

台灣東部花東縱谷場址分析及陷波
的可能性之探討



The site effect and the
possibility of trap wave in
the Longitudinal valley of
eastern Taiwan

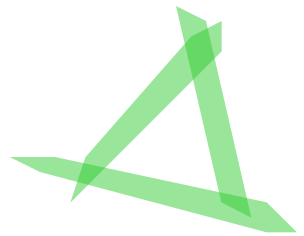
Speaker: Kuei-Mei Lin





報告重點

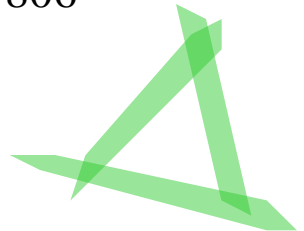
- ✿ 研究動機、目地
- ✿ 研究區域、背景
- ✿ 研究方法與結果
- ✿ 場址分析
- ✿ 陷波分析
- ✿ 小結



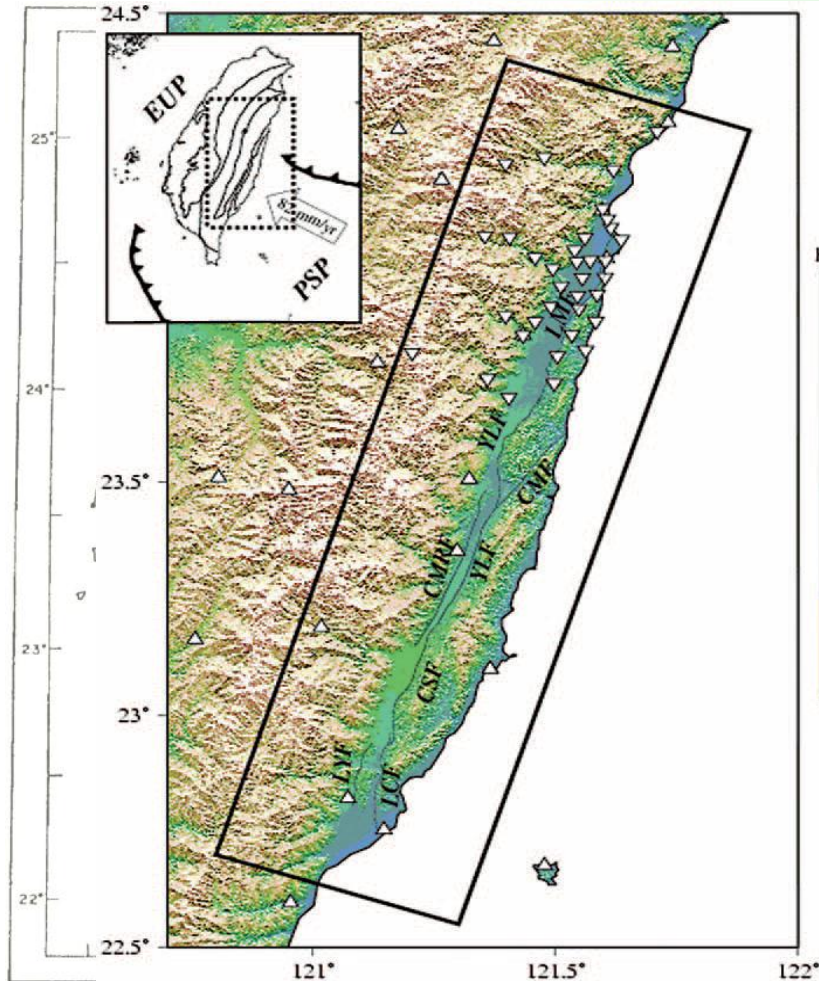


研究動機、目地

- 方春榮 (1994) 局部地質構造對震波傳遞的影響, 中大地物所碩士論文
- Li, Y. G., John E. Vidale and Elizabeth S. Cochran (2004) Low-velocity damaged structure of the San Andreas Fault at Parkfield form fault zone trapped waves. *Geophysical Research Letters*, **31**, L12S06
- Li, Y. G., Chen, P., Cochran, E. S., Vidale, J. E., and Burdette, T., (2006). Seismic evidence for rock damage and healing on the San Andreas Fault associated with the 2004 M6.0 Parkfield earthquake, *Bull. Seism. Soc. Am.*, 96, 349-363
- Takashi Mizuno (2003) The subsurface observation of fault-zone trapped waves: applications to investigations of the deep structure of active faults. *Bull. Earthq. Res. Inst. Univ. Tokyo*, **78**
- K. H. Kim, J. M. Chiu, J. Pujol, and K. C. Chen (2006) Polarity reversal of active plate boundary and elevated oceanic upper mantle beneath the collision suture in central eastern Taiwan. *Bull. Seism. Soc. Am.* **96**, No. 3, 796-806



