Exploration Permit for Minerals No. 27596

Buckland Volcano Project, Central Queensland

Annual Report for the period:

21/09/2022 to 20/09/2023

Holder: Rockminsolutions Pty Ltd A.C.N 642 143 780

Operator: Rockminsolutions P/L

1:250,000 Sheet: SE55-3

1:100,000 Sheets Springsure, Consuelo

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Submitted by: Ardent Group P/L

Date: October 2023

EPM 27596 Annual Report for 21/09/2022 to 20/09/2023

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Fig. 14 Centre Pivot Soil Sample Sites. Wealwandangie.

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Fig.16 Location of sample of welded ignimbrite for petrographic description

1. SUMMARY

The main body of EPM 27596 covers an area of approximately 80 square kilometres of Tertiary basaltic ignimbrites (extensive volcanic ash deposits) and tuff with a thickness of between 200 and 330m.

Undo (https://un-do.com/) and Lithos Carbon (https://www.lithoscarbon.com/) are organisations in the UK and USA respectively that are currently using crushed basalt spread on agricultural land to remove carbon dioxide from the air and turn it into carbonate minerals for permanent sequestration. The huge advantage of this technology is that it is low tech, inexpensive and has the added benefit of improving soil fertility and productivity at the same time. These organisations are using crushed hard basalt as a source but there is a limited amount of this material produced as a by-product at basalt quarries producing aggregate for concrete and road base. Additional crushing requires a high energy input. Most of the basaltic rock in EPM 27596 is in the form of basaltic ignimbrite or tuff and is not lithified. A low energy input is required to crush this material and once exposed to air and water it disintegrates.

Alternatively, Carbfix (see www.carbfix.com) in Iceland have developed a process to capture and permanently dispose of CO_2 – either from emissions or directly from the air. The method provides a complete carbon capture and storage solution, where water with dissolved CO_2 – a soda-water of sorts – is injected into subsurface favourable rock formations where natural processes transform the CO_2 into solid carbonate minerals. At the Hellisheidi power plant in Iceland, the Carbfix team has demonstrated that over 95% of CO_2 captured and injected was turned into rock in the subsurface basalt in less than two years. This contrasts the previous common view that mineral storage in CCS projects takes hundreds to thousands of years. The process can be applied wherever favourable rock formations, water and a source of CO_2 come together.

Rockminsolutions Pty Ltd has identified the most promising and extensive resource of the appropriate rock formation in Australia. The Buckland Basaltic Sequence, up to 330m thick, is an aerially extensive accumulation of basaltic pyroclastic flows or ignimbrite that should have extensive lateral permeability. While basalt rock is common, it is rare for such a thick and extensive ignimbrite formation to be found with the right lithological characteristics. The resource is also ideally situated in relation to coal, gas, forestry and agricultural resources and would underpin a leading global hub for negative emissions technology including energy (gas, electricity), hydrogen, CCS (Carbon capture and storage) and BECCS (Bioenergy with carbon capture and storage) while enhancing forestry and agricultural productivity across large tracts of central and southern Queensland. These basaltic ignimbrites are capped and preserved by extensive welded tuff horizons below which the material is largely poorly lithified and very amenable to crushing. It is ideal for applying to agricultural land with the benefits of enhanced weathering carbon capture as well as improved soil structure, water holding capacity and fertility. Research into this application is already underway on one property.

Covid-19 travel restrictions limited the amount of field work curried out on the EPM during the previous reporting period.

Sub-blocks:

BIM	BLOCK	SUB-BLOCKS
Charleville	625	C,D,E
Charleville	626	A,B,C
Charleville	337	N,Q,T,U,Y,Z
Charleville	482	V,W,X,Y
Charleville	554	A,B,C,D,F,G,H,J,K,L,M,N,O,P,Q,R,S,T,V,W,X,Y
Charleville	553	K,O,P,S,T,U,X,Y,Z

Total: 45 sub-blocks

2. INTRODUCTION

EPM 27596 is in two portions that are located south of Springsure and west of Rolleston as shown in Fig 1. The main body of the EPM was selected to cover one of the thickest and extensive accumulations of Tertiary basaltic rocks in Queensland. The smaller, northern portion of the EPM was selected to cover the northern limit of the Buckland volcanic sequence where easy access to exposures is available in old road gravel quarries. This portion also covers part of an Organic Beef property where crushed material from an old gravel quarry on the property (at land holder initiative and cost) has been applied at varying rates to fodder crops on a large centre pivot irrigation circle. The resulting changes in chemistry and texture to the black soils along with production variations are being monitored.

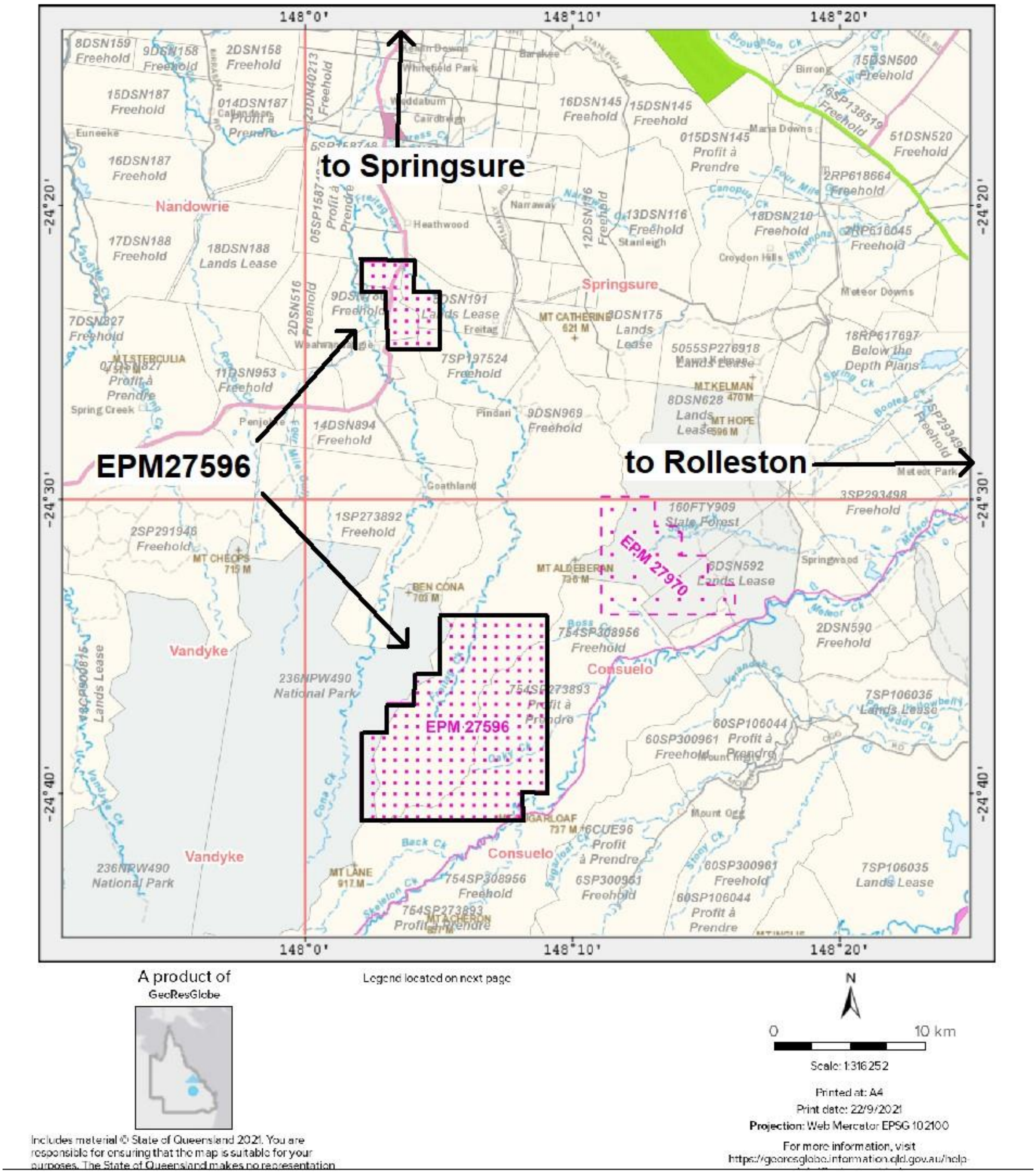


Fig. 1 Location of EPM27596 approximately 80km to the south of Springsure and west of Rolleston, Central Queensland. Map base supplied by GeoResGlobe.

The southern portion of the EPM covers the largest remnant of the Buckland volcanic sequence that has not been significantly dissected and eroded. Exposures in road cuttings on roads that ascend the Buckland Tableland provide evidence that the bulk of the sequence is a basaltic ignimbrite deposit capped by extensive resistant welded layers that have preserved the underlying mostly non-welded ash material. XRF and XRD analyses indicate that this non-welded ash material has very similar compositional properties over a significant vertical interval of over 150m. A simple absorption test of the non-welded ash found it to be very absorptive and permeable. This implies that this ash material has a good potential to be applied to agricultural land where advanced weather processes would absorb significant quantities of CO_2 from the atmosphere through carbonation (converting CO_2 to bicarbonate and then carbonate minerals) while also supplying essential plant nutrients and improving soil texture leading to productivity increases. In the future, when appropriate legislation exists, this large volume of basaltic material could also be suitable for in situ carbonation as is being undertaken in Iceland.

