PETROGRAPHIC REPORT

Rocks from
PASMINCO EL 11/85 YOLANDE (Henty Fault Wedge)
For Roger Poltock 7/1/90

by
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SAMPLE: 30106

SUMMARY: This rock is a quenched, strongly plagioclase-phyric basaltic lava or outermost margin of a dyke.

HAND SPECIMEN:

This is a plagioclase-phyric basalt with about 8-10 modal% of clay(?)-altered plagioclase phenocrysts in a very fine-grained groundmass.

THIN SECTION DESCRIPTION:

This rock is a petrographically simple basaltic lava or dyke margin composed of around 10 modal% of euhedral plagioclase phenocrysts that show flow alignment, and perhaps another 2-3 modal% of much smaller plagioclase microphenocryst in a quenched groundmass that was probably largely glassy. The plagioclase phenocrysts are albitized, rather narrow tabular prisms up to 3mm long, mainly well-formed, and with common alteration to sericite. The microphenocrysts are less than 0.2mm long, and similar shaped and altered to the phenocrysts. There are no mafic phenocrysts in this rock.

The groundmass of this sample is structureless and rather murky, and was probably originally a mat of quenched pyroxenes and plagioclases with interstitial glass. It is now composed of a fine-grained intergrowth of chlorite, sericite, quartz and probably albite, in which occasional altered acicular plagioclase quench crystals are visible. The metamorphic assemblage of this rock could be either prehnite-pumpellyite facies or lowermost greenschist facies. Its texture is unambiguously that of a quenched rock, and I would have argued that it is a lava. It is conceivable that it is from the very rim of a decent-sized dyke however. The abundant plagioclase as the sole crystalline phase suggests that it is an evolved basaltic to basaltic andesite composition. Without compositional data it is hard to assign affinities to this sample, but it is not an atypical lithology for either the Henty Dyke Swarm, or the Henty Fault Wedge, in which plagioclase-phyric basalts are quite common.

SAMPLE: 30105 Henty Fault Wedge

SUMMARY: This rock is a strongly plagioclase-phyric tholeiitic dolerite with a lowermost greenschist facies mineral assemblage. It is fairly typical of the Henty Fault Wedge dolerites that I have looked at before.

HAND SPECIMEN:

This rock is a distinctive grey-green strongly plagioclase-phyric basaltic or basaltic andesite with altered plagioclase phenocrysts up to at least 1cm long; many of these show zoning of alteration products.

THIN SECTION DESCRIPTION:

This sample is a well-preserved fine-grained porphyritic dolerite characterized by around 15 modal% of large (to 8mm in section) altered plagioclase phenocrysts, in a typical doleritic-textured groundmass composed of tabular altered albite, with interstitial and finer-grained anhedral to subhedral plates of augite and subordinate FeTi oxides. The latter have been altered to leucoxenic material. Former plagioclase phenocrysts have been albitized, and are riddled by murky epidote that occasionally also occurs as more crystalline blades and aggregates. Sericite is a less abundant but not uncommon alteration mineral in former plagioclase phenocrysts.

The groundmass plagioclase prisms show a similar alteration assemblage to the phenocrysts. Groundmass augite plates, mainly less than 1mm long, are colourless, often simply twinned, and free of alteration. Angular interstices between groundmass plagioclase, augite and FeTi oxides are filled by pale green chlorite and less abundant secondary quartz; tiny actinolite needles are occasionally present in the chlorite where it abuts augite.

This is a tholeiitic dolerite with a metamorphic assemblage typical of the lowermost greenschist facies of regional metamorphism. Its mineralogy and texture are similar to other Henty Fault Wedge dolerites, although the plagioclase phenocrysts are slightly larger and perhaps more abundant than other samples I have seen. It is well preserved and should be analyzed.

SAMPLE: 30117

SUMMARY: This is a tonalite intrusive from a shallow plug or dyke. It contains quite abundant biotite and some K feldspar, and thus is unlike the tonalites in the west Tasmanian ophiolites.

HAND SPECIMEN:

This is a speckled pale brown holocrystalline but relatively fine-grained felsic intrusive rock.

