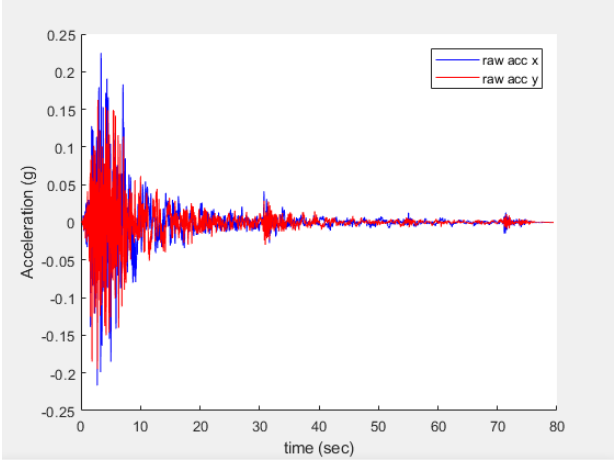
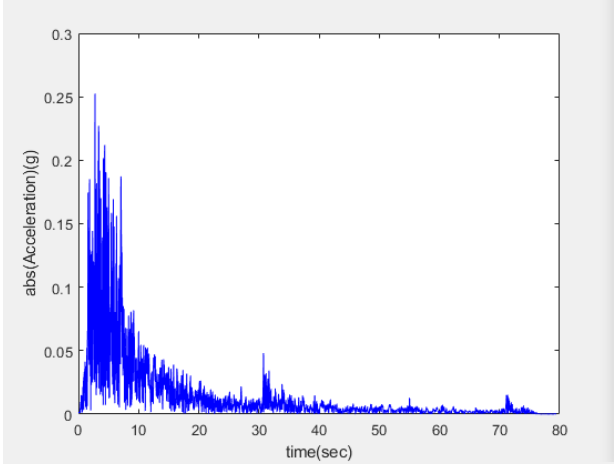
Example