3. REGIONAL CONTEXT

EPM27596 lies approximately 80km south of Springsure and 50km west of Rolleston in Central Queensland and covers the largest contiguous portion of the 200 to 300m thick Buckland Volcanic sequence outside of the Carnarvon National Park. The Carnarvon National Park forms the western boundary of the EPM. The underlying basement is the Springsure Shelf that is covered by Permian and Triassic sediments that are prospective for coal and gas. State Gas Ltd ATP 2062 overlaps the eastern portion of EPM 27596. State Gas Ltd is targeting coal seam gas in the Permian coal measures. The Tertiary Buckland Volcanic Province has been dated at between 25 and 28 Ma (Sutherland et al 1989). Assuming that Australia has been moving north at 7cm/year since then, this area would have been located around 40 degrees south where Bass Strait now is. The remnants of the Buckland Volcanic Sequence that have been targeted by this EPM have not previously been subjected to analysis, mainly due to limited access. Pindari Station have constructed a road access from the north. Road cuttings on these roads offer good exposures of the sequence, enabling identification of volcanic textures such as degassing pipes and a paleo soil horizon marking a temporary hiatus in volcanic activity. Interpretation of field observations has identified this portion of the Buckland Volcanic Province as an outlier of basaltic ignimbrite where a welded upper layer has protected an underlying largely non-welded ignimbrite sequence mostly in excess of 150m thick. Access to the northern section of the EPM is along the Wealwandangie Rd from Springsure. Two abandoned road gravel quarries on Wealwandangie Station provide good exposures of the basal portion of the northern limit of the basaltic ignimbrite. The geophysical images for this area on the GeoRes Globe website are compiled from old data with wide spaced flight lines. This data unfortunately is of little use in this study. More detailed aeromagnetic images of the eastern margin of the Buckland Tableland beyond the EPM imply that there was a reversal of the global magnetic field during the accumulation of the Buckland sequence.

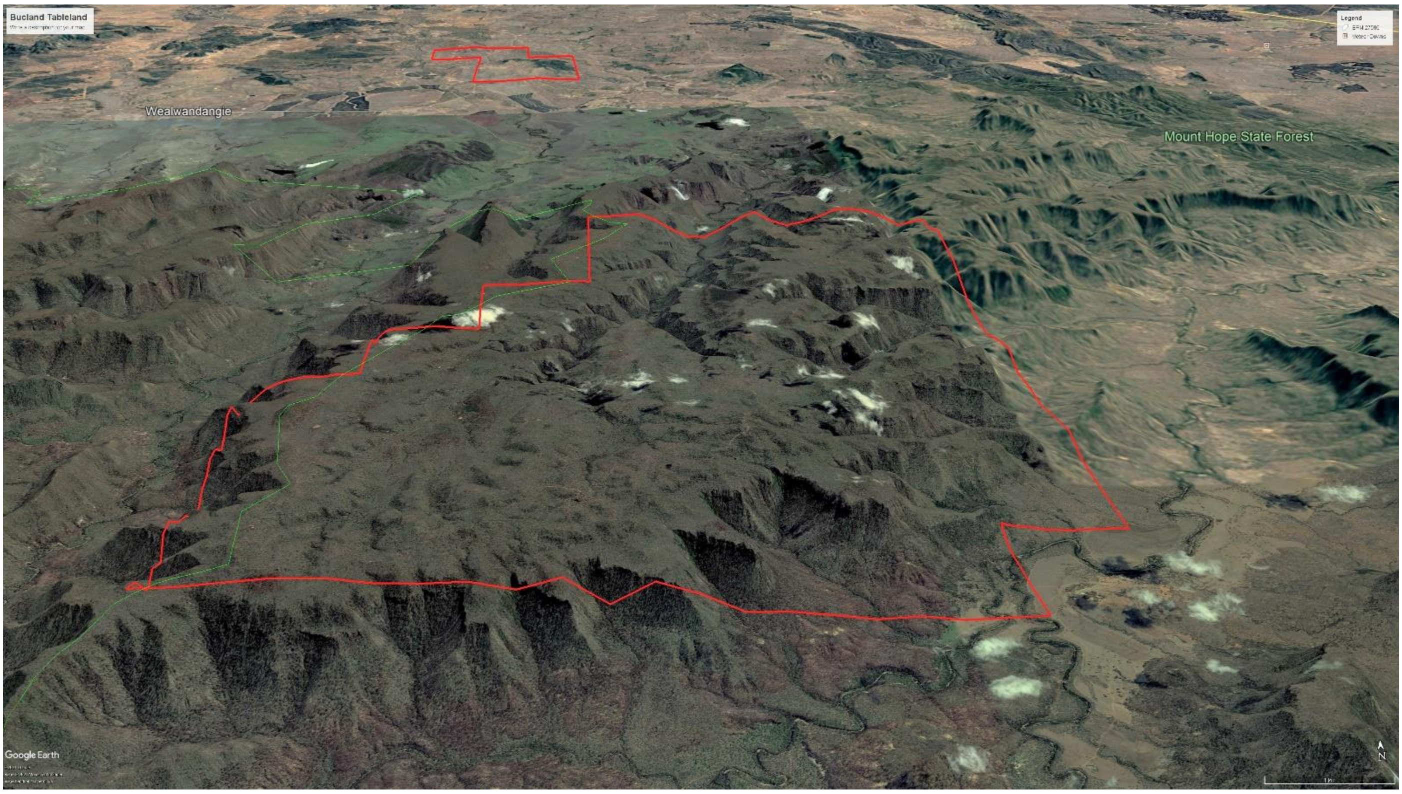


Fig. 2 Oblique view of the Buckland Tableland looking north. Red line delineates the two portions of EPM 27596. White patches are clouds. Scale bar bottom right is 1km. Google Earth image.

4. PREVIOUS EXPLORATION

The main area of EPM 27596 has had no previous mineral exploration while the smaller northern section has been investigated for bentonite in the Permian Black Alley Shale. This is currently not of interest.

5. GEOLOGY AND ROCK CHIP SAMPLING

The main body of EPM 27596 was selected on the basis of the Buckland Volcanic PhD Thesis by Andrew Skae submitted to the University of Oxford in 1998. This thesis described the Petrology of the Buckland Volcanic Province and identified it as a shield area 60km across and up to 300m thick with an age of 27 to 28 Ma. These characteristics identified the area as having some potential for carbon dioxide sequestration using the process pioneered by Carbfix in Iceland, converting CO2 to carbonate minerals. However none of Andrew's sample sites were within the boundaries of EPM 27596. The smaller northern portion of the EPM was selected on the basis that lavas may have interacted with the underlying bentonite, producing water and palagonite. Further research to establish whether the non-welded ignimbrite can be used as a supplementary cementitious material to make low-carbon cements is planned at University of Southern Queensland.

Fieldwork has found that the portion of the Buckland Tableland selected for EPM 27596 is mostly made up of basaltic ignimbrite. Welding of the upper layers has protected a large volume of non-welded, relatively soft basaltic ash that is both permeable and porous. This non-welded material is likely to have a high capacity to absorb carbon dioxide and fix it as carbonate minerals. There are two old road gravel quarries on Wealwandangie Station in the smaller northern portion of the EPM where material was extracted from eroded remnants of the northern extremity of the ignimbrite sheet. In one of the quarries there are large pillow-like structures formed by degassing channels and in both quarries the material is very vesicular.

Extensive calcrete carbonate precipitation from meteoric water is also evident at both quarries. The devitrified basaltic glass in the ash has been converted to palagonite as demonstrated by the XRD and XRF analytical results shown in Fig. 6 below.

A petrographic examination of a typical welded ignimbrite from the Buckland Tableland by Dr H.D. Hensel in 7 below found numerous patches of interstitial mesostasis that includes acicular crystals of ilmenite. This 'glue' appears to be the reason why the rock is so hard and resistant to weathering.

