

Take Home Quiz 3 KEY

Take home quizzes are due at the beginning of the following lecture. They are worth 2 points of EXAM credit. Please attach this sheet to your answers if additional sheets are used.

Sections 4.2.3 and 4.2.4 of the text contain information relevant to these questions.

1. The border zone between a pluton and country rock can reveal considerable information. Describe the factor that influences border zones, and the effects seen in different environments of emplacement.

A. The temperature contrast between the pluton and country rock. For shallow intrusions, the pluton is usually much hotter than the country rock. Chilled border zone may result. The magma chills quickly, with little chance for any differentiation or assimilation processes to operate. Chilled border zones may be recognized by their relatively finer grain size. Sharp border zones occur.

B. At depth, the country rock is closer to the pluton in temperature. Gradational borders occur. Borders may show injection, permeation, or a combination of the two.

2. Plutons may be categorized as:

- A. Pre-tectonic
- B. Syn-tectonic
- C. Post-tectonic

What type(s) of imprint does an orogenic episode create on each type? What rock characteristics are expected in each case, at any scale? Where will deformation be seen?

A. The orogenic events impart both a tectonic and a metamorphic imprint on the pluton. Internal foliation is established, and it parallels that of the country rock. Regional metamorphism may curve around the pluton, particularly if there are ductility differences. Most deformation will be concentrated at the border zone.

B. Will be affected by orogenic tectonics, often to a greater degree than the pre-tectonic pluton. Deformation will be seen throughout the pluton, not limited to the margins. Syn-tectonic plutons may elongate more than pre-tectonic plutons, in the direction of foliation.

C. Plutons lack foliation. Any regional deformation fabrics in the country rock will end discordantly at the pluton, or may end concordantly if a significant contact metamorphic aureole and schlieren exist.