Geophysical Research Abstracts,
Vol. 11, EGU2009-11231, 2009
EGU General Assembly 2009

Role of Tidal and Inertial Variability on Recent Sea-Ice Changes

W. Hibler

University of Alaska, International Arctic Research Center, Fairbanks, United States (billh@iarc.uaf.edu)

Tidal and inertial variability in sea ice drift and deformation has a significant effect on the mass budget of sea ice and hence air-sea heat fluxes and ice ocean salt fluxes. Since such high frequency variability tends to increase sea ice deformation and hence open water fraction, we expect ice growth to increase in winter and ice melt to increase in summer when such variability is included. Recent short term simulations (Hibler et. al., submitted) for example show up to 30% increases in winter ice production in tidally active regions. As an initial assessment of the role of tidal and inertial variability on recent sea ice changes, a series of 30 year simulations employing a simple embedded barotropic ice ocean tidal model are carried out with and without inertial and tidal forcing. Thickness evolution equations and a thermodynamic sea ice model with heat capacity are utilized together with observed atmospheric forcing. The results are analyzed to determine particularly the role of tidal and inertial variability on the reduction of Arctic Basin summer ice extent. Initial results suggest that tidal and inertial effects cause a substantially reduced summer extent, while not decreasing the ice mass significantly. This result may help explain the discrepancy between recent predicted summer ice extent and observations in climate simulations which do not include such effects.