

# Preliminary study of magnetic fabrics across the Chimei Fault of Coastal Range, Taiwan


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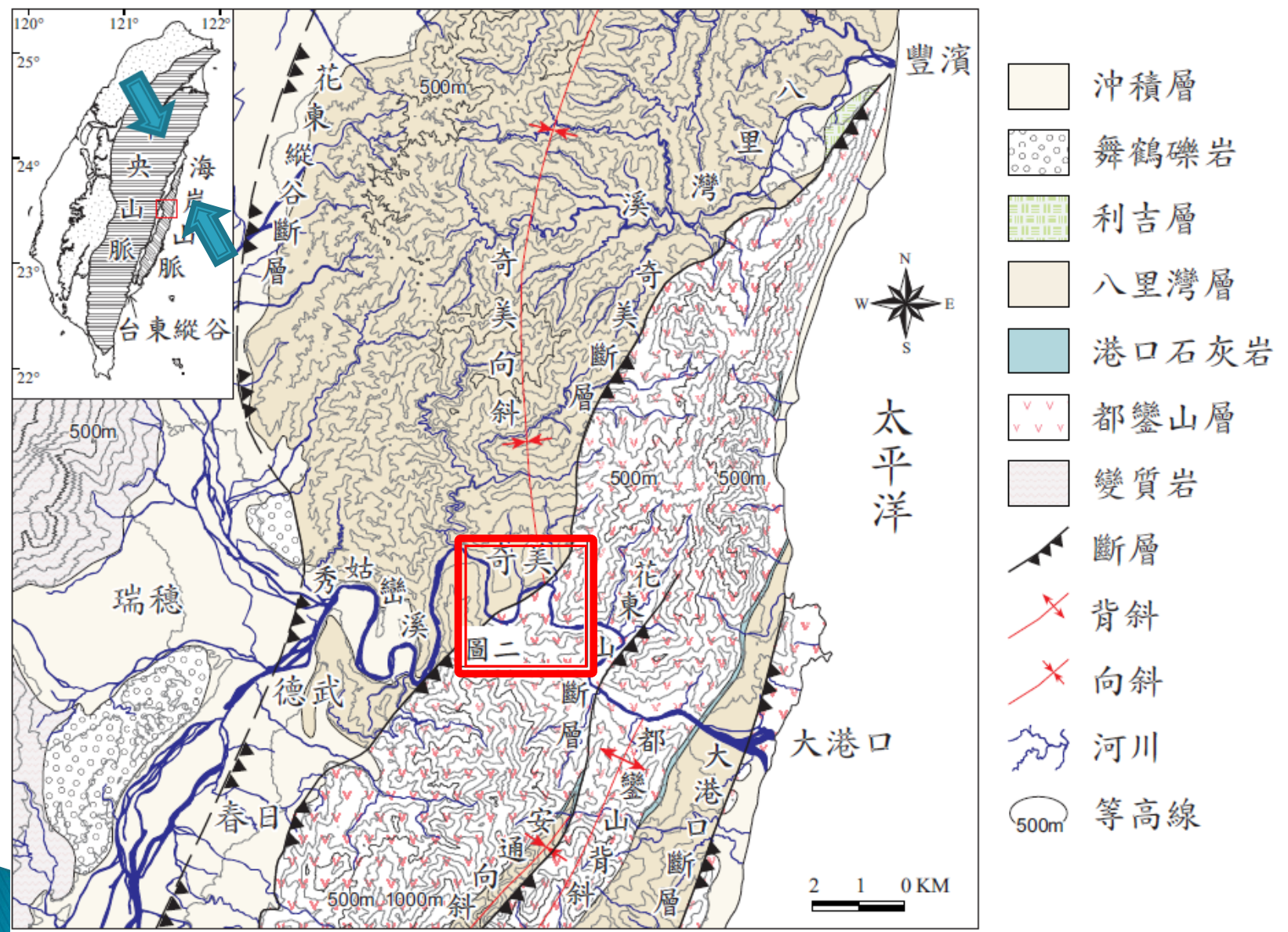
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# Outline

1. Introduction
  2. Field work
  3. Experiments
    - a. Anisotropy of magnetic susceptibility(AMS)
    - b. Temperature-Function Magnetic susceptibility
  4. Results
  5. Discussion
  6. Conclusion
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# Introduction



修改自王源和陳文山(1993)

Geologic map of middle Coastal Range

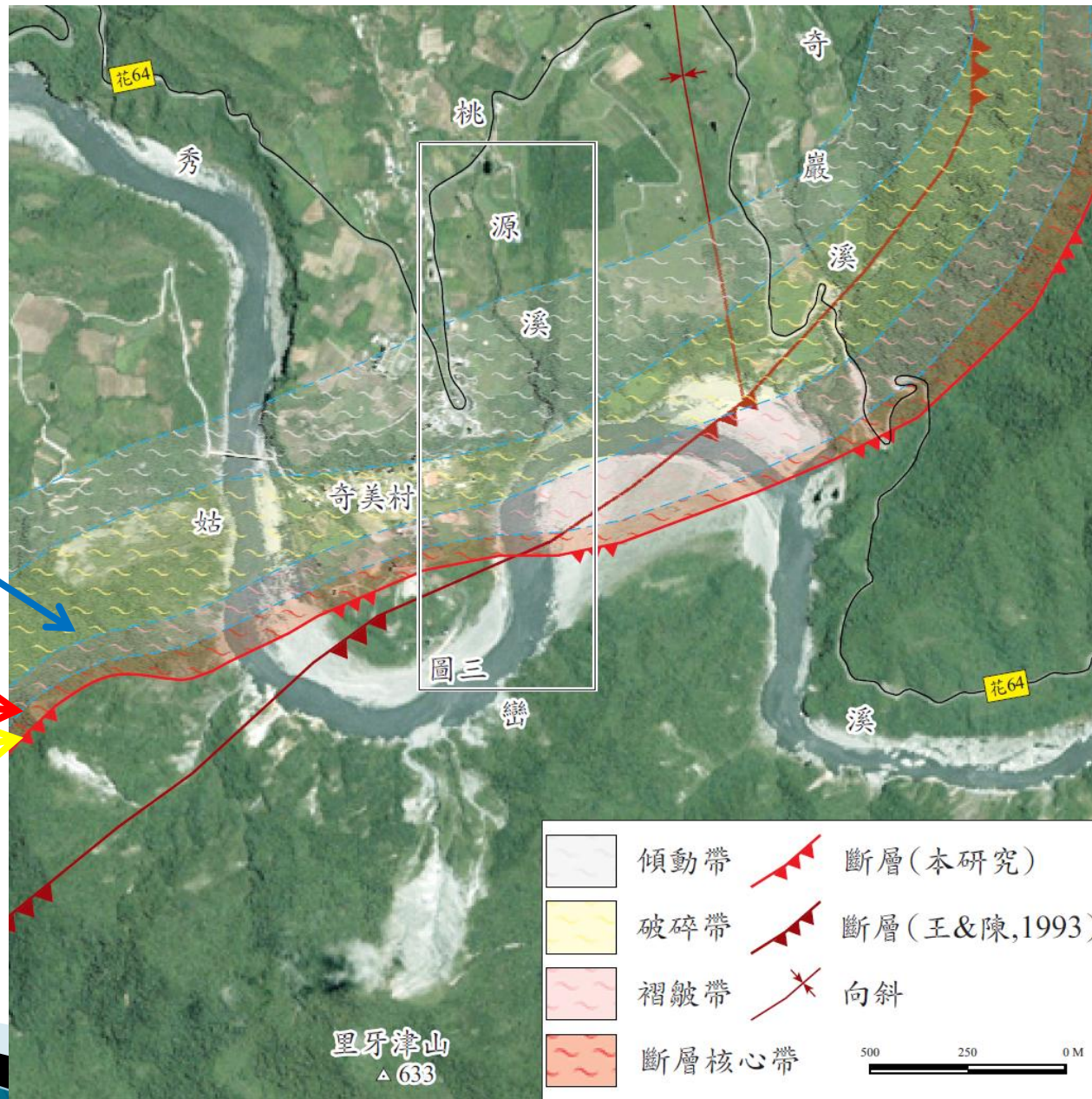


# Structural zone

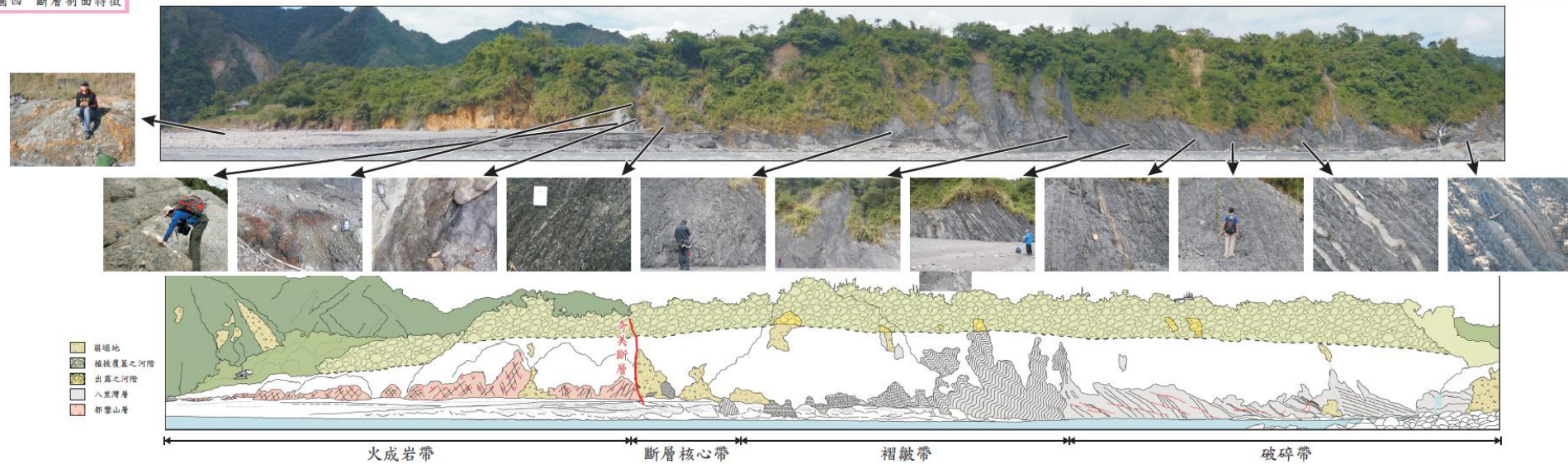
Damaged zone

Fold zone

Fault zone



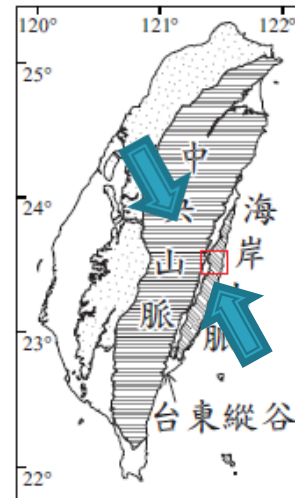
圖四 斷層剖面特徵



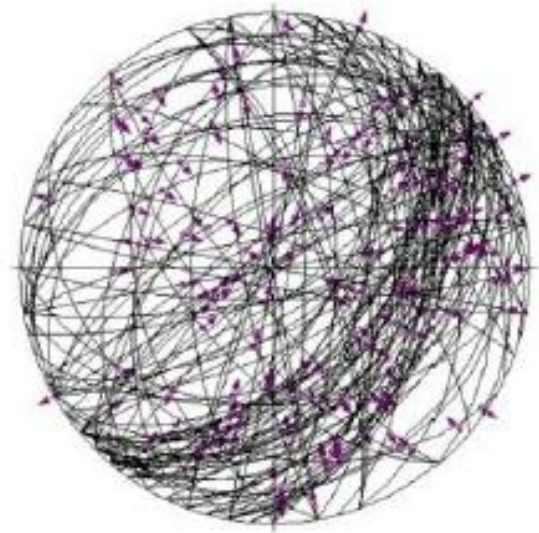
(蔡宜玲、鄧屬予, 2012)



