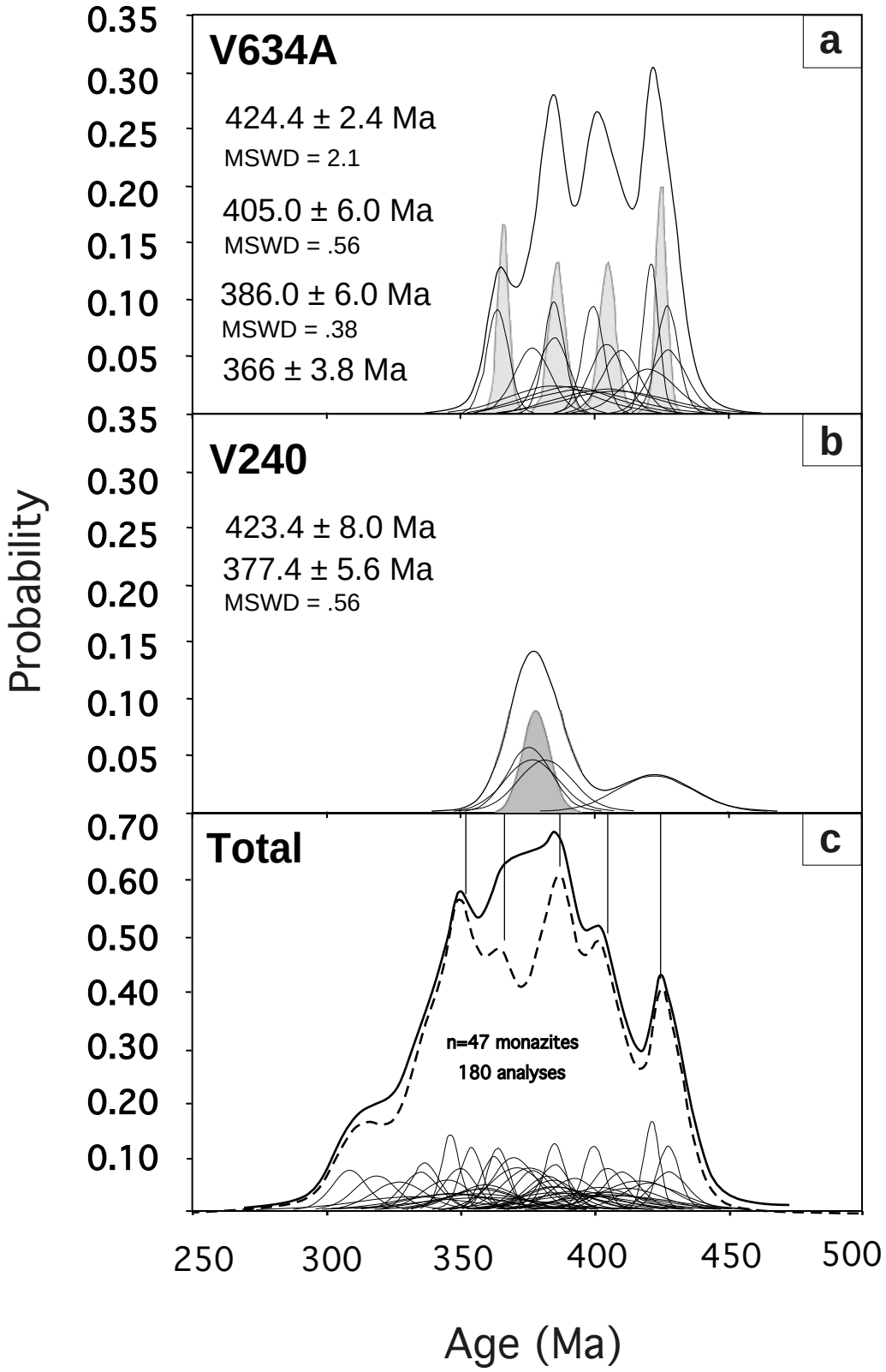
