

**AN ACTIVE RETROGRESSIVE THAW FLOW SLIDE ON
EASTERN MELVILLE ISLAND, DISTRICT OF FRANKLIN**

J.A. Heginbottom
Terrain Sciences Division

During field work on eastern Melville Island in July 1977, two active retrogressive thaw flow slides were noted in the lower valley of the stream draining Tingmisut Lake (75°56'N, 107°54'W). The slides were on either side of the stream valley, in slumped and frost riven material of the Canyon Fiord Formation, about 1.5 km from the lake and an equal distance from the sea at Weatherall Bay. Figure 1 shows the slide area on the southwest side of the valley. Figures 2 and 3 and Table 1 all relate to the slide on the northeast side of the valley, which was examined in some detail.

The slide was first visited on the morning of July 17, 1977, and a set of marker pegs was installed around the uphill edge of the slide area. The pegs were 30 cm lengths of 2 cm diameter birch dowel. Distances between pegs and from the pegs to the edge of the slide area were measured to the nearest centimetre using a steel tape. The bowl or basin of the slide was roughly circular in shape, with a diameter of approximately 45 m. The side and backwalls were 50 to 250 cm high. Exposed in the backwall was a layer of thawed soil, 75 to 100 cm thick, overlying massive ice with dirt bands at least 2 m thick. The headwall was retreating actively. Near the foot of the headwall the floor of the basin was a mass of liquid mud with free water on the surface. This mud was moving slowly downhill, draining and drying as it did so. Farther out from the headwall the water was flowing in the central part of the slide zone, with bands of dried mud on either side.

Headwall retreat was mainly by melting of the exposed massive ground ice and the continual falling away of the thawed soil above as individual crumbs to clods of soil, rather than as coherent blocks. Clods of soil falling onto the icy glacia slid down it and dissolved into the liquid mud of the basin floor.

Along the sides of the basin, there were several cracks in the ground surface several decimetres from the edge. As these walls were not retreating actively, it was not clear when, how, or why these cracks had developed.



Figure 1
Retrogressive thaw flow slide on the southwest side of a valley (July 17, 1977).

Table 1
Headwall retreat of retrogressive thaw flow slide, Tingmisut Lake, Melville Island, Northwest Territories

Date and time of survey	Line and distances (m)				
	P	Q	R	S	T
17 July 1977, 1210h	18.67	16.61	15.00	13.59	14.12
21 July 1977, 1615h	17.94	16.13	14.22	13.18	13.69
Differences (m/100 h)	0.73	0.48	0.78	0.41	0.43
Mean rate of headwall retreat (m/100 h)	0.57				

The absolute age of the two slides is not known. They are not visible as discrete features on the 1959, 1:60 000 scale aerial photographs. Examination of these photographs (A16763-54 and -55) shows that the valley of this stream is marked by numerous landslide scars of various ages.

Similar features to these slides have been described from the Mackenzie Delta area (Mackay, 1963; Kerfoot and Mackay, 1972), from Banks Island (French and Egginton, 1973), and from Ellef Ringnes Island (Lamothe and St-Onge, 1961).

The slide was examined again on the afternoon of July 21, 1977, and the distances from the pegs to the headwall were remeasured. From these two sets of measurements (Table 1) the amount of headwall retreat was determined. In the 100 hours between the two sets of measurements, the amount of retreat was between 40 and 80 cm. During this time, the air temperature, measured at the camp at Tingmisut Lake, ranged from +1 to +13°C with an average of +6.5°C. There was only a trace of precipitation.

The mean rate of retreat of 0.57 m/100 h compares well with values reported by Kerfoot and Mackay (1972) for "mud slumps" on Garry Island in the Mackenzie Delta and by French (1974) from eastern Banks Island. Kerfoot and Mackay surveyed a large mud slump on Garry Island nine times between June 1964 and August 1971. In 1964, 1965, and 1971 they visited it twice each summer, and retreat rates in metres/100 hours can be derived from the data they present. The mean rate was 0.28 m/100 h, whereas the maximum rate was 0.46 m/100 h. French surveyed two "slumps" in the Thomsen River-Johnson Point area of Banks Island in 1972

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Figure 2

Detail of headwall of a slide on the northeast side of a valley. See Figure 3 for the location of the area shown (July 17, 1977).

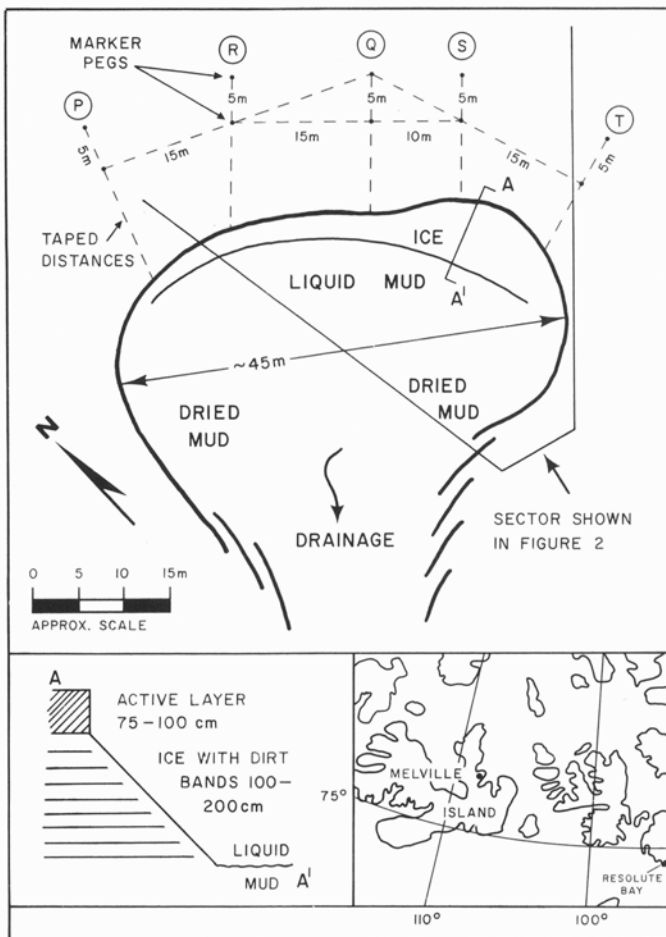


Figure 3. Sketch plan of retrogressive thaw flow slide near Tingmisut Lake, Melville Island, N.W.T.

and 1973. Mean retreat rates calculated from his data are 0.43 m/100 h for 1972 and 0.56 m/100 h for 1973. The minimum rate was 0.22 and the maximum 1.08 m/100 h.

It is hoped to revisit these features in the future and to make further measurements on their rate of development.

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