105·8m

SAMPLE NUMBER: MAC 29 562974

SUMMARY: This rock is a plagioclase+augite-phyric basaltic lava that has suffered restricted post-eruption brecciation and weak silica veining.

HAND SPECIMEN:

This is a dark green plagioclase+augite-phyric andesite that shows quite strong but localized brecciation and groundmass silica alteration.

THIN SECTION DESCRIPTION:

Over most of this thin section, this andesitic lava is texturally well preserved, consisting of subequal proportions (~10 modal% each) of former plagioclase and augite phenocrysts. The plagioclase phenocrysts are blocky to slightly rounded euhedral to subhedral crystals to 3mm long, although most are around 1mm long. They are entirely altered to a very messy intergrowth of rather coarse-grained sericite and abundant patches of almost isotropic dirty brown aggregates of almost microcrystalline epidote. The augite phenocrysts vary from perfectly fresh to totally chloritized euhedral crystals mainly less than 1mm long, although much of the augite occurs as intergrowths of four or five augite crystals making clots up to 3mm across. They often show compositional zoning, and contain small crystalline inclusions of plagioclase and FeTi oxides. Small gabbroic clots of intergrown augite and plagioclase are not uncommon.

The groundmass of this sample, where best preserved, was very weakly vesicular and vitrophyric, defined by a slightly fluidal arrangement of tiny acicular plagioclase through former glass that has devitrified to an exceptionally fine-grained and almost isotropic quartz-feldspar-chlorite intergrowth. Small vesicles (< 0.5mm across) make up less than a few modal% of this lava and are filled by chalcedonic quartz, often with a core of almost colourless epidote. Brecciation, probably associated with fluid overpressure and hydrofracturing post-eruption has produced regions in the rock of quite pronounced false breccia textures. Occasional jigsaw fit fragments are notable, and most fragments are clearly separated one from the other by silica veinlets that often contain tiny rosettes and blebs of chlorite. Where veining and brecciation are most intense, the formerly largely groundmass has recrystallized more thoroughly and is less 'isotropic' than in less altered parts of the rock.

The abundance of augite phenocrysts and the groundmass textures suggests to me that this is a basaltic composition, tending towards a basaltic andesite. It has suffered post-eruption brecciation associated with weak silica alteration.

158·5m

SAMPLE NUMBER: MAC 29 562975

SUMMARY: This sample is a mass flow volcanogenic conglomerate probably slumped off an andesitic volcano; it is dominated by strongly recrystallized formerly glassy andesite lava fragments.

HAND SPECIMEN:

This is a dark green quite polymict lava breccia or volcanogenic sandstone that contains diverse clasts of lava up to at least several cm long, in an altered volumetrically minor matrix.

THIN SECTION DESCRIPTION:

The diversity of lithic fragments in this sample show clearly that it is a polymict lava breccia or coarse volcanogenic sedimentary rock. Most fragments are 1-3mm long, and consist of plagioclase-phyric andesite, plagioclase+augite-phyric basalt and andesite, and glassy mafic to andesitic lava, but a few perlitic textured dacite fragments with sparse plagioclase phenocrysts are also present. Many of the fragments constituting this sample were glassy and vesicular, probably andesitic and have altered to quartz-albite-magnetite±chlorite assemblages. Less glassy fragments are often better preserved and were dominantly plagioclase-phyric andesites. Fragments containing abundant quite large, albitized blocky plagioclase phenocrysts in chlorite have probably been strongly affected by volume loss associated with pressure solution. Former augite phenocrysts in more mafic fragments are always altered to chlorite. There is no volcanic quartz in this rock. The alteration assemblages are quartz-dominated, although chlorite and epidote are not uncommon, the latter occurring as small pockets of well-formed prismatic pale yellow crystals.

I think that the exceptional diversity of lava fragments in this rock indicates that it has been redeposited, probably from a mass flow unit slumping off an andesite-dominated volcanic terrain. The matrix of this rock was possibly silty comminuted glass shards that were largely washed out during deposition, so that the formerly largely glassy lava fragments were compacted as they devitrified and recrystallized during burial metamorphism. This has led to strongly intergrown fragment margins and identification of former matrix is impossible. Occasional small concentrations of rather dark sphalerite were also noted.