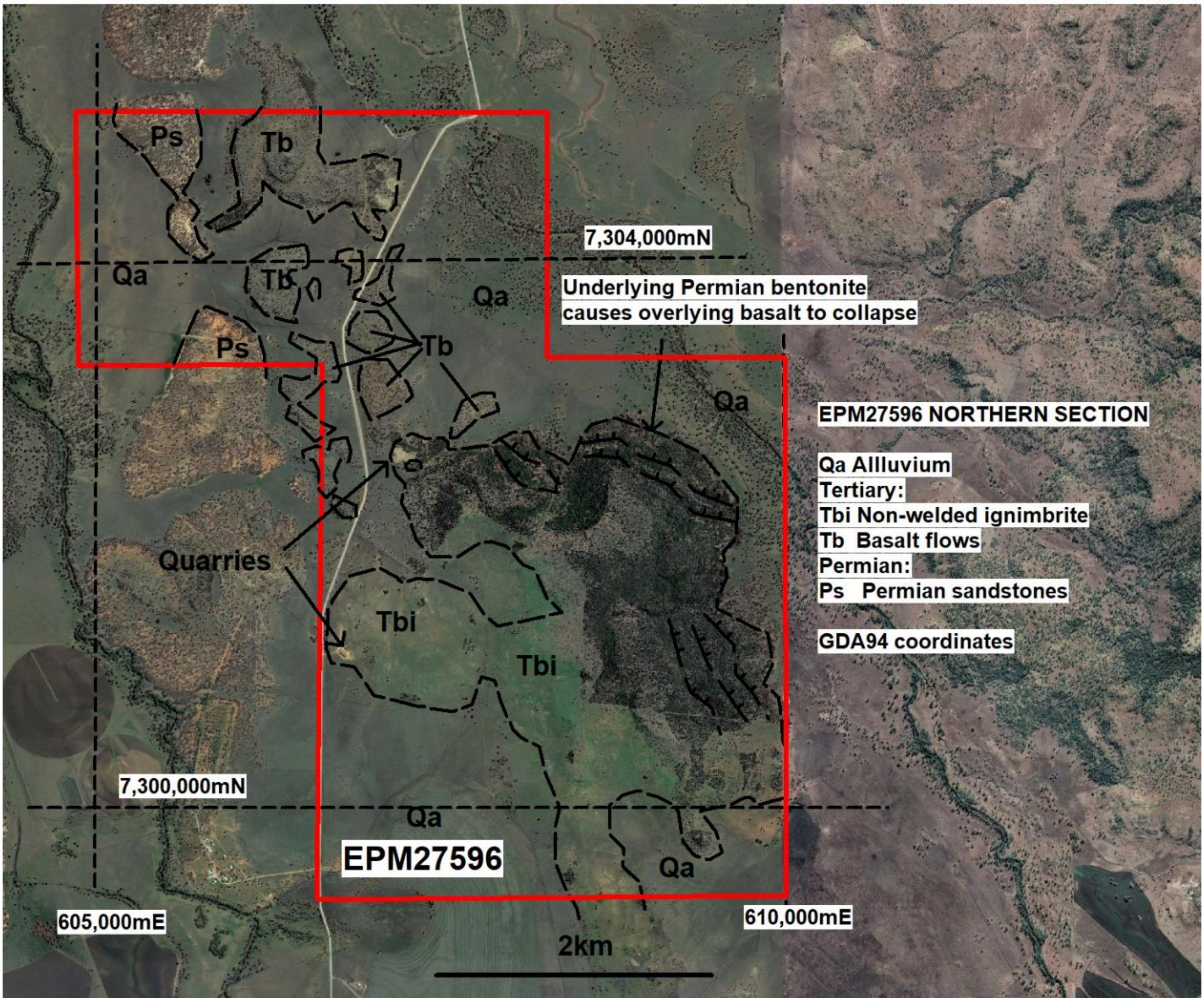
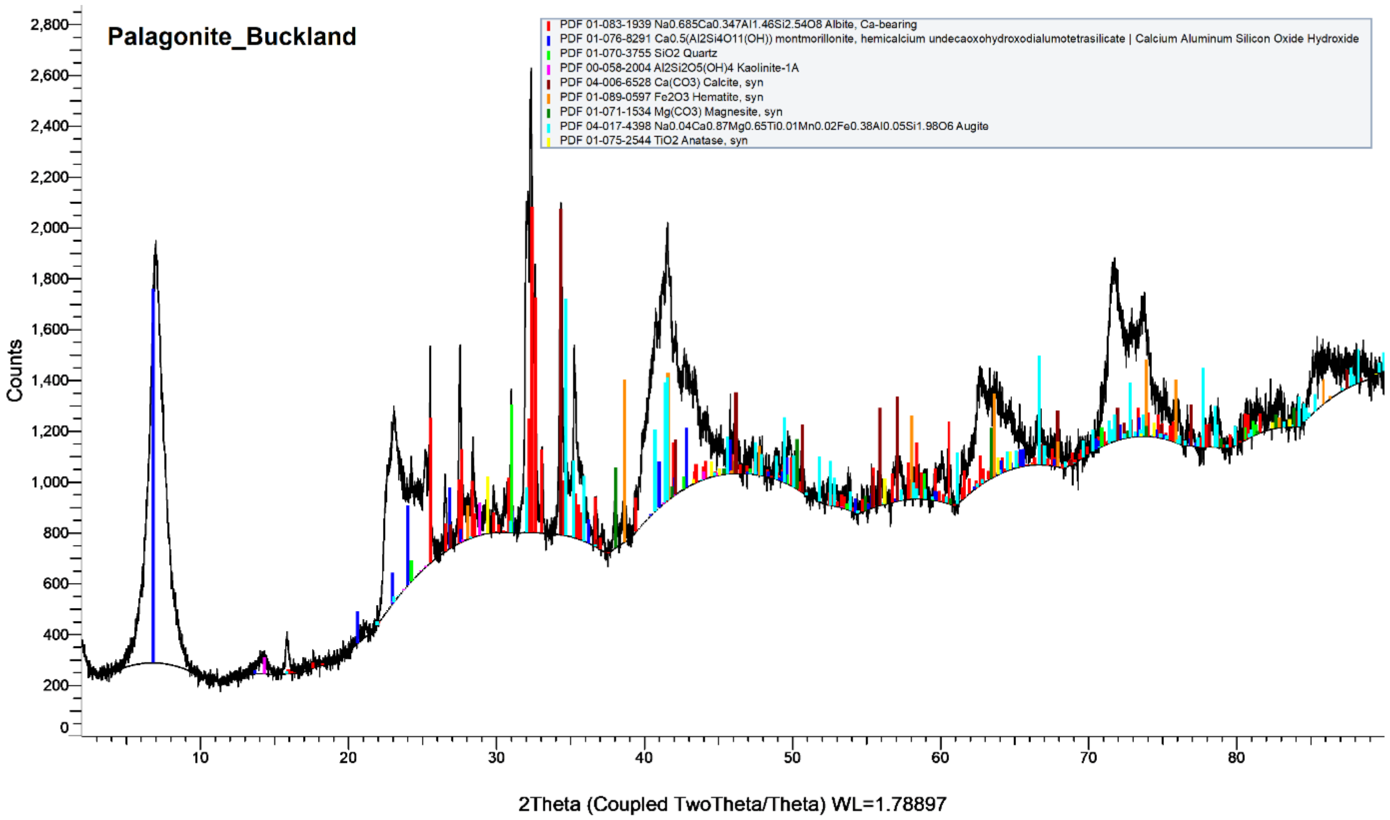


Fig. 3 Geological map of the norther section of EPM27596 overlaid on the Google Earth image. Non-welded ignimbrite (Tbi) overlies an older basalt flow that extends to the north and east.

Fig. 4 Apparent pillow structures in the northern limit of the Buckland Basaltic Ignimbrite most likely the result of degassing channels. Note carbonate calcrete formation both along and adjacent to the channels where CO_2 dissolved in rainwater has reacted with calcium and magnesium in the basalt. The ignimbrite at this distance from the eruptive centre (approx. 50km) has a high component of devitrified glass that is now a combination of amorphous material and smectite clay. It is essentially palagonite.

This material is both permeable and absorbent. When crushed and added to the black agricultural soils in the area it has a very positive effect on soil structure and fertility. It also has the ability to sequester CO_2 through accelerated weathering to carbonate minerals when spread on agricultural cropping soils. The rock is relatively soft and easy to crush and screen at costs below $10/tonne.

Fig. 5 Degassing tube/fracture in ignimbrite on Wealwandangie Station in old road gravel quarry. Note calcium and magnesium carbonate formation both within the tube/fracture and laterally. Clear evidence of the potential for CO2 sequestration by this palagonite-rich ignimbrite material. The white mineral lining the vesicles is most likely chabazite zeolite, an additional advantage for agriculture where it can improve the effectiveness of nitrogenous fertilisers by reducing the amount of leaching.



PDF 01-083-1939 Na0.685Ca0.347Al1.46Si2.54O8 Albite, Ca-bearing
PDF 01-076-8291 Ca0.5(Al2Si4O11(OH)) montmorillonite, hemicalcium undecaoxohydroxodialumotetrasilicate | Calcium Aluminum Silicon Oxide Hydroxide
PDF 01-070-3755 SiO2 Quartz
PDF 00-058-2004 Al2Si2O5(OH)4 Kaolinite-1A
PDF 04-006-6528 Ca(CO3) Calcite, syn
PDF 01-089-0597 Fe2O3 Hematite, syn
PDF 01-071-1534 Mg(CO3) Magnesite, syn
PDF 04-017-4398 Na0.04Ca0.87Mg0.65Ti0.01Mn0.02Fe0.38Al0.05Si1.98O6 Augite
PDF 01-075-2544 TiO2 Anatase, syn

A PORTABLE XRF ANALYSER OF THE FINE FRACTION DERIVED FROM CRUSHING THE MATERIAL FROM FIG. 4 ABOVE GAVE THE FOLLOWING ANALYSIS IN ppm, % for Fe and Ca.

Cu	Sr	Rb	Zn	Ni	Co	Fe	Mn	Ti	Ca	K	Ba	Zr
36	543	5	97	102	285	6.9%	1179	7335	10.4%	3760	273	121

Fig. 6 XRD and XRF results from the road gravel quarry in Fig.4 above. The XRD shows that the main minerals are montmorillonite, calcium-bearing albite and augite. The gap below the trace infers a large amorphous component.

