Abstract View

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On Modeling Seasonal and Interannual Fluctuations of Arctic Sea Ice

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ABSTRACT

Some results from a series of three-year aperiodic simulations of the Northern Hemisphere sea ice cover are reported. The simulations employ the dynamic-thermodynamics sea ice model developed by Hibler (1979) and use a one-day timestep on a 35×31 grid with a resolution of 222 km. Atmospheric data from the years 1973–75 are used to drive the simulations.

The simulations yield a seasonal cycle with excessive amounts of ice in the North Atlantic during winter and with somewhat excessive amounts of open water in the central Arctic during summer. Despite the seasonal bias, the simulated and observed interannual fluctuations are similar in magnitude and are positively correlated. The correlations with observed data are noticeably smaller when dynamical processes are omitted from the model. The simulated outflow of ice through the Greenland-Spitsbergen passage undergoes large fluctuations both seasonally and on an interannual basis. The outflow correlates highly with the simulated fluctuations of ice coverage in the North Atlantic sector and positively with the observed fluctuations of ice coverage in the same sector.