研究區域、背景



台灣地質分區(何春蓀, 1986)

- I 澎湖群島
- II 濱海平原
- III 西部麓山地質區
- IV 中央山脈西翼地質區
 - IVa 雪山山脈帶
 - IVb 脊樑山脈帶
- V 中央山脈東翼地質區
 - Va 太魯閣帶
 - Vb 玉里帶
- VI 東部縱谷
- VII 海岸山脈地質區

山帶
(象)

(Angelier, 1986.)
(Kim et al., 2006)



研究方法與結果_場址分析


測站資料(位置、鑽井資料)

搜尋2005~2009年, 測站PGA值<30gal的地震資料

基線修正

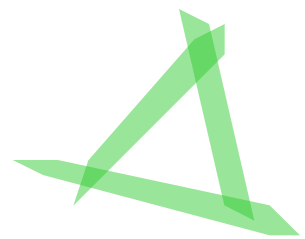
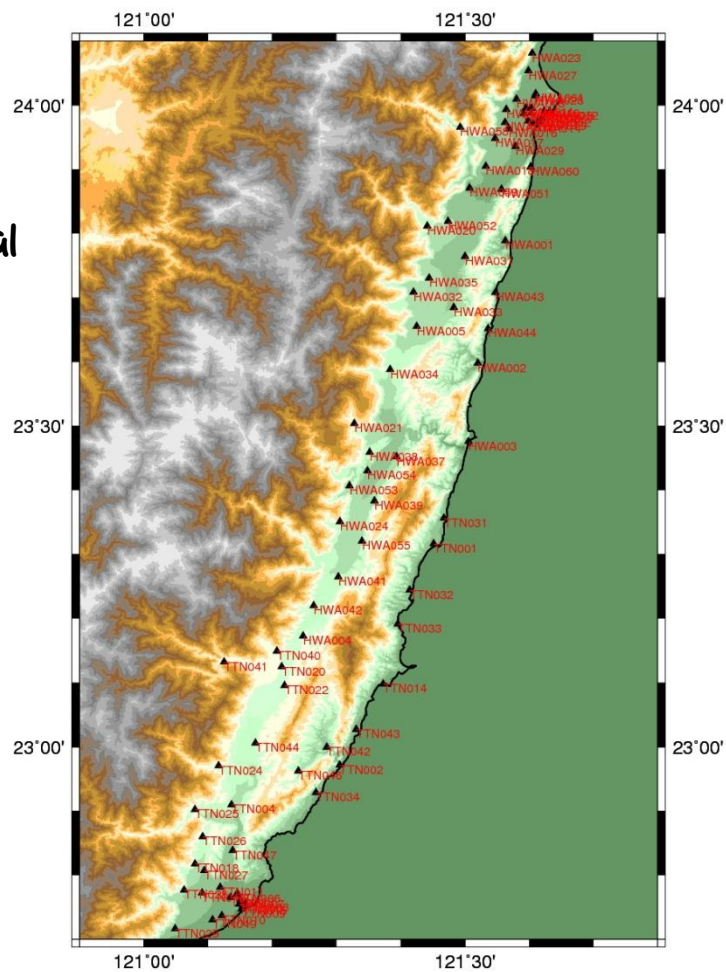
選取S波波段做H/V計算

