

New methods for the study of subglacial till

Martin Truffer (truffer@gi.alaska.edu), **William Harrison**, **Dale Pomraning**, **Kevin Abnett**, **Richard Ruhkick**, Geophysical Institute, University of Alaska, Fairbanks, AK

In-situ studies of subglacial till are difficult. The clast-rich layer can be several meters thick and some evidence suggests that the entire layer plays a crucial role in subglacial processes. Basal motion in turn is often responsible for more than half the glacier's motion. We developed and field tested a new massive hammer that allows us to penetrate several meters of subglacial till and install instruments there. The instrument probes were developed to take readings at certain intervals and transmit those readings through a low frequency magnetic field to a receiver hanging in the ice part of the borehole. This has two advantages: First, it facilitates the operation of the hammer, because there are no communication cables that could be damaged during hammering. Second, it makes the probes autonomous with no mechanical connection to each other or a cable. This is particularly desirable for deformation measurements.

A first field test of this method was conducted on Black Rapids Glacier in spring 2003. We achieved penetration depths of over 2 m, which is a record in glaciology, but it is less than what we had hoped for. We also recorded readings from the probes at irregular intervals throughout the summer demonstrating that the transmission method does work. We will present and discuss those new methods and the data gathered during this first field experiment.