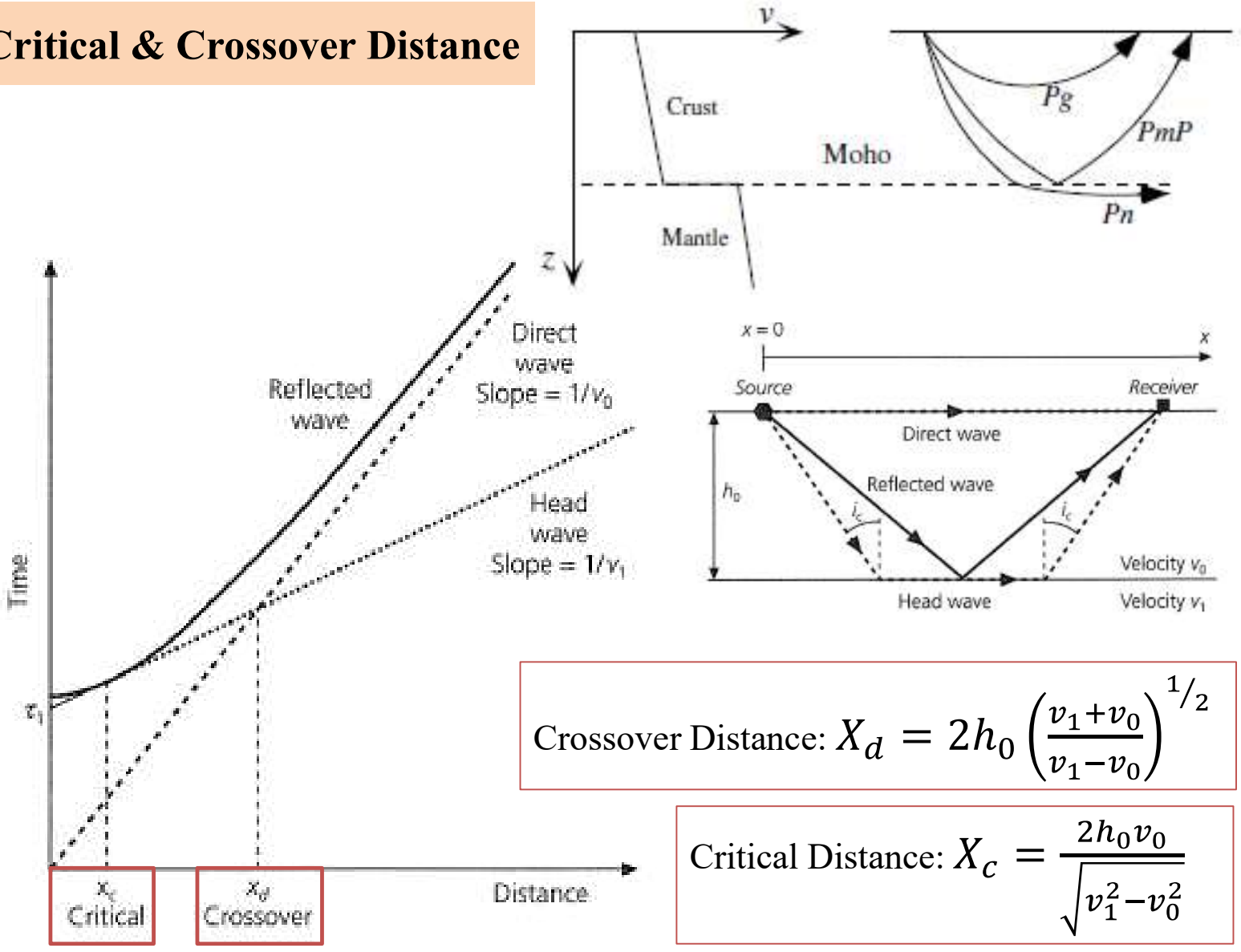
Critical & Crossover Distance



Crossover Distance: $X_d = 2h_0\left(\frac{v_1+v_0}{v_1-v_0}\right)^{1/2}$

Critical Distance: $X_c = \frac{2h_0v_0}{\sqrt{v_1^2-v_0^2}}$

Origin Time Calculation

Arrival Time =
Origin Time + Travel Time

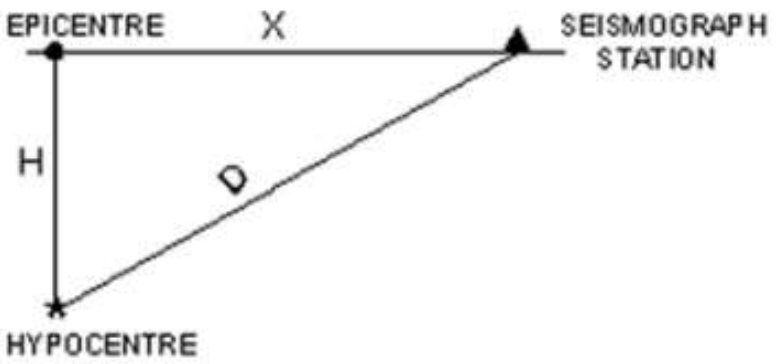
$$T_P = T_0 + \frac{D}{V_P}$$

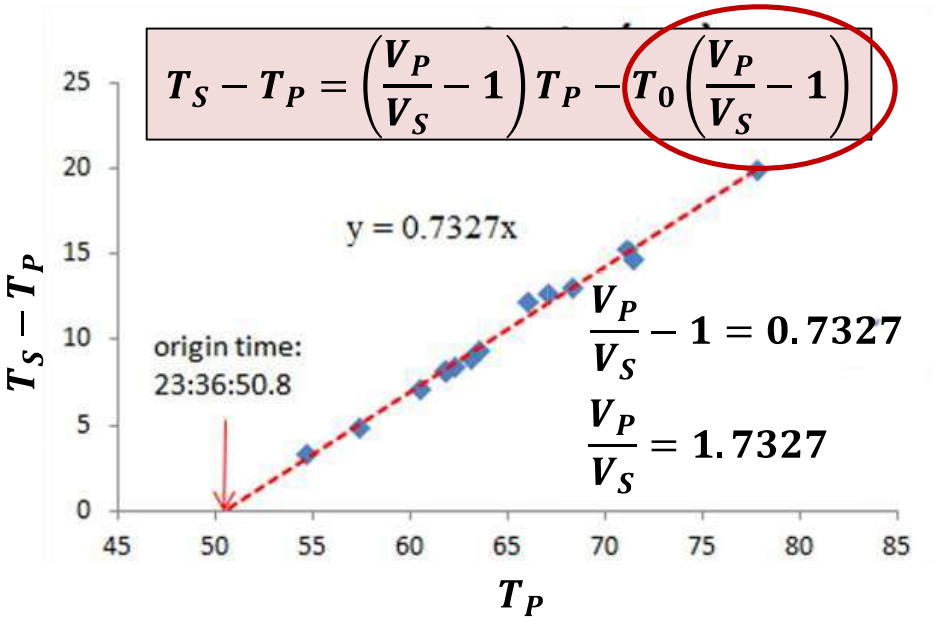
$$T_S = T_0 + \frac{D}{V_S}$$

$$T_S - T_P = D\left(\frac{1}{V_S} - \frac{1}{V_P}\right)$$