195.0 m

SAMPLE NUMBER: MAC 29 562976

SUMMARY: This sample is a andesitic lava breccia dominated by plagioclase+minor augite-phyric glassy andesite lava fragments; it has suffered weak silica alteration that has enhanced the brecciated appearance of this rock.

HAND SPECIMEN:

This is a dark green andesitic lava breccia or volcanogenic conglomerate with less diverse lava fragments, although one pale plagioclase-phyric dacite(?) fragment at least several cm long is obvious in the hand specimen.

THIN SECTION DESCRIPTION:

The 'dacitic' clast noted above in the hand specimen description is actually a quite vesicular, formerly glassy plagioclase+sparsely augite-phyric andesite fragment. The perfectly round vesicles are filled with radiating fibrous quartz, and are cored with either pale yellow epidote, or bundles of pale green pleochroic pumpellyite, sometimes associated with fibrous albite. Plagioclase in this large clast occurs as small (mainly <1mm long) phenocrysts totally altered to albite, and often containing granular yellow epidote inclusions.

The remainder of this rock is dominated by formerly glassy fragments of plagioclase+augite-phyric andesite that have suffered strong alteration, dominated by silification. Plagioclase phenocrysts and groundmass microlites are mainly replaced by albite and epidote, whereas much less abundant augite phenocrysts are partly or wholly chloritized. The fragment groundmasses, and especially those areas in between fragments (very poorly defined due to recrystallization of glass) have all been altered to, or replaced by, granular fine-grained silica in which chlorite, very fine-grained to quite granular epidote, and large patches of prehnite occur. Minor amounts of disseminated reddish sphalerite occur in this sample.

Although several different types of lava fragments are present in this rock, the dominance of the one andesitic fragment type in this sample suggest that it is a lava breccia. The breccia texture has certainly been enhanced by silica alteration and 'false' brecciation. The metamorphic assemblage is clearly prehnite-pumpellyite facies.

238.0m

SAMPLE NUMBER: MAC 29 562977

SUMMARY: This is a well-preserved augite+plagioclase-phyric vesicular basaltic lava.

HAND SPECIMEN:

This is a fairly massive dark grey-green vesicular andesitic to basaltic lava with sparse plagioclase and augite phenocrysts, chlorite-filled vesicles and occasional quartz veinlets.

THIN SECTION DESCRIPTION:

This is a texturally well-preserved basaltic lava consisting of about 5 modal% of fresh to chloritized augite phenocrysts and slightly less abundant and smaller albitized plagioclase phenocrysts in a formerly quite glass-rich groundmass in which acicular plagioclase microlites are abundant. Augite phenocrysts are mainly <1mm long euhedral crystals, but they often occur in multi-crystal clots, and intergrown with a few plagioclase crystals in gabbroic clots. Albitized plagioclase phenocrysts are rarely as long as 1mm, and often contain tiny chloritized melt inclusions paralleling crystal faces.

A feature of this rock is the relative abundance (5-8 modal%) of quite large (to 5mm across) ovoid vesicles that have been filled by a range of secondary products including radiating to botryoidal chalcedonic silica, patchy to radiating albite, granular yellow epidote and masses of green chlorite. The groundmass of this sample was vitrophyric, dominated by tiny acicular plagioclase microlites in glass. Devitrification of glass has produced a rather mottled appearance of the groundmass, due to concentrations of chlorite defining boundaries of lighter coloured zones in which quartz and albite produced during recrystallization of the devitrified glass are concentrated.

This is an augite+plagioclase-phyric vesicular basaltic lava.

319.2m

SAMPLE NUMBER: MAC 29 562978

SUMMARY: This was a well-preserved quite primitive clinopyroxene+olivine-phyric vesicular basaltic lava.

HAND SPECIMEN:

This is a vesicular, rather massive grey-green basaltic lava with abundant clinopyroxene phenocrysts and calcite-filled vesicles up to almost 1cm across.