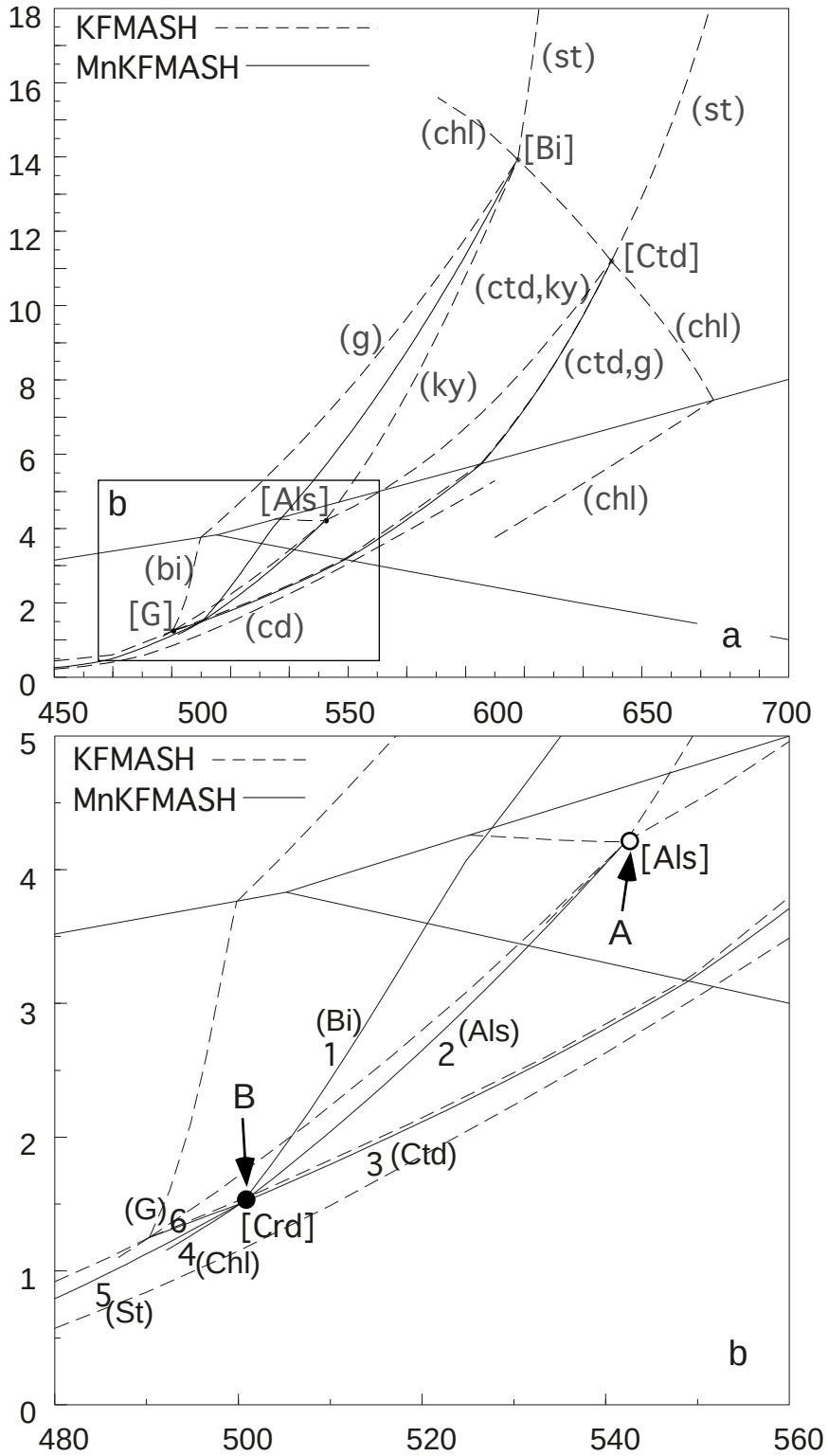