# Motivation

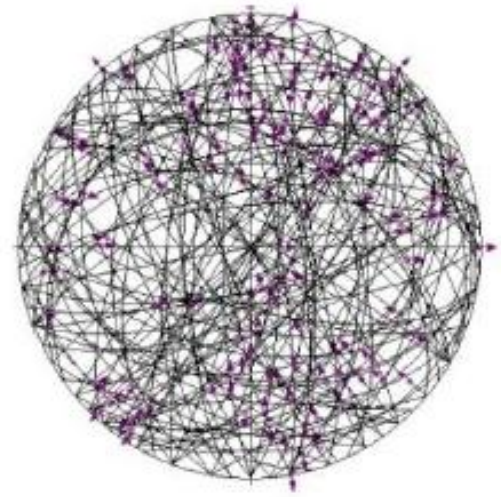


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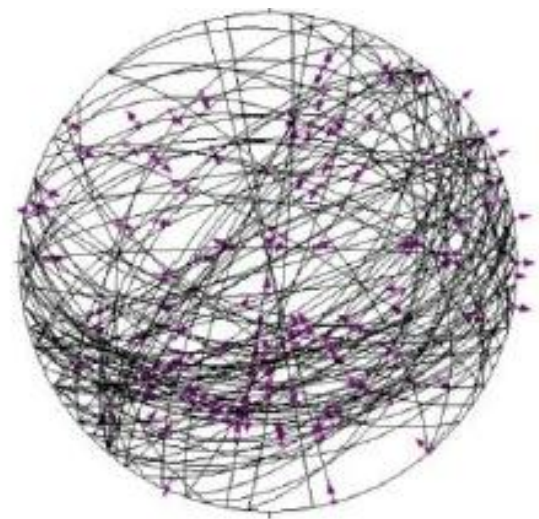


## Stress inversion

都  
鑾  
山  
層



破  
裂  
帶



(Szu-Ting Kuo , 2011)

# What's Anisotropy of Magnetic Susceptibility (AMS) ?

- Anisotropy of magnetic susceptibility (AMS)
- $M = kH$

*M = magnetization*

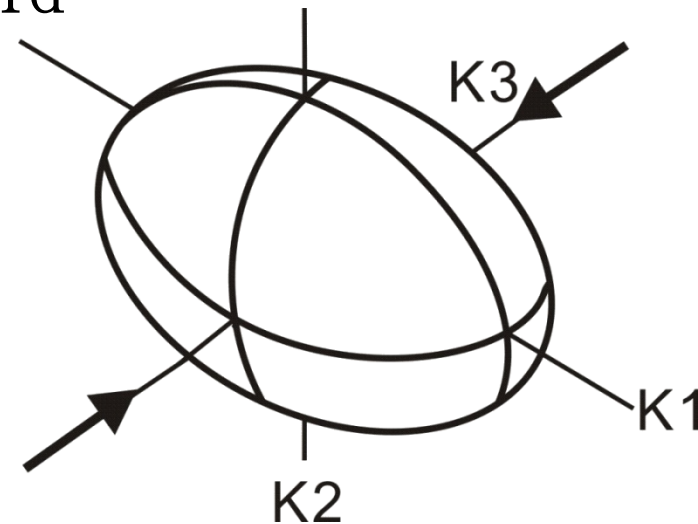
*H = additional magnetic field*

*K = susceptibility*

- Magnetic susceptibility ellipsoid

- $K_1 \geq K_2 \geq K_3$

$$K_{\text{mean}} = (K_1 + K_2 + K_3) / 3$$

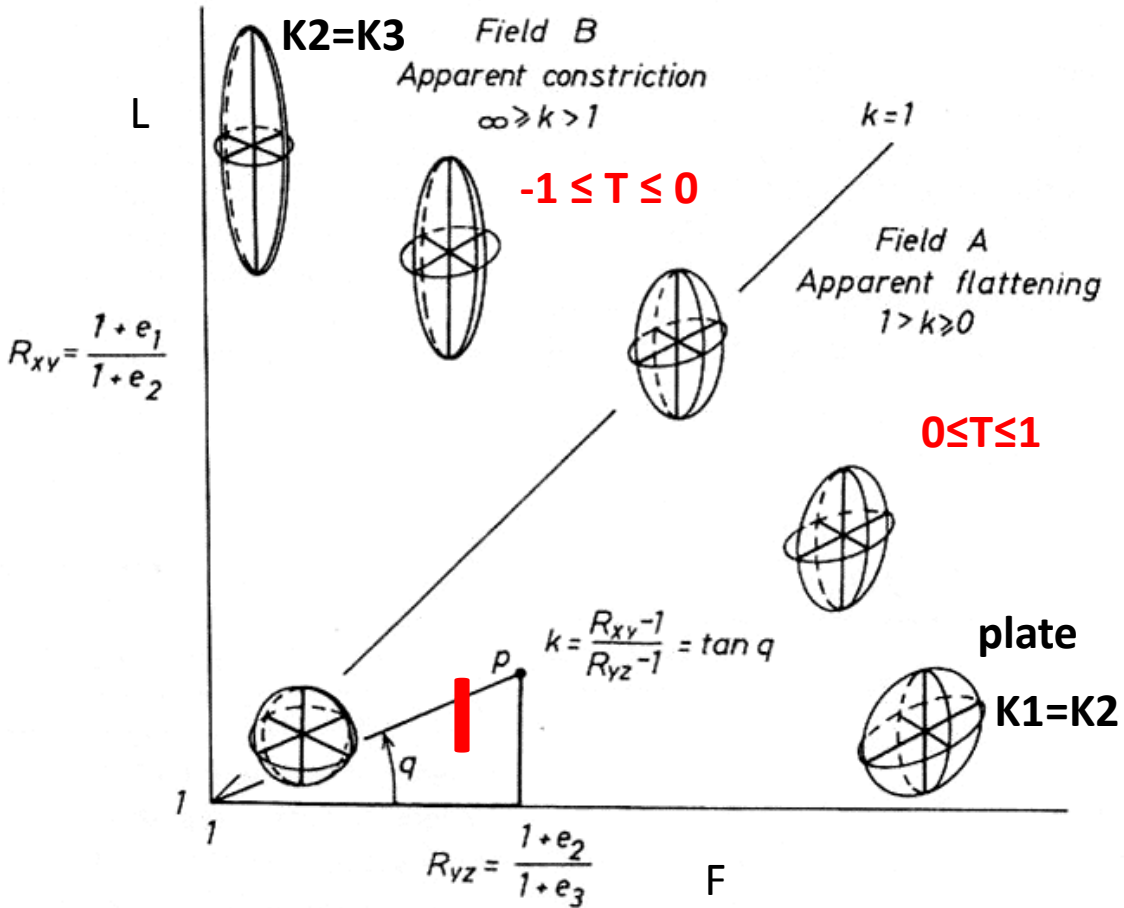


# Magnetic Susceptibility Ellipsoid

Shape and intensity of magnetic susceptibility ellipsoid

Flinn diagram (Ellipsoid)

cigar



Lamination (**L**) =  $K_1/K_2$

Foliation (**F**) =  $K_2/K_3$

Anisotropy (**P**) =  $K_1/K_3$

Shape parameter (ellipsoid) (**T**)

