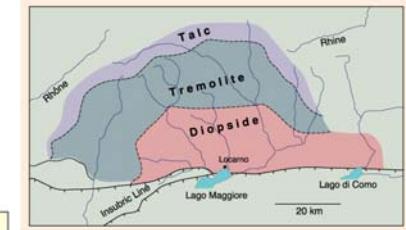
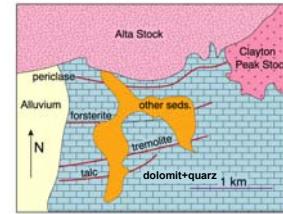
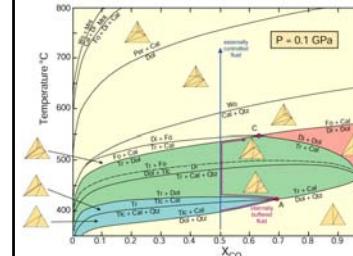


Carbonates at HP and CO₂ recycling

contact metamorphism in Colorado



regional metamorphism in the Alps

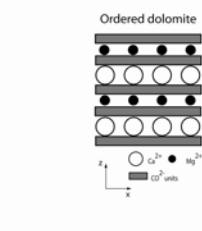
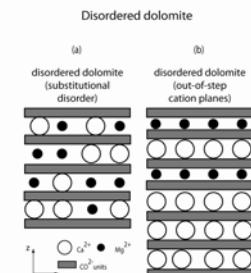
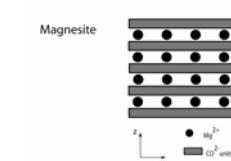
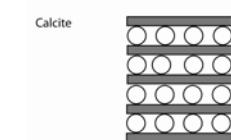
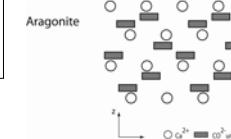