THIN SECTION DESCRIPTION:

This sample is an acidic holocrystalline intrusive rock composed of phenocrysts of feldspar and quartz, and minor biotite, set in a granular groundmass of the same minerals. Quartz phenocrysts are up to 2mm across, often quite fractured, and have ragged edges due to both reaction with melt and re-equilibration with groundmass during metamorphic degradation. They are occasionally intergrown with feldspar phenocrysts. The latter are mainly tabular prisms 1-2mm across, and are apparently albite, although some smaller phenocrysts with more sericite alteration may have originally been K feldspar. A few former mafic phenocrysts to about 1mm across may have been hornblende but are altered to chlorite; more abundant are smaller microphenocrysts of red-brown biotite, some of which are partly chlorite-altered.

The groundmass of this sample is holocrystalline and composed of a fine- to medium-grained granular intergrowth dominated by anhedral quartz and subhedral albite, with abundant interstitial sericite, and not uncommon small plates of brownish biotite. A few small zircons were noted, which may be useful for geochronological studies. The metamorphic assemblage is typical of the prehnite-pumpellyite to lowermost greenschist facies of regional metamorphism of felsic rocks.

This rock is likely to be a tonalitic dyke or shallow intrusive plug. I have not seen tonalites in the Henty Fault Wedge or Dyke Swarm before, but there presence here is not surprising. Tonalitic dykes and small intrusive bodies are frequently associated with the ophiolitic cumulate and dyke sections, but these tonalites lack biotite and are always well into the greenschist facies (abundant actinolite). This sample should also be analyzed.

SAMPLE: 30155 Henty Fault Wedge

SUMMARY: This is a contact between a typical greenschist facies Henty Fault Wedge metadolerite and a very fine-grained, chilled, sparsely plagioclase-phyric basaltic dyke of unknown affinities.

HAND SPECIMEN:

This sample is the contact zone between a very fine-grained metabasic lava or dyke and a dolerite or volcanogenic sandstone(?).

THIN SECTION DESCRIPTION:

Thin section examination shows that this sample covers the contact between a metabasaltic dyke and a host metadolerite or microgabbro. The contact is knife-sharp but irregular. The dyke is very sparsely plagioclase-phyric and shows a strong textural variation over less than 1cm distance, from an excellent almost spherulitic quench texture against the dolerite to a texture containing actinolite-altered dendritic to microlitic augite crystallites and crystals in a glassy mesostasis further in; even further away from the dolerite, the texture of the basalt dyke is dominated by sheaves of albitized plagioclase intergrown with tiny well-formed crystals of actinolitized augite. The few plagioclase phenocrysts are notably elongate prisms, and are albitized.

The host dolerite is composed of phenocrysts of augite and plagioclase that have been altered to fibrous pale green actinolite and albite respectively, set in a fairly recrystallized groundmass of actinolite-albite-chlorite-epidote and leucoxene.

Both host and basaltic dyke show well-developed low greenschist facies metamorphic assemblages. The host dolerite is little different from sample 30126 described above, with similar affinities and correlations implied. It is impossible without compositional data to make any judgement regarding the affinities of the totally recrystallized basaltic dyke, although its clear relationship (post-dating) to the dolerite means that some useful conclusions regarding temporal change of magma compositions might be drawn from its composition. The dyke should be analyzed.

SAMPLE: 30099 Henty Fault Wedge

SUMMARY: This is a formerly glassy, sparsely quartz+feldspar-phyric rhyolitic lava with strong calcite-sericite alteration.

HAND SPECIMEN:

This rock is a pinkish very fine-grained felsic lava(?) with greenish sericite streaks and a few quartz phenocrysts.

THIN SECTION DESCRIPTION:

This is a formerly highly glassy, sparsely quartz- and feldspar-phyric felsic lava that has extensively recrystallized and undergone quite strong calcite-sericite alteration during development of a very weak foliation. Quartz phenocrysts, of which only four or five are present in the section, are quite strongly rounded and reacted and reach about 1.5mm diameter; one or two contain small rounded, chloritized melt inclusions. Former plagioclase phenocrysts are only slightly more abundant than quartz and occur now as totally sericitized tabular prisms mainly less than 1mm long. Several sericitized plagioclase phenocrysts are streaked out into the weak foliation. Very small microphenocrysts of apatite and leucoxenitized FeTi oxides are not uncommon, and a number of well-formed small zircons were noted.

