PROJECT GEOLOGY

METALLIC INVESTIGATIONS

SOUTHEAST BRITISH COLUMBIA

A SURVEY OF CENOZOIC MAGNETOSTRATIGRAPHY IN SOUTH-CENTRAL BRITISH COLUMBIA

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INTRODUCTION

A detailed knowledge of changes in the earth's magnetic field through geological time affords an opportunity to explore the problem of stratigraphic correlation between the many unconnected Cenozoic volcanic basins that characterize the southern interior of British Columbia.

The utility of paleomagnetic methods stems from the fact that the earth's magnetic field undergoes periodic inversions which affect the orientation of magnetic minerals in newly formed rocks. An alternating sequence consisting of several dozen normal and reversed polarities has been established for Cenozoic rocks using radiometric dates for control (Tarling and Mitchell, 1976).

This report presents some preliminary results on polarity measurements from a type section of Eocene rocks near Penticton and a suite of Miocene to Pleistocene Plateau and Valley basalts from Hat Creek, Merritt, and the Kelowna area (*see* accompanying table).

The procedure for collecting samples and performing measurements is straightforward. In most cases horizontal or near-horizontal bedded lava flows were selected for sampling, each rock specimen being marked prior to removal to show a horizontal azimuth line and the vertical direction. Determinations were carried out using a portable fluxgate magnetometer, sensitive to less than 20 gamma variations.

RESULTS

The most continuous and readily accessible Eocene section available for polarity measurements is the White Lake basin southwest of Penticton. These rocks, comprising a diversified assemblage of lava flows and sedimentary rocks, attained a thickness of about 2 400 metres in the period 53.1 to approximately 48 Ma. Testing of the five principal members of the Marron Formation at 11 localities in this area and the Marama Formation at Summerland shows uniformly normal polarities.

The so-called Plateau and Valley basalts range widely in age and occur in isolated outliers. Normal polarity seems to be a common characteristic of these rocks as exhibited by the Miocene olivine basalt at Hat Creek (14.1±0.5 Ma) west of Cache Creek, on Carrot Mountain (11.8±0.4 Ma) west of Kelowna, and by the

Pliocene basalt (2.8±1.5 Ma*) exposed immediately northwest of Hydraulic Lake southeast of Kelowna. It is interesting to note, however, that similar basalt exposed at Swalwell Lake north of Kelowna and in road cuts east of Hydraulic Lake yield reverse or transitional polarities.

Two relatively recent Valley basalts included in the current study are the Quilchena basalt (0.5 Ma*) exposed south of the west end of Nicola Lake and the Lambly Creek basalt (0.76±0.11 Ma) found north of Westbank near Kelowna. In keeping with the known recent magnetostratigraphic record, the Quilchena basalt exhibits normal polarity and is assigned to the Brunes normal epoch. The Lambly Creek basalt, on the other hand, is anomalous having transitional or negative polarity and apparently belongs to the Matuyama reversed epoch.

MAGNETIC POLARITY OF SOME CENOZOIC LAVAS FROM SOUTH–CENTRAL BRITISH COLUMBIA

Unit	Polarity	Location	
		Latitude	Longitude
Quilchena basalt	normal	50° 08.2′	120° 41.3′
Lambly Creek basalt	reversal ?	49° 57′	119° 33′
Hydraulic Lake basalt	normal	49° 49.2′	119° 13′
Hydraulic Lake basalt	normal	49° 48.8′	119° 12.3′
Plateau basalt (east of Hydraulic Lake)	transitional ?	49° 47.2′	119° 03.7′
Plateau basalt (east of Hydraulic Lake)	transitional ?	49° 47.0′	119° 04.5′
Plateau basalt (east of Hydraulic Lake)	transitional ?	49° 45.8′	119° 07.2′
Plateau basalt (east of Hydraulic Lake)	reversal	49° 44.8′	119° 08′
Plateau basalt (east of Hydraulic Lake)	reversal	49° 43.9′	119° 07.1′
Swalwell Lake basalt	reversal	50° 03.5′	119° 14.7′
Carrot Mountain basalt	normal	49° 55.5′	119° 39′
Hat Creek basalt	normal	50° 42′	121° 35′
Marama dacite	normal	49° 35′	119° 40′
Marron Formation			
Park Rill member	normal	49° 19.2′	119° 41.2′
Nimpit Lake member	normal	49° 21.0′	119° 42.3′
Nimpit Lake member	normal	49° 20.8′	119° 42.6′
Kearns Creek member	normal	49° 20.5′	119° 43.8′
Kearns Creek member	normal	49° 22.4′	119° 45.1′
Kitley Lake member	normal	49° 20.3′	119° 44.8′
Yellow Lake member	normal	49° 20.3′	119° 44.9′
Yellow Lake member	normal	49° 20.2′	119° 45.9′
Yellow Lake member	normal	49° 22.2′	119° 46.7′
Yellow Lake member	normal	49° 14.8′	119° 47.2′
Yellow Lake member	normal	49° 22.3′	119° 38.9′

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*Ages for the Hydraulic Lake and Quilchena basalts were provided by P. A. Christopher and W. J. McMillan, respectively.