

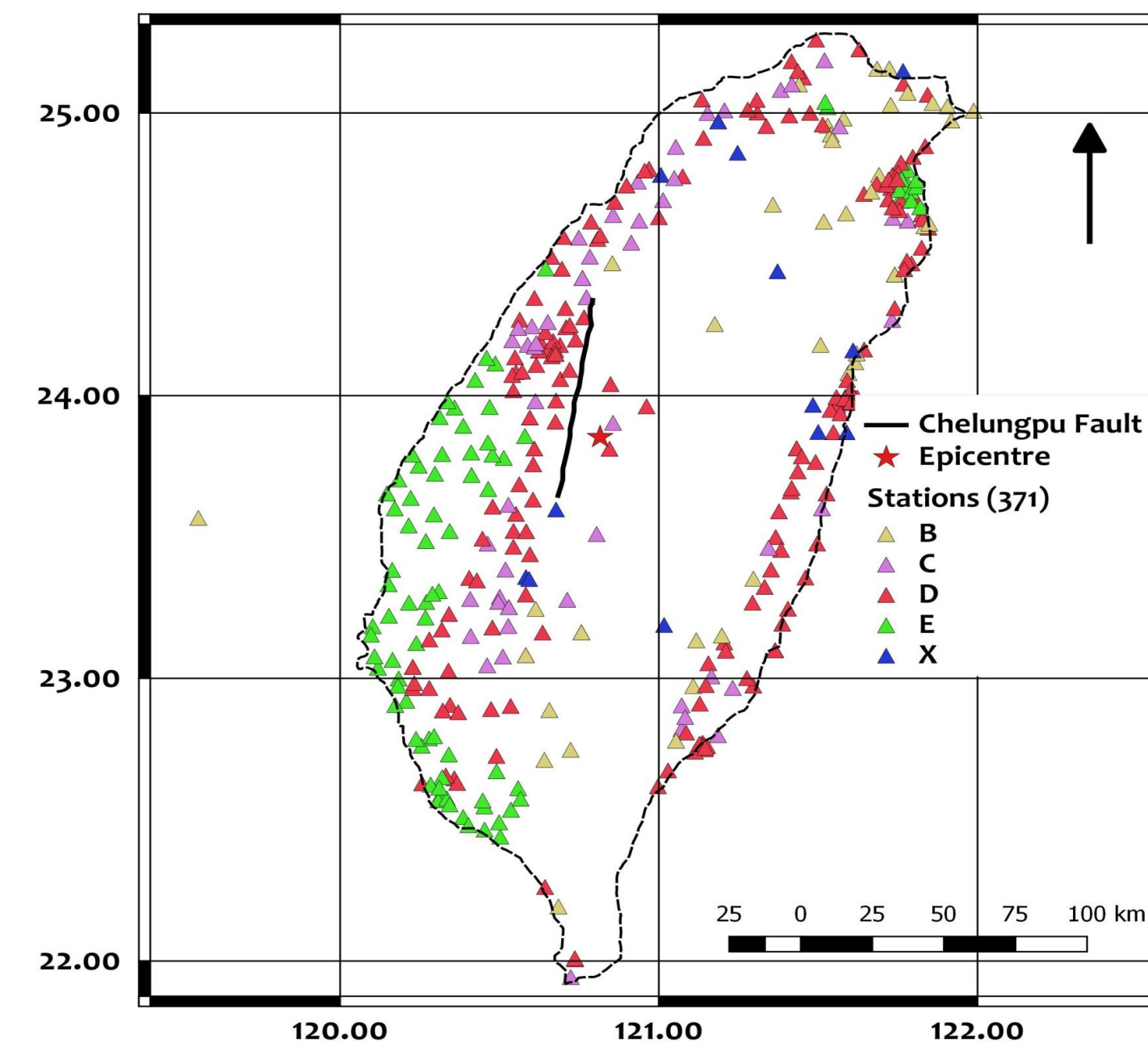
Variation of Characteristics of Ground Motion in Parallel & Normal Directions in Near-Fault Region

Introduction

- Near-Fault Ground Motions
 - Directivity Effect: Predominant in Strike-Slip Faults
 - Hanging wall Effect: Predominant in Thrust Faults
- Case Study: 1999 Chi-Chi Earthquake
- 21 Sep 1999, 7.6 Mw, 5° strike, 30° dip