挑選主頻



資料來源與選取

- @ TSMIP stations
- @ 2005~2009
- @ Station DGA < 30gal



分析方法：Nakamura(1989) 單站頻譜比法

$$R(t) = S_0(t) * P(t) * Si(t)$$

震源

路徑

場址

$$A_S(f) = \frac{S_V(f)}{B_V(f)}$$

$$R(f) = S_0(f) \times P(f) \times Si(f)$$

$$S_E(f) = \frac{S_H(f)}{B_H(f)}$$

特定站

$$\frac{R_s(f)}{R_r(f)} = \frac{S_{0s}(f) \times P_s(f) \times S_{is}(f)}{S_{0r}(f) \times P_r(f) \times S_{ir}(f)}$$

$$S_M(f) = \frac{S_E(f)}{A_S(f)} = \frac{\frac{S_H(f)}{B_H(f)}}{\frac{S_V(f)}{B_V(f)}} = \frac{S_H(f)}{B_H(f)} \times \frac{B_V(f)}{S_V(f)}$$

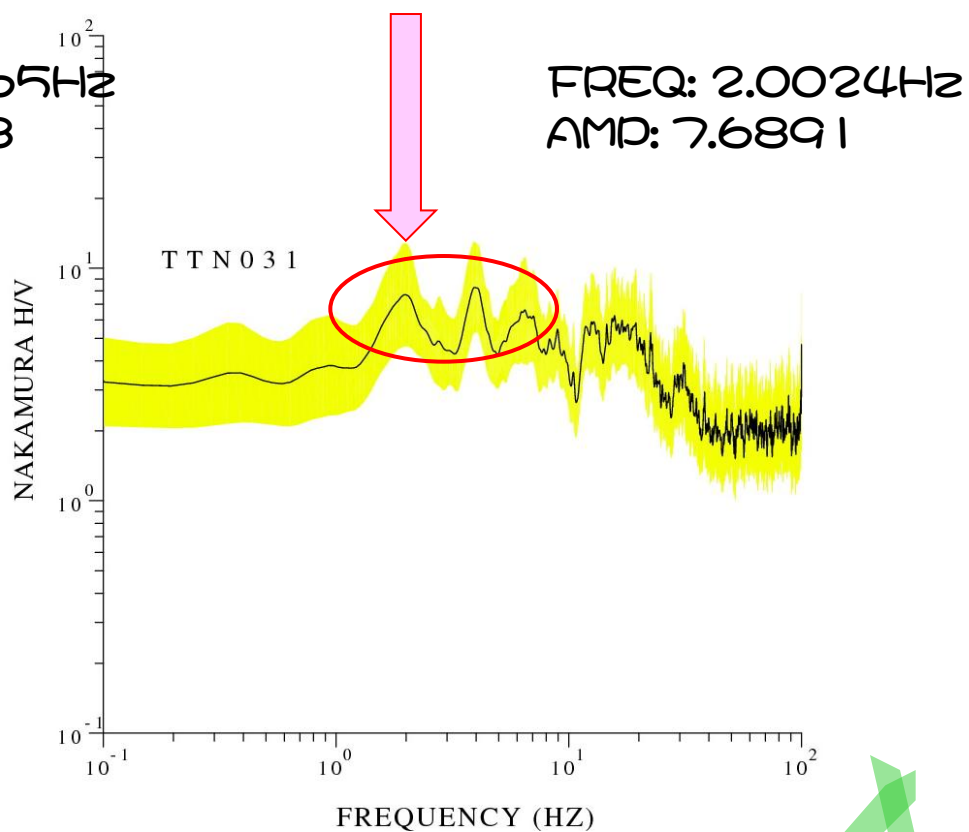
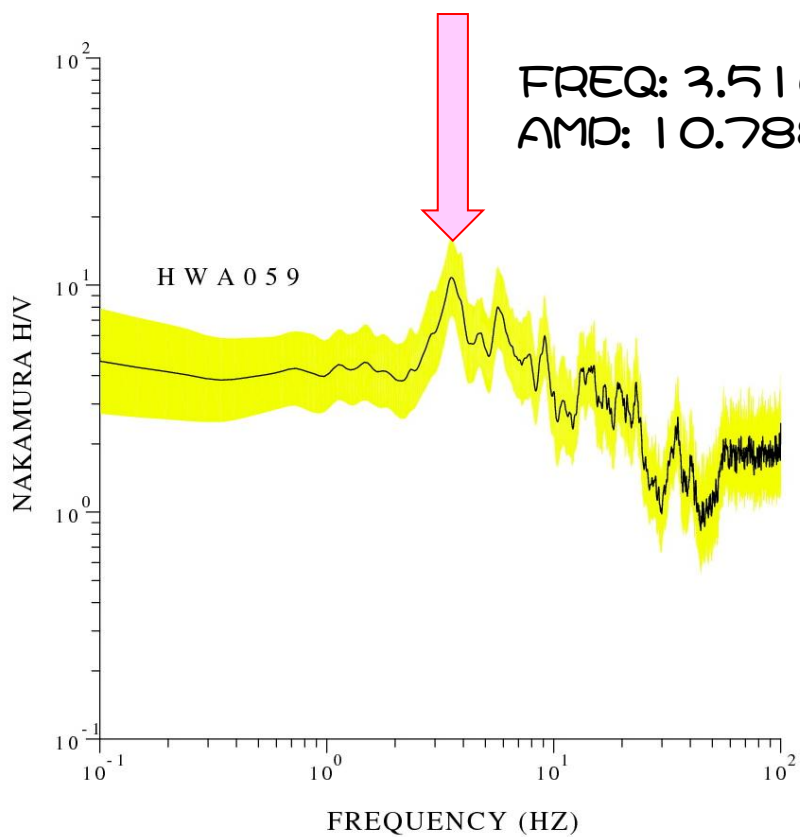
→ 近似於 1