$$T = \frac{\ln(K_2/K_3) - \ln(K_1/K_2)}{\ln(K_2/K_3) + \ln(K_1/K_2)}$$

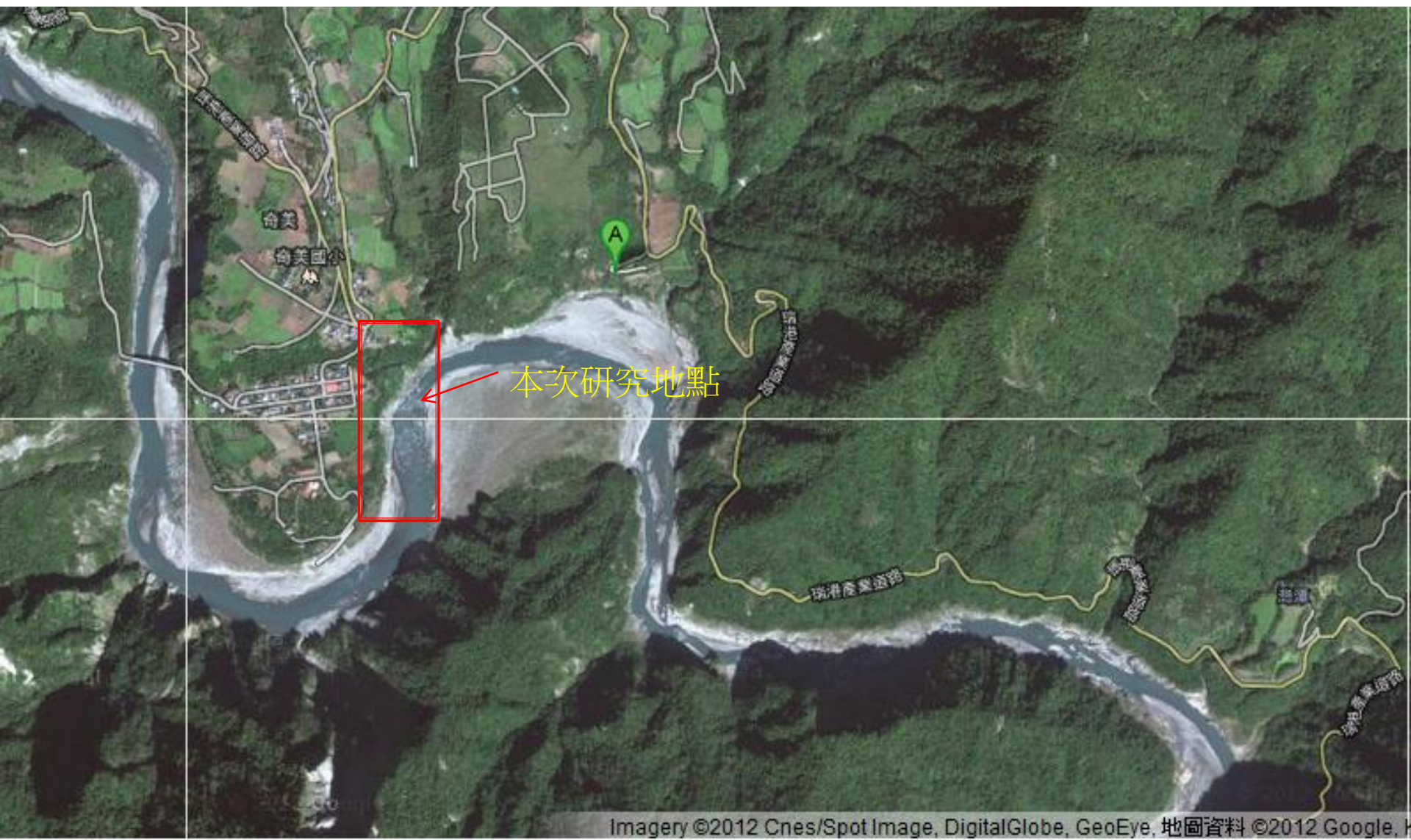
Intensity (**I**) =

$$i = \sqrt{(F-1)^2 + (L-1)^2}$$

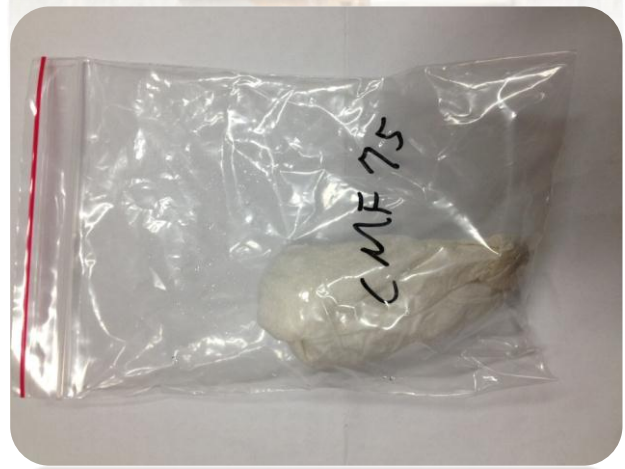
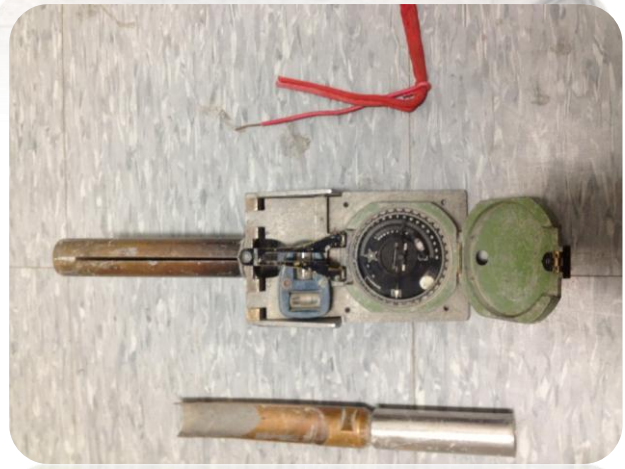


# Field work

2012.6.25 ~ 2012.6.29







# Specimen list

► 25 sites



Fault  
zone  
(6 sites)

Fold zone  
(13 sites)

Damaged zone  
(6 sites)



# ▶ 77 cores



143 specimens(135 reliable)



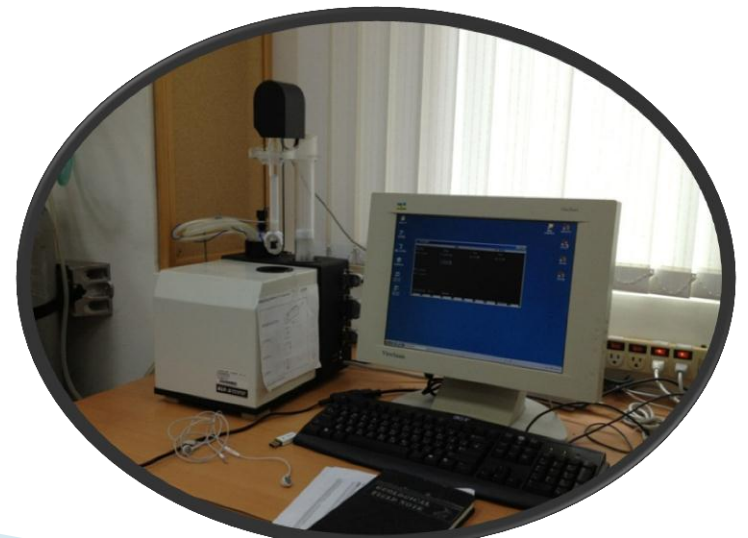
AMS :135  
Low Temp:10  
High Temp:6

# Experiments

## Anisotropy of magnetic susceptibility (AMS)

To get the value of  $K_1, K_2, K_3$ , intensity, anisotropy, lineation, foliation...

Showing axes orientation of ellipsoids in stereonet



# Experiments

For determining the kinds of minerals like magnetite, hematite, pyrrhotite...

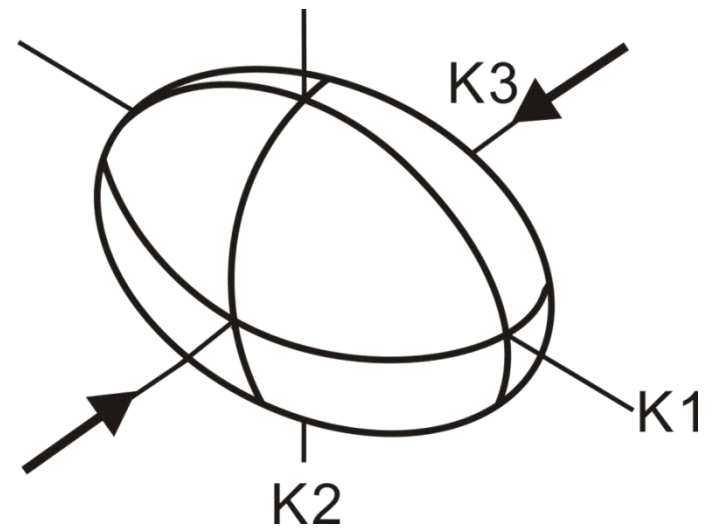
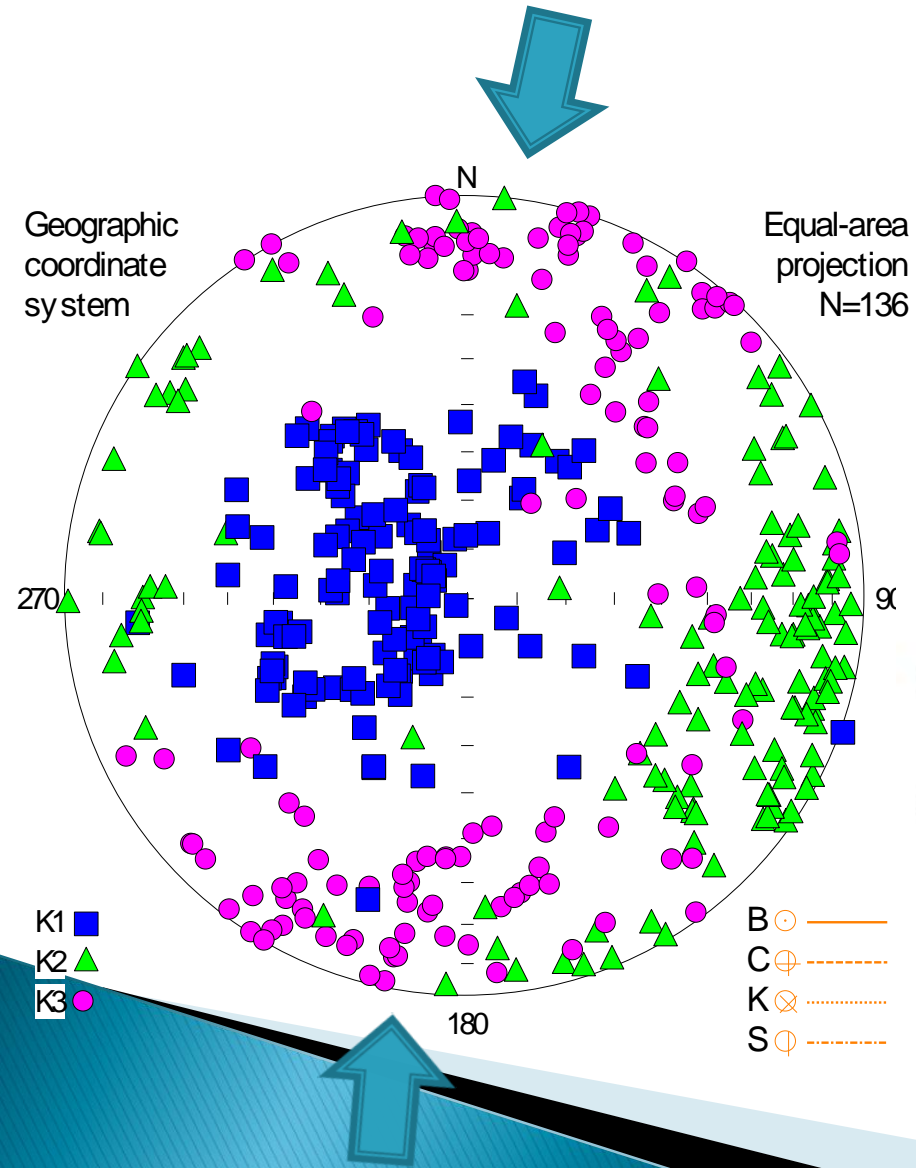
In order to move out the magnetic of the minerals, we up the temperature to  $700^{\circ}\text{C}$  or down to  $-190^{\circ}\text{C}$