THIN SECTION DESCRIPTION:

This is a quite primitive basalt dominated by abundant phenocrysts of fresh clinopyroxene and altered olivine in a vitrophyric groundmass. The clinopyroxene phenocrysts make up about 12-15 modal% of this sample and are euhedral to subhedral and mainly 0.5-2mm long; they often show compositional zoning and are frequently intergrown in clots of three or more crystals. Former olivine phenocrysts make up about 5 modal% of this rock and have characteristic prismatic shapes to about 1.5mm long and have been entirely replaced by granular secondary quartz intergrown with pale green chlorite and calcite. Small chromite euhedra are commonly included in the olivine phenocrysts. There were no plagioclase phenocrysts in this sample, as it is too mafic (and thus hot) to crystallize plagioclase.

Th groundmass of this sample is a mottled intergrowth of tiny acicular plagioclase microlites in devitrified glass that is almost isotropic, and contains small lighter coloured domains in which quartz (and albite?) have crystallized from the devitrified glass. The common large vesicles are filled by polycrystalline calcite, and the same mineral occurs in occasional narrow veinlets and fractures. This sample differs from those described above in that it lacks the plagioclase phenocrysts and is considerably more primitive (or magnesian). I would have guessed that it was from the Upper Basalt if I did not have the drill log.

357·8m

SAMPLE NUMBER: MAC 29 562979

SUMMARY: This is a rather altered polymict basaltic lava breccia in which the dominant fragments are augite+plagioclase-phyric basalt and clinopyroxene+**olivine-phyric basalt. It has suffered quite strong silica (±albite) alteration and veining.**

HAND SPECIMEN:

This sample is a dark grey-green basaltic lava breccia with fragments of clinopyroxene-phyric basaltic lava to several cm long.

THIN SECTION DESCRIPTION:

This is a polymict lava breccia with much stronger alteration than the previous sample. The dominant fragment type is a vesicular augite+plagioclase-phyric basalt, not unlike sample 977 above. In these, augite phenocrysts predominate over albitized plagioclase phenocrysts, (about 8 modal% and 3-5 modal% respectively), and vesicles are filled with chalcedonic silica, chlorite and calcite. The groundmass of these lava fragments varies from what was clearly entirely glassy (now brownish devitrified almost isotropic glass) to strongly vitrophyric and 'trachytic' textures in which abundant often aligned plagioclase microlites predominate. Less abundant fragment types include augite+olivine-phyric basaltic lava fragments very similar to 978 above, and a few mafic phenocryst-free plagioclase-phyric andesites.

The matrix of this lava breccia is very altered and recrystallized, and has been soaked and veined by secondary silica and albite in which dark green chlorite and patchy to granular yellow epidote are not uncommon. Although I have no doubt that this was a polymict lava breccia, it is clear that the silica solutions exploded many fragments as they invaded the rock.

This basaltic lava breccia is dominated by fragments similar to the basalts described under 977 and 978 above (I realize the latter two are stratigraphically higher - it is simply a petrographic comparison without implications.

469.6m

SAMPLE NUMBER: MAC 29 562980

SUMMARY: This is a distinctive sparsely plagioclase-phyric evolved andesite that texturally is more likely to be a shallow intrusive than a lava flow.

HAND SPECIMEN:

This is an aphyric, very even-textured pale grey-pinkish massive dacitic lava or shallow intrusive.

THIN SECTION DESCRIPTION:

This is a petrographically distinctive almost aphyric dacite or very silicic andesite lava that is quite unlike the more intermediate and mafic samples described above in this report. Small albitized plagioclase phenocrysts make up around 2-4 modal% of this rock,and one or two small totally chloritized former mafic phenocrysts (probably augite) were noted.

The remainder of this sample is an intergrowth of microlitic to somewhat more blocky small albite crystals with interstitial quartz and chlorite, and larger rather ragged and angular patches of coarser polycrystalline secondary quartz . The texture is not absolutely diagnostic, but I suggest that it is more likely that it represents a shallow intrusive rock in which there was not much glass, rather than the usual perlitic, highly glassy felsic lavas that occur in similar sequences in the region. I think the core log would better answer whether this rock is from the central portion of a quite thick flow, or else represents a shallow intrusive dacite body.

