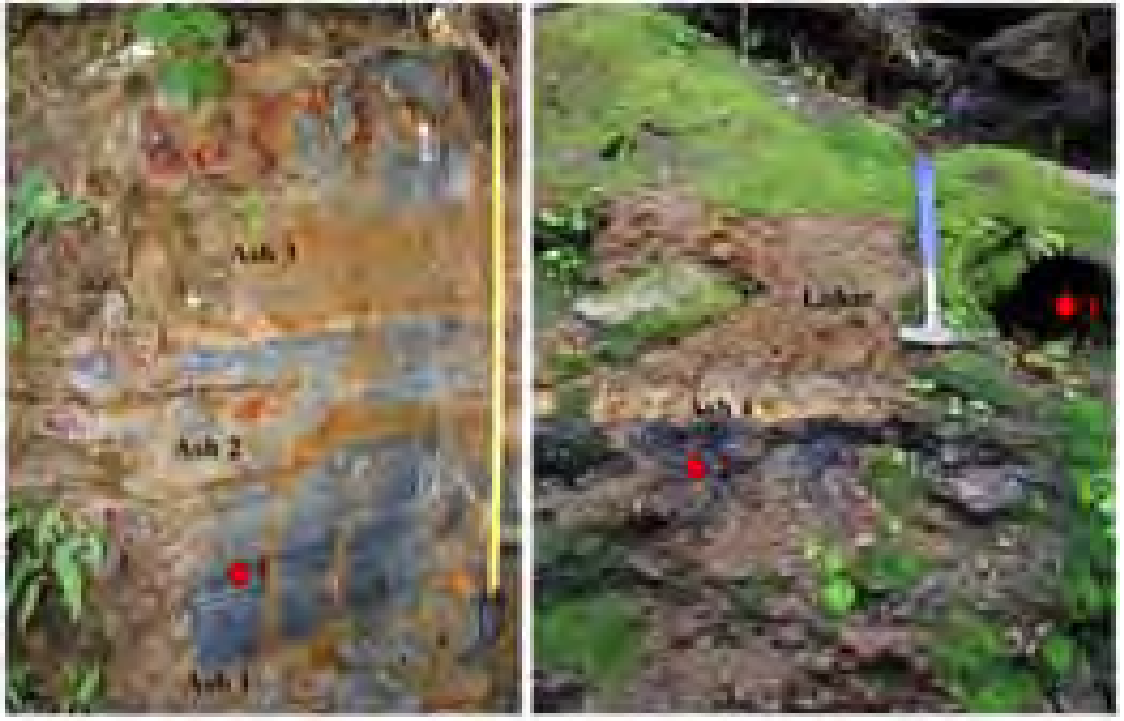


Ash deposits in Taipei Basin





(Chen and Lin, 2000)



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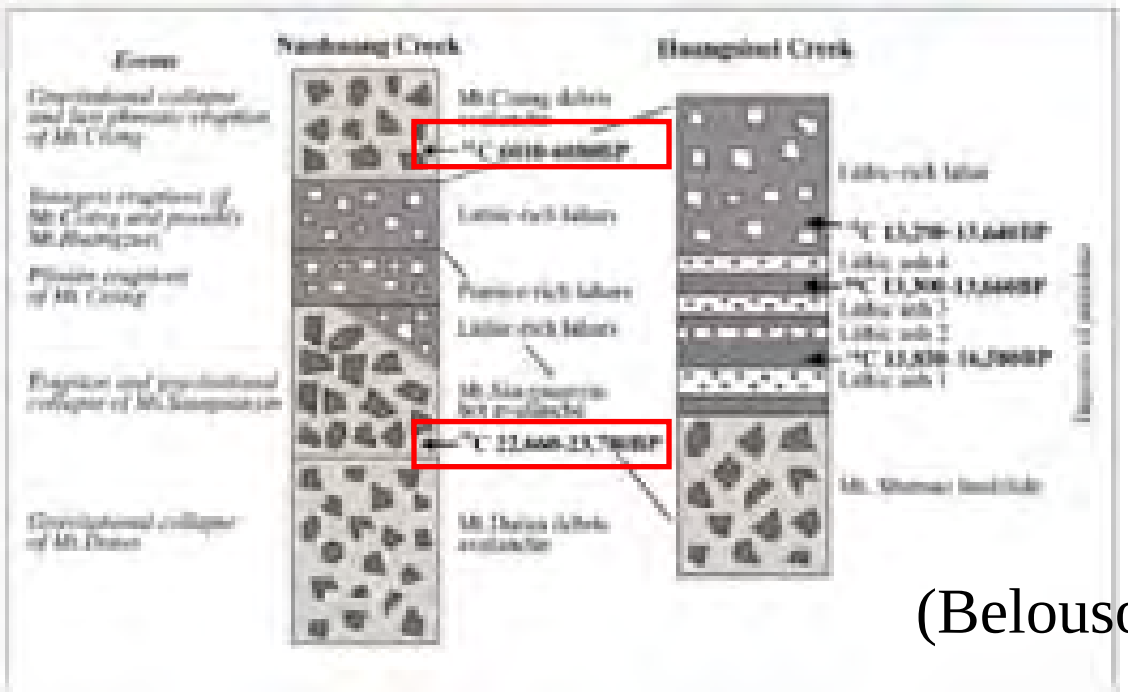
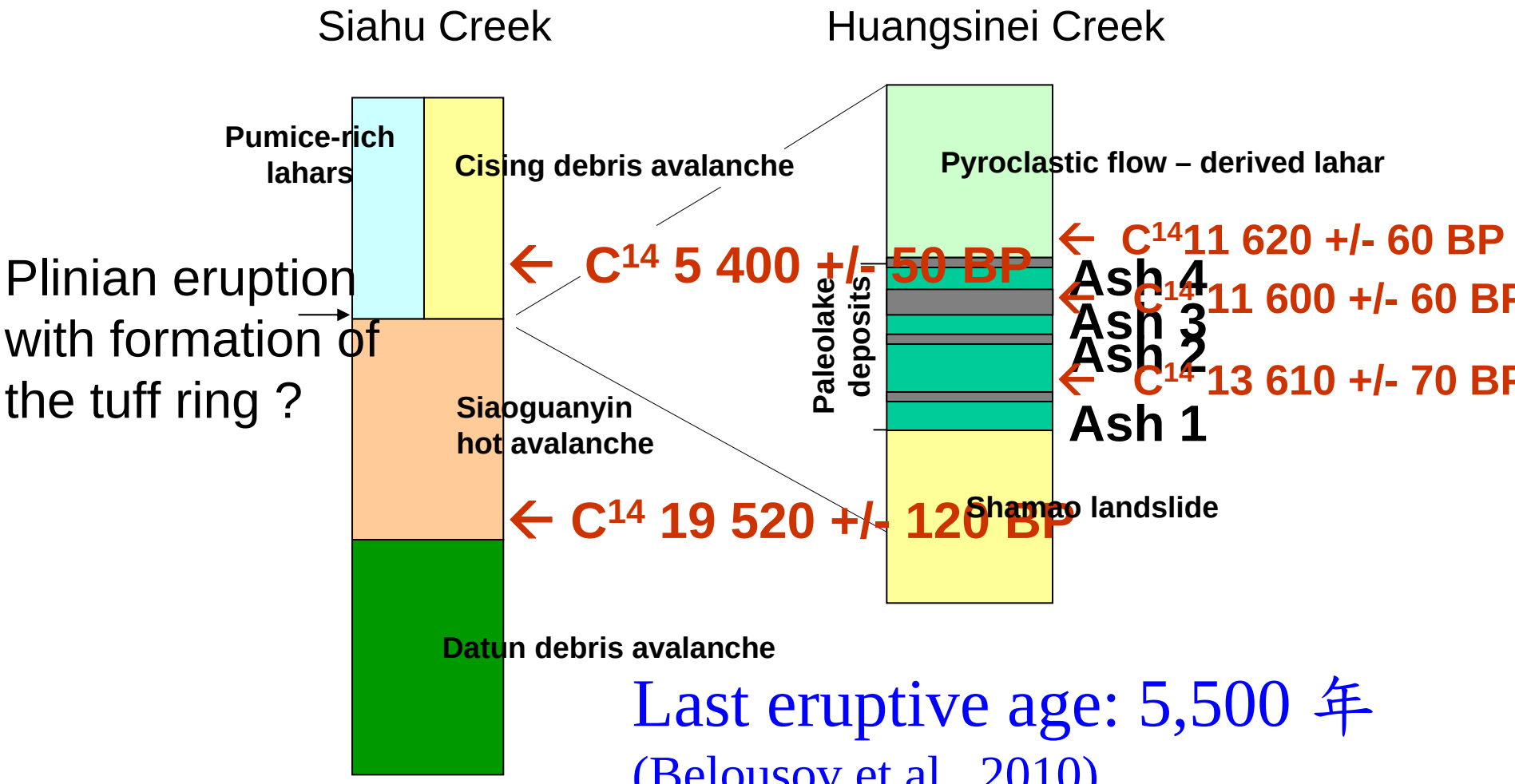


(Belousov et al., 2010)

