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RECORDS:

1965/70

VOLCANIC ACTIVITY AT MOUNT YELIA, NEW GUINEA

by

C.D. Branch.

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SUMMARY

Mount Yelia is a dormant volcano, 11,135 feet above sea level in the Owen Stanley Range north of Menyamya. The volcanic structure is clear in the upper 3000 feet of the mountain and comprises a northern dome and crater complex, a southern crater ridge, and a dome, all of augite - lamprobolite dacite.

Decadent solfatara areas are located along the inner face of the southern ridge and at the base of the dome on the southern and eastern sides, at an altitude of about 9000 feet above sea level. All the areas are cold and consist of sulphur encrusted talus blocks with hydrogen sulphide and a little sulphur dioxide issuing from fissures between the blocks.

The volcano is similar in character to Mount Lamington and nuee ardentes may be produced in future eruptions. Two possible avalanche valleys exist, one on the east and one on the west of the mountain, which drain steeply to sparsely populated valleys 5000 to 6000 feet below. These areas would need to be evacuated should an eruption appear imminent.

INTRODUCTION

Mount Yelia is a prominent dome-shaped peak 11,135 feet above sea level, located at latitude 07°03'S., and longitude 145°51'E., in the Owen Stanley Range north of Manyamya, T.P.N.G.

Although Mount Yelia has been a familiar land mark for many years to pilots between Port Moresby and Goroka, it was not until 1962 that attention was drawn to the possible volcanic origin of this mountain. In May 1962 Dr. M. Alpers of the Department of Public Health crossed the mountain when walking between Okapa and Menyamya and noted the presence of sulphur gases and a crater lake. Local natives reported that this centre had been active in the past. On receiving a letter from Dr. Alpers, G.A.M. Taylor, Senior Resident Geologist asked the A.D.O. at Menyamya for further information. As a result Patrol Officer D.C. Lindsay investigated the crater in October, 1962, and collected samples of sulphur and altered lava. His observations were confirmed in January, 1963, by Mr. G. Rosenberg of the Department of National Mapping who noted particularly the absence of heat, and collected samples of fresh lava from the cone complex when he established a survey beacon on the summit of Mount Yelia. Taylor inspected the volcano from the air on 27th February, 1963 and concluded that the volcano is similar in structure to Mount Lamington.

I flew to Mount Yelia from Menyamya by helicopter on 12th November, 1963. A camp was established for three days at an elevation of about 9750 feet above sea level (Pl.1) from which traverses were made to the solfatara areas and dome, the summit area, and the south-western slopes of Mount Yelia. A little firewood and water of doubtful quality from nearby swamps are available near the camp site. The co-operation of the Department of National Mapping who were using the helicopter at this time, and the assistance of Cpl. Waengo of the Royal Papua and New Guinea Constabulary, are gratefully acknowledged.

TOPOGRAPHY

Mount Yelia, situated at the end of a high ridge in rugged mountain country (Fig.1 and Pl.1), is a broad dome with a maximum elevation of 11,135 feet above sea level. To the north and west the mountain slopes precipitously to wide valleys 5000 to 6000 feet deep containing the headwaters of the Vilolo River, and to the south-east Mount Yelia is connected to Mount Marble by a ridge with an elevation of about 9000 feet above sea level. On most maps of the area Mount Yelia is not indicated and Mount Marble is plotted in its position: in addition it is confused sometimes with Mount Akana.

The lower slopes of Mount Yelia are thickly vegetated, but above 8000 feet above sea level the mountain is covered by patches of stunted moss forest and alpine grass and swamps. The air temperature at the camp 9750 feet above sea level ranged from 25°C to 8°C.

STRUCTURE OF MOUNT YELIA VOLCANO

The volcanic structure of Mount Yelia is clear in the upper 3000 feet, and the main components are (Pl.1):

1. Southern crater ridge
2. Northern dome and crater complex
3. Dome
4. Crater
5. Solfatara areas.

1. Southern crater ridge

A narrow arcuate crater ridge 1½ miles long and up to 750 feet high is preserved on the southern side of Mount Yelia, with a small outlier one half mile away on the south-western slope. The base of the ridge is about 9000 feet above sea level. Massive, grey augite-lamprobolite dacite (Morgan, 1963) from the top of the ridge near the eastern end possibly represents the earliest rocks erupted from the volcano.

