The new reveal of Chihshang faulting at Tapo, Eastern Taiwan

- Preliminary Result

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Introduction

Geological Setting

• The Chihshang Fault ruptured during the 1951 earthquake M6.2 and produced surface breaks with scarps tens of centimeters high [Lee et al., 2003]

• Later, this fault showed clear evidence of active creep at surface which was not recognized until the observations by Barrier and Chu [1984] on retaining wall near the Tapo village.

Study area:
Tapo Elementary School
Introduction

Location

Horizontal shortening rate
Of 16.2 mm/year.
[Lee et al., 2001]
Introduction
Previous Work

- The outcrop of Chihshang Fault in Fuli provide the view of westward thrusting of Lichi mélange over Quaternary gravel with dip of 60° (Yu et al., 1994)
Introduction

Previous Work

- No evidence of high angle of shear plane is revealed

1900±30BP

1540±30BP

28.4 m
Introduction

Previous Work

• No evidence of high angle of shear plane is revealed
Introduction

Previous Work

Telford et al. 1976

<table>
<thead>
<tr>
<th>Rock type</th>
<th>Resistivity (Ωm)</th>
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<tbody>
<tr>
<td>Clay</td>
<td>1 - 67</td>
</tr>
<tr>
<td>gravel</td>
<td>100 - 180</td>
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<tr>
<td>Alluvium and sands</td>
<td>10 - 800</td>
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</table>
Introduction

Previous Work
Introduction

Research Question

• Where is the Chihshang main fault?
• What mechanism applied in deformation at Tapo Elementary School?
Motivation & Aims

Motivation

• Better understanding the deformation at Tapo Elementary School.

Aims

• Construct the geological cross section model of the research area.
• Construct the deformation model of the escarpment at Tapo Elementary School.
Methodology

Research Question

- Where is the Chihshang main fault?
- What mechanism applied in deformation at Tapo Elementary School?

Methodology

- Borehole 7B: 50 m depth
- Borehole 7A: 82 m depth
- Borehole 8: 32 m depth
Result
Core logs

Mud
Brown colluvium
Metamorf and Andesite gravel

Mud
Metamorf and Andesite gravel

Mud
Metamorf and Andesite gravel
Result

7A Core logs & Inclinometer

61 m 60 m

80°
Contact mud and colluvium layer

Relative Horizontal distance

0 m 3.4 m
**Result**

Core logs & Inclinometer

Relative Horizontal distance

- 0 m
- 3.4 m

56°

65°

Pseudotachylyte

Core logs & Inclinometer

Depth 21.37 - 21.87 m

Displacement:
- South/North
- East/West

Mud

Brown colluvium

Metamorphic and Andesitic gravel
Redeposit mud?

Relative Horizontal distance

0 m 3 m 9 m 12.4 m 19 m

16

Result
Core logs & Inclinometer
Discussions

Surface of rupture

Chihshang main fault
Inclinometer in borehole 7 (July 2016 – October 2018) at depth: 5 – 15 m
5 meter depth’s motion rate 17.9 mm/yr, 6.5°NW

Main fault motion rate 6.6 mm/yr westward
Conclusions

- The main fault is located about 60 m eastward from the escarpment.
- The main fault dip of Chihshang fault at Tapo is about 72-74°.
- The ground motion of muddy layer at borehole 7 is likely not affected by the faulting.
Future Work

Future work:

- Insight analysis of the cores
- Insight analysis of inclinometer data
Future Work
~ Thank you~