Stratigraphic relations of the most recent volcanic deposits in TVG

W-SW foot of Mt. Cising

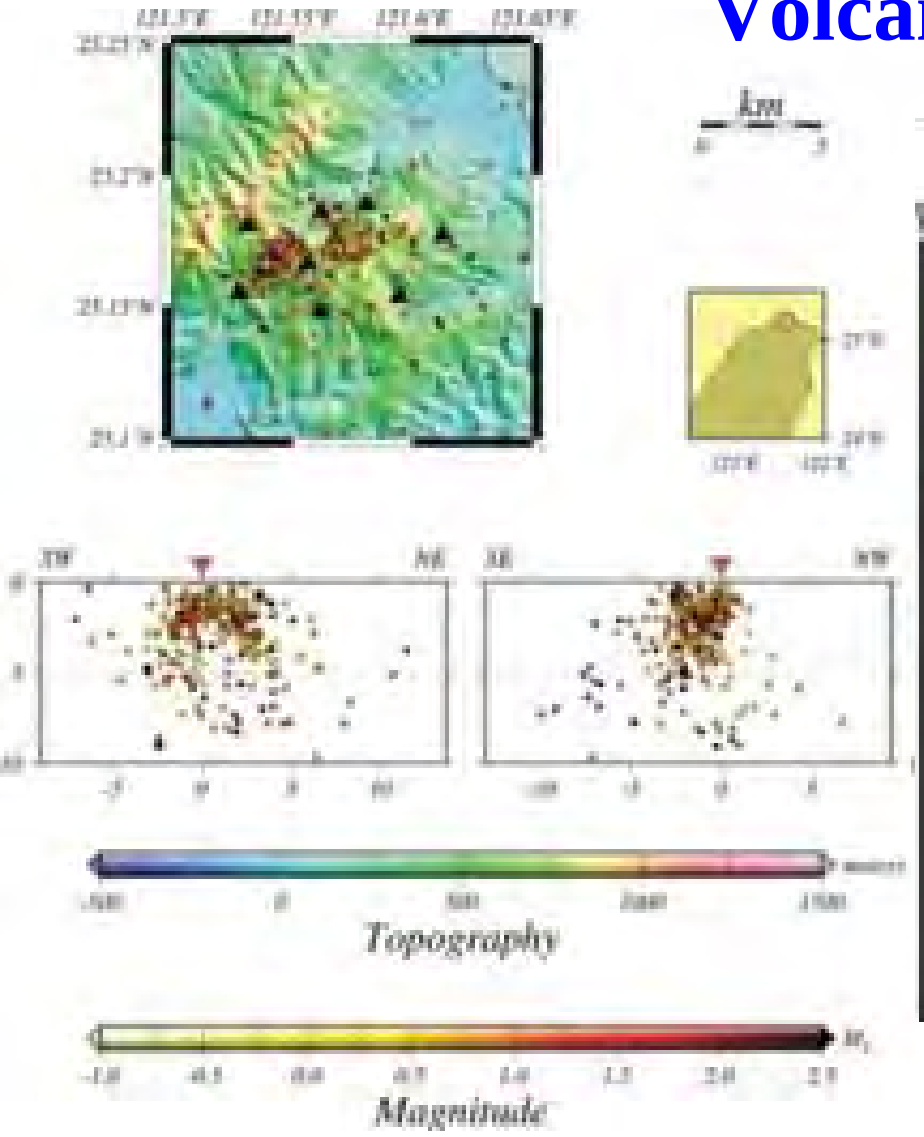


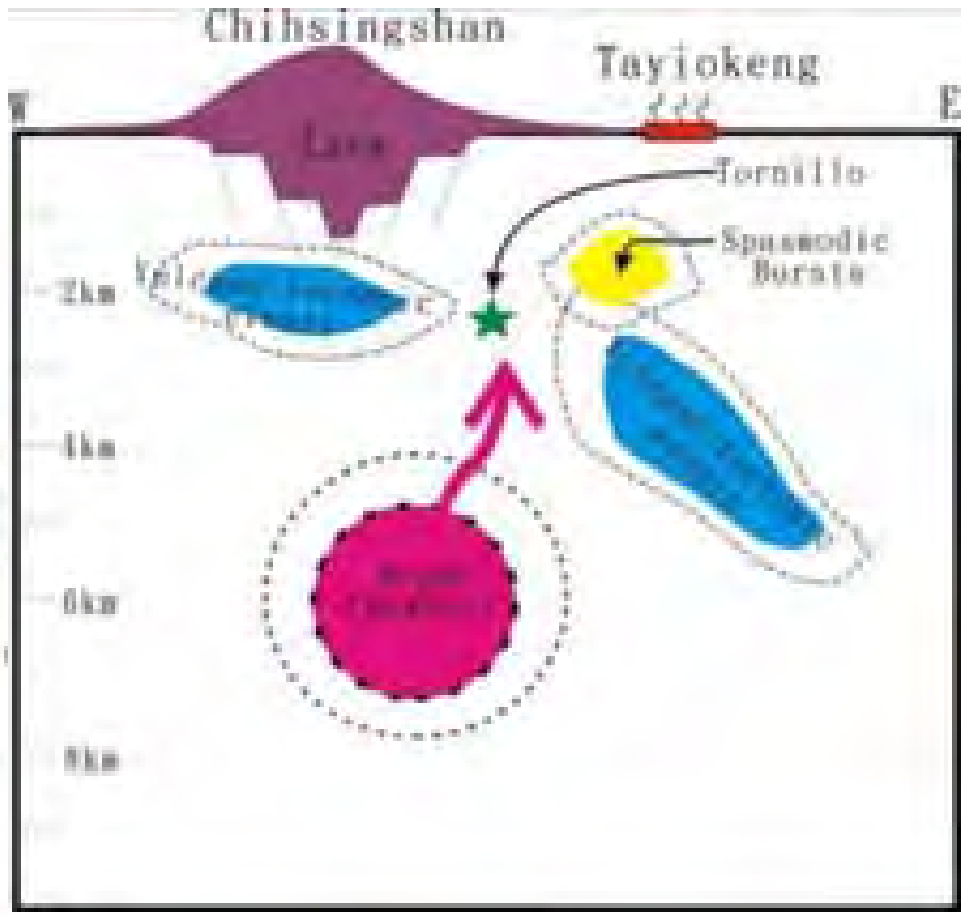
Last eruptive age: 5,500 年

(Belousov et al., 2010)

