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The thinning Arctic ice cover shown by the Polar Ice Prediction Systems (PIPS): 2000 – 2007

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Since the late 1980's, ice forecasting systems developed by the Naval Research Laboratory (NRL) have been predicting conditions in the Arctic for operational use by the U.S. Navy. The Polar Ice Prediction System (PIPS 2.0) was implemented operationally in 1996 and is currently run at the Naval Oceanographic Office (NAVOCEANO). PIPS 2.0 is a forecast system that consists of the Hibler ice model coupled to the Bryan and Cox ocean model. PIPS 2.0 forecasts conditions in all sea-ice covered areas in the northern hemisphere (down to 30˚ N in latitude). The horizontal grid resolution of the model is 0.28 degrees ($\sim$ 27 km) with 15 vertical levels. During an evaluation of the PIPS 2.0 forecasts from 2000-2007, a slow decrease in the ice volume occurs in the Arctic with a minimum during the summers of 2006 and 2007. The winter months of 2001 and 2004, shows a maximum in ice volume and coverage in the PIPS 2.0 results.

NRL has also been validating a new ice forecasting capability called PIPS 3.0. PIPS 3.0 will cover the same area as PIPS 2.0 but with higher resolution (9 km). The PIPS 3.0 system uses the latest Los Alamos ice model, CICE, containing improved methods for model thermodynamics, physics parameterizations, energy-based ridging and has the ability to predict multi-category ice thickness. The PIPS 3.0 model, expected to be operational in 2008, is coupled to the operational global Navy Coastal Ocean Model (NCOM). The forecasts from this coupled model are also showing similar trends of ice thinning during the same time period of 2006 and 2007.