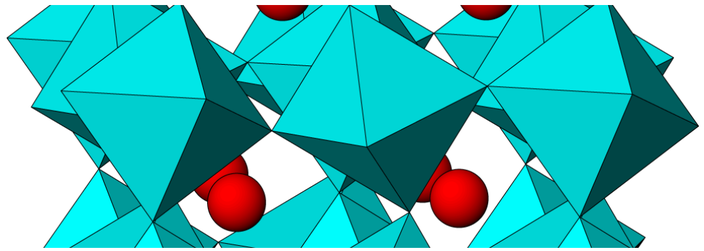
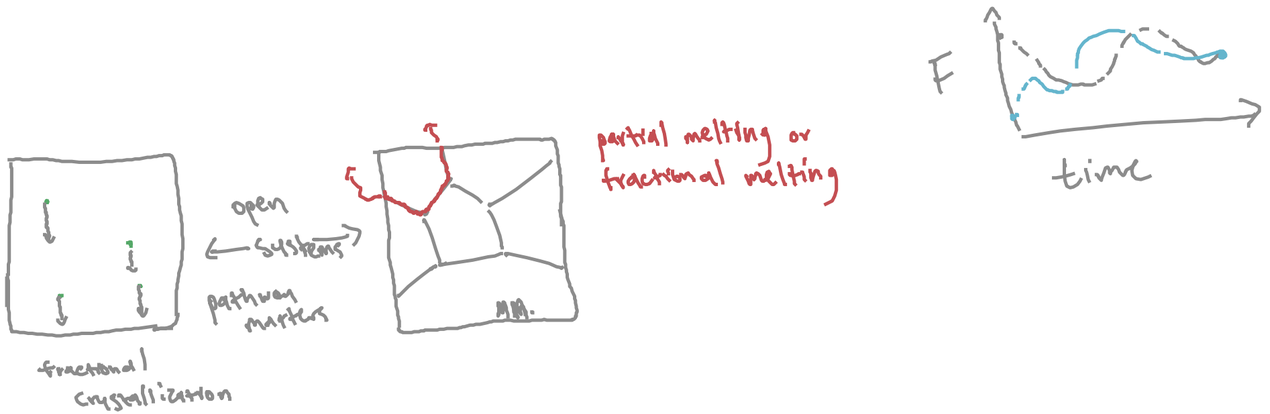


Lecture 9: Partial melting and explaining the crust

1. Partial melting
2. Explaining the crust

We acknowledge and respect the lək^{w}əŋən peoples on whose traditional territory the university stands and the Songhees, Esquimalt and W̱SÁNEĆ peoples whose historical relationships with the land continue to this day.

Fractional melting: concept and derivation



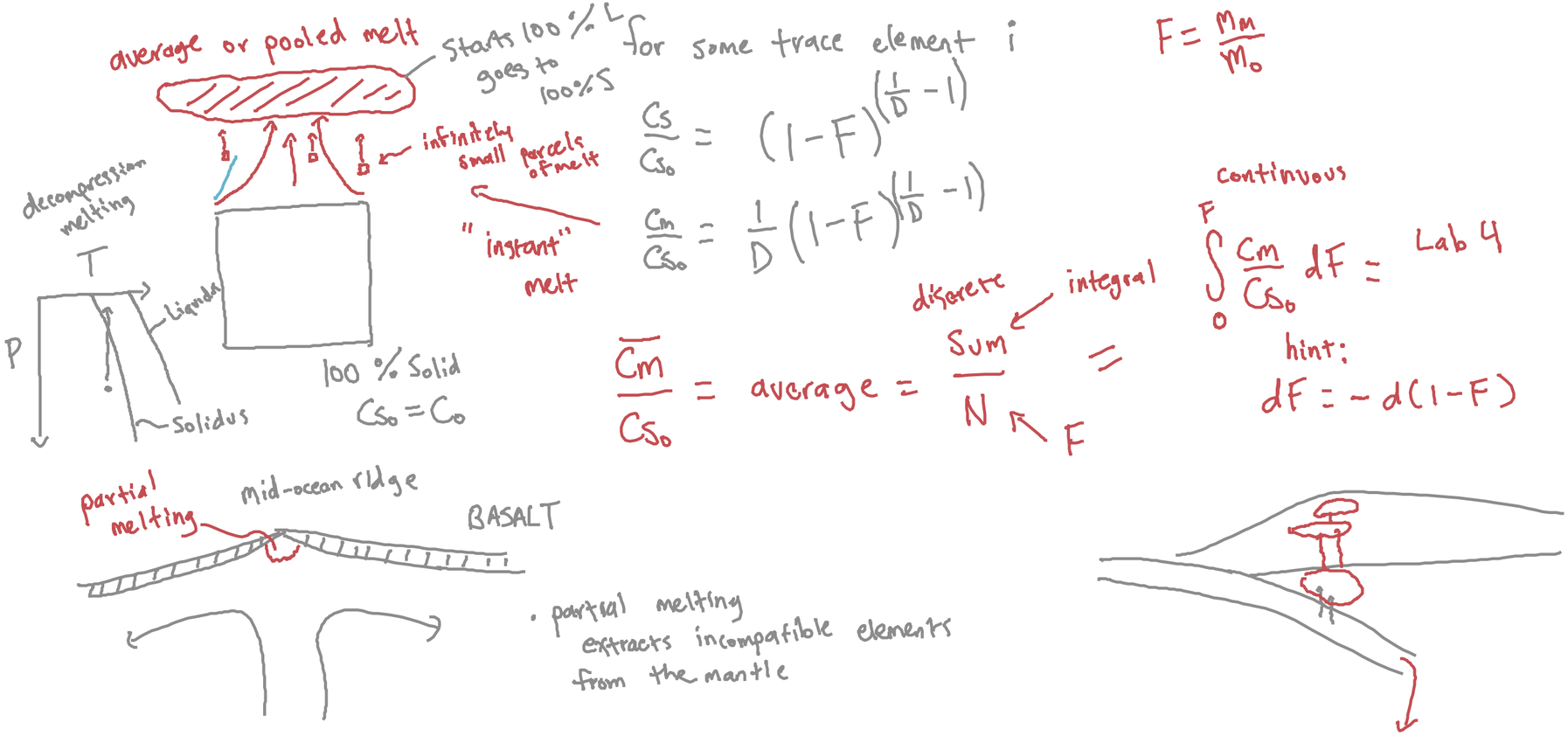
Change in the mass of the system = rate of melting