Evidence of active volcano -- Phenomenological Definition

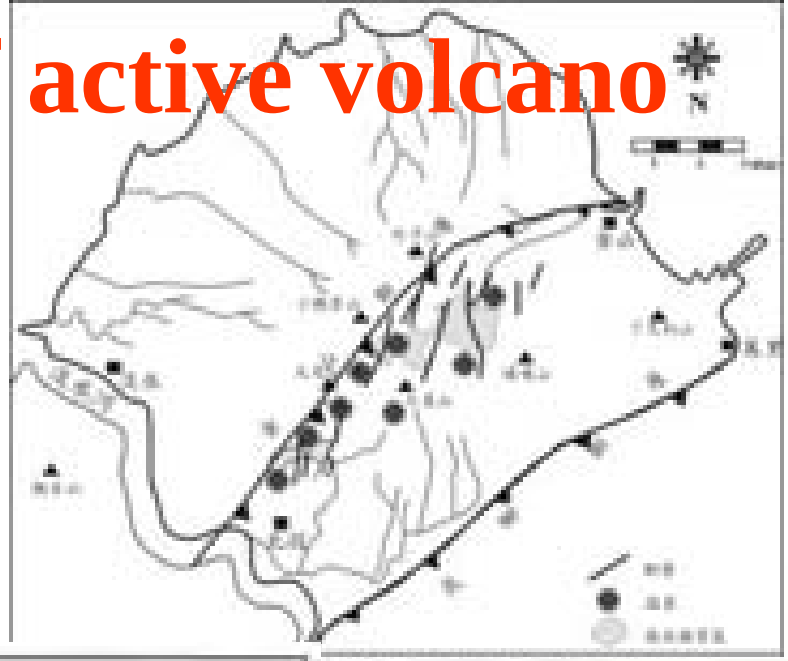
Volcanic earthquakes in TVG

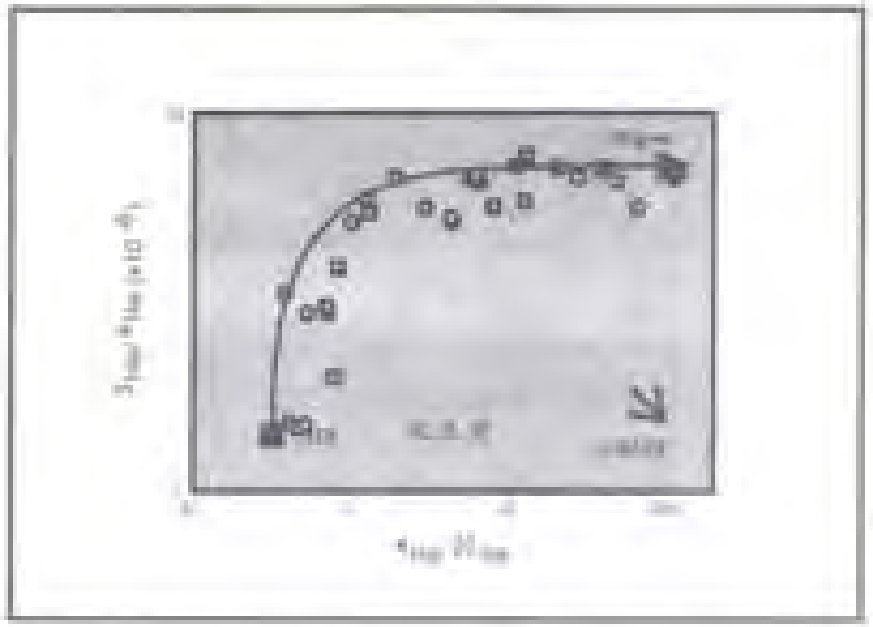




Lin et al., 2005

Evidence of active volcano

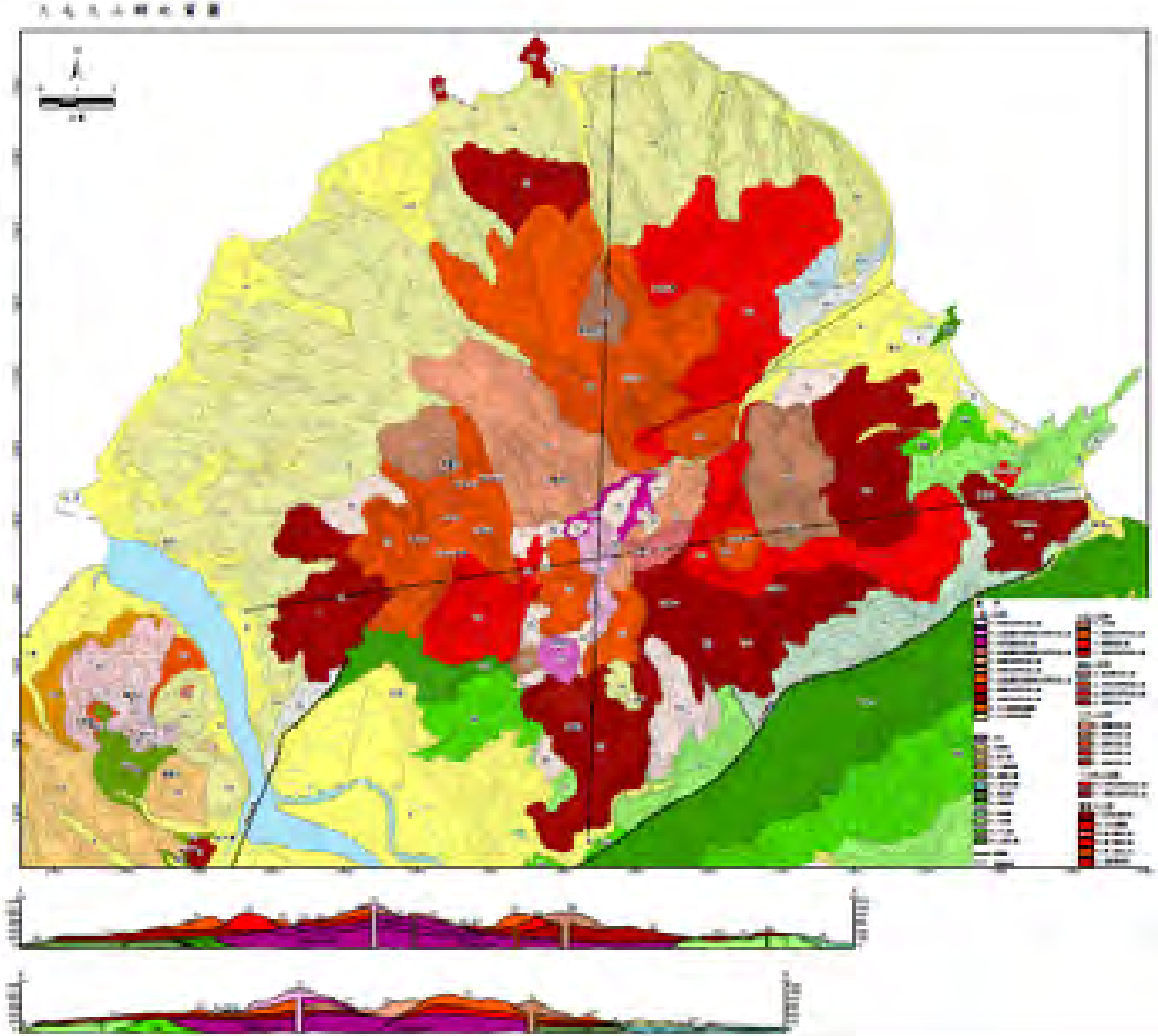




Magnitude

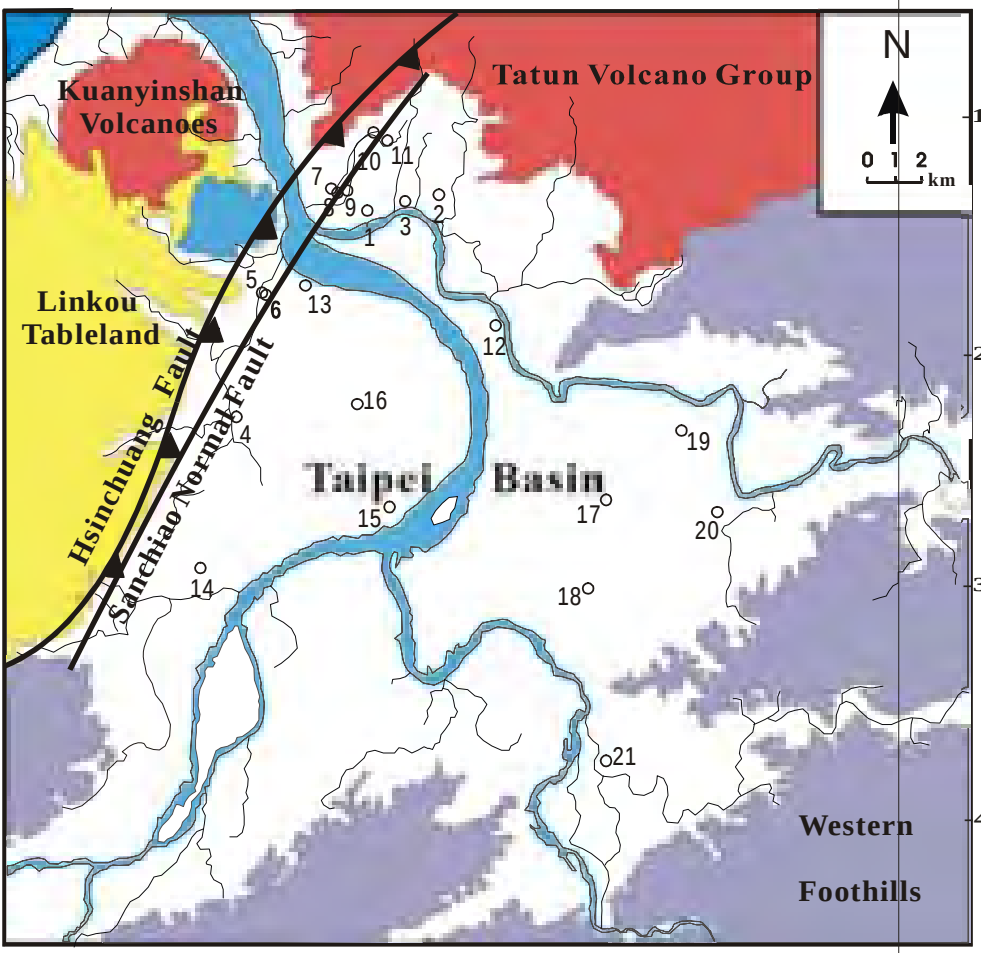
(Yang et al., 1999)