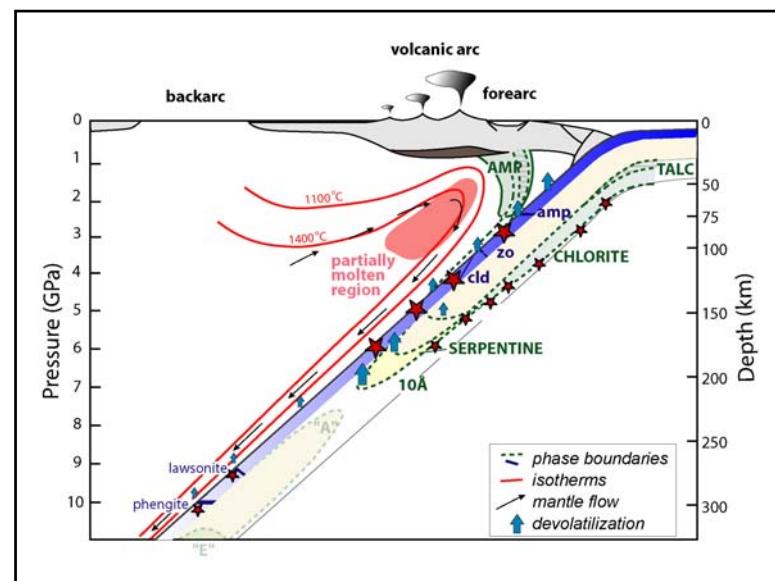
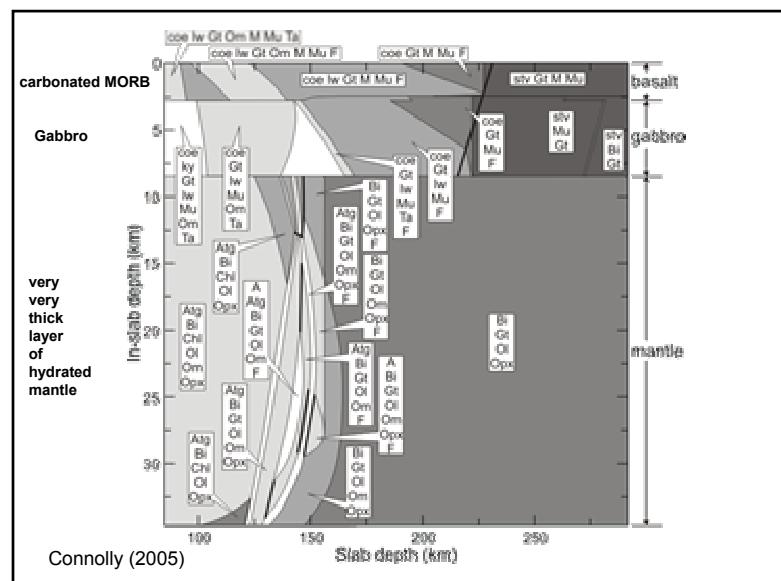
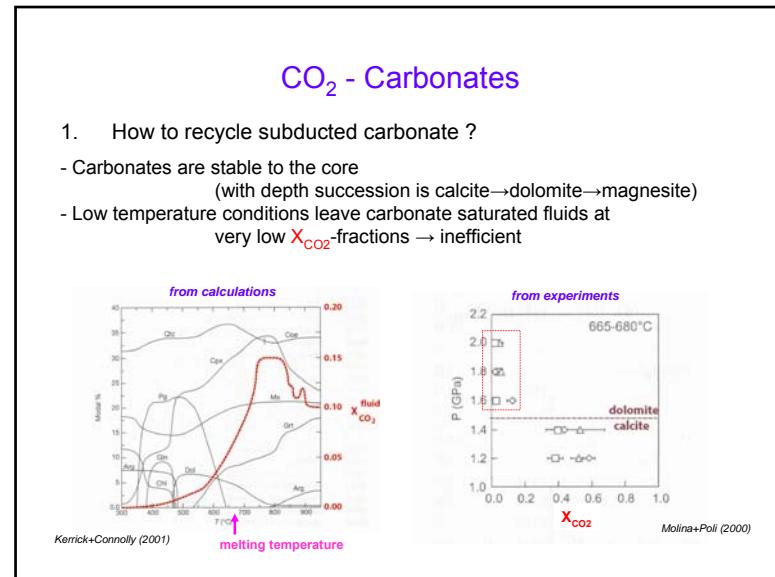
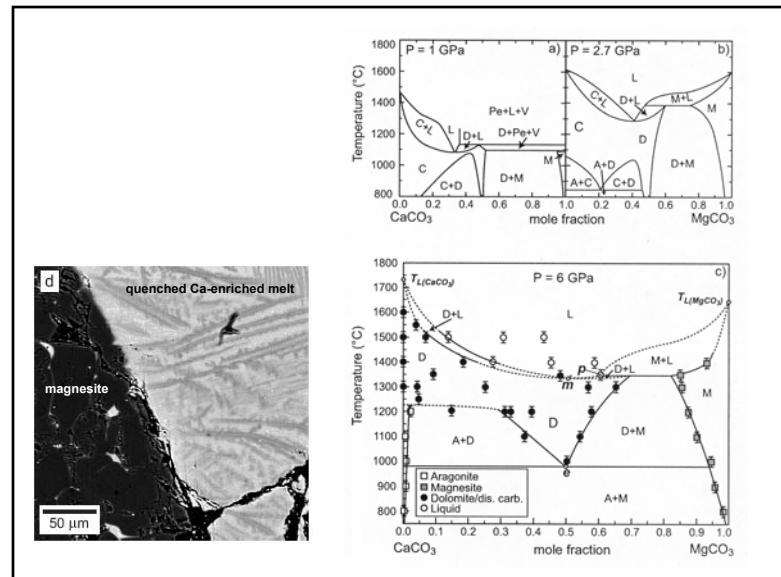
If you ever wondered, whether carbonates survive HP, you were posing the wrong question:

You should have wondered how we make carbonates not survive HP...
.... only in combination with HT

