

For each section the sonar was towed at one water depth only. Reflections are recorded from the nearest part of the ice shelf, which may occur at varying depths along the section. This complicates the interpretations. To solve this problem we plan to tow the sonar at several depths along ice-shelf fronts and icebergs during the 1978-79 expedition, for better three-dimensional information on the underwater morphology.

DISCUSSION

G. DE Q. ROBIN: I will be discussing the question of melting of the ice front on Wednesday—and will conclude that melting will be greater at greater depths. I am glad to see this information and to learn how irregular this melting can be. Did you find any cases where the ice shelf jutted out below sea-level? I expect this would worry the ship's Captain even more.

O. ORHEIM: It clearly would! I cannot remember any examples of the kind described from the Maudheim expedition, but they may have been present.

R. H. THOMAS: Did the ice front above sea-level show any distinctive features in the areas where these submarine rams were found?

ORHEIM: The recordings were done by an instrument trailing some hundreds of metres behind the ship, and by the time we were aware of them the area was far away, and we had no opportunity to re-examine the ice shelf, so I cannot answer your question adequately. Next season we shall do detailed under-water profiling of the ice shelf and will then also of course study the part above water.

DISSIPATION OF TIDAL ENERGY BY FLEXING ICE SHELVES

By C. S. M. DOAKE

(British Antarctic Survey, Natural Environment Research Council, Madingley Road, Cambridge CB3 0ET, England)

ABSTRACT. Plastic deformation of ice shelves in the region along the grounding line where they bend with the tide can dissipate enough tidal energy to make them the most important single source contribution to tidal friction (Doake, 1978). Some of the effects are to slow the rotation of the Earth and to cause the moon to retreat from the Earth.

REFERENCE

Doake, C. S. M. 1978. Dissipation of tidal energy by Antarctic ice shelves. *Nature*, Vol. 275, No. 5678, p. 304-05.

DISCUSSION

J. L. FASTOOK: Can this energy dissipation be related to an ablation or melting of the ice shelf?
C. S. M. DOAKE: No.

G. DE Q. ROBIN: Your hypothesis seems reasonable by comparison with Wadham's studies of dissipation of ocean-wave energy in large floes of pack ice at periods around 16 s. He showed that energy dissipation in deforming ice floes was the dominant loss and much exceeded viscous and other losses.