參考站

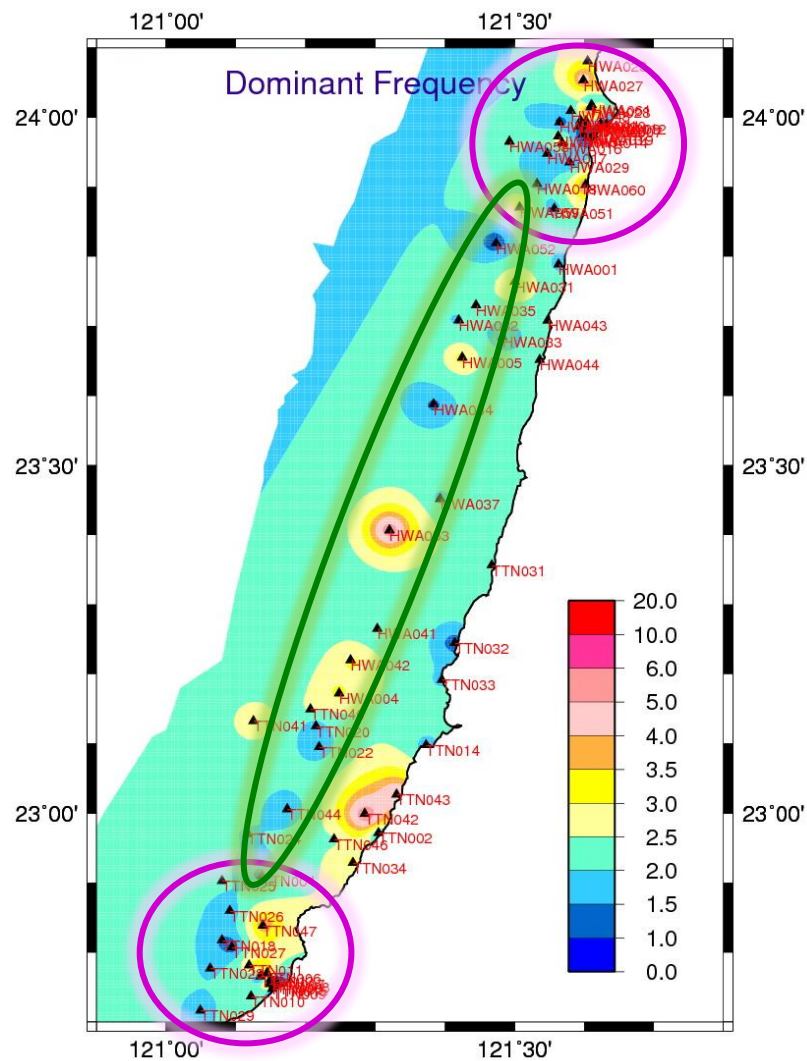
$$\frac{R_s(f)}{R_r(f)} \approx \frac{S_{is}(f)}{S_{ir}(f)}$$


$$S_M(f) \approx \frac{S_H(f)}{S_V(f)}$$

挑選主頻



主頻分佈圖





研究方法與結果_陷波分析

挑選地震資料(時間、規模、震央)



