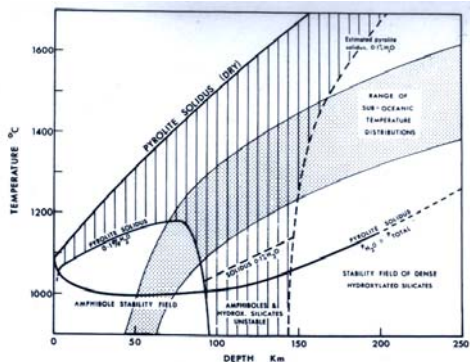


Exam Magmatic Processes 2009

This is not the exact exam because the paper with the questions had to be hand in. These are the approximate questions and the topics that have been questioned. Use this as an indication to know what you should be able to do and learn.

1. Explain Ringwoods Pyrolite model. Why did he do this? What are his assumptions? What are the shortcomings of the model?
2. What are the most important things that happens to the mantle when water is added?
3. Explain the low velocity zone with the following figure:



4. You think that the optical sign of a mineral in a thin section is biaxial negative. Explain what you have to do to determine the optical sign. What should you see when the mineral is indeed biaxial negative?
5. What can you do with a thin section to know if magma mixing took place?
6. You have a ternary system with a eutectic and three cotectics going to the sides of the ternary graph. The 3 minerals are A, B and C. Highlight the compositions where mineral B does not totally crystallizes as first mineral and where mineral C does not crystallizes the last upon increasing partial melting.
7. With the Mixing module in Igpet: Explain what the computer does. What are the assumptions and shortcomings?
8. See below:

| | Element I | Element II | Element III | Element IV |
|----------|-----------|------------|-------------|------------|
| Parent | 2 ppm | 6 ppm | 370 ppm | 510 ppm |
| Daughter | 4 ppm | | 120 ppm | |

Elements I and II are total incompatible. Two minerals crystallize in crystal fractionation, olivine and cpx. The D values for the elements III and IV in Ol and Cpx are given together with the following formula:

$$C_x/C_y = (D(1-F) + F)^{-1}$$

Calculate the concentrations of II and IV in the daughter.