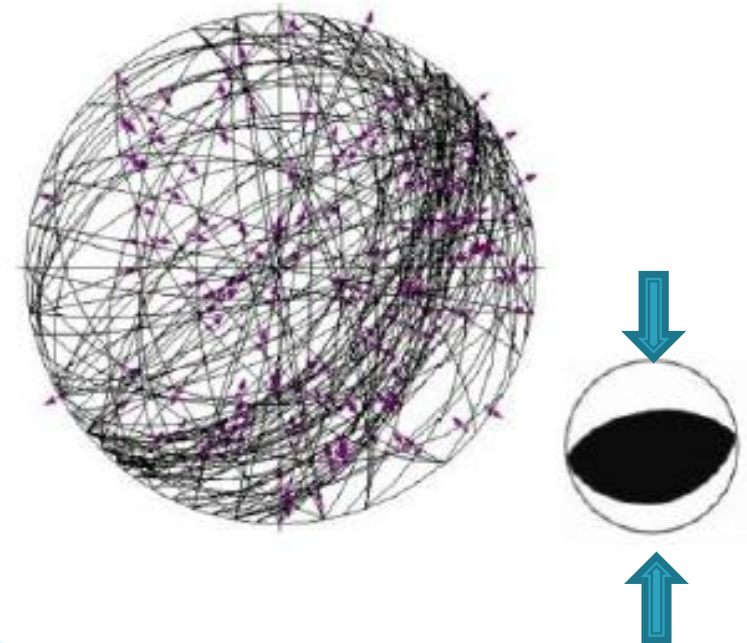


# Result

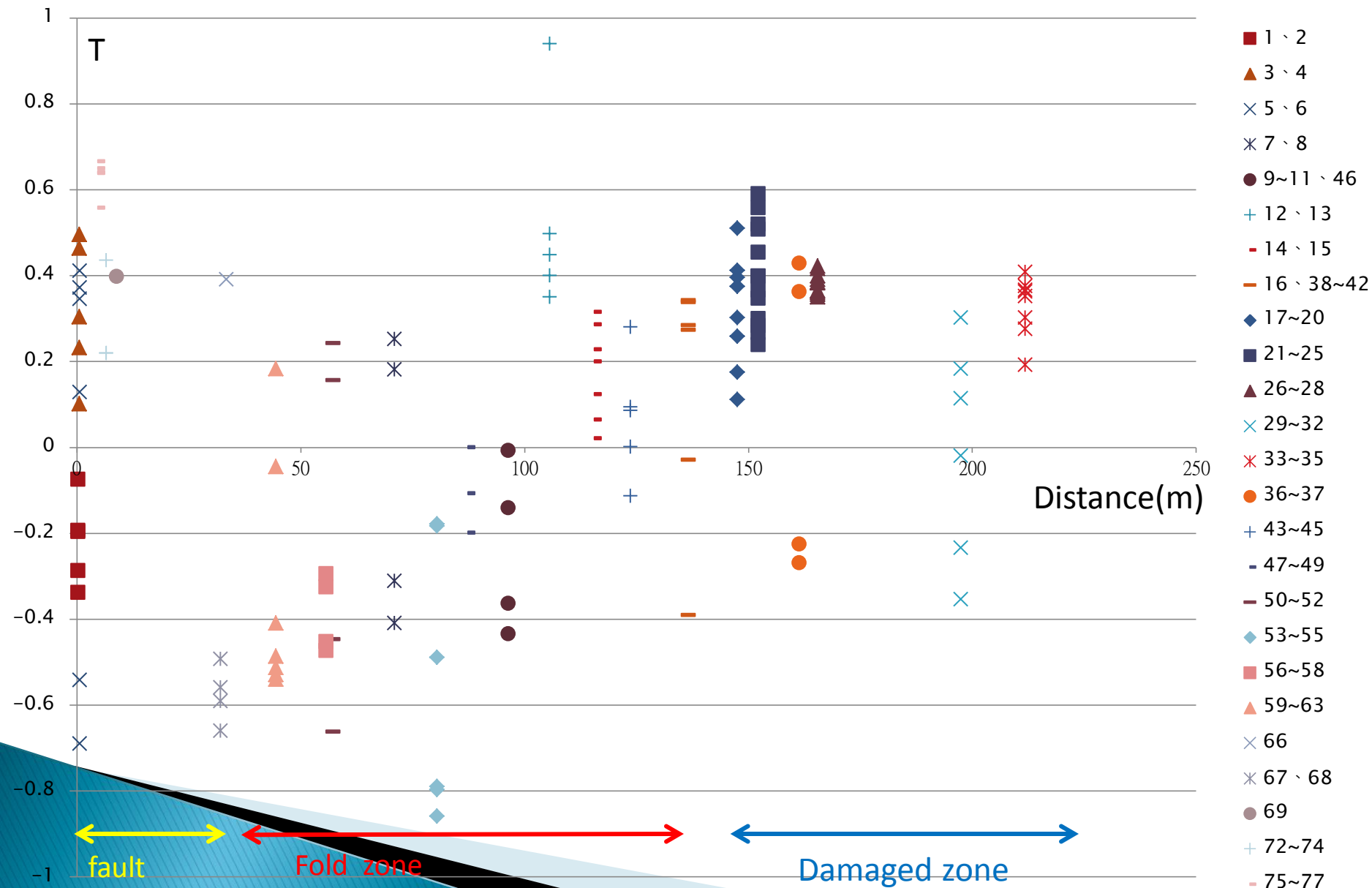
## AMS - stereonet



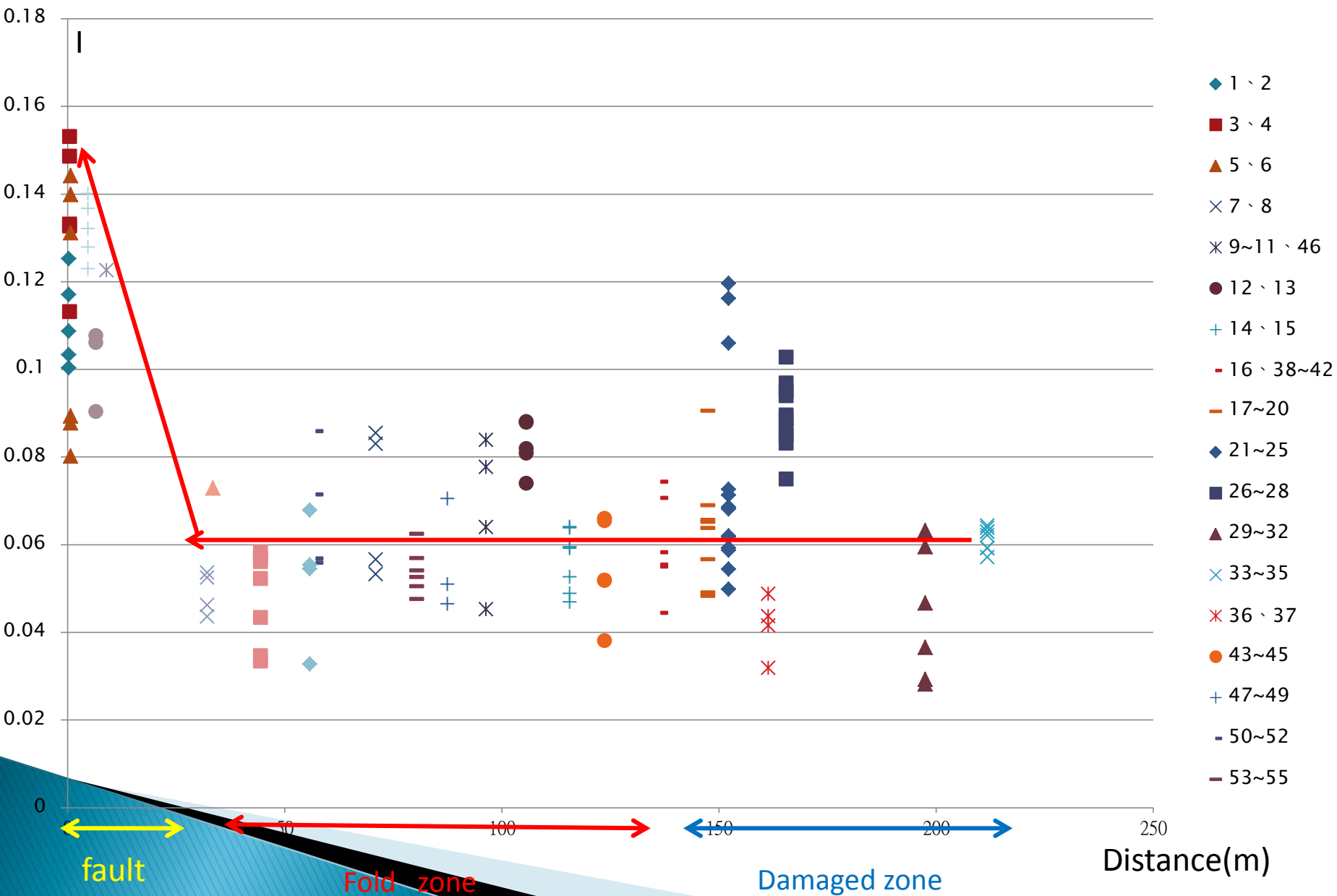
All specimen in geographic coordination



# Shape parameter (T)-Distance(D)



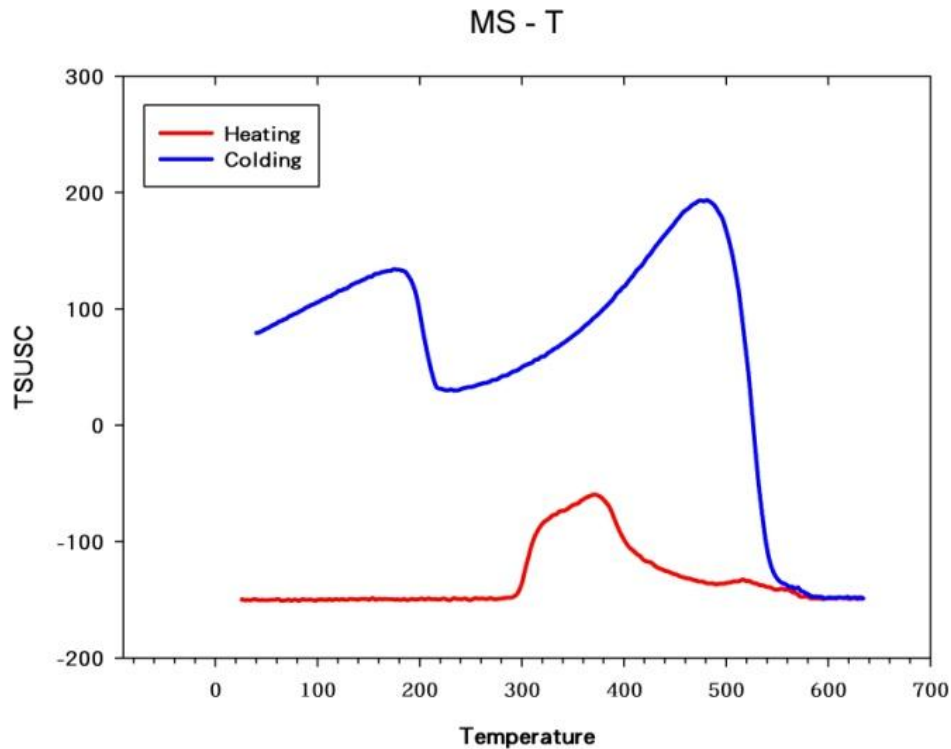
# Distance(D)-Intensity(I)