$$dM_0 = -dM_m = dM_s \qquad -C_m\,dM_m = d(C_s M_s)$$

$$\frac{C_s}{C_{s0}} = (1-F)^{\frac{1}{D}-1}$$

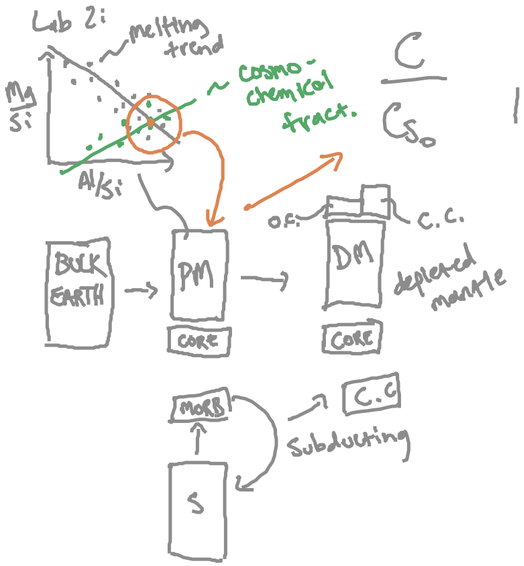
$$\frac{C_m}{C_{s0}} = \frac{1}{D}(1-F)^{\frac{1}{D}-1}$$

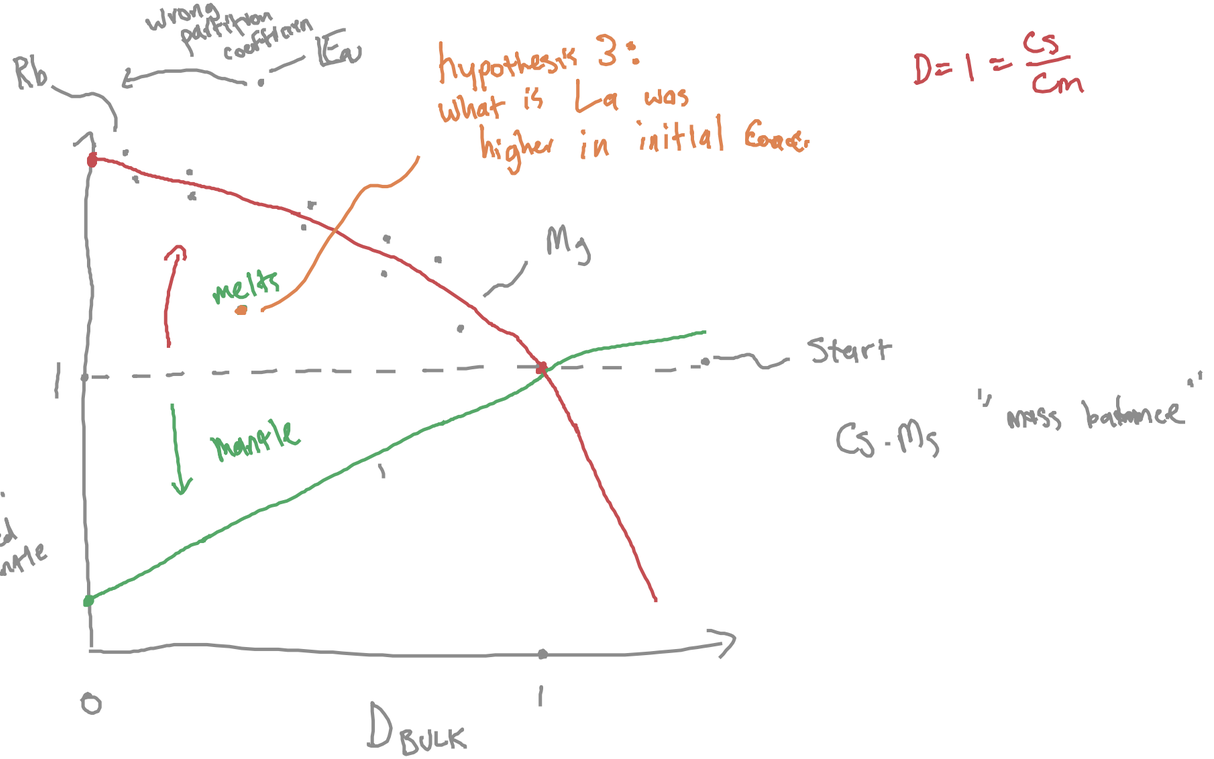
Fractional melting: concept and derivation