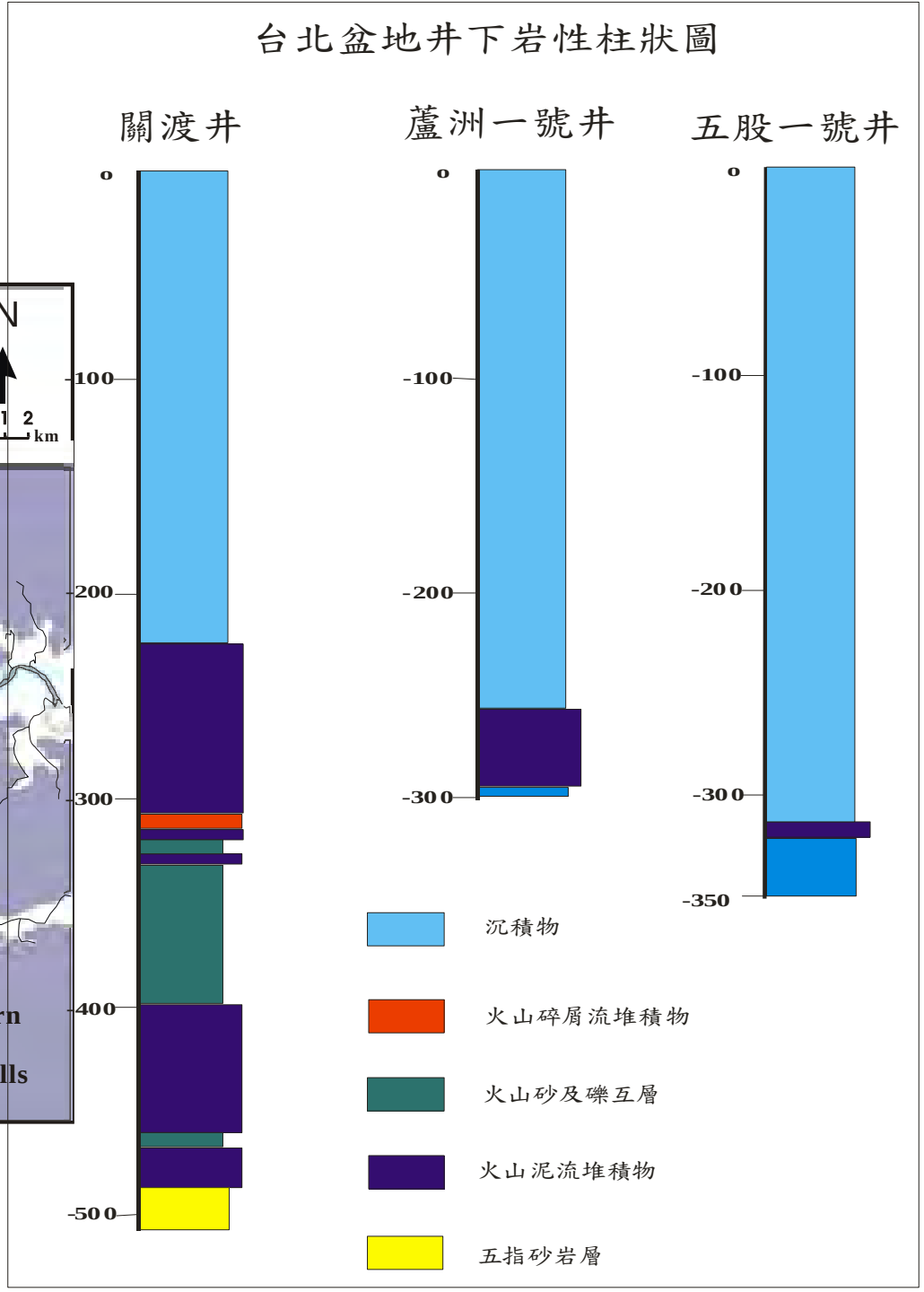
Characteristics of volcanic rocks



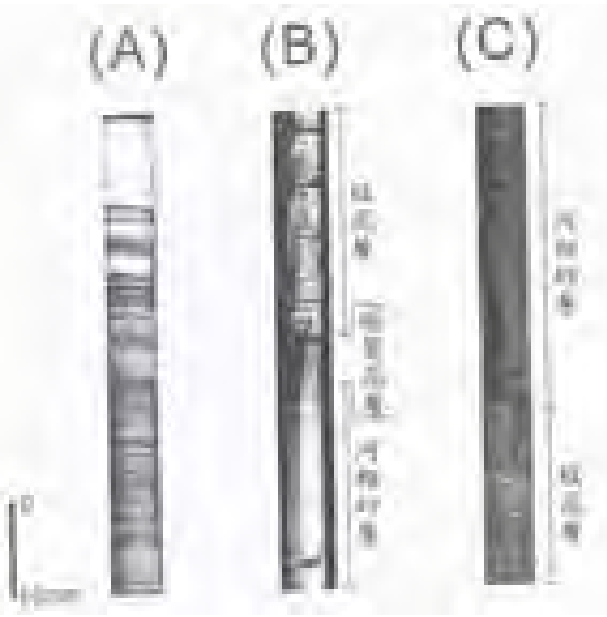
Potential volcanic hazards

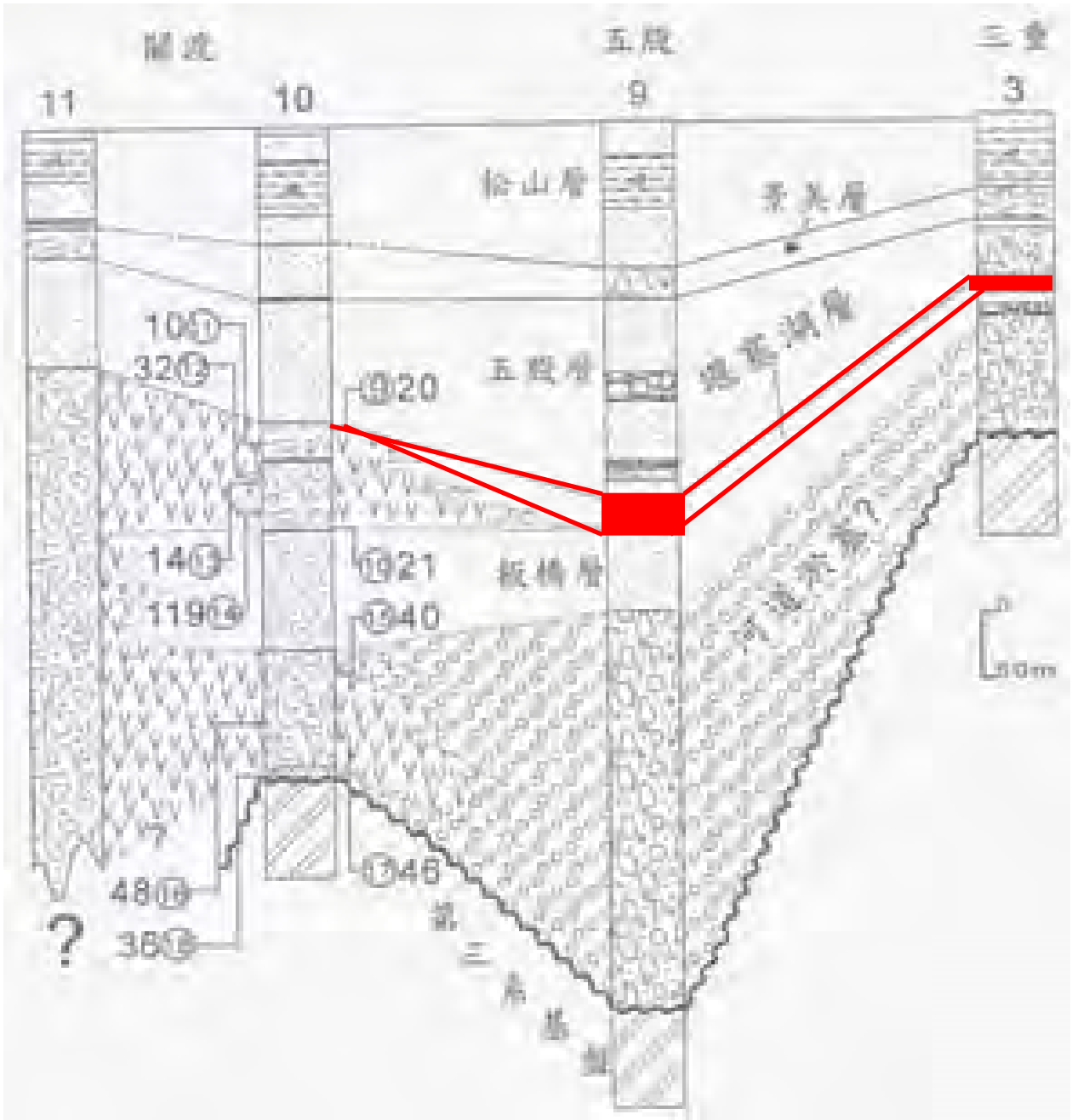
Lahar deposits in Taipei Basin



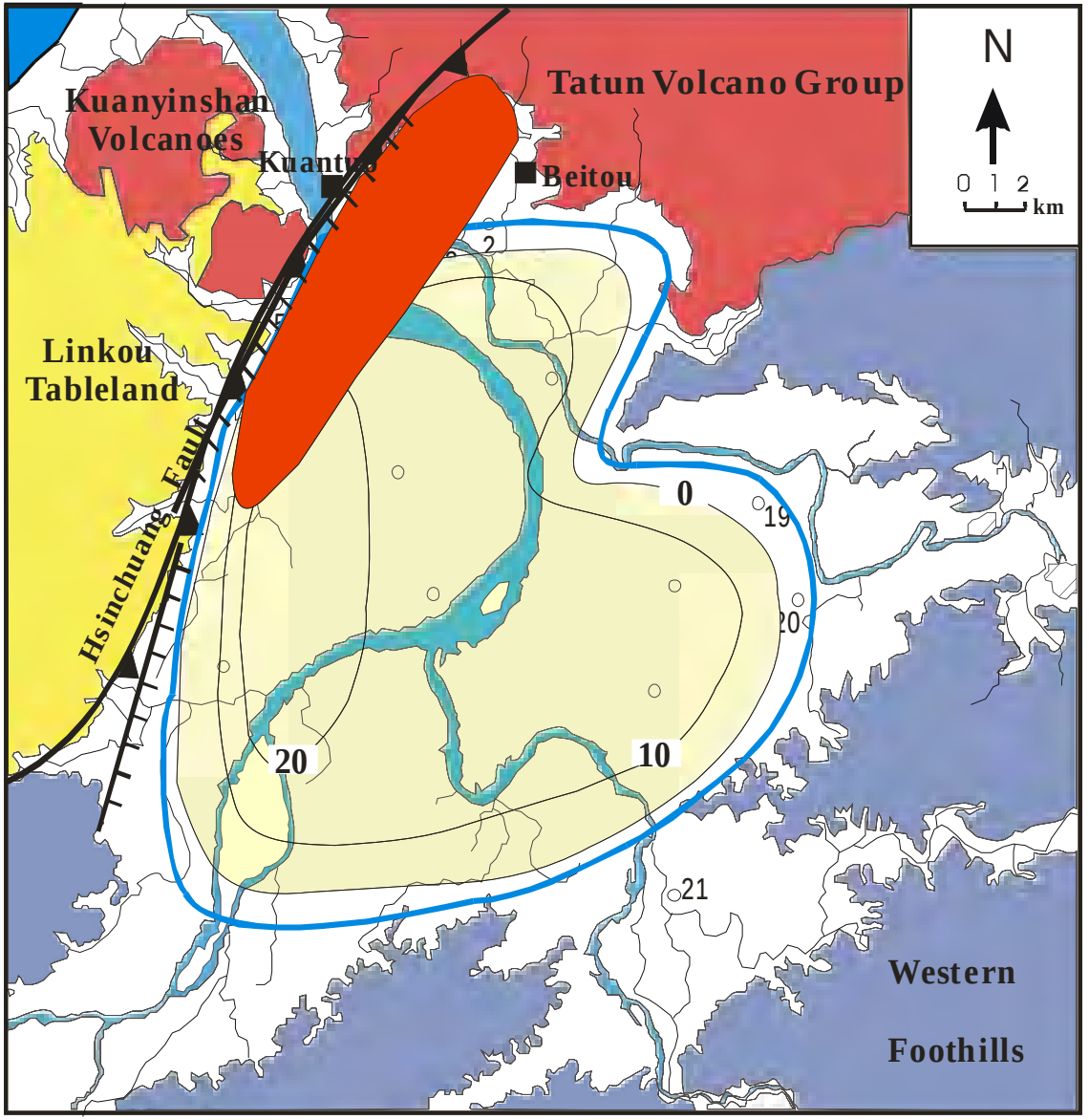


Dam lake



