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TITLE FROM IGY TO IPY - THE U.S. ANTARCTIC OVERSNOW GEOPHYSICAL-GLACIOLOGICAL RESEARCH PROGRAM OF THE INTERNATIONAL GEOPHYSICAL YEAR (IGY) 1957-58, FROM THE VIEW OF A YOUNG GRADUATE STUDENT PARTICIPANT

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When 12 countries established scientific stations in Antarctica for the 1957-58 International Geophysical Year (IGY), the Cold War was at its height, seven countries had made claims in Antarctica, and the Antarctic Treaty was a few years in the future. I was a graduate student geophysicist (assistant seismologist) on the unexplored Filchner-Ronne Ice Shelf as part of the only major field project of the U.S. Antarctic program. Starting in 1957, the U.S. began a series of oversnow traverses making seismic reflection ice soundings (and other geophysical measurements) and glaciological studies to determine the thickness and budget of the Antarctic Ice Sheet. The U.S.S.R. and France made similar traverses coordinated through the IGY. Although geology and topographic mapping were not part of the IGY program because of the claims issue and the possibility of mineral resources, the oversnow traverse parties did geologic work, where unknown mountains were discovered. The oversnow traverses continued through 1966 and resulted in an excellent first approximation of the snow surface elevation, ice thickness and bed topography of Antarctica, as well as the mean annual temperature of that era and snow accumulation.

The vacuum tube dictated the logistics of the oversnow traverse program. Seismic equipment including heavy batteries weighed about 500 kg. Therefore a Sno-Cat tracked vehicle was needed to carry this load. Usually three such vehicles were needed for safety. Because about 3 l/km of fuel were consumed by each Sno-Cat, about 100 kg/day of fuel per vehicle was required. A resupply flight could carry only ~600 kg/flight (varying greatly as to range and type of aircraft).The Filchner Ice (Shelf?) Traverse, 1957-58, in which I participated, encountered many crevasses. Vehicles broke through thin snow bridges and one man fell deep into a crevasse. Fortunately there were no deaths and only one serious injury resulting from crevasse accidents on the U.S. oversnow traverse program, in contrast to an aircraft death rate of 3.8 deaths per year in the U.S. program from 1955-61.

The oversnow traverses of the IGY employed the inductive method of scientific research with only the general objectives of defining the Antarctic Ice Sheet as to surface elevation, thickness, snow accumulation and temperature. In contrast, Antarctic research today employs deductive logic with narrowly defined objectives and testing of hypotheses. This change has been necessary because of expense, and competition of proposals by many scientists. Nonetheless something has been lost by this approach, and there is still the need for "exploration" types of research is the still unknown vast continent of Antarctica.