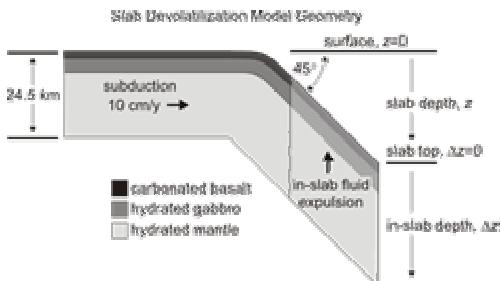


Carbonate structures

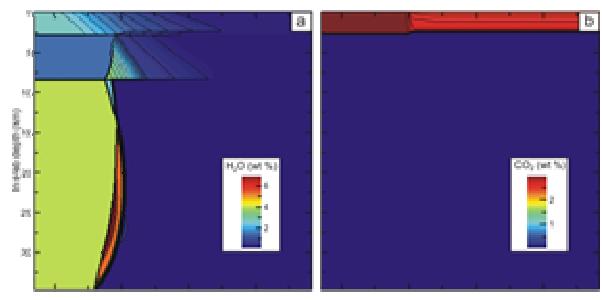
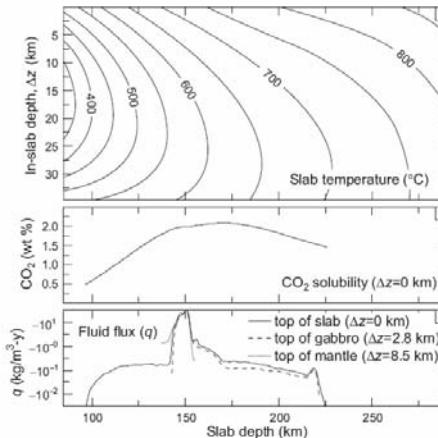




How to recycle subducted carbonate



Connolly (2005)