The groundmass is a mosaic-textured intergrowth of quartz and albite after glass that has suffered quite strong calcite-sericite alteration, with sericite defining of discontinuous weak foliation. This alteration is somewhat more intense than usually shown in regionally metamorphosed felsic lavas from western Tasmania, and may indicate it has suffered more localized hydrothermal alteration.

There is little doubt that this was a glassy rhyolitic lava, and as such is very similar to those in the Mount Read Volcanics, particularly in the Tyndall Group. The relationship of these felsic lavas in the Henty Fault Wedge to the metabasic rocks needs to be firmly established, as they demand very different petrogenetic scenarios.

SAMPLE: 30126 Henty Fault Wedge

SUMMARY: This is a greenschist facies metadolerite with sparse former augite and plagioclase phenocrysts, differing from other Henty Fault Wedge metadolerites by the higher metamorphic grade.

HAND SPECIMEN:

This rock is a grey-green fine-grained and finely-fractured metadolerite with spots to several mm across (after mafic phenocrysts?) of black chlorite, and altered plagioclase grains to about 2mm across.

THIN SECTION DESCRIPTION:

This sample is a texturally well-preserved holocrystalline fine- to medium-grained metadolerite that has entirely recrystallized under greenschist facies conditions to albite and actinolite, with abundant chlorite and leucoxene after FeTi oxides. Plagioclase phenocrysts to 2mm across, are mainly multi-crystal aggregates and make up only about 2 modal% of the sample. Even less abundant are former augite phenocrysts (also <2mm long) now composed of chlorite and fibrous to acicular actinolite.

The groundmass of this sample was clearly holocrystalline, with a typical doleritic texture, and is composed of intergrown plagioclase (albitized) laths and plates of augite that are mainly replaced by pale green actinolite. Small interstitial FeTi oxide grains are leucoxenitized, and quartz and chlorite are common interstitial alteration phases.

This dolerite is typical of both Henty Dyeke Swarm and Henty Dyke Wedge dolerites, although the rather well developed greenschist facies metamorphic assemblage in this sample implies somewhat higher temperature conditions of metamorphism than for typical Henty Fault Wedge prehnite-pumpellyite facies dolerites. This sample also should be analyzed.

SAMPLE: 30024B Henty Fault Wedge

SUMMARY: This rock is a strongly plagioclase+augite-phyric basaltic lava with a lowermost greenschist facies metamorphic assemblage, and is similar to some basalts from the SW end of the Henty Fault Wedge which together form a petrographically and compositionally distinctive group, transitional from typical Henty FW and DS tholeiites to Mount Read Volcanics basalts. This sample should be analyzed.

HAND SPECIMEN:

This is a dark grey-green strongly plagioclase+mafics-phyric metabasalt with phenocrysts up to 3mm long.

THIN SECTION DESCRIPTION:

This rock is strongly porphyritic, being composed of subequal proportions (around 10-12 modal% each) of albitized plagioclase and largely fresh augite phenocrysts, up to 3mm long, but mainly 1-2mm long. Both phenocryst phases are euhedral prisms. The albitized plagioclase phenocrysts have been further altered by abundant sericite speckling and patches of fine-grained murky epidote and possibly apple-green pumpellyite. Augite phenocrysts are sometimes partly replaced by pale green chlorite in which fine, fibrous needles of actinolitic amphibole are embedded. No FeTi oxide phenocrysts occur in this rock.

The groundmass of this rock was very fine-grained, probably partly glassy. It is now composed of a fine-grained intergrowth of secondary quartz-albite-chlorite containing small albite laths and chloritized augite prisms, and quite common but fine-grained and leucoxenized FeTi oxide grains. A few very narrow veinlets of fibrous quartz transect the sample. The presence of both actinolite and (probably) pumpellyite in this sample indicates that it was metamorphosed at the lowermost greenschist facies conditions of regional metamorphism (~300^{o}C), probably at slightly higher temperatures than the previous samples described that lack actinolite. The groundmass texture suggests to me that this sample was a lava, although the possibility that it was from the outermost chilled margin of a dyke cannot be ruled out.

This sample is petrographically very similar to some Henty Fault Wedge basalts from the SW end of the fault wedge (427216 and 427221 in my report for Pasminco). They are distinct compositionally and petrographically from the more typical sparsely augite-phyric or aphyric Henty Fault Wedge and Henty Dyke Swarm basalts, and are, in fact, transitional from the latter towards Mount Read-type (ie. calc-alkaline) basalts. The field relationships and composition of this and similar samples needs to be carefully determined.

