AFM Quiz

C:\Courses\320\fall2005\inclass, etc\60-AFMinClassAnswers.wpd

(This exercise is a condensed version of one written by Jane Selverstone, available at: http://serc.carleton.edu/NAGTWorkshops/petrology/teaching_examples/2240.html)

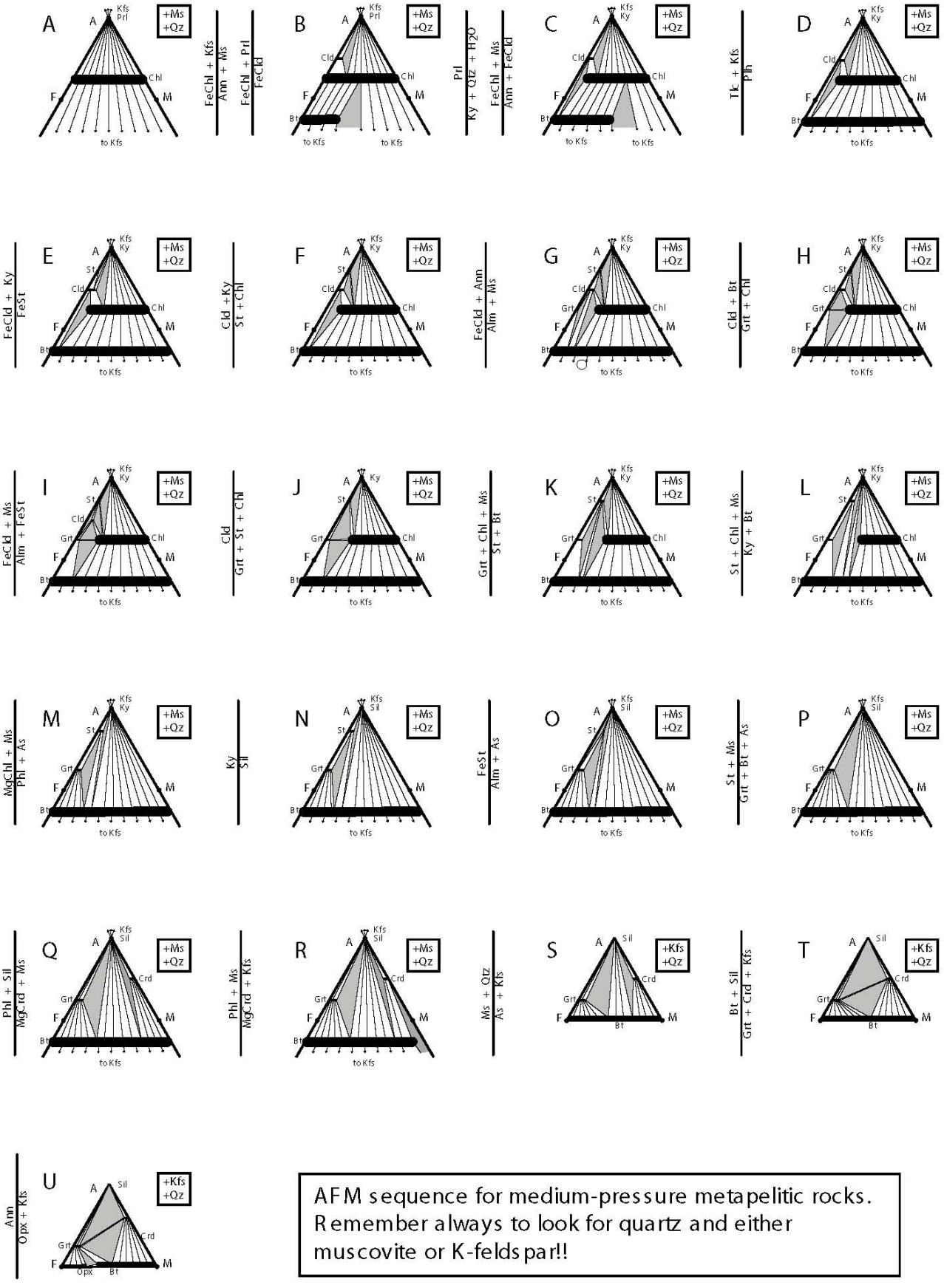
This exercise should be used after you think students know what AFM diagrams are and how they work. This is sort of a quiz – to see if they can properly interpret the diagrams.
It is best to keep the phase diagram and give it to them after they have completed the exercise. You can use it to wrap things up and show how the AFM diagrams correspond to specific parts of PT space.

