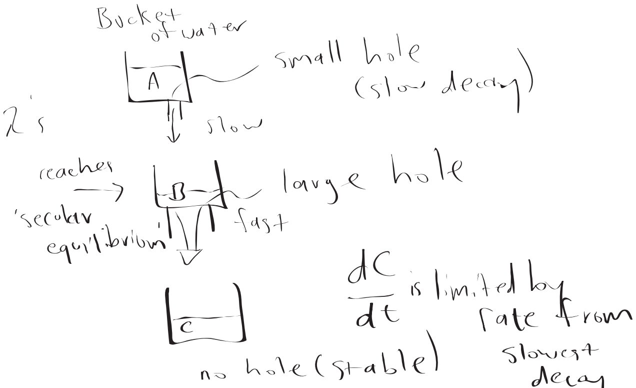
$$\frac{D}{X} = \frac{D_0}{X} + \frac{N}{X}\left(e^{\lambda t} - 1\right)$$

Pb/Pb dating and isochrons

$^{238}U \rightarrow {}^{206}Pb$ decay chain of α and β many λ's

$^{235}U \rightarrow {}^{207}Pb$

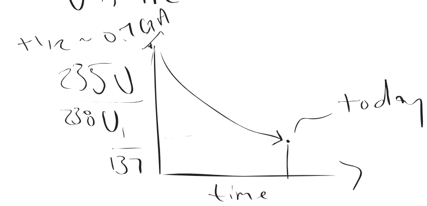


$\frac{dC}{dt}$ is limited by rate from slowest decay

^{204}Pb = "common" Pb, stable, non-radiogenic

U is RLC

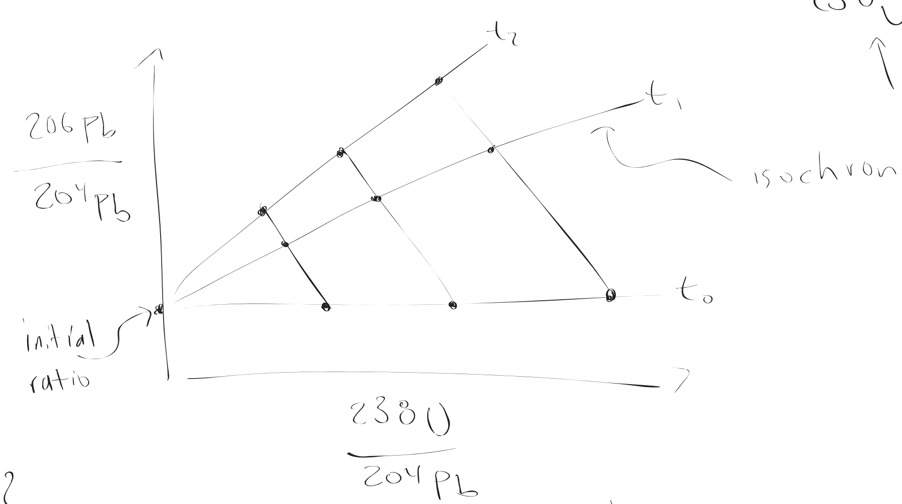
(1) $$\frac{^{206}Pb}{^{204}Pb} = \left(\frac{^{206}Pb}{^{204}Pb}\right)_0 + \frac{^{238}U}{^{204}Pb}\left(e^{\lambda^{238} t} - 1\right)$$



(2) $$\frac{^{207}Pb}{^{204}Pb} = \left(\frac{^{207}Pb}{^{204}Pb}\right)_0 + \frac{^{235}U}{^{204}Pb}\left(e^{\lambda^{235} t} - 1\right)$$

^{238}U

↑ slower decay $t_{1/2} \sim 4.5$ Ga



ratio of 1 and 2 (divide)

$$\frac{\frac{^{207}Pb}{^{204}Pb} - \left(\frac{^{207}Pb}{^{204}Pb}\right)_0}{\frac{^{206}Pb}{^{204}Pb} - \left(\frac{^{206}Pb}{^{204}Pb}\right)_0} = \frac{^{235}U}{^{238}U}\frac{\left(e^{\lambda 235 t} - 1\right)}{\left(e^{\lambda 238 t} - 1\right)}$$

$\frac{1}{137}$

$$\frac{^{207}Pb}{^{204}Pb} = \left(\frac{^{235}U}{^{238}U}\right)\left(\frac{^{206}Pb}{^{204}Pb}\right)\frac{\left(e^{\lambda 235 t} - 1\right)}{\left(e^{\lambda 238} - 1\right)} - \left(\frac{^{235}U}{^{238}U}\right)\left(\frac{^{206}Pb}{^{204}Pb}\right)_0\left(\frac{e^{\lambda 235 t} - 1}{e^{\lambda 238 t} - 1}\right) + \left(\frac{^{207}Pb}{^{204}Pb}\right)_0$$