

Recent Changes at the Front of Ward Hunt Ice Shelf, Ellesmere Island, N.W.T.

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It has been known for some time that the ice shelves of northern Ellesmere Island are the primary source of ice islands. The last major ice island calving occurred at the front of Ward Hunt Ice Shelf (WHIS) between August 1961 and April 1962 (Hattersley-Smith, 1963). Other important, but previously undocumented, changes to Milne and Ayles ice shelves have recently been noted. During field investigations in spring 1982 and 1983 further changes were observed at the front of WHIS.

The WHIS ice front remained unchanged from 1962-1980 (Serson, 1980). In 1980 the ice front at the west end of the ice shelf was up to 3 km north of the ice rise (Fig. 1); the ice was of typical gently rolling appearance. In 1982 the western ice front was established by means of satellite fixes and it was clear that 35-40 km² of ice shelf had calved and/or grounded during the period spring 1980 to spring 1982 (Jeffries, 1982). Beyond the ice front the hummocky ice surface was severely buckled and fractured. Some of the fractures contained sediment which, it was suggested, had been forced up through the cracks under pressure as the ice settled on the rock or sediment below the ice shelf. In spring 1983 the ice front remained the same as in the previous year but the area of grounded ice had decreased in size, probably as a result of further disintegration

and calving during summer 1982. The small pieces of ice shelf lying off Bromley Island (Fig. 1) might have calved from here.

On 23 April 1983 during a Twin Otter flight over the west end of WHIS, we observed two large ice islands and many smaller fragments about 2 km offshore (Fig. 1). The largest ice island was estimated to be 3 × 9 km (maximum) in size; the smaller ice island was no more than half this size, but both ice masses had a freeboard of about 4 m. Since four of the five major ice islands created in the 1961-62 calving had drifted westward, this suggested that a recent calving had occurred at the east end of WHIS. Furthermore, the ice must have calved since spring 1982, as the ice front at the east end of WHIS had at that time been the same as it was in 1980. The source of the ice islands was confirmed on 19 May 1983 during a snowmobile traverse between Ward Hunt Island and Cape Albert Edward (Fig. 1). The entire ice margin was characterized by a vertical, freshly broken ice cliff of up to 5 m freeboard. There were only occasional, widely separated pressure ridges, unlike the continuous pressure ridging present along the ice front to the west of Ward Hunt Island. The narrow rubble field across the centre of Figure 2 is dwarfed by the large sheet of first-year sea ice that has grown since the calving, which must have

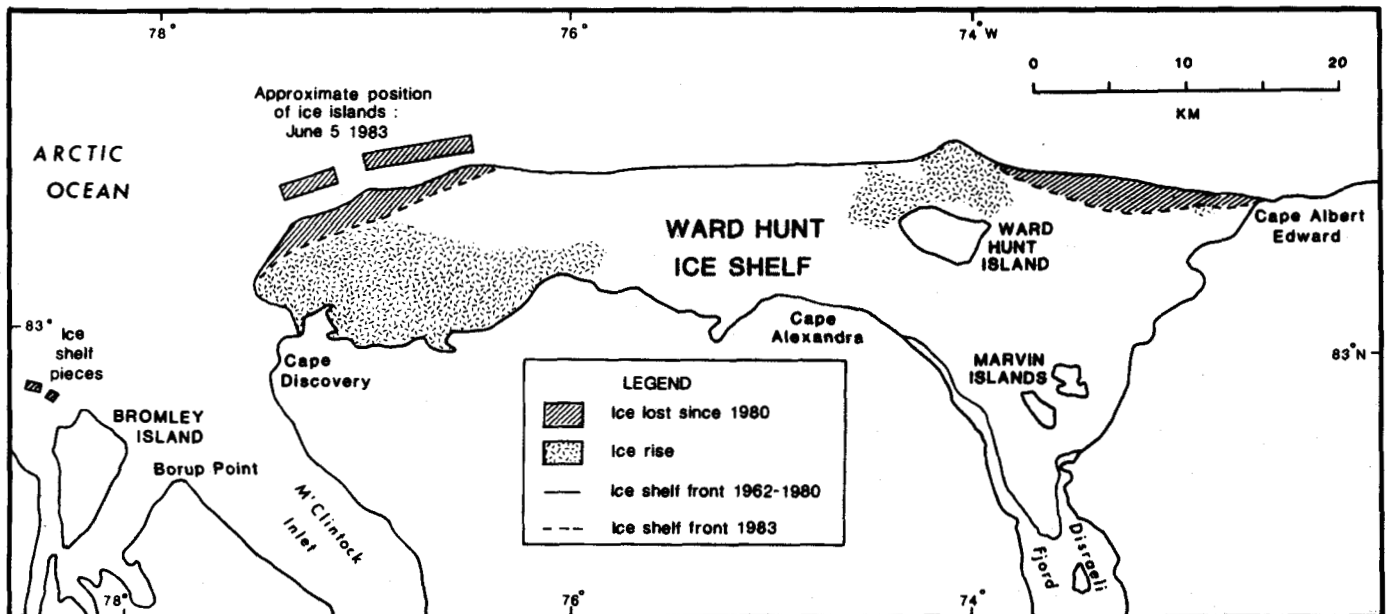


FIG. 1. Map of Ward Hunt Ice Shelf showing the location of recent ice front changes and the position of ice islands and shelf-ice pieces. Ice islands were last observed from the air, 5 June 1983.

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occurred in summer (or early fall at the latest) 1982. Figure 2 clearly shows the extent of the calving where up to 40 km² (1.6 km³) of ice has broken away from the front of WHIS between Ward Hunt Island and Cape Albert Edward.



FIG. 2. Photograph taken on 19 May 1983 from Cape Albert Edward looking across the new ice front to Ward Hunt Island and the ice rise.

REFERENCES

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