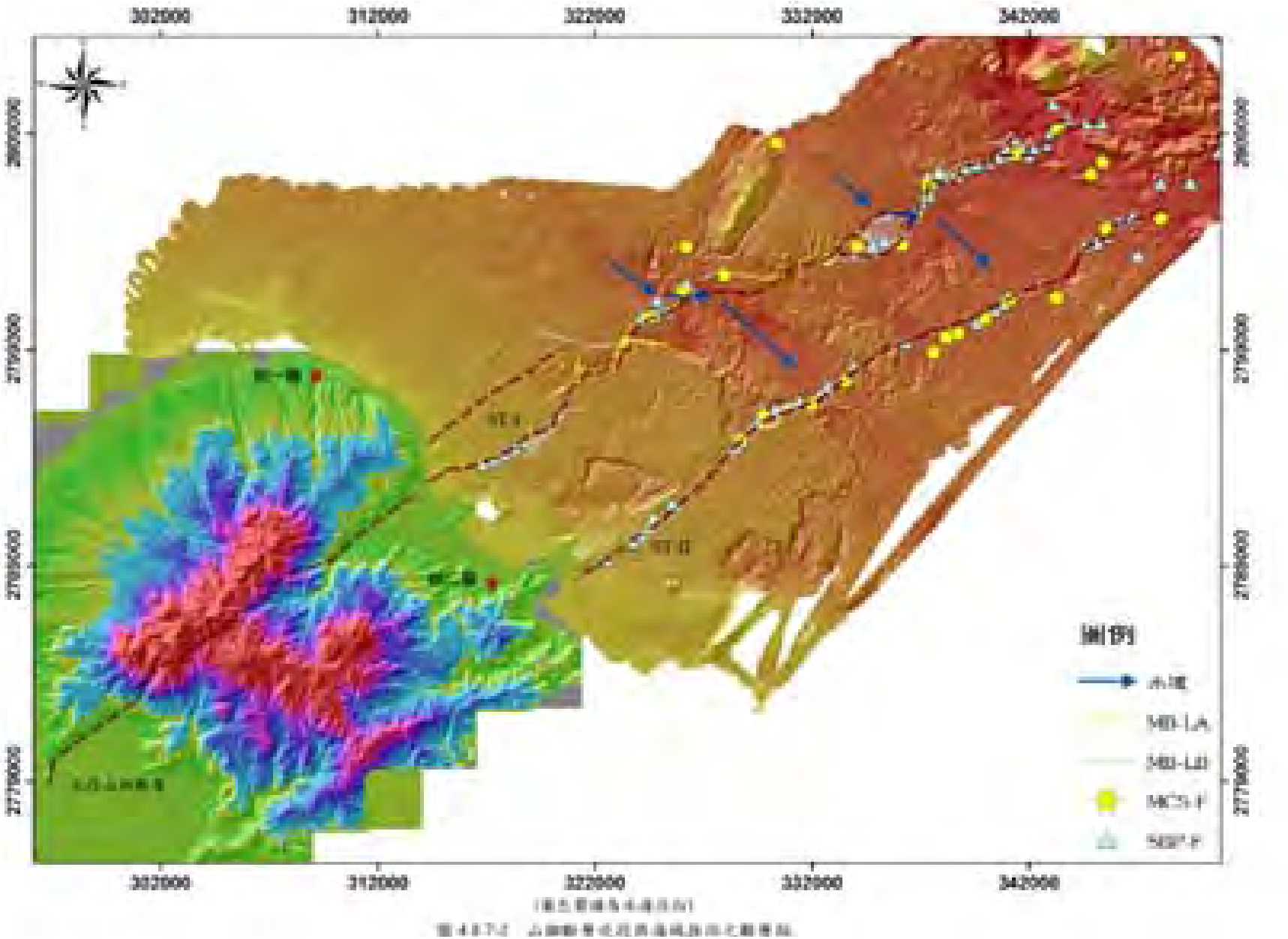


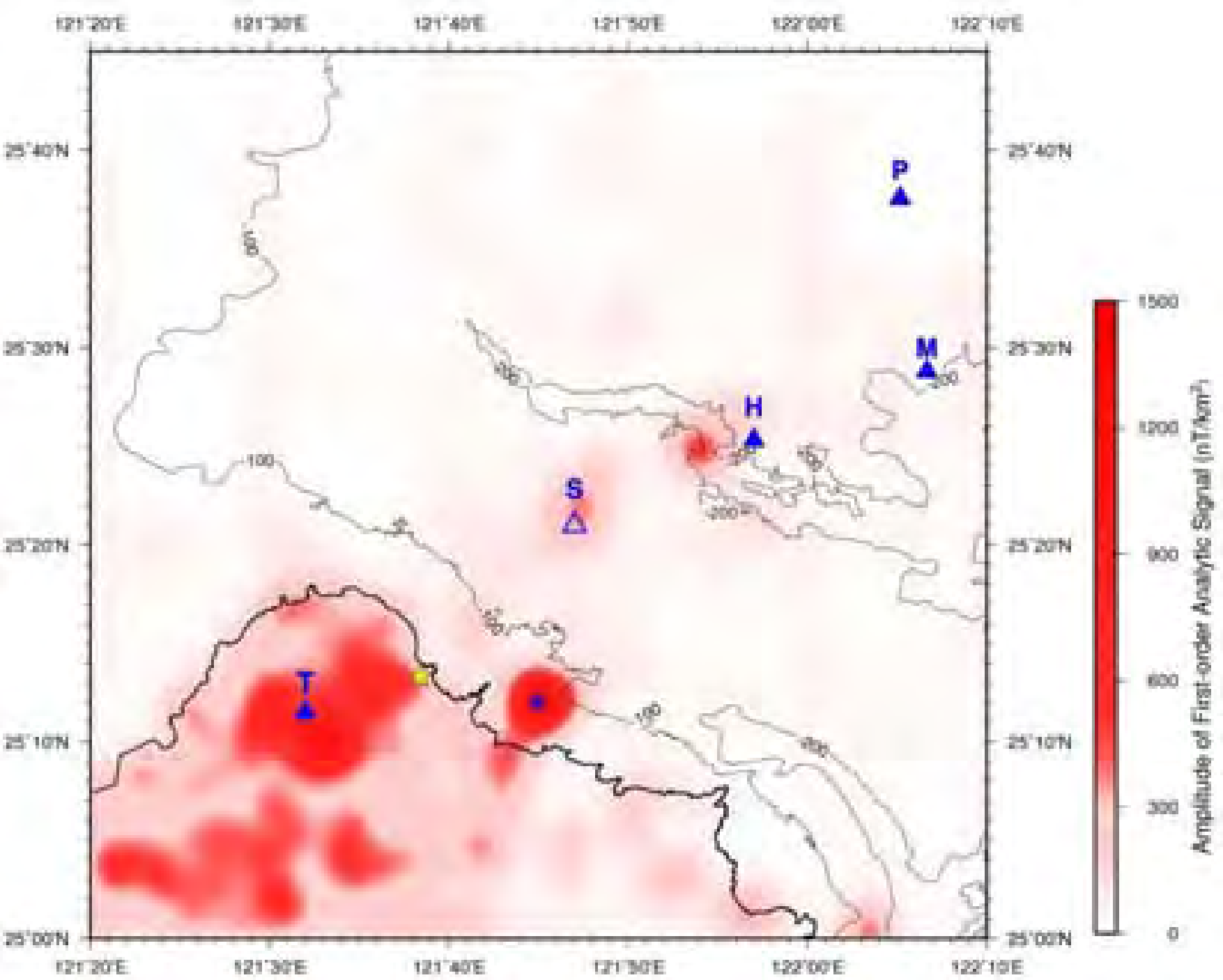
Distribution of dam lake



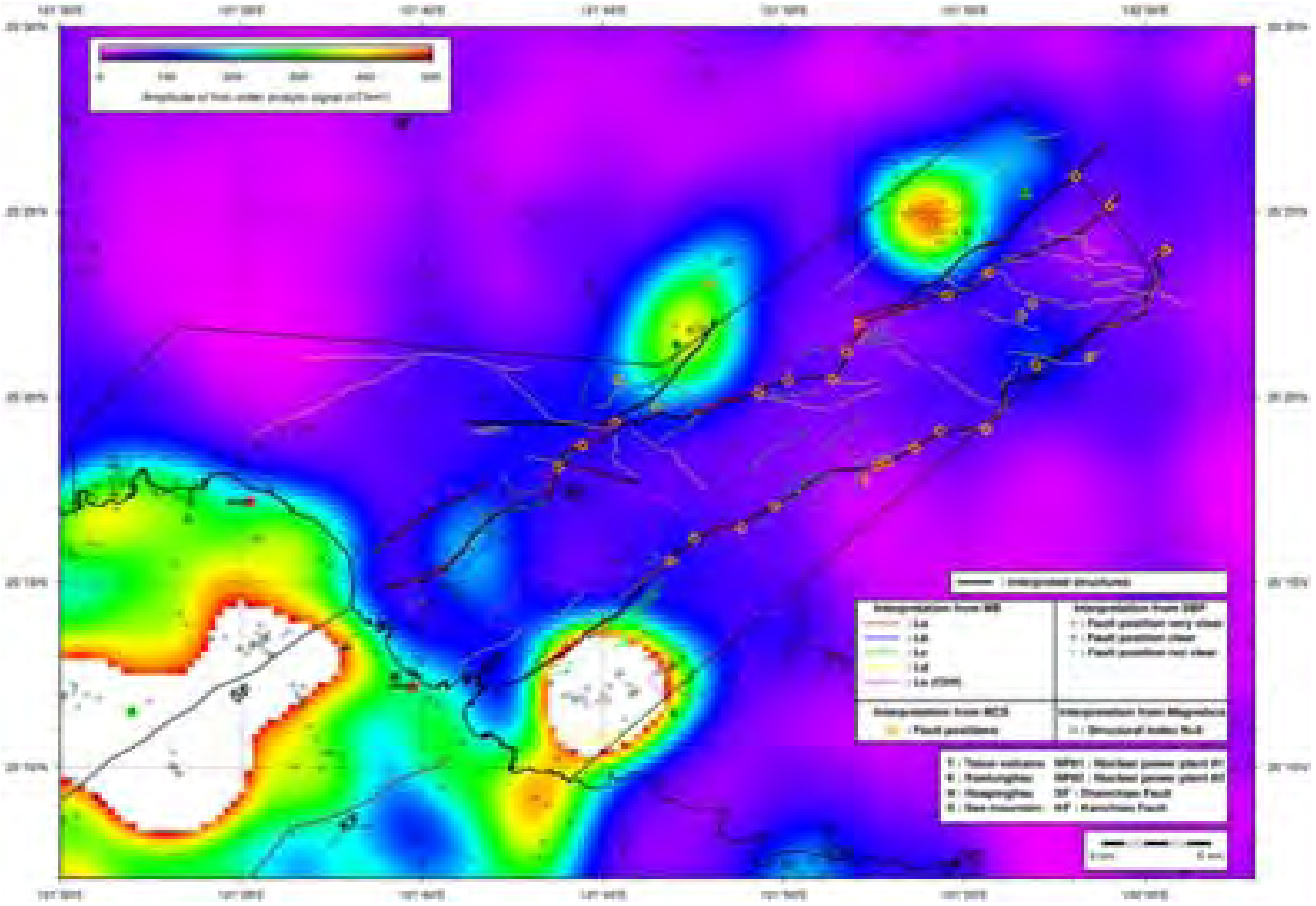
Modified from Teng et al., 2004

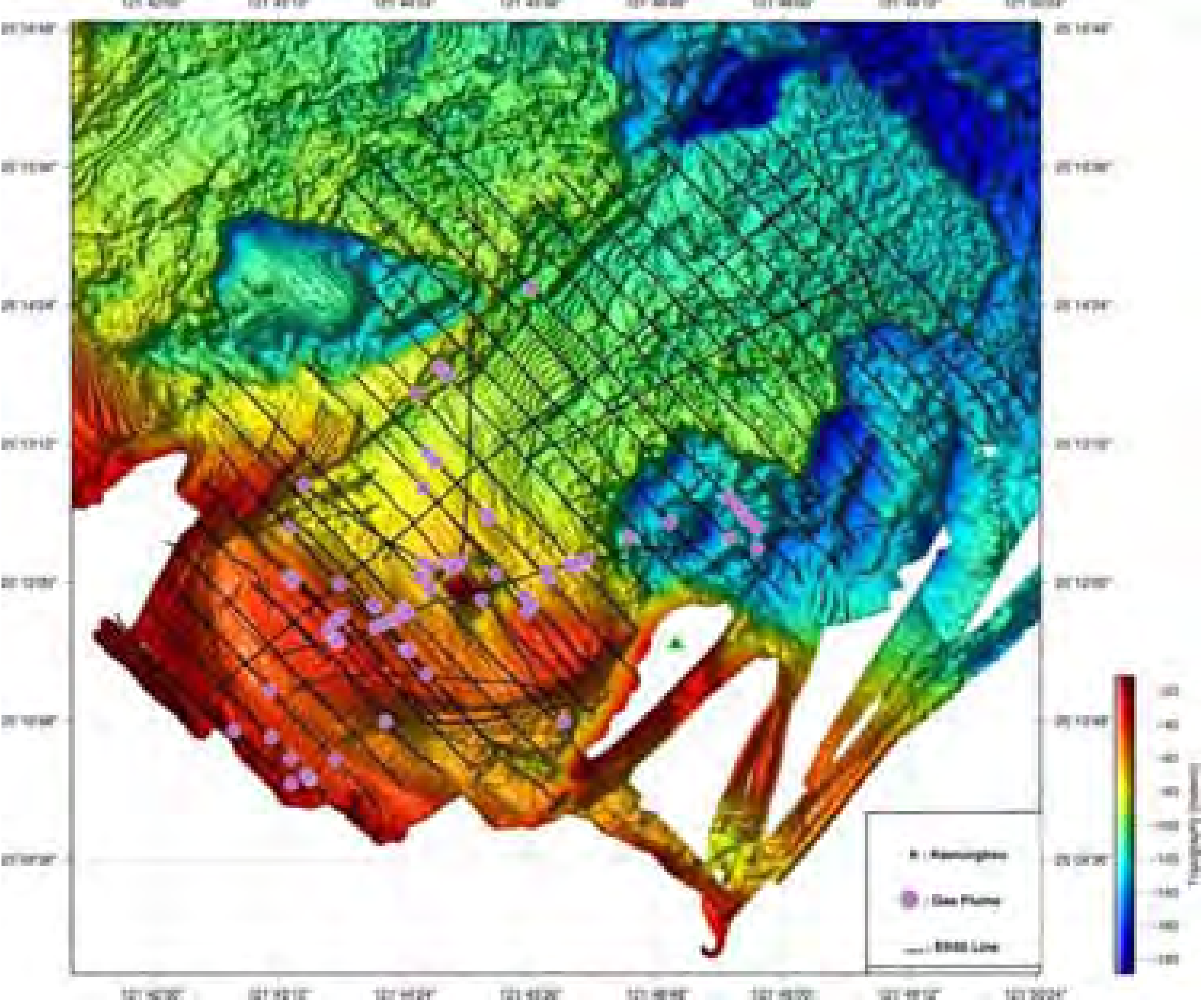
Recent survey on offshore of north Taiwan