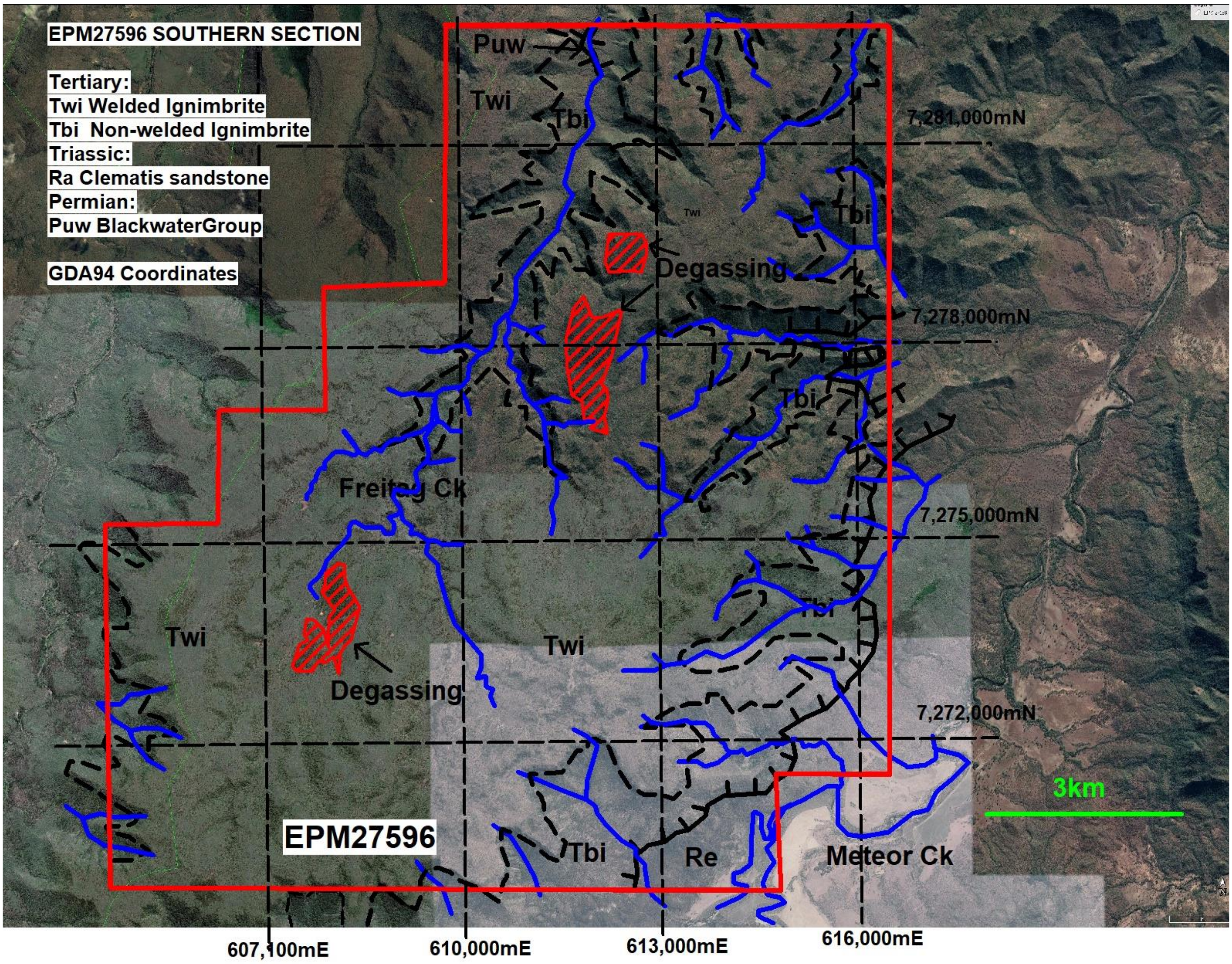


Fig. 7 Geological map of the southern portion of EPM27596 overlaid on the Google Earth image. This covers the Buckland Tableland that has been preserved by an extensive welded ignimbrite that overlies a thick, non-welded ignimbrite. This non-welded portion is thought to have the potential to sequester large tonnages of CO2 as carbonate minerals.

Fig. 8 Degassing tube/fracture in a road cutting on the northern escarpment of the Buckland Tableland showing the alteration halo (darker colour) rimmed by zeolite alteration, probably analcime.

Fig. 9 Two degassing tubes in ignimbrite exposed in a road cutting on northern escarpment of the Buckland Tableland. Both have alteration halos and zeolites on fractures are exposed to the right.

Fig. 10 Numerous degassing tubes on top of the Buckland Tableland. The host ignimbrite and scoria appears to have formed a natural geopolymer that is very resistant to weathering.

Fig. 11 This outcrop is part of the welded ignimbrite capping on top of the Buckland Tableland. It has the appearance of a natural geopolymer and is impermeable and resistant to weathering. The oxidised rind on the outcrop is very thin. Hat for scale.

Fig.12 Older, oxidised ignimbrite mantled with a paleo soil and overlain by younger ash. Carbonated vesicles below and above the contact. The interval between the eruptions was short.

Fig. 13 Pot trial results showing how the additions of compost and palagonite (from Buckland Ignimbrite) have a marked effect on the root and plant development in corn seedlings. In field sampling also found a significant increase in nitrogen in the soil after the addition of palagonite at all rates to an irrigated centre pivot circle adjacent to EPM 27596.

Soil samples were collected at 4 GPS located sites within a centre pivot irrigation circle where the landowner had spread palagonite at different rates. Significant changes were observed after one year (see below) but need to be verified by controlled experiment as part of a sponsored PhD study at Southern Cross University, Lismore. The soil samples were analysed by EAL Environmental Analysis Laboratory, Southern Cross University.

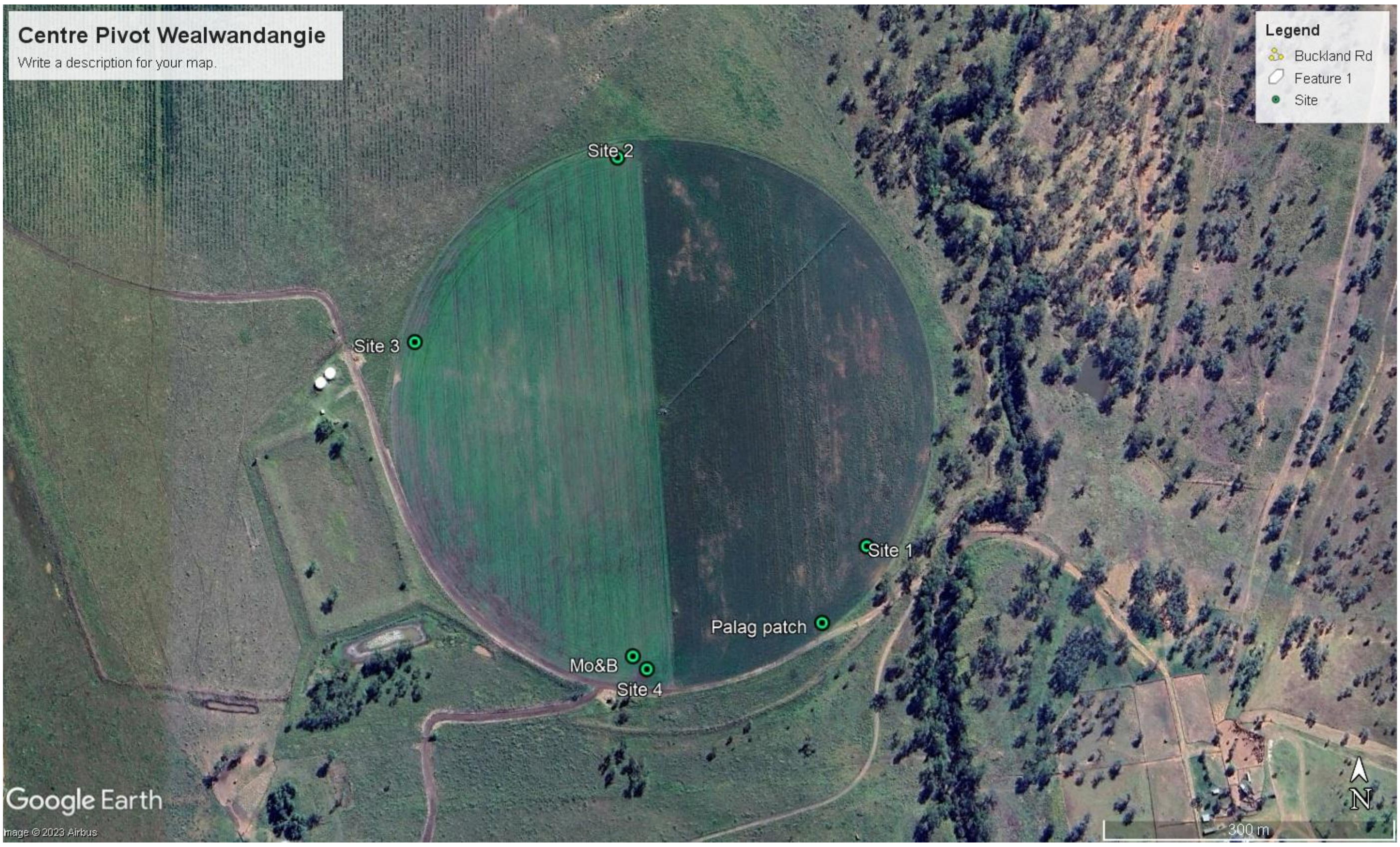


Fig. 14 Centre Pivot Soil Sample Sites. Wealwandangie. Tables of selected results see below.

