QUATERNARY MAPPING, CENTRAL VOLCANIC BELT

by

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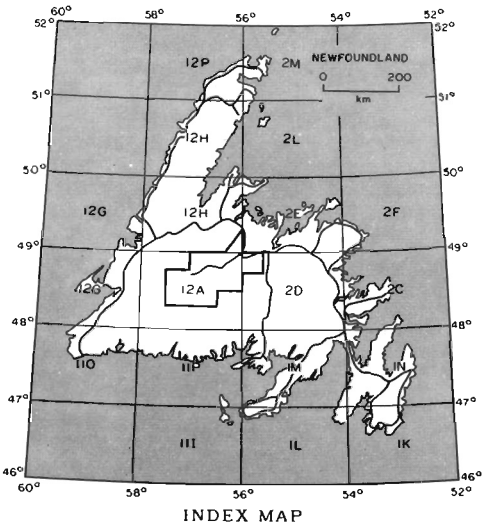
ABSTRACT

Open file releases 12A (212), Nfld. (93) and 12A (347) have been completed covering much of the Central Volcanic Belt of Newfoundland. The remaining areas will be released shortly and a comprehensive report on all these areas will be published in 1985. Three major divergent ice-flow directions have been recognized. The earliest flow was southward (160°-190°) and was succeeded by southwestward flow (220°-250°) and northeastward flow (050°-070°). Stratigraphy is limited to several exposures in the southwestern area of Red Indian Lake which record deposition possibly relating to the southward and southwestward flow and at Buchans which may relate to the northeast and southwest flows.

INTRODUCTION

Since 1978 much of the Central Volcanic Belt of Newfoundland has been mapped at a 1:50,000 scale (Figure 1). Open File releases (12A (212), Nfld (93), 12A (347)) (Vanderveer and Sparkes, 1979, 1980; Sparkes, 1984) for most of this area have been completed and the remaining areas (12A/15, 12H/1) will be released shortly. These open files include till geochemistry, landform classification, and glacial flow feature maps.

In 1985, a comprehensive report on the Quaternary geology of these areas will be published. This report will attempt to explain the complex glacial history of the Central Volcanic Belt in terms of the erosional and depositional features of the various ice advances. This report will also include summary maps of till geochemistry, texture, and lithologic composition for approximately 2000 samples.



INDEX MAP

Figure 1: *Location Map: Central Volcanic Belt of Newfoundland.*

GLACIAL FLOW

Three divergent ice-flow directions have been recognized (Figure 2) (Sparkes, 1984). The earliest flow was southward (160°-190°) and appears to have affected most of the central area. It is the only flow evident in the southern part of the area. In the west (Lloyds River, Tulks River), this flow was succeeded by a southwestward flow (220°-250°), and in the central to eastern area, by a northeastward flow (050°-070°). In the Buchans area, the northeastward flow was succeeded by a southwestward flow which is probably correlative with flow in the southwestern part of the Red Indian Lake area, and may reflect the latest phase of ice movement to affect the area.

STRATIGRAPHY

Most of the study area is covered by a mantle of till of varying thickness. The till consists of rock types generally derived from local bedrock. Along the Lloyds River, Tulks River and Costigan Brook Valleys, near the southwestern end of Red Indian Lake, and along the shoreline of Victoria Lake, several important exposures provide an understanding of the glacial stratigraphy of the area (Figure 3) (Vanderveer and Sparkes, 1982).

In the Tulks River Valley, a compact, fissile, reddish brown to gray lodgement till is composed mainly of volcanic rocks of local origin (Victoria Lake Group). Minor amounts of sedimentary and intrusive clasts may be exotic (further transported), but they may also be from the related volcaniclastic rocks or small intrusive bodies within the Victoria Lake Group. Lithologically, this till is similar to the other tills in the area. The till matrix (finer than 2 mm) consists of an average of 58% sand, 33% silt and 9% clay. This differs slightly from the surface tills, which generally have lower silt and clay contents. The term 'Tulks River till' is proposed for this unit. The type section is a