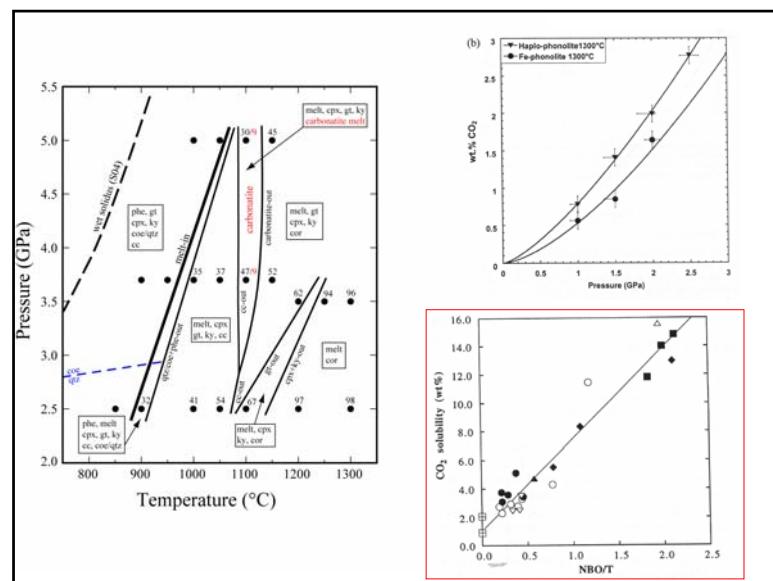
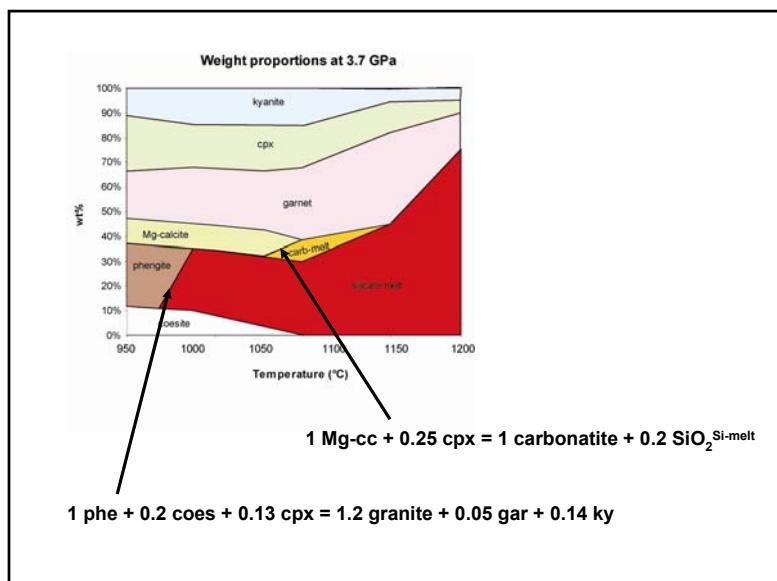
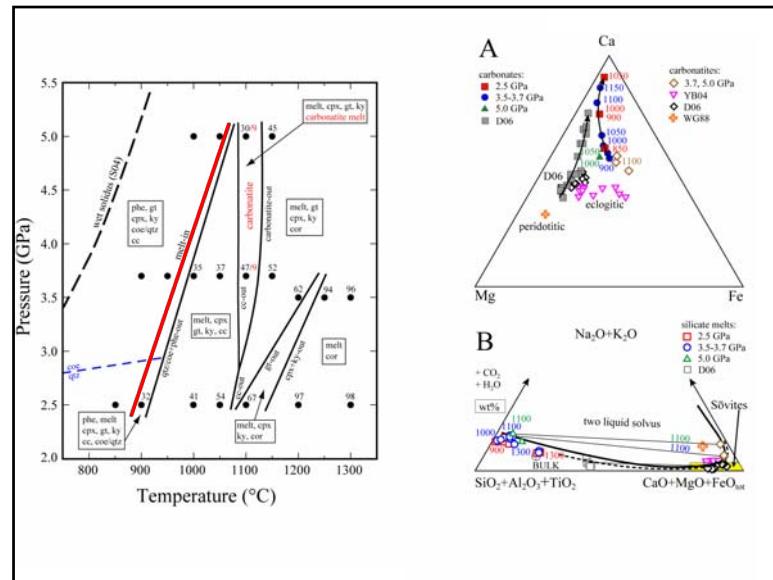
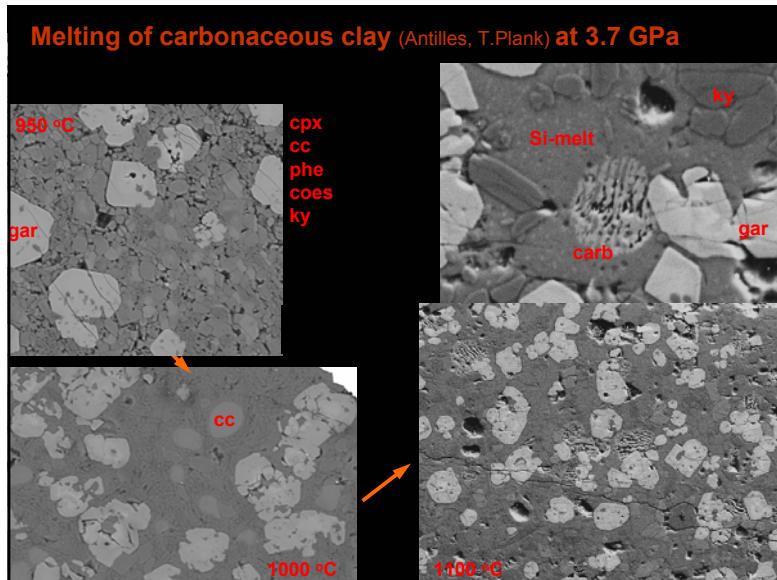
Connolly (2005)

