3.3. Magma types and eruption mechanisms.

Several different magma types may be empirically observed in the samples examined so far, but at present it is difficult to predict if they are related by some differentiation process to one or a few magma chambers, or if they represent discrete magmatic events from unrelated magmatic sources. At least two different domains of magmatism have so far been identified on a broad scale. These are the quartz/feldspar phyric volcaniclastics from the basal part of the sequence as observed in HL40 and HL62, and the almost aphyric units representing the upper part of the sequence as represented in MAC22. Within both domains are abundant lava clasts that appear to be similar in each case, ranging in composition from andesites to dacite/rhyolite. These clasts are variably vesicular, and some display flow banding.

The volcanic clasts found in HL40 and HL62 are dominantly quartz and feldspar phyric pumice, with crystal grainsizes of several millimetres being common (fig 12). The quartz mostly is probably of xenocrystic origin, with the primary magma being a poorly crystalized rhyodacite/rhyolite. The dominant magma type found in MAC22 is almost aphyric, with some rare, very small feldspar crystals observed. Being higher in the sequence, these probably represent eruption from a separate, less crystalised magma chamber.

From observation of the products, several different eruptive mechanisms may be inferred to have been operating during the deposition of the Upper Rhyolitic Sequence. A complete spectrum, ranging from effusive magmatic lava forming eruptions to explosive, fragmental lava producing eruptions, to explosive pumice (ignimbrite?) forming eruptions, may be inferred. The pumice found in the upper sequence preserves fine tube pumice textures indicative of shallow subaqueous or subaerial eruption. There is no indication in thin section of any flattening of these pumice clasts. In hand specimen, some of these units appear to show a eutaxitic texture, but there is no microtextural evidence for welding of these units. The flattening observed is probably due to diagenetic and tectonic flattening and strain. Of the primary depositional mechanisms of the volcanic units, little can be said at present with much confidence, however, several tentative interpretations may be made.

a) The material found in HL40 and HL62 seems to be redeposited. The intimate mixing of much of the volcanic material with the shales suggests that deposition occurred elsewhere, and that the remobilization of the volcanic material caused mixing the with the shale, and that the material has a fairly distal source.

b) The material found in MAC22 may represent much more juvenile material than that found in HL40/62. The density grading of the clasts observed in some units seems to suggest that deposition has occurred from a source in which