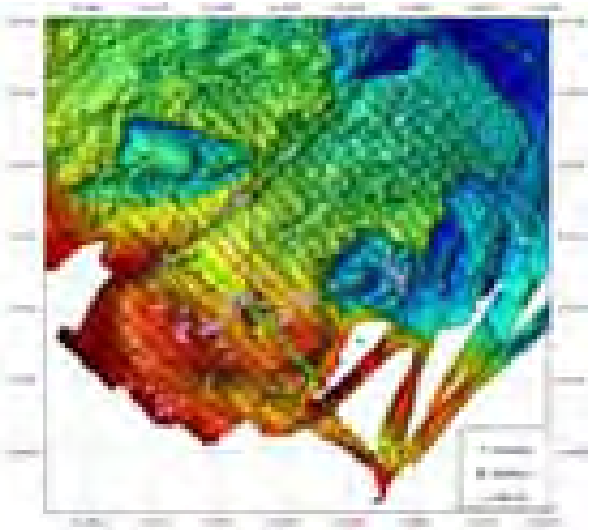

121°20'E
121°30'E
121°40'E
121°50'E
122°00'E
122°10'E
25°40'N
25°30'N
25°20'N
25°10'N
25°00'N
P
M
H
S
T
50
100
150
200
300
400
1500
1200
900
600
300
0
Amplitude of First-order Analytic Signal (nT/km²)

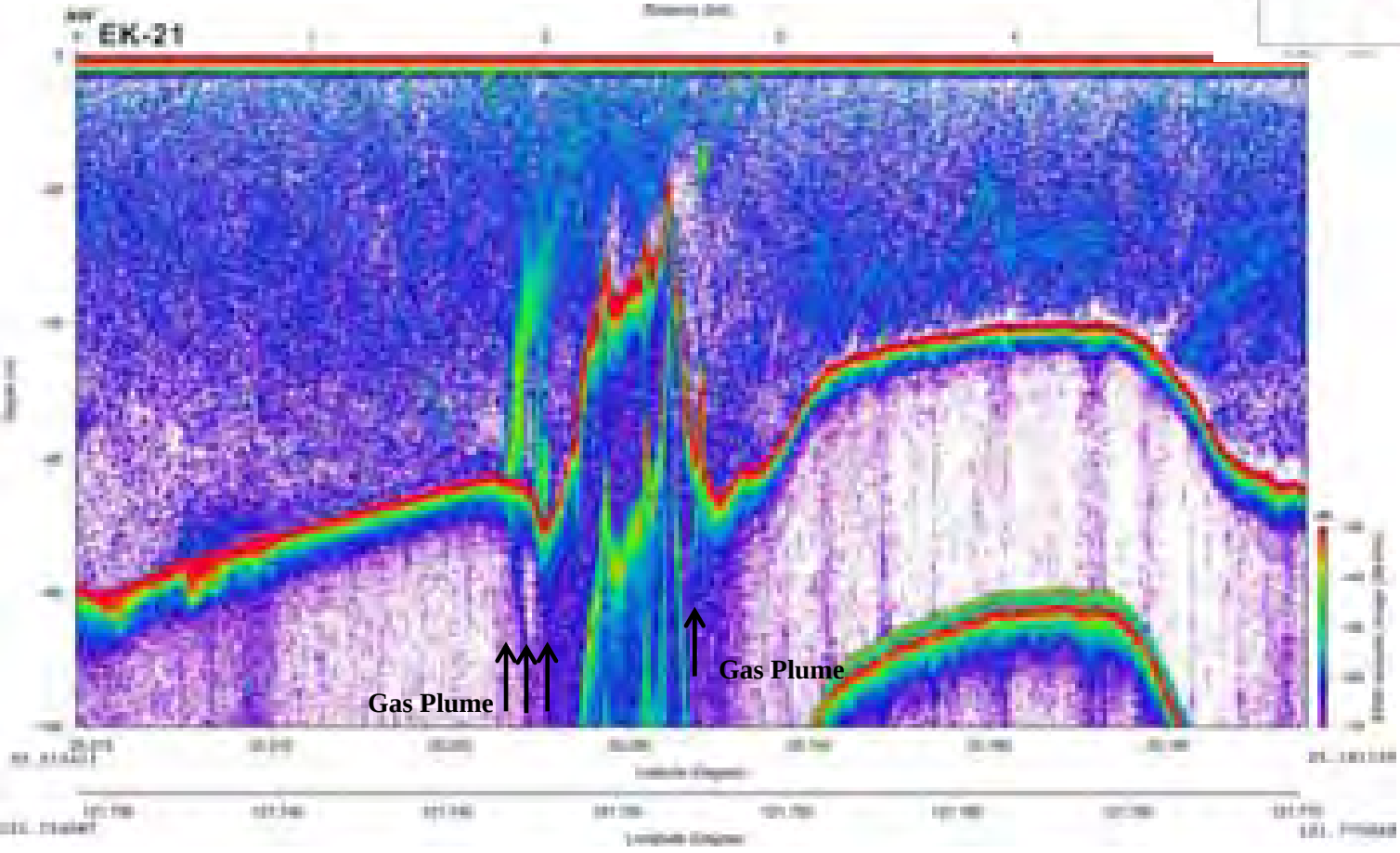
Volcanoes in offshore of north Taiwan



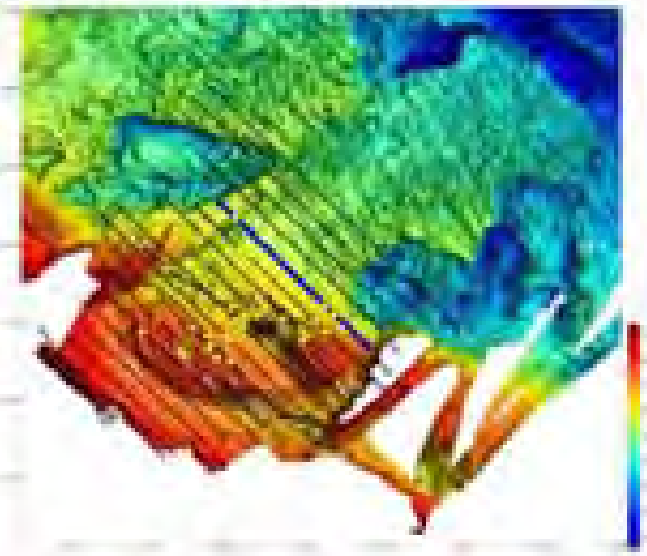

: Gas Plume

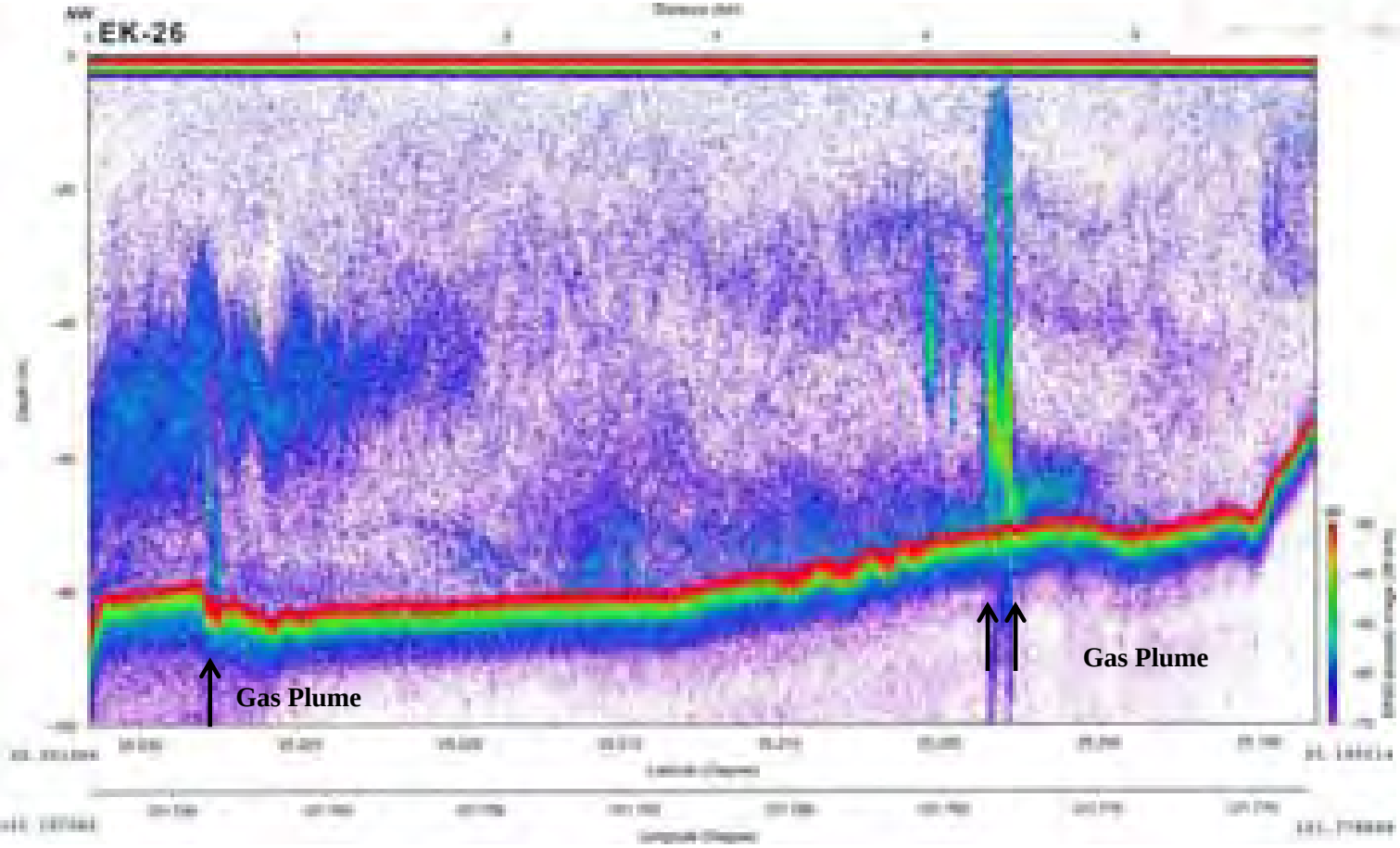
Gas plume in the offshore -- EK60 acoustic images

