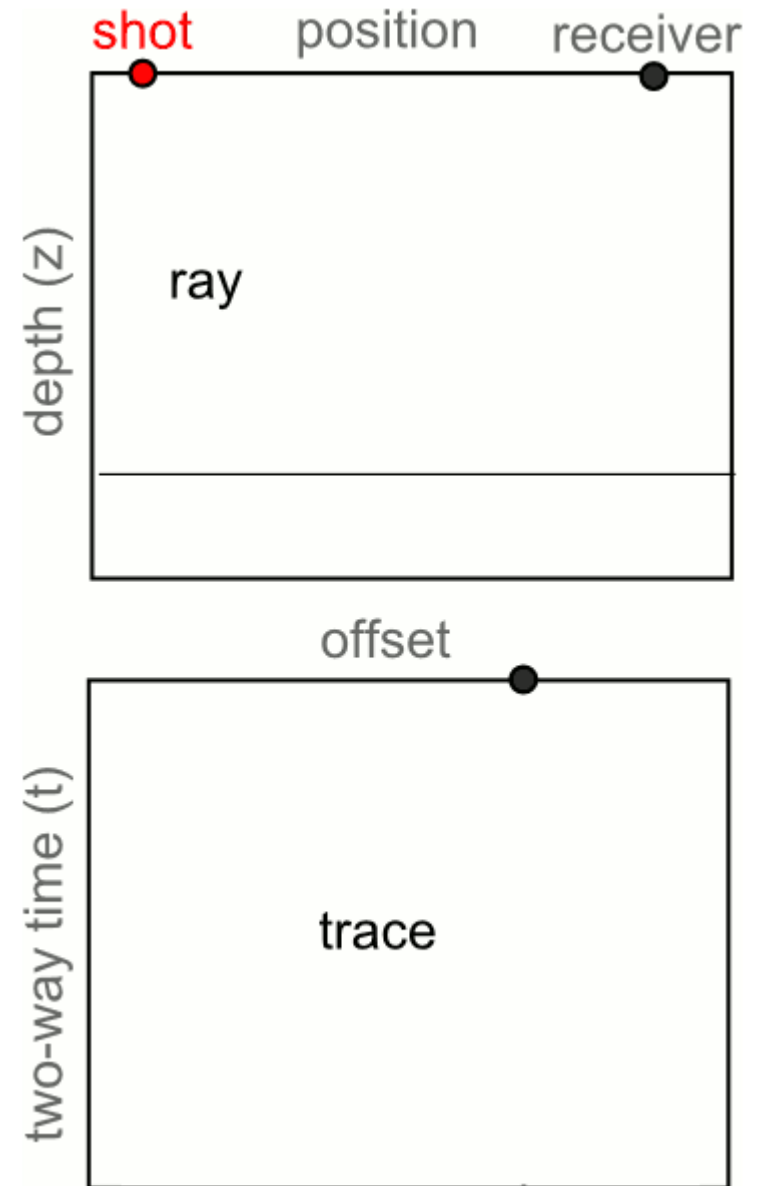


# Seismic reflection

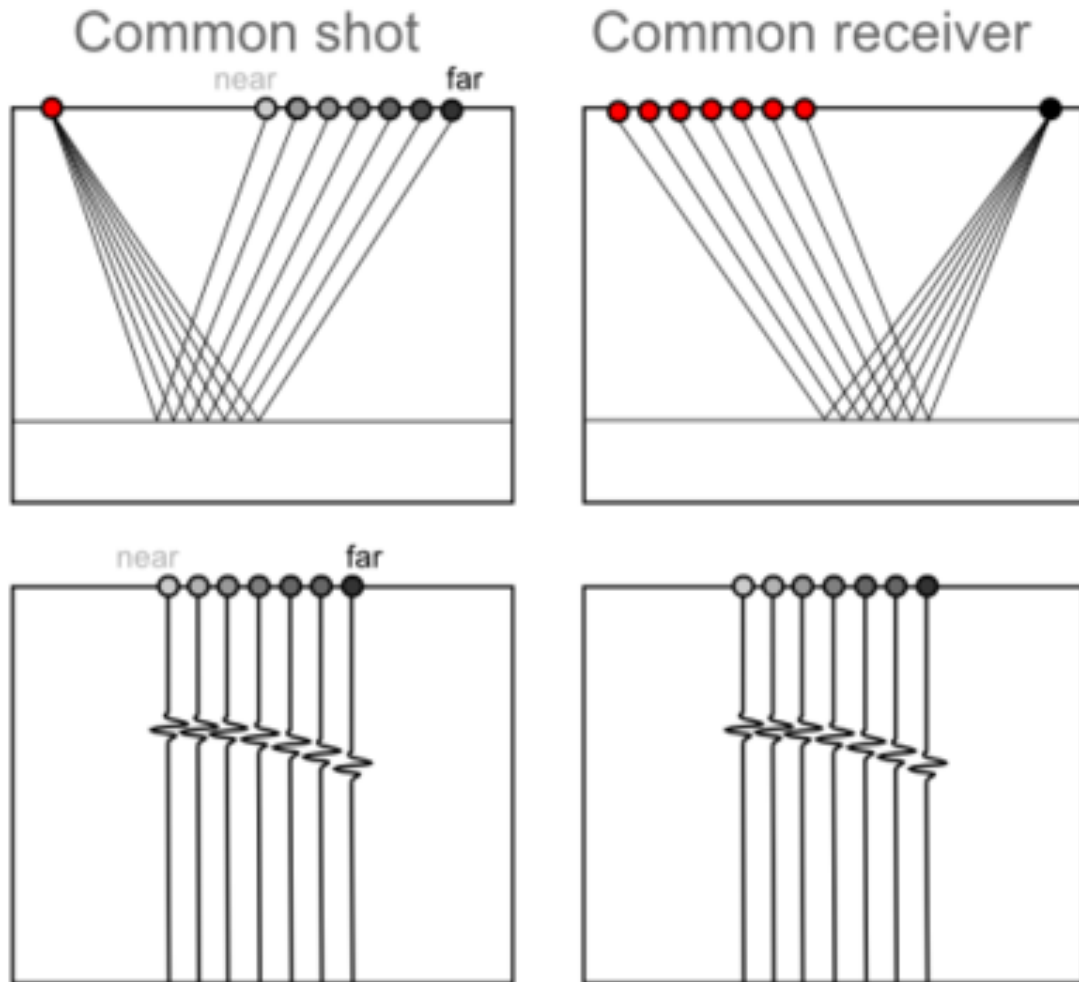
Processing

# Reflection

- If we have a change in acoustic impedance, we get a seismic reflection
  - Remember that acoustic impedance is  $Z = \rho V$
  - To draw a reflection, the point on the interface lies halfway between the shot and receiver
  - Thus, the angle of incidence = angle of reflection
- We measure a trace at a particular offset
  - A trace is the recorded curve when measuring ground movement



# Common shot gather

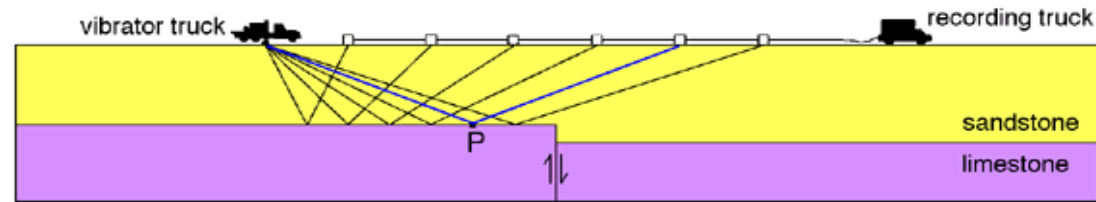
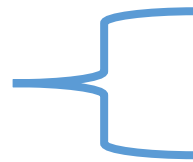


- Basic quality assessment tools in field acquisition.
- When the traces of the gather come from a single shot and many receivers, it is called a **common shot gather**.
- A single receiver with many shots is called a **common receiver gather**.
- It is very easy to inspect traces in these displays for bad receivers or bad shots.