SAMPLE: 30024A Henty Fault Wedge

SUMMARY: This rock is a well-preserved aphyric tholeiitic basaltic rock from a narrow dyke or dyke margin. It is reasonably correlated with other Henty Fault Wedge and Henty Dyke Swarm basalts.

HAND SPECIMEN:

This is a dark grey-green aphyric fine-grained metabasalt.

THIN SECTION DESCRIPTION:

This is an aphyric basalt with occasional microphenocrysts of augite and albitized plagioclase set in a holocrystalline but fine-grained, subophitic to intergranular textured groundmass. The few augite microphenocrysts are smaller than 1mm across, but well-formed, and most show some intergrown laths of plagioclase. They are colourless, fresh and unzoned. Even less common are albitized plagioclase phenocrysts partially replaced in turn by minor sericite and pale green chlorite.

The groundmass of this basalt is holocrystalline but fine-grained, composed of intergrown anhedral to subhedral fresh augite and partially sericitized, albitized plagioclase laths, with relatively abundant smaller, leucoxenitized FeTi oxides. Interstitial alteration minerals in the groundmass include pale yellow epidote, green chlorite and clear quartz. The alteration assemblage in this sample is typical of the prehnite-pumpellyite facies of regional metamorphism of basic rocks. The texture of this rock, characterized by the absence of glass or its alteration products, is typical of narrow basaltic dykes.

This is a tholeiitic basalt essentially identical texturally and mineralogically to numerous other Henty Dyke Swarm and Henty Fault Wedge rocks I have examined. However, unlike strongly plagioclase-phyric sample 30055, this sample could equally as well be a Crimson Creek-type tholeiitic basalt, since these are generally aphyric to sparsely augite-phyric tholeiitic basalts.

SAMPLE: 30124 Henty Fault Wedge

SUMMARY: This is a very strongly carbonate-altered former tholeiitic(?) aphyric basaltic lava or shallow dyke rock, possibly correlated with the Henty Fault Wedge and Dyke Swarm basalts. The alteration assemblage implies intense, localized hydrothermal alteration.

HAND SPECIMEN:

This is a relatively strongly altered, amygdaloidal pale grey-green metabasic lava with not uncommon carbonate-filled vesicles to 8mm across.

THIN SECTION DESCRIPTION:

This sample is texturally relatively well-preserved, but it is entirely replaced by fine-grained alteration products, dominantly calcite. The sample was probably originally an aphyric basalt, but all traces of original mineralogy have been obliterated by the intense and pervasive carbonate alteration. The rock was composed dominantly of laths of plagioclase mainly 0.2 - 0.5mm long, and <0.2mm wide, and showing a weak flow orientation, intergrown with subordinate platy augite and FeTi oxides; all primary silicate minerals are replaced by very fine-grained calcite, and minor interstitial sericite and pale green chlorite are not uncommon. Former FeTi oxides are small interstitial grains that have been strongly altered to brown Fe hydroxide or oxide minerals rimmed in many places by leucoxene; streaks of 'opaque' material along silicate grain boundaries attest to mobility of Fe during this alteration. Large vesicles, and small areas of groundmass, are filled by globular (botryoidal) calcite-chlorite intergrowths.

The intense alteration suffered by this sample is considerably more intense than normally encountered within basaltic lavas within the Mount Read Volcanics and associated suites (such as the Henty Dyke Swarm and Wedge basalts), and demands localized hydrothermal alteration. The alteration precludes confident correlation with other basaltic suites in western Tasmania, but texture rules out affinities with Hellyer-type Mount Read Volcanics basalts. I suggest that this was a tholeiitic basalt, again associated with the Henty Fault Wedge basalts. Despite the intense alteration, the immobile element signature of this sample, when available, should provide fairly confident correlation.

SAMPLE: 30055 Henty Fault Wedge

SUMMARY: This sample is a well-preserved plagioclase-phyric tholeiitic basalt with a holocrystalline groundmass texture suggesting it is a dyke rock. It is best correlated petrographically with similar rocks from the Henty Dyke Swarm and Henty Fault Wedge.

HAND SPECIMEN:

This is a dark green plagioclase-phyric metabasaltic lava with around 10 modal% of small, altered feldspar phenocrysts in a fine-grained matrix.

