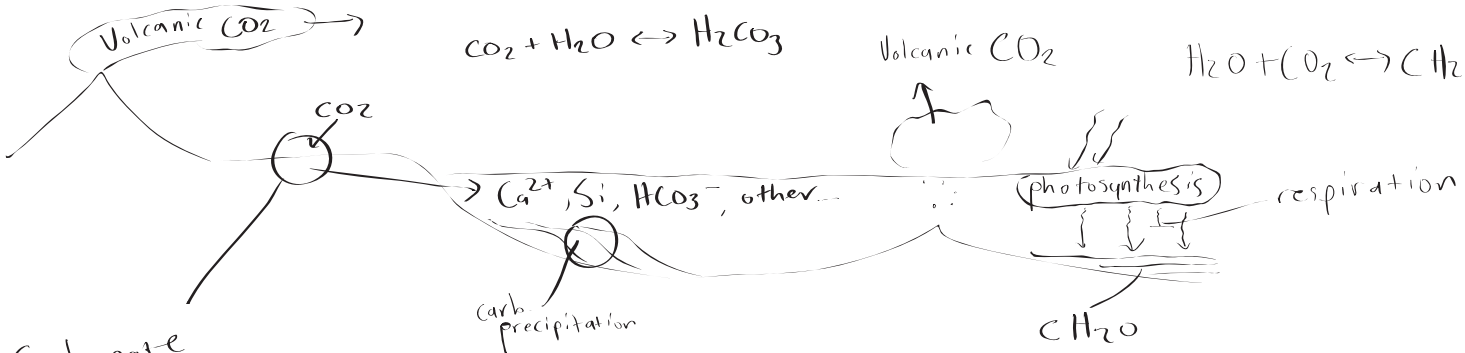

$$CaCO_3 + H_2CO_3 \rightarrow Ca^{2+} + 2HCO_3^-$$

Silicate Weathering

$$CaSiO_3 + 2H_2CO_3 \rightarrow Ca^{2+} + 2HCO_3^- + SiO_2$$

$\uparrow_{2 \times CO_2}$

$CaCO_3$ precipitation in the ocean consumes Ca^{2+} and $2HCO_3^-$, producing $H_2O + CO_2$ (H_2CO_3).

carb weathering $\xleftarrow[\text{change}]{\text{no } CO_2}$ carb precip

Silicate weathering $\xrightarrow[\text{consumed}]{CO_2}$ Carb precip

Burial of $CaCO_3$ is long term CO_2 sink

Burial of CH_2O is long term CO_2 sink

$CO_2 \xrightarrow[in]{\text{Flux}}$ atmosphere: 6000×10^{12} mol C/ky

CO_2 in atmosphere $\sim 70000 \times 10^{12}$ mol C

$M(t) \simeq 70{,}000 + (F_{in} - F_{out})t$ $\quad \frac{dm}{dt} = F_{in} - F_{out}$

$70000 \simeq 70{,}000 + (6000 - 6000)t$

$M(t) \simeq 70{,}000 + (0 - 6000)t$

$0 \simeq 70{,}000 - 6000t$

$\frac{M}{F} = \frac{70000}{6000} = t$ to deplete $M \simeq 11.6$ ky

1% imbalance

$70{,}000 - (5940 - 6000)t = M(t)$

$\frac{70000}{60} = t = 1.1$ My