The alteration assemblage in this sample contains dispersed messy brownish yellow epidote, rather more than I would expect to see developed from degradation of a dacitic lava. Perhaps this is more andesitic than dacitic, although the paucity of mafic phenocrysts suggests that it is a low-MgO andesite (maybe 2-3%). This rock is probably a shallow andesitic to dacitic intrusive.

480.6m

SAMPLE NUMBER: MAC 29 562981

SUMMARY: This sample was a vesicular plagioclase+augite+ sparse olivine-phyric basaltic lava.

HAND SPECIMEN:

This is a green rather altered massive plagioclase- phyric vesicular andesitic lava.

THIN SECTION DESCRIPTION:

This sample is mineralogically more altered than all those described above, as shown mainly by the thorough replacement of all former clinopyroxene phenocrysts by chlorite. The rock was a basaltic lava dominated by quite large phenocrysts of clinopyroxene and smaller plagioclase phenocrysts, but a few unambiguous former olivine phenocrysts are quite obvious in this section. The clinopyroxene phenocrysts reach 4mm long, but most are 1-2mm long euhedral crystals replaced entirely by green chlorite with deep blue anomalous pleochroism. Plagioclase phenocrysts were mainly euhedral prisms 0.5-1mm long, that were albitized then replaced virtually completely by calcite. They make up around 10 modal% of this rock, a similar amount to the augite phenocrysts. The few former olivine phenocrysts are pointed euhedra replaced by polycrystalline quartz, magnetite, calcite and chlorite.

The groundmass of this rock was probably glass charged with tiny acicular plagioclase microlites. The glass has devitrified and been partially and unevenly replaced by fine-grained calcite. Calcite is also the dominant vesicle filling. Zones of fluid-induced alteration brecciation in the sample are defined by almost jigsaw fit fragments being separated by lighter coloured and coarser-grained zones dominated by secondary silica, often intergrown with minor magnetite(?). A zone of more intense deformation has produced an almost schistose fabric in a limited part of the thin section.

This was a vesicular plagioclase+augite+sparse olivine-phyric basaltic lava.

488·3m

SAMPLE NUMBER: MAC 29 562982

SUMMARY: This rock is a strongly altered formerly plagioclase+augite±olivine-phyric basaltic lava with relatively intense calcite-pyrite alteration compared with the overlying samples.

HAND SPECIMEN:

This is a strongly carbonate-altered andesitic (?) lava with stringer pyrite.

THIN SECTION DESCRIPTION:

This sample is considerably more altered than the preceding samples in this report. It was clearly a porphyritic basalt with at least two types of phenocrysts. Relic crystal shapes suggest that the dominant phenocrysts were augite and plagioclase, although it is impossible to rule out that olivine phenocrysts were also present. Former plagioclase phenocrysts make up about 3-5 modal% of this rock and were mainly elongate prisms around 1mm long. They have altered totally to fine-grained sericite and minor carbonate. Former mafic phenocrysts were almost certainly mainly augite. They also make up around 5 modal% of this sample and are mainly 1-3mm long. They have been entirely replaced by messy very fine-grained intergrowths of secondary silica, chlorite and common calcite, spattered with tiny magnetite(?) streaks and grains that often tend to rim crystals and define former grain shapes.

The groundmass of this rock is so altered as to preclude positive identification of the original texture, although I am inclined to think it was quite glassy, since there are no tiny plagioclase microlites dispersed throughout it. The groundmass probably devitrified and secondary patchy silica crystallized from the devitrified glass before strong carbonate alteration overprinted the lot. Veinlets composed of calcite and dispersed aggregates of small pyrite euhedra are common, but much less than 1mm thick usually.

This sample was a plagioclase+augite±olivine-phyric basaltic lava that has suffered strong carbonate+pyrite alteration, clearly of local hydrothermal origin.

520.7m

SAMPLE NUMBER: MAC 29 562983

SUMMARY: This sample was an augite+plagioclase-phyric basaltic lava that has undergone strong silica-carbonate (±pyrite) alteration.

HAND SPECIMEN:

This is an intensely altered former mafic lava or lava breccia with strong silica-carbonate alteration.