2. Northern dome and crater complex

The main bulk of Mount Yelia is a broad dome about two miles in diameter and 3000 feet high, with the Mount Yelia trignometrical station at its summit. The dome is composed of augite-lamprobolite dacite ash, which in the summit area is oxidized, moderately cemented and faintly bedded. Apart from erosion gullies on the flanks, the form of the dome is regular, but its large size suggests that it may be built of several overlapping small domes extruded over a period of time from centres in the same general area.

Superimposed on the dome are eight well preserved explosion craters ranging from 150 to 500 feet across and up to 200 feet deep. No cones are preserved around the craters: they may have been eroded, but it is possible that the craters are diatremes. No thermal activity is evident in any of the craters, and all are covered by alpine grass and moss forest.

3. Dome

A small dome one half to three quarters of a mile across, and 1250 feet high has been extruded between the northern dome and crater complex, and the south-eastern end of the southern crater ridge. Moss forest on the slopes of the dome is stunted compared with the rest of the volcano, and suggests that the dome is the most recent volcanic structure. The dome is composed of dacite similar to the southern crater ridge, but it is strongly oxidized.

4. Crater

The irregular depression formed between the two domes and the crater ridge has been called a crater by previous observers. The crater is elongated east-west, with low swampy areas at either end, and a hill about 750 feet high in the centre. The low area at the eastern end is an area of internal drainage in which a shallow lake forms after heavy rain.

5. Solfatara areas

The largest solfatara area is located along the base of the northern (inner) slope of the southern crater ridge (Fig.2), with smaller solfatara areas around the base of the dome and at the foot of the hill in the centre of the crater, all at an elevation of about 9000 feet above sea level. Away from the volcano cold springs depositing sulphur have been reported by Patrol Officer C.F. Booth in the Kwonguya River at an elevation of 7800 feet above sea level, and in the head of the Kwonaga River at an elevation of 7300 feet above sea level.

The solfatara areas are confined mainly to the talus slopes, and within each area the talus blocks are leached and commonly encrusted with sulphur. Cold hydrogen sulphide with a little sulphur dioxide issues from fissures between the blocks. Sulphur stalactites and stalagmites a few inches long have grown in some of the fissures. No heat was evident at any of the solfatara areas visited.

FUTURE VOLCANIC ACTIVITY

Both the form of Mount Yelia and the petrology of the rocks erupted are similar to Mount Lamington, hence similar types of eruption with the production of nuee ardentes may be expected.

Two possible avalanche valleys exist, one on the east and one on the west of the mountain (Pl.1). In both cases the valleys drain steeply down to sparsely populated flat areas 5000 to 6000 feet below. These areas would need to be evacuated should an eruption appear imminent.