X- and Y- direction

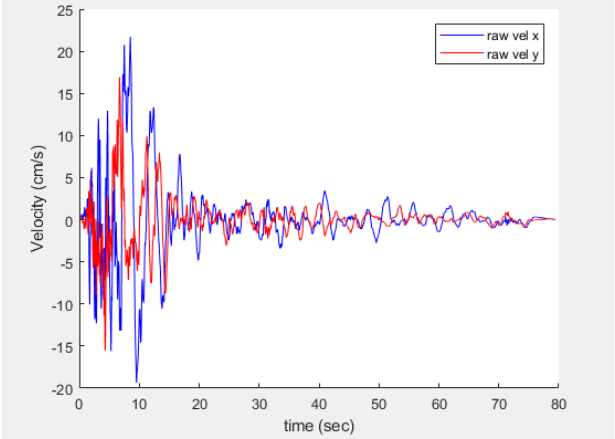
Composite absolute value

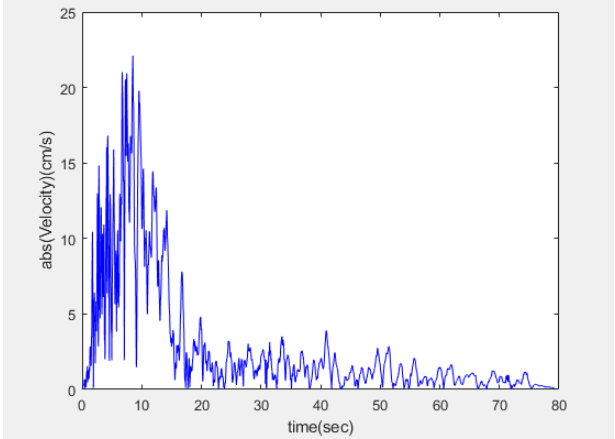
Acceleration





Velocity

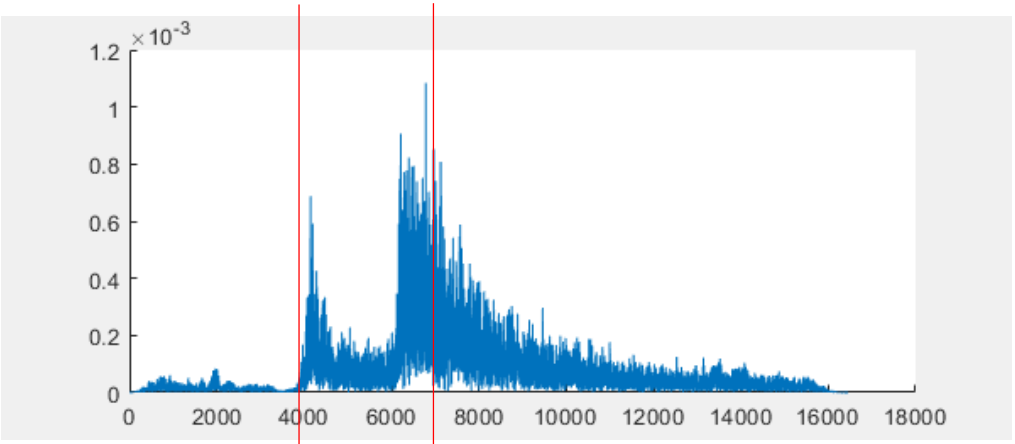


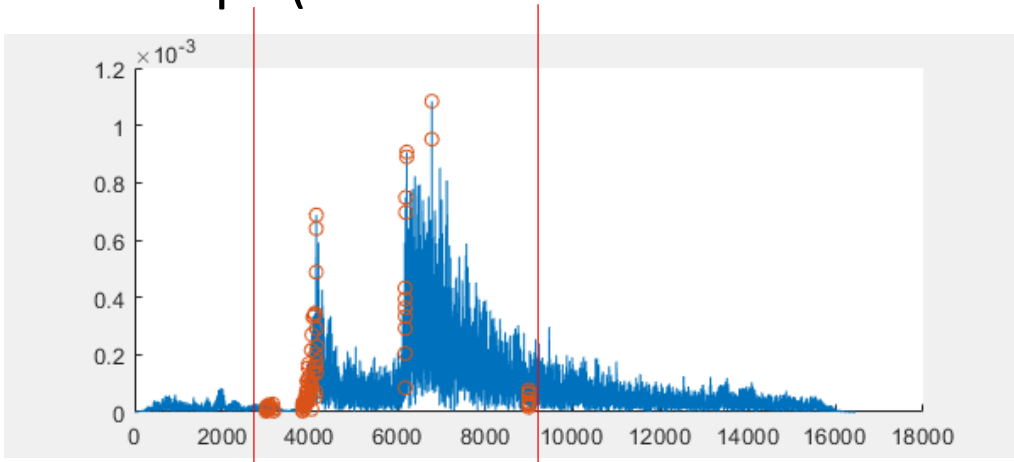


Envelope of the ground motion records

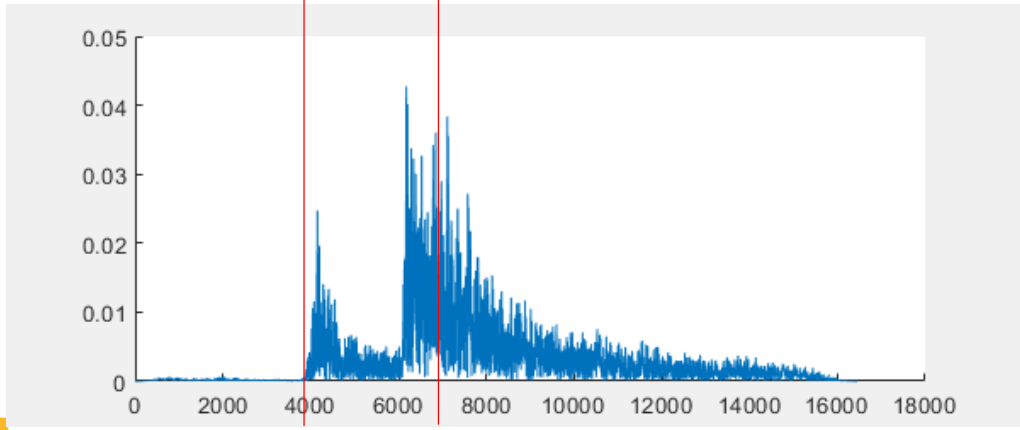
3000 steps (simulated duration = 30 sec) → 100 steps (simulated duration = 60 sec)