Figure 11a,b and c. 11a,b) Probability curve for monazite age distributions for samples V634A and V240 determined by U-Th-total Pb using the electron microprobe. Small curves represent ages for single monazite grains and grayed filled curves represent weighted averages for garnet growth events. 11c) Total distribution curve (solid line) for 5 samples dated around the Chester and Athens Domes. Dashed curve is total probability excluding V240 from Chapter 2 this dissertation. (see also Bell and Welch, 2002).

Figure 12a,b. Petrogenetic grids used to construct pseudosections 12a) The KFMASH and MnKFMASH petrogenetic grids calculated using the program THERMOCALC v3.21 and the Holland and Powell (1998) dataset with recent upgrades (2001). Solid lines are MnKFMASH univariant reactions and dashed lines are KFMASH univariant reactions. 12b) Blowup of the 2 grids about the cordierite-absent invariant (labeled B) in MnKFMASH. MnKFMASH reactions used to calculate pseudosections in figures 13-15 are listed below. Numbered reactions correspond to numbered lines in 12b. Mineral abbreviations used on petrogentic grids and following pseudosections are as follows: chl = chlorite, ctd = chloritoid, crd = cordierite g = garnet, st = staurolite, bi = biotite, als = aluminum silicate, and = andalusite, sill = sillimanite, ky = kyanite, q = quartz, mu = muscovite.