THIN SECTION DESCRIPTION:

__This sample is a texturally well-preserved porphyritic basaltic lava containing around 10 modal% of altered plagioclase phenocrysts mainly less than 2mm long in what was probably a fine-grained holocrystalline groundmass. The plagioclase phenocrysts occur as mainly well-formed single crystals and clots of crystals that have been albitized, and subsequently variably replaced by murky sericite that is often intergrown with fine-grained aggregates of almost colourless epidote.

The remainder of this rock is composed of a holocrystalline intergrowth of stout albitized plagioclase laths (<0.4mm long), fresh anhedral plates of augite, and quite common interstitial and marginally leucoxenized FeTi oxides. Alteration phases in the groundmass include (other than albite replacing the originally more calcic plagioclase) yellowish epidote, bright green chlorite and subordinate quartz, suggesting a metamorphic grade within the prehnite pumpellyite facies of regional metamorphism.

This sample was certainly basaltic compositionally, but the almost holocrystalline groundmass, lacking interstitial altered glass, suggests an origin as a dyke rock, or less likely perhaps, from the central portions of a very thick flow. The relative abundance of FeTi oxides and the texture suggest tholeiitic affinities, and are unlike either Mount Read Volcanics basalts (eg Hellyer basalts), or the low-Ti basalts that make up most of the lava carapace of the mafic-ultramafic complexes (ophiolites) in western Tasmania. Tholeiitic Crimson Creek Formation tholeiitic basalts and their correlates throughout western Tasmania are very rarely plagioclase-phyric, tending to rule out a correlation with this sample. Only lavas and dykes from the Henty Fault Wedge and Henty Dyke Swarm petrographically show strong similarities to this sample, and this is probably the best correlation that can be made without chemical data. This well-preserved sample should be included in any analytical study of the Henty Fault Wedge rocks.

SAMPLE: 30071

SUMMARY: This rock is a formerly glassy quartz+feldspar+biotite-phyric rhyolitic lava.

HAND SPECIMEN:

This rock is a pale brown quartz and feldspar-phyric felsic lava.

THIN SECTION DESCRIPTION:

This rock is a formerly glassy felsic lava containing around 8-10 modal% of slightly rounded and reacted but still "euhedral" phenocrysts of quartz to 2mm across. These show abundant devitrified melt inclusions, and internal strain features and common fracturing. Much less abundant are former plagioclase phenocrysts that are thoroughly sericitized, and subsequently replaced by dirty brown clayey material. Two quite large former biotite phenocrysts are present, replaced by sericite, chlorite and an Fe or FeTi oxide.

The formerly glassy groundmass has devitrified and crystallized to a fine-grained granular mosaic intergrowth of albite and quartz that is riddled by sericite, which in turn is partially replaced by a brownish clay (during weathering?) that gives this rock is colour. Anastomosing fractures through the sample also concentrate the Fe-stained clay and are darker brown than the matrix. The degree of sericite alteration of this sample is no more than usually observed in burial metamorphose felsic glassy lavas in the Mount Reads (ie. this sample shows no evidence of significant hydrothermal alteration). This is a rhyolitic lava and has obvious correlates in the strongly quartz-phyric rhyolitic lavas of the Tyndall Group and correlates above the Que River Shale in the Hellyer-Sock CK-Mount Cattley region, although quartz-phyric felsic lavas are also known from the Central Volcanic Complex.

SAMPLE: 30072

SUMMARY: This rock is a formerly glassy plagioclase+augite +quartz+biotite+FeTi oxide-phyric dacite lava with some calcite alteration overprinting the devitrified glassy groundmass.

HAND SPECIMEN:

This rock is a fresh feldspar+pyroxene (altered)- felsic lava with rather more mafic phenocrysts (chloritized) than in most Mount Read Volcanics dacites and rhyolites.

THIN SECTION DESCRIPTION:

This slightly vesicular sample is composed of around 10-12 modal% of albitized plagioclase feldspar phenocrysts, and 1-2 modal% of augite, quartz, FeTi oxides and biotite, all set in a fairly fine-grained recrystallized, formerly glassy groundmass. The albitized plagioclase phenocrysts are well-formed blocky prisms mainly less than 1.5mm long, that show variable sericite alteration and minor calcite spotting. Former mafic phenocrysts (augite probably) are small stumpy prisms (<0.4mm long) totally replaced by chlorite; former biotite phenocrysts are also chloritized, bur retain the 'book' cleavage traces well enough to confirm the mica precursor mineral. Quartz phenocrysts are quite large (to almost 2mm), strongly rounded and resorbed, and contain abundant devitrified melt inclusions. Former small FeTi oxide phenocrysts have broken down to chlorite-sphene intergrowths. Also notable are common and quite large apatite microphenocrysts.