$$T_S - T_P = \frac{D}{V_P}\left(\frac{V_P}{V_S} - 1\right)$$

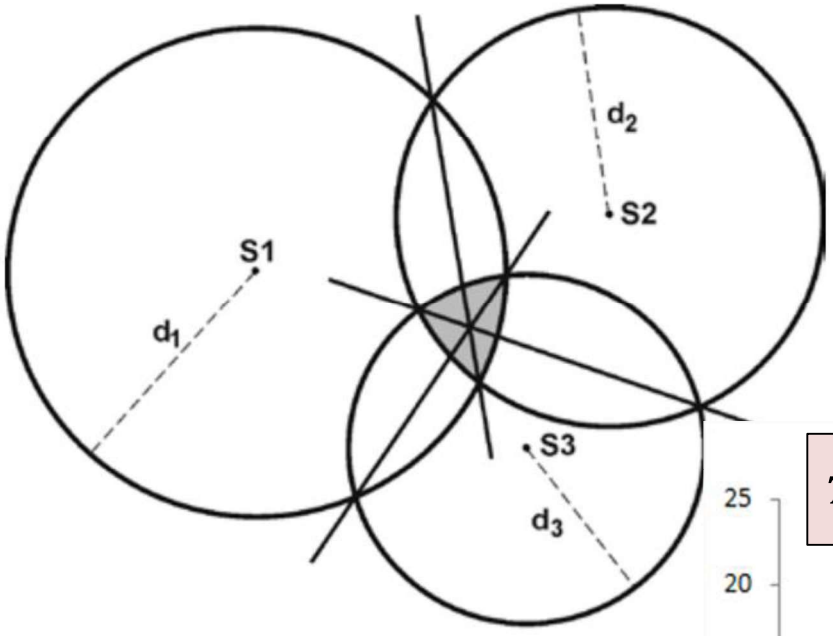
$$T_S - T_P = \left(\frac{V_P}{V_S} - 1\right)(T_P - T_0)$$





Wadati Diagram

Earthquake location



$$T_S - T_P = D\left(\frac{1}{V_S} - \frac{1}{V_P}\right)$$

$$D = \frac{T_S - T_P}{\left(\frac{1}{V_S} - \frac{1}{V_P}\right)}$$

$$T_S - T_P = \left(\frac{V_P}{V_S} - 1\right) T_P - T_0\left(\frac{V_P}{V_S} - 1\right)$$