# A TIME-DEPENDENT MODEL OF AN ICE DOME-ICE STREAM-ICE SHELF SYSTEM: PRELIMINARY RESULTS (Abstract only)

by

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ABSTRACT

This model is designed to simulate the temporal response of an ice sheet along a flow line by accounting properly for the division of the driving stress into basal-stress and longitudinal-stress gradient components. A vertical section along a central flow line is divided into both horizontal and vertical grid points. A self-consistent solution of stress and velocity is found for any specified geometry. The sliding velocity is determined from a relationship which includes the base stress and a prescribed subglacial water pressure. In these experiments, the ice is assumed to be isothermal. For any given set of initial conditions and a specified mass-balance distribution, the model follows the temporal behavior of the flow line to a steady state. In later work, the water pressure will be calculated from the equilibrium pressure within Röthlisberger conduits for the specific geometry and determined rate of meltwater production. The time-varying temperature field due to conductive and advective processes will be included in later versions of the model.

# ANALYSIS OF INTERANNUAL CHANGES IN ANTARCTIC SEA-ICE COVER USING PASSIVE MICROWAVE OBSERVATIONS (Abstract only)

by

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ABSTRACT

A quantitative comparison of seasonal and interannual Antarctic sea-ice coverage over the four years 1973-76 has been accomplished through the use of passive microwave imagery from the Nimbus-5 satellite. For the entire Southern Ocean both the total ice extent (area with ice concentration greater than 15%) and the actual ice area (the spatially-integrated ice concentration) have decreased over this period of 4 a, but not uniformly in all regions. From 1973 to 1976 the annual-mean value of total ice extent decreased from 13.8 x $10^6$ $km^2$ to 12.1 x $10^6$ $km^2$, yielding an average decrease of 4.0% $a^{-1}$. The inter-annual difference is greatest during the spring, as the ice decays, with the decrease in the December-mean averaging 8.4% $a^{-1}$, the largest of any month. The decrease in the November-mean averaged 4.5% $a^{-1}$. The overall decrease was principally due to the consistent yearly decrease of ice in the Weddell Sea sector (60°W to 20°E). Other sectors show less consistency. For instance, the ice in the Ross Sea sector (130°W to 160°E) increased from 1973 to 1974 and then decreased from 1974 to 1976, and no consistent trend is apparent in the ice extent between 20°E and 160°E. The total ice extent in the Bellingshausen-Amundsen seas sector (60°W to 130°W) actually increased slightly from 1973 to 1976. The area of the open water within the ice pack behaved differently from the total ice area, increasing each year from February to November but having no clear interannual trend. A detailed analysis of the passive microwave imagery for the Antarctic region is planned for publication in an atlas.



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