1) ctd + als = chl + st + g + q + H_2O

2) ctd + mu = chl + bi + st + g + q + H_2O

3) chl + st + mu = bi + g + als + q + H_2O

4) ctd + mu = bi + st + g + and + q + H_2O

5) chl + ctd + mu = bi + g + and + q + H_2O

6) chl + st + mu = bi + ctd + and + q + H_2O

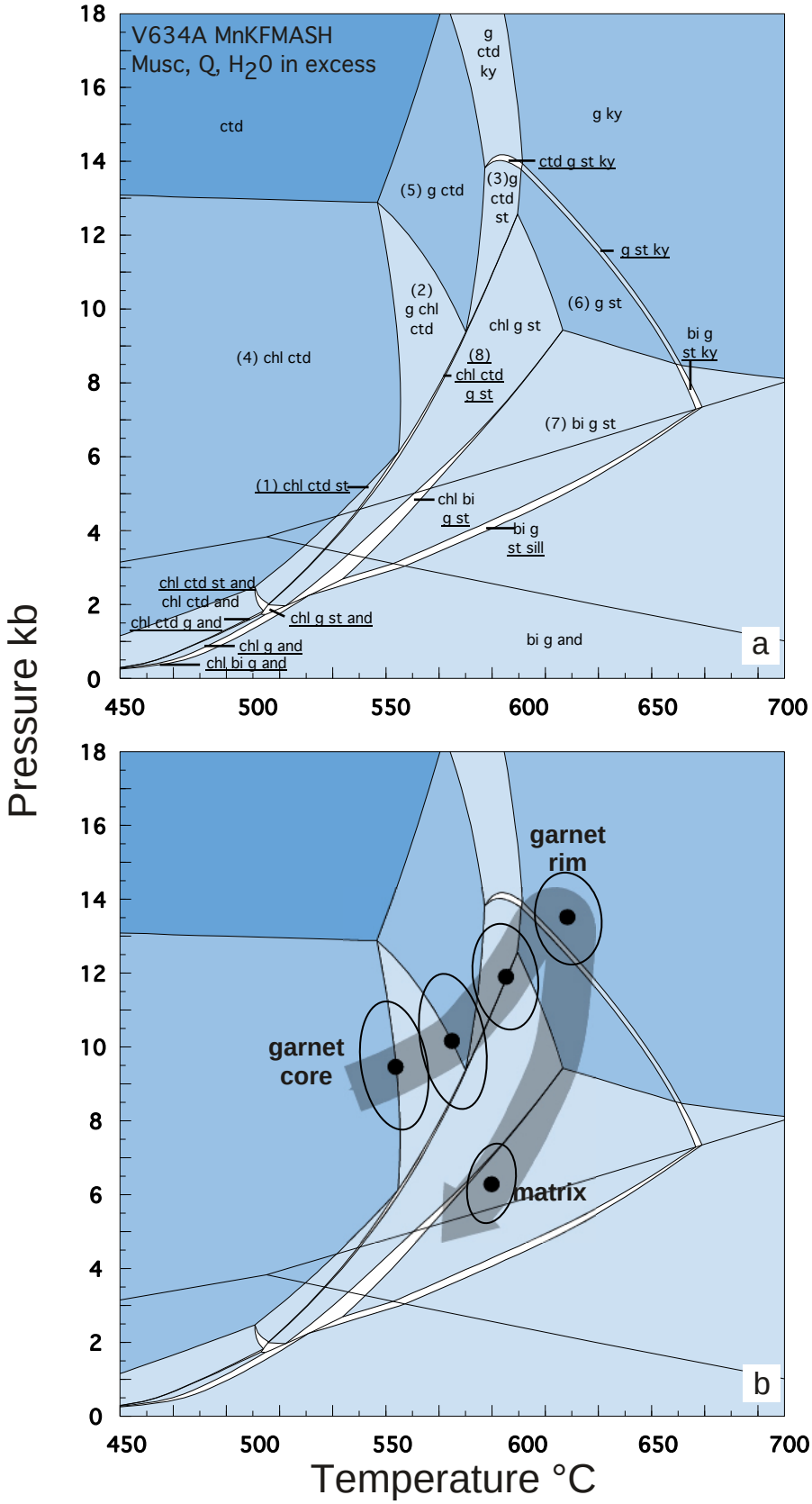


Figure 13a, b. 13a) V634A P-T pseudosection with fields labeled for stable assemblages: All fields contain muscovite, quartz and water in excess. Numbered fields are referred to in the text. Darker fill colors represent higher variance with divariant fields in white. 13b) Interpreted P-T path for V634A superimposed on the pseudosection with thermobarometric estimates with error ellipses.

