A Note on the Snout of *Dakshin Gangotri* Glacier, Antarctica

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ABSTRACT

The nearest exposed landmass to the Indian Research Station Antarctica in the Queen Maud Land is the Schirmacher Range *(Dakshin Gangotri).* A characteristic Feature of the southern periphery of this range is a number of glacier outlets overriding the rock surface. The nature and morphology of these glaciers differ conspicuously from the shelf ice north of this range. One of these glaciers was selected as part of glaciological studies in this area and detailed mapping of the snout position was carried out. The glacier was named *Dakshin Gangotri* glacier after the Indian Research Station of the same name.

INTRODUCTION

The nearest exposed landmass to the Indian Research Station at Antarctica in the Queen Maud Land, is the Schirmacher range *(Dakshin Gangotri.)* A characteristic feature of the southern periphery of this range is a number of glacier outlets overriding the rock surface. These typify the Piedmont glacier derived from the inland polar ice which once flowed over the Schirmacher hills. The nature and morphology of these glaciers differ conspicuously from the shelf ice north of this range. In contrast to the northern periphery characterised by an abrupt and steep fall towards the expanse of shelf ice, the southern periphery underlies the polar ice, which cascades down gently or with minor perturbations over the bed rock.

These outflowing glaciers of ice have the character of either a vertical cliff or a protruding tongue. The former type are in a dynamic state and waste by calving down, while the latter type appear to be more static, apparently adjusting gradually to various secular changes. One of the latter type (Fig 1) named *Dakshin Gangotri* glacier was selected for detailed mapping of its snout portion.

PHYSICAL FEATURES

Glacier front

The outline of the glacier front was plotted by tachaeometry (Fig 2) from a nearby survey station, the height of which as established by altimetry, is approximately 70 m. The glacier snout does not show any sinuosity, rather exhibits a smooth slightly concave front with the central portion drawn in by about 7 m compared to the peripheries. The elevation of the ice front varies from 66 to 69 m a.s.1.

Meltwater channels

The snout ice is characterised by a number of meltwater channels from which the water percolates deep into the glacier bottom, and emanates partially from the ice bedrock interface. This is common both to the frontal and southern periphery of the snout. The northern periphery is studded to the rock surface without the presence of any melt water. The frontal part of the snout and its northern margin, calve down frequently.

Fig.1. Photograph showing part of the snout of *Dakshin Gangotri* Glacier

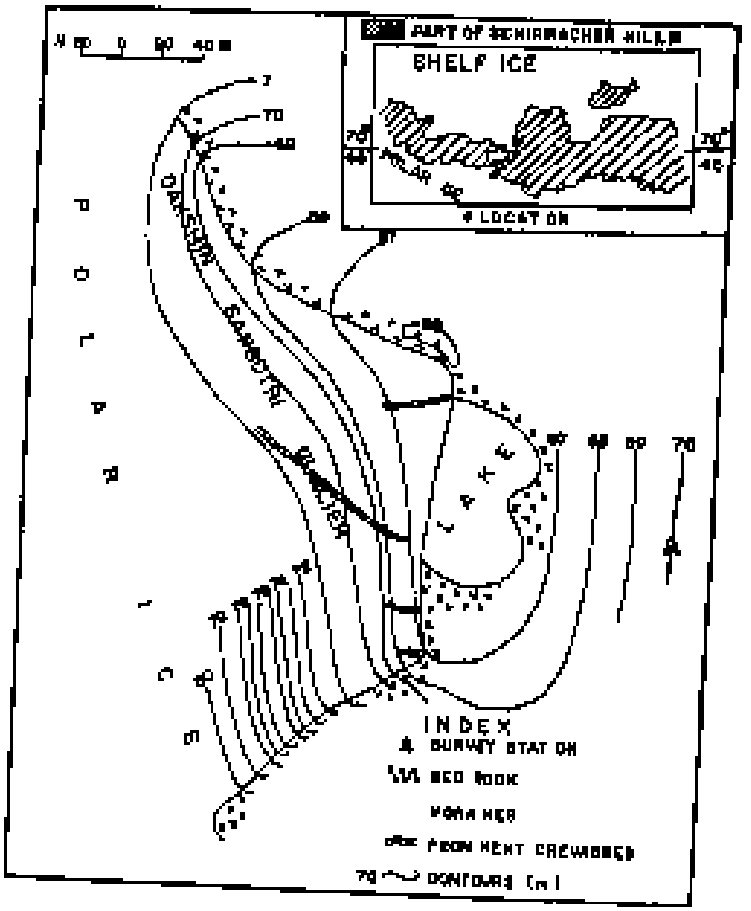

Fig.2. Map of the polar ice tongue *(Dakshin Gangotri* Glacier) Schirmacher Hills Antirctica

Crevasses

Four major crevasses, transverse to the snout front were present in January, 1983. These deep tuts were developed into melt water channels Water from one of these crevasses was seen cascading down like a waterfall at the southern end of the snout.

Proglacial lake

A proglacial lake covering an area of 45 m by 70 m, exists m front of the glacier. This lake drains into a bigger lake through small channel along its northern margin Pieces of glacier ice frequently float in this lake.

MORAINES

The glacier is devoid of any supraglacial moraines Rock-dust and small size rock particles are embedded in the upper part of the snout. In the proglacial zone, scattered ground-moraine is encountered, especially in the area bordering the eastern margin of the lake and the eastern flank of the snout. No striated or polished boulders were noticed. The erosional and the depositional activities of the glacier are manifest in lakes and ground-moraines.

CRYOCONITE HOLE

A reconnaissance of the continental ice sheet, from which the glacier tongue emanates further south of the snout, revealed the presence within the ice of a conspicuous solitary hole measuring about 40 X 30 cm, and about 75 cm deep and filled at the bottom. The sides reveal well preserved stratigraphic banding and some layering of fine sandy material Reported from other parts of Antarctica ice sheet also, this feature is supposed to have formed due to decreased albedo, because of the localised concentration of sand particles.

CONCLUSIONS

Monitoring of such glacier tongues of the inland ice sheet has a bearing on the state of flow of the polar ice cap, from which they emanate Any change in the physical aspects of the ice front reflects the overall ice regimen.