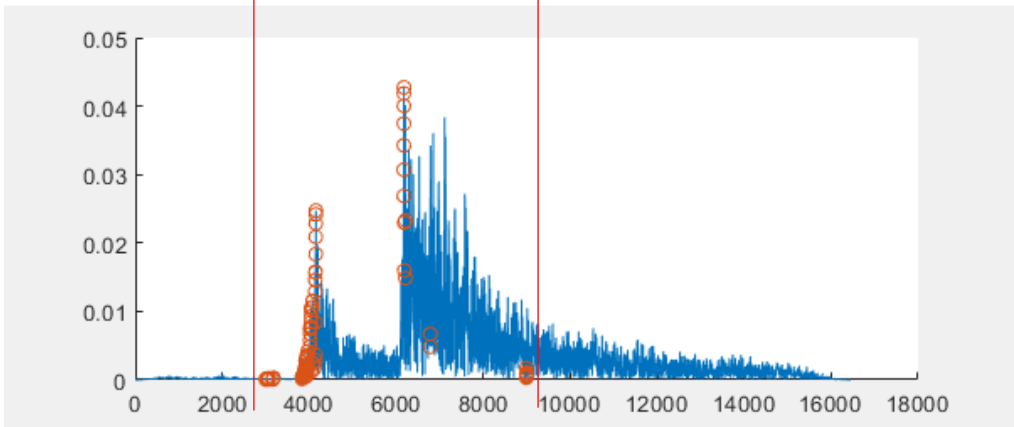
Acceleration

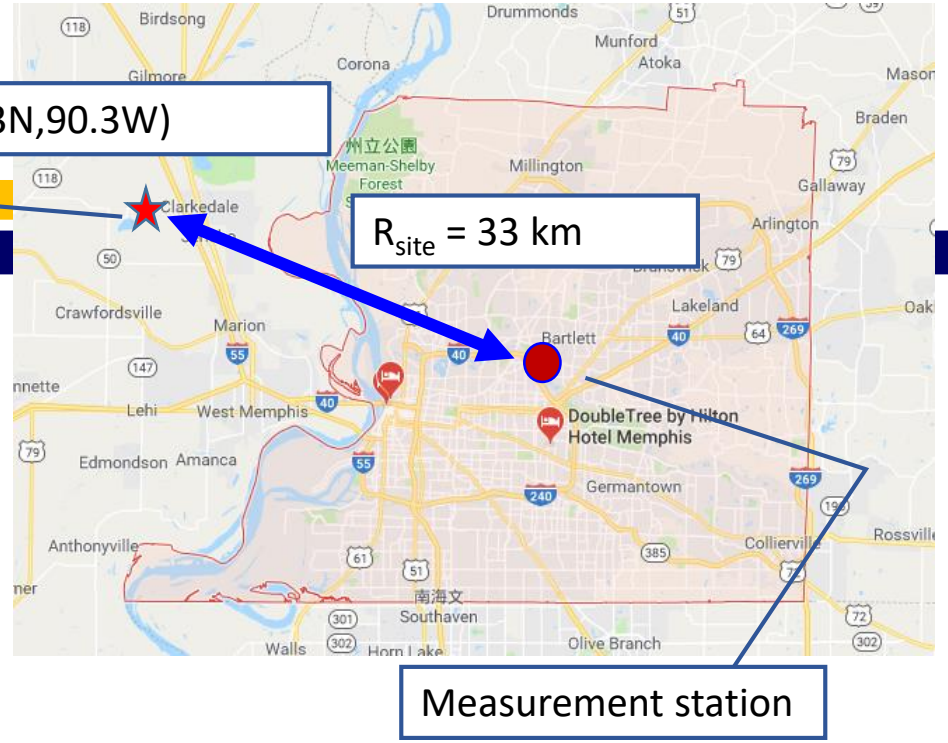




Velocity







1. Assume the site that the ground motion recorded at

$$\log_{10} ga_{site}(t) = 3.79 + 0.298 \times (M_W - 6) - 0.0536 \times (M_W - 6)^2 - \log_{10} R_{site} - 0.00135 \times R_{site} \rightarrow M_{ga}(t)$$

$$\log_{10} gv_{site}(t) = 2.04 + 0.422 \times (M_W - 6) - 0.0373 \times (M_W - 6)^2 - \log_{10} R_{site} \rightarrow M_{gv}(t)$$

2. Take the average of the backed-calculated Ms'

$$M(t) = \frac{M_{ga}(t) + M_{gv}(t)}{2}$$

3. Calculate ga(t,r) and gv(t,r) at any location with epicentral distance r

$$\log_{10} ga(t,r) = 3.79 + 0.298 \times (M(t) - 6) - 0.0536 \times (M(t) - 6)^2 - \log_{10} r - 0.00135 \times r$$

$$\log_{10} gv(t,r) = 2.04 + 0.422 \times (M(t) - 6) - 0.0373 \times (M(t) - 6)^2 - \log_{10} r$$