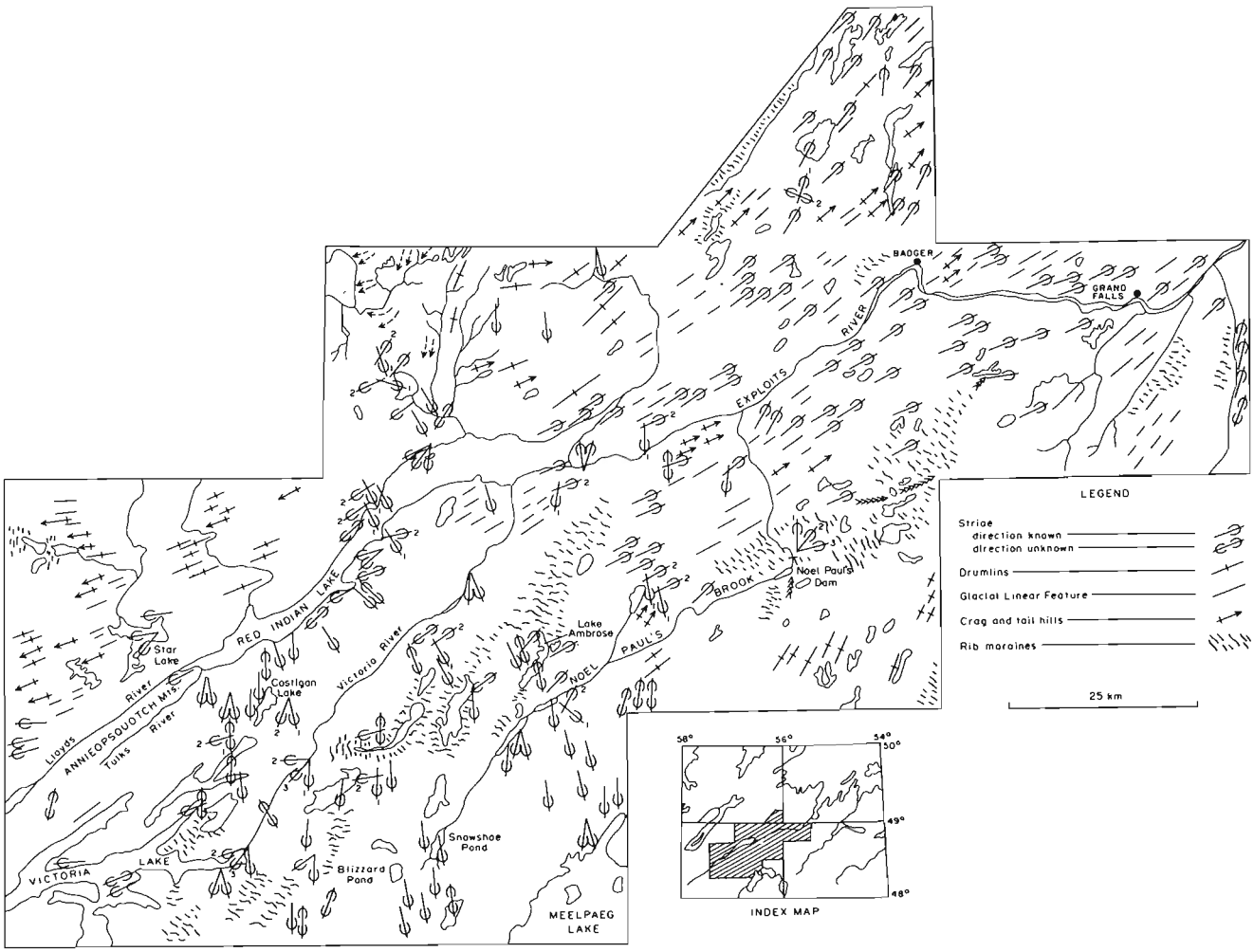


Figure 2: *Glacial flow features of the Central Volcanic Belt, Newfoundland. Numbers on striae indicate the relative age of ice flows (1 being the oldest).*

