Hi Tim

I hope you can beef up the comments a bit as follows:
1. The volcanics are mapped as being Finlayson group volcanics of the Yukon Tanana Terrane. Is there evidence in thin section that supports this? For example you note good cleavage in FA3. What about regional metamorphism producing certain mineralogy? There are phyllites in the area that seem right for YTT rocks, so I believe the mapping to that extent.

2. The granitic rocks and dykes are not foliated, and come in contact with the volcanics. The field terms I used for the hornfels seem to be wrong, as I called FA3 & FA8 biotite hornfels based on the colour of hand specimens. Obviously there is little or no biotite, just white micas, but the rocks have added pyrite + pyrrhotite and seem very hard like a hornfels. Is the py and po secondary, which would be consistent with the linear magnetic high anomaly?
The term calc-silicate hornfels was used for FA4 & FA6 & FA7 which might be OK, since there is epidote and maybe scapolite present? And the poikilitic texture might be consistent with contact metamorphism, I think. I was hoping for garnets.... Anyways, if you could comment on mineralogy &/or textures consistent with contact metamorphism or hornfels it would help me to tell the story.

Cheers, Bill

REPLY:

Seven of these specimens are undeformed. The foliation seen in FA3 is equivocal in nature. If, as I suspect this rock was a pyroclastic, then the foliation and preferred orientation of minerals simply reflects bedding. The one layer of anastomosing structures shown in (FA3-10pp) is only 1mm thick. This might represent a microscopic shear zone, but the fabric is equivocal. No other potential deformation is seen in these rocks. The volcanics are subaerial as no indication of pumice was seen. It is quite likely that pyrite and pyrrhotite were introduced soon after deposition of these volcanics. For pyrite to revert to pyrrhotite does require an elevated temperature, but that could well be developed in a volcanic pile. It does not necessarily indicate contact metamorphism. With prograde metamorphism chlorite and zeolites (a check on crystal form indicates that zeolite is more likely to be the mineral in the veins rather than scapolite) that are found in the veins would form calc-silicate (amphibole) and feldspar. Epidote in the veins is still consistent with low metamorphic grade. Considering the chemistry of a rhyolite, however, it may be noted that there are low Mg, Fe and Ca contents, so there is not a lot of material to form calc-silicates. These rocks could be close to greenschist facies without knowing it (but bear in mind the preserved zeolite if it is that). Micrpoikilitic texture is consistent with felsic volcanics.

I don't think that there is sufficient pyrrhotite in these rocks to appreciably alter their magnetic susceptibility. You need a different explantion for your magnetics.

Unfortunately to really recognise the nature of volcanics requires good exposure. Field observation is more useful than petrography. Mapping would indicate the relationship of the volcanics to the granite. If, as I suspect the microgranite is an alkali feldspar granite sensu stricto, then it is a good candidate for the subvolcanic intrusion to the rhyolites. There might be potential to prospect for Sn and Be. Collection of fresh specimens of granite and the volcanics next year would allow some chemical analysis (fusion/whole-rock and HF-perchloric traces) that would help to at least indicate whether these are an 'evolved' igneous suite. There are zircons in the granite, so U/Pb geochronology would be possible. A closer look at the limestone might also tell as story (how recrystallised is it? Does it contain any calc-silicate mineral assemblages? Any fossils?).