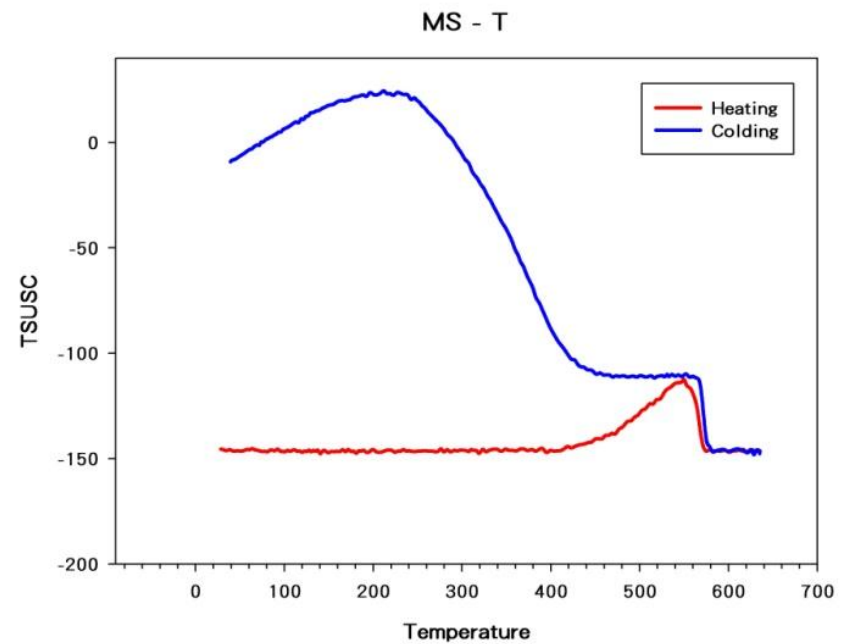


# Discussions

**Pyrrhotite**  
(about 300~400°C)

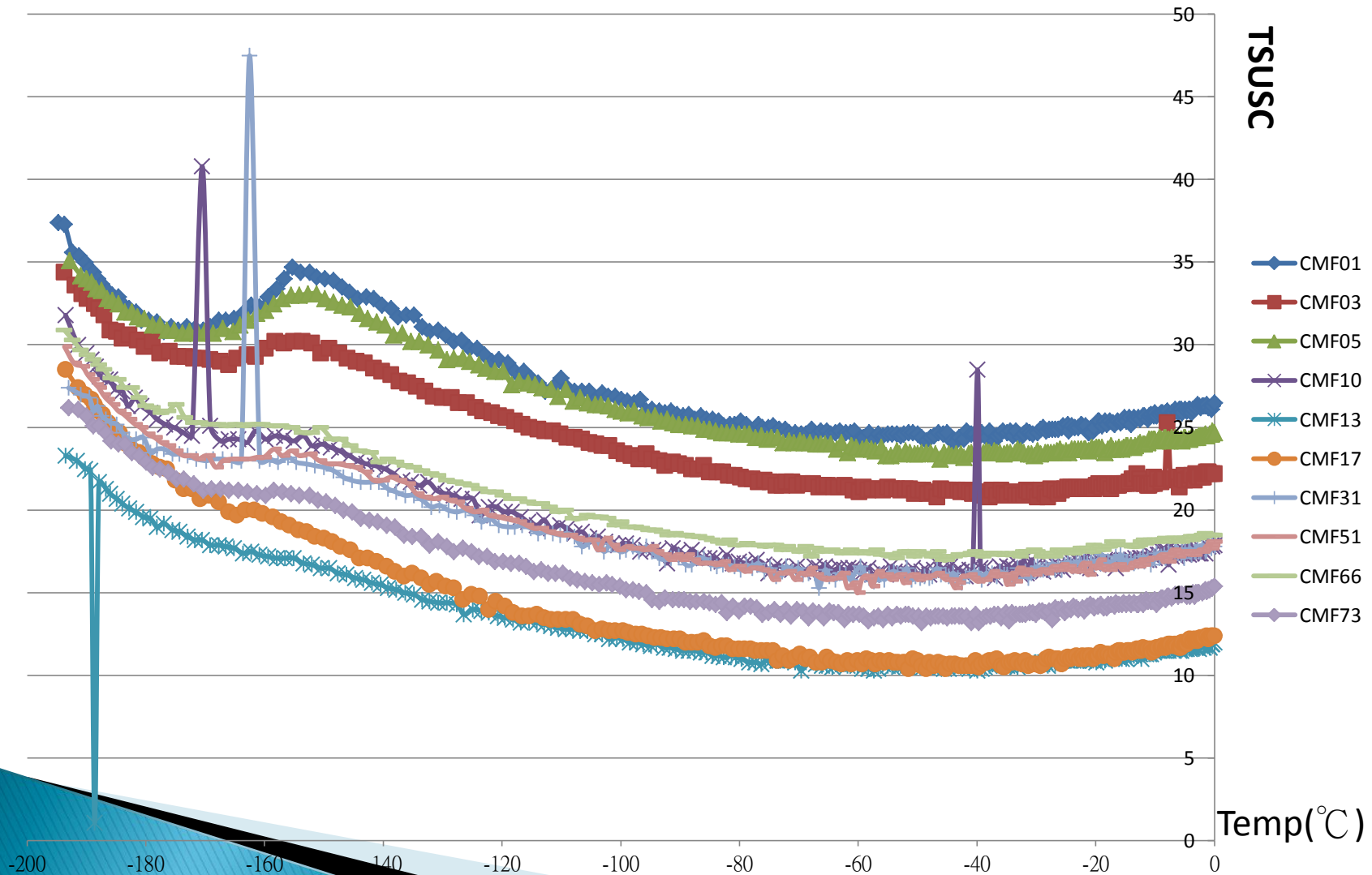


**Magnetite**  
(about 525°C ~ 600°C)



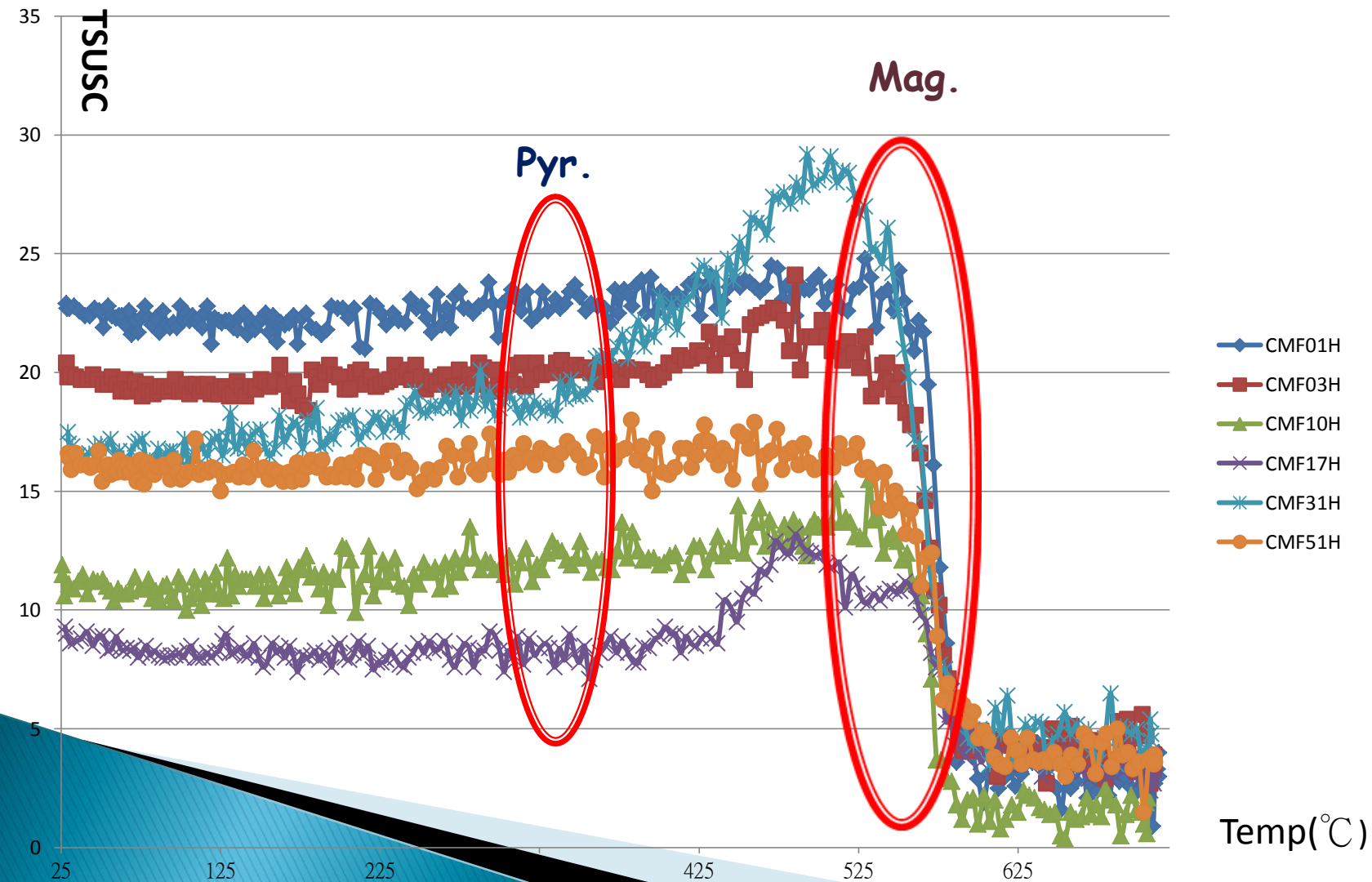
(Siao-Jyun Peng , 2011)

# Temperature-function magnetic susceptibility (0°C ~190°C)



# Discussions

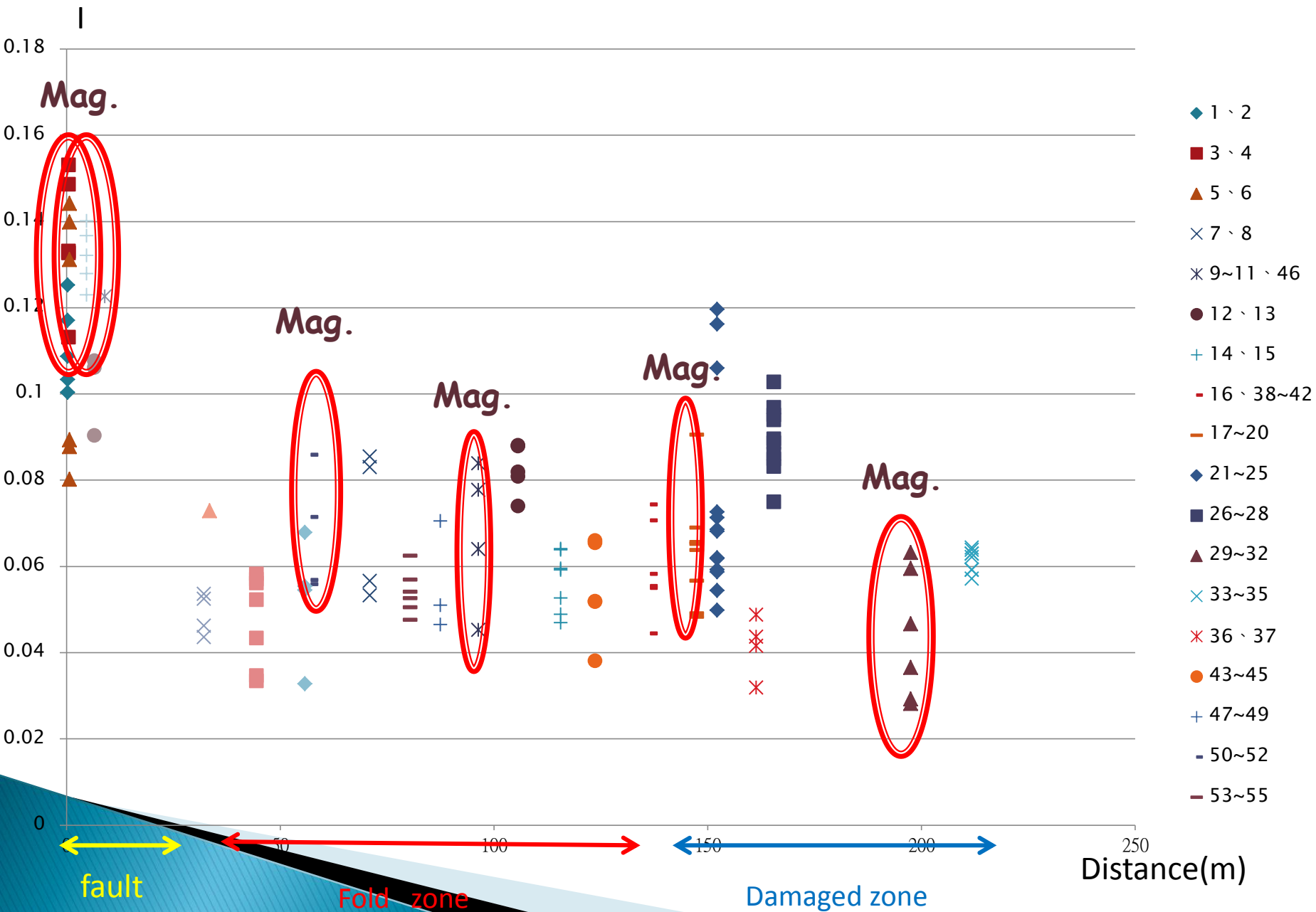
Temperature-function magnetic susceptibility (25~700)