測站接收到的原始加速度資料初步修正



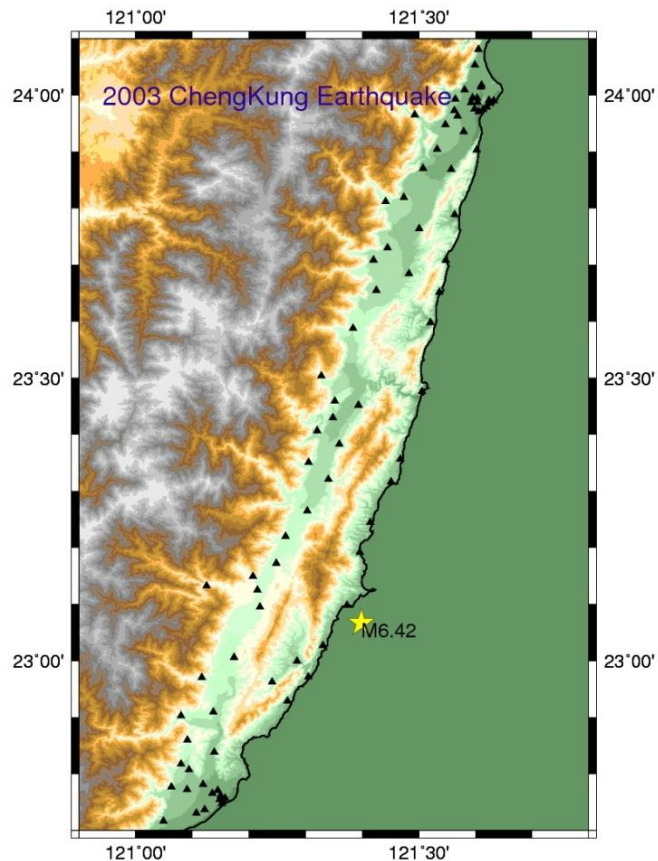
積分至速度項及位移項做觀察



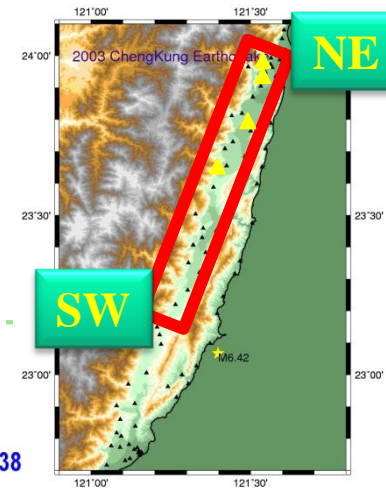
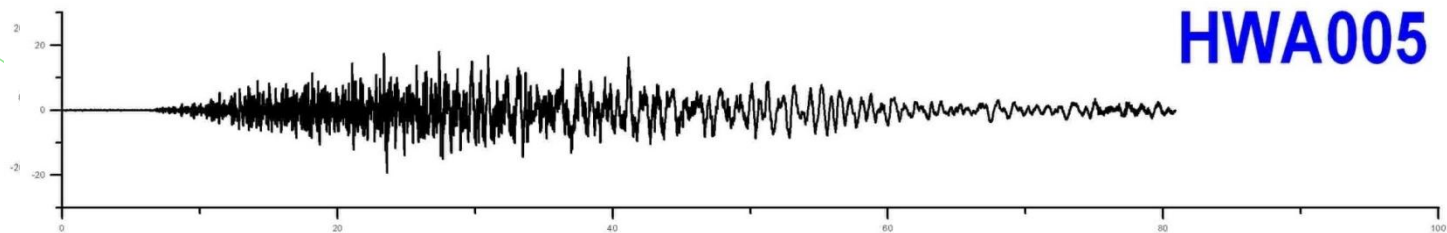
質點運動分析