Parameter	Sample 1 April 2021	Sample 1 April 2022	Sample 1 Nov 2022	Sample 1 May 2023
Soluble Ca mg/kg	2,170	3,076	1,708	2,171
Soluble P mg/kg	6.9	8.2	4.3	6.7
Nitrate N mg/kg	2.0	16	0.59	3.2
Ammonia N mg/kg	3.3	6.8	1.5	3.1
Electrical Conductivity ds/m	0.144	0.195	0.140	0.129
Total C %	1.1	0.79	1.1	1.3
DTPA Zn mg/kg	0.89	0.50	0.67	1.2
DTPA Cu mg/kg	1.1	0.89	1.1	1.4
pH (1:5 water)	8.9	9.13	9.00	8.69
Boron mg/kg (hot CaCl2)	0.74	0.37	0.62	0.51
Molybdenum mg/kg	0.42	0.39	0.35	0.45

Parameter	**Sample 2 April 2021**	**Sample 2 April 2022**	**Sample 2 Nov 2022**	**Sample 2 May 2023**
Soluble Ca mg/kg	**1,708**	**2,171**	**1,926**	**1,960**
Soluble P mg/kg	**4.2**	**6.7**	**5.6**	**4.6**
Nitrate N mg/kg	**6.4**	**23**	**1.7**	**6.5**
Ammonia N mg/kg	**4.1**	**6.6**	**1.7**	**3.1**
Electrical Conductivity ds/m	**0.181**	**0.266**	**0.173**	**0.198**
Total C %	**1.3**	**1.1**	**1.2**	**1.5**
DTPA Zn mg/kg	**0.71**	**<0.50**	**0.68**	**0.68**
DTPA Cu mg/kg	**1.5**	**1.4**	**1.8**	**1.8**
pH (1:5 water)	**9.15**	**9.35**	**8.65**	**8.84**
Boron mg/kg (hot CaCl2)	**1.4**	**1.2**	**1.3**	**1.4**
Molybdenum mg/kg	**0.42**	**0.33**	**0.43**	**0.65**

Parameter	**Sample 3 April 2021**	**Sample 3 April 2022**	**Sample 3 Nov 2022**	**Sample 3 May 2023**
Soluble Ca mg/kg	**2,116**	**2,171**	**2,096**	**2,317**
Soluble P mg/kg	**4.8**	**6.7**	**30**	**5.3**
Nitrate N mg/kg	**2.2**	**10**	**3.4**	**7.8**
Ammonia N mg/kg	**2.4**	**9.7**	**0.78**	**2.4**
Electrical Conductivity ds/m	**0.193**	**0.270**	**0.163**	**0.195**
Total C %	**1.3**	**1.1**	**1.9**	**1.4**
DTPA Zn mg/kg	**0.95**	**<0.50**	**0.83**	**0.72**
DTPA Cu mg/kg	**1.5**	**1.4**	**2.1**	**1.7**
pH (1:5 water)	**9.15**	**9.35**	**8.78**	**9.02**
Boron mg/kg (hot CaCl2)	**1.4**	**0.65**	**0.76**	**0.59**
Molybdenum mg/kg	**0.44**	**0.35**	**0.36**	**0.58**

Parameter	**Sample 4 April 2021**	**Sample 4 April 2022**	**Sample 4 Nov 2022**	**Sample 4 May 2023**
Soluble Ca mg/kg	**1,799**	**1,995**	**2,446**	**2,140**
Soluble P mg/kg	**16**	**13**	**4.6**	**17**
Nitrate N mg/kg	**2.7**	**16**	**1.1**	**2.2**
Ammonia N mg/kg	**3.0**	**7.0**	**0.78**	**2.4**

Electrical Conductivity ds/m	**0.150**	**0.190**	**0.204**	**0.194**
Total C %	**2.0**	**1.5**	**1.2**	**1.9**
DTPA Zn mg/kg	**0.86**	**0.58**	**0.65**	**0.81**
DTPA Cu mg/kg	**1.8**	**1.8**	**1.6**	**2.0**
pH (1:5 water)	**9.15**	**9.35**	**8.78**	**9.02**
Boron mg/kg (hot CaCl2)	**0.92**	**0.57**	**1.00**	**0.47**
Molybdenum mg/kg	**0.38**	**0.29**	**0.35**	**0.57**

The most significant result from these sample results is the increase in nitrogen in April 2022 after spreading palagonite basaltic ash which was also evident in the relative increase in growth. Other positive outcomes are the increase in soluble calcium and phosphorus along with an increase in electrical conductivity, the latter implying an increase in soil biological activity. The increase in nitrogen was most likely due to biological activity fixing nitrogen from the atmosphere. This implies that palagonite is a possible substitute for nitrogenous fertilisers. On the negative side there was a decrease in total soil carbon in April 2022, probably a consequence of very high summer temperatures in January 2022 (see Fig. 14 below). The increase in pH in April 2022 was likely caused by secondary calcium and magnesium carbonates in the basaltic palagonite that had been altered by CO2 in rainwater; as well as high rates of evaporation during high temperatures in January. This had a knock-on negative effect of reducing the availability of zinc, copper and boron. Adding elemental sulphur to the soil would lower the pH and make zinc, copper and boron more available. However, boron and molybdenum also need to be added at 3 and 0.5kg/hectare respectively to resupply plant requirements. The centre pivot area supported a very productive winter pasture crop of forage oats and rye grass in 2022. The May 2023 soil sampling results show that soil carbon levels overall have increased. Soil sampling of a small area where trace amounts of boron and molybdenum were added in April 2022 indicate that carbon levels have increased to 1.7% and zinc and copper are now more plant available (more research required here). Total copper and zinc concentrations in the soil are around 35 and 75mg/kg respectfully which are very adequate. The EAL total analytical results correlate well with hand-held XRF values. Trials are also underway to test weather the additions of boron and molybdenum will suppress the dominance of parthenium weed in the region's basalt-derived soils.

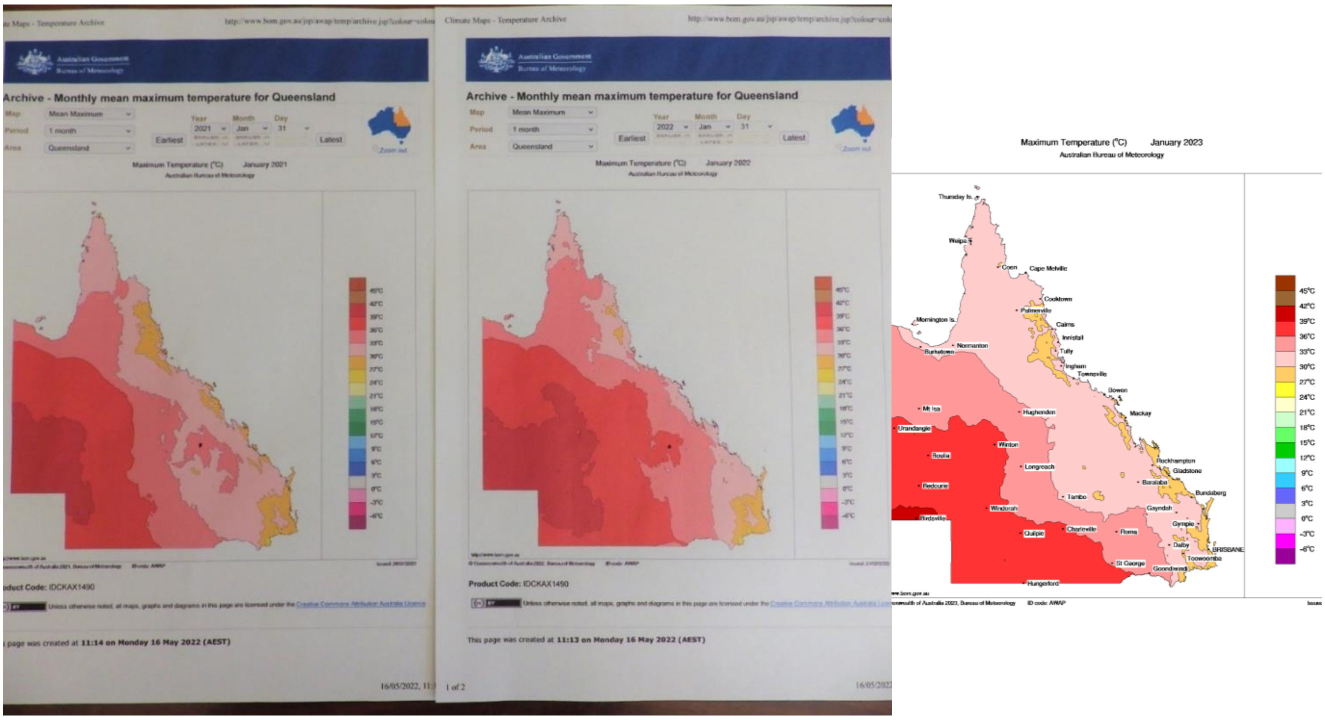


Fig. 15 Big difference in mean max January temperatures for Qld in Jan 2021, Jan 2022 and Jan 2023. Small black dot on middle image is EPM 27596 location. January 2021 was 33-36 degrees; January 2022 was 36-39 degrees and January 2023 was 30-33 degrees Celsius. This heat in 2022 almost certainly contributed to a decline in soil carbon as observed in consecutive samples taken from a centre pivot irrigated circle adjacent to the EPM27596 in 2022. Climate warming could result in large quantities of soil carbon loss across northern Australia.