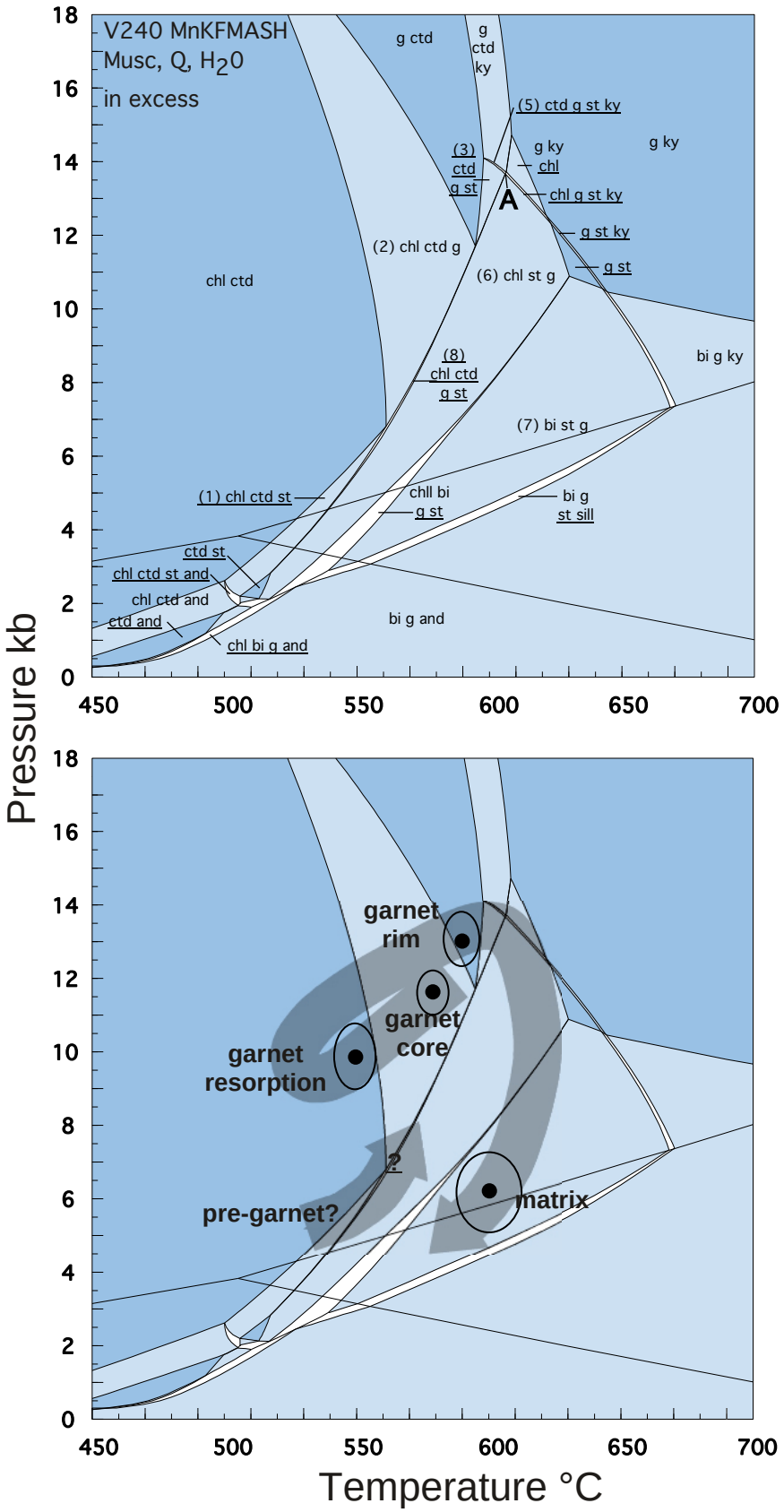


Figure 14a, b. 14a) V240 P-T pseudosection with fields labelled for stable assemblages. Labelling is same as figure 13a. Darker fill colors represent higher variance with divariant fields in white. 14b) Interpreted P-T path for V240 superimposed on the pseudosection with thermobarometric estimates with error ellipses.

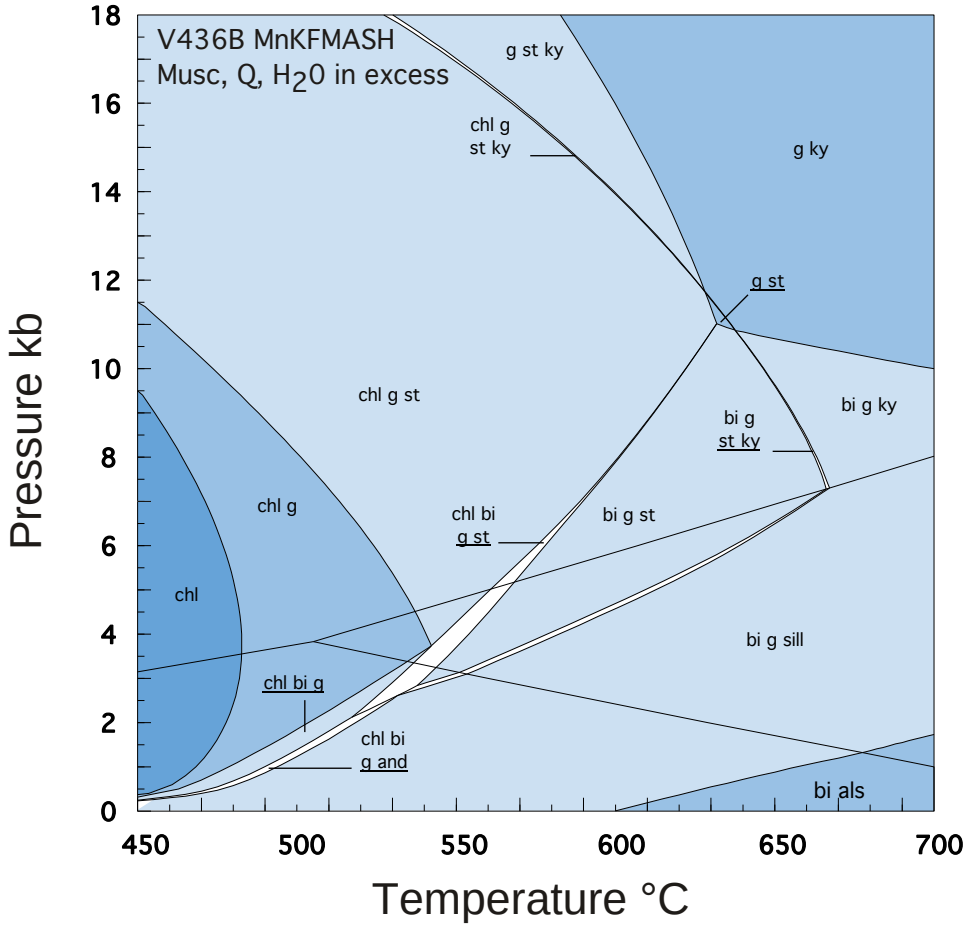


Figure 15. V436B P-T pseudosection with fields labeled for stable assemblages. Darker fill colors represent higher variance with divariant fields in white.

