GLG 333 -- COMMON METAMORPHIC TEXTURES AND STRUCTURES

[modified from Blatt, Tracy, & Owens, 2006, p. 365-371]

I. SHAPE OF INDIVIDUAL CRYSTALS

1. Idioblastic (or Idiomorphic). Crystals completely bounded by their own crystal faces; the metamorphic equivalent of euhedral.

2. Xenoblastic (or Xenomorphic). Crystals not bounded by crystallographic faces; the metamorphic equivalent of anhedral.

II. WHOLE-ROCK TEXTURES

A. BASED ON RELATIVE CRYSTAL SIZE

1. Equigranular. All crystals essentially the same size.

2. Megacrystic (or Crystalloblastic). Non-equigranular; some crystals distinctly larger than others; geometrically (but not genetically) analogous to porphyritic igneous texture.

   a. Porphyroblastic. Large crystals (porphyroblasts) grown in a finer-grained material by concretionary action. The finer-grained material will show signs of having been spread apart to make room for the porphyroblast.

   b. Poikiloblastic. Large crystals (poikiloblasts) grown in a finer-grained material by replacement. Commonly the poikiloblasts will contain inclusions of the incompletely replaced finer-grained material.

B. BASED ON RELATIVE CRYSTAL ORIENTATION

1. Isotropic (or Nonfoliated). No preferred crystal orientation.

   a. Hornfelsic. Massive, fine-grained (crystals < 0.5 mm); often includes randomly oriented megacrysts (resembles porphyritic-aphanitic igneous texture).

   b. Granoblastic (or Mosaic). Medium to coarse grained (crystals > 0.5 mm). Granular aggregate consisting of equigranular and equidimensional crystals.

   c. Decussate (or Diablastic). Medium to coarse grained (crystals > 0.5 mm); crystals randomly oriented but distinctly non-equidimensional (i.e. platy and/or elongate).

2. Anisotropic (Foliated and/or Lineated). Non-equidimensional (i.e. platy and/or elongate) crystals show a definite preferred orientation.

    a. Slaty. Very fine grained (crystals < 0.1 mm). Rock cleavage developed by the parallel (planar) alignment of microcrystalline micas (muscovite, biotite, and/or chlorite).

    b. Phyllitic. Fine grained (crystals < 0.5 mm). Characterized by crenulation cleavage, microfolds, or kink bands resulting from sub-parallel alignment of micas.

    c. Schistose. Medium to coarse grained (crystals > 0.5 mm). Planar texture developed by the parallel alignment of macroscopic non-equidimensional crystals (usually mostly micas and/or amphiboles).

    d. Gneissic. Banded or "rodded" texture; bands or rods of foliated or lineated material (usually mostly micas and/or amphiboles) alternating with bands or areas of mosaic-textured material (usually mostly quartz and feldspar).

    e. Migmatitic. "Mixed rock"; granoblastic leucocratic (i.e. light-colored) areas complexly intermingled with strongly foliated areas rich in ferromagnesian minerals; indicates local partial melting.

III. SPECIAL TEXTURES AND STRUCTURES

1. Relict sedimentary bedding. Bands of alternating color and/or grain size reflecting original variations within the sediment.

2. Cataclastic/mylonitic texture. Produced by crushing (but not recrystallization) associated with movement along closely spaced parallel shears (such as near the center of a large fault zone): cataclastic = coarse-grained; mylonitic = fine-grained.

3. Augen. Lenticular ("eye-shaped") masses of mineral material formed around a large central porphyroblast. The porphyroblast spreads the pre-existing mineral apart, allowing other minerals to grow by secretion into the "corners of the eye".

4. Boudinage. Lenticular ("sausage-shaped") masses developed as a competent unit enclosed in a less competent unit is pulled apart by tensional stress.