Contact Metamorphism Model: Note the dramatic influence of grain size.

0.1°C/yr heating rate of lower left boundary. Bolton, Luttge, Rye, Ague (in prep.)

Small grains ➔
Low perm, high SA

A and B, after 800 yrs, grain spacing 0.4 mm. Reaction driven flow
Max pore vel = 0.75 m/yr

Large grains ➔
High perm, low SA

C and D, after 320 yrs, grain spacing 4 mm. Buoyancy driven flow
Max pore vel = 4 m/yr

Figure 3.

A and C: $X_{CO_2}$ and flow (actual velocities for part C are much greater than in A).

B: $\Delta G=0$ curves + final $X,T$ pairs in domain

C: velocities with color $X_{CO_2}$

D: $\Delta G=0$ curves + final $X,T$ pairs in domain

B and D: ending $T-X_{CO_2}$ pairs for each point ($x$-$z$ pairs).

rxns 1: $\text{Dol} + \text{Qtz} + \text{H}_2\text{O} \leftrightarrow \text{Tlc} + \text{Cal} + \text{CO}_2$

4: $\text{Dol} + \text{Qtz} + \text{H}_2\text{O} \leftrightarrow \text{Tr} + \text{Cal} + \text{CO}_2$