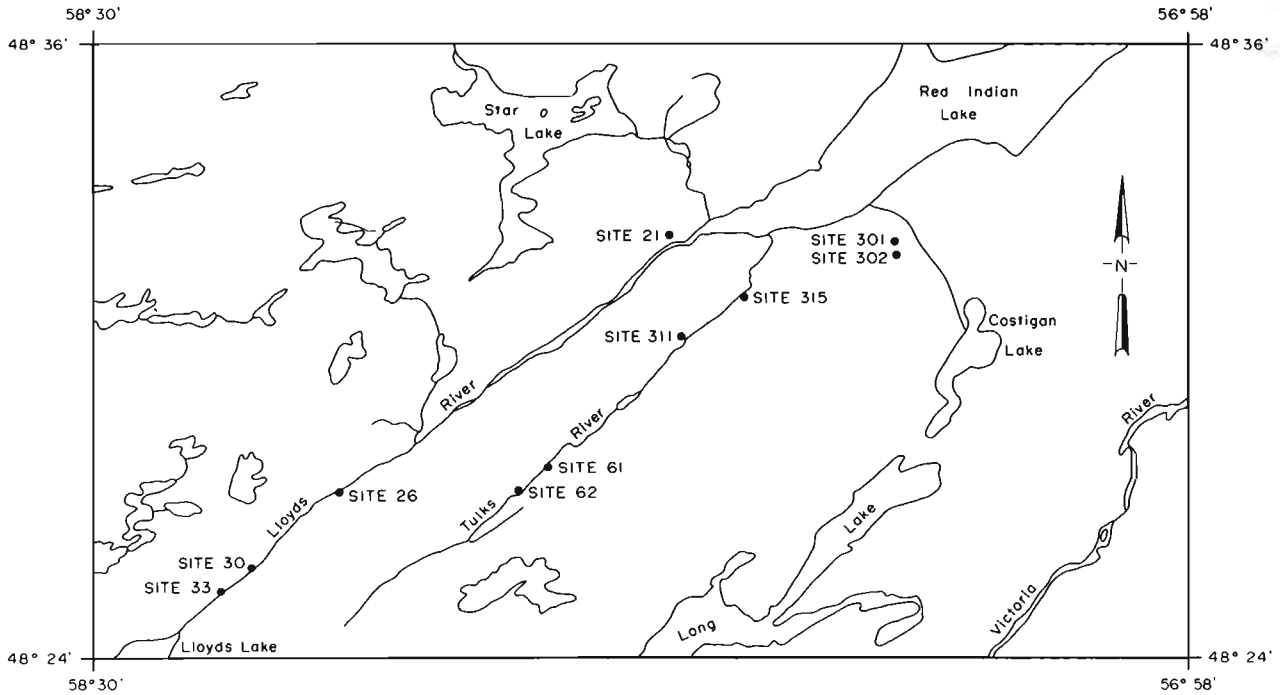
bank exposure within the river valley near Red Indian Lake (site 315). This till is overlain by a sequence of silt and clay rhythmites that is in turn overlain by a thin mantle of sandy till.

The Lloyds River Valley sections also record the deposition of rhythmites, which are here overlain by a poorly comminuted and poorly compacted sandy till of local origin. Sand and gravel outwash commonly overlie this upper till unit. The rhythmites, which often underlie till as in the Tulks River area, consist mostly of silt (67%), with lesser amounts of sand (22%) and clay (11%). They are often thinly stratified, graded and, where overlain by till, distorted or folded. The term 'Lloyds River rhythmites' is proposed for this unit. The type section is a roadcut exposure adjacent to Lloyds River (site 33).

The shoreline exposures on Victoria Lake also record a sequence of interbedded sand, gravel or sand and silt, overlain by a gray-brown compact till of local origin. The sand and silt have been disrupted and contorted, presumably during the emplacement of the upper till unit.

At Costigan Brook, near the south side of Red Indian Lake, a compact stony till containing gabbroic clasts, possibly derived from a northerly source, can probably be stratigraphically correlated with the Tulks River till. This Costigan Brook till is overlain by a thin red silty till which is overlain by sand and silt (site 301) or pebbly gravel (site 302). A thin red-brown till overlies the sand and silt at site 301.