The groundmass of this sample was almost certainly originally glassy. It has devitrified to a fine-grained granular mosaic of albite and quartz, with abundant interstitial sericite and minor chlorite. The sample contains a number of quite large rounded to oval vesicles filled by albite, sometimes partly overprinted by calcite. Fine-grained rather 'dirty' calcite is abundantly disseminated throughout the groundmass. The metamorphic grade of this sample is prehnite-pumpellyite facies, and whereas the calcite indicates some subsequent hydrothermal alteration, this was minor at best. This sample has somewhat more mafic phenocrysts than typically seen in Mount Read Volcanics felsic lavas, but is otherwise little different.

SAMPLE: 30091

SUMMARY: This rock is a massive lizarditic serpentinite after a dunite protolith; it contains useful relic red chromite grains.

HAND SPECIMEN:

This is a massive black serpentinite.

THIN SECTION DESCRIPTION:

This is a massive serpentinite composed almost entirely of structureless lizardite serpentine in which the only relic mineral is about 0.1-0.22 modal% of angular and fractured deep red chromite grains, less than 1mm across. There are no traces of former orthopyroxene or clinopyroxene in this sample, implying that it is derived from hydration of a dunite. Textural obliteration precludes determining whether the dunite protolith was a cumulate rock, or a tectonite dunite. A vein of talc intergrown with colourless chlorite cross-cuts the rock, while pale coloured spots evident in the hand specimen appear to be local concentrations of clay, possibly after talc.

This sample is not mentioned in your notes, but I assume that it comes from the NE end of the fault wedge where ultramafics and gabbros are recorded. Chromite has distinctive compositional features (mainly the ratio Cr/(Cr+Al)) that are very useful for determining the affinities of the ultramafic rock (or serpentinite) in which it is hosted. In the case of this sample, it would be very useful indeed to probe these chromites. If the precursor dunite is associated with the Henty Fault Wedge basalts etc, they should have a Cr/(Cr+Al) value from 0.3-0.7. If on the other hand, they are slices of the typical W Tasmanian ophiolite ultramafic section, they are derived from boninite parent magmas and will have Cr/(Cr+Al) > 0.7.

SAMPLE: 30057 Henty Fault Wedge

SUMMARY: This rock is a greenschist facies recrystallized mudstone or shale that contained very fine-grained detrital muscovite, probably from a pelitic metamorphic source, and a component of mafic or intermediate ash that recrystallized as the relatively abundant very fine-grained acicular actinolite in this rock.

HAND SPECIMEN:

This rock is an exceptionally fine-grained, hard, silicified(?) black shale or mudstone, strongly bleached at the weathering surface,

THIN SECTION DESCRIPTION:

This sample is seen in thin section to be a massive featureless mudstone with the only discernible clastic grains being <<1% of very small detrital muscovite, and one or two tiny angular detrital quartz grains. The rock is riddled with tiny secondary aggregates of dirty brown limonite/goethite that are concentrated in abundance along stylolite-like fractures and more linear cracks and partings. The remainder of the rock is composed of indeterminate material in which tiny acicular actinolite and/or chlorite grains are dispersed in abundance. This is probably a mudstone that contained both a very fine-grained component from a pelitic metamorphic source (muscovite) and probably some very fine-grained comminuted mafic or intermediate ash component. Recrystallization under lower greenschist facies conditions produced this tough, almost hornfelsic rock.

SAMPLE: 30061 Henty Fault Wedge

SUMMARY: This rock is a coarse-grained volcanogenic sandstone dominated by felsic volcanic detritus. The matrix has suffered strong but very patchy chloritization.

HAND SPECIMEN:

This rock is a fairly coarse-grained volcanogenic sandstone or grit with abundant detrital feldspar and dark very fine-grained lithic clasts to almost 1cm across.