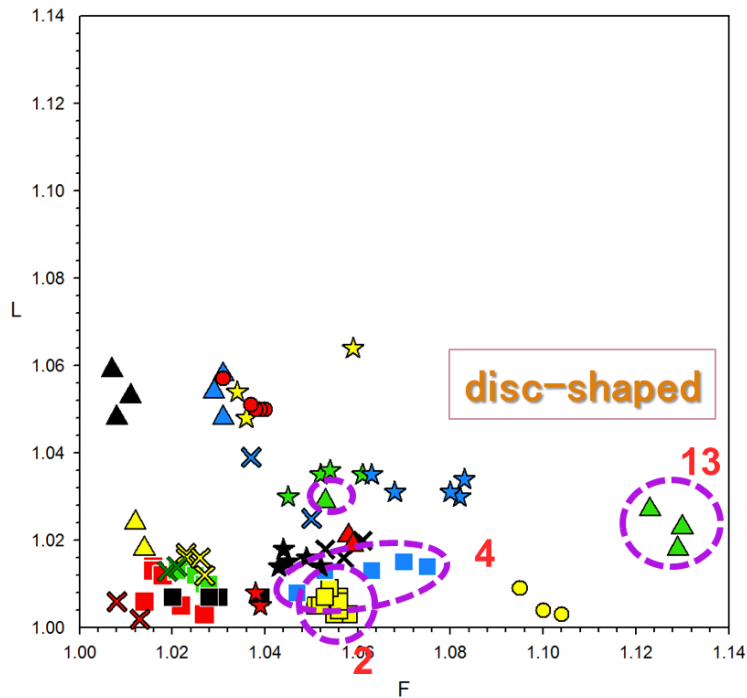
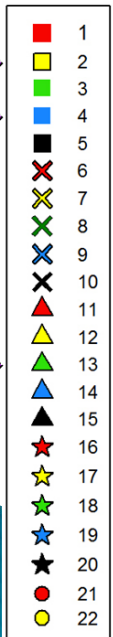
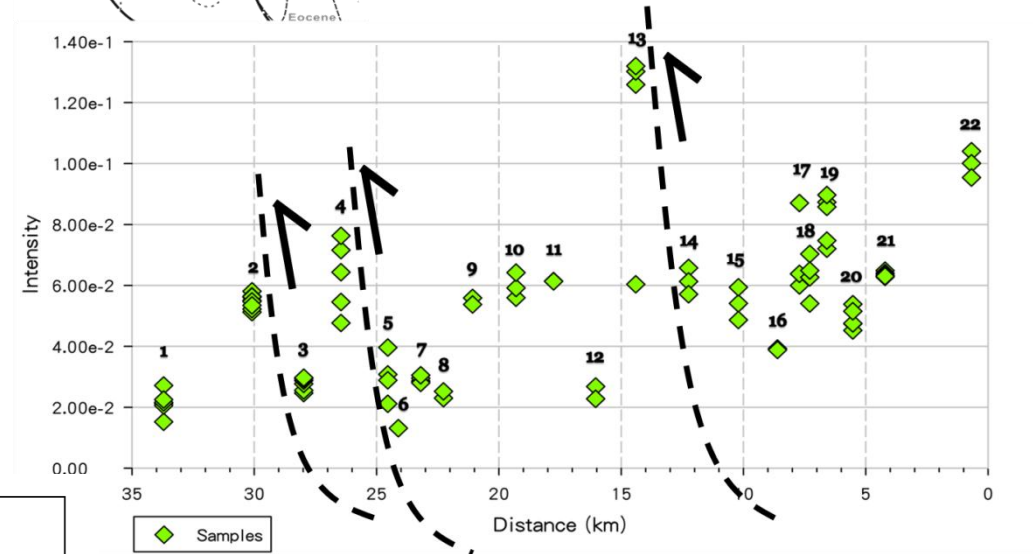
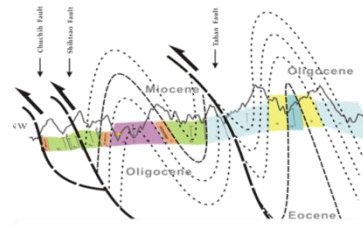


# Discussions

Distance(D)-Intensity(I)

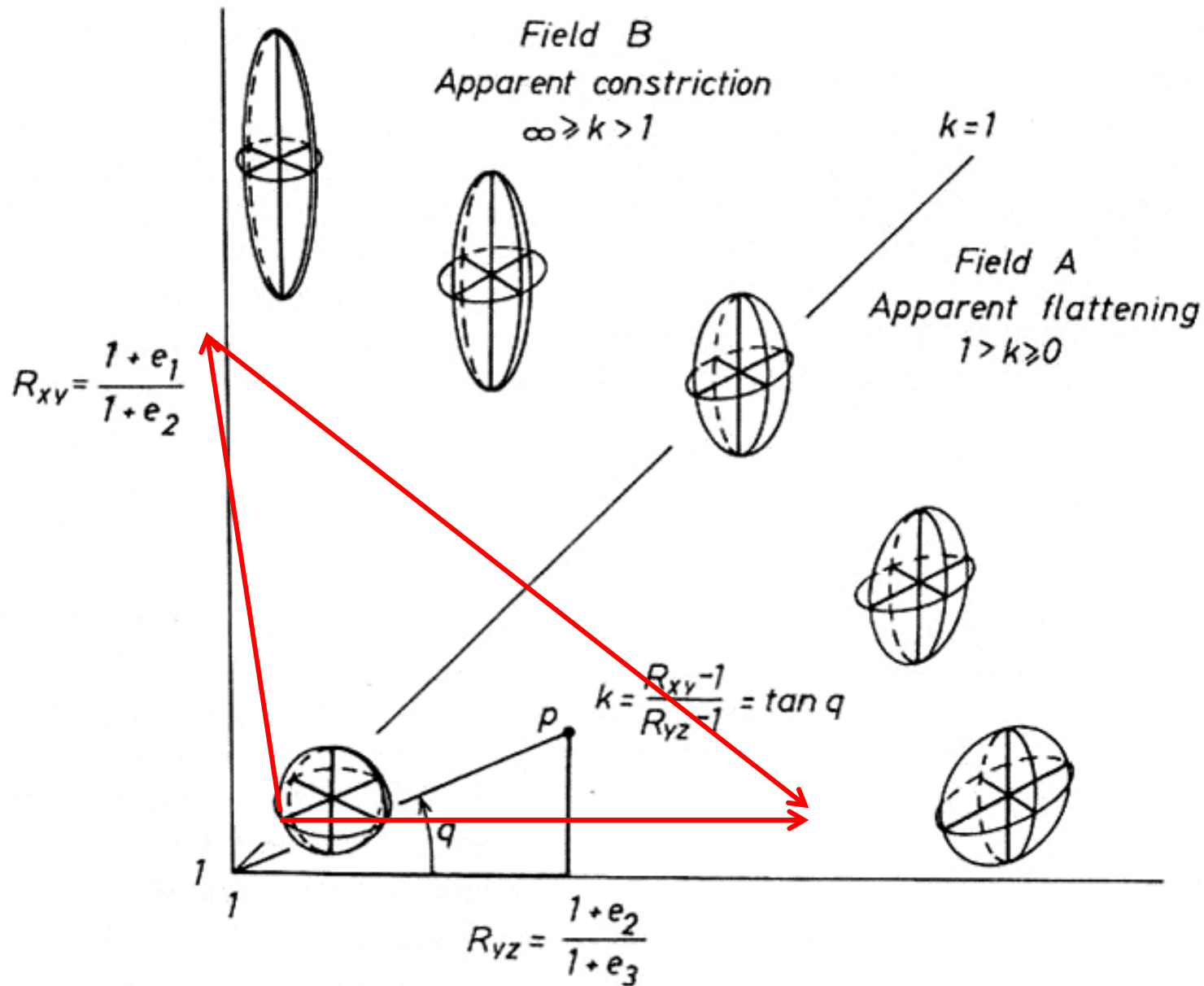


# Discussions



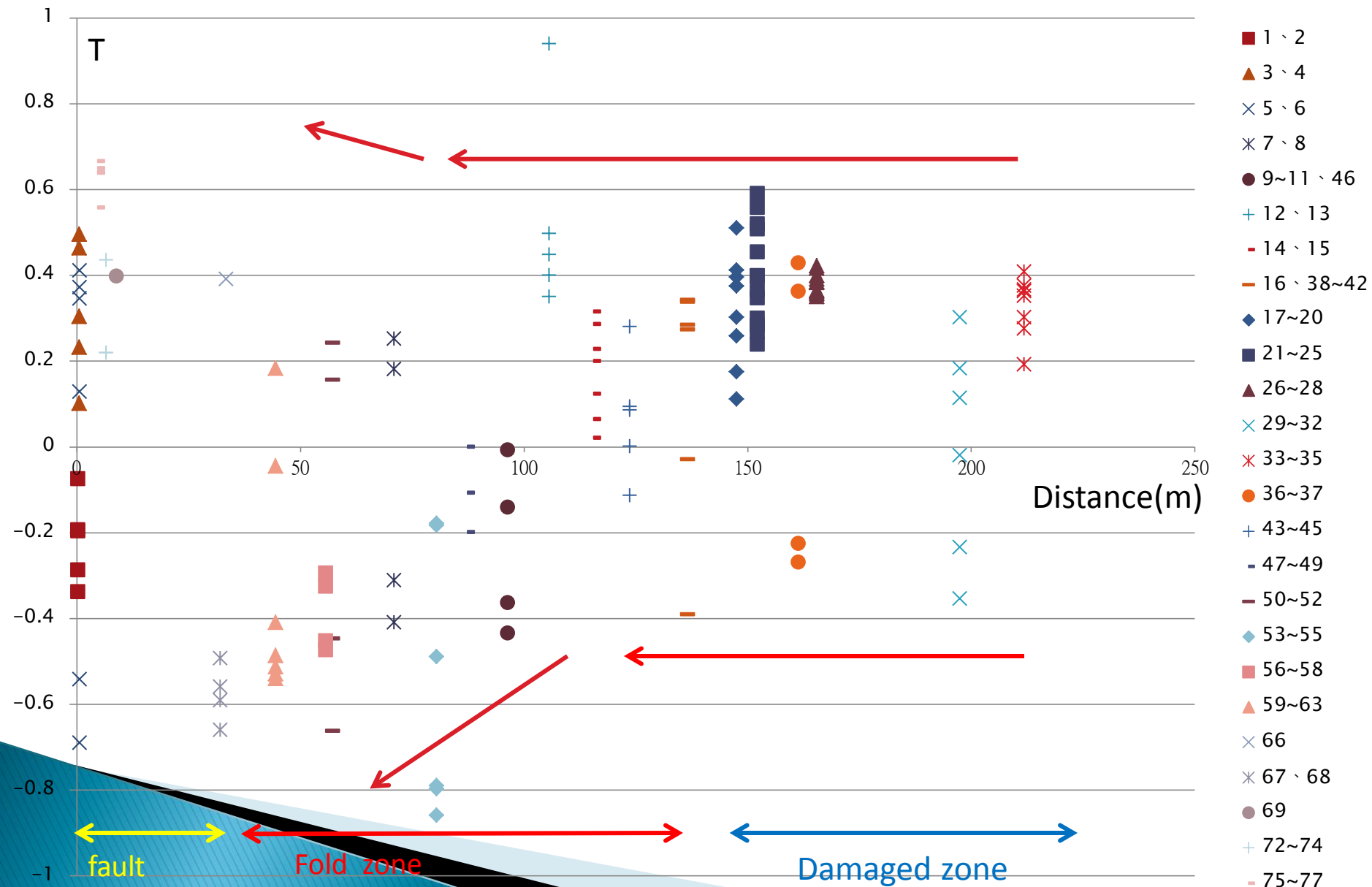
(Siao-Jyun Peng , 2011)