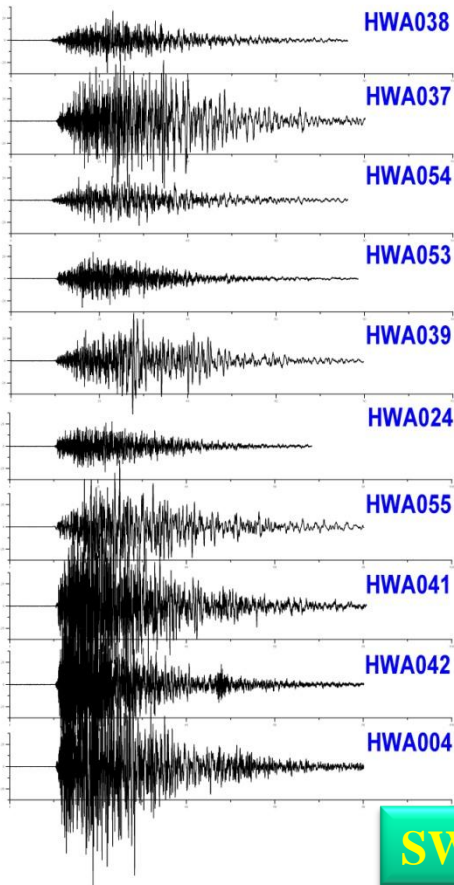
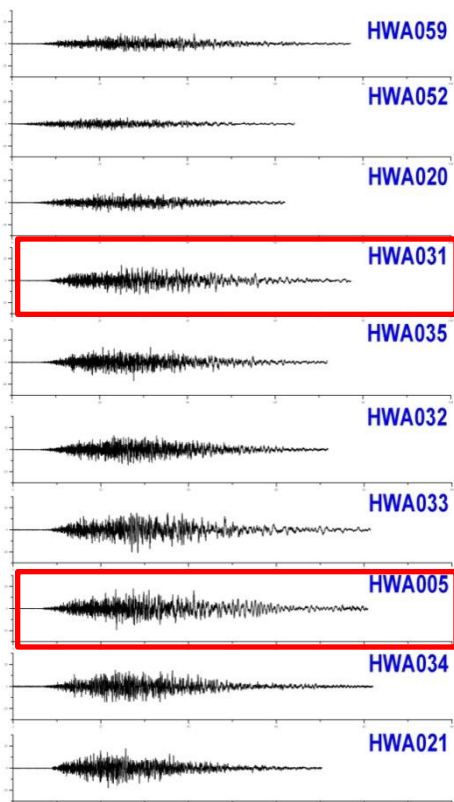
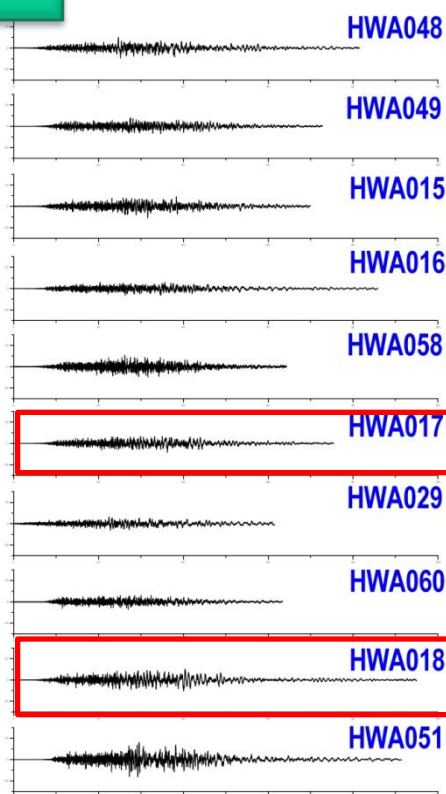
挑選地震資料



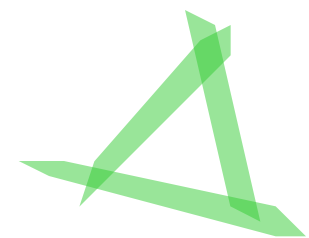
EQDATE	XLON	XLAT	DEPTH(km)	MAG
2003/12/10/04:38:013	121.3982	23.0667	17.73	6.42