One point of confusion often/always has to do with the arrows near the top apex in most of the AFM diagrams (but not diagrams S, T, and U) – make sure to explain the difference.

Here are the answers to the questions:

In what parts of PT space will the following minerals and assemblages be stable (assuming also that quartz and muscovite or K-feldspar are present):

1. chloritoid B-I
2. staurolite E-O
3. sillimanite + K-feldspar STU
4. chlorite + choritoid B-I
5. biotite + staurolite + kyanite KLM
6. staurolite + chlorite + garnet J
7. staurolite + garnet + biotite + kyanite nowhere



AFM sequence for medium-pressure metapelitic rocks. Remember always to look for quartz and either muscovite or K-feldspar!!

modified from Spear, 1993

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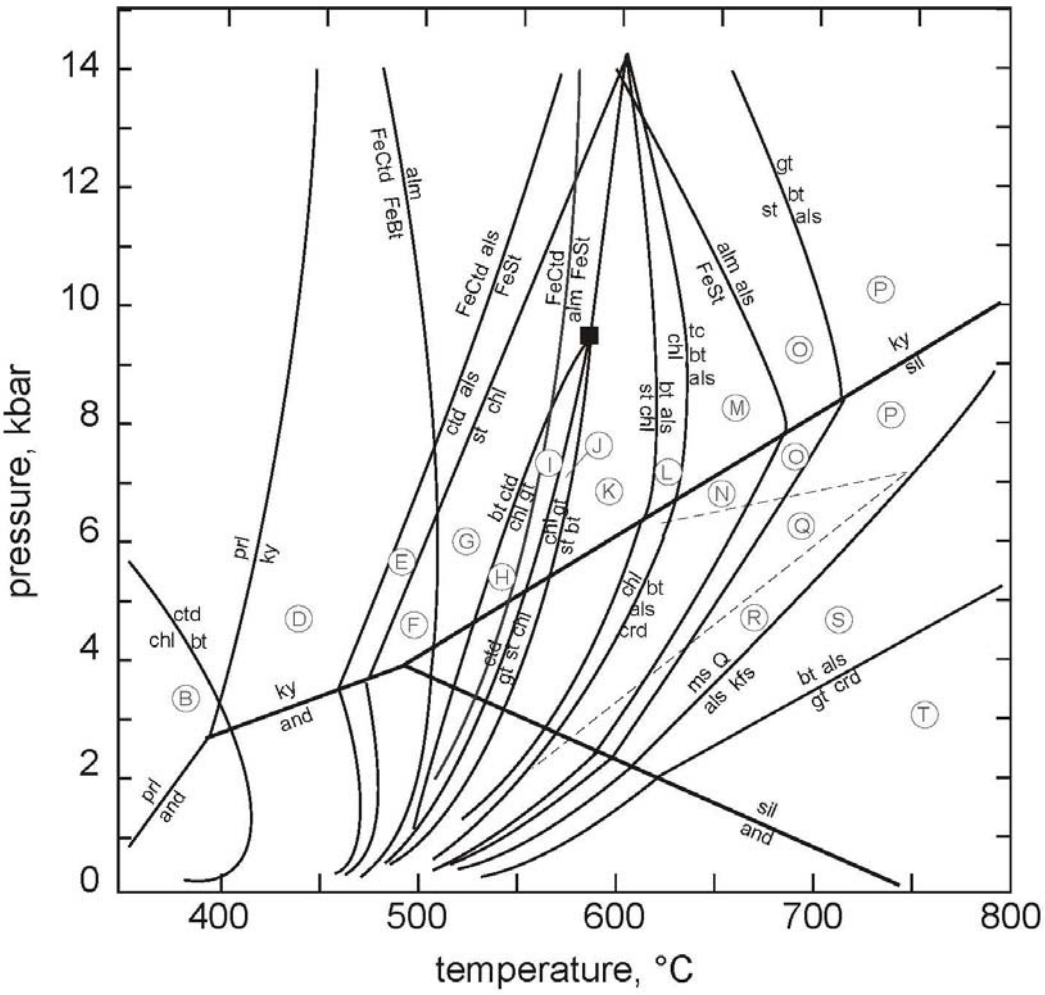

Labeled fields represent **divariant** regions; the labels correspond to the specific AFM topologies shown on the attached page.

alm = almandine	kfs = K-feldspar
als = and, kya, or sil	ky = kyanite
and = andalusite	ms = muscovite
bt = biotite	prl = pyrophyllite
chl = chlorite	Q = quartz
crd = cordierite	sil = sillimanite
ctd = chloritoid	st = staurolite
gt = garnet	tc = talc