# Discussions

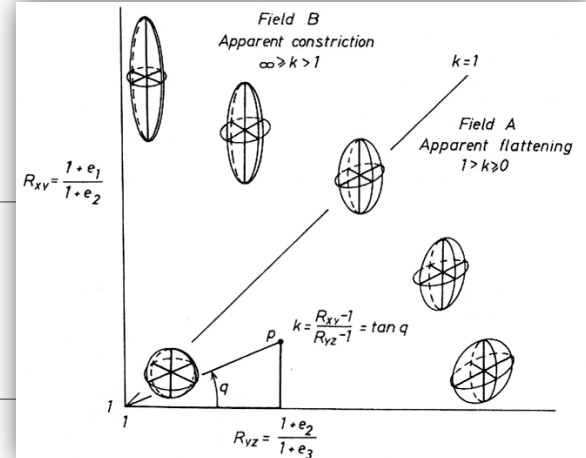
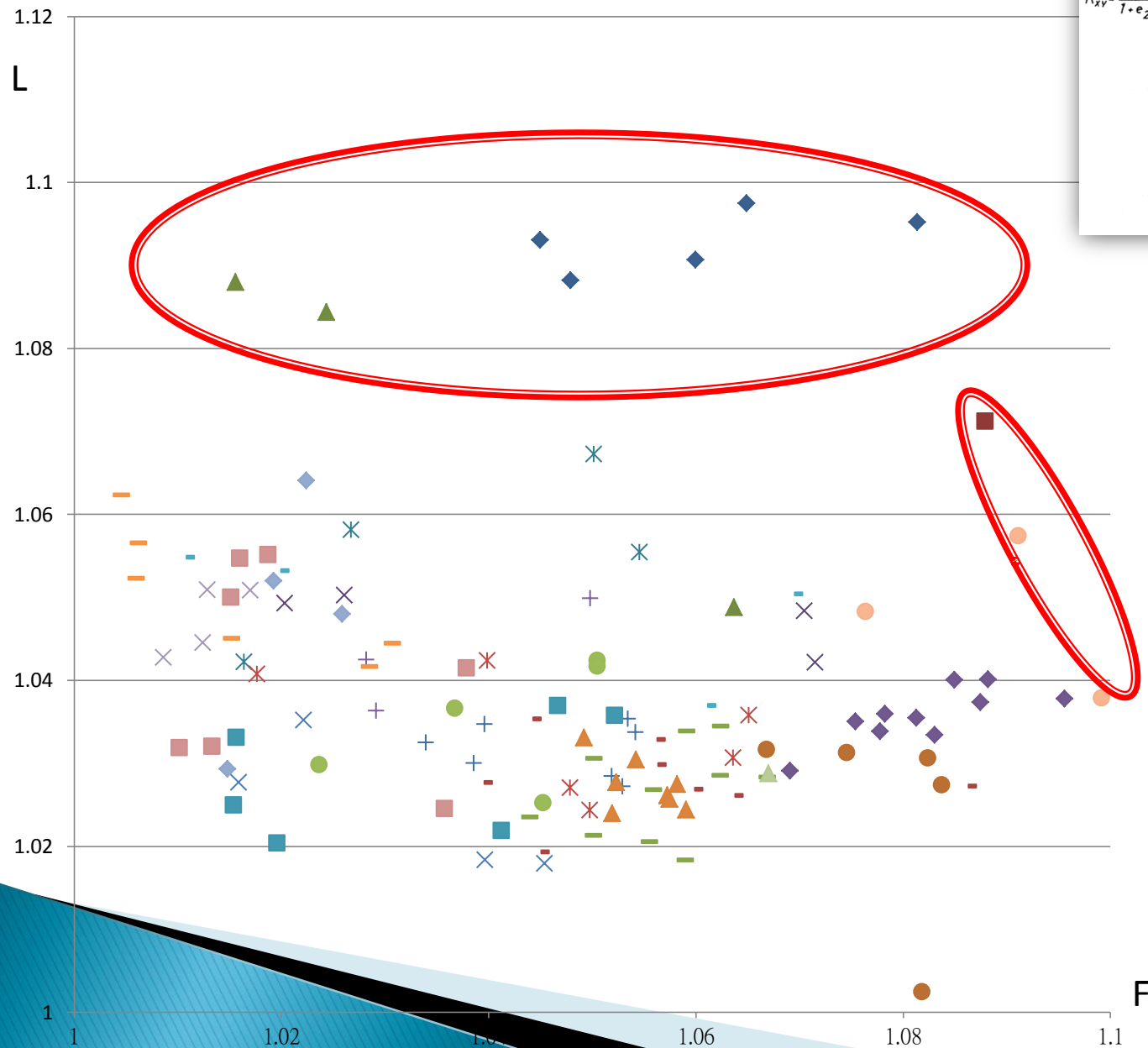