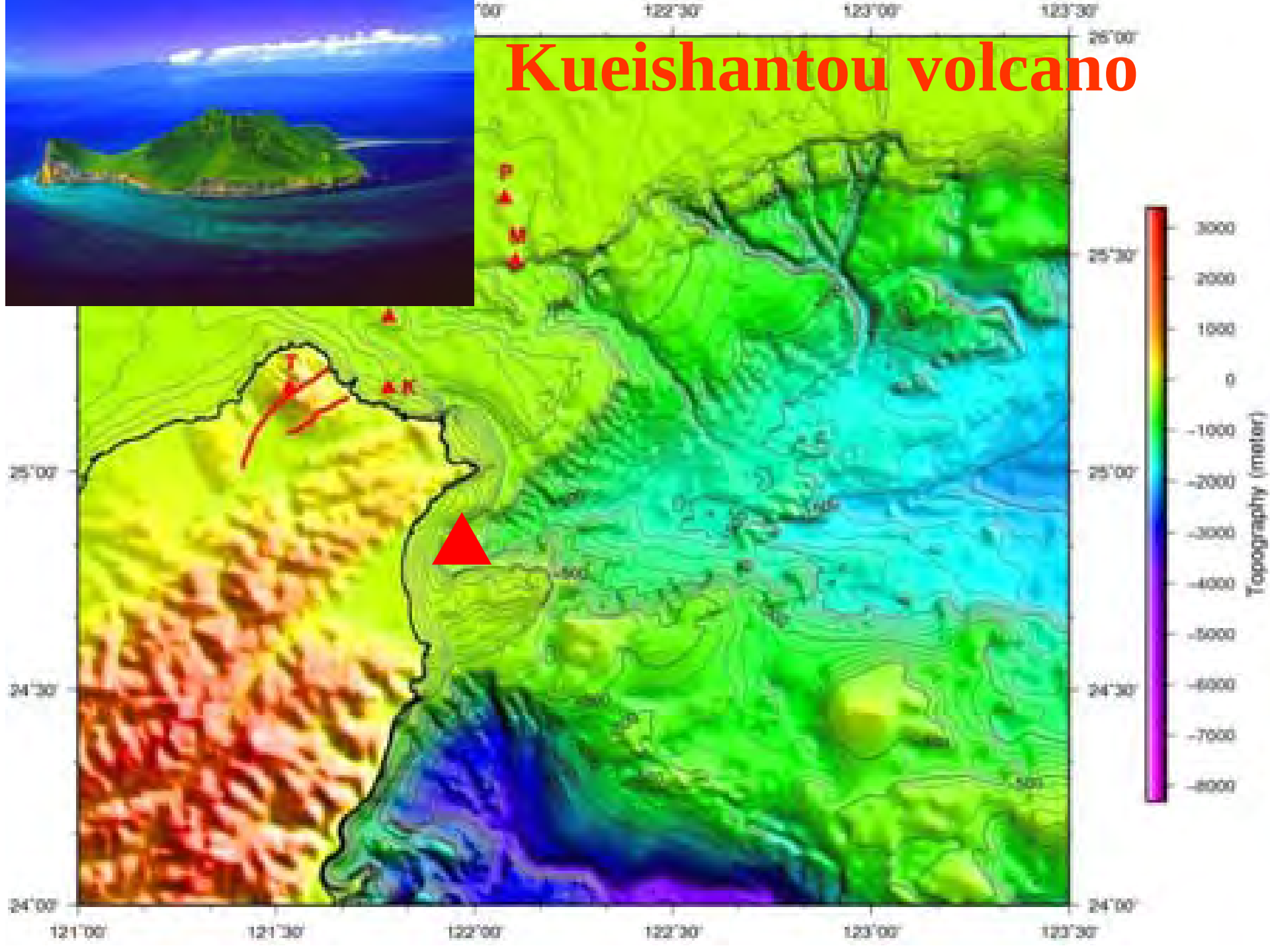




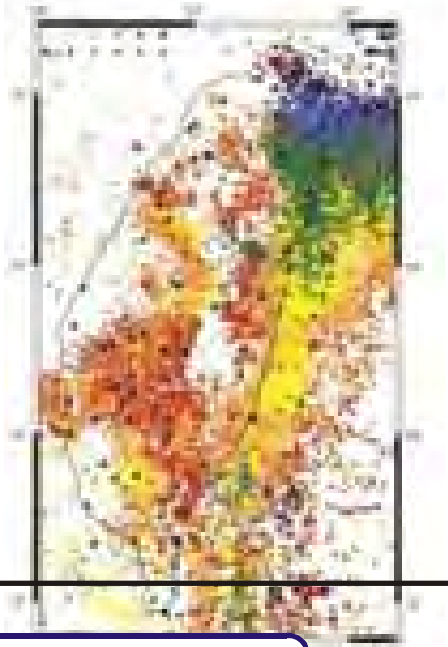
Gas plume in the offshore -- EK60 acoustic images

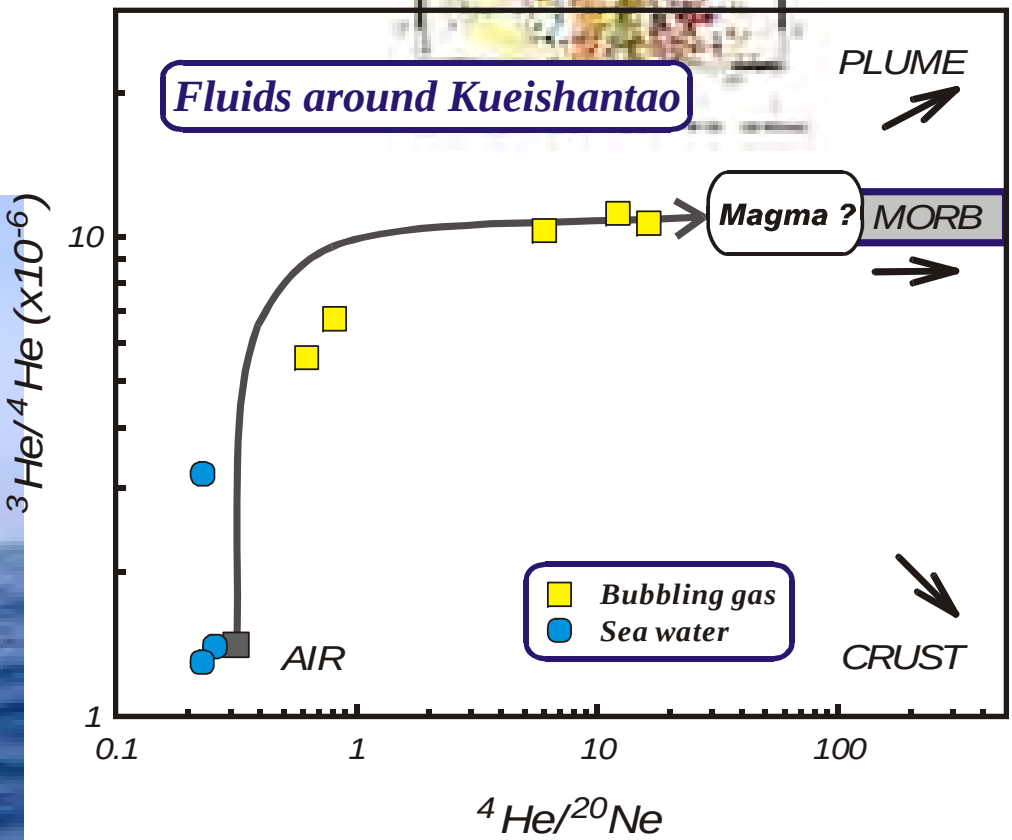




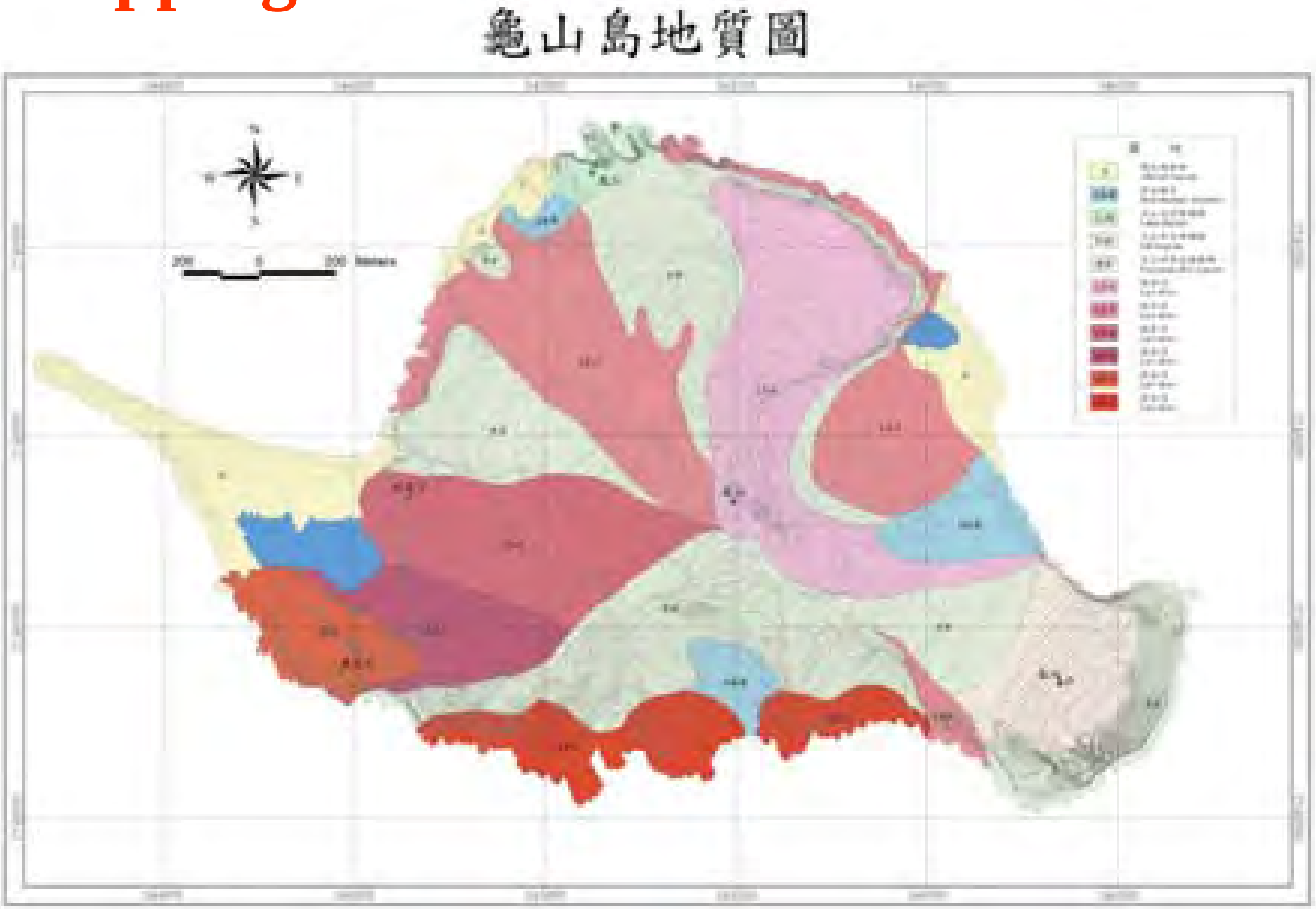

Kueishantou volcano
122°30'
123°00'
123°30'
26°00'
25°30'
25°00'
24°30'
24°00'
121°00'
121°30'
122°00'
122°30'
123°00'
123°30'
3000
2000
1000
0
-1000
-2000
-3000
-4000
-5000
-6000
-7000
-8000
Topography (meter)

