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Measurement of Key Polar Climate Variables in IPY4 Through Deployment of an International Fleet of Robotic Vehicles

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At the present time sea ice thickness distribution is understood to be a crucial variable that is descriptive of polar climate in a complex, integrative sense such that its determination over time is a significant priority. As it happens, the sea ice distribution is also a challenging determination given ideal circumstances of platforms and instrumentation, and these circumstances are not reliably extant. The standard approaches to sea ice information, ice-capable ships and satellites, do not at this time provide a workable strategy; ships cannot supply the coverage and satellites have not been equipped with proper instrumentation, which is in fact just now entering development phase. A strategy with promise for obtaining sea ice thickness in addition to other significant surface variables is the deployment of instrumented robotic vehicles; a particularly useful vehicle design is the Inflatable Rover under consideration for use on Mars. These vehicles can travel a 1-3 kilometers per hour powered by solar energy and can thus accomplish a major traverse in a 100-day deployment. The program we put forward calls for an international fleet of suitably designed rovers, each measuring useful variables relating to ice, snow, atmosphere, radiation, etc. In addition the rovers could collaborate in such tasks as monitoring each others activities, aiding in calibration and maintenance, and the like. Each rover could involve 2-3 co-investigators from different institutions and countries. Rover data would be satellite linked allowing K-12 monitoring of progress of the fleet. This IPY4 project integrates new technology into polar science, would engage the public and schoolchildren, could serve as a means of international cooperation, and all the while collects valuable climate change data. This work performed under contract to NASA.

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