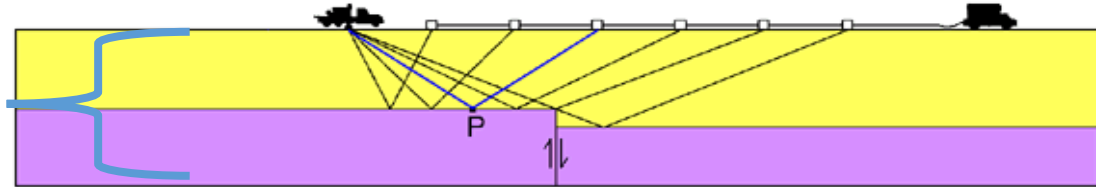
# Common shot gather

- As the seismic survey moves along the line, we get many common shot gathers.

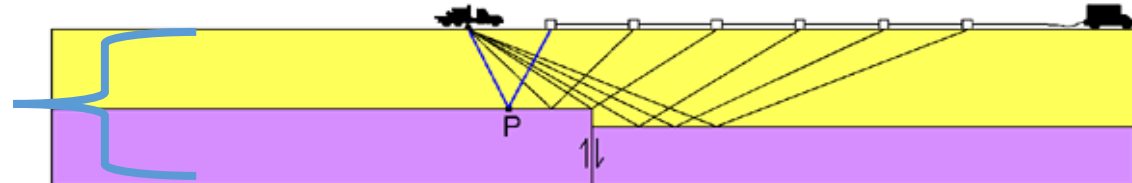
- A common shot gather



- Another common shot gather



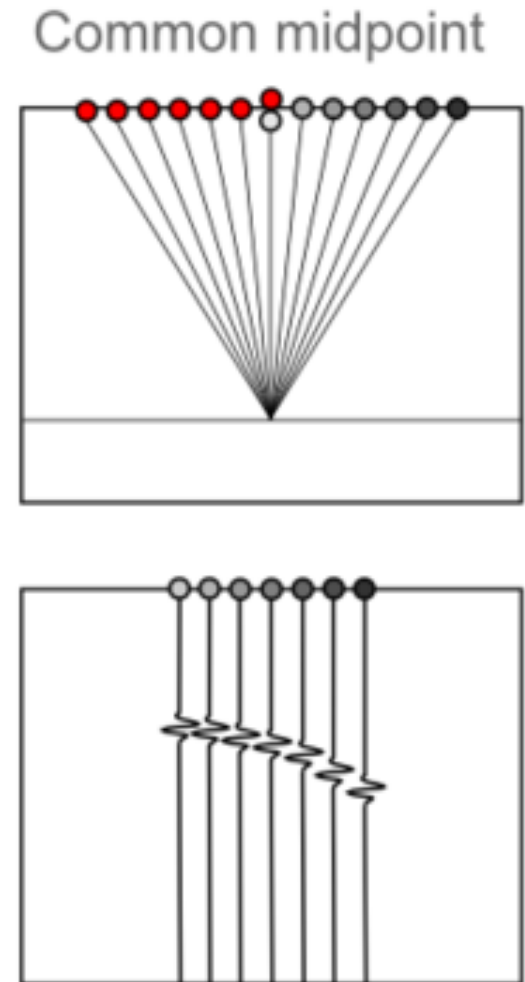
- A third common shot gather



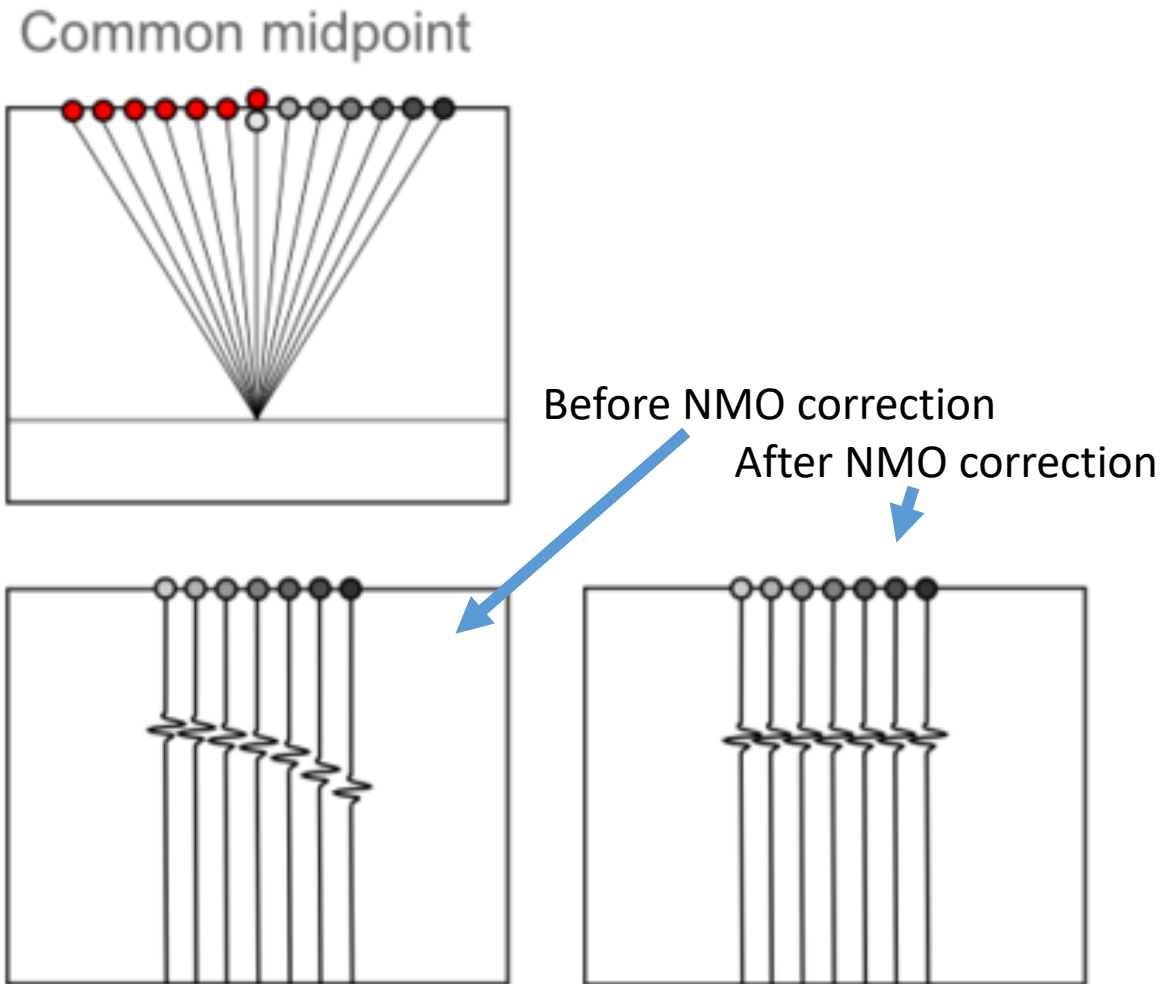
- In each, the shot moves and data is measured at multiple receivers

# Common midpoint gather

- The stereotypical gather: traces are sorted by surface geometry to approximate a single reflection point in the earth.
- Data from several shots and receivers are combined into a single gather.
- The traces are sorted by offset in order to perform velocity analysis for data processing and normal moveout (NMO) correction.



# Common midpoint (CMP) gather



- CMP gathers are obtained by rearranging common shot gathers
- This is done by grouping shot-receiver pairs based on where the reflection point is.
- Because the offsets are different (depending on the distance between the shot and receiver), the time to the reflection point (interface) differs.
- We correct for the time difference using velocity analysis. This is called Normal Moveout (NMO) correction.
- After NMO, all the traces in the CMP gather are summed together (ie, stacked) into a single trace.