Evidence of active volcano

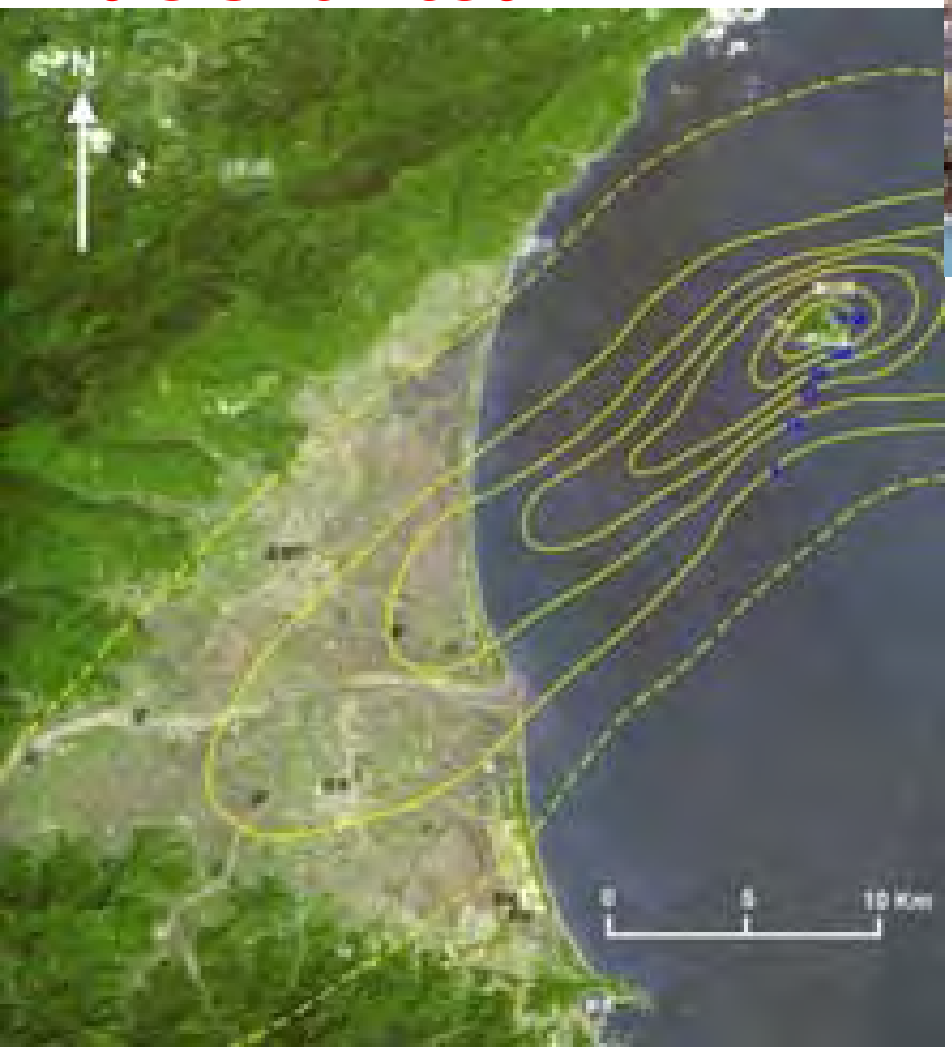




Mapping



Potential volcanic hazards in Kueishantou

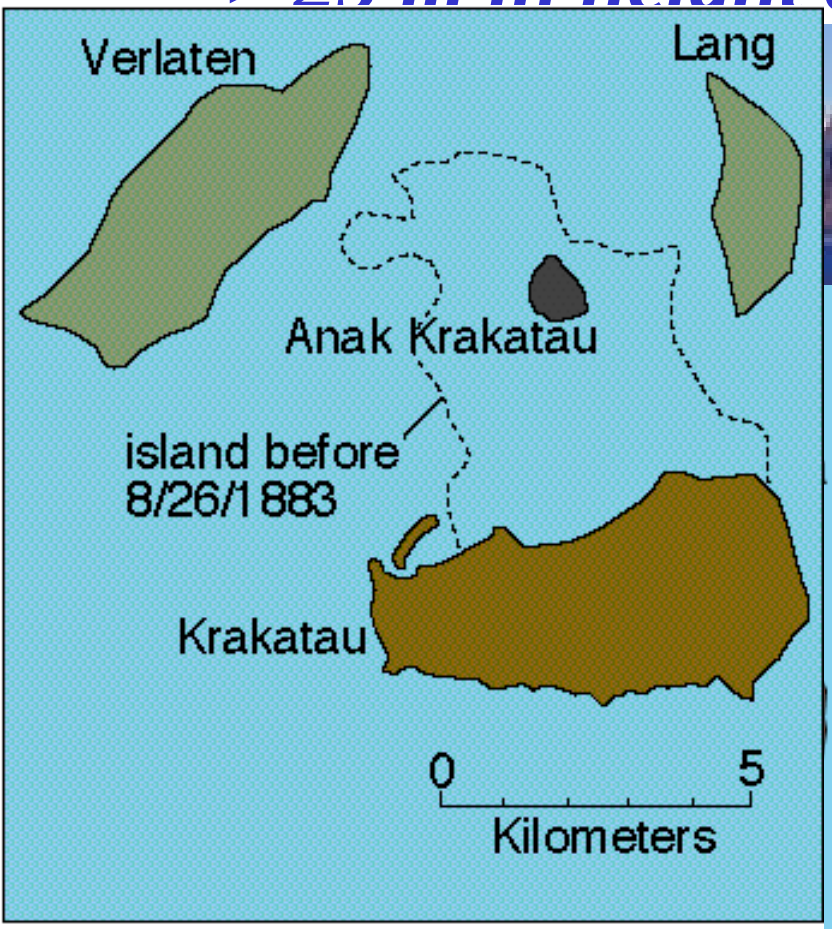


Krakatau Volcano, Indonesia

Santorini Volcano, Greece

> 30 m in height of wave

> 25 m in height of wave

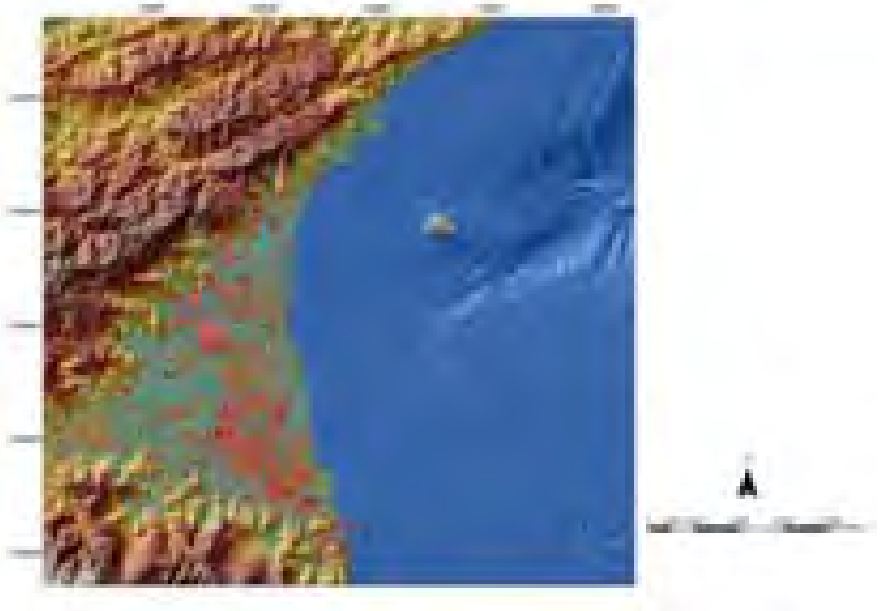


Collapse of volcanic body

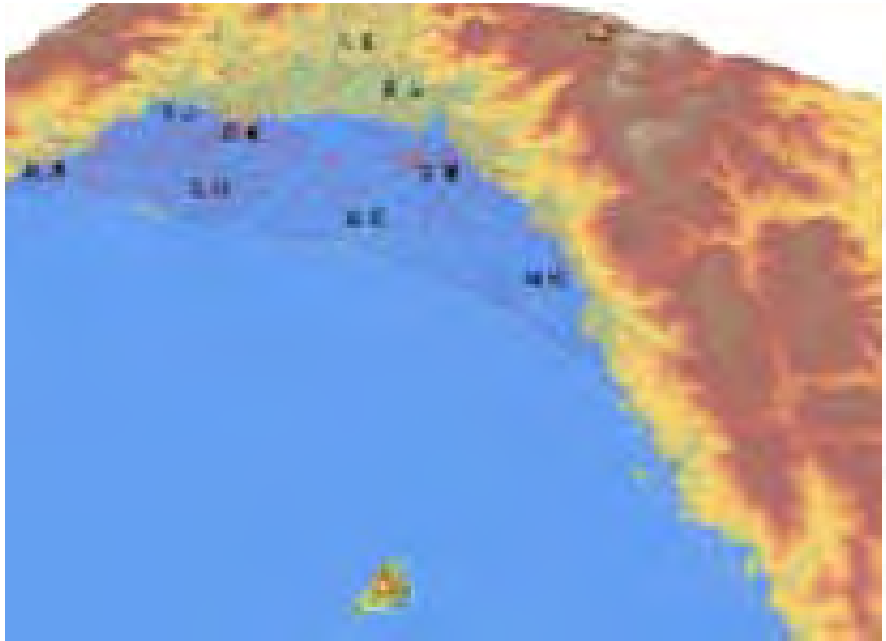
NE--SW

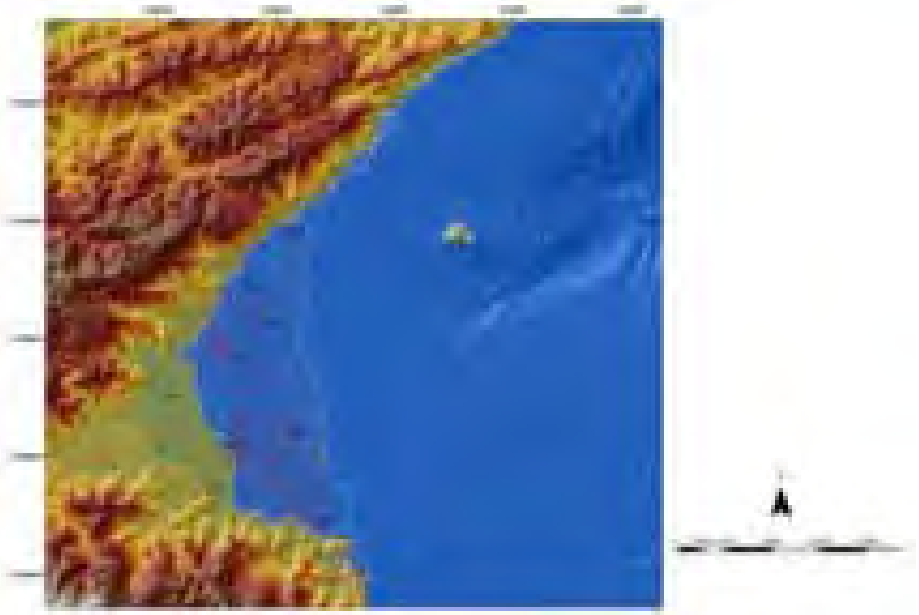
NE--SW

Location of Ilan Plain and Kueishantou



Coverred flood area of 5 m rising sea level






Thanks!
16 5 2001