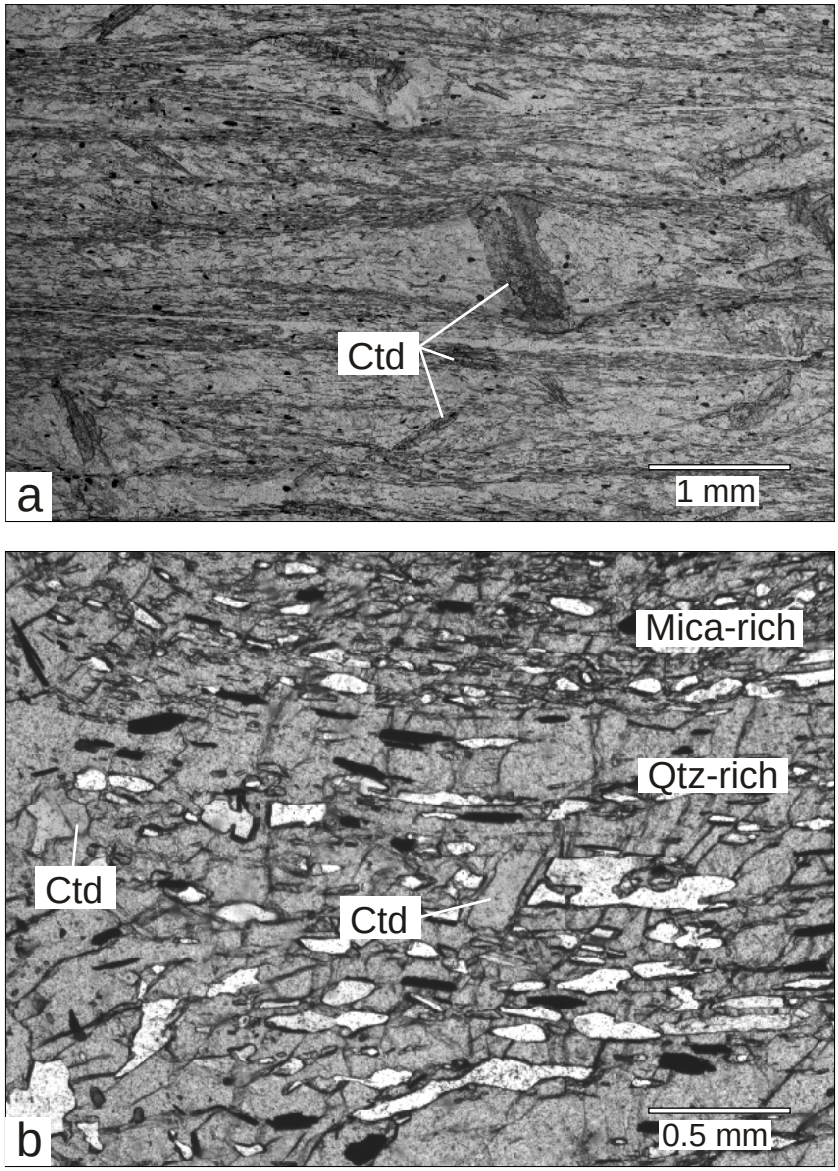
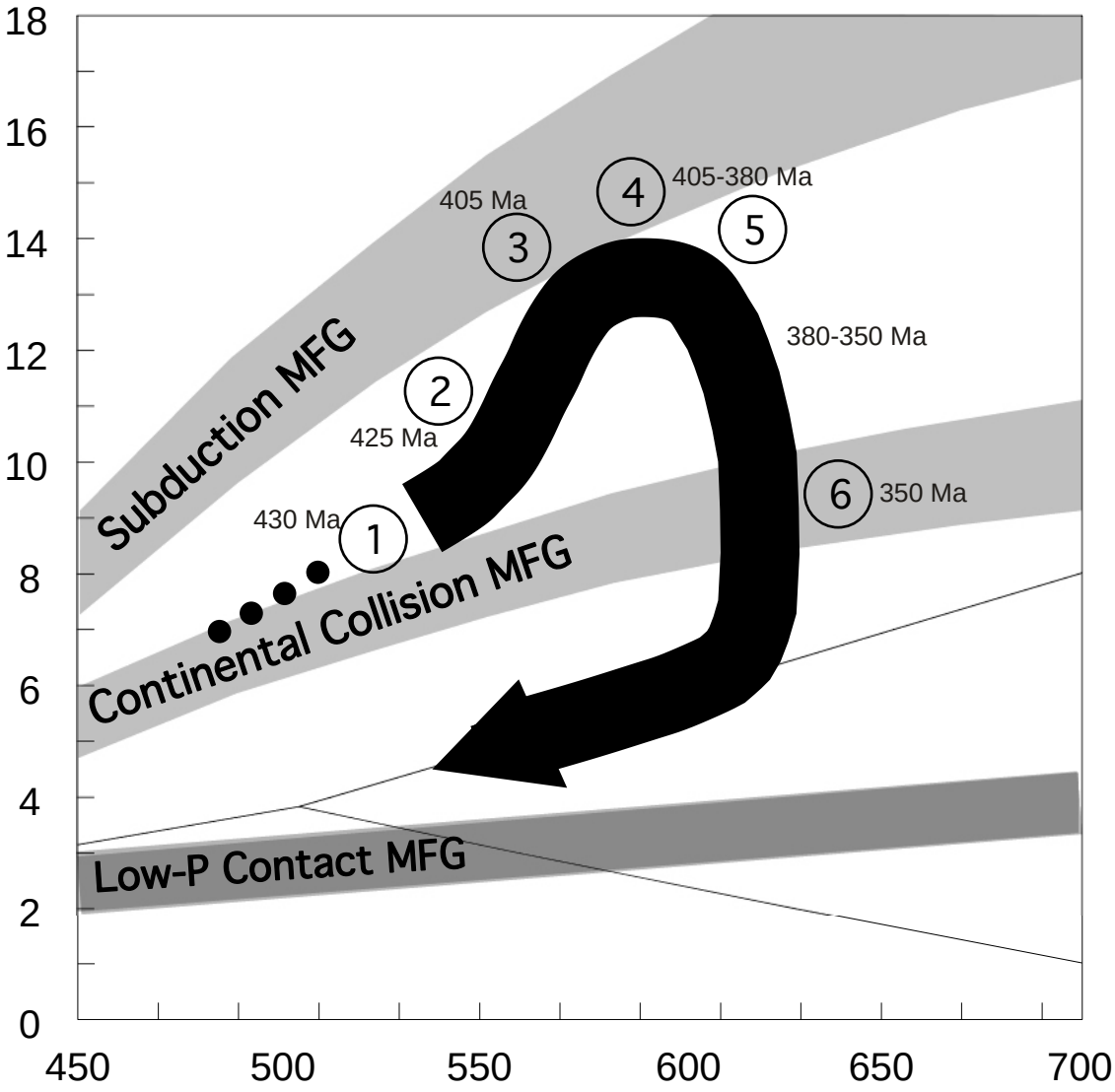


Figure 16a, b. 16a) Photomicrograph of a chloritoid-chlorite schist with spaced muscovite cleavage from Bell and others (1986). 16b) Photomicrograph of garnet core from V634A showing chloritoid laths oblique to the spaced foliation preserved as inclusion trails.



1) Residual Taconian thermal effects at 430 Ma. Large scale folding result W-NW shortening of Cambro-Ordovician sequence after docking of island arc.
2) Onset of Acadian orogeny at 425 Ma. Garnet growth begins during FIA set 2.
3) Continued crustal thickening. Garnet growth occurs along up-pressure path minor heating to 405 Ma. Garnet growth during FIA set 2 by N-S shortening.
4) Peak of crustal thickness approaching 14 kbar between 405-380 Ma. Shortening direction shifts to ENE-WSW with garnet growth during FIA set 3.
5) Continued heating to 386 Ma reaching 610°C at 12 kbar followed by crustal collapse and decompression.
6) Late garnet, staurolite and biotite grow during FIA set 4 with little heating during decompression to 350-360 Ma. Matrix recrystallization during FIA set 4 with shift in shortening direction to ESE-WNW.

Figure 17. A schematic P-T-t-d path that is consistent with reactions from pseudosections, thermobarometry, monazite geochronology, and FIA studies.