THIN SECTION DESCRIPTION:

This sample is similar to the previous rock (30002) in many respects, being a volcanogenic greywacke dominated by detrital albite phenocrysts and phenocryst fragments that appear to be mainly from felsic volcanic sources. Major points of difference between this rock and 30002 are :

1: this sample has larger and much more abundant felsic lava fragments; most of these were glassy, but have devitrified to quartz-albite mosaics, often with snowflake textures.

2: Also common in this sample are flow-textured sparsely plagioclase-phyric dacitic to andesitic lava fragments.

3: Augite phenocryst grains and fragments (fresh or altered) are absent entirely, and FeTi oxide grains are much less abundant than in 30002. No unambiguous mafic lithic fragments are present.

4: The silty matrix of this sample was definitely highly glassy, probably with a large component of felsic glass; this has devitrified to granular quartz-albite mosaics that show highly variable extents of overprinting chloritization. Some patches of intensely chloritized matrix are almost 1cm across, and were mistaken in hand specimen for fine-grained lithic fragments.

This is a volcanogenic coarse sandstone derived in large part from a proximal felsic volcanic terrain.

SAMPLE: 30002 Henty Fault Wedge

SUMMARY: This rock is a medium-grained volcanogenic greywacke with detrital grains from both typical Mount Read felsic lavas and tuffs, and more mafic andesites and basalts (dolerites). It contains no pelitic metamorphic detritus.

HAND SPECIMEN:

This rock is a massive, structureless medium-grained grey-green volcanogenic sandstone with abundant feldspar and lithic grains.

THIN SECTION DESCRIPTION:

This rock is clearly a volcanogenic greywacke with a non-framework supported fabric. It composed dominantly of only slightly rounded detrital phenocrystal plagioclase, with subordinate phenocryst fragments of augite, quartz, FeTi oxides and rare hornblende, and small, fine-grained lithic volcanic clasts of varying lithology and texture, all set in an indeterminate silty to clayey matrix that may have had a high glassy ash component. The plagioclase grains are <2mm long albite, always speckled by submicroscopic hematite, and are of two main types. Large blocky phenocrysts with sericite spotting are more typical of phenocrysts liberated from felsic lavas and tuffs; however, many albite grains have abundant epidote inclusions and a few are marginally intergrown with augite, almost certainly implying a derivation from more mafic rocks. Augite phenocryst fragments are considerably less abundant than feldspar (perhaps making up around 2-3 modal% of the sample) and would almost certainly be derived from either andesitic or mafic rocks; a few have fringes of actinolite, implying that this sample was metamorphosed under lowest greenschist facies conditions. Detrital quartz grains are clearly of volcanic origin, being monocrystalline, with occasional crystal faces preserved. They would be derived from felsic lavas or tuffs. Leucoxene-altered FeTi oxide grains are relatively large (to around 1mm across) and blocky and look more like they are derived from felsic lavas than andesite-basalt lavas. The few easily identifiable lithic clasts include a beautiful perlitic-cracked formerly highly glassy dacite to rhyolite lavas, several other definite recrystallized formerly glassy felsic lava clasts and a few holocrystalline clasts with doleritic textures. No pelitic metamorphic detritus is present in this sample. The matrix is very fine-grained and riddled with dirty brown epidote, suggesting that it may have had a significant mafic ash component, although no shard textures are preserved.

SAMPLE: 30102 Henty Fault Wedge

SUMMARY: This rock is a very strongly hematite+albite-altered, plagioclase-phyric andesitic dyke.

HAND SPECIMEN:

This rock is a strongly oxidized dark red lava or dyke with small plagioclase phenocrysts.

THIN SECTION DESCRIPTION:

__This rock is a fairly sparsely plagioclase-phyric andesitic dyke rock with around 3-5 modal% of rather ragged small albitized plagioclase phenocrysts (mainly <1mm long) set in an exceptionally feldspar-rich groundmass that is charged with ting hematite grains and grain aggregates that produce the distinctive red colour of this rock. The plagioclase phenocrysts are mainly anhedral clusters of albite microphenocrysts and often have dark rims caused by accumulation at crystal margins of tiny hematite grains. There are no mafic phenocrysts in this sample, not are there any FeTi oxide phenocrysts or microphenocrysts.