# Shape parameter (T)-Distance(D)

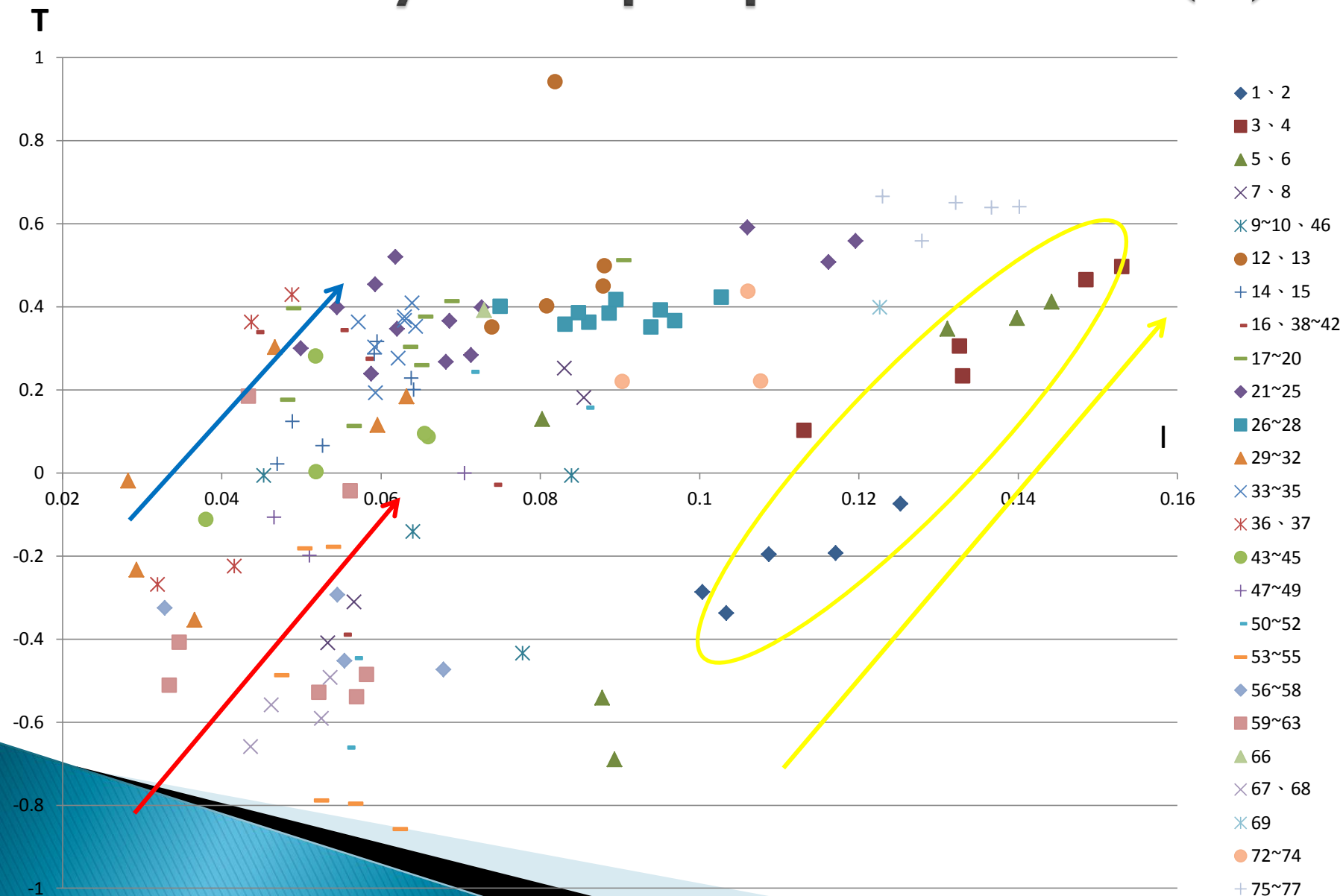


# Foliation-Lineation



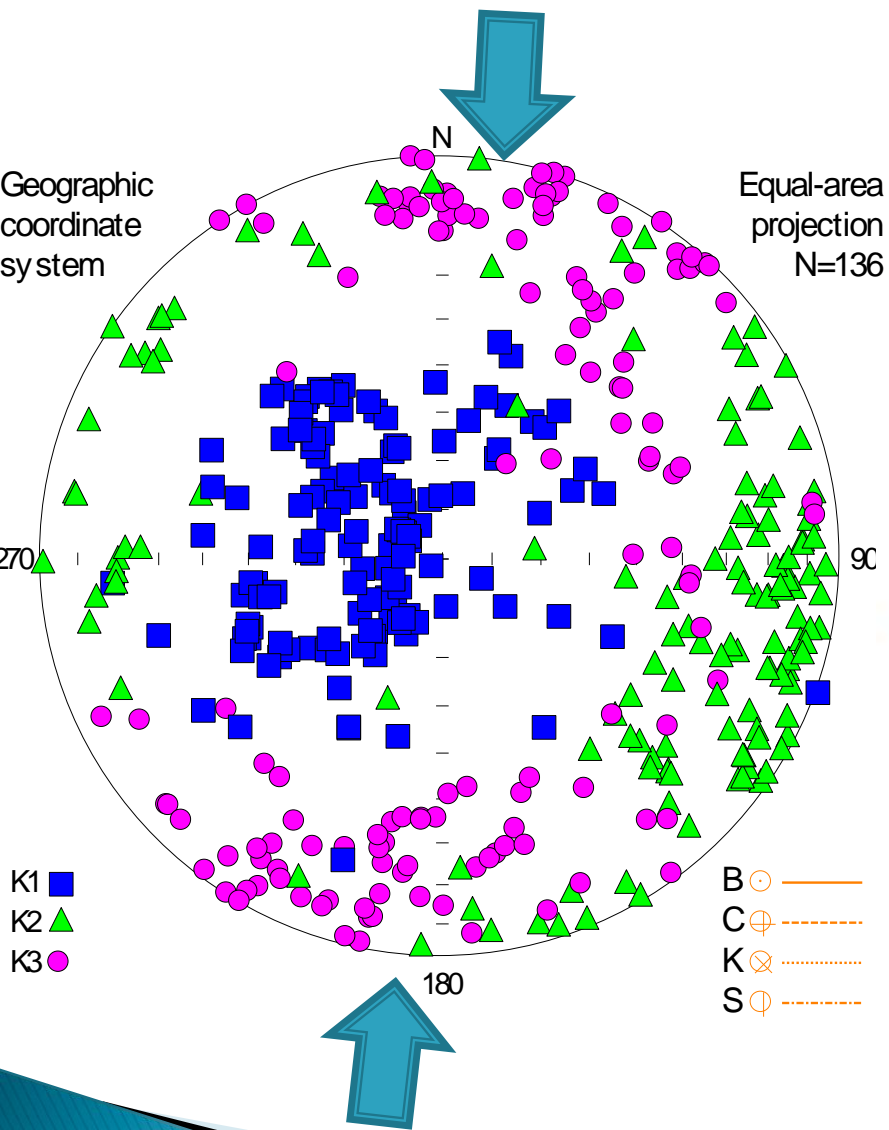
- + 14、15
- 17~20
- 21~25
- ◆ 26~28
- 29~32
- ▲ 33~35
- × 36、37
- × 16、38~42
- 43~45
- + 47~49
- 50~52
- 53~55
- ◆ 56~58
- 59~63
- ▲ 66
- × 67、68
- × 69
- 73、74
- + 75~77

# Intensity-Shape parameter (T)

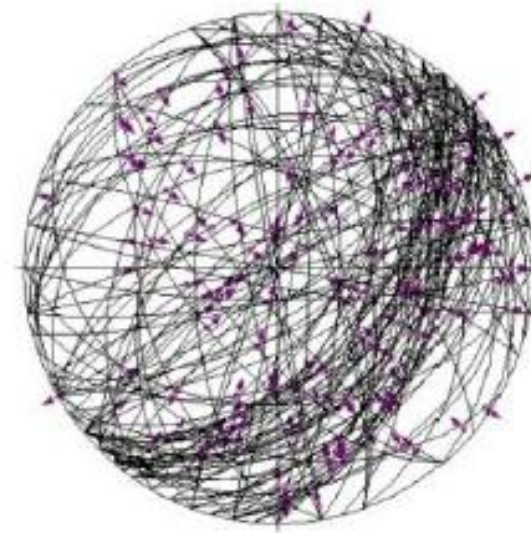




# Conclusion

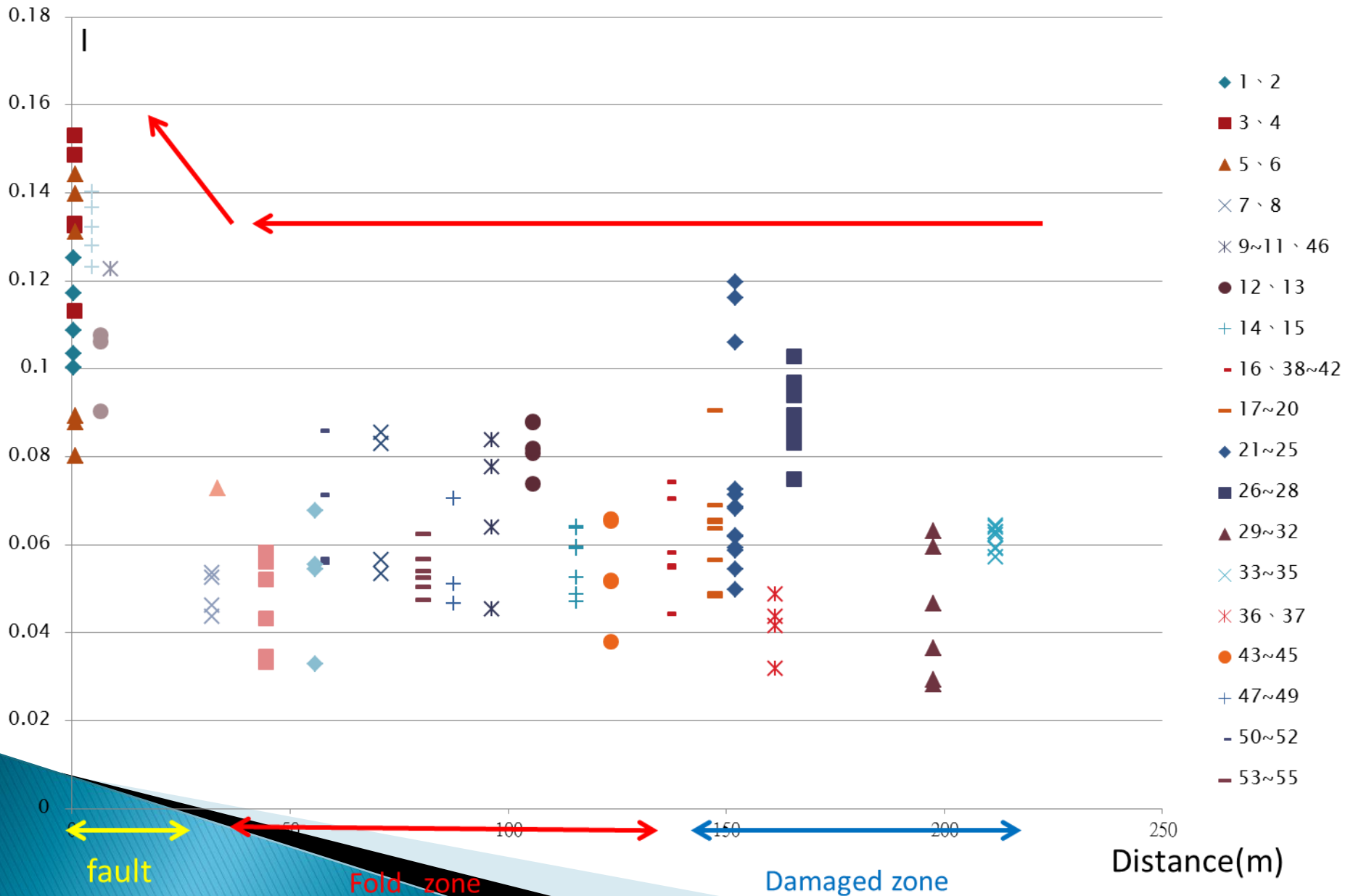


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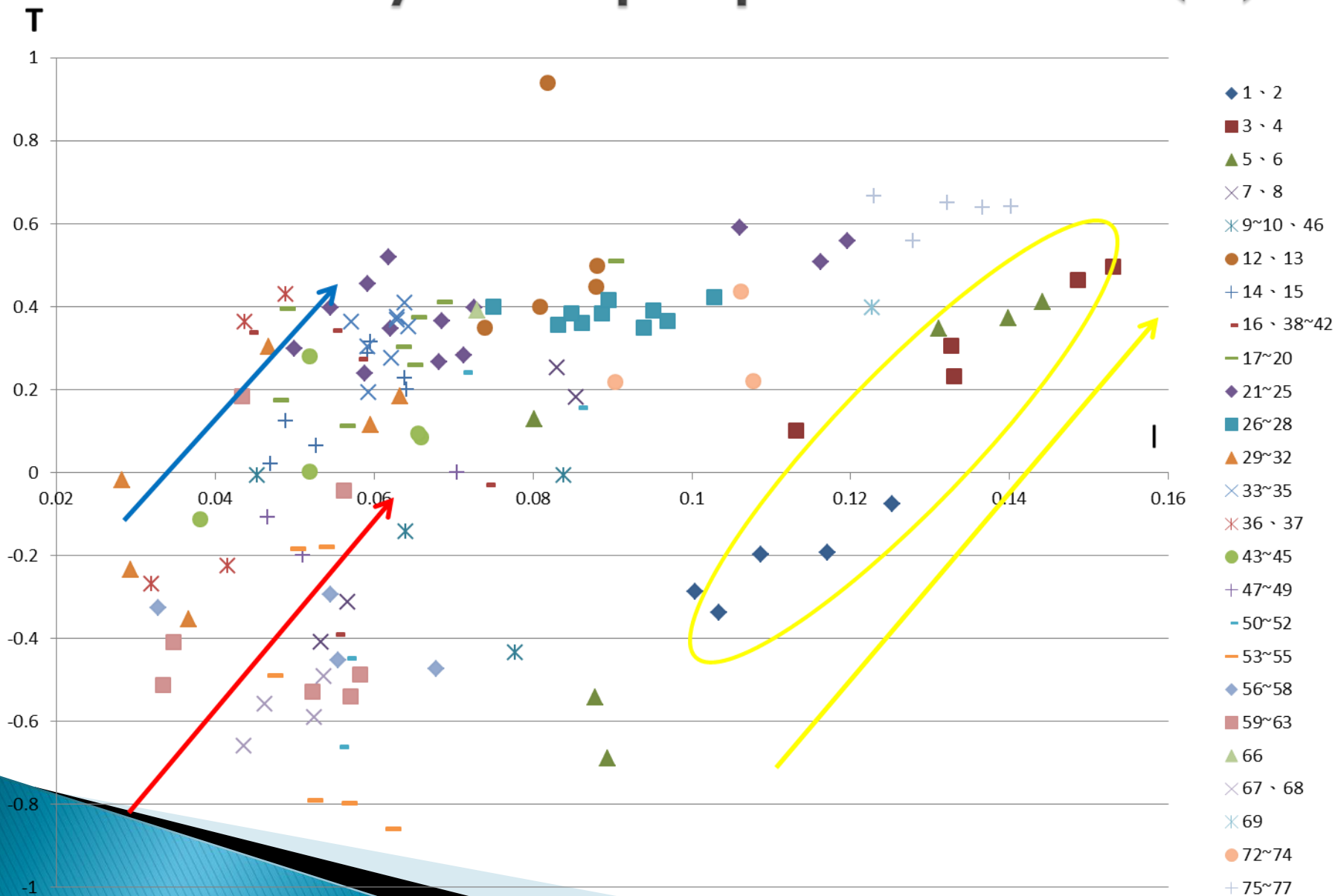


(Szu-Ting Kuo, 2011)

# Distance(D)-Intensity(I)



# Intensity-Shape parameter (T)





Thank you for your listening