THIN SECTION DESCRIPTION:

This rock consists of cores of relatively weakly altered lava fragments set in a very strongly altered, in places schistose, matrix. Most of the lava fragments appear to have been petrographically similar, so the rock may have been a massive lava, or a lava breccia. The intense brecciation that dominates the sample is clearly associated with the strong alteration.

Most lava fragments were augite+plagioclase-phyric basalts, with large chloritized augite phenocrysts being somewhat more abundant than the smaller (mainly <1mm long) albitized plagioclase phenocrysts. In the more schistose lava fragments, the chloritized former augite phenocrysts are stretched out into the weak foliation, whereas albitized plagioclase phenocrysts have maintained their euhedral shapes. It is impossible to tell whether any of the altered formerly mafic phenocrysts were olivine, although the relative abundance of plagioclase phenocrysts might suggest that this basalt was rather evolved.

The groundmass of most fragments was clearly vitrophyric, with acicular albite microlites set in devitrified and altered glass. However, large areas of groundmass have been swamped by relatively coarse- to very fine-grained silica, with subordinate dirty brownish calcite or siderite as a minor alteration phase. Schistose fabrics in high strain zones are more chloritic and have sericitic streaks compared with less altered parts of the rock. Quite large idiomorphic pyrite cubes are associated with ribbon quartz veinlets that transect this rock.

This was an augite+plagioclase-phyric basaltic lava that has suffered strong silica-carbonate alteration.

543·4m

SAMPLE NUMBER: MAC 29 562984

SUMMARY: This rock was an augite+plagioclase-phyric basaltic lava that is quite altered (silica-pyrite) compared to similar lithologies higher in MAC 29.

HAND SPECIMEN:

This is a massive dark green slightly carbonate-altered porphyritic basalt with abundant very fine-grained disseminated pyrite and abundant altered augite(?) and plagioclase phenocrysts.

THIN SECTION DESCRIPTION:

This sample was originally an augite+plagioclase-phyric basaltic lava. Augite phenocrysts to about 3mm long maximum are entirely altered to admixtures of pale green chlorite and fine-grained silica. A few crystals with outlines suggestive of former olivine phenocrysts are also quartz-chlorite-altered, although these also have rims of very fine-grained opaques. The former mafic phenocrysts, clearly dominated by augite, make up about 7-10 modal% of this rock. Plagioclase phenocrysts make up about 5-7 modal% of this rock and are tabular prismatic crystals, generally less than 1mm long, that show a flow alignment and are invariably strongly altered to fine-grained sericite, chlorite and calcite.

The groundmass of this rock was vitrophyric to trachytic, being composed largely of tiny plagioclase microlites showing strong flow alignment. Interstitial glass in the groundmass has devitrified to irresolvable felsic material with dispersed tiny Fe or FeTi oxides. Scattered abundantly throughout the groundmass are patches of polycrystalline quartz that appears to have segregated from the altering groundmass, commonly in association with granular epidote and small pyrite crystals. The groundmass is transected by many discontinuous high-strain zones which have focussed both pressure solution and the concentration of dark fine-grained insoluble residues, and deposition of pyrite.

569.8m

SAMPLE NUMBER: MAC 29 562985

SUMMARY: This is a quite strongly altered formerly plagioclase + augite-phyric basaltic andesite or andesite lava with an earlier alteration assemblage of silica-magnetite-pyrite, and a later overprinting calcite±pyrite alteration assemblage.

HAND SPECIMEN:

This is a grey quite altered plagioclase-phyric andesitic lava with veins of calcite, and disseminated calcite-pyrite alteration.

THIN SECTION DESCRIPTION:

In thin section, this sample is clearly seen to have been a plagioclase+augite-phyric andesite or basaltic andesite lava. Small (mainly <1.5mm long) albitized plagioclase phenocrysts make up about 10 modal% of the rock, show no preferred orientation, and are strongly overprinted by sericite-calcite alteration. Former augite phenocrysts are less abundant but larger than the plagioclase phenocrysts, and are totally altered to chlorite-silica-magnetite intergrowths that have also been overprinted by calcite.