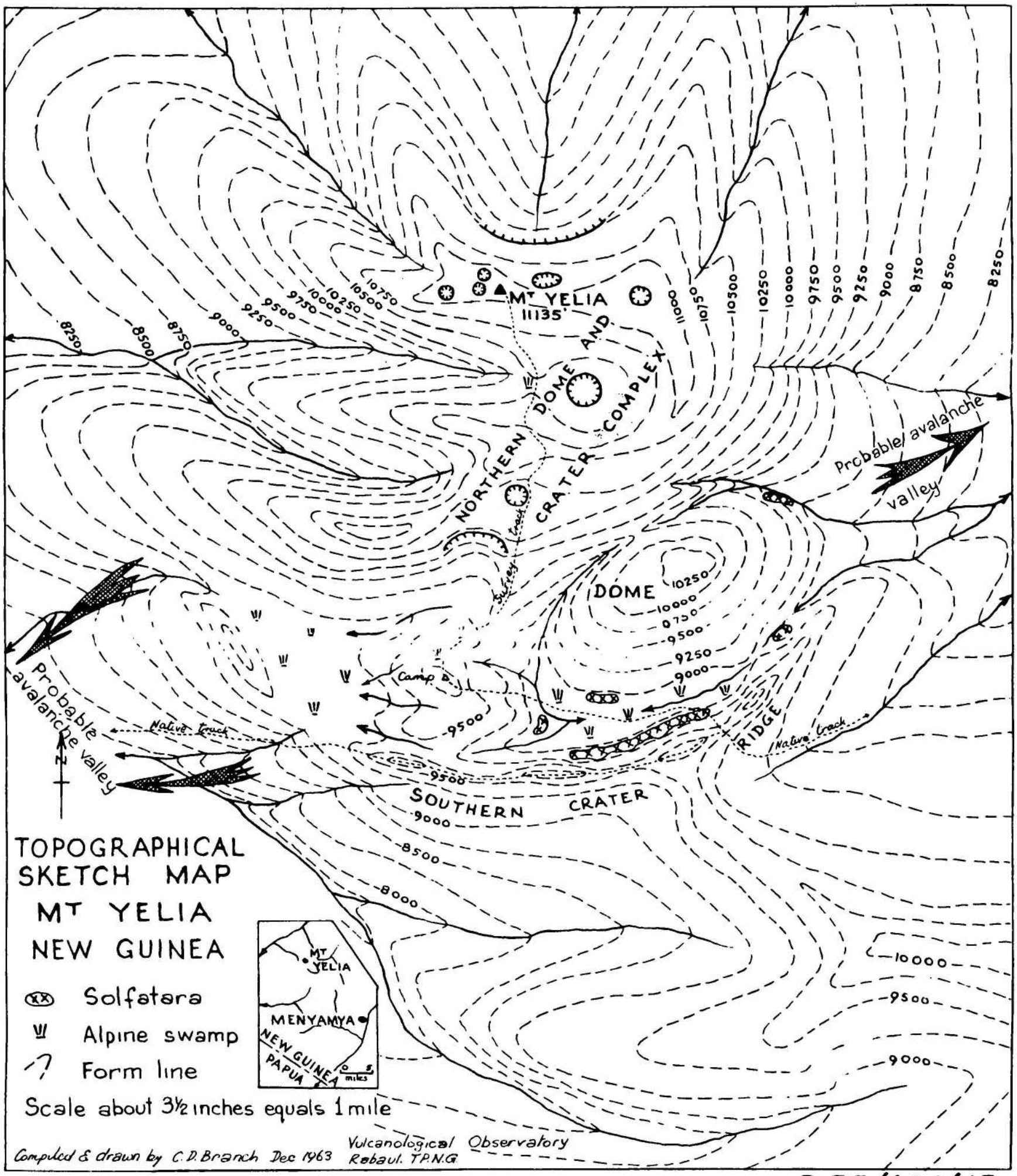
At present Mount Yelia volcano is dormant, but an unconfirmed native report suggests an eruption occurred at this centre about 20 years ago. The volcano should be kept under surveillance and any increase in volcanic activity reported immediately to the Vulcanologist, Rabaul. The nearest patrol posts, Menyamya to the south and Wonenara to the north are unfortunately too far away to be able to observe the volcano, but changes in volcanic activity would be readily noted by pilots on the Port Moresby-Goroka flight who fly almost over the mountain.

REFERENCES

MORGAN, W.R., 1963 - The petrology of lava samples from Mount Victory and Mount Yelia, Territory of Papua and New Guinea. Bur.Min.Resour.Aust.Rec., 1963/160 (unpubl.)

Fig.1 Summit area of Mount Yelia as seen from the east (cf. P.1 for topographical features). (Neg.G/7616).

Fig.2 Solfatara area at base of southern crater ridge. (Neg.G/7615)


Mt YELIA
11135
NORTHERN DOME AND CRATER COMPLEX
DOME
RIDGE
SOUTHERN CRATER
Probable avalanche valley
Native track
Camp
Survey track
8250
8500
8750
9000
9250
9500
9750
10000
10250
10500
10750
11000
TOPOGRAPHICAL SKETCH MAP
MT YELIA
NEW GUINEA
Solfatara
Alpine swamp
Form line
MT YELIA
MENYAMYA
NEW GUINEA
PAPUA
0 5 miles
Scale about 3½ inches equals 1 mile
Compiled & drawn by C.D. Branch Dec 1963
Vulcanological Observatory
Rabaul. T.P.N.G

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