NE

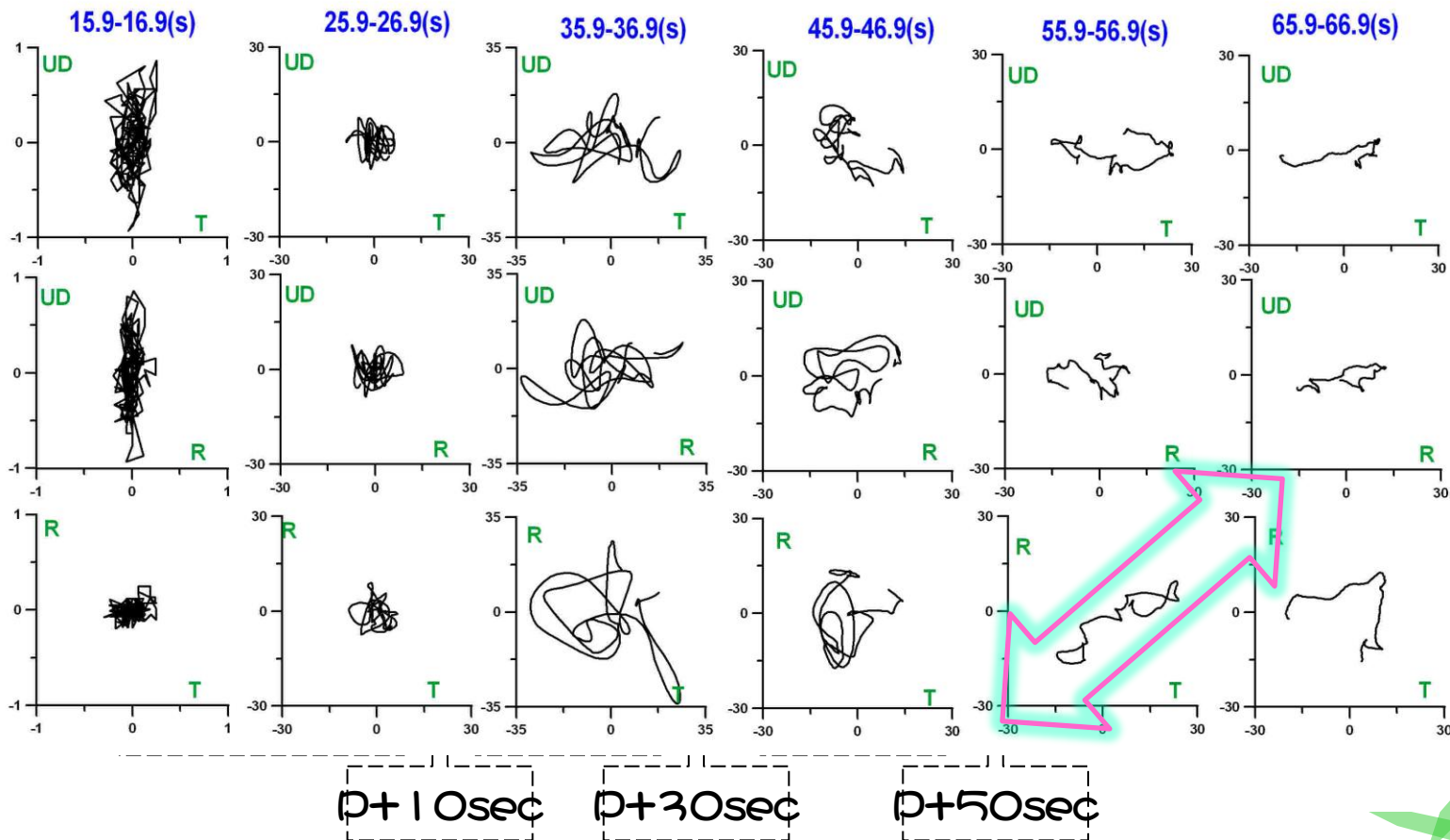


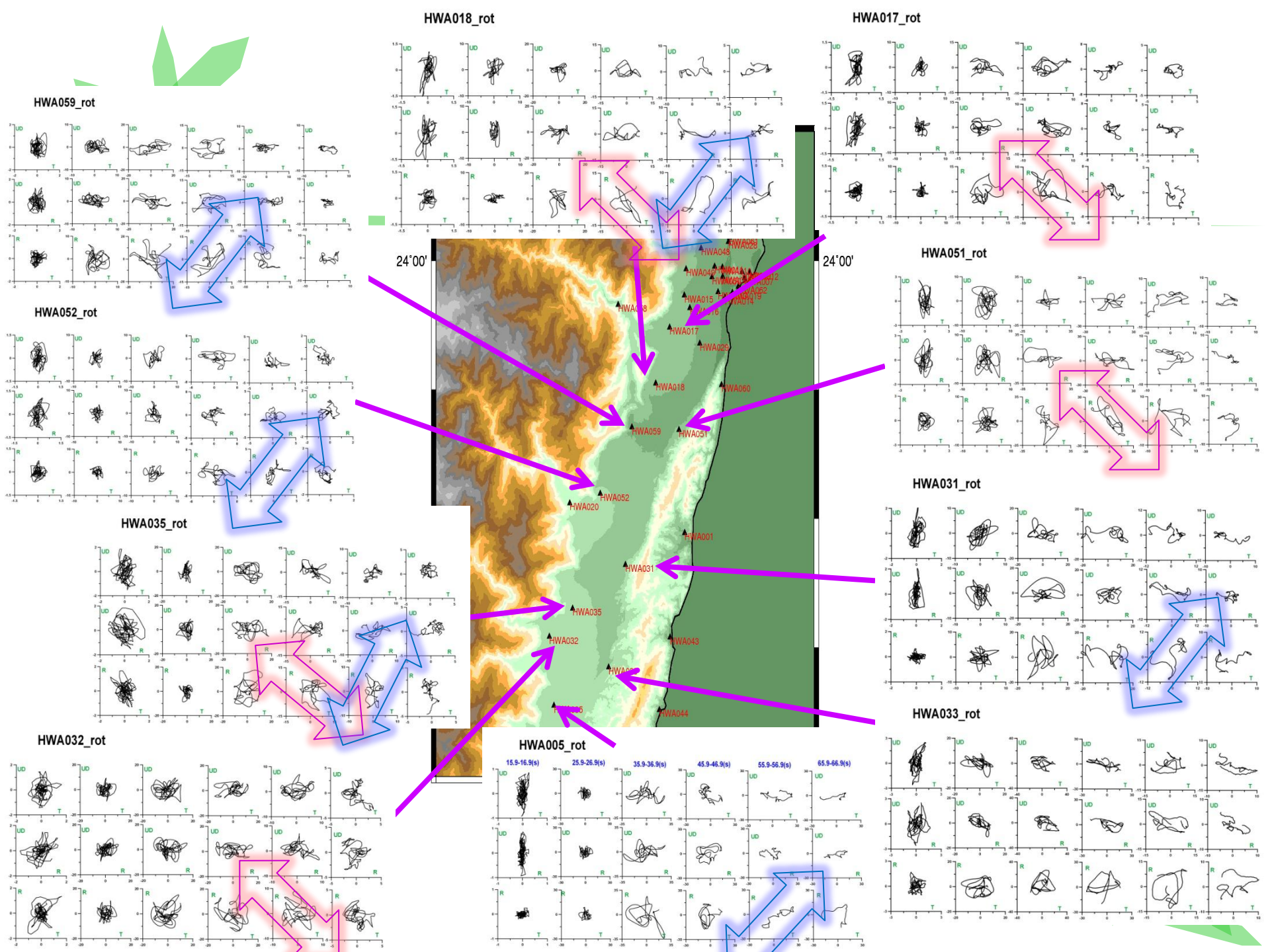
SW




質點運動分析_示範站HWA005

HWA005_rot

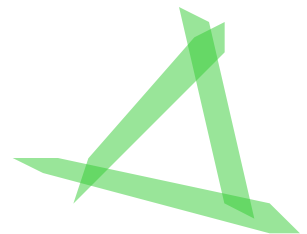






小結

- ✿ 主頻分佈圖中，平原地區主頻值較低，顯示此處有較厚的沖積層；而縱谷中分布不均的主頻值暗示此處構造複雜。
- ✿ 對於該區之主頻解釋還需加入其他研究來加以佐證與釐清。另外因強震站分佈較廣，解析度也是一大考驗。
- ✿ 2003成功地震資料分析中可發現有不同方向之波的傳遞，於此我們可進一步利用其他地震資料加以證實與驗證。





報告完畢。