At Buchans, in the open pit of the Oriental Mine, three distinct units are



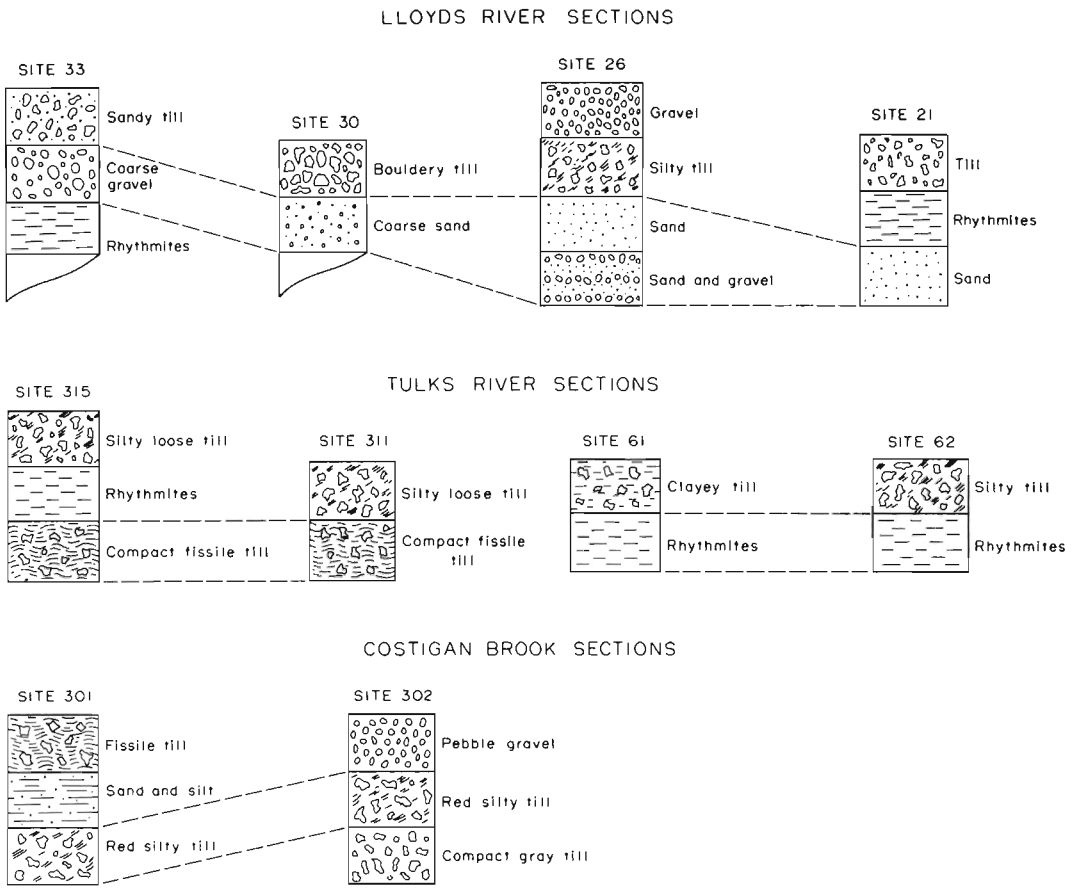


Figure 3: *Central Volcanic Belt: Stratigraphic Profiles.*

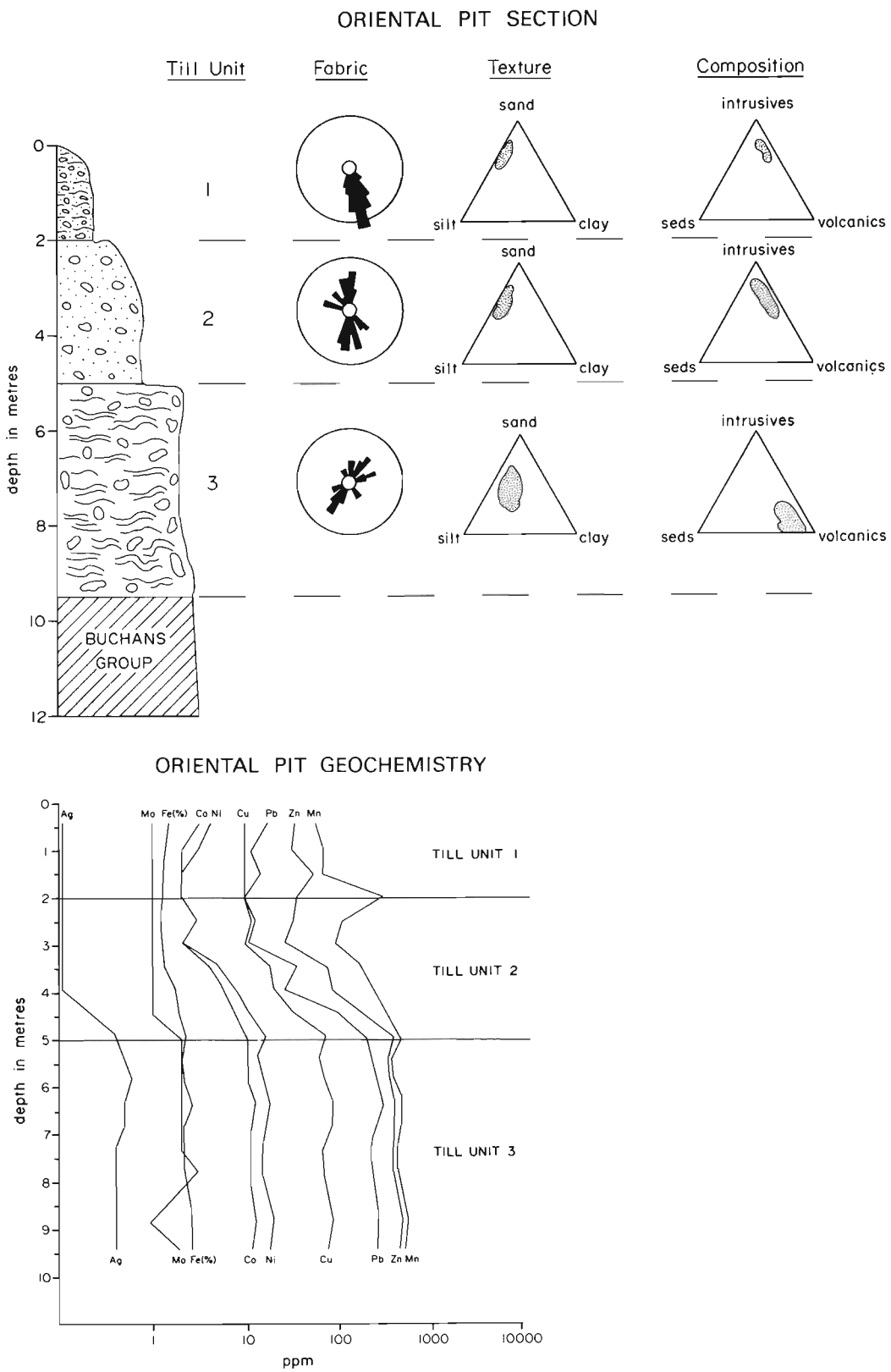


Figure 4: *Oriental Pit Section, Buchans.*

exposed (Figure 4). The upper unit (Unit 1), which exhibits some sorting, is possibly a meltout facies of Unit 2. These units are lithologically similar, consisting of mostly intrusive clasts derived from the Topsails Granite, indicating the same source (i.e., transport from the north-northeast). The characteristic red color of these tills is due to this dominant composition. The lower unit (Unit 3) is a gray, clayey, very fissile lodgement till composed mostly of volcanic clasts of the Buchans Group.

At the sandfill pit for the Asarco mining operation at Buchans, 1-2 m of moderately compact, stoney till overlies up to 50 meters of sand with minor silt bands. This till is similar to the red till in the Oriental pit and is composed of mostly granitic clasts of the Topsails Granite.

SEQUENCE OF GLACIAL EVENTS

Based upon the glacial flow indicators and stratigraphy, the following sequence of events is proposed:

(1) The early ice movement toward the south (160°-190°) radiated from a center northwest of Red Indian Lake and crossed most of the study area. This ice flow possibly deposited the Tulks River till. No age can be assigned to this event.

(2) The Lloyds River rhythmites were deposited in a proglacial lake (Vanderveer and Sparkes, 1982; Mihychuk, this volume) formed as the result of glacial damming of Red Indian Lake during the separation of the southward glacial flow into smaller local ice centers (Buchans Plateau, Lake Ambrose to Victoria Lake). The sand at the sandfill pit near Buchans, may also have been deposited at this time.

Samples of these glaciolacustrine rhythmites were analyzed for fossil pollen by J.J. McAndrews of the Royal Ontario Museum. No pollen was recorded in most of the samples but more sampling and analysis were recommended for one section which may provide more information on the depositional environment or age of the rhythmites and a minimum age for the emplacement of the Tulks River till.

(3) After deposition of the glaciolacustrine rhythmites, glaciation of the area recurred during the Late Wisconsin from at least two accumulating ice centers. Ice flow was directed northeastward and southwestward from an ice center located between Victoria Lake and Lake Ambrose (Figure 2). The northeastward flow is also evident in the area east of Buchans and may have emplaced the lower gray till exposed in the Oriental pit, although the only evidence for this is that the greatest source area for the clasts in this till lies to the west and southwest. Minor variations in the direction of these flows were probably the result of local topographic control. Subsequent to this advance, ice flowed southwestward from a center north and northeast of Buchans and occupied at least part of Red Indian Lake as well as the Lloyds River and Tulks River Valleys. This event may have deposited the red granitic till in the Oriental and sandfill pit and the till which overlies the rhythmites in these other valleys.

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