The groundmass of this rock was largely glassy, and has devitrified to a near-isotropic irresolvable material containing small spots of secondary quartz and riddled with tiny opaques (magnetite? or pyrite?). Meandering veinlets and fractures are filled either with dark very fine-grained epidote spotted with magnetite/hematite grains, or else quartz-calcite veins with dispersed coarser-grained pyrite. Concentrations of pyrite not associated with banding are also present, although the individual pyrite crystals are usually <0.1mm across.

This is a strongly altered plagioclase+augite-phyric basaltic andesite or andesite lava in which a silica-magnetite-pyrite alteration appears to have been overprinted by calcite (±pyrite) alteration.

602.9 m

SAMPLE NUMBER: MAC 29 562986

SUMMARY: This was a relatively well-preserved vesicular glassy augite+ plagioclase-phyric basaltic lava, with weak autobrecciation, probably from close to the top of a cooling unit. It is significantly less altered than samples in this core immediately above and below it.

HAND SPECIMEN:

This is a dark grey autobrecciated augite-phyric basaltic lava that is much less altered than the preceding four samples. Fragments are up to at least 1cm across.

THIN SECTION DESCRIPTION:

This is an autobrecciated and vesicular augite+plagioclase - phyric basaltic lava with a largely (formerly) glassy groundmass texture. Some augite phenocrysts are euhedra up to almost 5mm long, commonly occurring in clots of three or more crystals. Augite phenocrysts vary from perfectly fresh to totally chloritized, and they make up around 7-10 modal% of the rock. Former plagioclase phenocrysts are slightly less abundant and generally smaller than the augite phenocrysts, and they are always totally replaced by fine-grained sericite, although ghost twinning and compositional zoning is often still visible.

The groundmass texture of this sample varies from fragment to fragment, although there is no doubt that all fragments are from a single flow, probably near the top of that flow, and represent textural variation reflecting variable cooling rate. In some fragments, the groundmass was essentially entirely glass with few microlites of plagioclase, and the glass has devitrifed to a near isotropic exceedingly fine-grained brownish material. In other more slowly-cooled fragments, the devitrified glass is charged with tiny plagioclase microlites. Ovoid to round vesicles make up around 2-4 modal% of the rock and are lined with a narrow band of quartz and filled by pale green chlorite. In zones between fragments, alteration is far more intense, with strong chlorite-silica alteration accompanied by trains and concentrations of tiny magnetite(?) granules. Cross-cutting calcite veins are clearly the latest alteration feature.

This formerly augite+plagioclase-phyric basaltic lava is notably less altered than those samples from above it (81 - 85) and below it (87-89) in MAC 29. This may simply be a relatively weakly altered 'core' surrounded by more intense alteration in the 'footwall alteration zone'. Alternatively, it may be that the alteration zone is repeated or thickened by faulting.

653·3m

SAMPLE NUMBER: MAC 29 562987

SUMMARY: This is a very strongly altered formerly augite(+plagioclase?)-phyric basaltic hyaloclastite, with variable vesicularity in fragments. Alteration was early silica-pyrite-(sericite/fuchsite) followed by later calcite overprinting.

HAND SPECIMEN:

This is a grey green strongly carbonate altered formerly augite+plagioclase-phyric basaltic lava breccia, with common fuchsite and disseminated pyrite.

THIN SECTION DESCRIPTION:

This is probably the most strongly altered sample in the set being examined. It appears to have been a basaltic lava breccia or hyaloclastite, and unlike most of the other samples from this hole, contains abundant very strongly vesicular basaltic lava fragments, resembling scoria. These contain stretched and totally altered (chloritized, then overprinted by calcite) former augite phenocrysts, and the degree of alteration is too intense to decide for certain whether smaller carbonate-altered phenocrysts in these vesicular fragments were plagioclase or augite. The formerly glassy groundmass of these fragments is a very messy heterogeneous and often weakly foliated intergrowth of sericite and fine-grained carbonate, and brown less altered devitrified glass, riddled with small rounded vesicles filed by silica and calcite.