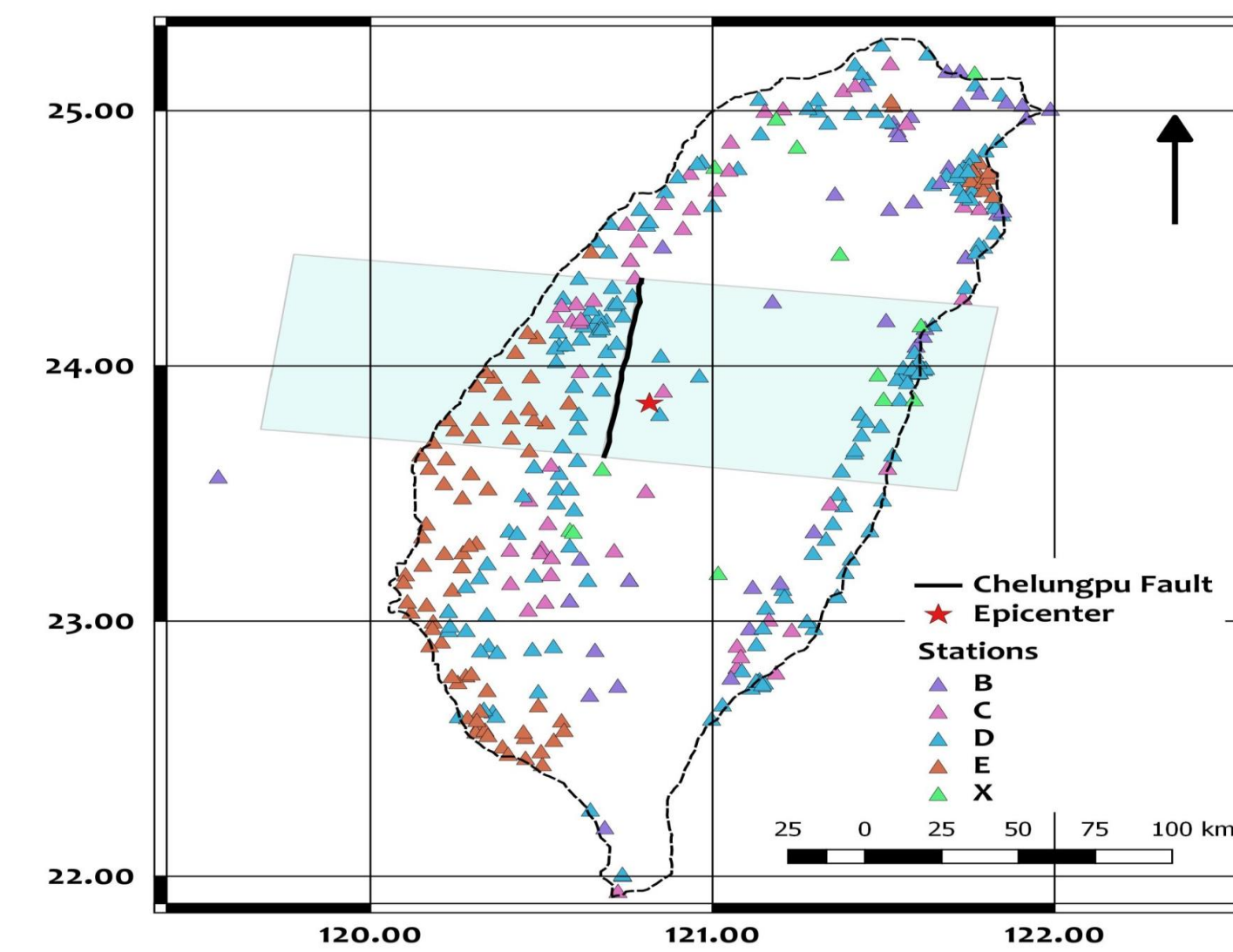
Site classification of recorded seismic station

Soil Type	Shear Wave Velocity (m/sec)	No of Stations
S _B	760 – 1500	55
S _C	360 – 760	61
S _D	180 – 360	207
S _E	< 180	102
X	-	16