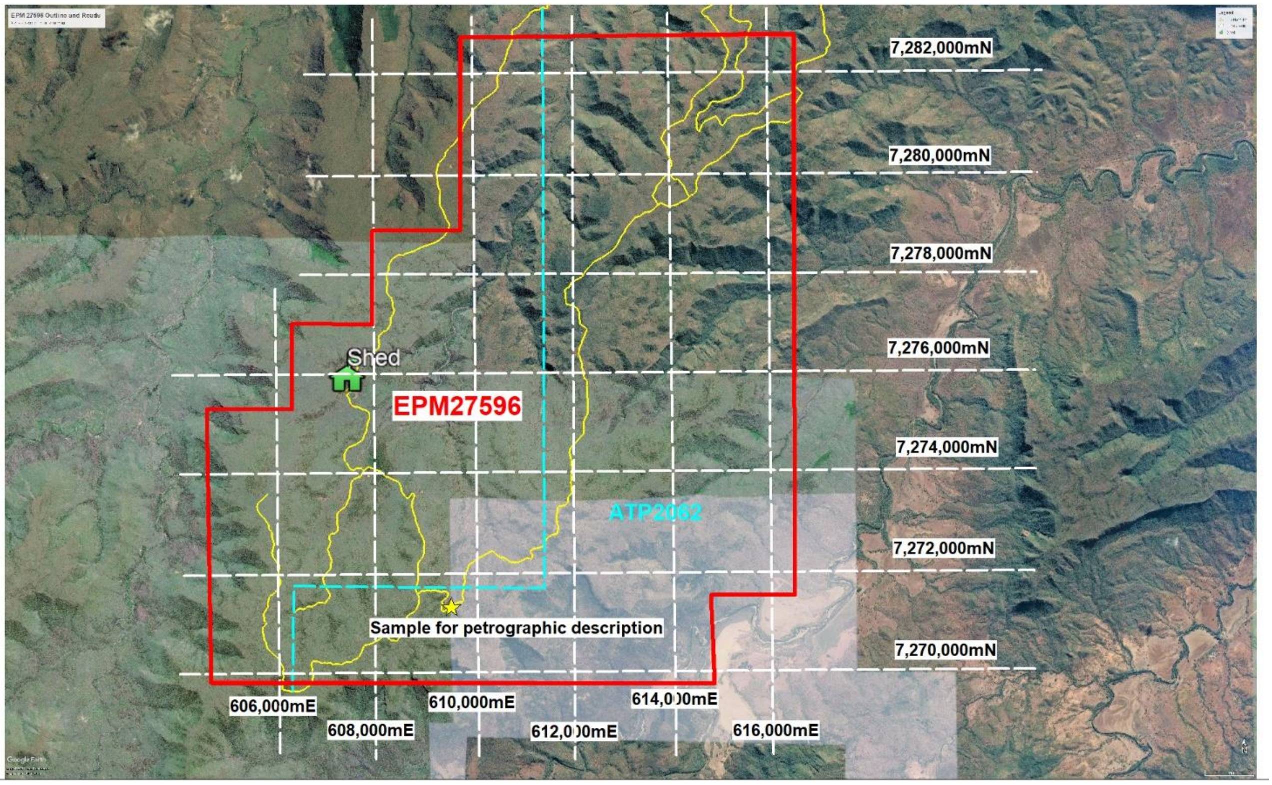


Fig.16 Location of sample of basaltic welded ignimbrite for petrographic description (GDA94 coordinates)

6. **Petrographic Description of Typical Welded Basaltic Ignimbrite from the Buckland Tableland (GDA94 Coords: Zone 55 609482mE 7271324mN) by Dr H.D. Hensel (Hensel Geosciences P/L)**

Macroscopic and binocular description of rock

This is a highly vesicular, very fine-grained, darkish-grey volcanic rock with considerable variation in vesicularity. Portions of the sample are coarsely vesicular with voids up to 8mm. This grades into zones with much finer vesicles of <1mm.

Under the binocular microscope the rock displays dark reddish-brown patches resembling alteration. Some of the vesicles contain encrustations which is likely to be poorly crystalline.

A scratch test shows that the rock is moderately hard and it does resist scratching. It was not difficult to cut.

This is a partly altered, highly vesicular basalt of uncertain tholeiitic affinity. Plagioclase feldspar is the dominant mineral followed in roughly equal amounts by calcic pyroxene and altered olivine. Minor skeletal ilmenite crystals and a fine, sparse mesostasis essentially complete the primary mineralogy. But as with many basalts there is a moderately abundant secondary mineral contribution. The most obvious is the almost complete alteration of the olivine (see photographs) to a reddish-brown clay.

There is only one generation of olivine. It consisted of smallish crystals that are poorly formed. There are virtually no well-developed crystal faces or crystal forms. One relatively large crystal of olivine retains a core of silicate alteration that has preceded the clay alteration. Another crystal has a lighter-coloured alteration core which could suggest some compositional zoning. A typical crystal size is around 0.2mm with the largest to 0.7mm. In one or two of the alteration patches there is some minor cracking which is not unusual. That is because most of the alteration is likely to be smectite and this clay has a high shrinkage behaviour. It is somewhat surprising that there is such limited cracking.

Most of the plagioclase feldspar occurs as well-formed, fresh-looking, multiply twinned laths with the largest not exceeding 0.8mm. Twinning is irregular and there is negligible compositional zoning. There is basically no alteration and the indicated composition is high andesine- low labradorite. There is no obvious flow direction or alignment of the laths which could be due to the vesiculation.

Calcic pyroxene occurs as numerous small crystals – up to 0.8mm – which have crystallized simultaneously with the feldspar. This has resulted in an intergranular texture. There has not been any development of prismatic crystal shape and the very subtle colouration suggests an augitic composition. There has not been any alteration of the pyroxene.

Ilmenite forms fairly abundant, generally very elongate to skeletal crystals up to 0.6mm. It is commonly associated with the interstitial mesostasis.

Another feature is the degree of vesiculation. As noted in the hand description some of the vesicles are up to 6mm across. There is no discernible elongation of the vesicles and no compaction. Also of interest is the absence of clay occupying the vesicles. In several of the vesicles there is a hint of crystallization of a possible zeolite.

Despite the alteration to the olivine and the presence of secondary minerals this type of rock is usually regarded as suitable for construction purposes.

Mode of rock

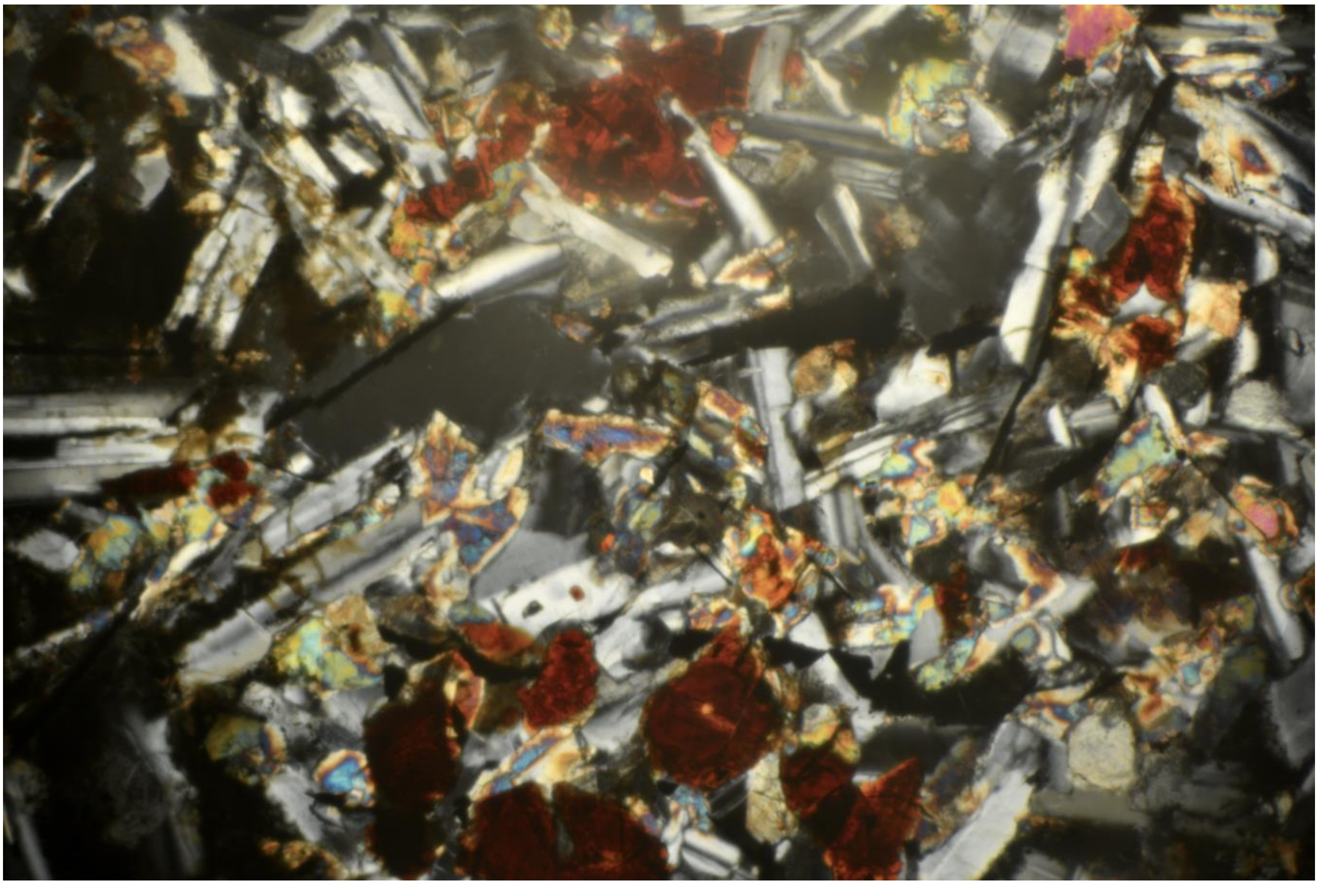
altered and residual olivine	18%
feldspar	36%
calcic pyroxene	22%
mesostasis	4%
opaque minerals	2%
voids	18%