Less vesicular (vesicles < ~ 10 modal%) fragments appear to have been quite glassy augite-phyric basalts, in which the groundmass is dominantly brown devitrified glass now containing abundant fine-grained brown carbonate. Former augite phenocrysts are chlorite-calcite altered, and barely recognizable, and the former existence of smaller plagioclase phenocrysts is arguable. Vesicles in these less vesicular fragments are larger (to 2mm across) and filled by a similar carbonate-dominated assemblage as in the highly vesicular fragments.

The fuchsite so obvious in the hand specimen is certainly not obvious in thin section, although the thin section cut-off shows that the sample cut for thin section unfortunately came from the least fuchsitic part of the hand specimen provided. Disseminated pyrite is most concentrated in the inter-fragment areas and in vesicles and fractures. It is definitely associated with the earlier alteration phase, which was silica-sericite(fuchsite?)-pyrite. Subsequent calcite alteration had overprinted and veined this rock.

718.7 m

SAMPLE NUMBER: MAC 29 562988

SUMMARY: This sample was a basaltic lava breccia dominated by augite+plagioclase (±olivine?)-phyric basalt fragments and considerably more vesicular and glassy fragments, probably of similar phenocryst assemblage. The latter have focussed and absorbed deformation and are now foliated and far more altered than the less glassy, less vesicular fragments. Silica-pyrite-chlorite alteration preceded calcite overprinting.

HAND SPECIMEN:

This is a coarse basaltic lava breccia in which paler-coloured porphyritic and altered basaltic lava fragments to at least several cm long are set in a dark green strongly altered and foliated matrix; the rock contains disseminated pyrite.

THIN SECTION DESCRIPTION:

The large paler-coloured fragments in this sample are porphyritic basalt in which former augite phenocrysts make up around 5 modal% of the rock, and a few small tabular prismatic altered plagioclase phenocrysts are usually present. The former presence of olivine phenocrysts is very difficult to ascertain, due to the strong alteration, although relic crystal shapes of a few phenocrysts are very reminiscent of olivine. All the former mafic phenocrysts are pseudomorphed by calcite, and the plagioclase phenocrysts are replaced by fine-grained sericite.

The matrix areas between the basalt fragments in this rock are dominantly composed of green chlorite that is quite foliated, and clearly replacing strongly vesicular and deformable basaltic glass fragments. Augite phenocrysts in the former glass have been stretched into the foliation, microcrystalline silica-filled vesicles likewise, and blebby calcite overprints and veins much of the inter-fragment areas. In these areas, disseminated pyrite occurs as narrow veinlets and trains, and occasional coarser clumps of pyrite crystals up to a few mm across occur. Tiny sericitized plagioclase microlites are present in chloritized glass in some of these fragments.

It could be that the glassy, vesicular fragments now smeared out between the more competent basalt fragments represent parts of the same flow, mixed together during explosive eruption and production of hyaloclastite-type lava breccia.

749.3m

SAMPLE NUMBER: MAC 29 562989

SUMMARY: This is a weakly altered sparsely plagioclase-phyric glassy andesite more similar to the rocks at the base of MAC 28 than the overlying basaltic lava pile in MAC 29.

HAND SPECIMEN:

This is a massive finely plagioclase-porphyritic dark grey andesite lava.

THIN SECTION DESCRIPTION:

This rock was a weakly plagioclase-phyric andesitic lava with a glassy groundmass. Plagioclase phenocrysts, mainly less than 1mm long, make up a few modal% of this lava and are albitized and partly overprinted by fine-grained sericite-calcite alteration. They show distinct flow alignment. There are no unambiguous former mafic phenocrysts in this section.

The groundmass of this rock was originally quite homogeneous, and largely glassy, with occasional small vesicles (now quartz-calcite filled). The groundmass has been totally devitirified, and variably altered across the slide, mainly reflected in the intensity of sericite meshing. Sericite defines a weak foliation in the most altered regions of the thin section, and small blebs of clear quartz have grown from the altered glass. Pyrite occurs as small crystals growing in abundance in meandering veinlets of fibrous quartz.

This sock was a sparsely plagioclase-phyric glassy andesite, and is quite distinctly different from the other lavas in the lower part of this hole, which are entirely basaltic. It resembles more the rock at the base of MAC 28 (808).