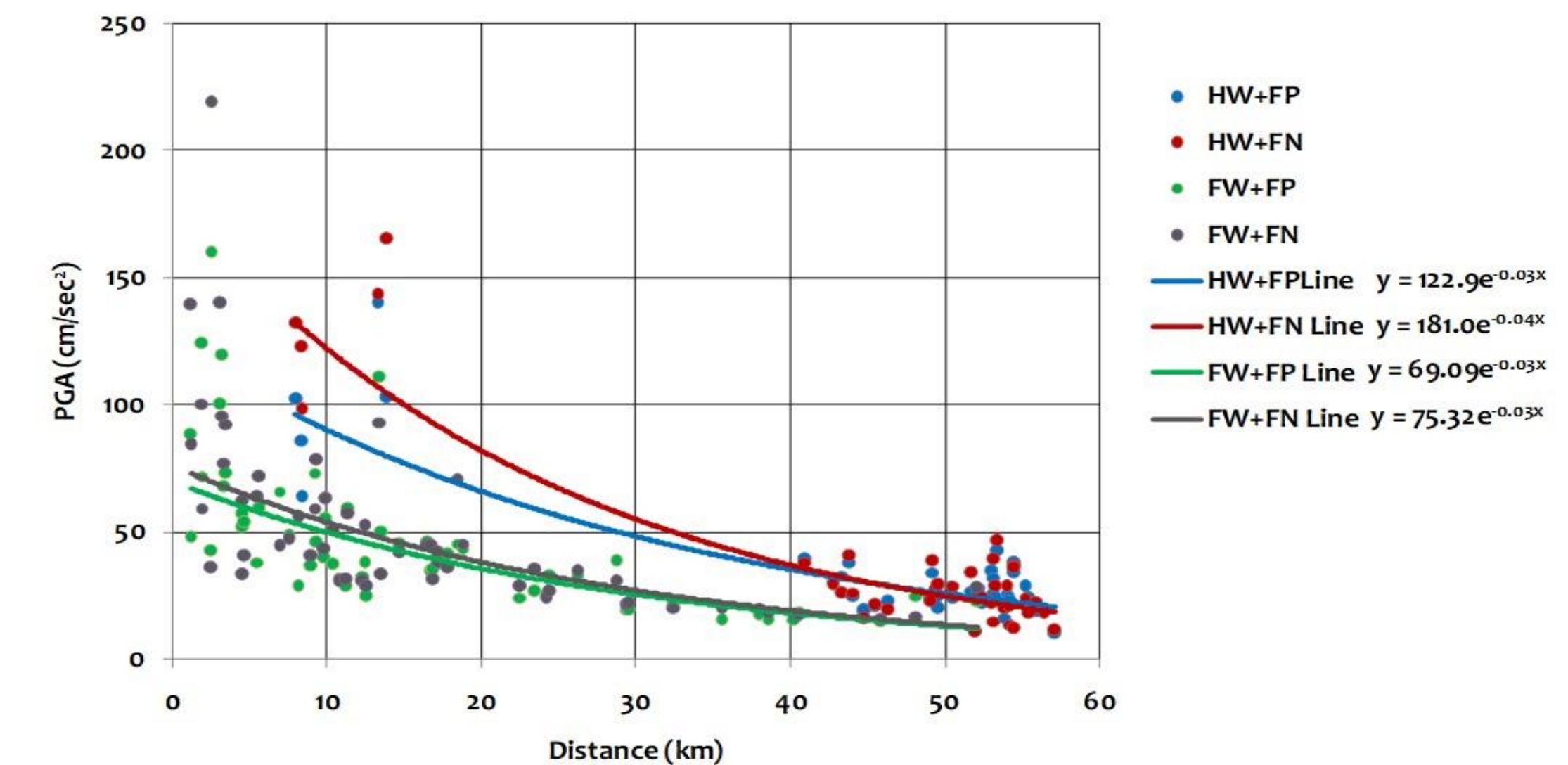


Spatial distribution of stations that have recorded the 1999 Chi-Chi Earthquake

Case Study: 1999 Chi-Chi Earthquake

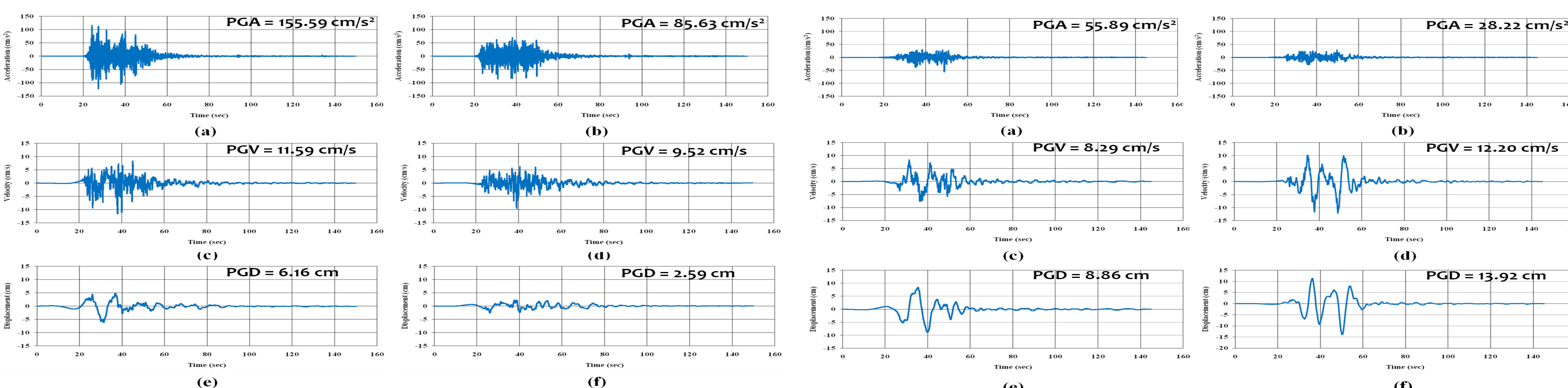


Map of Taiwan showing seismic stations that are categorized into two; hanging wall stations and footwall stations



Plot of nearest distance of recorded stations from the fault vs. recorded PGA in FN and FP components of ground motion at hanging wall (HW) and footwall (FW) stations. The lines indicate the trend followed by each of the four cases.

Observations



Acceleration, velocity and displacement time histories in FN and FP directions at TCU078

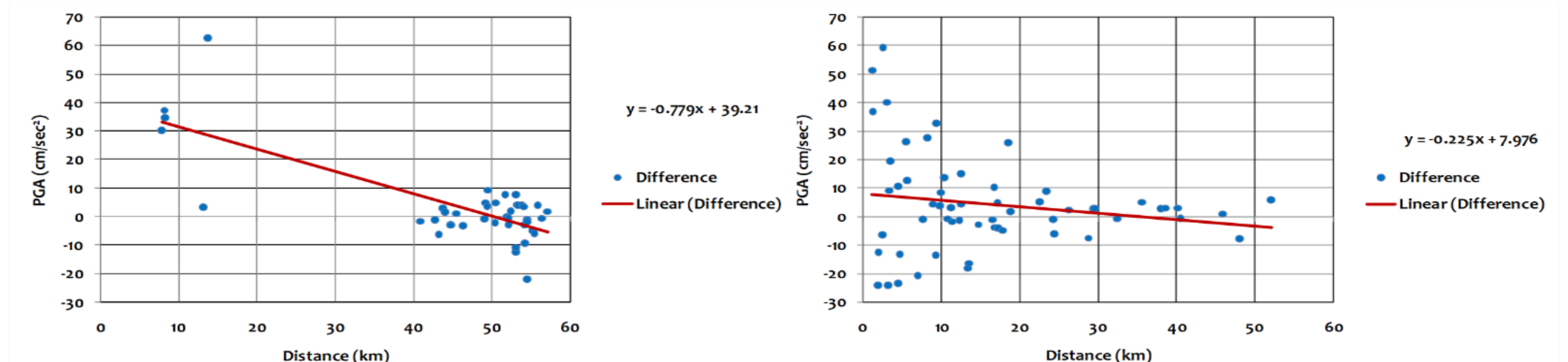
Acceleration, velocity and displacement time histories in FN and FP directions at TCU060

Conclusions

- PGA on the hanging wall is higher by at-least 20% than the stations on footwall with the high frequency waves at stations on the hanging wall
- Near-fault region can be defined as the region away from the surface fault trace within which the recorded components of ground motions with ratio of FN to FP is greater than 1. This understanding can further be directly related to the

Observations

- Attenuation of seismic wave is rapid in near-fault region
- Variation of PGA in FN and FP on the hanging wall is higher compared to footwall



Variation of PGA difference in FN and FP directions with distance of the station from the fault on the hanging wall and footwall stations