



Figure 1: A Wenner electrode array along a section of an ice core is configured to measure the vertical conductivity of sea ice. A current  $I$  is injected through the outer electrodes C1 and C2. The potential difference  $\Delta V$  resulting from the current flow is measured at the inner electrodes P1 and P2. The ratio  $\Delta V/I$  is the resistance  $R$  in ohms. Here the electrode spacing is  $L = 10$  cm and  $a = 10$  cm.

with sea ice. For example, there has been significant interest in the development of EM induction devices (24, 26, 27) mounted on ships, planes and helicopters. These techniques, and the interpretation of the data to obtain thickness information, rely on knowledge of the electrical properties of sea ice, and how they vary with depth, temperature, salinity, and ice type.

\*\*\*\*\*

Malcolm

The electrical anisotropy of sea ice associated with the geometry and distribution of brine pockets has meant that traditional surface based geophysical techniques for in-situ measurement of the resistivity structure have been of limited usefulness (19, 21–23, 25). It has been shown however (25) that the technique of cross-borehole dc resistivity tomography, utilizing vertical strings of electrodes frozen into the ice, can be used to derive the horizontal component of the anisotropic resistivity. Although insertion of the electrode strings causes localised disturbance of the natural state of