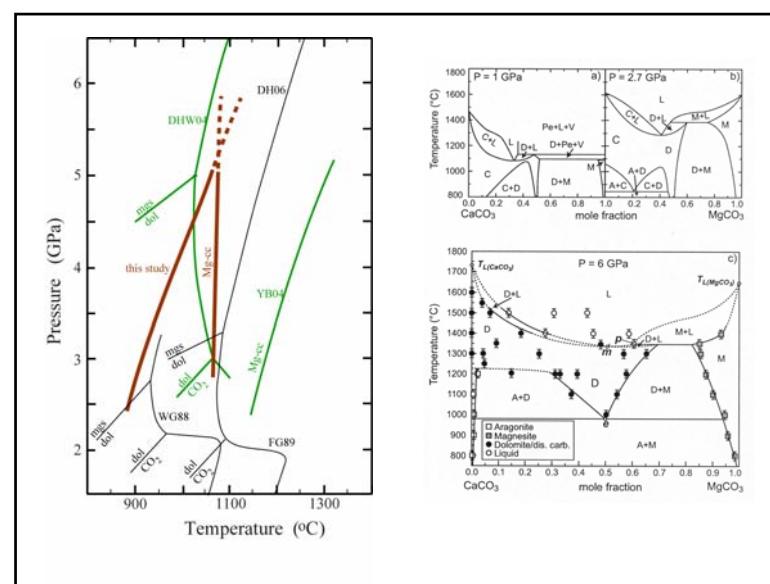
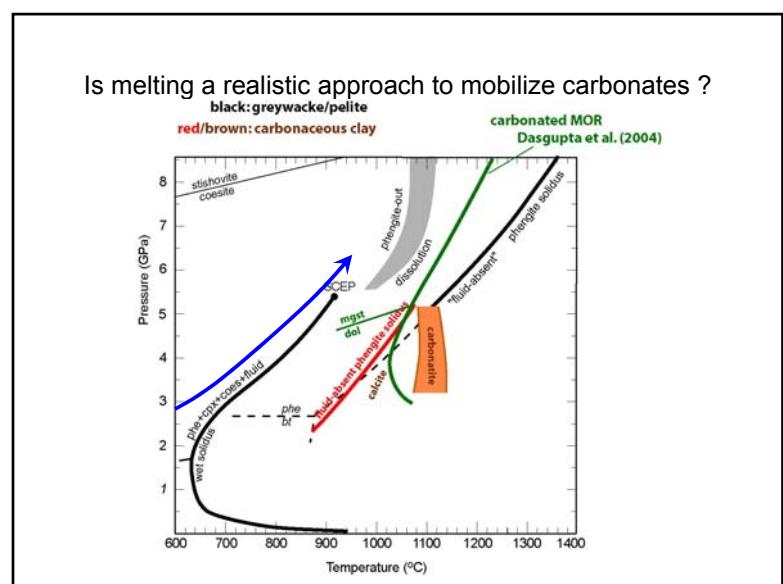
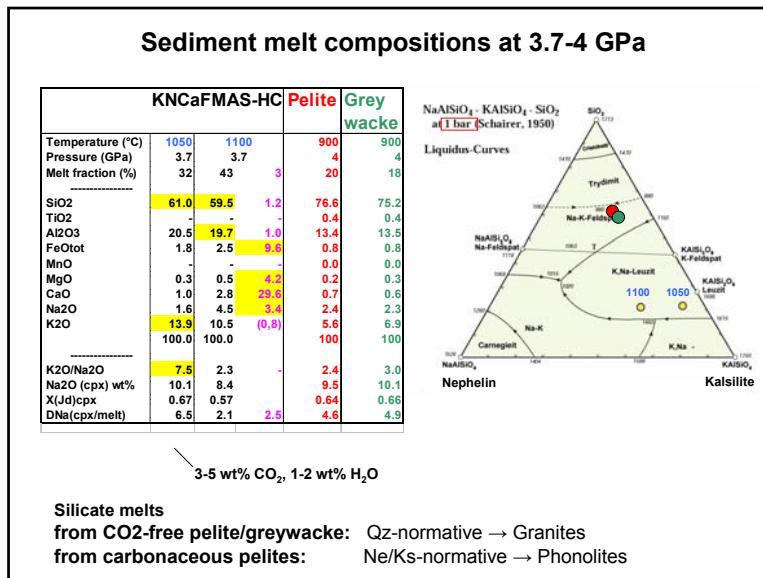
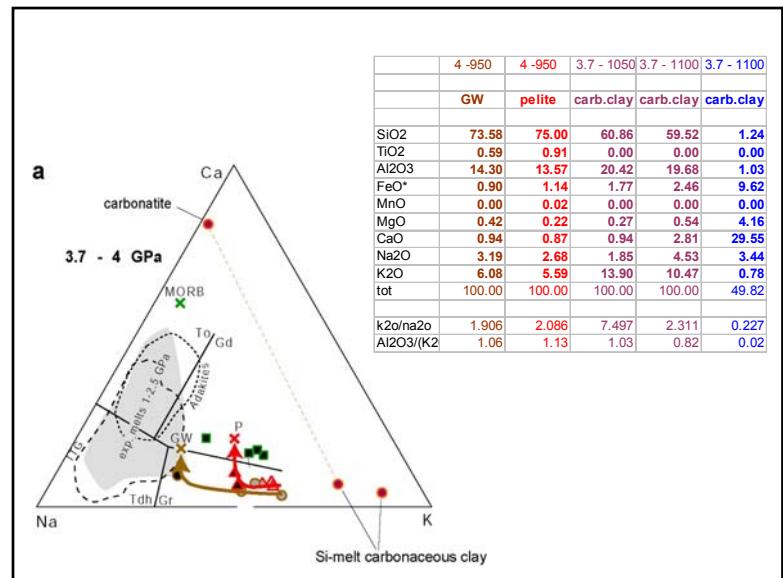
Conclusion:

Carbonates (normally dolomite and magnesite) are just happily sitting out the H₂O-flush and won't surrender their CO₂, or at least keep >80%. (this is also correct for sedimentary compositions)

How to recycle subducted carbonate

- not through carbonate destabilization
- nor through flushing with large quantities of fluid (X_{CO_2} is too low)
- **How about melting ?**





Recycling subducted carbonate ?

not through carbonate destabilization

nor through flushing with large quantities of fluid (X_{CO_2} is too low)

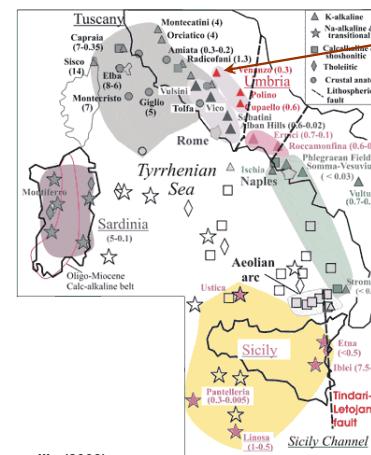
How about melting ?

During steady state not realistic, required temperatures are $>1000\text{ }^{\circ}\text{C}$ (4 GPa)

But: *thermal relaxation will lead to these temperatures*

4b) Ultrapotassic magmas of Central Italy (Intra-Appenine/Umbria)

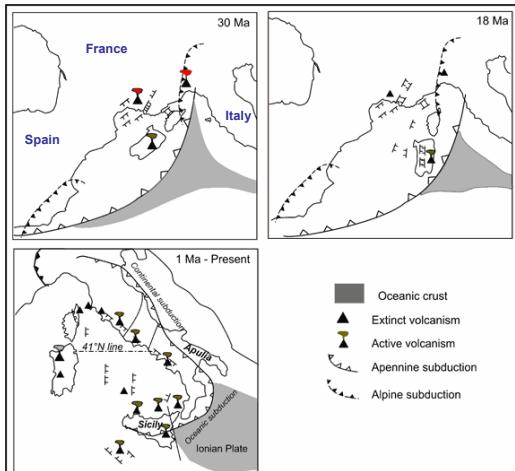
Ultrapotassic Magmatism of Central Italy



Peccerillo (2003)

	San Venanzo	AM07	group II Kimberlite
SiO_2	43.50	64.90	40.72
TiO_2	0.78	0.00	1.98
Al_2O_3	10.96	20.30	6.45
FeO	6.23	1.09	9.17
MgO	13.60	0.13	22.26
CaO	15.83	0.46	13.41
Na_2O	0.98	1.37	0.53
K_2O	7.81	11.70	4.05
P_2O_5	0.31	---	1.43
Cr (ppm)	820	---	1200
Ni (ppm)	150	---	700
Mg#	79.6	17.5	81.22
$\text{K}_2\text{O}/\text{Na}_2\text{O}$	8.00	8.54	7.64
$\text{CaO}/\text{Al}_2\text{O}_3$	1.44	0.02	2.08

- ultrapotassic
- ultracalcic
- primitive X_{Mg} , Cr, Ni



The Italian ultrapotassic volcanism (800.ky - 0 ky)