The groundmass is a holocrystalline intergrowth of quite elongate plagioclase (albite) laths set in a matrix of anhedral albite and abundant fine-grained hematite. No sign of former mafic grains in the groundmass are discernible. The style of alteration displayed by this sample is characteristic of rocks altered by very oxidizing fluids that strip all the Ca from the rock and replace it with Na; these fluids rarely produce economic Cu-Zn-Pb-rich VMS deposits, but are often active in the footwall alteration zone of massive volcanogenic sulphide deposits that are rich in magnetite and pyrite (eg. Big Cadia in central W NSW). Epidote-rich rocks (epidosites and strongly epidote-veined rocks) are often closely associated with this type of alteration. Only compositional data for immobile elements could determine whether this andesitic rock is an evolved variant of the more typically basaltic Henty Fault Wedge and Dyke Swarm rocks.

SAMPLE: 30156 Henty Fault Wedge

SUMMARY: This sample is a greenschist facies formerly plagioclase+ augite-phyric dolerite with less FeTi oxides than many of the other dolerites examined in this set. It may correlate with some of the lower TiO2 dolerites described from the SW end of the fault wedge (eg 427221, 205 and 216)

HAND SPECIMEN:

This rock is a porphyritic basalt or dolerite with common pinkish altered feldspar phenocrysts and chloritized (?) augite phenocrysts.

THIN SECTION DESCRIPTION:

This sample is a texturally well-preserved originally plagioclase+augite-phyric dolerite or basaltic dyke rock, with a holocrystalline groundmass. It consists of 1-2mm-long phenocrysts of albitized plagioclase and actinolite-chlorite-altered augite, each forming about 5-8 modal% of the sample. The albitized plagioclase phenocrysts are quite pinkish in plane polarized light, being charged with submicroscopic flakes of hematite; they are rarely well-formed, and often appear to have reacted marginally with the groundmass during greenschist facies metamorphism. Augite phenocrysts are euhedral to subhedral and are entirely altered, either to fibrous pale green actinolite, almost colourless chlorite, or both. There are few FeTi oxide microphenocrysts in this rock; those present are altered to leucoxenic aggregates.

The groundmass of this rock was clearly holocrystalline and composed of interlocking subhedral laths of albitized plagioclase and stubby prisms of augite that are totally replaced by actinolite. Small rounded high birefringent grains of sphene replace tiny groundmass FeTi oxides. The texture of the groundmass of this rock is indicative of a basaltic dyke, rather than a lava. The total replacement of augite by actinolite is typical of mid-greenschist facies conditions of regional metamorphism. This sample originally would have been quite similar to 30024B, and the lack of a significant FeTi oxide component suggests compositional affinities with the lower TiO2 group of dykes analyzed from the southern end of the Henty Fault Wedge (eg. 427221, 216 and 207 in my report to Pasminco).

are albitized, rather narrow tabular prisms up to 3mm long, mainly well-formed, and with common alteration to sericite. The microphenocrysts are less than 0.2mm long, and similar shaped and altered to the phenocrysts. There are no mafic phenocrysts in this rock.

The groundmass of this sample is structureless and rather murky, and was probably originally a mat of quenched pyroxenes and plagioclases with interstitial glass. It is now composed of a fine-grained intergrowth of chlorite, sericite, quartz and probably albite, in which occasional altered acicular plagioclase quench crystals are visible. The metamorphic assemblage of this rock could be either prehnite-pumpellyite facies or lowermost greenschist facies. Its texture is unambiguously that of a quenched rock, and I would have argued that it is a lava. It is conceivable that it is from the very rim of a decent-sized dyke however. The abundant plagioclase as the sole crystalline phase suggests that it is an evolved basaltic to basaltic andesite composition. Without compositional data it is hard to assign affinities to this sample, but it is not an atypical lithology for either the Henty Dyke Swarm, or the Henty Fault Wedge, in which plagioclase-phyric basalts are quite common.

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TO FERGUS FITZGERALD

LOCATION	PETROLOGICAL	SAMPLES
30002	56N	76360E
30024A/B	52.5N	77100E
30055	21.5N	73450E
30057	22N	74570E
30061	16N	74100E
30071	14N	75870E
30072	18N	75960E
30091	18N	75160E
30099	32N	76590E
30102	32N	74945E
30105	86N	74320E
30106	36N	74680E
30117	28N	76060E
30124	40N	74570E
30126	44N	74770E
30155	48N	75840E
30156	48N	75800E