Name of rock Altered, vesicular olivine basalt

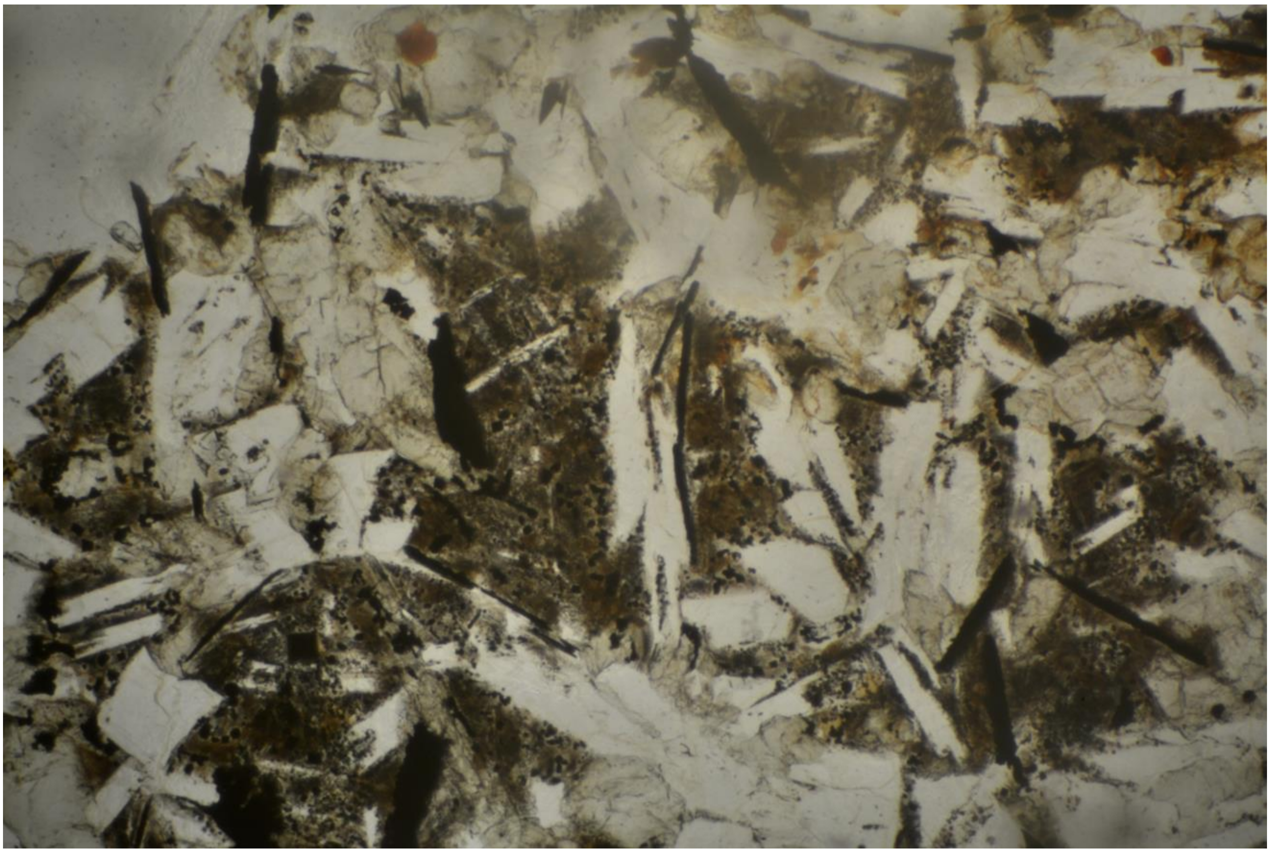
Dr. H. D. Hensel

(HENSEL GEOSCIENCES)

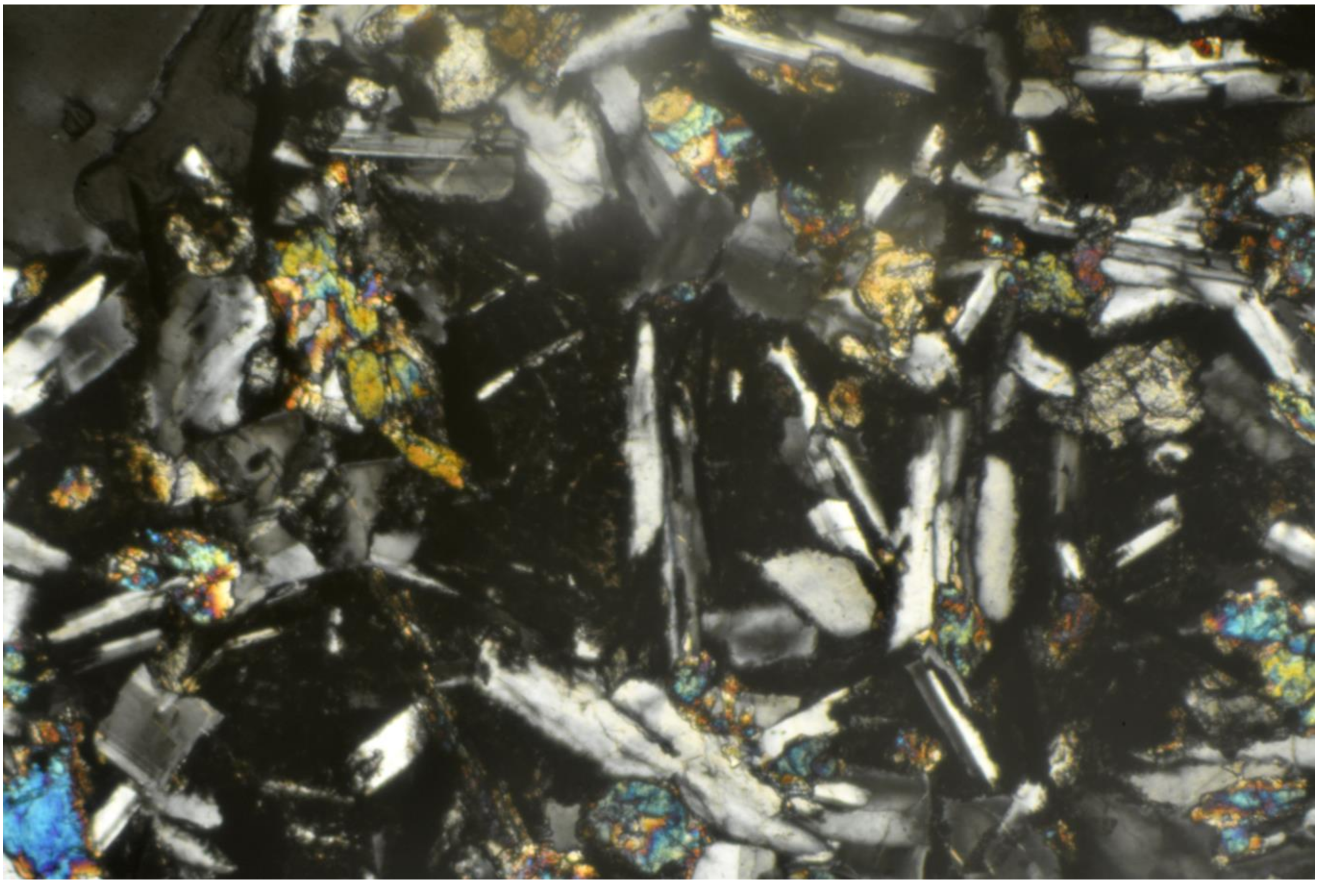
17th August, 2022)