hypothesis 1: wrong D_{BULK}?

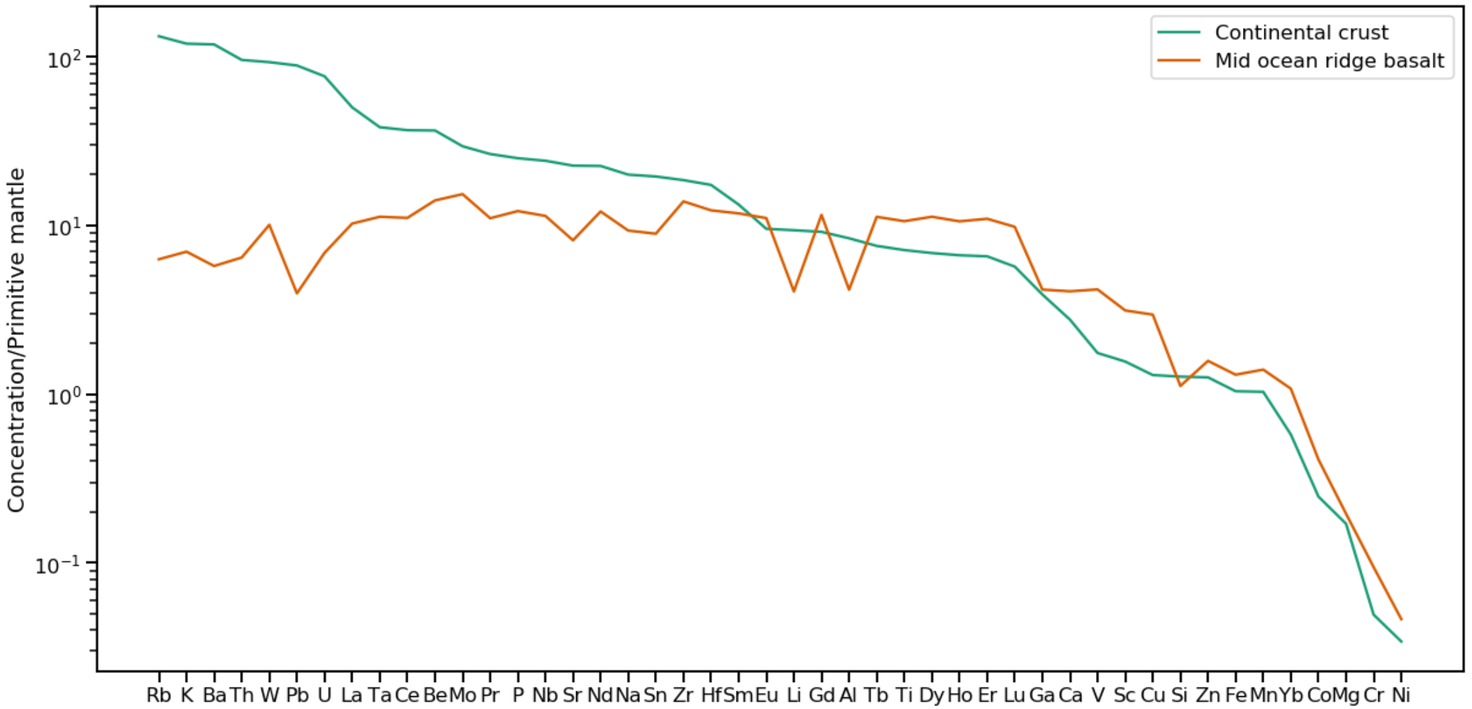
hypothesis 2: model too simple





$D = 1 = \frac{Cs}{Cm}$

$Cs \cdot Ms$ "mass balance"


Continental crust
Mid ocean ridge basalt
Concentration/Primitive mantle
10^{2}
10^{1}
10^{0}
10^{-1}
Rb K Ba Th W Pb U La Ta Ce Be Mo Pr P Nb Sr Nd Na Sn Zr Hf Sm Eu Li Gd Al Tb Ti Dy Ho Er Lu Ga Ca V Sc Cu Si Zn Fe Mn Yb Co Mg Cr Ni