

## CORRESPONDENCE

The Editor,  
*Journal of Glaciology*

Sir,

*Hans Island, Kennedy Channel*

R.D. Hudson's letter to the editor (1983) concerning the direction of glacial flow across Hans Island, Kennedy Channel, is accompanied by a footnote on the discovery and national status of Hans Island. It is stated that "according to legal authority in Ottawa 'Canada exercises sovereignty over Hans Island and it is part of Canadian territory'. It is so shown on Canadian maps and charts".

It is not in dispute that this statement reflects the view of Canadian authorities. However, according to the view of the Danish Government, Hans Ø constitutes part of the national territory of Denmark and as such is within the jurisdiction of the government of Denmark and subject to Danish law. Hans Ø is shown as part of Denmark on Danish maps and charts.

The conflicting views of the Governments of Denmark and Canada reflect the present state of affairs that the question of sovereignty over Hans Ø is still unresolved.

There exists a common understanding between Denmark and Canada to the effect that since the question of sovereignty over the island has not yet been solved no action should be taken by either side which might prejudice the settlement of the issue.

PETER BRUCKNER

*Ministry of Foreign Affairs,  
Astatisk Plads 2,  
DK-1448 København K,  
Denmark  
18 January 1984*

### REFERENCE

Hudson, R.D. 1983. Direction of glacial flow across Hans Island, Kennedy Channel, N.W.T., Canada. *Journal of Glaciology*, Vol. 29, No. 102, p. 353-54. [Letter.]

Sir,

*Avalanche probabilities*

The devil tries to hide in every statistical study. He did not do a good job hiding in Judson (1983) which concludes that an avalanche on an "index path" is "of little diagnostic value" as a predictor of another avalanche the same day on a "physically similar" path.

In Judson's study, the conditional probability that avalanche A will occur given a "paired" avalanche B is designated  $P[A|B]$ , which Judson finds is  $\leq 0.2$  in 90% of his cases. Although that finding seems plausible, what is the "diagnostic" significance of 0.2, and where does that number come from? It is surely reason for concern even if  $P[A|B] = 0.1$ , where A threatens life or property. Protective measures (artificial release, road closures, warnings) are in order. The minimum value of  $P[A|B]$  at which the risk is acceptable will vary from case to case, but it is usually well below 0.1, perhaps even below 0.01 depending on the number of lives and economic value at risk. Moreover, even if  $P[A|B]$  has a low value it may be relatively high compared with the "unconditional"  $P[A]$ . Although it is not feasible to show in detail all his cases, why has Judson displayed only his highest  $P[A|B]$  values? It is equally important to see a summary of how his poorer cases distribute. From the high values in his table I, one suspects that  $P[A|B]$  has great "diagnostic value", given the right choice of pairs.

It would also be interesting to see how the ratio  $R = P[A|B]/P[A]$  varies across his entire sample, for this ratio reflects the probability increase given the event B. The computation of  $R$  for the 40 pairs in table I shows that  $1.5 \leq R \leq 7.4$  and  $\bar{R} = 3.8$ . This seems to confirm that  $P[A|B]$  has "diagnostic value" compared with  $P[A]$  for the pairs in table I. Also,  $R$  varies randomly as  $P[A|B]$  varies over its range (0.74 to 0.26) in table I. Only Judson can tell us if  $R$  drops for the majority of his data (not summarized in table I), or if the low values of  $P[A|B]$  correlate with a correspondingly low  $P[A]$ .

The irony of Judson's paper is that avalanche forecasters do not usually think in terms of "paired paths". They usually reason qualitatively that if there is an event B in a group of  $n$  paths then the probability increases that there will be another event somewhere else in the remaining  $n-1$  paths. Depending on  $n$  and many other factors the conditional probability of an event A or C or D or ... given event B may be well above  $P[A|B]$ . Protective measures are distributed over these  $n-1$  paths, but compromises are sometimes necessary in order to cover all paths. Given Judson's paper, and without seeing the complete summary mentioned above, the more probable conclusion is that indexing one path against another may have "diagnostic value".

RON PERLA

*National Hydrology Research Institute,  
Box 313,  
Canmore, Alberta T0L 0M0, Canada  
29 August 1983*

### REFERENCE

Judson, A. 1983. On the potential use of index paths for avalanche assessment. *Journal of Glaciology*, Vol. 29, No. 101, p. 178-84.