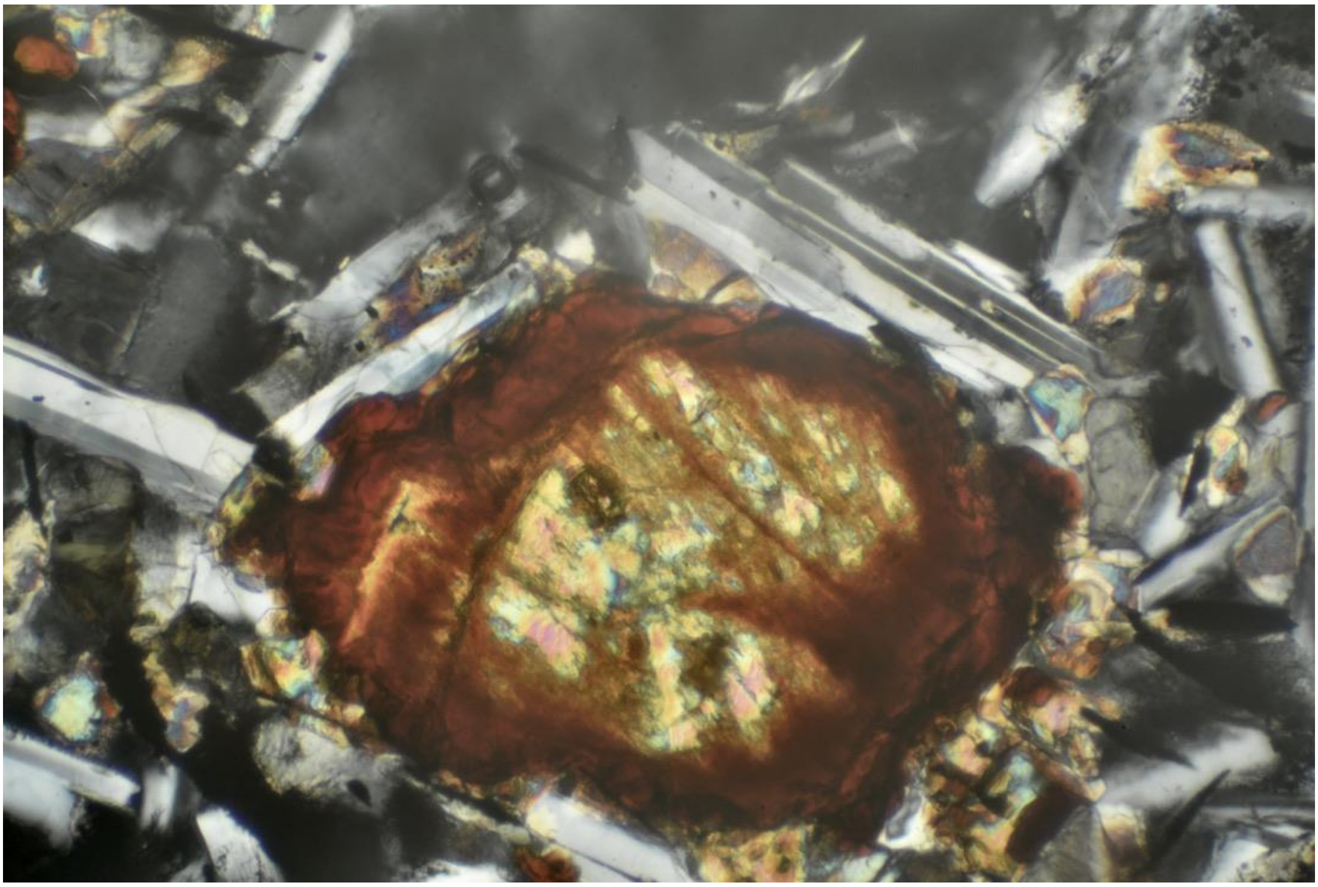
MARTIN 2 a – typical textural view in polarized light of this basalt highlighting the totally altered olivine crystals among twinned plagioclase feldspar laths and intergranular calcic pyroxene. Scale: side of photograph is 1.6mm



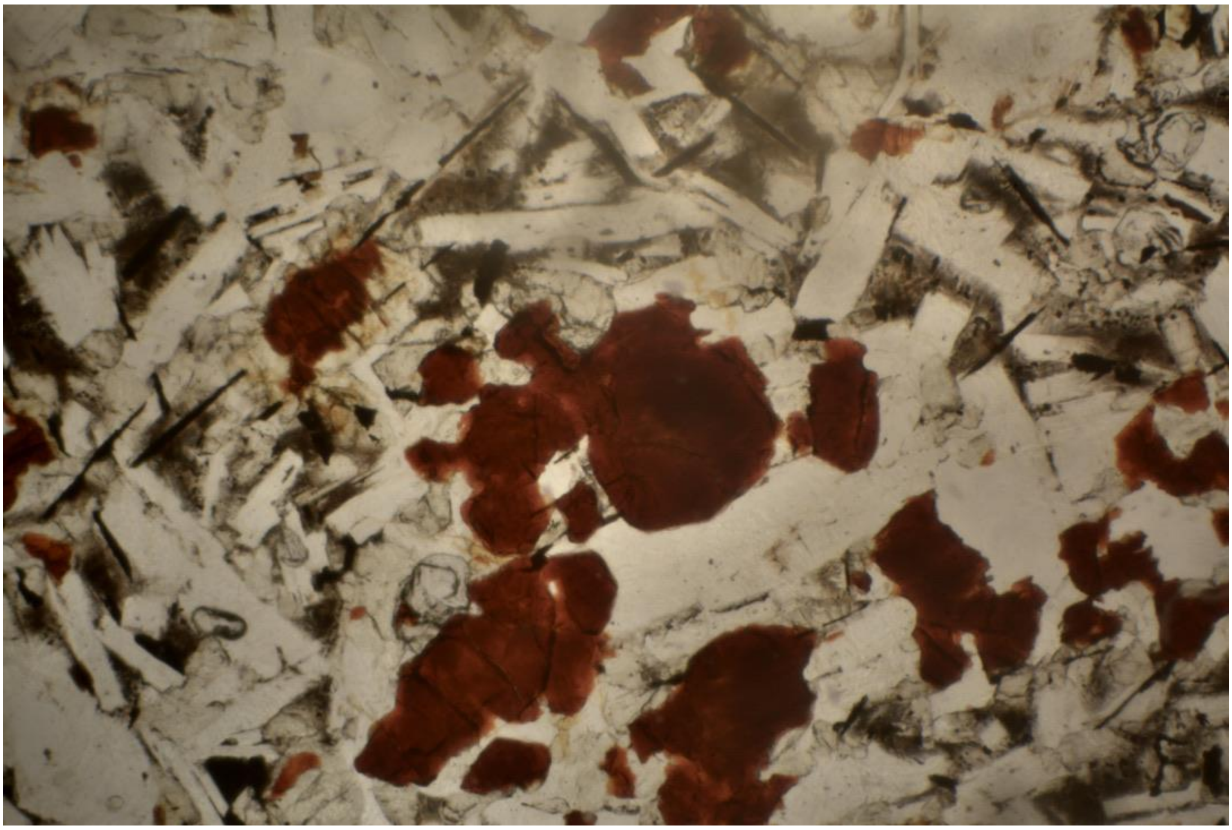
MARTIN 2 b – another textural view in ordinary light showing numerous pockets of mesostasis and skeletal to acicular ilmenite crystals.   Scale: side of photograph is 1.6mm



MARTIN 2 c – same view as previous photo in polarized light.   Scale: side of photograph is 1.6mm



MARTIN 2 d – slightly magnified and condenser-enhanced view of a residual olivine crystal. Scale: side of photograph is 0.8mm



MARTIN 2 f – a condenser-enhanced view in ordinary light of a small cluster of totally altered olivine crystals. Scale: side of photograph is 1.6mm

MARTIN 2 g – another view in ordinary light of mesostasis patches and acicular to skeletal crystals of ilmenite. Scale: side of photograph is 1.6mm

7. CONCLUSIONS

The Buckland Tableland has been found to comprise an unusual accumulation of basaltic ignimbrite. The only other documented occurrence of a similar sized formation of this size is on the Gran Canary Island. The physical and chemical characteristics make this rock formation suitable for crushing and spreading on agricultural land to both improve fertility and absorb CO2 from the atmosphere through advanced weathering. It may also be suitable for CO2 conversion to carbonate minerals using the dissolved CO2 injection technique developed by Carbfix in Iceland. A third application may be in the development of geopolymers or low carbon cement. These processes combined have the capacity to absorb and convert many millions of tonnes of CO2 from the atmosphere as well as reduce emissions through the manufacture of low carbon cement.

Future work will initially involve more field mapping, geochemical and XRD analyses and further petrographic examinations of rocks from the Buckland Tableland. Continued monitoring of the effects of applying crushed ignimbrite (palagonite) to agricultural black soil cropping land will also be undertaken.

Planning is underway for drilling of a number of holes through the basaltic ignimbrite on the Buckland Tableland to obtain fresh samples to test the absorption and conversion rates to carbonates when spread on agricultural land (Enhanced weathering) or impregnated with water saturated with CO2. Rockminsolutions P/L entered into a joint venture with State Gas Ltd in December 2022 with the aim of drilling two holes of 200 metres depth and conduct mineralogical analyses of samples from both wells to test the viability of carbon dioxide absorption in both ex-situ and in-situ environments. These wells are to be drilled in the vicinity of Zone 55 613750mE and 7279400mN. To date it has not been possible to locate a drilling contractor to undertake the project.

Research is also underway to test if the addition of trace amounts of boron and molybdenum will reduce the dominance of parthenium fire weed that are now very prominent in basalt derived soils in Central Queensland. A number of landholders have been given boron and molybdenum to trial at rates of 4kg B and 100g Mo per hectare.

8. REFERENCES

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