Bingo-Antidote standalone

Sample HAL104 is a garnet-biotite gneiss from the Central Metasedimentary Belt in the southwestern Canadian Grenville Province. The main mineral is made of quartz, plagioclase, biotite, garnet, sillimanite and minor staurolite. Sillimanite and staurolite are not in equilibrium as inferred from textural relationships. Staurolite forms tiny, rounded crystals in plagioclase and in close relationship with biotite. Therefore, staurolite seems to be associated to a retrograde stage.

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1. Make an isochemical phase diagram (Domino) for a water saturated system from 500 to 800°C and 4 to 12 kbar using the following bulk composition:

0 SI(1.1666)AL(0.2632)FE(0.0852)MG(0.0824)MN(0.0021)CA(0.0064)NA(0.0916)K(0.0299)H(1.00)O(?) * HAL104

Use the database **JUN92.bs**

2. Find the P-T condition of the peak assemblage Grt, Bt, Plg, Qz, St is stable. Check P-T condition with Theriak (using the long output). Note: replace the "0 " at the beginning of the bulk definition line by "1" in the THERIN-file.

3. WAIT FOR DISCUSSION!

4. Generate an input text-file in the following format, using the microprobe analysis of table 1 (only the grey values):

1. Number of Phases,e.g.
   2
2. Number of elements, e.g.
   8
3. Choose elements, which you want to consider, e.g.
   O SI AL FE MG K H E
4. "number of oxygen apfu" #SI #TI #AL … #H #E of the first phase (H and E are placeholders and are always 0), e.g.
   11.00 38.00 17.00 13.00 15.10 10.00 0.00 0.00
5. "number of oxygen apfu" #SI #AL … #H #E of the second phase, e.g.
   2.00 1.00 0.00 0.00 0.00 0.00 0.00 0.00
6. Give names of mineral phases just the same as in the database (and in the same order as they occurred in line 4 and 5, e.g.
   BIOTITE A-QUARTZ
7. Give estimated volume fractions of each mineral in the same order as they occurred in line 6, e.g.
   30.00 40.00
8. Tell the program if numbers in line 4 and 5 are oxides in wt% (then write "O") or apfu in mol (write "A"), e.g.
   O A

Save this text-file in your working folder.

5. Open antidote.m in MATLAB/Octave.

6. Define the names of input-file, database-file and bulk composition-file. Write also the temperature and pressure range in the “USER INPUT” block of the antidote.m script. Use the same parameters as in step 1.

7. Run the antidote.m program.

8. WAIT FOR DISCUSSION!

9. Repeat the calculation with the database **tc55.txt**

10. WAIT FOR FINAL DISCUSSION!

Optional:

Use grt-core and bt-1 compositions (instead of grt-rim and bt-2), and run antidote.m again.

Table 1:

	plg	*st*	*grt-rim*	*bt-2*	*grt-core*	*bt-1*
SiO_2	67.2	27.2	38.6	37.2	39.12	36.9
TiO_2	0.0	0.8	0.0	2.3	0.04	2.6
Al_2O_3	20.3	52.7	21.5	17.4	22.3	17.3
FeO	0.3	13.5	33.5	13.6	28.2	14.5
MnO	0.0	0.1	1.4	0.1	1.1	0.6
MgO	0.0	3.3	6.2	15.0	9.6	15.5
CaO	1.2	0.0	0.2	0.0	0.37	0.0
Na_2O	10.8	0.0	0.0	0.2	0.0	0.2
K_2O	0.1	0.0	0.0	9.6	0.0	9.6
Total	99.8	97.6	101.3	95.3	100.772	95.7